THE ANTHROPOLOGY OF ST. CATHERINES ISLAND 2. THE REFUGE-DEPTFORD MORTUARY COMPLEX

DAVID HURST THOMAS AND CLARK SPENCER LARSEN

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2. THE REFUGE–DEPTFORD MORTUARY COMPLEX

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ABSTRACT

Data and implications from nine burial mounds excavated by crews of the American Museum of Natural History on St. Catherines Island, Georgia, are given in this monograph. As a group, these nine sites define a surprisingly homogeneous pattern and these data comprise virtually all that is known regarding the mortuary customs practiced along the Georgia and Florida coast between *ca.* 1500 B.C. to A.D. 600. The sites are rather unspectacular sand mounds, which exhibit a remarkably consistent stratigraphic patterning. The skeletal materials recovered are poorly preserved, except in the rare case when shell was added to the interment. The radiocarbon evidence, consisting of 29 determinations from the nine mounds, strongly suggests a marked periodicity in the use of these sites. In all cases, the areas seem to have been visited for centuries—in some cases millennia—prior to the actual construction of the mortuary mound. Several graves were placed into this pre-mound surface, and mound-building activities occurred at all sites sometime during the first 600 years A.D. A number of intrusive burials were added shortly thereafter, and then ceremonial activities virtually ceased at all sites. Most cultural materials found inside the mounds were accidental inclusions which resulted from pre-mound sacred (and probably secular) activities. Very few deliberate grave offerings were found. The biocultural evidence suggests that the Refuge-Deptford population enjoyed good health, although they suffered from an extreme rate of dental attrition. Although the data are limited, these sites seem to reflect an egalitarian sociopolitical organization operative during Refuge-Deptford times. The relatively high proportion of bundle burials seems to suggest that the annual round of these peoples exploited both island and mainland resources. We offer a number of cautious speculations regarding the nature of ritual and symbolism during the Refuge and Deptford phases. These suggestions are a variety of hypotheses that require testing with data from both mortuary and habitation sites of this period.

INTRODUCTION

This is the second part in a series dealing with the anthropology of St. Catherines Island. The mortuary complex, which existed during the Refuge and Deptford phases, i.e., *ca.* 1500 B.C. through A.D. 600, is discussed here. Crews from the American Museum of Natural History excavated nine mounds between November 1974 and May 1977. To our knowledge, no mounds of comparable antiquity have been scientifically excavated and reported for the Georgia and Florida coast. In addition, our excavations seem to provide the first real data regarding the religious and ritual practices during this period. While the lack of comparable data has limited the scope of our generalizations, our findings do raise some interesting possibilities and provide a series of hypotheses to be considered in future excavations in this area.

The composition of this monograph reflects the interdisciplinary nature of our entire program on St. Catherines Island. The archaeological excavations were supervised by Thomas, although the day-to-day pragmatics of each individual excavation were often carried out by an experienced student crew chief. Larsen participated in all aspects of the excavations, his principal responsibility being the exposure and description of each burial. As we explain in Chapter 2, the badly deteriorated condition of most of the skeletons required that many of the osteometric observations be made *in situ*. A great deal of information would have been lost had not a trained physical anthropologist been on hand at all times.

Because so little comparable data exist for this time period, we have gone to great lengths to provide basic descriptions of all aspects of our fieldwork. Chapters 3 and 4 present detailed descriptive data for all nine sites, with special emphasis on stratigraphy, skeletal remains, and the artifacts associated with each site. The function of chapters 3 and 4 is to provide a corpus of unbiased descriptive data

on the Refuge-Deptford mortuary complex, as evidenced from the nine sites excavated on St. Catherines Island.

Once the descriptive materials have been presented, the monograph proceeds to analyze this evidence. Chapter 5, prepared by Chester B. DePratter, discusses in depth the nature of ceramics during the Refuge and Deptford phases. DePratter calls on his extensive experience with the W.P.A. collections from Chatham County and elsewhere to provide an overview of this poorly known period.

Chapter 4 examines the scant comparable data available on mortuary complexes during the Refuge and Deptford phases. The usefulness of the archaeological record is hampered by both the lack of excavations of similar sites, and a generally low rate of publication for those sites which have been seriously examined.

The final chapter presents our reconstruction of the Refuge and Deptford phases, as seen through the mortuary complex. We attempt to synthesize the available data regarding chronology, seasonality, subsistence, technology, sociopolitical organization, ritual, and symbolism. The lack of comparative data compels us, we believe, to go beyond the immediate evidence and occasionally offer our speculations regarding the nature of the people of the Georgia coast during this time. Speculation seems warranted in this case because so little is known of the lifeways of Refuge and Deptford people. Our speculations are clearly labeled as such and have been carefully distinguished from our primary data. We realize the somewhat controversial nature of some of our suggestions, and we hope that the basic data have been presented in a sufficiently complete manner as to allow colleagues to argue against our position, if they so wish. The ultimate test of our ideas must rest with data not yet generated, and we hope that our analysis will stimulate more such research in the future.

An Appendix, prepared by George R. Clark II, discusses the preliminary results of on-going studies of site seasonality as determined from prehistoric clam shells *(Mercenaria mercenaria)*. Clark presents his studies of growth cycles among the modern clams of St. Catherines Island, and then generalizes these results to determine when the prehistoric clams were collected at two sites of the Refuge-Deptford complex. Although this approach holds considerably more promise when used in conjunction with systematic archaeological site survey (now in progress), the initial results on the Refuge-Deptford mounds seem encouraging. Once again, data are presented in great detail, so that independent investigators can draw their own conclusions about the validity of the generalizations.

We make no attempt in this monograph to discuss later developments in the ceremonial complex on St. Catherines Island, even though several relevant sites have already been excavated. We present the Refuge-Deptford complex as a cultural baseline; once understood, the Refuge-Deptford sites can serve as reference points against which later and more complicated developments can be measured. We plan to discuss these later sites in future articles of this series.

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It is once again our pleasure to acknowledge the generous support of the Edward John Noble Foundation, which financed the fieldwork, analysis, and publication of this research. Mr. and Mrs. Frank Y. Larkin have been especially helpful and sympathetic in encouraging our archaeological investigations on St. Catherines Island.

We also thank Mr. John Toby Woods for his assistance and interest in our work. Mr. Woods has covered every square foot of St. Catherines Island (several times), and he initially showed us the location of the burial mounds discussed in this monograph. By its nature, archaeological research is disruptive, and Mr. Woods showed a terrific blend of helpfulness and patience with the visiting archaeologists. We also are grateful to the rest of the permanent staff on St. Catherines for clearing the mounds, pulling tree stumps, and generally assisting in the dozens of details that arise when so large a group visits the Island: Mr. Jim Evans, Mr. Royce Hayes, Mr. Lynn Holman, Mr. John Lukas, Mr. Marvin Rigdon, and Mr. Jack Waters.

This research has called on the capabilities

of a number of specialists, who coordinated material despite occasional trying circumstances. Mr. Dennis O'Brien was in charge of the artwork, which involved preparing the burial drawings and stratigraphic profiles in the field. O'Brien then followed through in New York to produce all the artwork in this volume. Ms. Susan Bierwirth was project photographer and is responsible for all the field photographs reproduced herein (except figs. 26, 29, and 47, which were taken by O'Brien). Mr. Richard Gubitosa functioned as the project cartographer, and he prepared all the topographic maps in this volume. Ms. Trudy Thomas established the initial cataloguing system on St. Catherines Island, and Ms. Ann Marie Lunsford served as both laboratory and field assistant throughout most of the project.

We thank Dr. George R. Clark II, who conducted a detailed analysis of the clam shells recovered in the burial mounds (see Appendix) and Mr. Chester B. DePratter for his guidance and assistance with the ceramics (see Chapter 5). We acknowledge the help of Dr. C. Lavett Smith for identifying the shark's tooth from McLeod Mound and Dr. Donald Grayson for identifying the bird burial at Cunningham Mound D. We also thank Dr. Jerald T. Milanich for providing comparative skeletal data from St. Simons Island, Ms. Darcy Evon for the preparation of the dental summary statistics, Mr. Thomas K. Black III for helpful suggestions, and Ms. Mary E. O'Halloran for her aid in the analysis of the human skeletal remains.

We especially thank the crew members who conducted most of the actual excavations. Even a beautiful place like St. Catherines Island can provide hazards and miseries to the archaeological excavator. The following individuals are to be thanked for their willingness to stick it out:

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CHAPTER 1. MORTUARY ARCHAEOLOGY ON THE GEORGIA COAST

CLARK SPENCER LARSEN AND DAVID HURST THOMAS

The Georgia Coast has been the scene of considerable archaeological excavation directed at reconstructing prehistoric burial practices. Unfortunately, results of few of these excavations have been published in detail. We begin the present study with a summary of previous work, so that the American Museum excavations on St. Catherines Island can be viewed in a broader regional perspective.

The first archaeologist to investigate prehistoric mortuary practices along the coast was Charles Colcock Jones, Jr., who published his impressions in 1873. Unfortunately, Jones described his work in cursory fashion, and rarely mentioned specific archaeological localities. Jones, however, did note the presence of more than 40 mounds on Colonels Island, where his family owned Maybank Plantation. Most of his large collection of mortuary artifacts was ultimately acquired by the American Museum of Natural History (see Thomas, Jones, Durham and Larsen, 1978, Chapter 1). Some of these specimens were assigned proveniences by plantation on which the mound occurred. Jones undoubtedly encountered dozens of human burials, and human cranial fragments were included in his collection.

William McKinley of Milledgeville also explored the coastal mounds of Georgia (McKinley, 1873). Although McKinley seems to have concentrated his efforts on the shell rings of Sapelo Island, he also mentioned a large mound, 7 feet high in Bourbon field, on Sapelo Island, noting that the mound was "full of pottery and mens' bones" (McKinley, 1873, p. 424). McKinley also discussed survey and excavation of mounds located in southwestern Georgia, and work at Ocmulgee, near Macon.

Clarence B. Moore spent the fall and winter of 1896-1897 working along the Georgia coast. He seems to have used Savannah as a base of operations. Then he traveled along the Intercoastal Waterway where he anchored for short periods at various Sea Islands. Moore's accounts of the excavations were published in 1897. Moore discussed his procedures in detail and described his finds in each site. He was accompanied by a physician, M.G. Miller (also of Philadelphia), whose examinations in the field provided preliminary data on the human skeletal materials. Moore excavated about 50 mounds along the Georgia coast, exposing approximately 1350 burials in all (see table 1). Apparently he saved only a few crania and pathological specimens, which were later donated to the United States National Museum, the Army Medical Museum, the Peabody Museum of Archaeology and Ethnology, and the Heye Foundation.

Moore's work is important because he described meticulously the human material, including the orientation and rough estimates of sex and age. Nevertheless, Moore collected only the odd specimens of bone and whole pots, most of the bones and sherds being discarded in the field.

The next major effort was made by Antonio J. Waring, much of whose research was published posthumously in 1968. Waring conducted extensive excavations at the Indian King's Tomb (Haven Home site) and Mound A at the Eulonia site. Waring later participated in, and directed, some of the Works Projects Administration excavations.

Preston Holder also conducted W.P.A. excavations during the winter of 1936-1937 on St. Simons Island. A large cultural and biological sample was recovered from the Airport site, the Sea Island Mound, Charlie King Mound, and Cannon's Point (table 1), but only a two-page summary is available describing these important excavations (Holder, 1938). Holder also tested four conical mounds and a single platform mound at the Evelyn Plantation on the mainland (Waring and Holder, 1968).

More important were the Works Projects Administration excavations partially under the direction of Joseph R. Caldwell, conducted be-

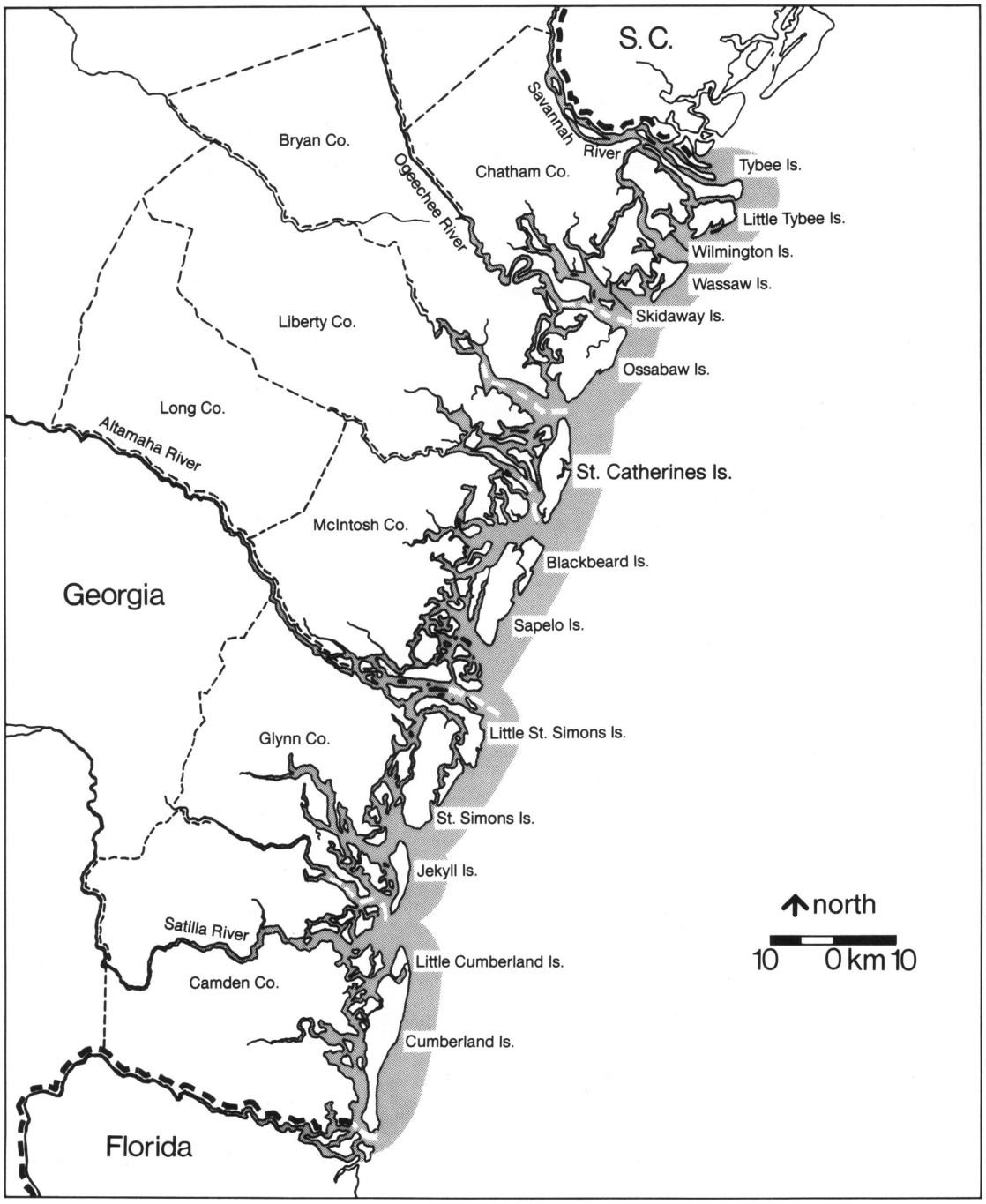


FIG. 1. Location of St. Catherines Island, Georgia.

tween 1937 and 1940. Burials were recovered at the Walthour site, Cedar Grove, Dotson Mounds, the Deptford site, Deptford Mound, and the Irene Mound. The Irene excavations

TABLE 1
Summary of Georgia Coastal Mortuary Archaeology

Locale	Period	Location	Number of Burials	Reference
Fairview (2 mounds)	—	Camden County	~10	Moore, 1897
Woodbine	—	Camden County	~27	Moore, 1897
Owen's Ferry	—	Camden County	3	Moore, 1897
Brunswick (2 mounds)	—	Camden County	0	Moore, 1897
Lawton's Field (2 mounds)	—	Camden County	43	Moore, 1897
Townsend Mound	—	McIntosh County	59	Moore, 1897
The Thicket (3 mounds)	—	McIntosh County	16	Moore, 1897
Passbey Mound	—	McIntosh County	11	Moore, 1897
Shell Bluff	—	McIntosh County	31	Moore, 1897
Hopkins Mound	—	McIntosh County	10	Moore, 1897
Crescent	—	McIntosh County	16	Moore, 1897
Walker Mound	—	McIntosh County	36	Moore, 1897
Contentment	—	McIntosh County	45	Moore, 1897
Broro Neck	—	McIntosh County	~3	Moore, 1897
Bahama (2 mounds)	—	McIntosh County	~10	Moore, 1897
Laurel View (2 mounds)	—	McIntosh County	27	Moore, 1897
Creighton Island (2 mounds)	—	McIntosh County	262	Moore, 1897
St. Catherines Island (7 mounds)	—	Liberty County	124	Moore, 1897
Ossabaw Island (9 mounds)	—	Chatham County	310	Moore, 1897
Skidaway Island (3 mounds)	—	Chatham County	32	Moore, 1897
Sapelo Island (3 mounds)	—	McIntosh County	255	Moore, 1897
Eulonia	Savannah I	McIntosh County	13	Waring, 1968f
Indian King's Tomb	St. Catherines	Chatham County	44	Waring, 1968d DePratter, personal commun.
Airport Site	Wilmington I(?)	St. Simons Island	89	Holder, 1938
Sea Island Mound	St. Catherines	Sea Island	36	Larson, 1957 DePratter, personal commun.
Charlie King Mound	St. Catherines	St. Simons Island	8	Holder, 1938 DePratter, personal commun.
Cannon's Point	St. Catherines	St. Simons Island	3+	Larson, 1957 DePratter, personal commun.
Evelyn Plantation	Deptford, Swift Creek	Glynn County	13	Waring and Holder, 1968 DePratter, personal commun.
Irene Mound	Savannah II-Irene	Chatham County	265	Caldwell, 1939, 1940; Caldwell and McCann, 1941 Hulse, 1939a, 1939b, 1941
Dotson Mounds (2 mounds)	St. Catherines	Chatham County	14	Caldwell, 1943 Caldwell and McCann, 1940 DePratter, n.d.b Caldwell and McCann, n.d.b
Cedar Grove (3 mounds)	Wilmington-Savannah I	Chatham County	~10	Caldwell and McCann, n.d.a DePratter, n.d.b

TABLE 1 — (*Continued*)

Locale	Period	Location	Number of Burials	Reference
Walthour Site	Wilmington	Wilmington Island	3	Caldwell and McCann, n.d.c DePratter, n.d.a
Fort King George	Historic	McIntosh County	6	Caldwell, 1943 Hulse, n.d.b Caldwell and Hulse, n.d.
Deptford Mound	Savannah I	Chatham County	6	Caldwell, 1943 Caldwell, McCann and Cain, n.d. DePratter, n.d.b
Deptford Site	Wilmington	Chatham County	42	Caldwell, McCann and Cain, n.d. DePratter, n.d.a
Norman Mound	Savannah II-Irene	McIntosh County	31	Larson, 1957
Sea Island Point	Wilmington I (?)	Sea Island	1	DePratter, personal commun.
Oemler Marsh Midden	St. Simons	Wilmington Island	1	DePratter, personal commun.
Pagan Plum Point	Wilmington	Skidaway Island	1	DePratter, 1975
Goodyear Mound	Savannah II	Glynn County	2	Cook and Pearson, n.d.
Oatland Mound	Savannah II	St. Simons Island	3	Cook and Pearson, n.d.
Sea Palms Site	Deptford-Wilmington	St. Simons Island	~30	Cook, personal commun.
Townsend Mound	Irene	McIntosh County	1	Cook, n.d.c
Red Knoll Site	Irene	Chatham County	6	Pearson, personal commun.
Seven Mile Bend Site	Irene	Bryan County	1	Cook, n.d.d.
Lewis Creek Site	Savannah II-Irene	McIntosh County	~30	Carnes, personal commun. Cook, n.d.b.
Kent Mound	Irene–Altamaha	St. Simons Island	30+	Cook, n.d.a, n.d.e
Couper Field	Savannah–Irene	St. Simons Island	20+	Wallace, 1975 Zahler, 1976
Taylor Mound	Savannah–Altamaha	St. Simons Island	20+	Cook and Pearson, 1973 Wallace, 1975 Zahler, 1976
Indian Field	Savannah–Irene	St. Simons Island	6	Wallace, 1975 Zahler, 1976
Cannon's Point	Wilmington	St. Simons Island	3	Martinez, 1975
Cannon's Point (shell ring)	St. Simons	St. Simons Island	scattered bone	Marrinan, 1975
Seaside Mound I	Deptford I	St. Catherines Island	8	Caldwell, 1971
Mary's Mound	St. Catherines	St. Catherines Island	4	Caldwell, 1971
John's Mound	St. Catherines	St. Catherines Island	66	Caldwell, 1971

have been published in detail (Caldwell and McCann, 1941), but the other sites are treated only in unpublished manuscripts (Caldwell and McCann, n.d.a., n.d.b., n.d.c.; Caldwell, McCann and Cain, n.d.). While searching for the location of Fort King George near Darien in 1940, Caldwell also excavated the remains of six English soldiers who had died between 1721 and 1727 (Caldwell and Hulse, n.d.). Subsequent excavations at this site encountered over

60 additional military burials (Sheila Caldwell, n.d.).

W.P.A. excavations in Chatham County established the basic outline for the Georgia coastal chronology, defining the Refuge, Deptford, Wilmington, Savannah, and Irene cultural periods. In their report on the Irene Mound, Caldwell and McCann (1941) provided a comprehensive review of the later prehistory along the Georgia coast. Chester DePratter is currently analyzing the unpublished Chatham County archaeological materials excavated by the W.P.A. (see Chapter 5).

World War II halted the Works Projects Administration's involvement in Georgia coastal archaeology, and little further research was accomplished until the 1960s. Important excavations were conducted, however, at the Norman Mound (McIntosh County) by the Georgia Historical Commission (now the Office of Site Planning, Department of Natural Resources). Under the direction of Lewis H. Larson, Jr., the Norman Mound was excavated during the winter of 1953-1954 (Larson, 1957). This Savannah II-Irene period site yielded 31 burials.

The mid-1960s were a time of renewed interest in the mortuary practices of the Georgia coast, although regrettably most of this work remains unpublished. Some of the important sites excavated include the Lewis Creek site, Seven Mile Bend, Red Knoll, Townsend Mound, Goodyear Mound, Sea Palms site, Oatland Mound, Pagan Plum Point, Oemler Marsh Midden, Sea Island Point, and the Kent Mound (table 1). Most of these sites are late prehistoric (Savannah II-Irene) mounds and contained relatively few individuals.

In the early 1970s the University of Florida excavated an impressive series of sites on St. Simons Island under the direction of Jerald Milanich and Charles Fairbanks (Milanich, 1976, 1977). The most important sites include Couper field, Taylor Mound,[1] Indian Field, and Cannon's Point. The bulk of this material is once again associated with late prehistoric and early historic contexts (mainly Savannah II through Altamaha periods). Several doctoral dissertations and master's theses were generated describing the cultural and biological aspects of the St. Simons Island sites (Wallace, 1975; Martinez, 1975; Marrinan, 1975; Zahler, 1976).

Finally, Joseph R. Caldwell conducted several burial mound excavations on St. Catherines Island between 1969 and 1971 (table 1). His untimely death halted the analysis and publication of this important work. Only a single paper (Caldwell, 1971) is available describing his St. Catherines excavations.

In all, a great deal of effort has been expended on the prehistoric mortuary complex of Georgia, but the usefulness of these data is diminished by the lack of analysis and publication. Much of Caldwell's work has been synthesized for its chronological implications, producing a sequence bolstered by a limited number of radiocarbon dates (Caldwell, 1952, 1958, 1971). Hulse (1941) provided a basic outline of the biocultural status of a large sample from late prehistoric times. But the basic trends in the evolution of the mortuary complex still remain to be defined. We know almost nothing about demography, health, morphology of the coastal populations, and the sociocultural implications of grave furniture and status ranking remain to be investigated.

The American Museum of Natural History's excavations are designed to remedy, in part, this hiatus. The present monograph deals only with the Refuge-Deptford period mortuary complex based on excavations carried out on St. Catherines Island between 1975 and 1977. Comparative data from the intermediate and late prehistoric periods will be discussed in subsequent publications.

[1]The Taylor Mound was initially excavated by Cook and Pearson (n.d.).

CHAPTER 2. ARCHAEOLOGICAL TECHNIQUES AND PROCEDURES

DAVID HURST THOMAS AND CLARK SPENCER LARSEN

Each mound was excavated according to a predetermined strategy. In this manner, the series of mounds discussed here can be compared and contrasted on the basis of the actual material culture recovered, without interference from problems of archaeological technique. We believe this analysis has been facilitated by careful planning of the excavation strategy before actual excavation began.

All mounds were excavated according to the following sequence. The mound was first cleared of underbrush, palmettos, and vines. A perimeter around the mound was clear-cut, so that photographs could be taken without problems from tree shadows. In many cases, we found it necessary to remove several large trees including water oak, live oak, hickory, cedar, and pine. The felled trees were then removed from the immediate mound area with a tractor and dragline. Every mound required at least one day of preparation before excavation could begin.

After the mound was cleared, a metric grid system was laid out. Baselines were established along cardinal directions with stakes placed at 2-meter intervals. Then the project cartographer (Gubitosa) prepared a contour map of the mound and the surrounding borrow pits. A 10-cm. contour interval was calculated throughout. We found these topographic maps particularly useful in defining mound boundaries; to our surprise, the boundaries were generally more distinct on the close-interval map than they were on the ground.

A permanent datum point was established on the perimeter of each site, and the contour map keyed into this arbitrary zero point. Because no mound was to be wholly excavated, it was important that the datum point be permanent, so we set a brass monument into a large concrete base. Any future work at these mounds can readily be plotted into the existing grid system with reference to this permanent datum.

Excavation began only after the mound had been thoroughly cleared, photographed, and mapped. The excavation was divided into two stages. The initial objectives were to excavate a test trench to determine stratigraphy, obtain samples for radiometric dating, and to collect sufficient sherds for a cultural determination. This initial trench generally consisted of four contiguous 2-meter square units, which were excavated well into sterile sand. This 8-meter test trench generally began at the edge of the mound and cut forward to the center. Trenches were set out tangential to the very center of the mound, to avoid disturbing any central pit before the stratigraphy was satisfactorily delimited. At least two of the initial test pits were carefully troweled throughout, so that no scrap of cultural debris would be missed. If sufficient sherds were found in the test units, the remainder of the site was also troweled. But if sherd density was minimal, the remaining excavation units were shovel-scraped. The backdirt was carted in wheelbarrows at least 50 feet off the site in order to preserve the contours of the unexcavated portions.

All shells, sherds, bones, and other artifacts were mapped in three dimensions. A standard builder's level was set up over the permanent site datum, and the elevation of the artifacts was recorded using a metric stadia rod. Recording the exact provenience, even in the test units, allowed us to reconstruct precise artifact distribution maps for the entire mound. Any burials encountered in this preliminary stage were pedestaled and left unexcavated.

This preliminary excavation generally required a week of excavation for a crew of six. Work at the mound was then halted so that the results of the tests could be determined. In almost all cases, sufficient charcoal was obtained in the test excavation, so that at least two radiocarbon samples were processed immediately. The sherd samples were washed and catalogued, and preliminary counts prepared.

Nine mounds were tested in the preceding

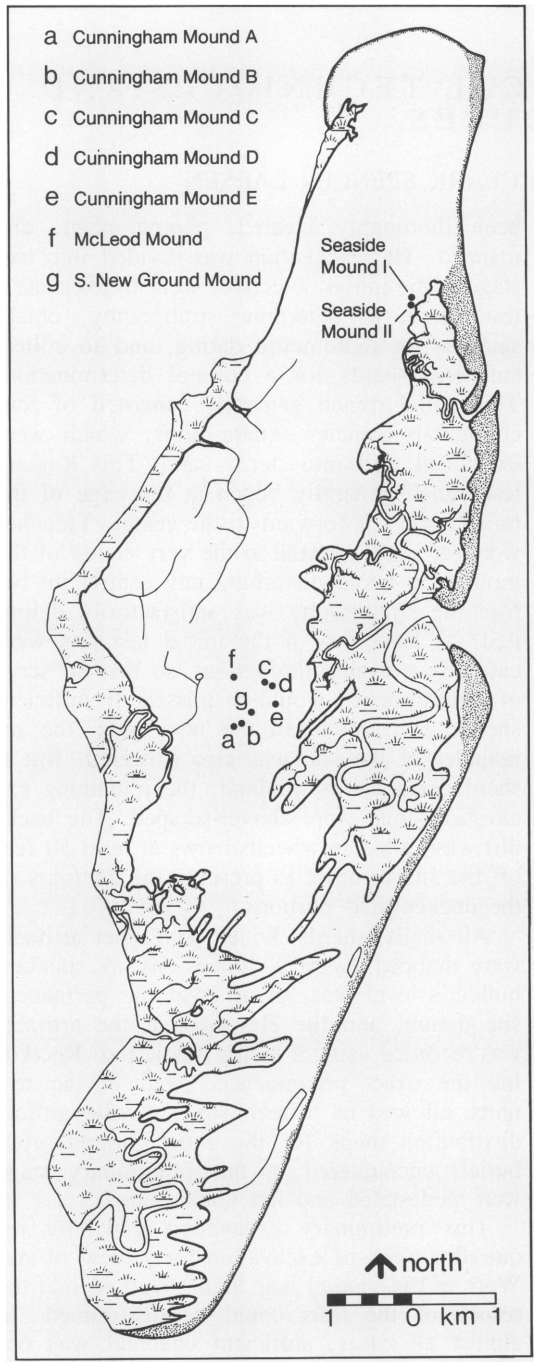


FIG. 2. Location of the Refuge-Deptford burial mounds on St. Catherines Island.

manner. Once the results of the radiocarbon tests and ceramic study were completed, it was possible to construct a rough chronology of the St. Catherines burial mounds based strictly on the preliminary test excavation. We could then select certain mounds for intensive excavation. Specifically, we began investigating the earliest of the mounds, setting aside the later sites for subsequent investigation.

Another important factor conditioned excavation strategy. St. Catherines Island is an extremely favorable location in which to conduct archaeological investigation. Agriculture has not been practiced for more than 100 years, and sites have been deliberately preserved rather than destroyed. Because the public is not admitted to St. Catherines Island, there is no problem of looting or vandalism. It is a rare circumstance in which an archaeologist can systematically test nearly a dozen sites, return to the laboratory to assess the results, and not worry about the sites being destroyed in the meantime. The sites are wholly inaccessible to the public, and their protection is complete.

Such a situation requires a great deal of forethought and planning. Because none of the sites is in imminent danger, each must be excavated according to a careful plan. Once all the mounds were tested, only selected sites were extensively excavated and in all but two cases (discussed below) at least 50 percent of the mound was left unexcavated. We think it is imperative, whenever possible, that archaeologists preserve a significant segment of the site for future investigation. Too many new techniques are being developed, and too many previously unthought-of questions are being asked to justify complete demolition of any single site. Although it is tempting to excavate completely the richer, more exciting sites, we think the need for preservation outweighs any short-term benefits gained from total excavation. St. Catherines Island offers a unique opportunity to preserve archaeological sites, and we think a strategy of total excavation would be wasteful, short-sighted, and perhaps even unethical.

Once certain sites had been selected for intensive investigation, a second, rather different strategy for excavation was employed. The ex-

cavations were designed to open large blocks of contiguous units rather than trenches. Trenches are useful primarily for determining stratigraphy and chronology. The second stage of excavation followed a more horizontal strategy, and concentrated on exposing larger areas. As before, all artifacts, sherds, bone, and shell concentrations were mapped in three dimensions and assigned field numbers.

Unfortunately, human bones were in a relatively poor state of preservation in these early mounds, so the burials required special attention. Once a burial was discovered, work in the vicinity ceased and the "burial detail" was called in. Because the burials decayed once exposed, it was essential that each burial be quickly excavated, drawn, and photographed. To do this, a team consisting of a physical anthropologist (Larsen), a commercial artist (O'Brien), and a photographer (Bierwirth) worked together to expose, draw, and photograph each burial as it was found. The bones were often so friable that Larsen was required to take many of his measurements of the bones *in situ*. In fact, a number of sex and age determinations were made in the field because the bones disintegrated upon exposure. We think that the amount of information recovered was at least doubled because Larsen was on hand to make osteological observations before the bones had been removed. Once a burial was exposed, drawn, and photographed it was removed and taken to the research facility on the Island. The bones were then packed for transport to the University of Michigan where Larsen prepared the skeletal specimens for final analysis. This preparation involved extensive cleaning and reconstruction prior to analysis as described in later sections of this monograph.

SKELETAL REMAINS

The condition of the human skeletons was poor. The bone was friable and fragmentary due to soil acidity and permeability. In effect, soil had dissolved most of the bone matrix in the majority of burials. Usually only the postcanine teeth were preserved. Cranial and postcranial elements that are hardest, such as the femoral midshaft (Evans, 1973), or have relatively thick cortical bone (e.g., inferior aspect of the squama of the occipital, temporal petrous portion, femoral and tibial midshafts), survived the harsh soil conditions. The paucity of metric, age, sex, and dental data reflects the fragmentary nature of the skeletal material.

Cranial and mandibular measurements were based on standard techniques provided by Martin (1928). Other chords included bregma-inion, lambda-basion, inion-basion, auricular point-auricular point, nasion-auricular point, bregma-mastoidale, inion-mastoidale, inion-auricular point, nasion-frontomalare orbitale, and auricular point-bregma. If the measurement was paired—occurring on both right and left sides of the cranium—only the left side measurement was recorded. If that was not possible, the right side was measured. Several non-traditional measurements were recorded, including zygomatic arch thickness (jugale to the summit of the malar tubercle), cheek height (orbitale to the summit of the malar tubercle), temporalis length (maximum distance from the most anterior aspect of the temporal line on the frontal to the most posterior aspect of the superior temporal line), temporalis height (maximum vertical distance from the auricular point to the superior temporal line), ascending ramus height at the condyle (perpendicular distance from the most superior aspect of the condyle to a flat surface on which the mandible is resting), ascending ramus height at the coronoid process (perpendicular distance from the most superior aspect of the coronoid process to a flat surface on which the mandible is resting), symphysis thickness (maximum thickness of the mandibular symphysis measured parallel to the base of the corpus).

Deciduous and permanent teeth were measured to the nearest 0.1 mm. Mesiodistal diameters were taken at the points of contact with respect to normal tooth position, and the buccolingual diameters were measured at the maximum breadth perpendicular to the mesiodistal axis for all teeth. Frequency of caries was also recorded.

Postcranial measurements followed Bass (1971) except for diameter of the radius head,

transverse diameter and circumference of the tibial midshaft, and vertical and horizontal femoral neck diameters. Instruments used included spreading calipers (GPM 95-107), vernier calipers (Mitutuyo), a linen tape (GPM 95-111), and an osteometric board (Abawerk No. 144).

Age estimation was not possible for the majority of individuals. Criteria included auricular surface morphology (Lovejoy and Pryzbeck, in press), completed ossification of the spheno-occipital synchondrosis, dental attrition, and suture closure. The last two were used only in a general sense. If the third molars had at least occlusal polish, then the associated individual was termed adult. Likewise, if sutures showed some degree of ectocranial and/or endocranial obliteration, then the individual was also termed adult. Age standards based on suture closure were not used because inter- and intra-population variability makes the technique unreliable (Brooks, 1955; McKern and Stewart, 1957). Other general indicators of age were cortical bone thickness, overall size of the bone fragments, and burial length. The age criterion of cortical thickness is limited because the individual might actually be an adolescent rather than an adult, as rapid endosteal apposition begins as a result of the steroid mediated phase of bone growth (Garn, 1970). This criterion creates the possibility of overaging the individual. Pubic metamorphosis standards were not utilized as no symphyseal faces remained preserved. Subadults were aged according to tooth formation (Moorrees, Fanning and Hunt, 1963), epiphyseal closure (Krogman, 1962) and long bone length (Merchant and Ubelaker, 1977) where possible. Standards based on tooth formation developed by Moorrees, Fanning and Hunt (1963) have been demonstrated to be most appropriate when dealing with archaeologically recovered skeletal material (Ubelaker, 1974; Merchant and Ubelaker, 1977).

Sex determination was possible for about half of the individuals. Morphological sex traits are generally absent in subadults, therefore, only the adult individuals were sexed. Diagnostic traits include supraorbital morphology, development of the mastoid process and squamosal area of the occipital, muscle attachment on long bones, morphology of the greater sciatic notch, and preauricular sulcus. Male skeletons generally exhibit more rugose areas of muscle attachment. For the St. Catherines sample, this is particularly true for insertion areas on the proximal femur for m. gluteus maximus, m. gluteus medius, m. gluteus minimus, and the insertion for m. deltoideus on the lateral aspect of the humeral diaphysis. Female crania and postcrania generally lacked strong muscle attachment areas. In relatively complete mandibles, bony attachments for m. temporalis, m. massetericus, and m. pterygoideus medialis were more developed in males. Also, the greater sciatic notch in the male pelvis is much narrower. The male pubis generally lacks a ventral arc, the medial aspect of the ischiopubic ramus is flat, and there is no subpubic concavity. By contrast, the female ventral arc is pronounced as is the subpubic concavity. Likewise, there is usually a ridge of bone on the medial aspect of the ischiopubic ramus (Phenice, 1969). The two forms of the pre-auricular sulcus were also noted in this sample (Houghton, 1974). One form was found in both males and females marking the attachment for the inferior part of the ventral sacroiliac ligament. The other form, utilized here in distinguishing males from females, is found only in the female and is characterized by pitting which results from the trauma of childbirth at the area of attachment of pelvic joint ligaments. Although scars of parturition are also present on the posterior aspect of female pubes following birth (Stewart, 1970), they were not sufficiently preserved for observation in this sample.

The marginal condition of the St. Catherines skeletal material made it impossible to use all age and sex criteria for each individual. Each individual was analyzed separately and assessed. Burial descriptions basically include age and sex, orientation, and skeletal elements present.

RADIOCARBON DATING

One critical aspect of the research reported herein is the absolute dating of the earliest

TABLE 2
Age and Sex Summary, Cunningham Mound Group

			Age Criteria					Sex Criteria					
Mound	Burial	Age	Dental Attrition	Tooth Formation	Epiphysis Fusion	Other	Sex	Nuchal Development	Supraorbital Torus	Mastoid Process	Sciatic Notch	Preauricular Sulcus	Other
McLeod	1	Adult	X	—	—	—	F	F	—	F	—	—	3
	2	Adult	X	—	—	—	I	—	—	—	—	—	—
	3	Adult	X	—	—	—	F	F	—	F	—	—	3
	4	Adult	X	—	—	1	F?	—	—	F	—	—	—
	5	Adult	X	—	—	1	M	M	—	M	—	—	6
	6	Adult	X	—	—	1	I	—	—	—	—	—	—
	7	Adult	X	—	—	—	M	M	M	—	—	—	6
	8	Adult	X	—	—	1	I	—	—	—	—	—	—
	9	Adult	X	—	—	1	I	—	—	—	—	—	—
	10	Adult	X	—	—	—	F?	—	—	F	—	—	—
	11	Adult	X	—	—	—	I	—	—	—	—	—	—
	12	Adult	X	—	—	—	F?	—	—	F	—	—	—
	13	Adult	X	—	—	—	F	F	—	F	—	—	3
	14	Adult	X	—	—	—	F	F	F	F	F	F	3
	15	20-24	—	—	2	—	F	—	—	—	F	F	3
	16	25-29	—	—	—	5	F	F	F	F	F	F	3
	17	Adult	X	—	—	—	F	F	—	F	F	F	3
	18	Adult	X	—	—	—	M	M	—	M	—	—	6
	19	Adult	X	—	—	1	I	—	—	—	—	—	—
	20	Adult	X	—	—	1	I	—	—	—	—	—	—
A	1	Adult	X	—	—	—	I	—	—	—	—	—	—
C	1	Adult	X	—	—	1	F?	—	—	F	—	—	—
	2	Adult	—	—	—	1	I	—	—	—	—	—	—
	3	Adult	—	—	—	—	F	F	—	F	—	—	—
	4	18±	X	—	—	—	I	—	—	—	—	—	—
	5	Adult	X	—	—	—	I	—	—	—	—	—	—
D	1	15±	—	X	2	—	F	—	—	—	—	—	3
	2	Adult	X	—	—	—	1	M	M	M	M	M	—
	4	Adult	—	—	—	—	I	—	—	—	—	—	—
	7	Adult	X	—	—	—	I	—	—	—	—	—	—
	8	I	—	—	—	—	I	—	—	—	—	—	—
	1	Adult	X	—	—	—	F	—	—	—	—	—	3
South New Ground	1	Adult	X	—	—	—	F	—	—	—	—	—	4

Key:
1. General thickness of cortical bone and overall size.
2. Head and distal femoral epiphyses not fused.
3. Gracile crania-postcrania.
4. Gracile mandible.
5. Lovejoy and Pryzbeck (in press).
6. Robust crania-postcrania.

F. Female.
M. Male.
I. Indeterminate.
X. See text.

TABLE 3

Age and Sex Summary, Seaside Mound Group

			Age Criteria						Sex Criteria					
Mound	Burial	Age	Suture Closure	Dental Attrition	Tooth Formation	Auricular Surface	Other	Sex	Nuchal Development	Supraorbital Torus	Mastoid Process	Sciatic Notch	Pre-Auricular Sulcus	Other
I	1	20-24	—	—	—	1	—	F	—	—	—	F	—	—
	2	Adult	—	—	—	—	2	M	M	M	M	—	—	—
	3,4	?	—	—	—	—	—	I	—	—	—	—	—	—
	5	Adult?	—	—	—	—	3	I	—	—	—	—	—	—
	6	Adult	4	—	—	—	—	I	—	—	—	—	—	—
	7,8	Adult	—	5	—	—	—	M	—	—	—	—	—	8,12
	7,8	Adult?	—	—	—	—	3	I	—	—	—	—	—	—
	7,8	8-10	—	—	7	—	6	I	—	—	—	—	—	—
	10	Adult	—	5	—	—	—	M	M	—	M	—	—	8,12
	12A	Adult	—	5	—	—	—	F	F	F	F	F	F	—
	12B	Adult	—	5	—	—	—	M	M	M	M	—	—	1
	12C	Birth-6 mos.	—	—	—	—	6	I	—	—	—	—	—	—
	12D	12	—	5	—	—	—	I	—	—	—	—	—	—
	13	Adult	—	5	—	—	—	I	—	—	—	—	—	—
	14	Adult	—	5	—	—	—	M	M	—	M	—	—	8,12
	15A	12	—	—	7	—	—	I	—	—	—	—	—	—
	15B	Adult	—	—	—	—	—	I	—	—	—	—	—	—
II	1	?	—	—	—	—	—	I	—	—	—	—	—	—
	2	Adult?	—	—	—	—	3	I	—	—	—	—	—	—
	3	?	—	—	—	—	—	I	—	—	—	—	—	—
	4	Adult	4	—	—	—	—	M	M	—	M	—	—	8
	5	Adult	—	5	—	—	—	I	—	—	—	—	—	—
	6	?	—	—	—	—	—	I	—	—	—	—	—	—
	8A	Adult?	—	—	—	—	3	I	—	—	—	—	—	—

TABLE 3 — (*Continued*)

			Age Criteria						Sex Criteria					
Mound	Burial	Age	Suture Closure	Dental Attrition	Tooth Formation	Auricular Surface	Other	Sex	Nuchal Development	Supraorbital Torus	Mastoid Process	Sciatic Notch	Pre-Auricular Sulcus	Other
	8B	7-10	—	—	7	—	—	I	—	—	—	—	—	—
	8C	Adult	4	5	—	—	—	M	M	—	M	—	—	8,12
	10	?	—	—	—	—	—	I	—	—	—	—	—	—
	11	35-39	—	—	—	1	—	M	M	—	M	—	M	—
	12	?	—	—	—	—	—	I	—	—	—	—	—	9
	13A	Adult	4	—	—	—	—	F	F	F	F	—	—	9
	13B	Adult	—	5	—	—	—	F	F	F	F	—	—	9
	13C	Adult	—	5	—	—	—	F	F	—	F	—	—	9
	14	30-34	—	5	—	—	—	F	—	—	—	F	F	11

Key: 1 Lovejoy and Pryzbeck (in press)
2 Spheno-occipital synchondrosis ossified.
3 General thickness of cortical bone and overall size
4 *At least* partial closure
5 *At least* some wear (occlusal, polish, M_3^3 minimum)
6 Merchant and Ubelaker, 1977
7 Moorrees, Fanning and Hunt, 1963
8 Generally robust crania
9 Generally gracile crania
10 Generally robust mandible
11 Generally gracile postcrania
12 Generally robust postcrania
F Female
M Male
I Indeterminate

Note: Seaside Mound II, Burial 13; based on Lovejoy and Pryzbeck (in press), at least one of the three individuals is 30-34.

TABLE 4

Radiocarbon Determinations for Early Mounds on St. Catherines Island, Georgia

Laboratory Number	Provenience	Raw Determination	Corrected Age
McLeod Mound			
UCLA-1997E	Charcoal from primary humus	3250 ± 60 B.P.	1600-1640 B.C. ± 70
UGA-1557	Charcoal from primary humus	2660 ± 60 B.P.	850-890 B.C. ± 70
UGA-1554	Oyster shell covering Central Tomb	2370 ± 65 B.P.	470 B.C. ± 75
UGA-1555	Oyster shell covering Central Tomb	2285 ± 80 B.P.	420 B.C. ± 90
UGA-1256	Charcoal from mound fill	1840 ± 65 B.P.	A.D. 130-110 ± 75
Cunningham Mound A			
UGA-1254	Charcoal from Feature 3	2965 ± 75 B.P.	1270 B.C. ± 85
UCLA-1997C	Charcoal from Feature 3	2150 ± 60 B.P.	210-380 B.C. ± 70
UGA-1560	Charcoal from Feature 4	1855 ± 65 B.P.	A.D. 130-110 ± 75
UGA-1562	Charcoal from central pit	3405 ± 80 B.P.	1770-1870 B.C. ± 90
Cunningham Mound B			
UGA-1007	Charcoal from primary humus	1865 ± 60 B.P.	A.D. 110-90 ± 70
UGA-1008	Charcoal from Feature 1	2155 ± 65 B.P.	230-380 B.C. ± 75
UCLA-1978	Charcoal from Feature 1	2500 ± 60 B.P.	765 B.C. ± 70
UGA-1684	Charcoal from stump in primary humus	1845 ± 60 B.P.	A.D. 130-110 ± 70
Cunningham Mound C			
UGA-1253	Charcoal from primary humus	2375 ± 80 B.P.	480 B.C. ± 90
UCLA-1997A	Charcoal from Feature 1	1410 ± 60 B.P.	A.D. 590-570 ± 70
UGA-1686	Charcoal from Feature 2	3010 ± 60 B.P.	1300-1360 B.C. ± 70
Cunningham Mound D			
UGA-1255	Charcoal from primary humus	2805 ± 60 B.P.	1020-1050 B.C. ± 70
UCLA-1997D	Charcoal from primary humus	1430 ± 60 B.P.	A.D. 570 ± 70
Cunningham Mound E			
UGA-1559	Charcoal from primary humus	1435 ± 55 B.P.	A.D. 560 ± 65
UGA-1561	Charcoal from primary humus	1425 ± 60 B.P.	A.D. 570 ± 70
South New Ground Field			
UGA-1688	Charcoal from primary humus	1890 ± 55 B.P.	A.D. 70 ± 65
UGA-1689	Charcoal from primary humus	2155 ± 60 B.P.	230-380 B.C. ± 70
Seaside Mound I			
UGA-SC3	Shell from pit in primary humus	2350 ± 220 B.P.	440-460 B.C. ± 230
UGA-104	Shell from pit in primary humus	2220 ± 100 B.P.	400 B.C. ± 110
UGA-112	Log from intrusive burial	1430 ± 115 B.P.	A.D. 570 ± 125
UGA-1826	Shell from Feature 15.	1240 ± 60 B.P.	A.D. 730-700 ± 70
Seaside Mound II			
UGA-1552	Shell from pit in primary humus (Feature 1)	2340 ± 65 B.P.	440 B.C. ± 75
UGA-1553	Shell from pit in primary humus (Feature 1)	2650 ± 70 B.P.	850-880 B.C. ± 80
UGA-1556	Charcoal from upper mound fill (intrusive burial 8).	445 ± 70 B.P.	A.D. 1420 ± 80

mortuary complex on St. Catherines Island. Prior to the involvement of the American Museum of Natural History on the Island, only three radiocarbon dates were available on the Refuge-Deptford mounds, those dates processed for Seaside I (reported in Caldwell, 1971). An additional 26 determinations have now been processed, and for ease of presentation these results are tabulated on table 4. Where possible, the radiocarbon determinations are processed on charcoal, which was generally available in the primary humus zone of the mounds. Where charcoal was unavailable, samples of oyster shell were dated.

Recent research has shown that the atmospheric inventory of C^{14} is not stable as has commonly been assumed (Olsson, 1970). To compensate for this fluctuation, the radiocarbon determinations have been "corrected" using the MASCA correlation between C^{14} and dendrochronological dating (Ralph, Michael and Han, 1973). To accomplish this, the raw laboratory determinations were first converted from B.P. to A.D./B.C. estimation by subtracting 1950 and then compared with the bristlecone curve. Both the raw laboratory determinations and the bristlecone corrected dates are listed in table 4. Throughout this report, we cite the corrected radiocarbon date, unless stated otherwise.

CHAPTER 3. THE CUNNINGHAM MOUND GROUP

DAVID HURST THOMAS, CLARK SPENCER LARSEN, AND ANN MARIE LUNSFORD

Seven aboriginal mounds are near the center of St. Catherines Island (see fig. 3). Because of their proximity and approximate contemporaneity, we have grouped them together as the Cunningham Mound complex. The individual mounds have been designated as Cunningham

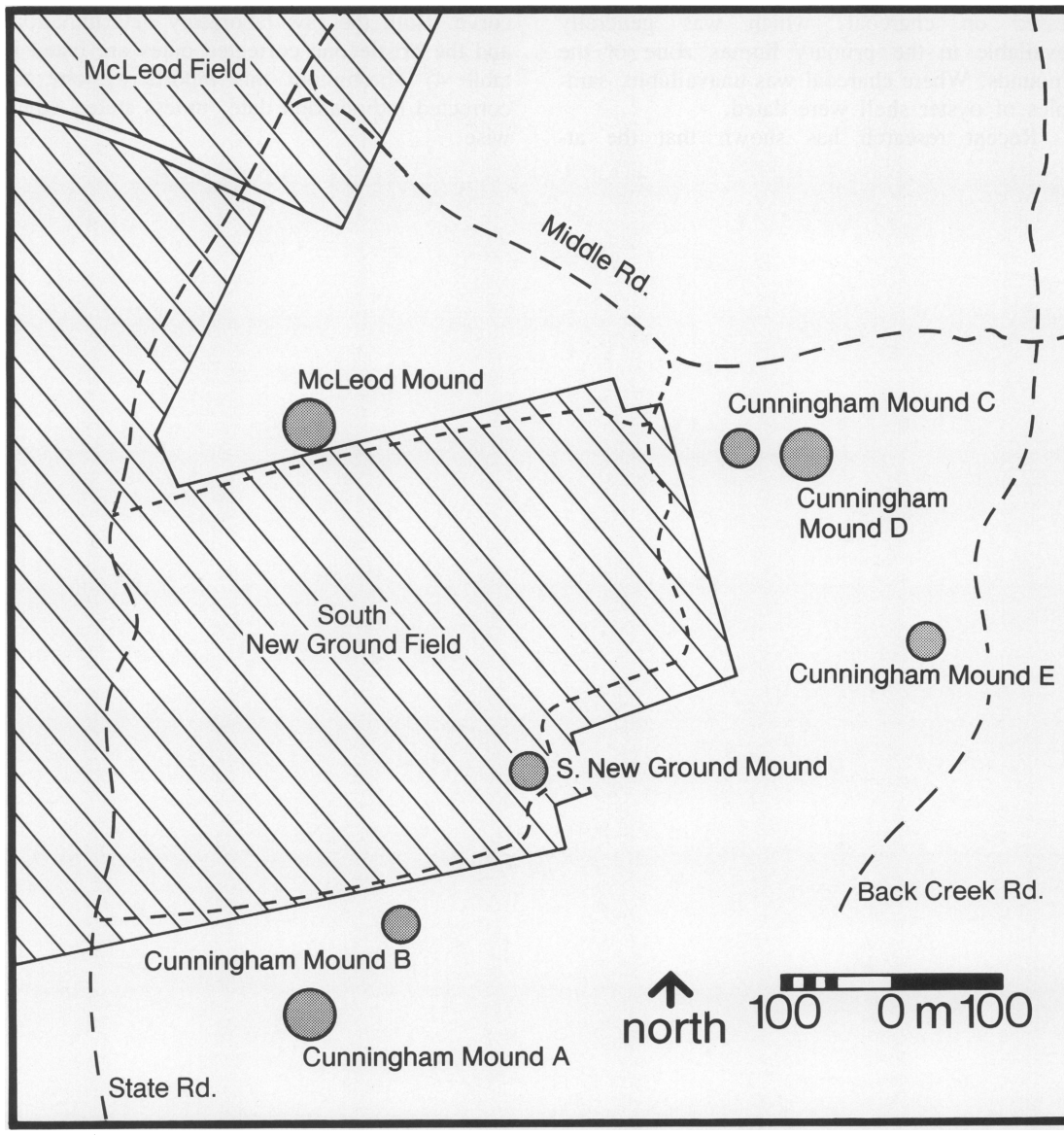


FIG. 3. Location of the Cunningham Mound Group relative to the antebellum fields.

Mounds A-E, McLeod Mound, and South New Ground Mound. In all cases, we have employed the name of the nearest antebellum field (see Thomas, Jones, Durham and Larsen, 1978, fig. 4).

Although we have combined the seven mounds into a "group," we do not mean to imply that they were necessarily "grouped" in aboriginal times. That is, we are not claiming that this mound series was, in any way, a *ceremonial complex* in the sense of Hopewellian or Mississippian complexes. Because of the agricultural disturbances during colonial and antebellum times, a number of nearby mounds have probably been destroyed. In addition, because we have not conducted an intensive settlement pattern survey of this area, other mounds might still be undiscovered. The seven mounds are simply grouped together for convenience and we do not imply any sort of aboriginal unity among the individual sites.

A total of 35 burials was excavated by the American Museum of Natural History from the Cunningham Mound group. The details of excavation are described site-by-site in the sections following. The cranial, postcranial, and dental measurements have been grouped in tables 5 to 7.

McLEOD MOUND

McLeod Mound (9 Li 47) is immediately north of the antebellum McLeod Field (fig. 3). In fact, the boundary ditch missed the aboriginal mound by only 8 meters. McLeod Mound stands 1 meter high, covering an area of approximately 300 square meters (see fig. 4.). Three large borrow areas are evident on the southeastern and northwestern margins. When first encountered in the fall of 1974, the mound contained a slight depression in the northeastern corner, probably the result of earlier vandalism. Several oyster shells were scattered about the surface of the mound.

Excavation on McLeod Mound began in November 1975 by a crew from the American Museum of Natural History. A dense stand of saw palmettos was cleared, a dozen trees were removed from the site, and a permanent brass datum (stamped "AMNH 105") was set in concrete 15 meters southeast of the center of the mound. The excavation was completed in May 1976. Approximately 100 cubic meters of fill was removed; we estimate that roughly 160 cubic meters remain intact for future excavation (see figs. 5-8).

STRATIGRAPHY

The stratigraphic section is illustrated in figure 9 and the measured stratigraphic section is described on table 8. The following account interprets and synthesizes this stratigraphy. This interpretation must be regarded as tentative, of course, because only about 40 percent of McLeod Mound has been excavated.

The mound is situated on a sterile substratum of yellow sand (Unit I). This deposit is found throughout the upland, Pleistocene portion of St. Catherines Island, and is almost always capped by a well-developed A horizon, called the *primary humus zone* (Unit II in this report). At McLeod Mound, the primary humus was thoroughly burned prior to mound construction. Six charcoal-stained pits were excavated in units F4 and G4; these are all roughly 10 cm. in diameter and extend through the primary humus into the sterile substratum. Although they superficially appear to be postholes, we think they are probably roots that were charred during the initial mound burning. One of these rootcasts is evident in figure 9.

Two radiocarbon dates are available for Unit II, about 1600 B.C. and about 850 B.C. (see table 4). These dates are significantly different from one another (see Thomas, 1976, pp. 249-251) and presumably date two separate events. Perhaps one of the dates is somewhat contaminated, or perhaps two separate episodes of burning occurred. The precise dating of the events at McLeod is considered in the final section of this monograph.

Several pits were excavated into the burnt primary humus. Because they are isolated one from the other, it is impossible to tell the sequence in which these pits were created.

FEATURE 5: Pit approximately 15 cm. in diameter, excavated through primary humus into sterile yellow sand (sq. F2, 60 cm. from south, 80 cm. from west); approximately 50 cm. deep and filled with dark gray sand, some charcoal, several oyster shells and a single knobbed whelk.

TABLE 5
Cranial Measurements (in Millimeters), Cunningham Mound Group

	McLeod Mound					Cunningham Mounds C		Cunningham Mounds D
	3	7	13	16	17	1	3	2
Inion-mastoidale	91.9	—	—	—	—	—	—	95
Inion-auricular point	97.1	—	—	—	—	95.7	89.5	98.8
Inion-lambda	59.0	—	54.2	62.9	—	74.8	67.3	69.8
Inion-bregma	—	—	147	139	—	—	—	152
Inion-opisthion	—	—	—	38.6	—	—	—	—
Inion-basion	—	—	—	64.0	—	—	—	—
Bregma-auricular point height	—	—	—	124.1	—	—	—	131.5
Bregma-lambda	—	—	107.4	100.5	—	—	—	98.6
Bregma-mastoidale	—	—	—	—	—	—	—	161
Bregma-nasion	—	—	—	114	113	—	—	—
Bregma-opisthion	—	—	—	148	—	—	—	—
Bregma-basion	—	—	—	134	—	—	—	—
Lambda-basion	—	—	—	105.5	—	—	—	—
Lambda-opisthion	—	—	—	93.4	—	—	—	96.4
Lambda-nasion	—	—	—	156	—	—	—	—
Nasion-basion	—	—	—	97	—	—	—	—
Nasion-frontomalare orbitale	—	—	—	—	53.0	—	—	—
Auricular point-auricular point	—	—	—	125	—	—	—	—
Asterior-asterion	—	—	—	102.2	—	—	—	—
Biorbital breadth	—	—	—	—	99.1	—	—	—
Minimum frontal breadth	—	—	—	91.0	102.6	—	—	—
Maximum breadth	—	—	—	144	—	—	—	—
Maximum length	—	—	—	160	—	—	—	(180)
Temporalis length	—	—	—	130	—	—	—	107.4
Temporalis height	—	—	—	81.4	—	—	—	89.5
Frontal arc	—	—	—	—	121	—	—	—
Parietal arc	—	—	125	118	—	—	—	117
Occipital arc	—	—	—	—	—	—	—	113
Palate length	—	—	—	47.6	—	—	—	—
Palate breadth	—	—	—	36.5	—	—	—	—
Mandible								
Condylar breadth	—	—	—	—	—	—	—	24.5
Ascending ramus height, coronoid	—	—	—	—	—	—	—	67.6
Ascending ramus height, condyle	—	—	—	—	—	—	—	63.0
Corpus height, P_2-M_1	—	36.6	—	—	—	—	—	—

( ), measurement estimate.
___, right side measurement.

FEATURE 6: Pit approximately 25 cm. in diameter, excavated through primary humus (sq. F2, 25 cm. from north, 60 cm. from west); approximately 50 cm. deep and filled with dark gray sand with charcoal.

FEATURE 7: Pit measuring 30 cm. east-west and 20 cm. north-south, excavated through primary humus (sq. D2, extends into northwall, 80 cm. from west); filled with dark gray sand and charcoal.

FEATURE 8: Pit approximately 50 cm. in diameter, tapering in profile to a point, excavated through

primary humus (sidewall of sq. C3, 90 cm. from west); approximately 50 cm. deep and filled with dark humus.

FEATURE 9: Pit approximately 40 cm. in diameter excavated into primary humus (sq. E2, 30 cm. from south, 5 cm. from east); filled with dark humus, and shell concentration located approximately 1 meter to the west, resting on the primary humus layer.

FEATURE 10: Pit measuring 28 cm. east-west and 32 cm. north-south, excavated through primary humus (sq. D1, 17 cm. from north, 48 cm. from east); contained one abrader (on a Refuge Plain sherd) and two Refuge Simple Stamped sherds. The pit was filled with charcoal-stained gray sand. Burial 20 was situated 1.4 meters to the south, but was apparently not associated.

These six features cluster along the northern

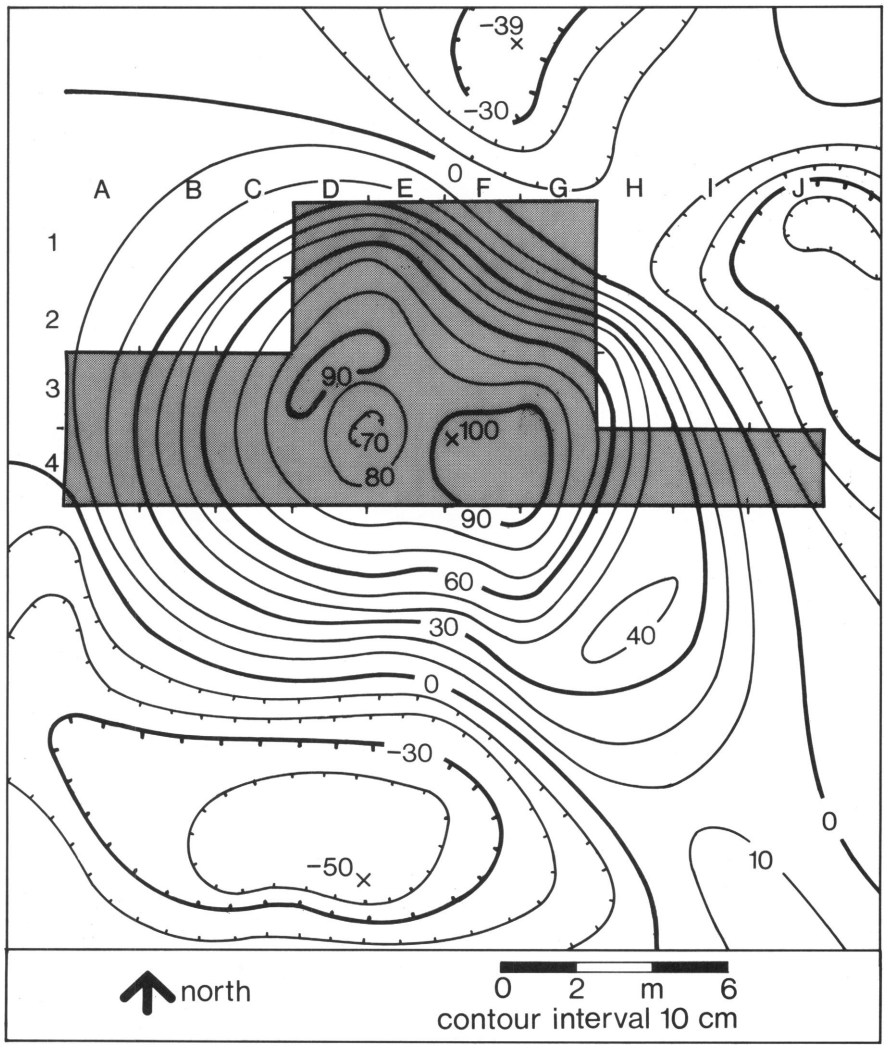


FIG. 4. Topographic map of McLeod Mound. Shaded portion indicates area excavated by the American Museum of Natural History.

TABLE 6
Summary Dental Statistics, Cunningham Mound Group

			McLeod Mound					Cunningham Mound C				
	Diameter	Tooth	N	Minimum	Maximum	Mean	Std. Dev.	N	Minimum	Maximum	Mean	Std. Dev.
Mandible	L	I1	1	5.3	5.3	5.3	—	—	—	—	—	—
	B	I1	1	6.0	6.0	6.0	—	—	—	—	—	—
	L	I2	1	6.3	6.3	6.3	—	—	—	—	—	—
	B	I2	1	6.4	6.4	6.4	—	—	—	—	—	—
	L	C	1	6.6	6.6	6.6	—	—	—	—	—	—
	B	C	1	7.4	7.4	7.4	—	—	—	—	—	—
	L	PM1	3	6.7	7.8	7.4	.64	1	7.9	7.9	7.9	—
	B	PM1	3	8.1	9.0	8.5	.45	1	8.6	8.6	8.6	—
	L	PM2	5	6.3	7.9	7.2	.58	2	7.2	7.8	7.5	.42
	B	PM2	5	8.0	9.0	8.4	.43	2	8.0	8.4	8.2	.28
	L	M1	8	10.9	12.5	11.7	.61	1	12.3	12.3	12.3	—
	B	M1	8	11.0	12.0	11.5	.38	1	11.8	11.8	11.8	—
	L	M2	9	10.7	13.2	11.8	.87	3	11.0	13.3	12.1	1.15
	B	M2	9	10.1	12.3	11.1	.61	3	9.6	11.6	10.8	1.08
	L	M3	11	10.2	13.4	12.0	1.03	2	12.3	13.9	13.1	1.13
	B	M3	11	9.9	12.1	10.7	.56	2	10.5	11.8	11.2	.92
Maxilla	L	I1	3	8.0	8.9	8.4	.47	—	—	—	—	—
	B	I1	3	6.7	7.1	6.9	.21	—	—	—	—	—
	L	I2	1	7.1	7.1	7.1	—	—	—	—	—	—
	B	I2	1	7.1	7.1	7.1	—	—	—	—	—	—
	L	C	4	7.9	8.8	8.3	.44	—	—	—	—	—
	B	C	4	8.3	8.6	8.5	.13	—	—	—	—	—
	L	PM1	6	5.4	8.0	7.1	.98	—	—	—	—	—
	B	PM1	6	9.2	10.1	9.6	.31	—	—	—	—	—
	L	PM2	7	5.3	8.0	6.9	.83	2	7.1	7.4	7.3	.21
	B	PM2	7	8.2	11.0	9.4	.85	2	8.9	10.0	9.5	.78
	L	M1	6	10.1	12.0	11.1	.78	1	11.8	11.8	11.8	—
	B	M1	6	12.0	12.9	12.4	.32	1	13.3	13.3	13.3	—
	L	M2	9	9.4	11.6	10.7	.76	3	9.7	12.2	11.1	1.27
	B	M2	9	10.0	12.6	11.8	.79	3	10.5	13.0	11.7	1.26
	L	M3	8	8.1	11.5	10.1	1.12	3	9.0	11.3	10.0	1.17
	B	M3	8	9.1	12.1	11.1	.93	3	10.4	12.5	11.2	1.12

L = length
B = breadth

periphery of the mound, and clearly antedate mound construction. It is remotely possible that some pits are actually charred tree stumps, but we think this is unlikely.

The central pit at McLeod consists of two portions, designated as Feature 4 North and South. Interpretation of the Central Tomb is complicated by an intrusive pit excavated much later, probably by pothunters.

We suggest the following sequence of construction for the Central Tomb:

1. A large pit (Feature 4 South) was excavated; this 6-meter wide pit is evident in figure 8 as a thick dark stain at the bottom of the stratigraphic section.
2. Feature 4 South was then filled with disturbed primary humus; no artifacts or burials were recovered from this pit.

Cunningham Mound D					Cunningham Mound E					South New Ground Mound				
N	Minimum	Maximum	Mean	Std. Dev.	N	Minimum	Maximum	Mean	Std. Dev.	N	Minimum	Maximum	Mean	Std. Dev.
2	4.8	5.3	5.1	.35	—	—	—	—	—	—	—	—	—	—
2	5.6	5.8	5.7	.14	—	—	—	—	—	—	—	—	—	—
2	5.8	6.4	6.1	.42	—	—	—	—	—	—	—	—	—	—
2	6.0	6.4	6.2	.28	—	—	—	—	—	—	—	—	—	—
2	6.8	7.5	7.2	.49	—	—	—	—	—	—	—	—	—	—
2	7.1	8.0	7.6	.64	—	—	—	—	—	—	—	—	—	—
2	7.2	7.6	7.4	.28	—	—	—	—	—	—	—	—	—	—
2	7.6	8.9	8.3	.92	—	—	—	—	—	—	—	—	—	—
2	7.8	8.1	7.9	.21	—	—	—	—	—	1	6.9	6.9	6.9	—
2	8.2	9.5	8.9	.92	—	—	—	—	—	1	7.5	7.5	7.5	—
2	12.1	12.3	12.2	.14	—	—	—	—	—	1	12.3	12.3	12.3	—
2	11.3	11.4	11.4	.07	—	—	—	—	—	1	11.4	11.4	11.4	—
2	11.8	12.1	11.9	.21	—	—	—	—	—	—	—	—	—	—
2	10.8	11.5	11.2	.49	—	—	—	—	—	—	—	—	—	—
2	11.0	12.2	11.6	.85	1	11.8	11.8	11.8	—	—	—	—	—	—
2	10.1	10.5	10.3	.28	1	11.8	11.8	11.8	—	—	—	—	—	—
2	8.9	9.6	9.3	.49	—	—	—	—	—	—	—	—	—	—
2	7.3	7.3	7.3	—	—	—	—	—	—	—	—	—	—	—
2	7.7	8.4	8.1	.49	—	—	—	—	—	—	—	—	—	—
2	6.9	6.9	6.9	—	—	—	—	—	—	—	—	—	—	—
2	8.3	8.4	8.4	.07	—	—	—	—	—	—	—	—	—	—
2	8.8	8.9	8.9	.07	—	—	—	—	—	—	—	—	—	—
2	7.3	8.4	7.9	.78	1	7.3	7.3	7.3	—	—	—	—	—	—
2	9.3	9.3	9.3	—	1	9.6	9.6	9.6	—	—	—	—	—	—
2	7.4	8.4	7.9	.71	—	—	—	—	—	—	—	—	—	—
2	9.3	10.4	9.9	.78	—	—	—	—	—	—	—	—	—	—
2	11.4	11.6	11.5	.14	—	—	—	—	—	1	9.9	9.9	9.9	—
2	12.3	12.6	12.5	.21	—	—	—	—	—	1	11.6	11.6	11.6	—
2	10.9	12.0	11.5	.78	1	11.8	11.8	11.8	—	1	10.6	10.6	10.6	—
2	11.4	12.4	11.9	.71	1	11.8	11.8	11.8	—	1	12.3	12.3	12.3	—
2	10.3	10.3	10.3	—	1	9.7	9.7	9.7	—	—	—	—	—	—
2	10.6	11.3	10.9	.49	1	11.0	11.0	11.0	—	—	—	—	—	—

3. The filled-in pit, and an area extending approximately 8 meters to the north, was covered with a ring of shell and potsherds. The shell has been radiocarbon dated to 440 B.C. (see table 4), and we think that the shells were collected in December or January (see Appendix).
4. A second pit—or an extension of the filled-in pit—was excavated to the north; this is Feature 4 North. The backdirt from Feature 4 North was placed on the filled-in pit.
5. Five skeletons were laid out in the northern pit, then covered with clean yellow sand; the nature of the Central Tomb is considered below.

This reconstruction is based, in large part, on the stratigraphic section reproduced in figure 9. It appears that Units IIIa and IIIb represent the backdirt from the Central Tomb. This backdirt was piled on top of the shells and indicates that the placement of the shells predates the actual digging of the pit. The southern excavation must have occurred previously and then filled in and covered with shells. Unit II in the

TABLE 7

Postcranial Measurements (in Millimeters) and Indices, Cunningham Mound Group

	McLeod Mound								Cunningham Mound D			
	14		15		16		17		1		2	
	left	right	left	right	left	right	left	right	left	right	left	right
Humerus												
Maximum length	—	—	(310)	—	(330)	(330)	—	—	—	—	—	—
Maximum diameter, midshaft	—	(21.9)	20.6	21.3	20.9	20.7	—	—	—	—	—	—
Minimum diameter, midshaft	—	16.3	12.6	12.4	16.5	15.2	—	—	—	—	—	—
Circumference, midshaft	—	61.7	56.7	58.1	61.8	59.6	—	—	—	—	—	—
Radius												
Maximum diameter, crest (midshaft)	—	—	—	—	—	15.6	—	—	—	—	—	—
Minimum diameter, crest (midshaft)	—	—	—	—	—	10.4	—	—	—	—	—	—
Maximum length	—	—	—	—	(240)	236	(240)	—	—	—	—	—
Head diameter	—	—	—	—	—	(16)	—	—	—	—	—	—
Ulna												
Maximum length	—	(250)	—	—	—	—	—	—	—	—	—	—
Femur												
Vertical diameter, neck	—	—	29.4	27.8	24.7	26.5	—	—	—	—	—	—
Horizontal diameter, neck	—	—	23.2	23.5	22.3	22.7	—	—	—	—	—	—
Maximum morphological length	—	400	430	(432)	(435)	—	—	(410)	(320)	—	—	—
Ant.-post. diameter, midshaft	—	29.2	26.9	28.0	26.4	28.5	28.2	27.4	—	—	—	(30.7)
Transverse diameter, midshaft	—	23.2	23.5	23.4	24.3	24.4	24.5	24.1	—	—	—	(22.7)
Circumference, midshaft	—	82.5	77.7	79.7	78.2	82.0	81.4	80.4	—	—	—	(84.5)
Ant.-post. diameter, subtroch.	—	24.1	23.2	25.4	24.7	25.9	25.5	25.2	18.6	—	—	—
Transverse diameter, subtroch.	—	30.5	30.9	32.4	31.5	30.8	33.4	31.2	25.6	—	—	—
Maximum diameter, head	—	—	40.5	40.0	(37)	—	—	42.5	—	—	—	—

TABLE 7 — (*Continued*)

	McLeod Mound								Cunningham Mound D			
	14		15		16		17		1		2	
	left	right	left	right	left	right	left	right	left	right	left	right
Tibia												
Maximum length	—	—	—	—	—	—	—	(400)	—	—	—	—
Ant.-post. diameter, midshaft	—	(31.7)	—	—	—	—	28.1	28.1	—	—	—	—
Traverse diameter, midshaft	—	(21.7)	—	—	—	—	20.7	20.7	—	—	—	—
Circumference, midshaft	—	82.2	—	—	—	—	79.6	73.6	—	—	—	—
Stature (cm)[a]	153±3.8		161.1±3.8		162.4±3.8		155.9±3.8		—		—	
Indices												
Pilastric index	—	125.9	114.5	119.7	108.6	116.8	115.1	113.7	—	—	—	135.2
Femoral mid-shaft index	—	79.0	75.1	78.4	78.4	84.1	76.3	80.8	72.7	—	—	—
Tibial mid-shaft index	—	68.5	—	—	—	—	73.7	73.7	—	—	—	—

( ) Measurement estimate.

[a]Genovés, 1967; adult female femur.

FIG. 5. Initial test excavations at McLeod Mound in November 1975. The lower limbs of burial 2 have been pedestaled, and the excavator is exposing the skull of burial 1.

FIG. 6. Excavation at McLeod Mound, photograph taken March 1976. The 4-trench has been continued to the east and the 3-trench has been opened on the western portion of the site.

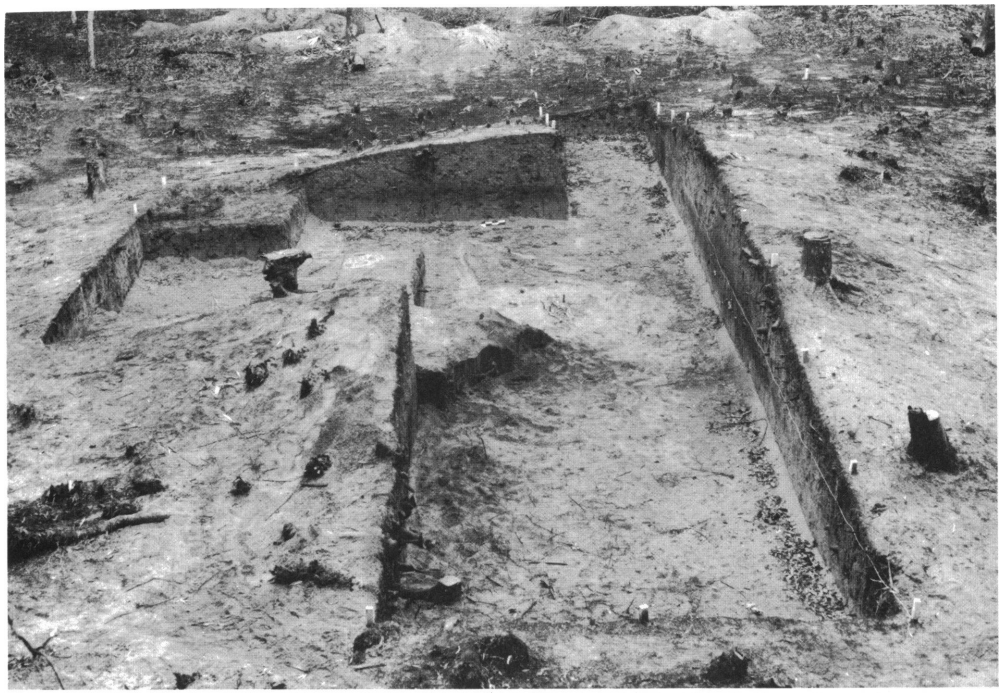


FIG. 7. Excavations at McLeod Mound, photograph taken in early May 1976. Bundle burial 17 can be seen in the center of the excavation. The Central Tomb is clearly evident as the light-colored area surrounding burial 17.

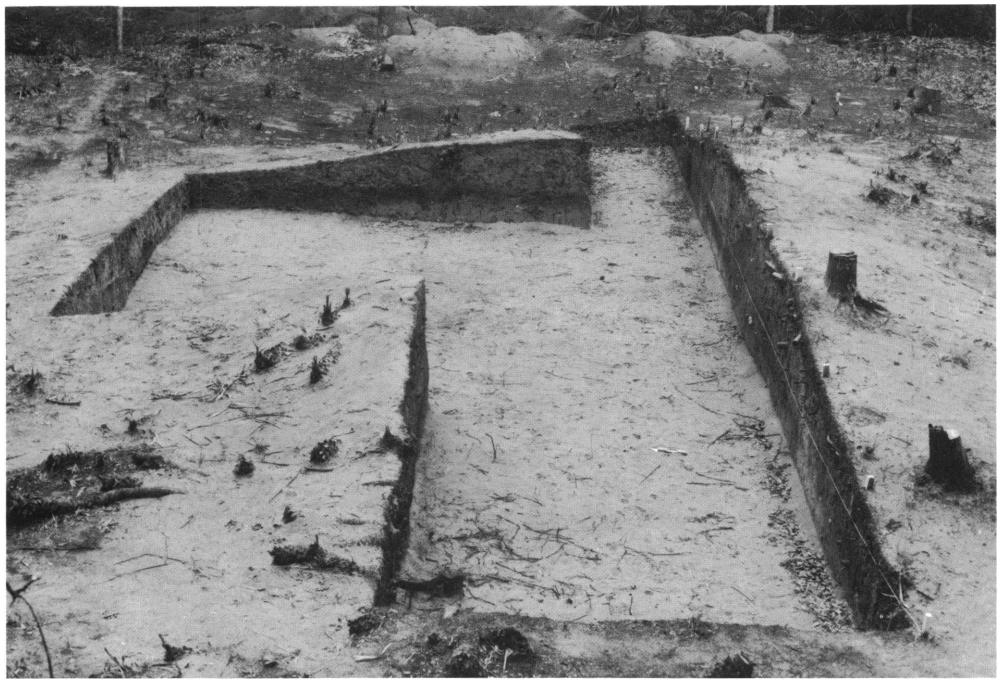


FIG. 8. McLeod Mound after the excavations had been completed. Photograph taken in late May 1976.

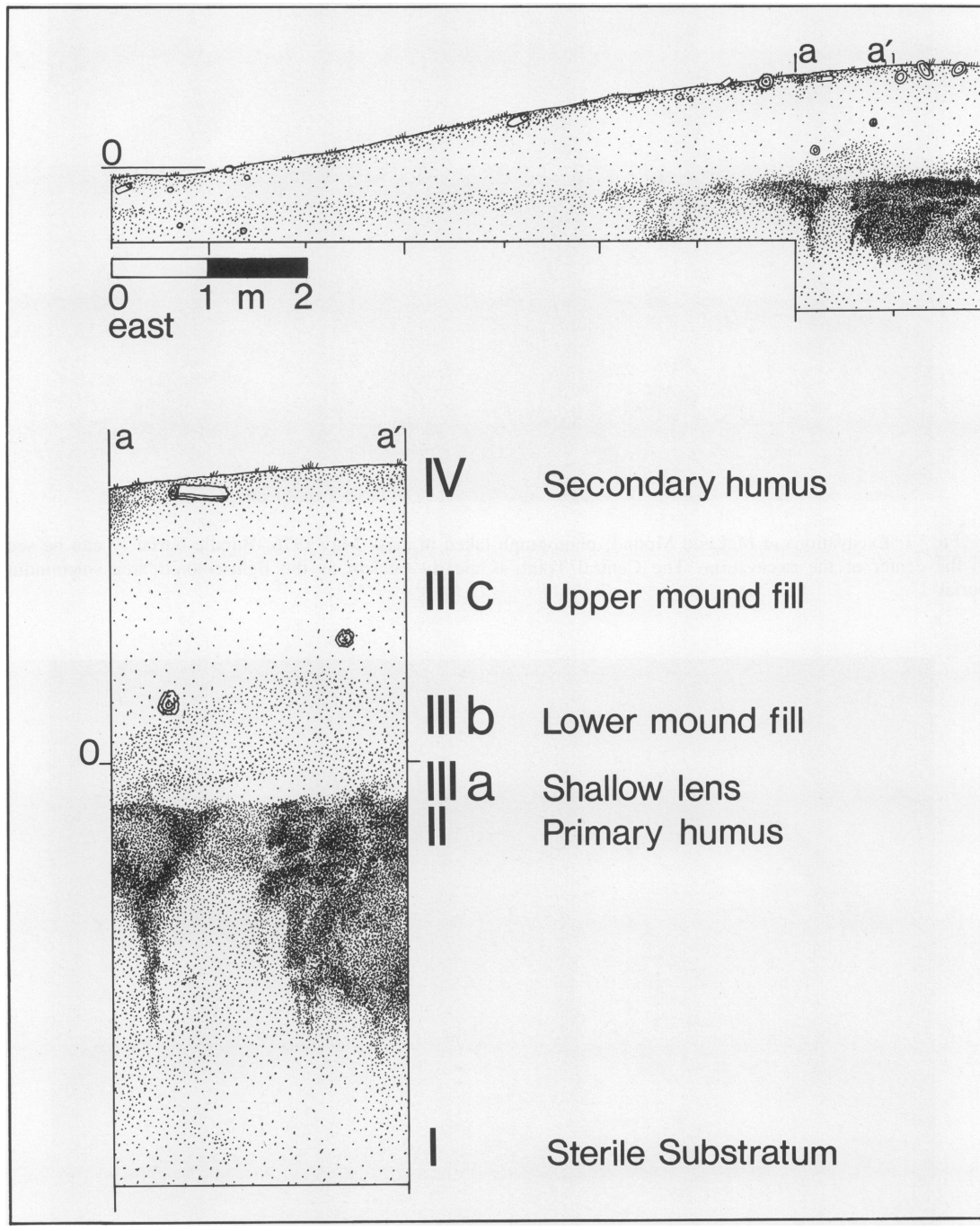


FIG. 9. Stratigraphic profile of McLeod Mound, south wall of 4-trench.

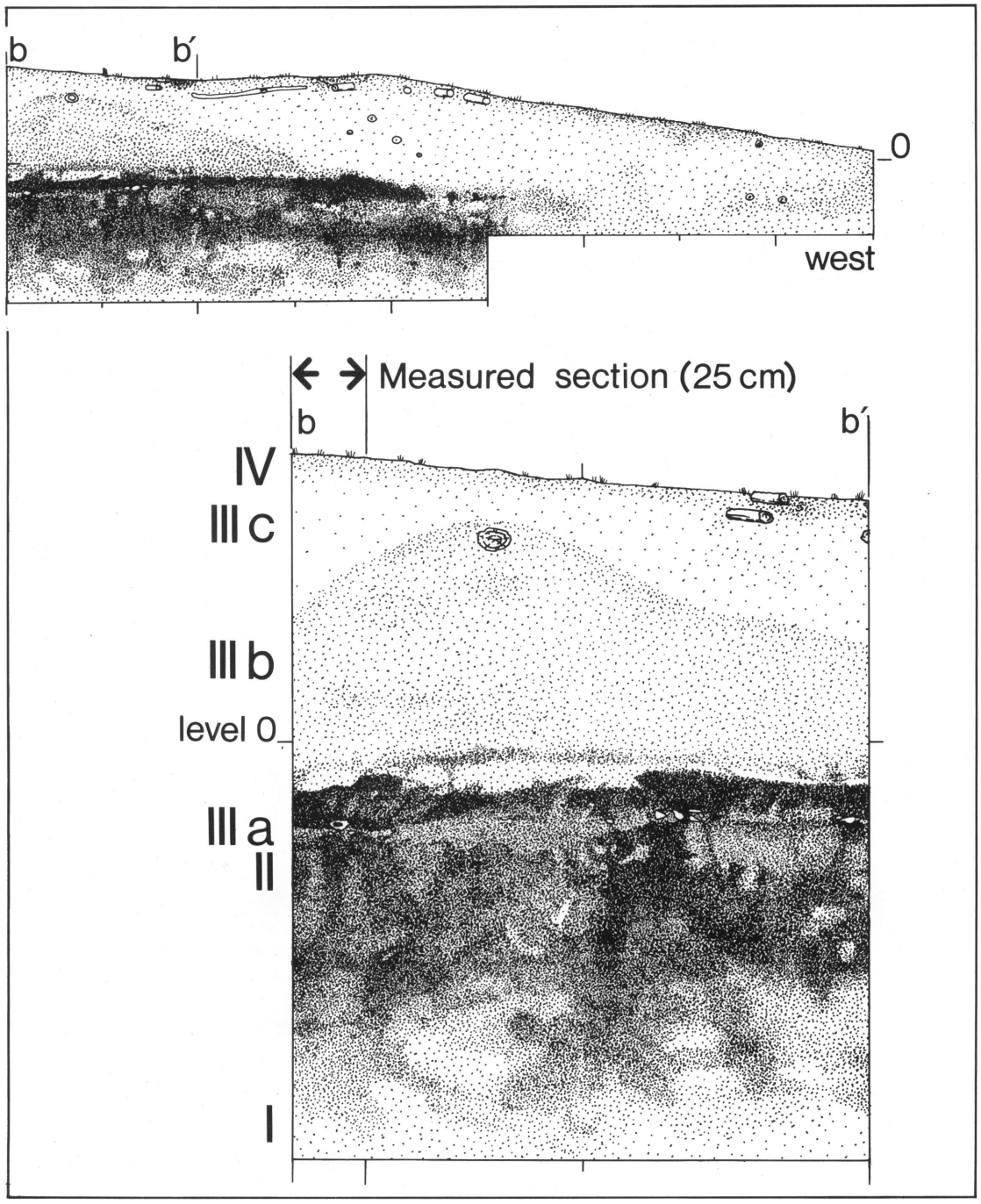

b
b′
0
west
Measured section (25 cm)
b
b′
IV
III c
III b
level 0
III a
II
I

TABLE 8
Measured Stratigraphic Section of McLeod Mound
(for location of section, see figure 9)

Unit	Thickness (cm.)	Description
IV	10	*Secondary humus*, dark grayish brown sand, fairly dense root mat (10 YR 4/2: dry), formed as A horizon of Unit IIIc. Contact gradual over 4-5 cm.
IIIc	30-40	*Upper mound fill*, brownish yellow sand (10 YR 6/6: dry). Radiocarbon date: A.D. 130-110 ± 75 (UGA-1256). Contact distinct.
IIIb	50-65	*Lower mound fill*, dark brown sand (10 YR 3/3: dry), charcoal flecks throughout. Contact abrupt.
IIIa	4-5	*Shallow lens*, brownish yellow sand (10 YR 6/6: dry), occasional charcoal flecks present. Contact very abrupt.
II	90	*Primary humus*, very dark grayish brown sand (10 YR 3/2: dry), slightly mottled with abundant charcoal present, apparently disturbed with lens of shell embedded near center of mound; formed as A horizon of Unit I. Radiocarbon dates on charcoal: 1600-1640 B.C. ± 70 (UCLA-1997E); 850-890 B.C. ± 65 (UGA-1557). Radiocarbon dates on shell: 470 B.C. ± 75 (UGA-1554); 420 B.C. ± 90 (UGA-1555). Contact gradual.
I	30+	*Sterile substratum*, yellow sand (10 YR 7/8: dry), slightly mottled, uncompressed occasional charcoal flecks present near top. Bottom not exposed.

stratigraphic section is thicker because the primary humus was scraped off (presumably from the north), then shoveled to the south. The sterile substratum (Unit I) was briefly encountered, and it formed Unit IIIa as backdirt in the stratigraphic profile. Then the tomb must have been systematically enlarged, extending only into Unit II. Had Unit I been excavated, we would expect the backdirt (Unit IIIb) to be mottled, rather than the uniform dark gray evident in the stratigraphic section.

The nature of Feature 4 South is poorly understood because only the northern half of McLeod was excavated. Perhaps unexcavated burials lie to the south, but it is also possible that Feature 4 South is empty, as was the case at some of the other mounds to be discussed later in this section. It seems clear, however, that the Central Tomb (Feature 4 North) postdates the excavating and filling of the southern pit.

The clam shells surrounding the Central Tomb have been radiocarbon dated to 470 B.C. ± 75 and 420 B.C. ± 90 (table 4). We also think that these shells were collected in a single season, probably either December or January (see Appendix). Of course the death of the clams may not relate directly to the creation of the Central Tomb; we discuss these possibilities in the concluding section.

Sometime after the Central Tomb was constructed and filled, the rest of McLeod Mound was built. Two borrow pits are evident, indicating the source of the mound fill (Unit IIIc). The upper humus (Unit IV) probably began to form as soon as the mound was completed. One radiocarbon date is available from this fill, A.D. 130-110 ± 75 (table 4). There is no evidence to indicate whether this date reflects actual deposition of Unit IIIc or whether it originates from debris associated with a later, intrusive burial. These possibilities are considered in the final section. This reconstruction is shown diagrammatically in figure 10.

Several post-mound features were noted:

FEATURE 2: Pit approximately 15 cm. in diameter excavated into Unit IIIc, but not down to level of primary humus (sq. D4, 15 cm. from south, 80 cm. from east). Filled with mottled sand, charcoal, and one Refuge Simple Stamped potsherd. This pit did not reach the level of the primary humus, and hence must postdate mound construction.

FEATURE 2: Pit approximately 15 cm. in diameter (sq. D4, 30 cm. from south, 30 cm. from east). Contained mottled sand and evidently not associated with Feature 1.

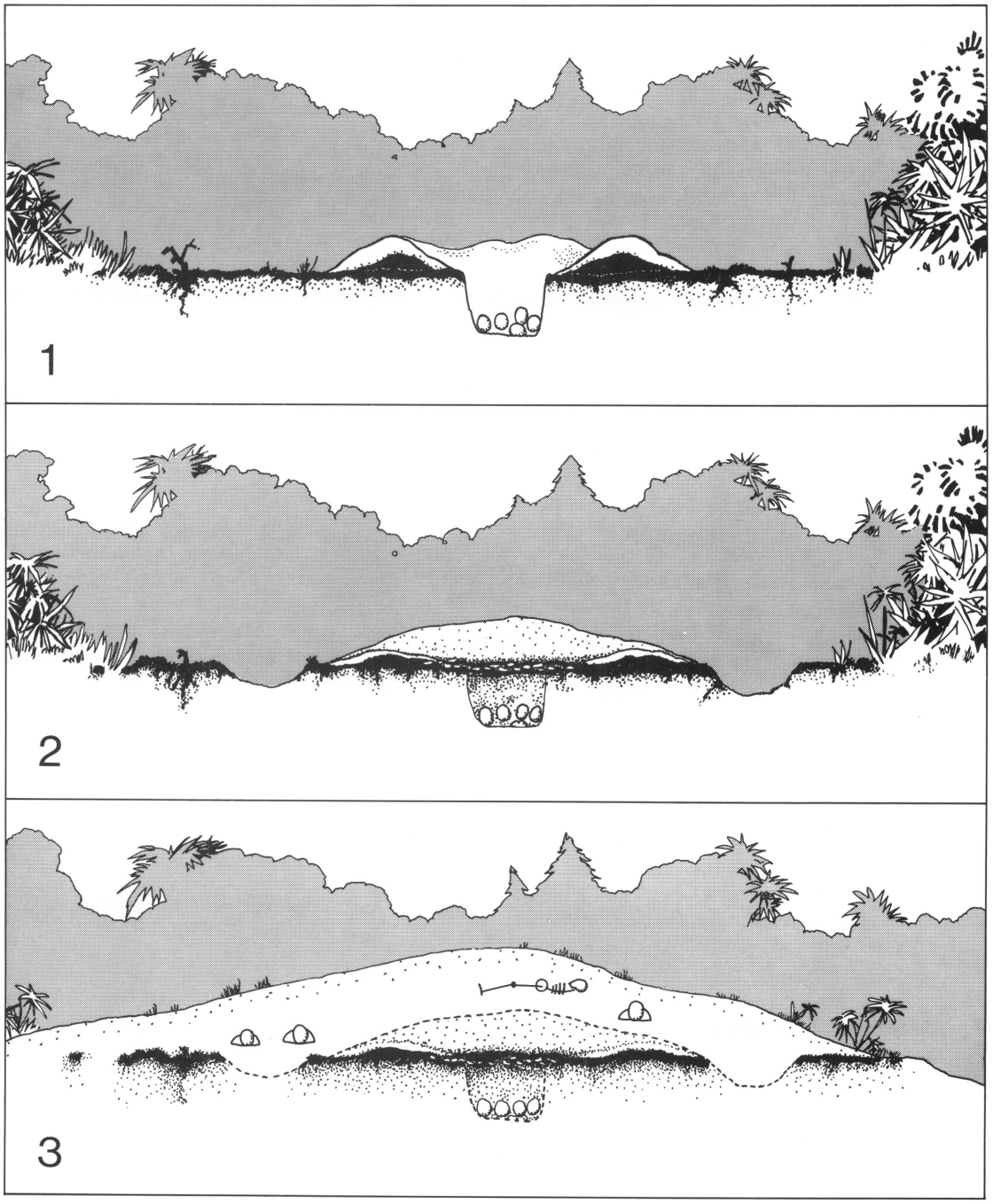


FIG. 10. Stages of mound-building evident at McLeod Mound. 1. The land was burnt, the Central Tomb excavated, and five burials (nos. 13-17) placed within. 2. A small sand mound has been erected over the Central Tomb. Note how the borrow areas truncate the primary humus. 3. The mound has been enlarged, inundating the original borrow pits. Several intrusive burials have been placed in the mound fill.

FEATURE 3: Pit approximately 10 cm. in diameter (sq. D4). Filled with ash and charcoal.

All three post-mound pits are within 2 meters of another, yet do not appear to be connected.

At a much later date, a large pit was excavated in the central part of McLeod Mound. The excavation, probably a pothole, is evident as the depression to the northeastern corner in figure 4. The pit tapered markedly toward the bottom, and could be easily followed during our excavations. The fill contained decomposing leaves, therefore we think that this feature represents vandalism within the last century or so. The excavators continued to a level slightly below the primary humus and barely encountered the central pit. The feet of burials 15 and 16 were disturbed during this excavation. A great deal of shell associated with the Central Tomb was found in the pothunted backdirt.

SKELETAL REMAINS

McLeod Mound is unusual among the Refuge-Deptford age mounds of St. Catherines Island, in that the pre-mound pit contained relatively well-preserved skeletons, a result of the shell ring covering the burials (see figs. 11-13). The calcium carbonate in the shell probably neutralized the acidic groundwater and thereby protected the bones from extensive post-mortem destruction.

The pre-mound pit contained the remains of five individuals, all females. Although all individuals were interred during one event, they were in various states of decomposition at the time of burial. Burials 13 and 17 (see figure 13) were completely disarticulated bundles. Burial 14 was also a bundle, but the left hand was partly articulated, with scaphoid, trapezium, and trapezoid in anatomical position. Three thoracic vertebrae were also articulated. Burials 15 and 16 were completely articulated.

Some observations can be made about the condition of the bodies prior to burial. Unfortunately, little is known about rates of tissue decay after death, and it seems clear that factors involved include climate, protection by clothing and accessibility to animals and insects (Ubelaker, 1974, pp. 66-67). On the basis of forensic studies conducted in the Washington D.C. area, T.D. Stewart and J.L. Angel have noted that bodies left exposed on the ground surface can reduce to bone in less than a month, especially when accessible to scavenging birds and mammals.

If we assume some degree of climatic similarity between the mid-Atlantic coast and the Georgia Sea Islands, then the Stewart and Angel studies and Ubelaker's data from the Juhle site can be relevant. It seems clear that the individuals represented by burials 13 and 17 at McLeod died before the other three women. How much earlier can only be estimated, but the lack of any articulated bones suggests sometime in excess of six months. The hand and vertebrae of burial 14 were partially articulated, suggesting a death somewhat later than that of 13 and 17. Finally, burials 15 and 16 were in complete anatomical order, suggesting they died only shortly before burial. Thus, the Central Tomb at McLeod contains five individuals who seem to have died at least at three different times during a six-month period. In other words, burials 13, 17, and 14 were stored after death for later burial upon the death of individuals 15 and 16.

The burials of the pre-mound tomb are described as follows:

BURIAL 13: female, adult; bundle, head to the east; cranial reconstruction (squamosal portion of the occipital, right and left parietals, frontal), fragments of occipital, temporal, sphenoid, frontal, left and right ulnae, right femur, left fibula, coccyx, talus, cuboid, third navicular; maxillary right third molar, enamel, and root fragments.

BURIAL 14: female, adult; bundle, head to east; cranial reconstruction (left squamosal portion of the occipital, left and right parietals, frontal), fragments of left and right temporals, left and right ilia, left clavicle, left and right scapulae, left and right humeri, left and right ulnae and radii, left and right femora and tibiae, thoracic and lumbar vertebrae, right lunate, left trapezium, left and right trapezoids, left scaphoid, left first and second metacarpals, proximal hand phalanx, one proximal, four middle, two distal foot phalanges, and metatarsal or metacarpal diaphysis.

BURIAL 15: female, 20-24; supine, extended, head to the east; fragments of frontal, left and right parietals, left and right temporals, squamosal portion of occipital, maxilla, ilium, ischium, left and right scapulae, left and right humeri, radii, femora, patellae, tibiae, fibulae, left calcaneus,

left and right cuneiforms, left hamate, capitate, lunate, trapezium, trapezoid, scaphoid, left metacarpals (1,3,5), hand phalanges, fifth metatarsal, foot phalanges, ribs, cervical and thoracic ver-

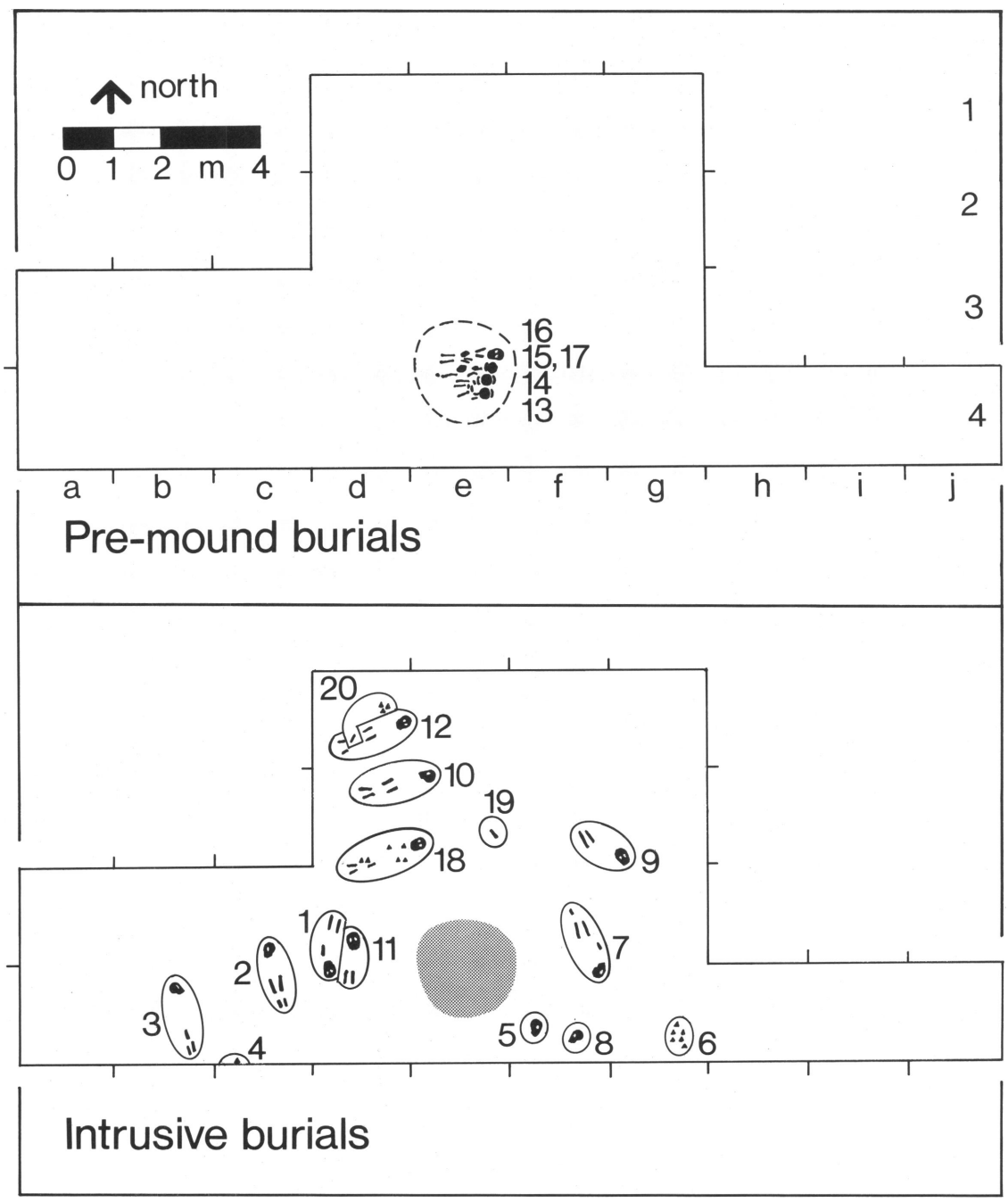


FIG. 11. Schematic diagram of burials at McLeod Mound.

FIG. 12. Photograph of Central Tomb at McLeod Mound. Burials 13-16 are evident in this view.

tebrae; mandibular right central incisor, lateral incisor, first premolar through third molar, left canine through first molar, third molar, maxillary right and left incisors, right first premolar and left canine.

BURIAL 16: female, 25-29; supine, extended, head to the east; calvarium, mandible, fragments of left and right ilia, left clavicle, left and right scapulae, humeri, ulnae, radii, femora, right tibia, cervical, thoracic and lumbar vertebrae, ribs, left and right calcanea, right cuboid, left and right first cuneiforms, left third cuneiform, left and right hamates, capitate, lunate, triquetral, trapezoid, scaphoid, right trapezium, first, second, third, fifth left metacarpals, first, second, third, fifth right metacarpals, hand phalanges, first left metatarsal, first, fourth, fifth right metatarsals, foot phalanges, sacrum; mandibular left first molar through third molar, right first molar through third molar, complete maxillary dentition.

BURIAL 17: female, adult; bundle, head to the east; cranial reconstruction (squamosal portion of the occipital, left and right parietals, frontal, left and right temporals, zygomas, sphenoids), fragments of mandible, left and right ilia, clavicles, humeri, ulnae, femora, tibiae, fibulae, right scapula, right radius, sacrum, hyoid, cervical, thoracic, lumbar vertebrae, ribs, left and right tali, left and right naviculars, left first cuneiform, right first and

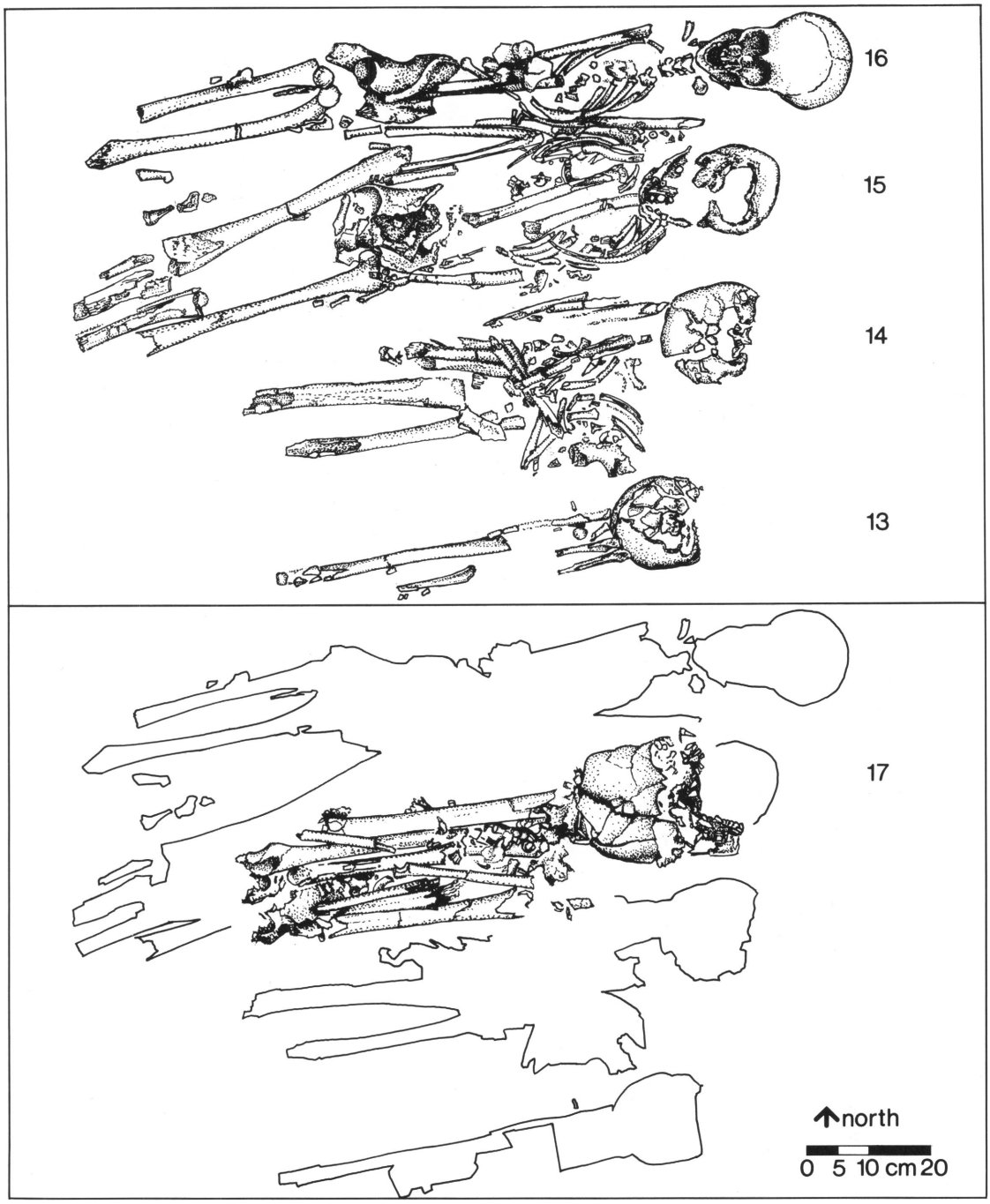


FIG. 13. Burials contained within the Central Tomb at McLeod Mound. Note that bundle burial 17 was found below the others.

second cuneiforms, left hamate, left capitate, left lunate, left trapezium, left and right scaphoids, right triquetral, left and right fifth metacarpals, hand phalanges, left first metatarsal, left and right fifth metatarsals; mandibular left first, second and third molars, right second and third molars, maxillary left and right canine through second molar and right central incisor.

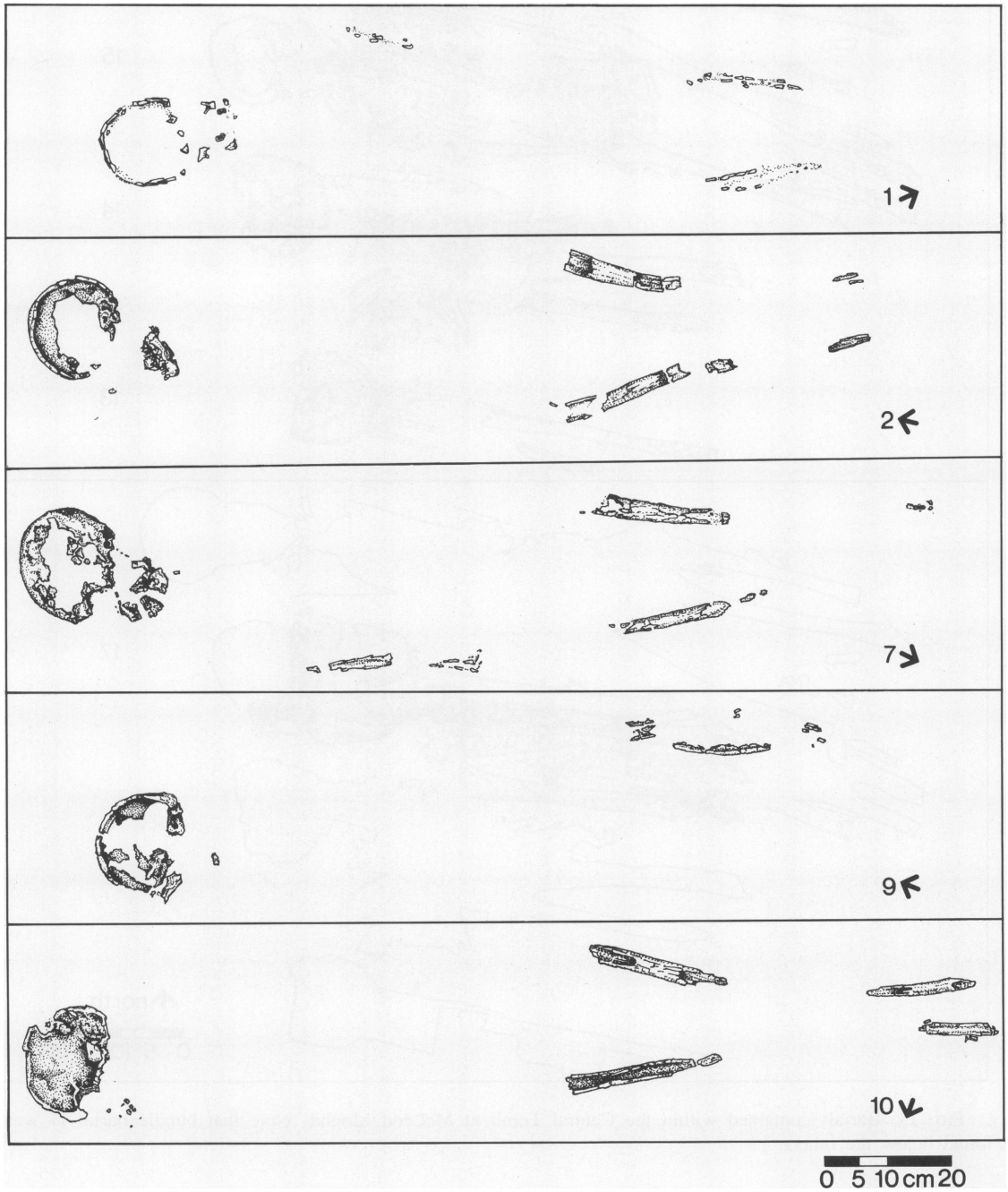


FIG. 14. Intrusive burials found at McLeod Mound.

Fifteen additional burials were found at McLeod. The stratigraphic evidence indicates that these additional burials did not penetrate the original humic Unit II. Hence all burials except those in the Central Tomb are considered intrusive, interred after the mound was completed. All intrusive burials are illustrated on figures 14 and 15.

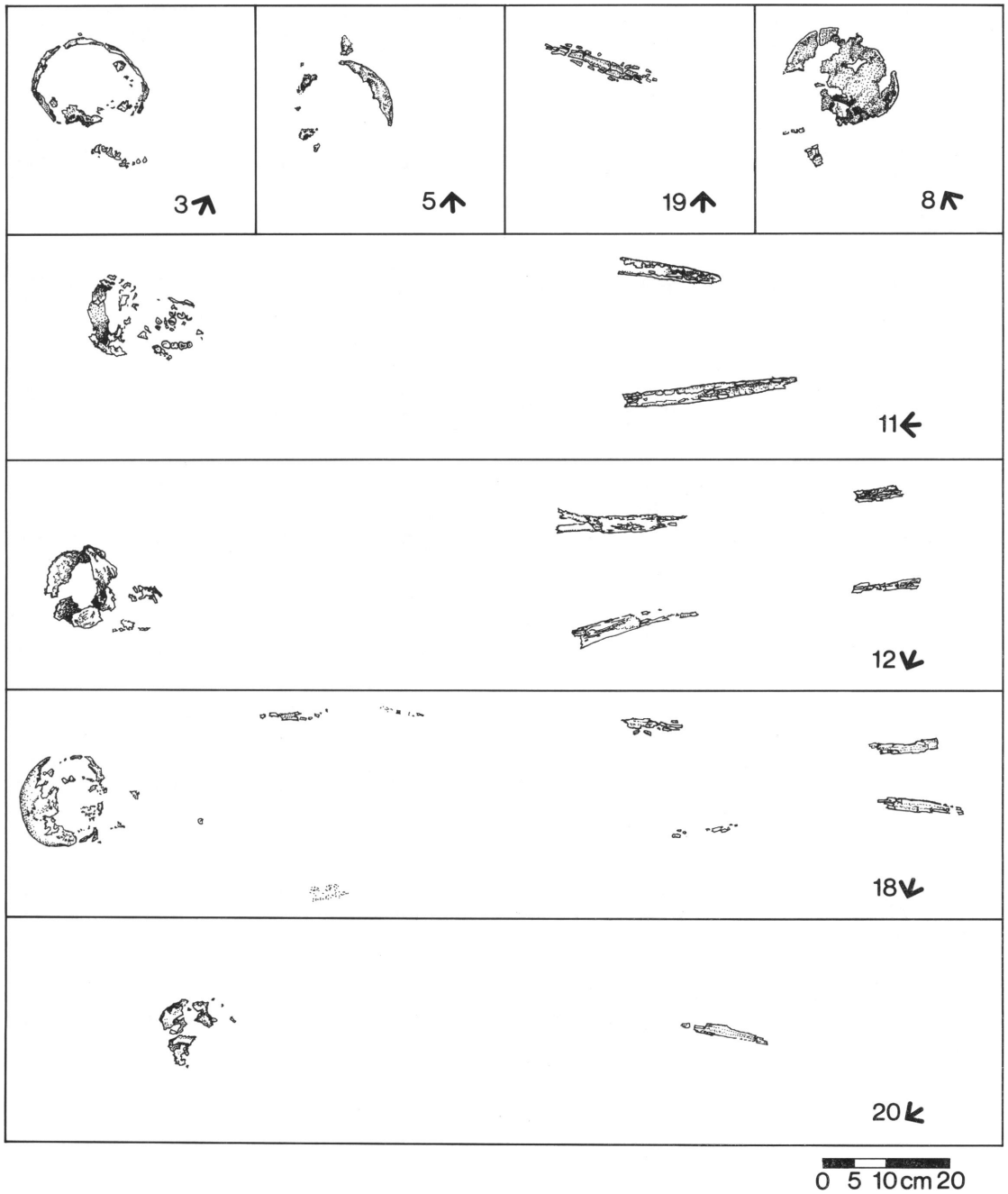


FIG. 15. Intrusive burials found at McLeod Mound.

BURIAL 1: female, adult; supine, extended, head to the southwest; fragments of parietals, left and right temporals, squamosal portion of the occipital, mandible, left humerus, left and right femora, first and second cervical vertebrae; mandibular left first premolar, first, second and third molars, maxillary left second premolar, first and third molars, right first, second and third molars.

BURIAL 2: adult; supine, extended, head to the northwest; fragments of left and right temporals, parietal, frontal, occipital, maxilla, mandible, left and right femora and tibiae; mandibular left and right first premolars through third molars, maxillary left canine, right canine through third molar, right first, second and third molars.

BURIAL 3: female, adult; supine, extended head to the north; cranial reconstruction (left parietal, temporal, sphenoid, squamosal portion of the occipital), fragments of maxilla, mandible, left and right femora; mandibular left and right second premolars through third molars, maxillary first premolar through third molar, right first, second and third molars.

BURIAL 4: female (?), adult; right temporal fragments removed from the south profile of the excavation, burial not completely excavated.

BURIAL 5: male, adult; supine, extended, head to the northeast; cranial reconstruction (squamosal portion of the occipital, left temporal, left and right parietals), fragments of one unidentifiable long bone diaphysis.

BURIAL 6: adult; one flat cranial fragment; long bone diaphyseal fragments.

BURIAL 7: male, adult; supine, extended, head to the southeast; cranial reconstruction (squamosal portion of the occipital, right temporal), fragments of frontal, left temporal, right zygoma, mandible, right humerus, right ulna or radius, left and right femora, left tibia, cervical vertebrae; mandibular right first, second and third molars, maxillary right canine through third molar.

BURIAL 8: adult; head to the northeast: temporal fragments; mandibular right third molar, maxillary right second and third molars; only skull exposed and removed.

BURIAL 9: adult; supine, extended, head to the south; fragments of left and right temporals, occipital, frontal, femoral diaphyses and enamel.

BURIAL 10: female (?), adult; supine, extended, head to the northeast; fragments of right parietal, right temporal, frontal, squamosal portion of the occipital, mandible, left and right femora and tibiae; mandibular right second premolar through third molar, maxillary right second premolar and second molar.

BURIAL 11: adult; supine, extended, head to the north; fragments of left parietal, left and right temporals, squamosal portion of the occipital, maxilla, mandible, left and right femoral diaphyses; mandibular right second and third molars, maxillary left and right second and third molars.

BURIAL 12: female (?), adult; supine, extended, head to the northeast; fragments of left and right temporals, maxilla, left and right femora and tibiae, first and second cervical vertebrae; mandibular right and left third molars.

BURIAL 18: male, adult; supine, extended, head to the northeast; cranial reconstruction (squamosal portion of the occipital, left and right temporals), fragments of mandible, left and right humeri, femora, tibiae, first and second cervical vertebrae; mandibular right third molar, enamel and root fragments.

BURIAL 19: adult; isolated femoral diaphysis fragments.

BURIAL 20: adult; supine, extended, head to the northeast; fragments of left and right temporals, femoral diaphysis, enamel.

CERAMICS

More than 400 sherds were recovered in the excavation at McLeod. Complete sherd counts, and a discussion of their temporal significance is presented by DePratter in Chapter 5. For now, we are concerned with the spatial distribution of the major ceramic types summarized in table 9. The sherds clearly tend to cluster in Unit II, the primary humus (that is, between −21 to −40 cm. below datum). A few sherds were worked down into Unit I, probably the result of the extensive pre-mound digging noted above. About one-third of the ceramics was scattered about in the post-mound fill.

Figure 16 shows the horizontal distribution of the potsherds at McLeod Mound. Although there are a couple of tight clusters (as in squares G2 and B3), the sherds tend to be distributed rather uniformly throughout the site.

The evidence from table 9 and figure 16 clearly indicates that the McLeod ceramics are fortuitous and are therefore not deliberately associated with the human burials. In particu-

TABLE 9
Sherd Frequencies at McLeod Mound

Type	Surface	+109 - +100	+99 - +90	+89 - +80	+79 - +70	+69 - +60	+59 - +50	+49 - +40	+39 - +30	+29 - +20	+19 - +10	+9 - 0	−1 - −10	−11 - −20	−21 - −30	−31 - −40	−41 - −50	−51 - −60	−61 - −70	−71 - −80	−81 - −90	No Vertical Provenience	Total
	Depth																						
St. Catherines Burnished Plain	—	—	—	—	—	—	—	—	—	—	—	—	—	6	—	—	—	—	—	—	—	—	6
Check Stamped (combined)	—	—	—	1	—	1	1	—	1	2	—	4	2	—	5	5	1	1	1	1	—	2	28
Refuge Simple Stamped	1	—	—	—	2	2	2	3	3	7	12	14	22	29	68	90	15	3	3	—	—	—	276
Refuge Plain	1	1	—	—	1	—	2	6	3	1	11	6	8	8	19	37	9	1	1	1	—	—	116
Total	2	2	—	1	3	3	5	9	7	10	23	24	32	43	92	132	25	5	5	2	—	2	427

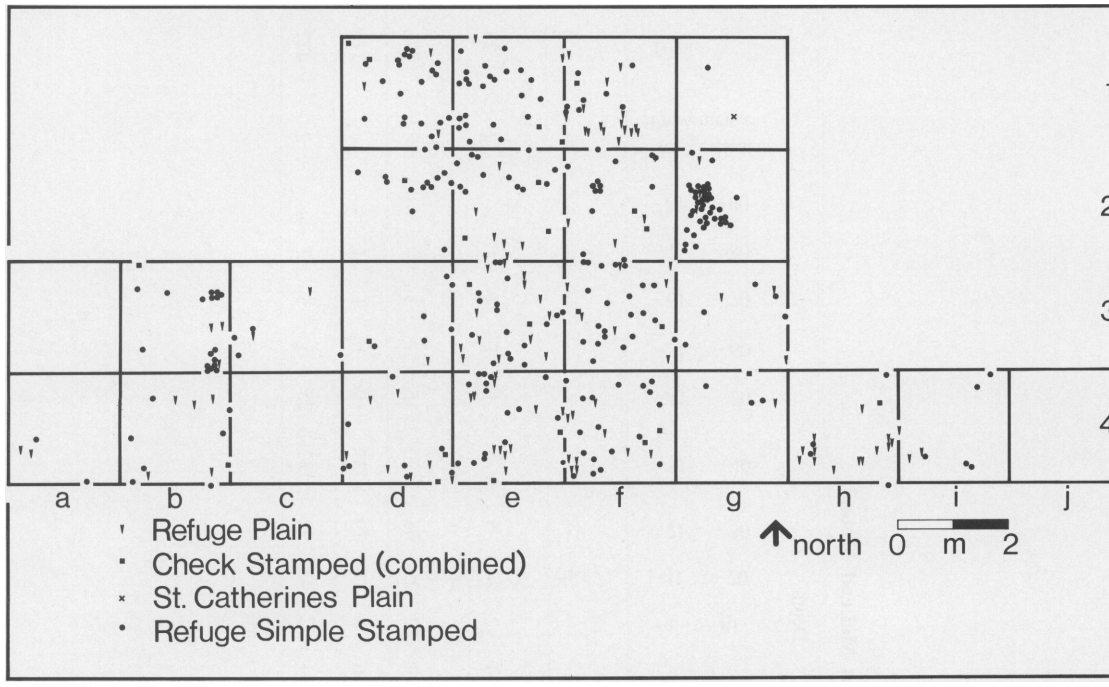


FIG. 16. Horizontal distribution of potsherds at McLeod Mound.

lar, we noted an almost complete absence of cultural materials associated with the premound pit. It seems that the sherds (and indeed, all the cultural associations) are simply inclusions incorporated accidentally within the fill of the mound.

This means that, in a sense, McLeod Mound is actually two separate archaeological sites. It is, of course, a burial mound, probably constructed in the sequence suggested in figure 10. But McLeod also contains hundreds of potsherds and artifacts which have nothing to do with this ceremonial activity. The potsherds and lithics were probably not gravegoods; they simply happen to have been incorporated into the mound fill. The ceramics indicate that the construction of McLeod Mound destroyed an archaeological site of the Refuge period. Perhaps this site was created during the construction of McLeod Mound, perhaps not. But, because sites of the Refuge period are poorly known (see Waring, 1968b, 1968e), these cultural materials provide some clues as to what the habitation site might have looked like before it was destroyed as fill for the McLeod Mound.

ABRADERS

One characteristic that defines the Refuge period is the presence of *abraded sherds*. Waring (1968e, p.207) recognized this artifact type at the Refuge site and suggested that abraders may be restricted to Refuge times. More recently, DePratter (1976a) has found abraders in several Refuge collections, and he too stresses that abraders are diagnostic of this period.

Examination of the McLeod sherds indicates that over 10 percent (47) had been abraded in one manner or another (see figs. 17 and 18). In fact, the relative density of abraders in the McLeod fill is almost twice that at the Refuge site, where Waring recognized only 43 abraders in a sherd collection numbering in excess of 1100. Abraders, as well as the elusive Refuge complex itself, have probably been overlooked in the analysis of many early coastal collections (DePratter, 1976a).

For descriptive purposes, we distinguish five kinds of wear patterns on the surface of the McLeod sherds:

I. ACUTE, ROUNDED EDGE DAMAGE: The wear occurs on one or more sherd edges, with angles

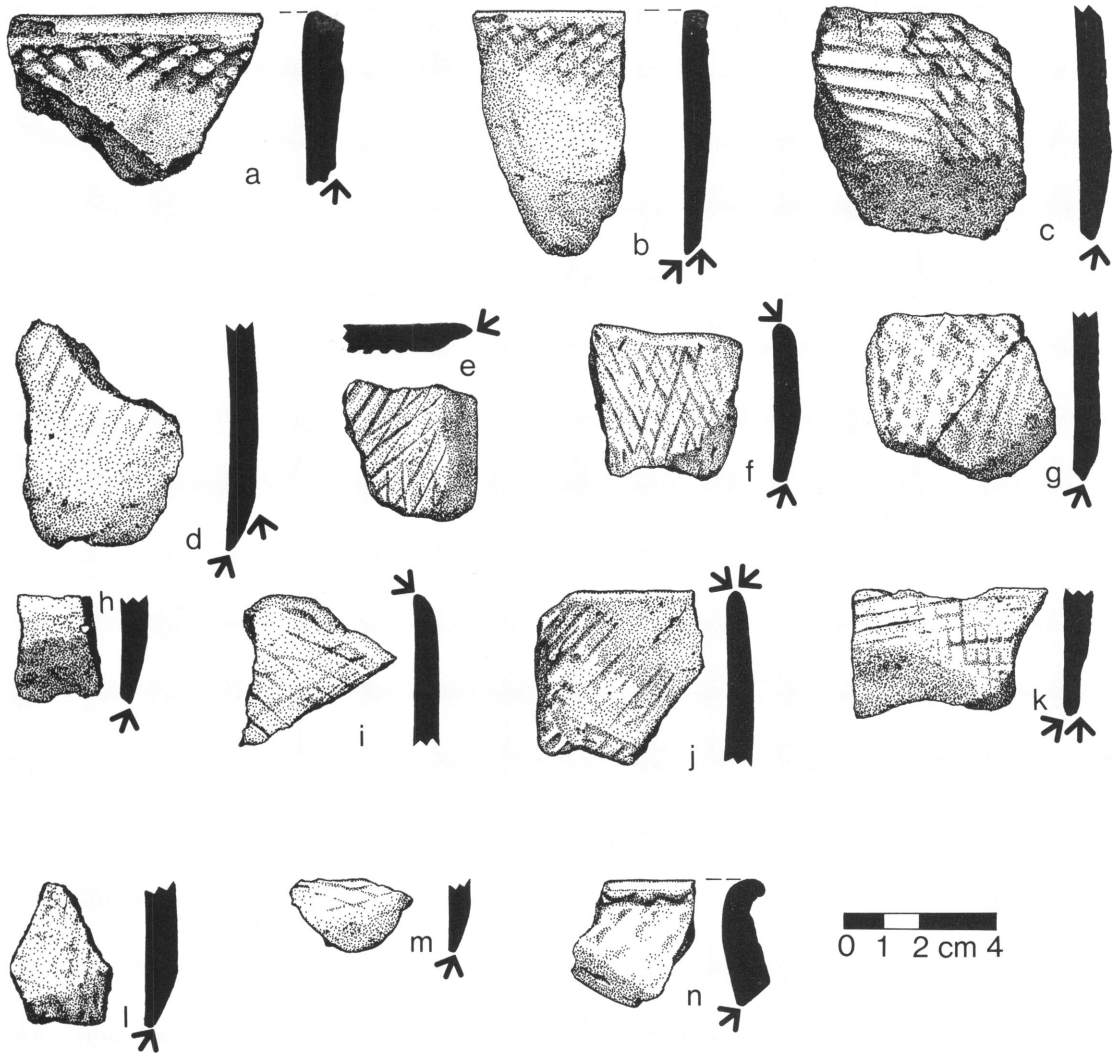


FIG. 17. Abraders made on Refuge Simple Stamped sherds from McLeod Mound. Arrows denote areas of abrasion.

running from 45° to 60° on the same sherd. The abraded material must have been soft because the sherd edges are ground, rather than grooved or faceted as one would expect from a harder surface. Abrasion of hide or soft fiber could produce this kind of wear.

II. FACETED EDGE DAMAGE: This wear, although rare, is quite distinctive. The abraded material must have been hard and flat; the sherd wears without rounding at all, indicating a steady back-and-forth pressure at a constant angle against a resistant surface. These abraders could have functioned as rasps for smoothing wood, flat bone, or even pottery.

III. FLAT SURFACE ABRASION: Damage occurs on the body of the sherd rather than on the edge. The wear can be faint, barely obliterating the surface texture. The abraded object must have been rather soft, since a hard material would produce faceting which is lacking. Wear of this kind could result from a light sandpapering action on any flat, fairly soft surface.

IV. SHALLOW GROOVE SURFACE DAMAGE: This wear seems to be a more extreme version of Type III wear; abrasions are restricted once again to the sherd body, and consist of gradual, shallow surface depressions. The sharp grooves and scratches which characterize sherd hones are absent. The sherd may have been held stationary, with some soft, rounded object rubbed across the surface.

V. DAMAGE FROM DRILLING: Sherds occasionally show shallow pits which seem to result from light

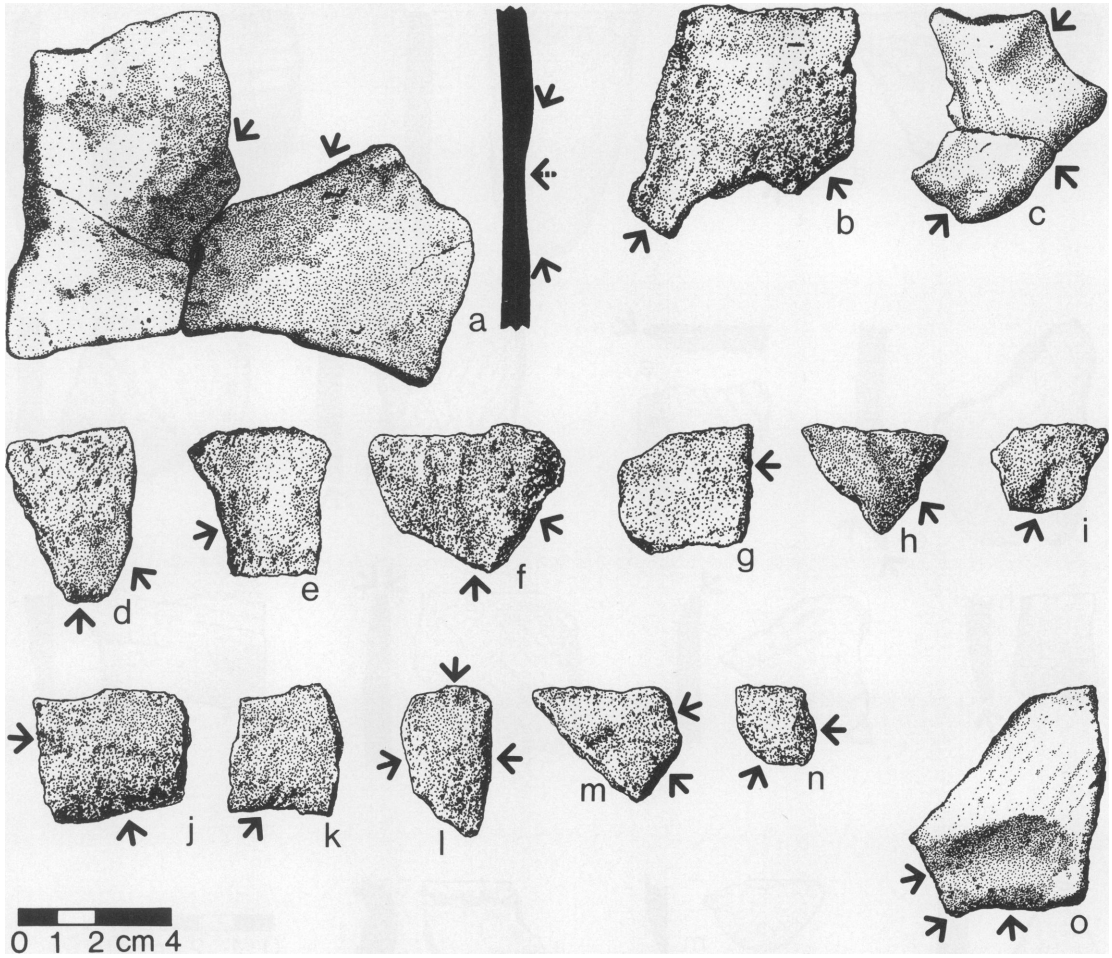


FIG. 18. Abraders made on Refuge sherds from McLeod Mound.

drilling. Sherds could have served as either bases for some kind of rotary drill, or perhaps as hand grips for devices such as fire-drills.

Table 10 presents the frequency of wear on the 47 McLeod sherds. It is interesting to note that much of the flat Type III surface abrasion occurs on Refuge Simple Stamped sherds, and the shallow grooves (Type IV abrasion) occur most commonly on Refuge Plain sherds. Drill holes (Type V damage) were absent at McLeod.

Whatever the specific uses, it seems clear that the McLeod abraders functioned in a variety of ways. There is no stone native to St. Catherines Island, and the sherd abraders seem to be a ceramic analogue of stone tools manufactured in areas of available quarry stone.

LITHICS

Only two projectile points were found during our excavations at McLeod Mound (table 11, fig. 19). A dark brown chert point was possibly associated with burial 10 and a light brown point base was found near burial 17, although the association is not certain.

Four chert flakes, a complete hammerstone,

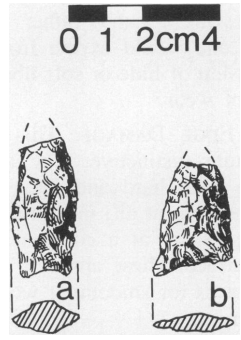


FIG. 19. Projectile points found at McLeod Mound. a. 28.0/504; b. 28.0/783.

TABLE 10
Abraded Sherds from the McLeod Mound

Spec. no.	Type	Wear I	II	III	IV	V	Remarks
28.0/736	Refuge Simple Stamped	X	—	—	—	—	—
28.0/519	Refuge Simple Stamped	—	X	X	—	—	—
28.0/569	Refuge Simple Stamped	X	—	—	—	—	—
28.0/424	Refuge Simple Stamped	X	—	—	—	—	Worked on both sides
28.0/832	Deptford Check Stamped	—	—	X	—	—	—
28.0/741	Deptford Check Stamped	—	—	X	—	—	Rim
28.0/595	Refuge Plain	—	—	—	X	—	—
28.0/465	Refuge Plain	X	—	—	—	—	—
28.0/851	Refuge Plain	X	—	—	X	—	—
28.0/738	Refuge Plain	—	—	—	X	—	—
28.0/397	Refuge Plain	X	—	—	X	—	—
28.0/731	Refuge Plain (or Refuge Simple Stamped)	—	—	—	X	—	—
28.0/744	Refuge?	—	—	—	X	—	—
28.0/475	Refuge?	X	—	—	—	—	—
28.0/525	Refuge?	X	—	—	X	—	—
28.0/389	Refuge?	X	—	—	X	—	—
28.0/527	Refuge?	—	—	—	X	—	—
28.0/693	Refuge?	X	—	—	—	—	—
28.0/462	Refuge Plain	—	—	X	—	—	—
28.0/623	Refuge?	X	—	—	X	—	—
28.0/432	Refuge Plain	—	—	—	X	—	—
28.0/818	Refuge Plain	X	—	—	—	—	—
No Prov.	Refuge?	—	—	X	—	—	—
28.0/696	Refuge?	—	—	X	—	—	—
28.0/395	Refuge Simple Stamped	—	—	X	—	—	—
28.0/710	Refuge Simple Stamped	—	—	X	—	—	—
28.0/353	Refuge Simple Stamped	—	—	—	X	—	—
28.0/583	Refuge Simple Stamped	—	—	X	—	—	—
28.0/714	Refuge Simple Stamped	X	—	X	—	—	—
28.0/669	Refuge Simple Stamped	X	—	—	—	—	—
28.0/490	Refuge Simple Stamped	—	—	X	—	—	—
28.0/801	Refuge Simple Stamped	X	—	—	—	—	—
28.0/392	Refuge Simple Stamped	X	—	—	—	—	—
28.0/586	Refuge Simple Stamped	X	—	—	—	—	—
28.0/717	Refuge Simple Stamped	X	—	—	—	—	—
28.0/708	Refuge Simple Stamped	X	—	—	—	—	—
28.0/721	Refuge Simple Stamped	—	—	X	—	—	—
28.0/614	Refuge Simple Stamped	X	—	—	—	—	—
28.0/668	Refuge Simple Stamped	X	X	—	—	—	—
28.0/808	Refuge Simple Stamped	—	X	—	—	—	Rim
28.0/804	Refuge Simple Stamped	X	—	X	—	—	—
28.0/515	Refuge Simple Stamped	X	—	X	—	—	—
28.0/417	Refuge Simple Stamped	—	—	X	—	—	Rim
28.0/645	Refuge Simple Stamped	—	X	X	—	—	—
28.0/728	Refuge Simple Stamped	—	—	—	X	—	—
28.0/678	Refuge Simple Stamped	X	—	X	—	—	—
28.0/589	Refuge Simple Stamped	X	—	X	—	—	—

TABLE 11

Attributes for Projectile Points from all Refuge-Deptford Mounds
(Variates in parentheses are estimates for broken artifacts. Measurements in Millimeters and Grams.)

Spec. No.	Site	Association	Length Max.	Length Axial	Width Max.	Width Basal	Thickness	Weight	Material
28.0/345	Cunningham C	Burial 3	61.5	54.5	26.3	—	4.5	6.3	Chert
28.0/346	Cunningham D	central pit	39.6	39.6	23.7	23.0	11.0	8.0	Quartzite
28.0/350	Cunningham D	Burial 2	54.6	54.6	23.0	22.0	8.5	11.8	Chert
28.0/351	Cunningham D	Burial 2	61.6	60.6	21.0	—	15.5	12.1	Chert
28.0/504	McLeod	Burial 7	(41.0)	(40.0)	17.3	14.0	7.7	5.6	Chert
28.0/766	Cunningham D	Burial 4 ?	33.5	32.1	18.6	—	6.7	4.8	Chert
28.0/783	McLeod	Burial 10 ?	(33.5)	(30.0)	19.6	—	5.0	3.2	Chert
28.0/920	Cunningham D	central pit	(48.5)	(43.0)	32.0	—	6.7	(7.7)	Chert
28.0/947	Cunningham D	Burial 4	46.0	—	23.7	—	11.3	10.1	Chert
28.0/950	Cunningham D	Burial 4	41.2	—	20.3	17.3	9.0	5.1	Chert
28.0/951	Cunningham D	Burial 4	37.5	—	24.1	16.8	8.6	6.7	Chert
28.0/952	Cunningham D	Burial 4	35.2	—	25.6	20.2	7.6	6.7	Chert
28.0/953	Cunningham D	Burial 4	33.3	—	23.2	20.2	9.4	7.2	Quartzite
28.0/954	Cunningham D	Burial 4	57.0	—	24.6	20.8	8.2	11.3	Chert
28.0/958	Cunningham D	Burial 4	42.0	—	19.6	—	6.8	5.1	Chert
28.0/1100	Cunningham A	Below central pit	73.0	—	34.0	25.5	7.9	23.7	Chert
28.0/1104	Seaside II	Below burial 2	(62.5)	—	37.0	15.2	9.0	16.7	Chert
28.0/1177	Seaside I	Below Feature 1	40.7	—	24.0	17.3	10.0	9.0	Chert
28.0/1184	Seaside I	Unit III Fill	40.0	—	23.7	20.0	9.4	7.9	Chert
28.0/1387	Seaside II	Unit III Fill	—	—	18.1	18.1	6.1	1.5	Chert

and a well-worn small side-scraper were also found in the fill of McLeod Mound.

Shark's Tooth

A single, broken shark's tooth (fig. 20d) was found in the mound fill not far from the Central Tomb at McLeod Mound (sq. E3, 26 cm. below datum). C. Lavett Smith of the Department of Ichthyology, the American Museum of Natural History, has examined the specimen, and concluded that it is probably from the recent great white shark *(Carcharodon carcharias)*.

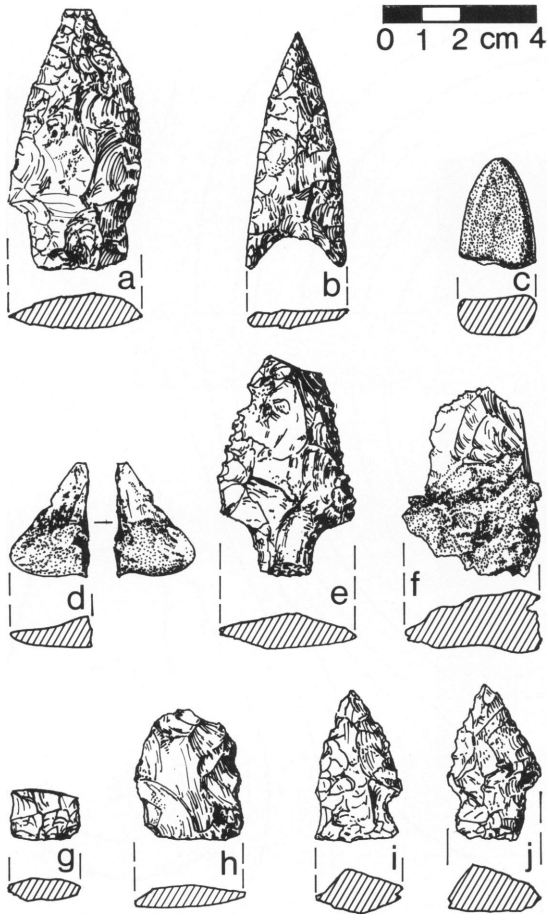


Fig. 20. Miscellaneous artifacts recovered from the Refuge-Deptford mounds on St. Catherines Island. a. projectile point 28.0/1100 (Cunningham Mound A); b. projectile point 28.0/345 (Cunningham Mound C); c. polished stone fragment 28.0/1628 (Cunningham Mound C); d. partially drilled shark's tooth 28.0/1212 (McLeod Mound); e. projectile point 28.0/1104 (Seaside II); f. chert scraper 28.0/1128 (Seaside II); g. projectile point or biface base 28.0/1387 (Seaside II); h. scraper 28.0/1264 (Seaside I); i. projectile point 28.0/1184 (Seaside I); j. projectile point 28.0/1177 (Seaside I).

The tooth has been drilled from both sides, and is quite similar to the specimen illustrated by Furey (1977, fig. 1*a*). The breakage occurred along the axis of the central hole, and it seems likely that the specimen was broken in the process of drilling. The tooth fragment was examined microscopically, but no signs of wear or striations are apparent.

The tooth seems to be an artifact discarded in the process of manufacture, then included accidentally in the mound fill. We do not think the shark's tooth functioned as grave furniture.

CUNNINGHAM MOUND A

Cunningham Mound A (9 Li 43) is the largest and most southern burial site in the Cunningham Field Mound group. Situated 100 meters southeast of the antebellum boundary ditch, the mound stands about 75 cm. high and covers an area of approximately 400 square meters (fig. 21). Two conspicuous borrow pits lie to the southeast and northeast of the mound. There were no signs of previous investigation.

Crews from the American Museum of Natural History began investigation of Cunningham Mound A in November 1975, when a number of large hickory and small oak and pine trees was removed. A permanent brass datum (stamped "AMNH 100") was set in concrete 30 meters north of the center of the mound. An initial north-south stratigraphic trench was excavated and profiled (fig. 22), and was followed by an intersecting east-west trench. As discussed below, the stratigraphic profiles indicated the presence of a central pit to the west, so several additional excavation units were opened in January 1977. Approximately 80 cubic meters of fill was excavated by the American Museum, and we estimate that at least 200 cubic meters remain unexcavated.

Stratigraphy

The north-south stratigraphic profile is shown in figure 23 and the major stratigraphic Units are described on table 12. The construc-

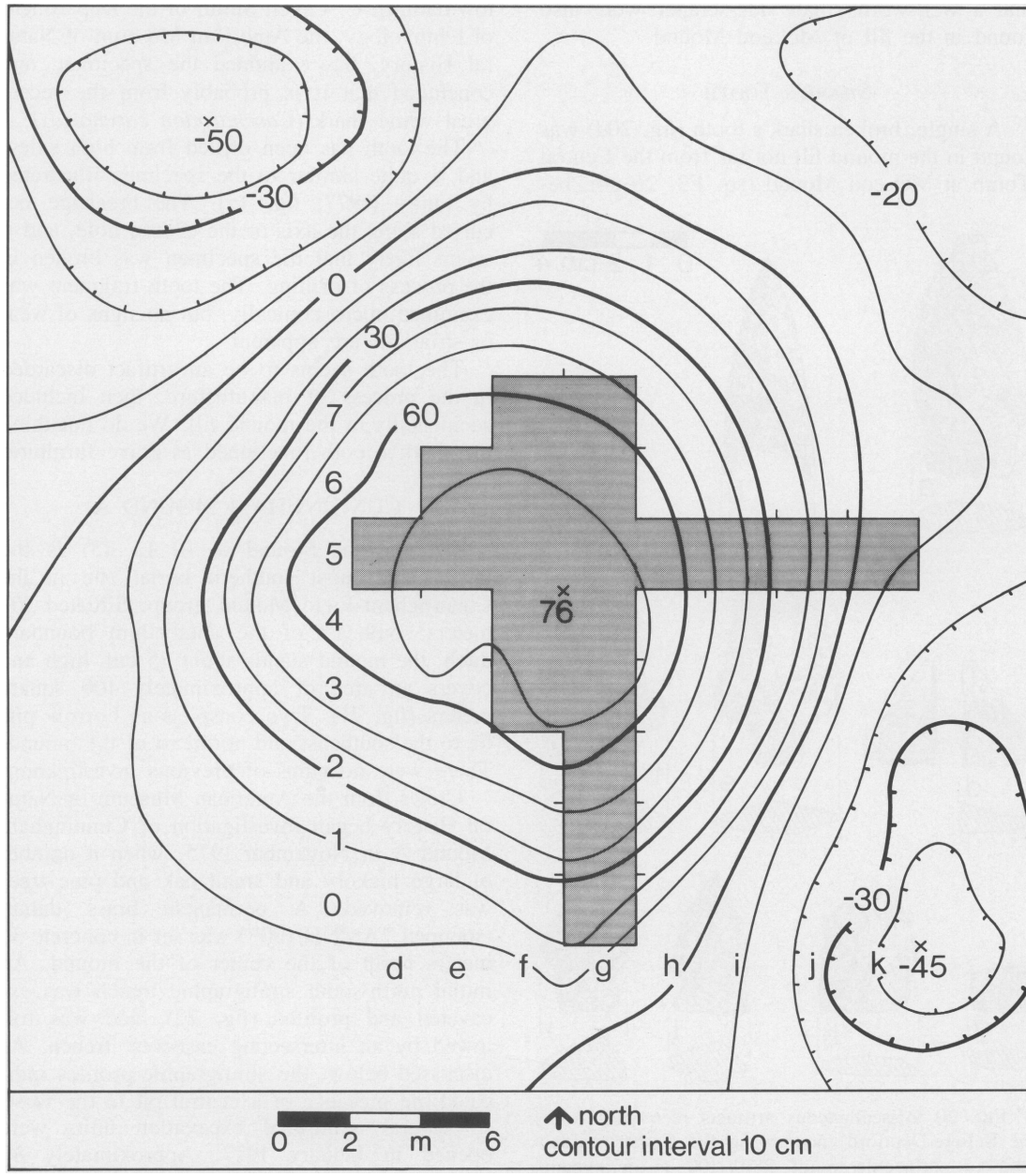


FIG. 21. Topographic map of Cunningham Mound A. Shaded portion indicates area excavated by the American Museum of Natural History.

tion on Cunningham Mound A began with an intensive burn of the primary humus (Unit II). Unit II, when excavated, was littered with charcoal and burnt tree stumps. The burning, more intensive than evident on any other of the St. Catherines burial mounds, was concentrated toward the center of the mound. In places, the burnt stratum was 30 cm. thick. A small test

excavation approximately 100 meters to the south showed no evidence of any burning to a depth of about 150 cm. We think that the field was cleared, the vegetation stacked near the center and torched.

After the field was cleared, a number of pits was excavated through the burnt humus into the sterile substratum (Unit I). The following pre-mound features were excavated:

FEATURE 1: Pit measuring 41 cm. in diameter, excavated into primary humus; approximately 25 cm. in depth, filled with dense charcoal and burnt pine pitch.

FEATURE 2: Pit measuring 56 cm. in diameter, excavated through primary humus; approximately 33 cm. in depth, filled with dark humic sand and charcoal.

FEATURE 3: Large burnt upright log, perhaps a stump, measuring about 55 cm. in diameter. Outer portions radiocarbon dated to: 1270 B.C. ± 85 (UGA-1254); 210-380 B.C. ± 70 (UCLA-1997C). Stump lies in primary humus and was probably burned when the mound was initially cleared.

FEATURE 4: Large burnt log, lying flat; approximately 115 cm. in length and 39 cm. in width. Outer portions radiocarbon dated to A.D. 130-110 ± 75 (UGA-1560).

FEATURE 5: Pit measuring 90 cm. in diameter, excavated through primary humus into sterile substratum; approximately 20 cm. in depth, filled with dense charcoal and ash deposit.

FEATURE 6: Pit measuring 40 cm. in diameter excavated through primary humus into sterile substratum; approximately 50 cm. in depth, filled with charcoal and ash.

In addition, a large central pit was excavated into the sterile substratum. The oval pit measured approximately 3 meters north-south by 3.5 meters east-west and was approximately 90 cm.

FIG. 22. Cunningham Mound A after excavations had been completed. Photograph taken in late January 1977.

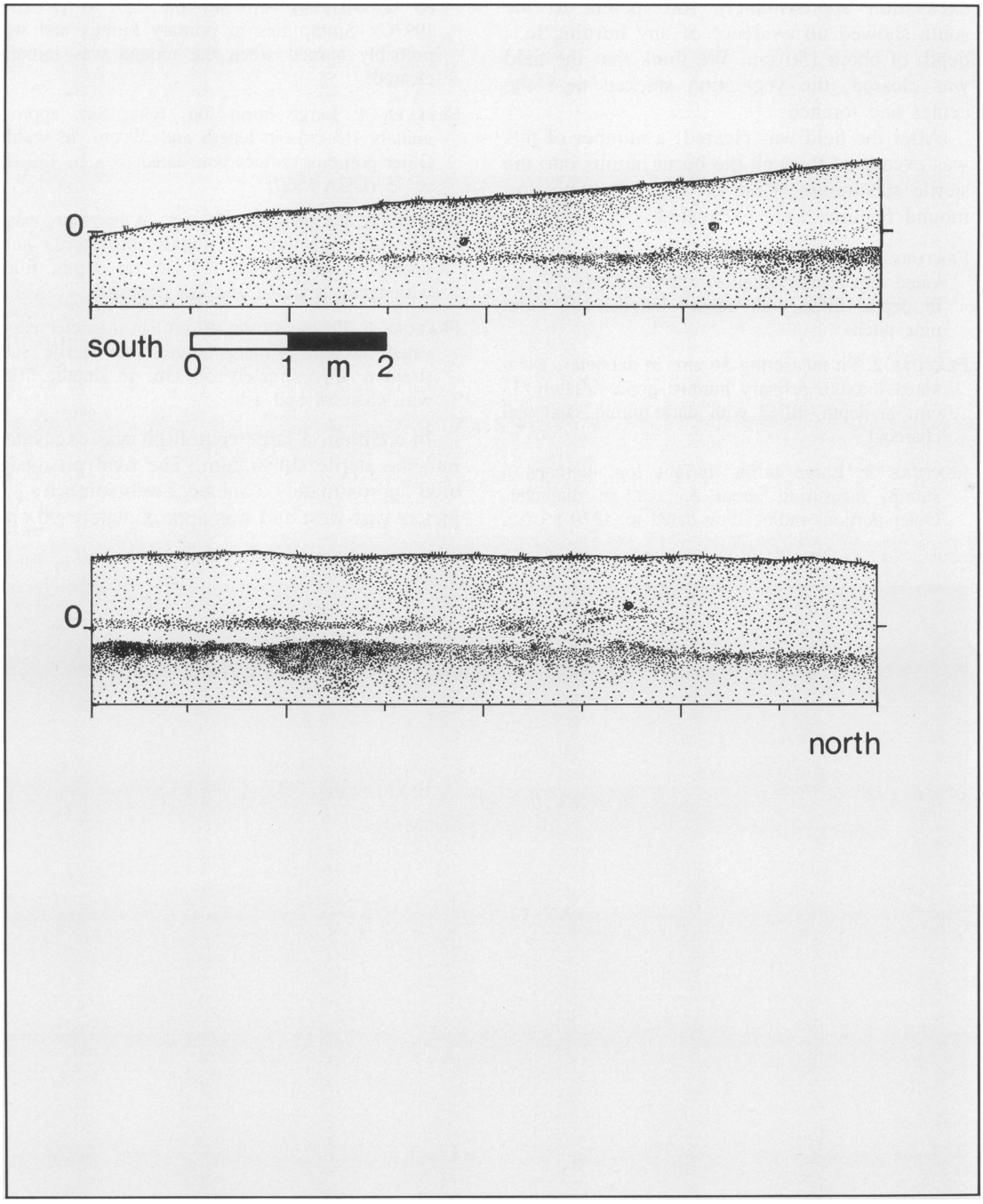


FIG. 23. Stratigraphic profile of Cunningham Mound A, showing the west wall of trench G.

deep at the center. Charcoal from the fill was dated to 1770-1870 B.C. ± 90 (UGA-1562). The fill was light tan mottled sand, which appeared in marked contrast to the very dark gray

TABLE 12
Measured Stratigraphic Section of Cunningham Mound A

Unit	Thickness (cm.)	Description
IV	8	*Secondary humus*, dark grayish brown sand (10 YR 4/2: dry), dense root mat, formed as A horizon of Unit IIIc. Contact gradual over 3 cm.
IIIc	50	*Mound fill* grades from dark brown sand (10 YR 3/3: dry) at top to yellowish brown (10 YR 5/4) at bottom, a few scattered charcoal flecks present. Contact abrupt.
IIIb	15	*Redeposited primary humus*, very dark gray sand (10 YR 3/1: dry). Contact abrupt.
IIIa	10	*Shallow lens*, very pale brown sand (10 YR 7/3: dry). Contact abrupt.
II	15	*Primary humus*, very dark gray sand, (10 YR 3/1: dry), heavily carbonized, formed as A horizon of Unit I. Radiocarbon date: 210-380 B.C. ± 70 (UGA-1997C). Contact gradual over 10 cm.
I	30+	*Sterile substratum*, yellowish brown sand (10 YR 5/4: dry). Bottom not exposed.

pit margins. This central pit was empty except for a single projectile point (described below).

The stratigraphy of the central pit at Cunningham A is very similar to that at the McLeod Mound. As the central pit was being excavated, the backdirt was apparently piled up around the margins because the humus (Unit II) is much thicker around the edges of the central pit. Then the excavators came upon the unburnt, sterile sand (Unit I) which underlies the humus. This sterile yellow fill (Unit IIIa) was spread on the thick humus. Thus we interpreted the thin yellow sand lens in figure 23 as reworked Unit I, removed as backdirt from the central pit. As at McLeod, the central pit was barely excavated into the sterile substratum because only minimal yellow backdirt was removed. The pit was enlarged but only in the outlying dark humic portions. This later backdirt (Unit IIIb) continued to accumulate over the sterile sand lens until the pit had been completed. The central pit was then filled with lightly mottled sterile sand, probably obtained from a borrow pit located off the mound area proper. This distinct black/yellow/black banding hence results from excavating a central pit through burnt humus into the underlying sterile substratum. This feature was observed repeatedly in our excavations on St. Catherines Island.

The mound was then constructed using fill obtained from the two large borrow pits observable on the perimeter of Cunningham Mound A. The fill is somewhat mottled, reflecting a mixture of both sterile substratum and the overlying A horizon (Unit II).

After completion of the mound, one (or more) intrusive burials were added. Excavations made by the American Museum crews encountered only one such burial (described below), but because only 30 percent of the mound fill was excavated, additional intrusive burials probably remain undiscovered.

Skeletal Remains

Only a single intrusive burial was found at Cunningham Mound A. This individual was probably 18 to 25 years old, but sex was inde-

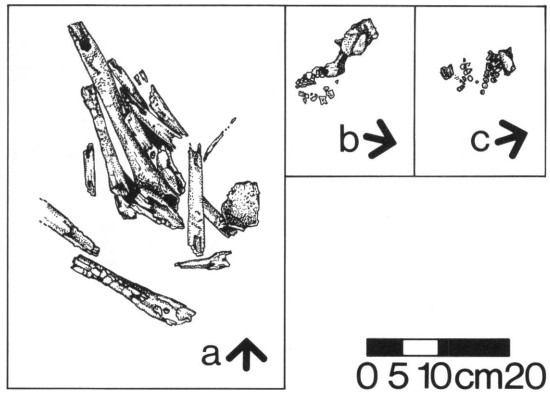


FIG. 24. Miscellaneous burials found in the Refuge-Deptford mounds on St. Catherines Island. a. burial 1 at Cunningham Mound E; b. burial 1 at Cunningham Mound A; c. burial 1 at South New Ground Mound.

terminate. Only the following elements were recovered: occipital and mandible fragments, maxillary dentition from right canine through third molar, mandibular right second and third molars. The burial is illustrated in figure 24b.

Cultural Association

Three potsherds were found in stratigraphic Unit II, square G-7. All three sherds are Oemler Complicated Stamped, and they are illustrated in figure 73.

A single chert projectile point (28.0/1100) was found immediately below the pre-mound pit. This point is illustrated in figure 20a.

CUNNINGHAM MOUND B

Cunningham Mound B (9 Li 44) is situated 125 meters northeast of Mound A. The mound stands 117 cm. high and covers approximately 200 square meters (fig. 25). Three shallow borrow pits are situated to the south, the northeast, and the northwest of the mound. There were no signs of previous excavation.

Cunningham Mound B was the first mound

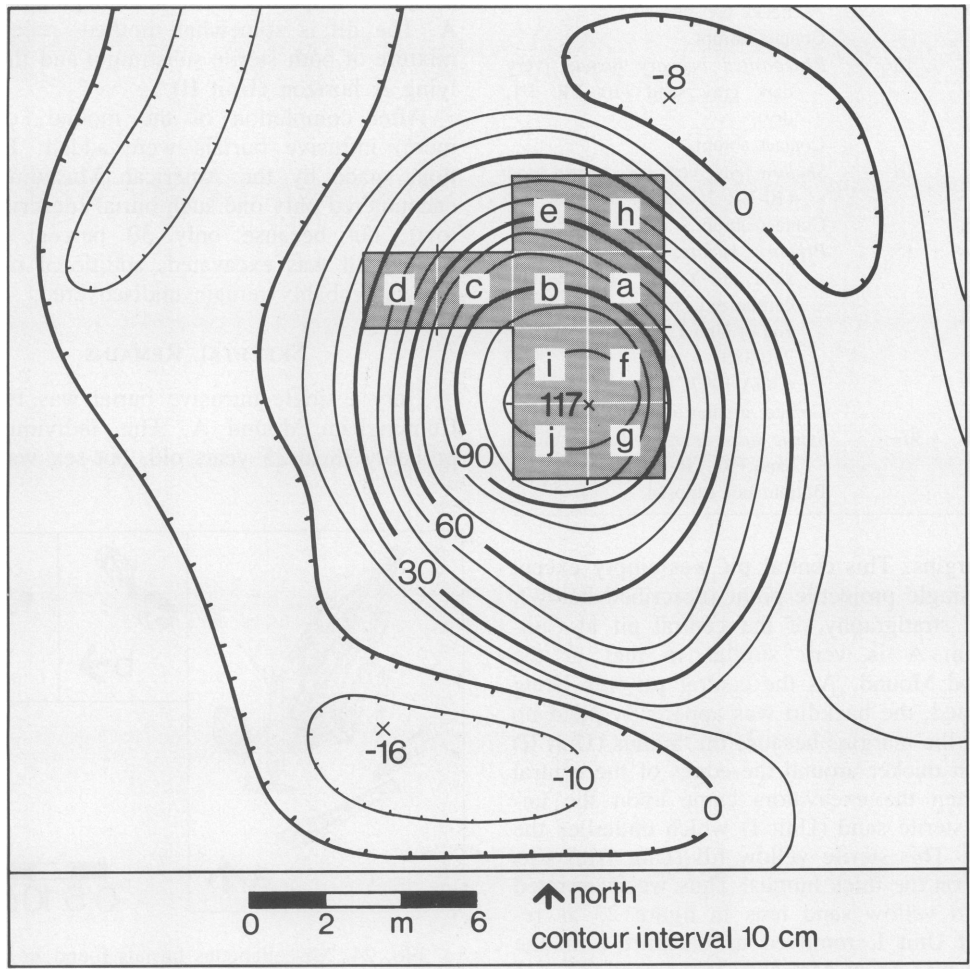


FIG. 25. Topographic map of Cunningham Mound B. Shaded portion indicates area excavated by the American Museum of Natural History.

on St. Catherines Island explored by the crews from the American Museum. Vegetation was cleared and initial test units were excavated in March 1975. A permanent brass datum (stamped "AMNH 101") was set in concrete 20 meters northwest of the center of the mound. Excavations made by the American Museum crews were completed March 1977 (fig. 26). A total of 50 cubic meters of fill were removed, leaving about 150 cubic meters untouched.

STRATIGRAPHY

The major east-west stratigraphic profile is shown in figure 27 and the stratigraphic units are described on table 13. The sequence of

FIG. 26. Cunningham Mound B after excavations had been completed. Photograph taken in May 1977.

construction seems roughly similar to that noted at McLeod and Cunningham Mound A; the major difference is that no central pit is evident at Cunningham B.

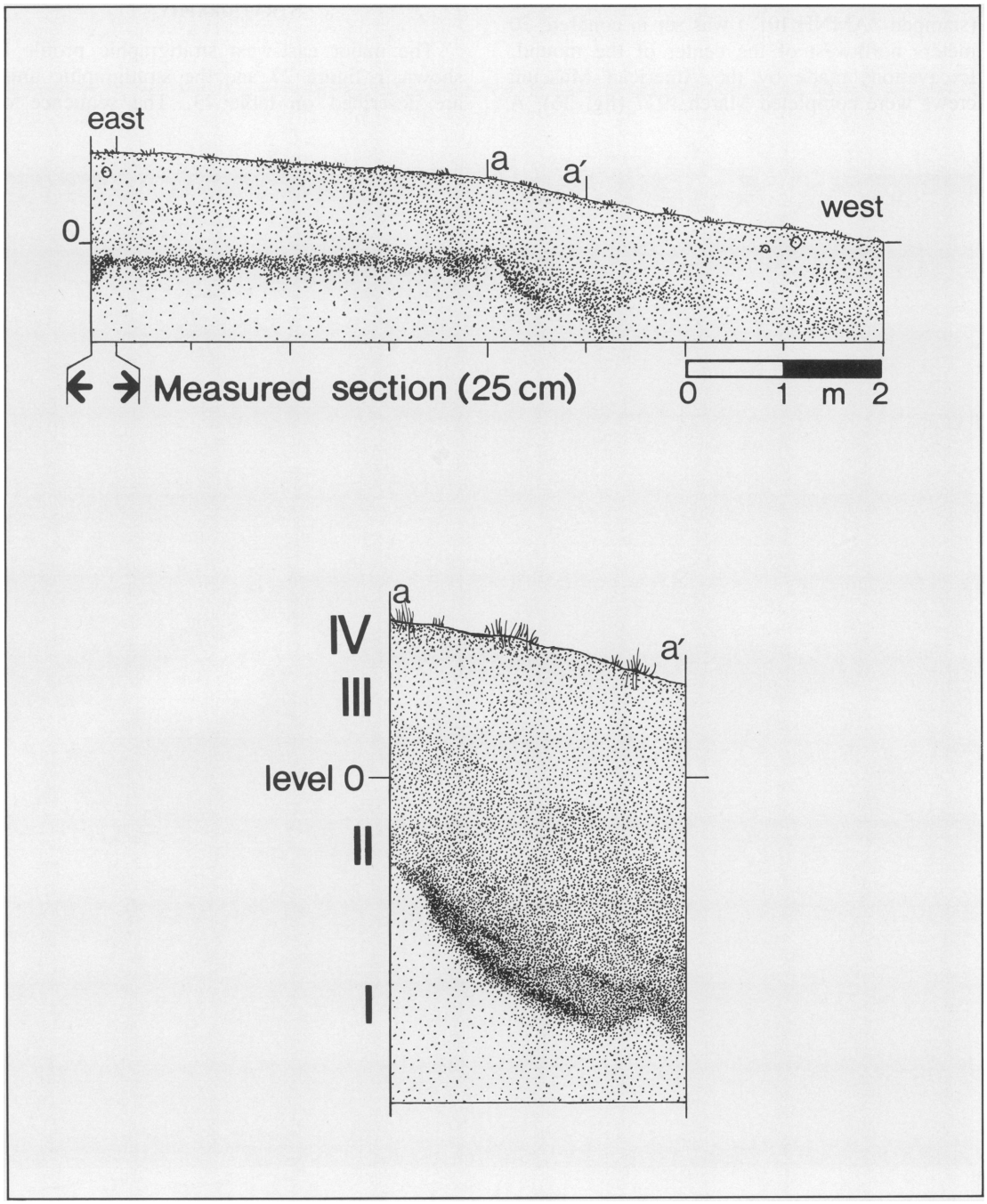


FIG. 27. Stratigraphic profile of Cunningham Mound B, showing south wall of trench ABCD.

As before, Unit I is sterile sand, probably deposited during the Pleistocene. The overlying primary humus (Unit II) has been burnt, and two radiocarbon dates are available from charcoal within the humus: A.D. 110-90 and A.D. 130-110. These two dates are statistically indistinguishable. A number of pre-mound pits was excavated through the primary humus into the sterile substratum:

FEATURE 1: Pit measuring 40 cm. in diameter, excavated into primary humus (northern margin of sq. B); approximately 30 cm. deep, filled with dense charcoal. Maybe a burnt log. Charcoal from this pit has been radiocarbon dated to 765 B.C. and 230-380 B.C.

FEATURE 2: Pit measuring 45 cm. in diameter, excavated through primary humus (eastern margin of sq. I); approximately 50 cm. in depth, filled with humic sand. This feature is evident in figure 27.

We found no evidence of a central pit, although the center portion of the mound was thoroughly cross-sectioned.

TABLE 13
Measured Stratigraphic Section of Cunningham Mound B

Unit	Thickness (cm.)	Description
IV	10	*Secondary humus* (10 YR 6/1: dry), gray sand with abundant rootlets. Contact gradual.
IIIb	50-55	*Late mound fill* (10 YR 6/2: dry), light brownish gray sand. Contact distinct.
IIIa	10-15	*Early mound fill* (10 YR 5/2: dry), grayish brown sand. Contact distinct.
II	17	*Primary humus* (10 YR 5/1: dry), gray sand with charcoal flecks present. Radiocarbon dates from pre-mound Feature 1: 230-380 B.C. ± 75 (UGA-1008), 765 B.C. ± 70 (UCLA-1978). Radiocarbon date from primary humus: A.D. 110-90 ± 70 (UGA-1007), A.D. 130-110 ± 70 (UGA-1684). Contact gradual.
I	20+	*Sterile substratum* (10 YR 7/4: dry), yellowish brown sand. Bottom not exposed.

The actual mound was constructed sometime after the primary humus had been burnt. Figure 27 shows that the initial borrow pit was actually rather close to the center of the mound. As the initial mound grew, the dirt was excavated from farther away. The stratigraphic section in figure 27 clearly shows that the primary humus was truncated by this lateral excavation. As the mound grew, this early borrow area was filled by later deposition, until the contour reached that evident in figure 25.

No bones of any kind were encountered in the excavation at Cunningham Mound B.

CULTURAL ASSOCIATIONS

Despite careful troweling and shovel-scraping, only a single potsherd was found during our excavations. This Oemler Complicated Stamped sherd (fig. 73) was found near the top of Unit II in sq. B.

CUNNINGHAM MOUND C

Cunningham Mound C (9 Li 45) is a small burial mound approximately 100 meters northeast of the boundary ditch surrounding Cunningham Field. The mound stands only 56 cm. high and covers less than 250 square meters. Two shallow borrow pits are situated immediately to the north and south of the mound. There were no signs of previous excavation (fig. 28).

Crews from the American Museum began investigations at Mound C in November 1975. The mound was cleared of one large hickory and several small pine trees. A permanent brass datum (stamped "AMNH 103") was set in concrete 10 meters northeast of the center of the mound. The site was again excavated in May 1977. American Museum crews excavated approximately 25 cubic meters of fill at Cunningham Mound C, leaving about 75 cubic meters untouched (fig. 29).

STRATIGRAPHY

Cunningham C is the smallest of the mounds explored on St. Catherines Island, yet its stratigraphy is probably the most complex. The stratigraphic profile is shown in figure 30 and described in table 14.

The mound is built on a substratum of ster-

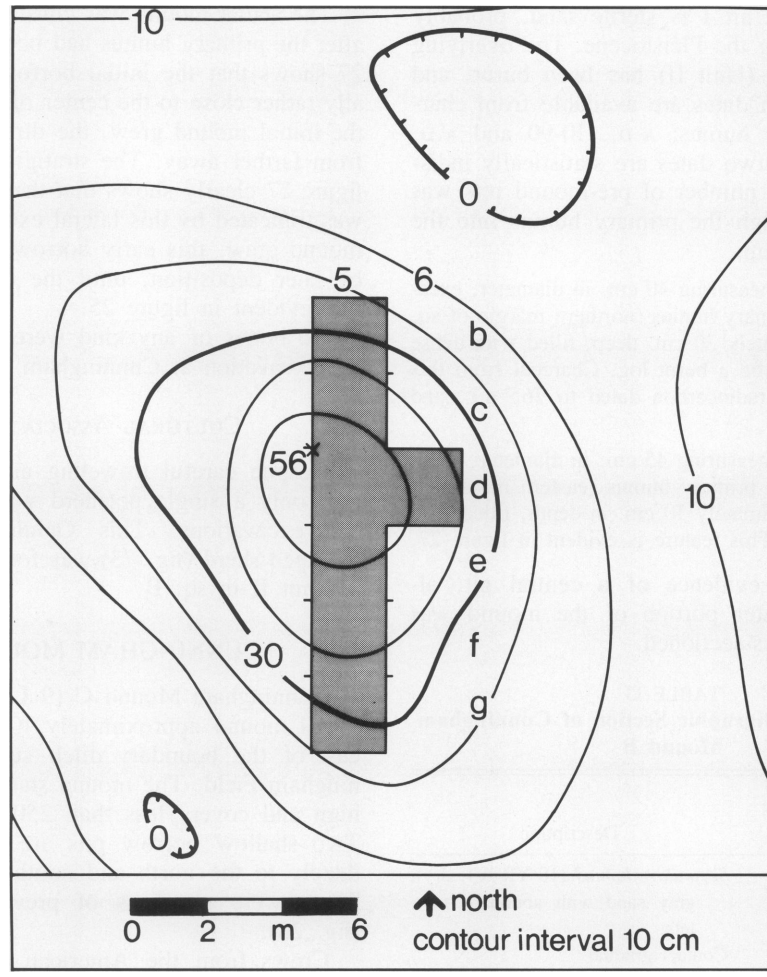


FIG. 28. Topographic map of Cunningham Mound C. Shaded portion indicates area excavated by the American Museum of Natural History.

ile Unit I sand, but the contact with the overlying Unit II primary humus is indistinct and undulating. Part of this can certainly be explained by the later disturbances by cultural features. Apparently Unit II was burnt at least once. Features 2 and 3 were obviously excavated before the construction of the mound:

FEATURE 2: Pit measuring 42 cm. north-south and 53 cm. east-west, excavated through primary humus (sq. C5, 31 cm. from the north, 77 cm. from the west); pit is filled with charcoal, dozens of fragments of cremated bone (burial 2), a broken biface fragment (28.0/1607) and several potsherds, mostly St. Simons Plain. Charcoal from this pit has been radiocarbon dated to 1300-1360 B.C. ± 70.

FEATURE 3: Pit measuring 20 cm. north-south and 23 cm. east-west, (C5, 15 cm. from the north, 60 cm. from the west); pit is filled with dense charcoal, but no bone or sherds present.

It seems that Unit II was burnt sometime after Features 2 and 3 were constructed. A single radiocarbon date on charcoal from the humus is 480 B.C. ± 90.

The mound was built sometime after the

burning of Unit II, and at least one instrusive pit, Feature 1, was added:

FEATURE 1: Hearth measuring about 35 cm. east-west and 55 cm. north-south (sq. D5, 115 cm. from west, 40 cm. from south); penetrates through primary humus. This feature appears to be the remains of a fire built in pit for burial 1. Charcoal from this feature has been radiocarbon dated to A.D. 590-570 ± 70.

A thin layer of secondary humus, Unit IV, then developed over the entire surface of the mound.

SKELETAL REMAINS

The following pre-mound burials were located at Cunningham Mound C (figs. 31 and 32):

BURIAL 2: two adults (two right frontal fragments at

FIG. 29. Cunningham Mound C after excavations had been completed. Photograph taken in May 1977.

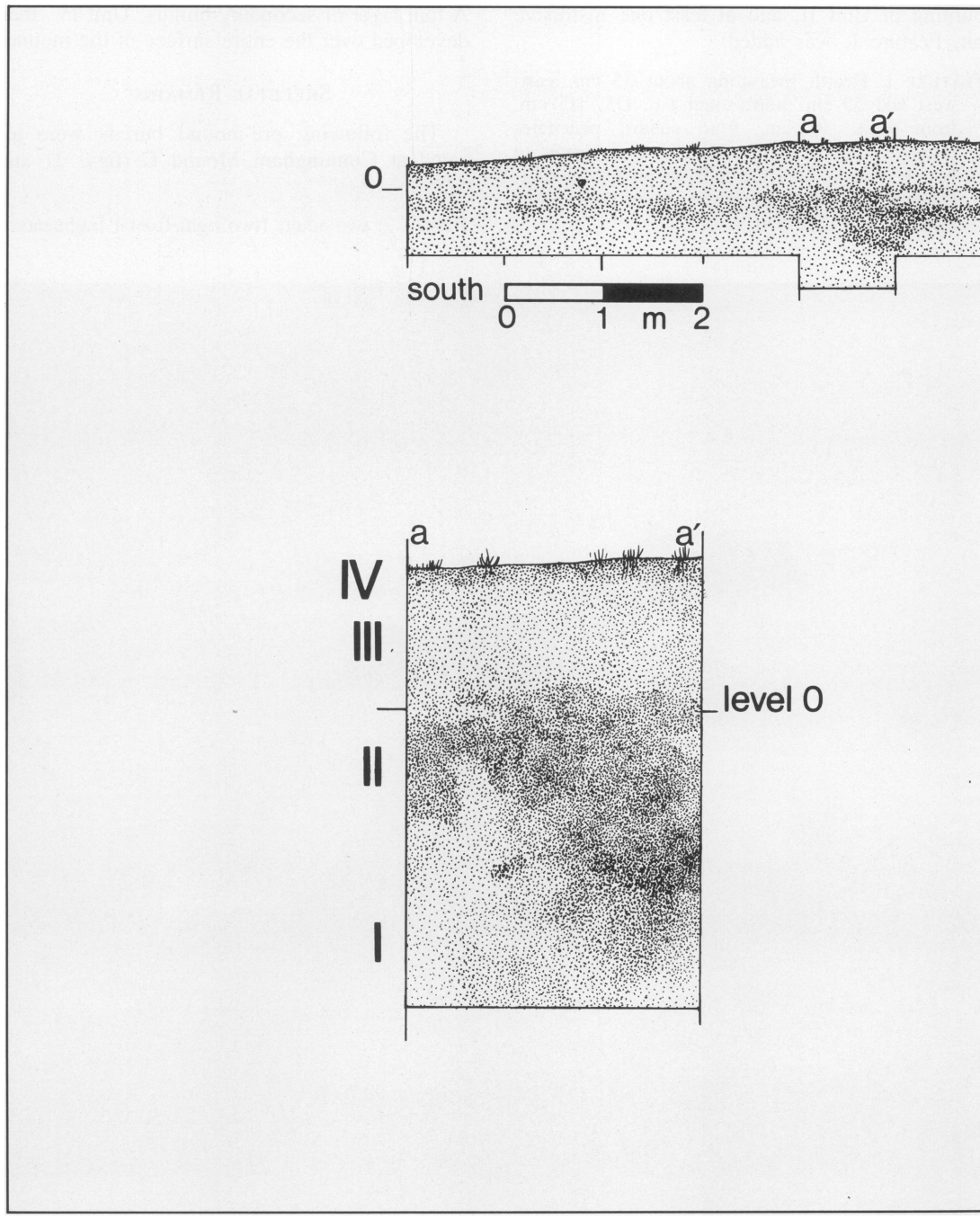


FIG. 30. Stratigraphic profile of Cunningham Mound C, showing west wall of 5-trench.

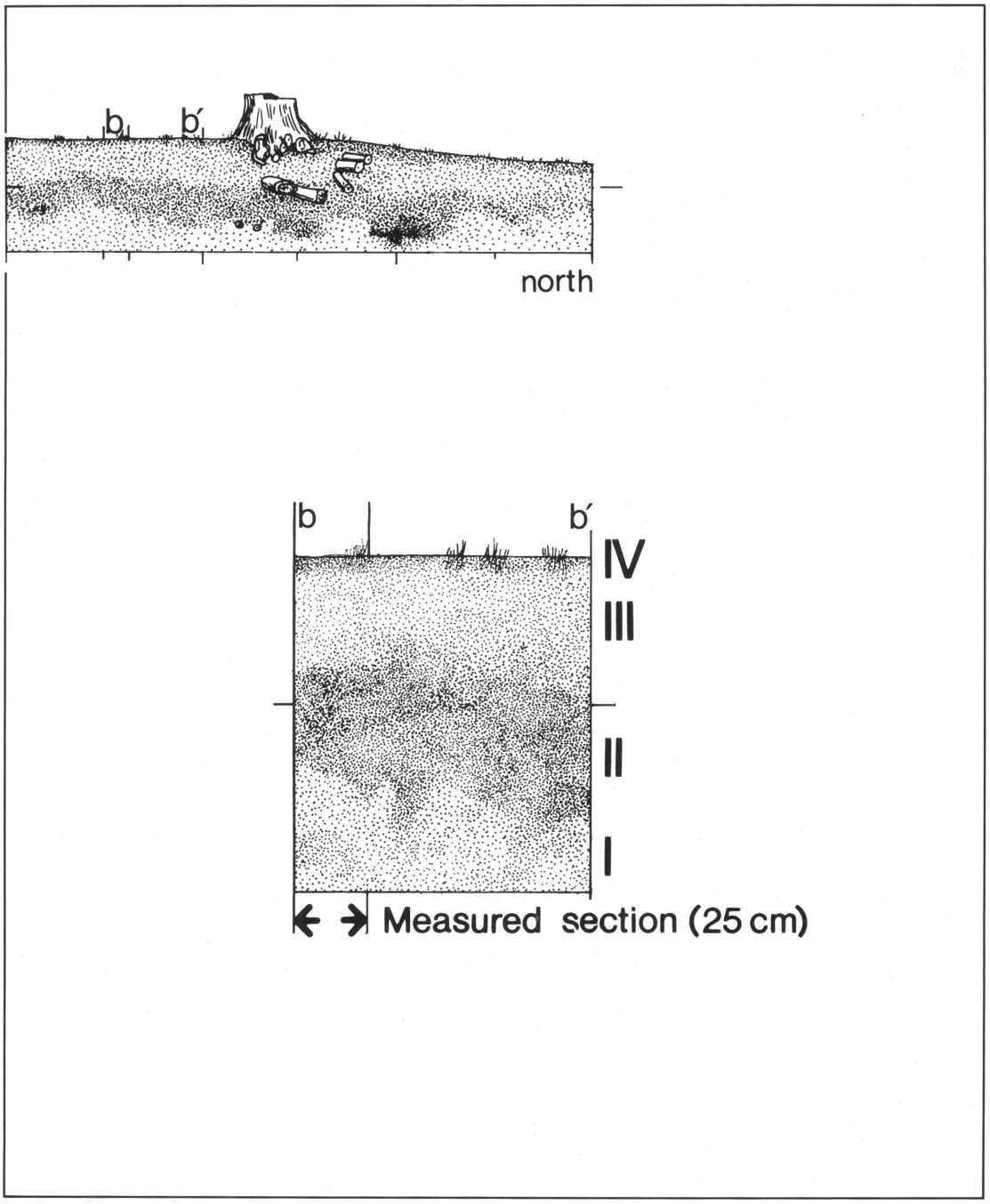

b
b′
north
b
b′
IV
III
II
I
Measured section (25 cm)

TABLE 14
Measured Stratigraphic Section of Cunningham Mound C

Unit	Thickness (cm.)	Description
IV	7	*Secondary humus* (10 YR 6/3: dry), pale brown sand with abundant rootlets; very poorly developed A horizon.
		Contact extremely gradual.
III	40	*Mound fill* (10 YR 6/3: dry), pale brown sand with hickory roots present.
		Contact gradual.
II	25	*Primary humus* (10 YR 5/4: dry), yellowish brown sand with occasional charcoal flecks. Radiocarbon date on charcoal in primary humus: 480 B.C. ± 90 (UGA-1253).
		Contact indistinct.
I	40+	*Sterile substratum* (10 YR 7/4: dry), very pale brown sand.
		Bottom not exposed.

zygofrontal suture); cremation; fragments of flat cranial (120), temporal (1), sphenoid (1), frontal (2), patella (1), long bone diaphysis (2634), premolar root (1), proximal hand phalanx (1), rib (1), second cervical vertebra (dens epistropheus).

BURIAL 3: female, adult; supine, extended, head to the southeast; cranial reconstruction (squamosal portion of the occipital, left and right parietals, right temporal), fragments of left and right temporals, occipital condyle, and femoral diaphysis; mandibular left second molar, maxillary left second and third molars.

BURIAL 4: adult, 18 ±; fragments of left and right temporals, sphenoid, occipital squamous; postcrania not recovered; mandibular left second premolar through third molar, right third molar, maxillary left second premolar, left and right second and third molars.

BURIAL 5: adult; fragments of left and right temporals, enamel and roots; mandibular left and right second and third molars, right first and second premolars, maxillary left and right first, second and third molars, right second premolar. Postcrania not recovered.

A single intrusive burial was excavated at Cunningham C. This extended burial was in a distinct pit and was associated with a hearth (Feature 1):

BURIAL 1: female (?), adult; supine, extended, head to the south; cranial reconstruction (squamosal portion of the occipital, left and right parietals, left temporal), fragments of left temporal, left and right femoral diaphyses.

CERAMICS

A diverse array of potsherds was recovered from Cunningham C, ranging from St. Simons Plain to the Wilmington series. The vertical provenience of these ceramics is presented on table 15, and the horizontal distribution is illustrated in figure 33.

The St. Simons Plain sherds are fairly well

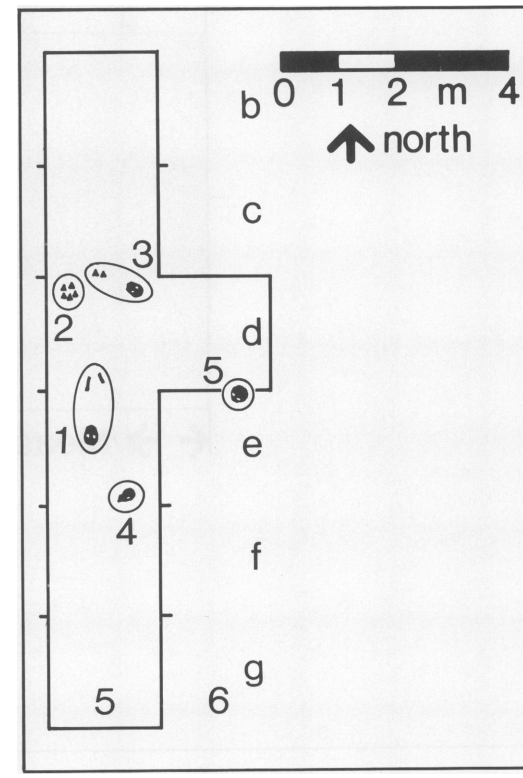


FIG. 31. Schematic diagram of burials found at Cunningham Mound C.

TABLE 15

Sherd Frequencies at Cunningham Mound C

Type	Surface	+109 - +100	+99 - +90	+89 - +80	+79 - +70	+69 - +60	+59 - +50	+49 - +40	+39 - +30	+29 - +20	+19 - +10	+9 - 0	−1 - −10	−11 - −20	−21 - −30	−31 - −40	−41 - −50	−51 - −60	−61 - −70	−71 - −80	−81 - −90	−91 - −100	No Vertical Provenience	TOTAL
	Depth																							
Wilmington Heavy Cord Marked	—	—	—	—	—	—	—	—	—	—	1	—	19	1	—	3	1	—	—	—	—	—	7	32
Wilmington Plain	—	—	—	—	—	—	—	—	—	—	1	1	5	3	2	2	—	—	—	—	—	—	6	20
Deptford Cord Marked	—	—	—	—	—	—	—	—	—	—	—	2	5	5	1	—	—	—	—	—	—	—	3	16
Deptford Check Stamped	—	—	—	—	—	—	—	—	—	—	1	1	2	21	16	5	—	—	—	—	—	—	4	50
Refuge Dentate Stamped	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	1
Refuge Simple Stamped	—	—	—	—	—	—	—	—	—	1	—	—	2	5	3	1	1	—	—	—	—	—	5	18
Refuge Plain	—	—	—	—	—	—	—	—	—	1	2	2	15	5	10	3	1	—	—	—	—	—	13	52
Refuge abraders	—	—	—	—	—	—	—	—	—	—	—	1	—	1	3	—	—	—	—	—	—	—	—	5
St. Simons Plain	—	—	—	—	—	—	—	—	—	2	—	—	3	1	5	10	5	—	—	1	—	—	10	37
Too indistinct to type	—	—	—	—	—	—	—	—	—	1	1	1	—	1	3	1	—	—	—	—	—	—	1	9
TOTAL	—	—	—	—	—	—	—	—	—	5	6	8	52	43	43	25	8	—	—	1	—	—	49	240

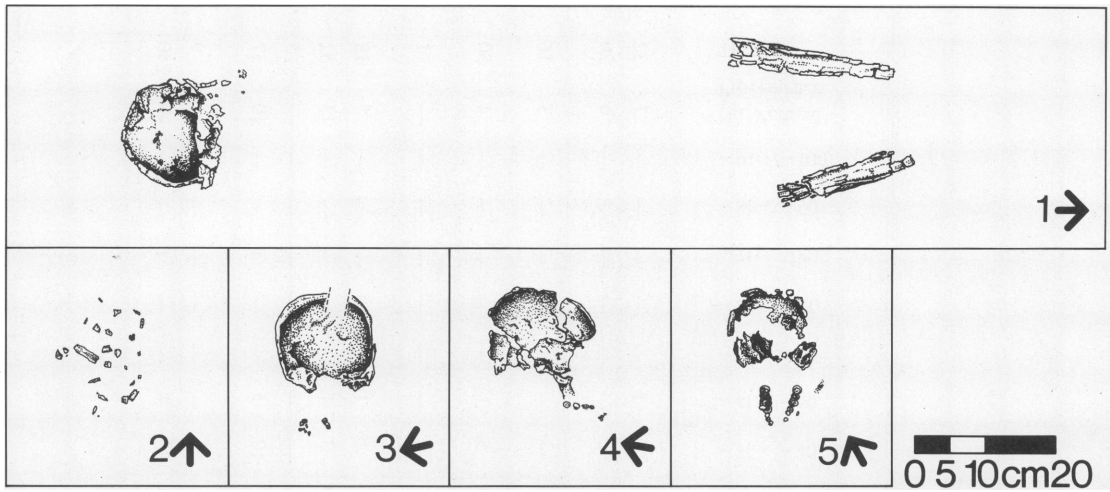


FIG. 32. Burials found at Cunningham Mound C.

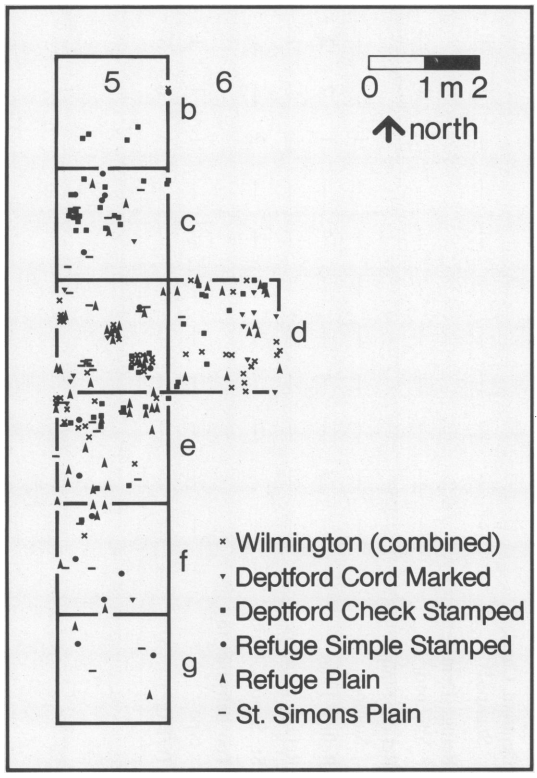


FIG. 33. Horizontal distribution of potsherds at Cunningham Mound C.

scattered throughout the excavated area (fig. 33), but they tend to be slightly lower than the later types (table 15). While excavating intrusive burial 1, we noted that the St. Simons sherds were clearly *beneath* both the burial pit and the associated intrusive hearth (Feature 1). In addition, St. Simons sherds were found associated with a cremation in Feature 2, which was radiocarbon dated to 1300-1360 B.C. The fiber-tempered sherds probably resulted from very early ceremonial activity at this site.

Nearly two-thirds of the ceramics at Cunningham C were from the Refuge-Deptford phases. These sherds are scattered throughout Units II and III, and do not appear to cluster with any burials or features.

Nearly 50 Wilmington series sherds were found clustered near the center of the mound (fig. 33). These ceramics appear to be intrusive into Cunningham C and are clearly associated with burial 1 and Feature 1, which has been radiocarbon dated to A.D. 590-570. It is quite likely that other intrusive Wilmington-age burials are still present in the unexcavated portions of Cunningham Mound C.

Nearly a dozen blue-on-white pearlware sherds were found scattered on the surface near the southern portion of Cunningham C. These historic sherds doubtless originated from Middle Settlement, an antebellum site located only

about 300 meters to the northeast. Two antebellum burials were found in Cunningham Mound D, which is nearby (Thomas, South and Larsen, 1977).

ABRADERS

Five abraded sherds were found in the fill of Cunningham Mound C. Three of these sherds exhibited Type I wear (28.0/1328, 28.0/1375, 28.0/1362), two of the sherds were abraded by Type II wear (28.0/1590, 28.0/1587) and one of the sherds was surface abraded (28.0/1328).

LITHICS

A chert projectile point was found associated with burial 3 (see fig. 20b). One white quartzite biface fragment (28.0/1607) was found associated with burial 2 and Feature 2. This artifact is crudely worked and appears to be a broken preform or blank, possibly for a projectile point.

Eleven flakes were found and plotted. Most are of a light tan chert and none shows signs of utilization. One reddish chert core fragment (28.0/1625) was also recovered; one edge may possibly have been used as a scraper.

A fragment of a steatite (?) celt or gorget was found in sq. B5, lying in the primary humus (fig. 20c).

CUNNINGHAM MOUND D

Cunningham Mound D (9 Li 46) is the northernmost burial mound in the Cunningham group. Approximately 200 meters to the northeast of Mound D is Middle Settlement, the ruins of an antebellum outpost. In addition to the aboriginal materials discussed below, two slave burials (numbers 3 and 5) were found in the fill of Cunningham Mound D. These intrusive burials have been dated to roughly A.D. 1800, and are discussed elsewhere (Thomas, South and Larsen, 1977).

Mound D stands approximately 60 meters to the east of Cunningham C. Mound D rises approximately 75 cm. above the present ground surface, and is encircled on the southern, eastern, and northern margins by a shallow borrow pit (fig. 34). When first encountered in 1974, the mound was badly overgrown with palmettos and vines. A dead live oak stood atop the mound and several younger oaks, hickories, and pines were growing from the sides of the mound. The site was cleared in November of 1975, and there was no evidence of previous excavation; the historic burials were not marked in any way. A permanent brass datum (stamped "AMNH 104") was set in concrete 15 meters north of the center of the mound. Five contiguous 2-meter square units were excavated, stratigraphies drawn, and radiocarbon samples processed. In March 1976, a crew from the

TABLE 16
Measured Stratigraphic Section for Cunningham Mound D
(For location of section, see figure 36.)

Unit	Thickness (cm.)	Description
IV	7	*Secondary humus*, very dark grayish brown sand (10 YR 3/2: dry), dense root mat, formed as A horizon of Unit IIIb. Contact gradual.
IIIb	60	*Mound fill*, yellowish sand (10 YR 5/4: dry), at top grading to very dark grayish brown sand (10 YR 3/2: dry), at bottom, slightly compacted, slightly mottled with charcoal flecks throughout. Abrupt contact.
IIIa	10	*Shallow lens*, yellowish brown sand (10 YR 5/6: dry), loosely compacted, slightly mottled. Abrupt contact.
II	17-20	*Primary humus*, very dark grayish brown sand (10 YR 3/2: dry), moderately compact, charcoal throughout, formed as A horizon of Unit 1. Radiocarbon date 1020-1050 B.C. ± 70 (UGA-1255) and A.D. 570 ± 70 (UCLA-1997D). Contact gradual over 3-5 cm.
I	30+	*Sterile substratum*, brownish yellow sand (10 YR 6/6: dry), uncompacted. Bottom not exposed.

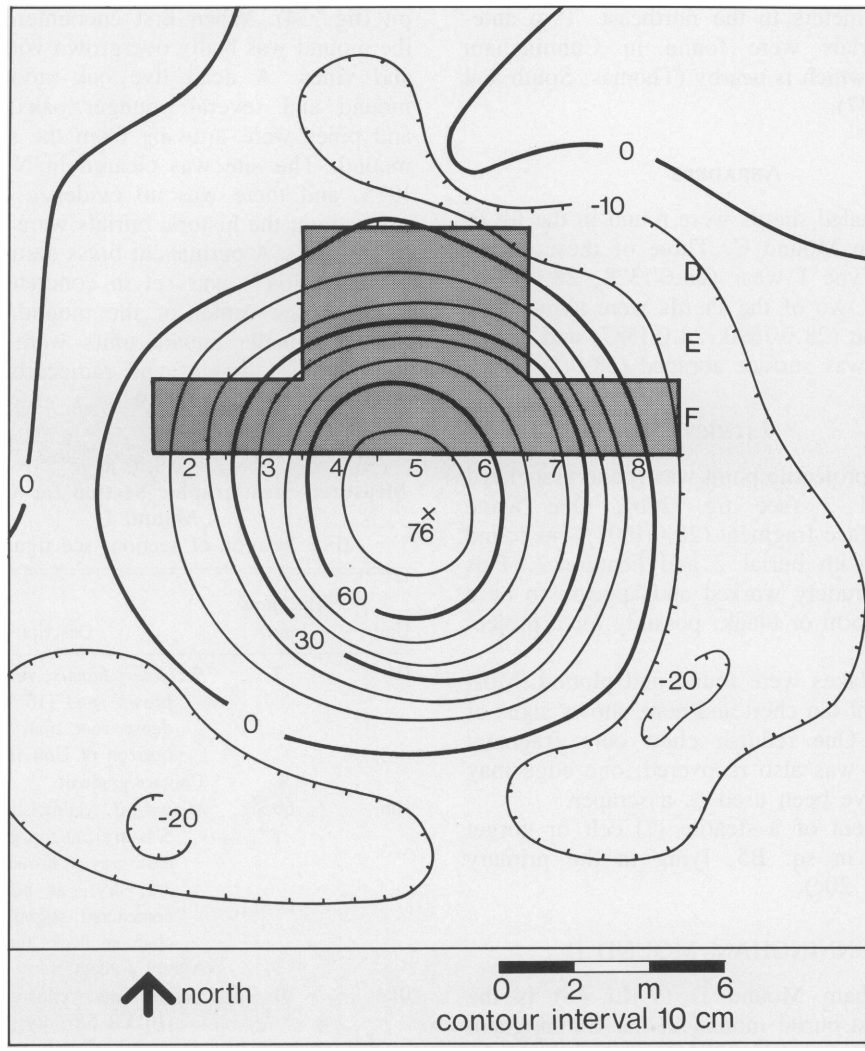


FIG. 34. Topographic map of Cunningham Mound D. Shaded portion indicates area excavated by the American Museum of Natural History.

American Museum returned to complete excavation of the major east-west stratigraphic trench. Excavation of the central tomb and later intrusive burials continued in May 1976. Approximately 52 cubic meters of fill were excavated, and we estimate that roughly 80 cubic meters remain untouched (fig. 35).

The major east-west stratigraphic profile is pictured on figure 36 and the measured stratigraphic section is described on table 16.

Cunningham Mound D is constructed on a substratum of sterile brownish yellow sand (Unit I), capped as usual with the primary humus A horizon. The first evidence of cultural activity is the burning of this humus zone. Charcoal from this burning has been radiocarbon dated to 1020-1050 B.C. ± 70 (UGA-1255).

A large rectangular pit (Feature 1) was excavated through the burnt humus into sterile yellow sand. This feature was badly disturbed by later historic burials, so the nature of the central tomb is unclear, but a scattering of

human bones (burial 4) and the projectile point cache (discussed below) leave little doubt that Feature 1 was constructed as a pre-mound tomb. The thin lens of yellowish brown sand, evident in the east-west profile (fig. 36), is probably backdirt from excavation of the central pit.

The mound itself then was constructed, probably in a single episode. Borrow pits are evident in figure 34. Unit IIIb is fairly uniform, and no basket loading or interim stages of mound building is evident. After the mound was completed, a thin secondary humus (Unit IV) developed over the entire surface. One radiocarbon date is available from the fill: A.D. 570 ± 70 (UCLA-1997D).

Skeletal Remains

Several human burials were encountered at this mound (figs. 37 and 38). Burials 3 and 5 are historic slaves described in Thomas, South and Larsen (1977). Burial 4, found on the southeastern edge of the pre-mound pit, was an adult, represented only by enamel and fragments of long bone diaphyses. We think that burial 4 was associated with a pre-mound tomb, which possibly contained other individuals. All additional evidence was destroyed about A.D. 1800 when the slaves were buried at Cunningham Mound D.

The five prehistoric intrusive burials are plotted in figure 37, and the burial drawings are illustrated in figure 38. The intrusive burials consisted of the following:

Burial 1: female, 17; bundle; fragments of right temporal, frontal, nasal, mandible, left femur, tibiae, fibulae, ulnae or radii, second cervical vertebra; complete dentition except mandibular right central incisor.

Burial 2: male, adult; flexed on right side with head to the south; cranial reconstruction (frontal,

Fig. 35. Cunningham Mound D, after excavations had been completed (note historic graves). Photograph taken in May 1976.

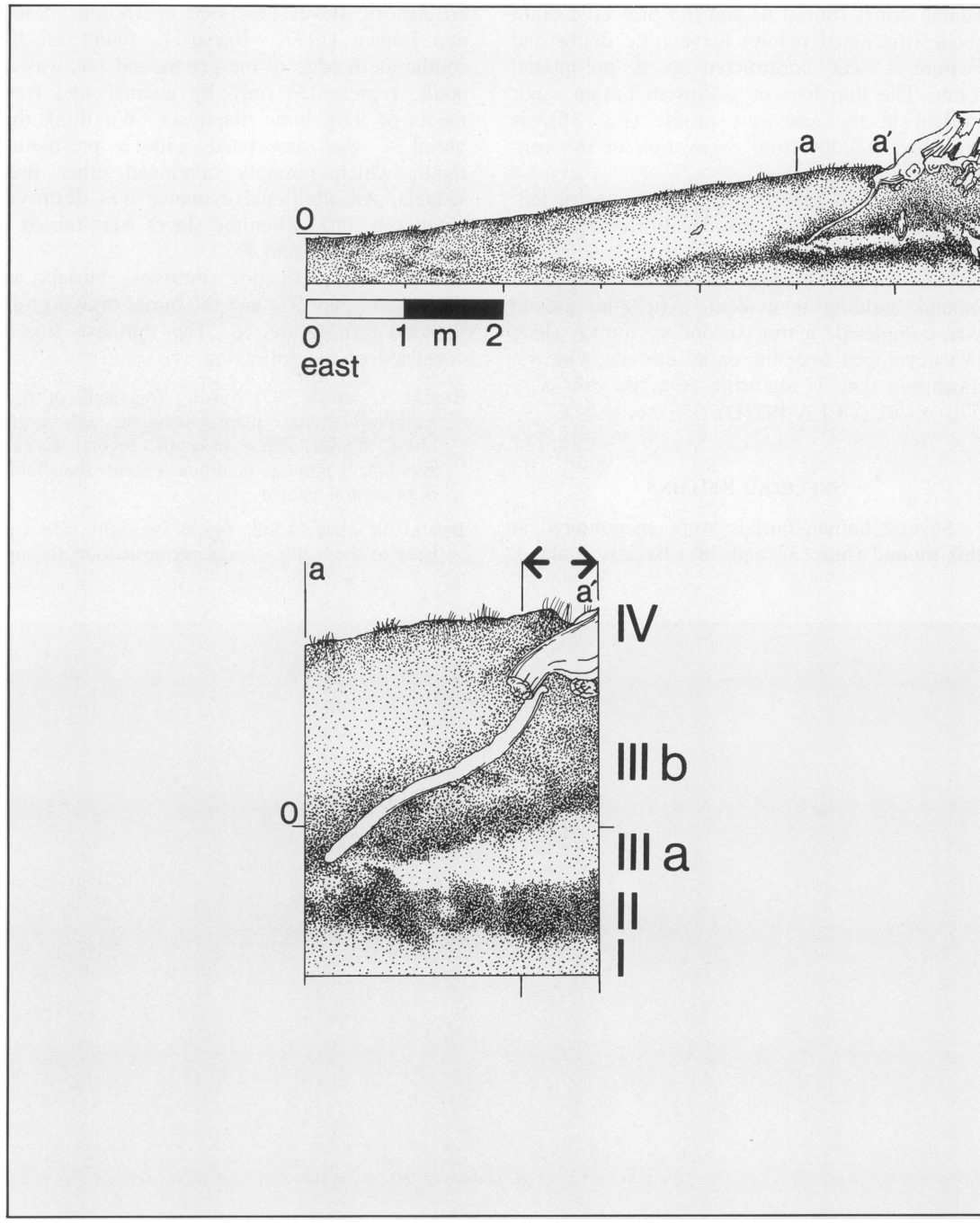
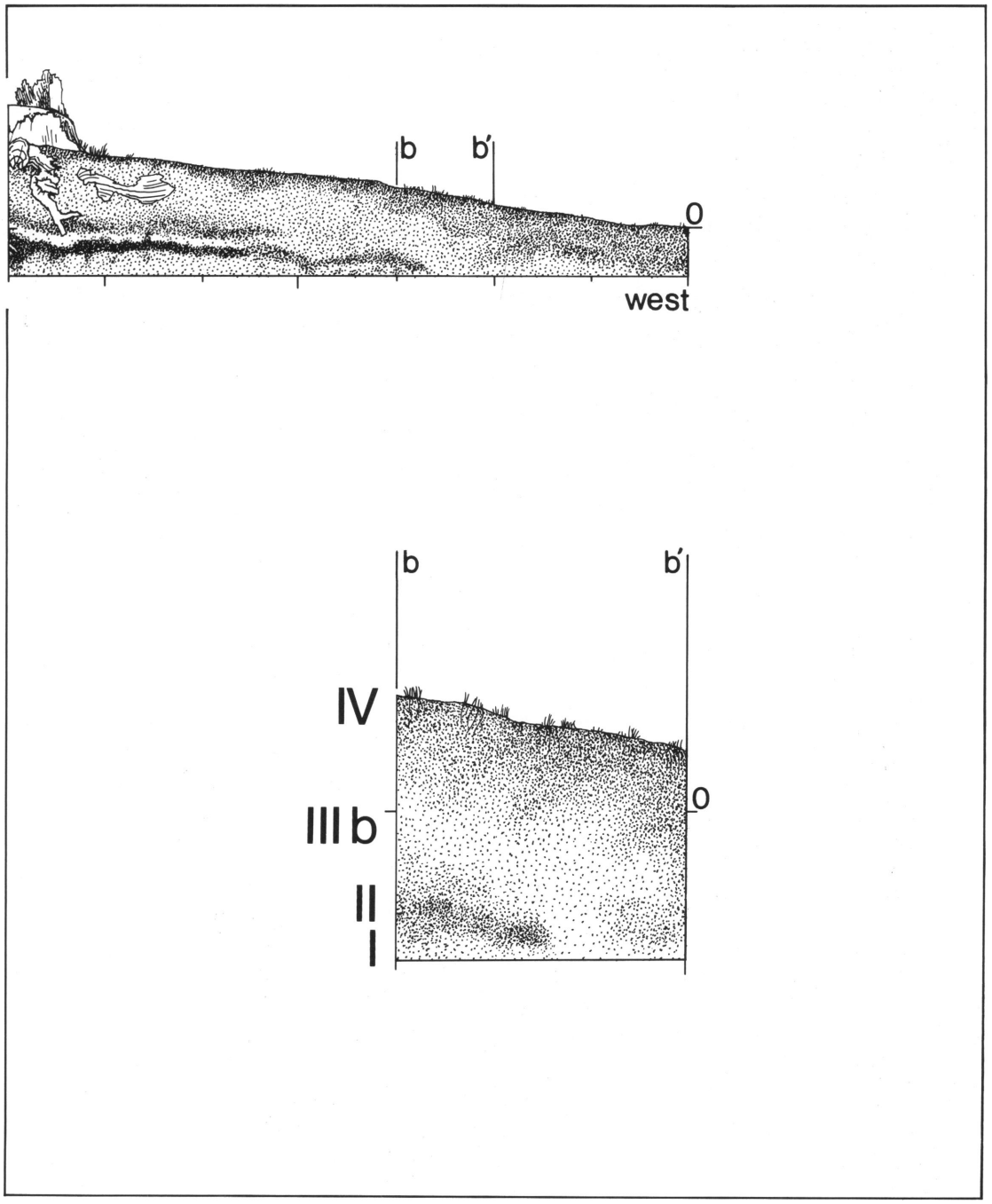


FIG. 36. Stratigraphic profile of Cunningham Mound D, south wall of F-trench.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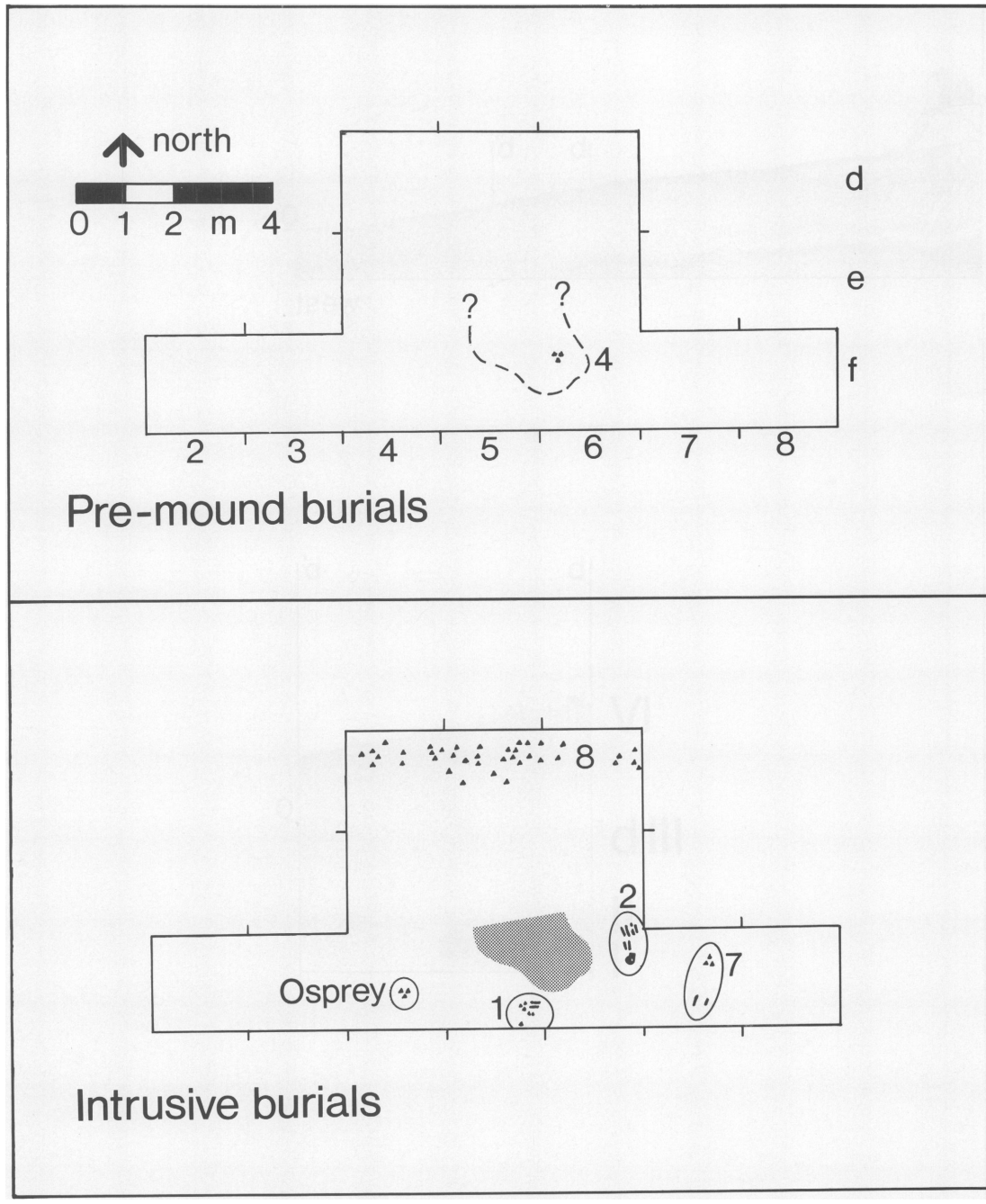


FIG. 37. Schematic diagram of burials at Cunningham Mound D.

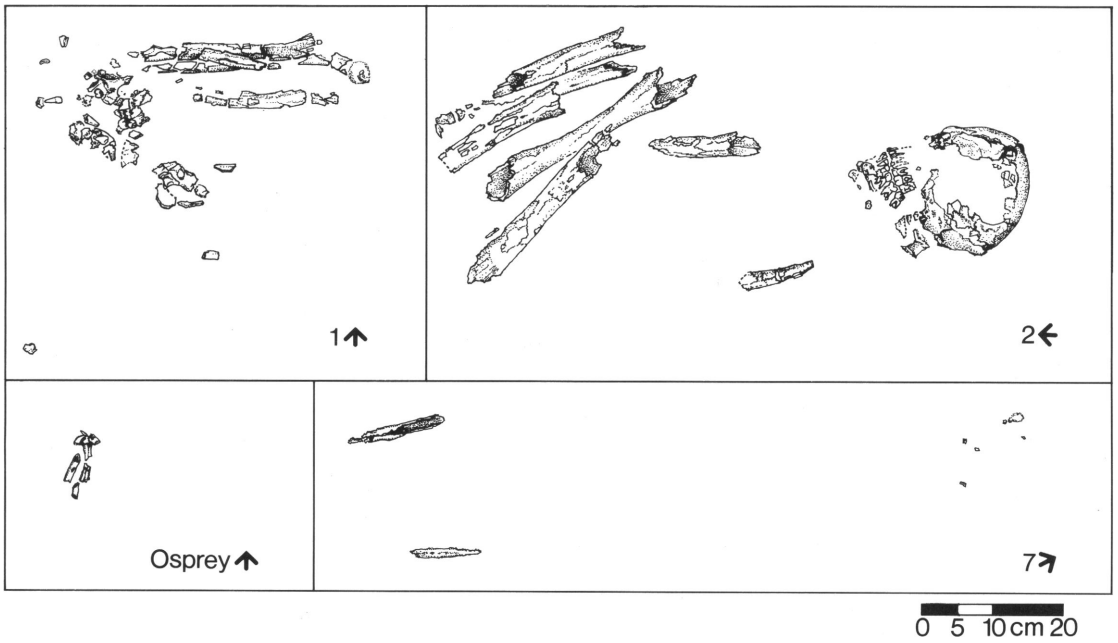


FIG. 38. Burials found at Cunningham Mound D.

left parietal, left temporal and squamosal portion of the occipital); fragments of mandible, ilium, left and right humeri, tibiae, fibulae, right talus, cervical vertebrae; complete dentition except mandibular right central incisor and maxillary left central and lateral incisors.

BURIAL 7: adult; supine, extended, head to the northeast; several flat cranial fragments, enamel and pieces of left and right femoral diaphyses.

BURIAL 8: adult; cremation; several flat cranial and 63 long bone diaphyseal fragments scattered throughout several units of the excavation.

NONHUMAN BURIAL

A few fragmented bones were designated in the field as burial 6. But on closer examination, the bones were found to be those of an osprey *(Pandion halialtus)*. Five elements were identifiable: three distal phalanges, one medial phalanx and one fragment of the proximal right tarsometatarsus (Donald Grayson, personal commun.). The osprey was given an intentional burial, not apparently associated with human bones (see fig. 37).

CERAMICS

Sherds were not particularly abundant at Cunningham D. Despite extensive testing, only 48 typable potsherds were recovered, and their distribution is presented in table 17. Interestingly enough, all the sherds belong in the Refuge Series, being either Plain or Simple Stamped.

The horizontal distribution of the sherds is presented in figure 39 and, once again, there seems to be no particular tendency for the sherds to clump. Of course the central area of Cunningham D was badly disturbed by the later historic burials, so any sherds found in this area were probably reworked in the *ca.* 1800 backdirt.

Only two abraded sherds were present at Cunningham D; both were Refuge Simple Stamped. One sherd (28.0/747) showed type III abrasion; the other (28.0/752) showed type I abrasion.

PROJECTILE POINT CACHE

A cache of lithics was found at Cunningham D, and these artifacts are shown on figure 40.

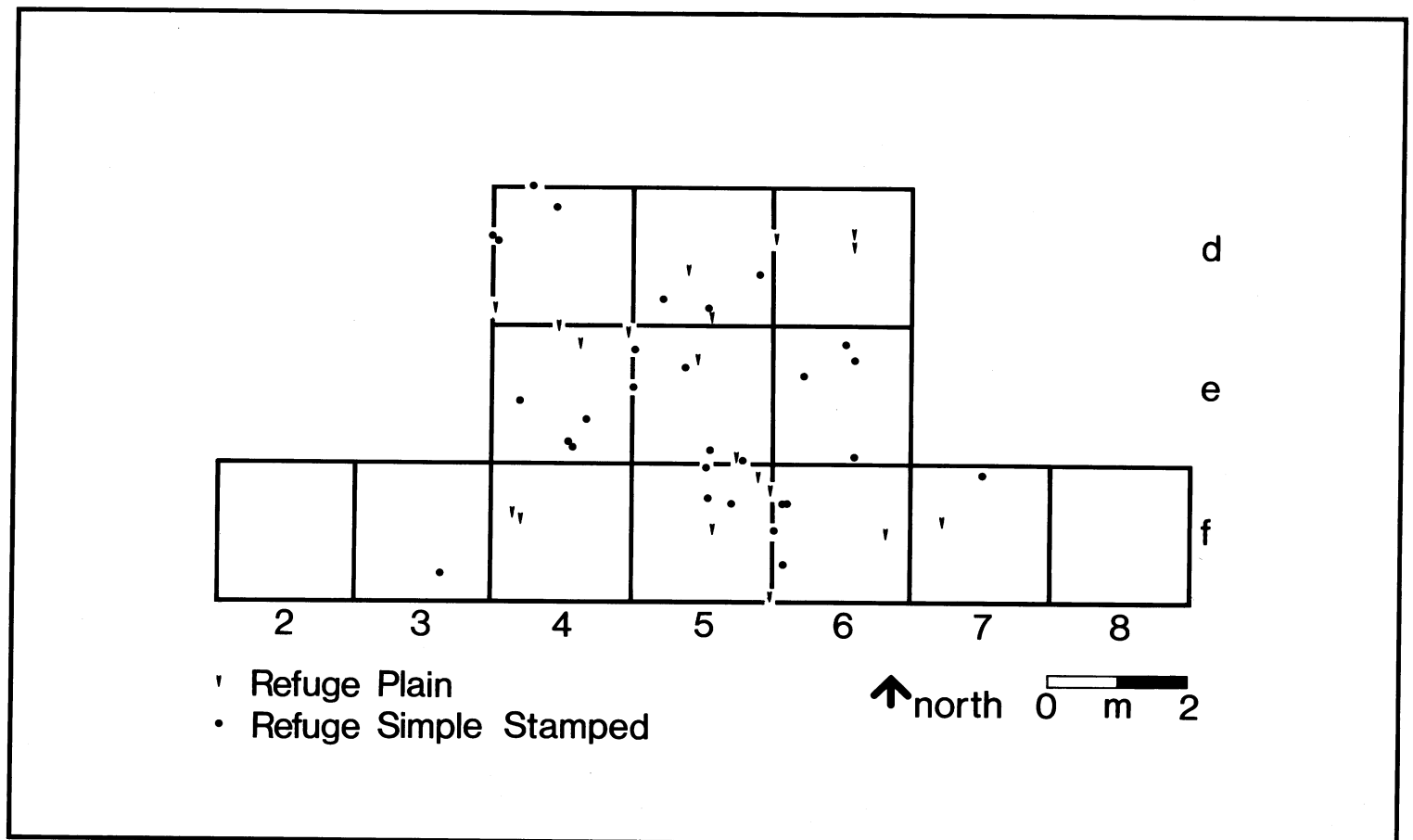


FIG. 39. Horizontal distribution of ceramics at Cunningham Mound D.

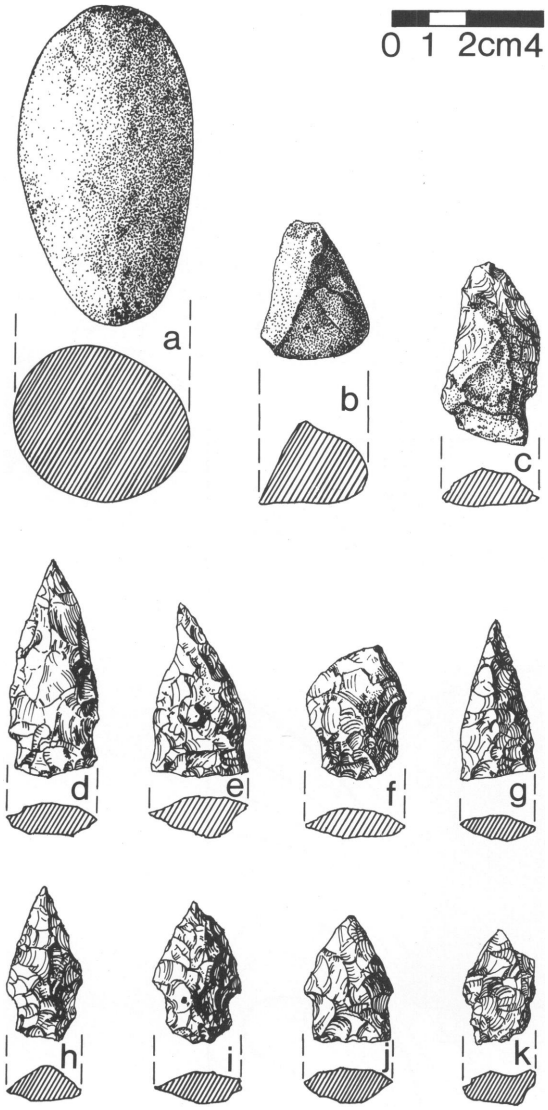


FIG. 40. Projectile point cache associated with burial 4 at Cunningham Mound D. a. hammerstone 28.0/955; b. hammerstone fragment 28.0/946; c. chert flake 28.0/949; d. projectile point 28.0/954; e. projectile point 28.0/947; f. projectile point preform 28.0/952; g. point tip 28.0/958; h. projectile point 28.0/950; i. projectile point 28.0/951; j. projectile point 28.0/953; k. unworked smoky quartz 28.0/948.

Four complete projectile points were present (fig. 40d, h, j, and i) along with two bifacially worked tips, which appear to have been broken (fig. 40e, g). One other piece (fig. 40f) appears to be a projectile blank or preform. The attributes of these lithics are provided in table 11.

The cache also contained a unifacially flaked chert sidescraper (fig. 40c), one complete quartzite hammerstone and a quartzite hammerstone fragment (figs. 40 a, b), flecks of mica, and a small piece of smoky translucent quartz (fig. 40k).

The cache was found in association with burial 4, which had been badly disturbed by the much later, intrusive slave burials. The cache was so tightly circumscribed that it appears to have initially been buried in a bag or basket, which has subsequently disappeared. The contents would certainly indicate that this was a flintworking kit, probably buried with its owner.

OTHER LITHICS

Two complete projectile points were found in association with burial 2 at Cunningham D (fig. 41). They appear to be made of materials

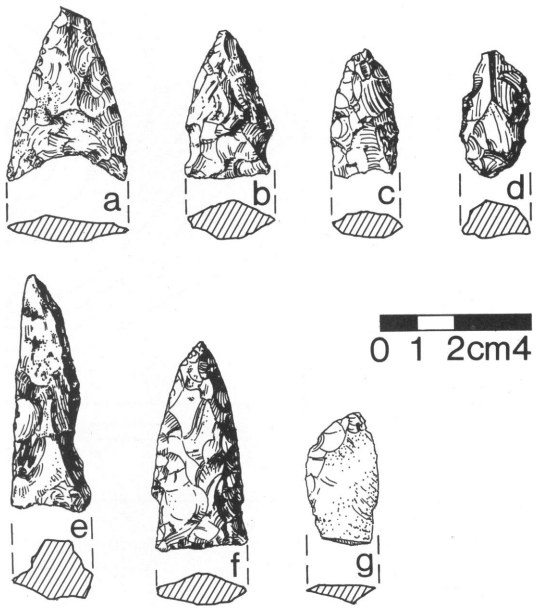


FIG. 41. Lithics from Cunningham Mound D. a. projectile point 28.0/920; b. projectile point 28.0/346; c. projectile point 28.0/766; d. scraper 28.0/961; e. projectile point 28.0/351; f. projectile point 28.0/350; g. unifacial scraper 28.0/960.

TABLE 17
Sherd Frequencies at Cunningham Mound D

Type	Depth														
	+69 - +60	+59 - +50	+49 - +40	+39 - +30	+29 - +20	+19 - +10	+9 - 0	−1 - −10	−11 - −20	−21 - −30	−31 - −40	−41 - −50	−51 - −60	−61 - −70	Total
Refuge Plain	—	1	2	4	5	1	4	2	3	5	1	1	—	—	29
Refuge Simple Stamped	—	—	1	—	4	3	1	1	2	2	3	1	1	—	19
Total	—	1	3	4	9	4	5	3	5	7	4	2	1	—	48

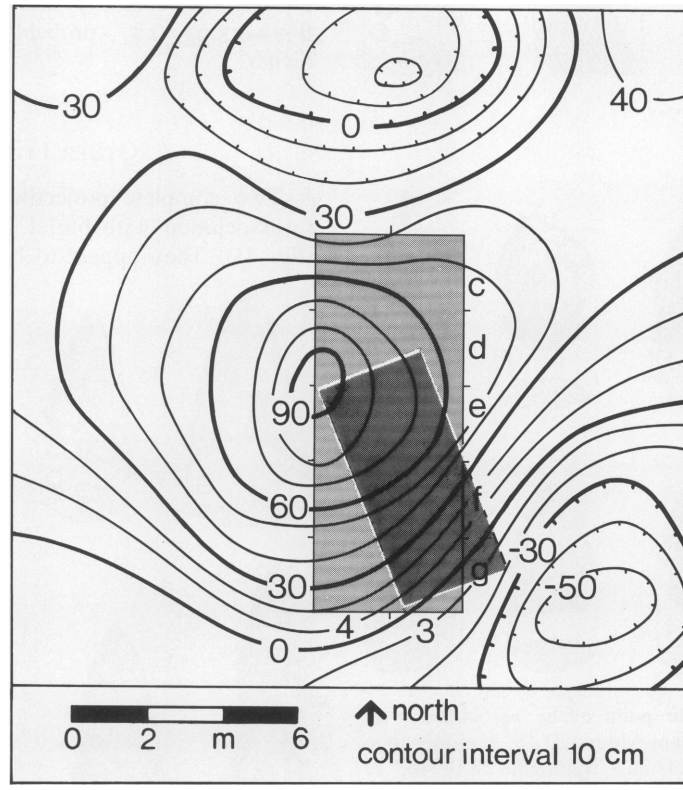


FIG. 42. Topographic map of Cunningham Mound E. Lightly shaded portion indicates area excavated by the American Museum of Natural History; dark shading shows area previously excavated by University of Georgia.

similar to those found in the projectile point cache, associated with burial 4.

Four other lithics were found in the area of the central tomb, but the context appears to have been disturbed by slave burials 3 and 5. The two chert projectile points and unifacial scrapers are illustrated on figure 41.

One isolated projectile point (fig. 41a) was

FIG. 43. Cunningham Mound E after excavations had been completed. Photograph taken in January 1977.

found in sq. D5 (120 cm. from the west, 135 cm. from the north) at a depth of 23 cm. below datum. Although scattered bones were found in this area, there was no clear-cut burial association with this point.

CUNNINGHAM MOUND E

This mound (9 Li 28) is situated on the eastern margin of the Cunningham Mound group. The salt marsh lies less than 400 meters to the east, but the dense forest cover obscures any view of the marsh or beach. The mound is not large, standing only 90 cm. high and covering less than 150 square meters (fig. 42). Two borrow pits are evident to the north and southeast of the mound proper. Mound E supports several large hickory trees, the nuts of which provided no small hazard to excavators working on the site in late fall.

Cunningham Mound E was initially tested some years ago in conjunction with University of Georgia excavations on St. Catherines Island. Two contiguous 10-foot squares had been excavated into the sterile substratum. Figure 42 indicates the extent of this initial excavation. Because the backdirt from these test pits covered most of the remaining mound, the contours on figure 42 must be regarded merely as best estimates of the original mound topography. No field notes, artifacts, or burial records are available for these two units.

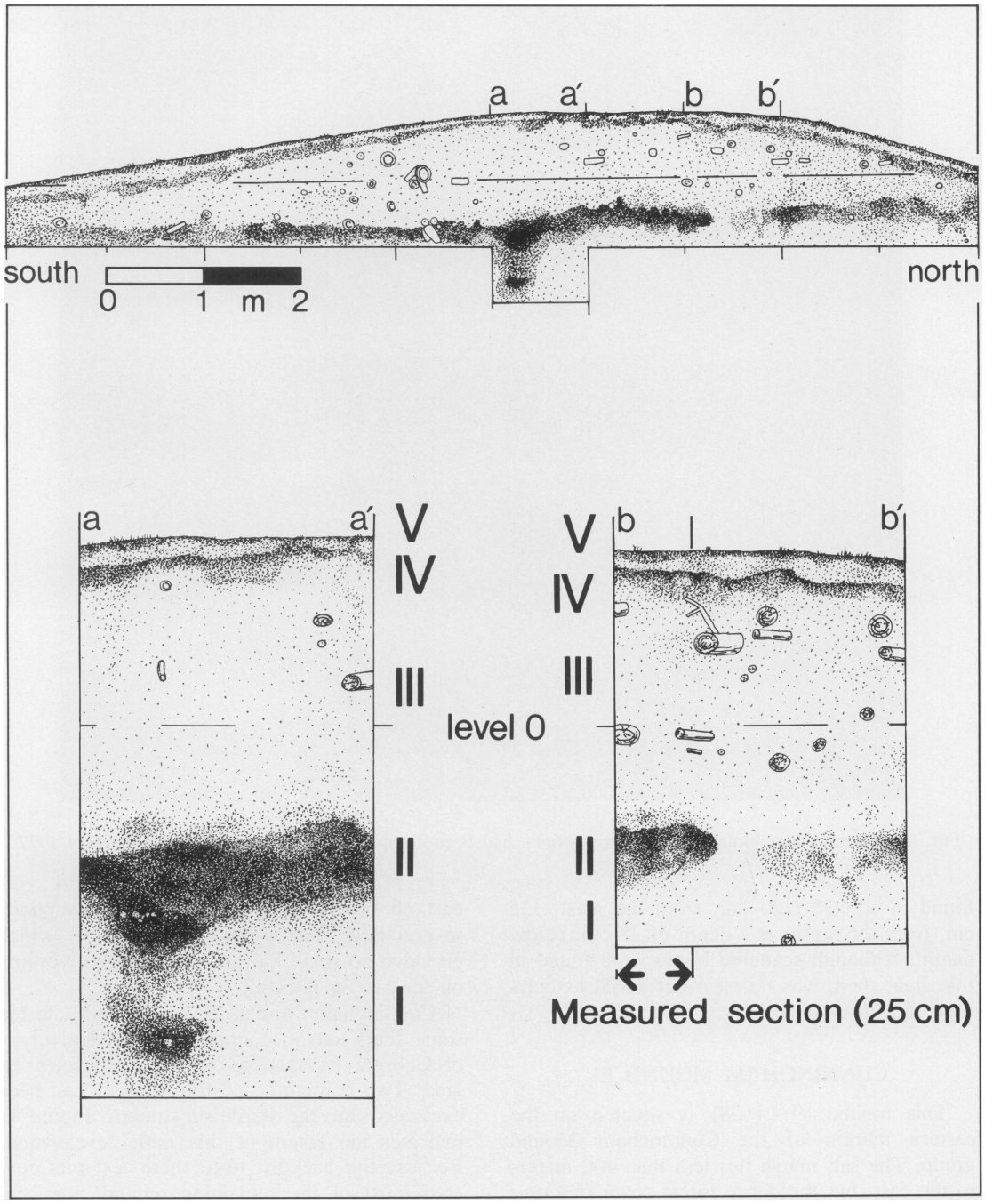


FIG. 44. Stratigraphic profile of Cunningham Mound E, west wall of 4-trench.

Crews from the American Museum excavated Cunningham Mound E in November 1976 and January 1977. A permanent brass datum (stamped "AMNH 109") was set in concrete 12 meters northeast of the center of the mound. The hickories were not cleared as the American

TABLE 18
Measured Stratigraphic Section of Cunningham Mound E
(See figure 44 for exact location of section.)

Unit	Thickness (cm.)	Description
V	12	*1970 backdirt*
		Contact abrupt.
IV	12	*Secondary humus*, dark brown sand (10 YR 3/3: dry), dense root mat, formed as A horizon of Unit III.
		Contact gradual over 3 cm.
III	85	*Mound fill*, grades from dark yellowish brown sand (10 YR 4/4: dry), at top to brownish yellow sand (10 YR 6/6: dry), at bottom.
		Contact distinct.
II	23	*Primary humus*, very dark gray sand (10 YR 3/1: dry), charcoal abundant throughout, formed as A horizon of Unit I. Radiocarbon dates: A.D. 560 ± 65 (UGA-1559); A.D. 570 ± 70 (UGA-1561).
		Contact gradual over 5 cm.
I	17+	*Sterile substratum*, yellowish brown sand (10 YR 5/6: dry).
		Bottom not exposed.

Museum explorations were designed only to test rather than intensively to excavate. The earlier backdirt was removed where possible, and all excavation units were taken into sterile sand. We estimate that the earlier excavation removed approximately 9 cubic meters. Approximately 80 cubic meters of fill remain unexcavated at Cunningham Mound E (see fig. 43).

Stratigraphy

The east-west stratigraphic profile of Cunningham Mound E is represented in figure 44, and the major stratigraphic units are described in table 18. The mound construction was not complex and can be described in the following sequence of steps.

The mound was first cleared of vegetation and the primary humus zone (Unit II) was burnt. As is characteristic of the Cunningham Mound group, the burning was most intense near the center of the mound. Two consistent radiocarbon dates on charcoal from Unit II suggests this burning occurred about A.D. 570.

Several features were then excavated into the humus before the mound was constructed:

Feature 1: Pit measuring 45 cm. in diameter excavated through primary humus; approximately 32 cm. deep and filled with charcoal and dark humus.

Feature 3: Linear pit measuring approximately 75 cm. across excavated into primary humus; approximately 35 cm. deep and filled with sterile yellow sand (see fig. 44). Feature 2 lies immediately to the north and probably represents humus backdirt from excavation of feature 3.

Feature 4: Pit excavated into humus, dimensions difficult to determine because it extends into eastern sidewall; pit filled with mixed fill from Units I and II.

Feature 6: Pit nearing 40 cm. in diameter, extending through primary humus into Unit I; possibly a burnt stump, hole filled with dense concentration of charcoal, extending approximately 80 cm. deep. Feature 6 is clearly evident on figure 44.

Fill (Unit III) was then added to build the mound over the burnt humus surface. Feature 5, evident in the eastern sidewall, indicates where the humus zone was obliterated to the north. The borrow pit which lies on the northern perimeter of the mound was probably continued so far south that it truncated the primary humus. As the mound grew larger, this borrow pit disappeared with later fill. A similar event occurred at Cunningham Mounds B, D, and McLeod Mound.

Once the mound was completed, a humic A horizon (Unit IV) developed over the entire surface. One intrusive burial was discovered near the western sidewall, and scattered enamel fragments were found in the eastern units.

Skeletal Remains

No pre-mound burials were found, only a single intrusive bundle burial was encountered (see fig. 24a).

Burial 1: female, adult, 18 ±; bundle; fragments of

ilia, left and right humeri, left femur, left and right tibiae; mandibular right third molar, maxillary left second premolar and third molar, right second and third molars.

Fragments of tooth enamel were also found in two concentrations along the eastern perimeter of the excavation trench, but they were too deteriorated for analysis (see fig. 45).

Cultural Associations

Not a single potsherd was found. The only cultural associations discovered in the entire mound were three pieces of uncut mica. The mica fragments, each about 2 cm. square, were found approximately 10 cm. above the primary humus zone. It seems likely that the mica was associated with Features 2 and 3.

SOUTH NEW GROUND MOUND

South New Ground Mound (9 Li 12) is situated in the middle of an antebellum field, intermediate between Cunningham Mounds B and C. When first examined in 1974, the site stood 100 cm. high and covered an area of nearly 500 square meters. Conspicuous borrow areas encircle the western half of the site (see fig. 46). The site had obviously been disturbed sometime in the past.

Excavation of this site began in March 1976, when the site was mapped, gridded, and cleared of pine trees. A permanent brass datum (stamped "AMNH 102") was set in concrete 15 meters northeast of the center of the mound. A north-south stratigraphic trench was excavated in November 1976, and in January 1977 a burial was discovered. Several additional test units were excavated in May 1977. Approximately 25 cubic meters of fill were removed, and it is impossible to estimate how much of the mound remains undisturbed (fig. 47).

C.B. Moore and South New Ground Field

C.B. Moore is known to have excavated seven prehistoric mounds during his fieldwork on St. Catherines Island during the fall and winter of 1896-1897. Three of these mounds—Greenseed Field, King New Ground Field, and South End Field—provided rich digging, and Moore discovered human burials by the dozens, along with scores of artifacts and potsherds (Moore, 1897, pp. 75-89). But four of the St. Catherines mounds proved to be disappointments, containing little or no aboriginal remains. Of these "empty" mounds, Moore had little to say, except to speculate that they may have served as house foundations (Moore, 1897, p. 81).

The exact whereabouts of Moore's excavations on St. Catherines Island have been a matter of some speculation for decades. Survey teams from the University of Georgia and the American Museum of Natural History have been unsuccessful at locating any of the seven mounds excavated and described by Moore in 1896-1897.

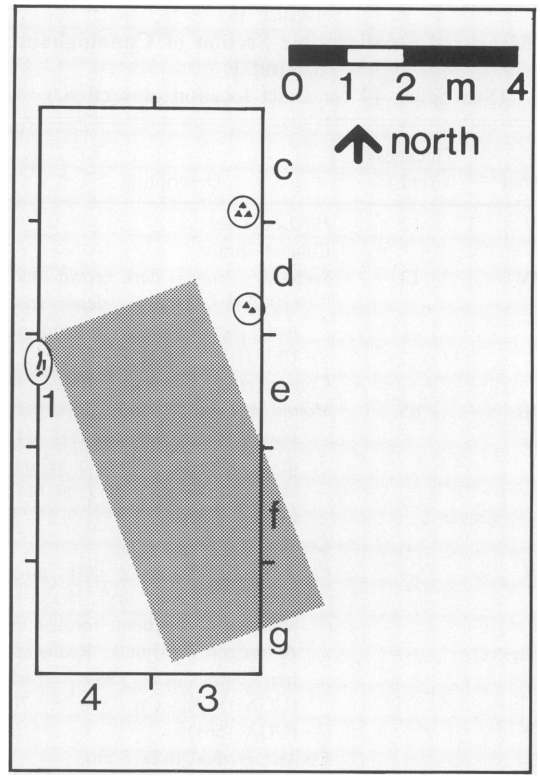


FIG. 45. Schematic diagram of skeletal remains at Cunningham Mound E. Triangles indicate concentrations of tooth enamel.

One of Moore's "empty" mounds is near Middle Settlement, and Moore (1897, p. 81) described the site as follows:

St. Catherines Island, Liberty County. Mound near Middle Settlement. In a large field formerly under cultivation, but at present covered with scrub and timber of small size, about one-half mile in a southwesterly direction from the Middle Settlement, is a mound which has been ploughed over in former times and has been dug into to a considerable extent. Its height is 5 feet; the diameter of its base, 54 feet. It was trenched in various directions, and portions of the center were dug out without result. It was composed of yellowish-brown sand, unstratified, and may have been used for domiciliary purposes.

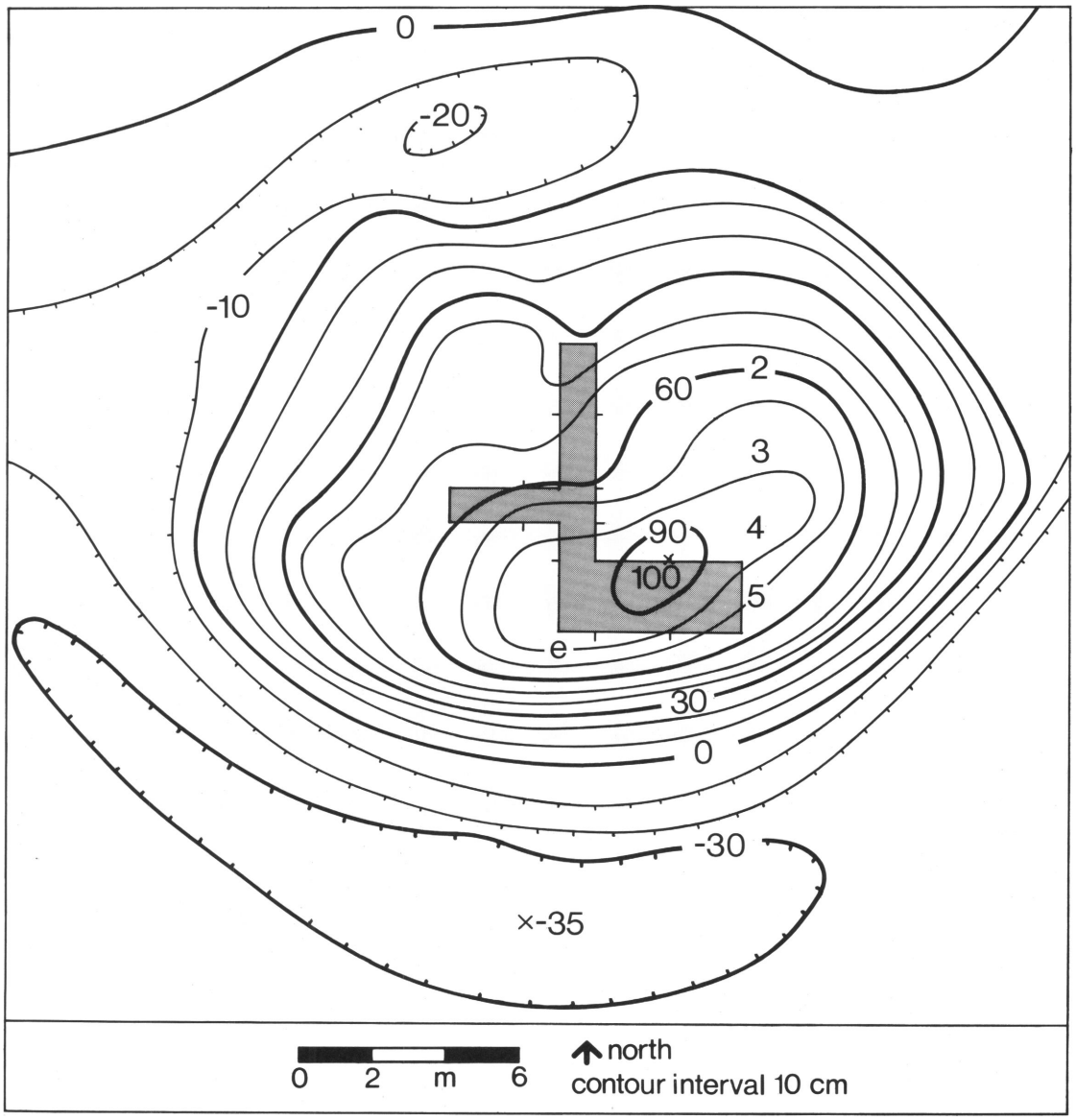


FIG. 46. Topographic map of South New Ground Mound. Shaded portion indicates area excavated by the American Museum of Natural History.

FIG. 47. South New Ground Mound after excavations had been completed. Photograph taken in May 1977.

The Cunningham Mound group is, of course, immediately adjacent to Middle Settlement (fig. 3), and two slaves, probably living at Middle Settlement, were found interred in Cunningham Mound D (Thomas, South, and Larsen, 1977). One objective in exploring this complex of burial mounds was to locate Moore's enigmatic "empty" mound, presumably in this area.

The most striking clue is that Moore's mound lay amidst a large fallow field. Gubitosa, the project cartographer, carefully mapped the antebellum field boundaries, as shown in figure 3. Of the seven mounds in the

Cunningham group, only one (9 Li 12) is actually within a field; the other six mounds are on the marginal windrows which surround the antebellum fields. Site "9 Li 12" has been assigned the name "South New Ground Mound," which is listed as the nineteenth-century name for the tract.

A glance at the topography of South New Mound indicates that it must have been dug into sometime in the past (see fig. 46). Mr. Woods assures us that this excavation must have been at least 40 years ago, or more. So when crews from the American Museum began working on South New Ground Mound, in November 1975, the objective was, in part, to see whether this site could have been Moore's missing mound "near Middle Settlement."

The plan of excavation called first for trenching to find Moore's excavations, if present. An 8-meter-long north-south trench was initially excavated for stratigraphic purposes, and then a second 3-meter-long trench was added to intersect the first trench. The resulting north-south stratigraphic section (fig. 48) seemed to verify our initial hunch: South New Ground Mound had indeed been previously excavated, and systematically at that. The profile showed that the original humus level had been almost entirely destroyed and then the trench had apparently been backfilled (either deliberately or by slumping).

We suspect, of course, that this previous excavation was by Moore. This suspicion is bolstered somewhat by the presence of a large firehearth located *between* layers of backfill (see fig. 48). In his unpublished diary, Moore noted that his fieldwork took place during the winter months, and he frequently noted the adverse weather. It is not at all unlikely that Moore and his crew built a small fire near his working area, and we think this is what the profile on figure 48 indicates.

The location of the mound within a field, the churned stratigraphy and the firehearth obviously made during the excavation all seem to verify our suspicions that South New Ground is indeed Moore's mound "near Middle Settlement."

This finding does not, however, resolve the aboriginal use of the site. Moore found nothing, and dismissed the site as "domiciliary." The extreme southern portion of our first exploratory trench intersected what appeared to be undisturbed primary humus, evident in figure 49, so we then opened two adjacent 2 by 2 meter squares in the hope of encountering undisturbed mound deposit.

Figure 49 presents the profile of these excavations. A single badly decomposed burial was encountered in this excavation (fig. 24c), along with a large portion of undisturbed humus. Charcoal from this humus has been radiocarbon dated to A.D. 70 ± 65 (UGA-1688) and 230-380 B.C. ± 70 (UGA-1689). This places South New Ground Mound well within the time range established for the other six mounds in the Cunningham group.

The 1976 American Museum excavation thus established not only the aboriginal character of South New Ground Mound, but also explained why Moore's 1896 fieldwork failed to locate any cultural materials here. C. B. Moore was a man accustomed to finding obvious, and rather striking features in his work along the Georgia

TABLE 19
Measured Stratigraphic Section of South New Ground Mound

Unit	Thickness (cm.)	Description
IV	10	*Secondary humus* (10 YR 6/3: dry), pale brown sand with abundant rootlets. Contact gradual.
IIIb	95	*Mound fill* (10 YR 6/2: dry), light brownish gray sand with scattered charcoal and several pine roots growing throughout. Contact distinct but mottled.
IIIa	8	Shallow lens (10 YR 7/4: dry), very pale brown sand. Contact distinct but mottled.
II	18	*Primary humus* (10 YR 5/1: dry), gray sand. Radiocarbon dates: A.D. 70 ± 65 (UGA-1688); 230-380 B.C. ± 70 (UGA-1689) Contact indistinct.
I	30+	*Sterile substratum* (10 YR 7/3: dry), very pale brown sand. Bottom not exposed.

coast and elsewhere. In fact, the frontispiece in his book (1897) shows a beautiful urn burial from South-end Settlement on St. Catherines Island, probably belonging to the Irene period.

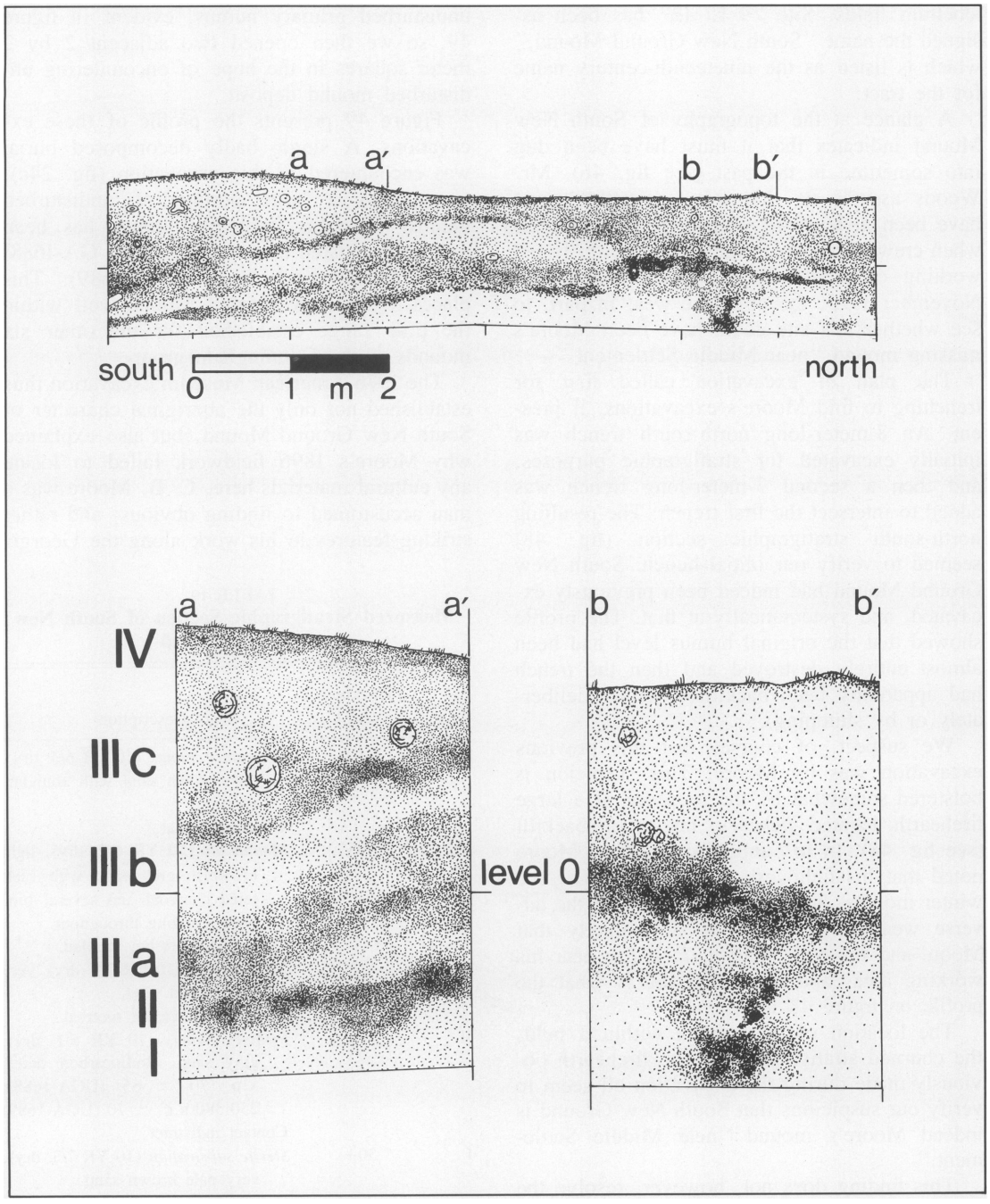


FIG. 48. Major stratigraphic profile of South New Ground Mound, west wall of E-trench east. Note disturbed stratigraphy, probably the result of previous excavation by C. B. Moore.

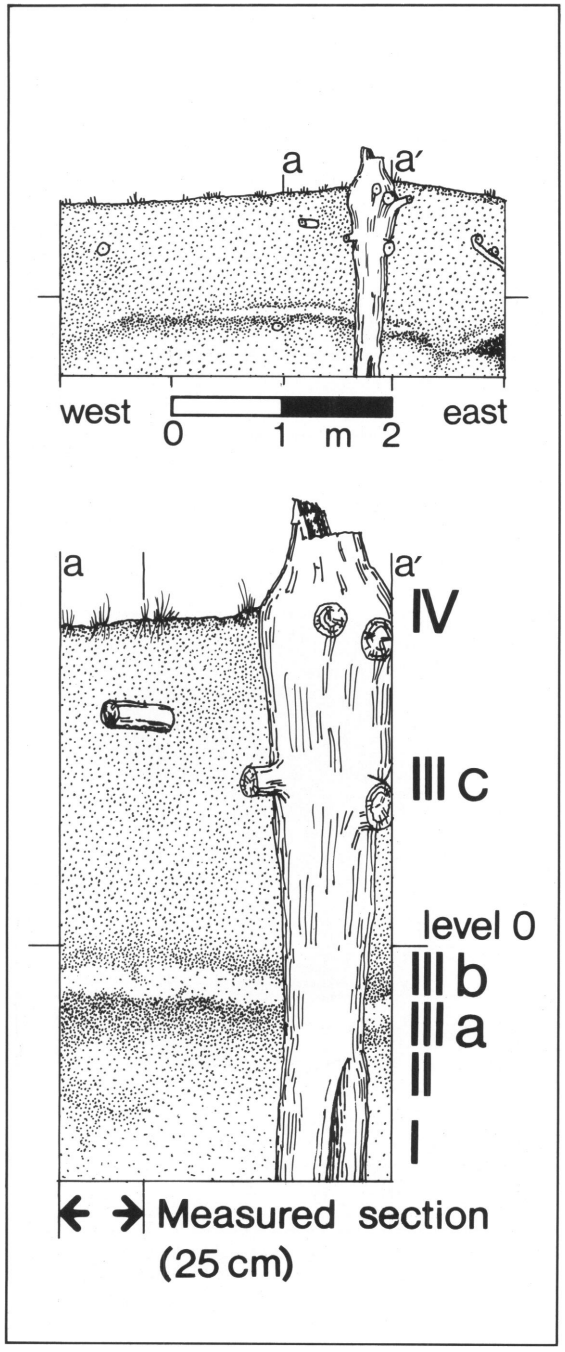


FIG. 49. Stratigraphic profile of South New Ground Mound, north wall of 5-trench. This stratigraphy is intact, and consistent with that observed at nearby mounds.

From the preceding descriptions of the Cunningham Mound group, it is clear that Refuge-Deptford mounds are not spectacular at all. The skeletons generally lack grave goods, and bones crumble at the slightest touch. Little wonder that Moore dismissed his mound near Middle Settlement as a mere house foundation.

SKELETAL REMAINS

BURIAL 1: female, adult; several flat cranial fragments, left mandibular corpus; mandibular second premolar and first molar (see fig. 24c).

CHAPTER 4. THE SEASIDE MOUND GROUP

DAVID HURST THOMAS, CLARK SPENCER LARSEN, AND ANN MARIE LUNSFORD

Two aboriginal mounds are situated along the eastern margin of St. Catherines Island near McQueens Inlet (see fig. 2). Because of their proximity and approximate contemporaneity, we have grouped the two together as the Seaside Mound complex. As was the case with the Cunningham Mound group, we do not mean to imply any aboriginal unity in this designation.

Seaside Mound I contained 13 burials, of which the first eight were excavated by the University of Georgia in 1970. Much of the skeletal materials from these excavations has been lost and is unavailable to us for study. Where possible, however, we have integrated the surviving materials with our own findings. Seaside II had not been previously excavated and a total of 12 burials were excavated. The cranial, dental, and postcranial measurements for all the Seaside burials are compiled in tables 20-22.

SEASIDE I

Seaside Mound I (9 Li 26) stands approximately 150 meters east of the present McQueens marsh on the eastern edge of St. Catherines Island. Seaside I was first tested in 1970 by the University of Georgia, under the direction of Joseph Caldwell.[1] Apparently no contour map was prepared at the time, and we were unable to do so because of backdirt piled on the unexcavated portions. According to Smith (n.d), the site originally measured 60 by 55 feet, with the faint impression of a borrow pit encircling the mound. A depression in the top of the mound indicated that a trench had been put into the site at some time before 1970.

University of Georgia crews worked at Seaside I during August 1970. Eight burials were excavated and about three dozen sherds re-

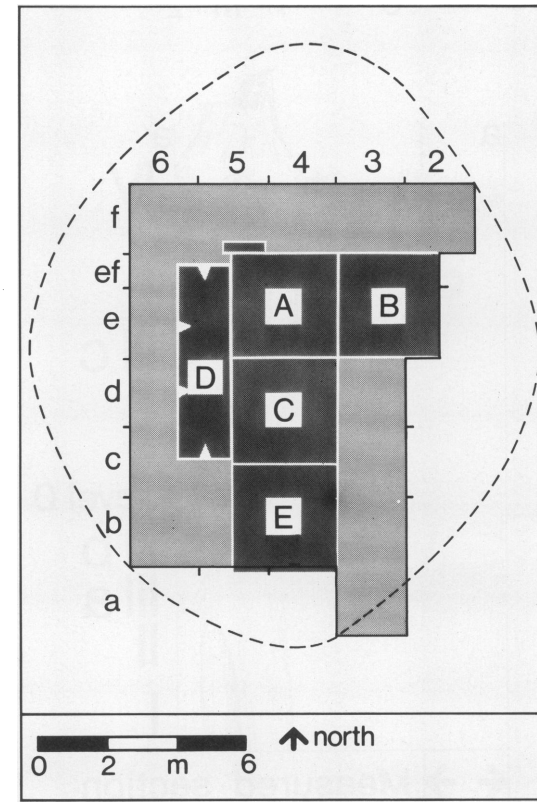


FIG. 50. Plan view of Seaside I. The darkly shaded area indicates the area excavated by the University of Georgia in 1970; the lightly shaded area was excavated by the American Museum of Natural History. The dotted line represents the approximate edge of the mound.

[1]The Department of Anthropology at the University of Georgia has generously provided us with the available field notes, photographs, artifacts, and skeletal material from the 1970 test excavations at Seaside I. We have incorporated these findings in the present report, and have also drawn upon a preliminary report (Smith, n.d.) which briefly outlines the results of the 1970 excavations by the University of Georgia.

TABLE 20
Cranial Measurements (in Millimeters), Seaside Mound Group

	Seaside Mound I					Seaside Mound II				
	2	8	12A	12B	14	8C	11	13A	13B	13C
Mastoidale-bregma	—	—	—	—	—	171	(157)	—	152	—
Auricular pt.-bregma	—	—	—	—	—	145.0	(127)	122	133	—
Mastoidale-inion	—	—	—	—	—	104.0	96.3	—	83.1	(84)
Mastoidale-opisthion	—	—	—	—	—	—	65.5	—	—	—
Inion-auricular pt.	—	112.3	—	—	—	114.1	104.3	101.0	95.4	94.8
Opisthion-auricular pt.	—	—	—	—	—	—	88.3	—	—	—
Nasion-frontomalare orbitale	50.3	—	56.9	—	—	—	—	49.0	—	—
Zygomatic arch thickness	—	—	—	29.7	—	—	—	—	—	—
Cheek height	—	—	—	35.1	—	—	—	—	—	—
Biorbital breadth	—	—	103.8	—	—	—	—	—	—	—
Orbital breadth	—	—	(44.3)	—	—	—	—	35.8	—	—
Orbital height	—	—	(45)	—	—	—	—	35.7	—	—
Temporalis length	—	—	—	—	—	—	—	130.3	128.4	—
Temporalis height	—	—	—	—	—	—	—	93.6	92.2	—
Bregma-Lambda	—	—	—	—	—	115.5	116.6	102.6	112.2	—
Bregma-inion	—	—	—	—	—	160	168	132.9	146	—
Bregma-opisthion	—	—	—	—	—	155	173	—	—	—
Bregma-nasion	106.7	—	—	—	—	—	—	108.9	113.3	—
Lambda-inion	(63)	82.0	—	—	82.4	63.7	87.3	43.2	63.1	63.7
Opisthion-inion	—	—	—	—	—	55.3	52.9	—	—	—
Lambda-opisthion	(98)	—	—	—	—	100.9	122.3	—	—	—
Asterion-asterion	—	—	—	—	—	114.1	—	—	—	—
Nasion-lambda	—	—	—	—	—	—	—	168	167	—
Maximum length	—	—	—	—	—	—	—	174	176	—
Maximum breadth	—	—	—	—	—	—	(138)	—	—	—
Occipital arc	(105)	—	—	—	—	120.2	—	—	—	—
Parietal arc	—	—	—	—	—	134.4	132	—	—	—
Frontal arc	120	—	—	—	—	—	—	—	—	—
Lambda-inion arc	—	—	—	—	—	66.3	—	—	—	—
Inion-opisthion arc	—	—	—	—	—	52.2	—	—	—	—
Mandible										
Bicondylar breadth	—	—	—	(120)	—	—	—	—	—	(112)
Condylar breadth	—	—	(25.5)	25.3	—	—	(24)	—	—	(14)
Asc. ramus ht., coronoid	—	—	(68)	76.3	—	—	—	—	—	—
Asc. ramus ht., condyle	—	—	—	61.3	—	—	—	—	—	42.3
Asc. ramus, min. breadth	—	—	—	36.9	—	—	—	—	—	—
Symphysis height	—	—	—	37.8	—	—	—	—	—	29.2
Symphysis thickness	—	—	14.8	14.7	—	—	—	—	—	13.0
Corpus height, P_2-M_1	—	—	34.7	37.2	39.6	—	—	—	—	27.1

( ), measurement estimate.
___, right side measurement.

covered; many of these materials have subsequently disappeared and are unavailable for study.

The crew from the American Museum excavated at Seaside I in January and March 1977. The University of Georgia excavations were

TABLE 21
Summary Dental Statistics, Seaside Mound Group

			Seaside Mound I					Seaside Mound II				
	Diameter	Tooth	N	Minimum	Maximum	Mean	Std. Dev.	N	Minimum	Maximum	Mean	Std. Dev.
Mandible	L	I1	2	4.3	5.6	4.9	.92	2	4.7	6.0	5.4	.92
	B	I1	2	6.0	6.5	6.3	.35	2	5.8	6.7	6.3	.64
	L	I2	4	6.5	7.3	6.8	.35	3	5.8	6.8	6.4	.55
	B	I2	3	5.9	6.2	6.1	.17	3	5.5	6.3	5.9	.40
	L	C	3	5.8	7.8	6.7	1.02	3	5.3	8.2	6.9	1.48
	B	C	3	7.7	8.3	8.1	.34	3	6.5	7.8	7.4	.75
	L	PM1	4	6.8	8.3	7.7	.65	5	5.8	8.7	7.4	1.06
	B	PM1	4	7.7	8.7	8.4	.47	5	7.6	8.4	7.9	.33
	L	PM2	4	6.2	8.2	7.3	.91	5	6.4	8.1	7.3	.79
	B	PM2	4	7.4	9.8	8.6	1.05	5	7.8	8.9	8.3	.44
	L	M1	6	11.3	12.8	12.3	.71	5	11.0	13.2	12.1	1.03
	B	M1	5	11.1	11.8	11.4	.23	5	10.2	12.3	11.2	.92
	L	M2	9	10.8	13.0	12.0	.68	4	10.9	13.1	12.2	.94
	B	M2	9	10.8	11.6	11.3	.29	4	10.1	12.0	11.1	.79
	L	M3	8	10.1	13.0	11.9	.99	6	10.8	12.9	11.9	.77
	B	M3	8	10.5	11.7	11.0	.43	6	10.1	11.6	10.8	.53
Maxilla	L	I1	2	6.5	8.9	7.7	1.7	2	7.8	9.1	8.5	.92
	B	I1	2	6.4	7.6	7.0	.85	2	7.0	7.2	7.1	.14
	L	I2	2	7.6	7.9	7.8	.21	2	5.9	7.5	6.7	1.13
	B	I2	2	6.0	6.9	6.5	.64	2	5.8	6.3	6.1	.35
	L	C	4	6.7	8.8	8.1	.93	3	7.6	9.1	8.3	.75
	B	C	3	8.3	9.2	8.7	.45	3	8.1	9.0	8.5	.47
	L	PM1	5	7.0	8.0	7.4	.45	3	5.4	7.9	6.8	1.28
	B	PM1	5	9.2	10.5	9.9	.51	3	8.8	9.2	8.9	.23
	L	PM2	7	6.8	8.3	7.6	.53	3	7.0	7.8	7.5	.42
	B	PM2	6	9.5	10.8	10.2	.51	3	9.0	9.9	9.4	.45
	L	M1	9	10.5	11.6	11.1	.32	5	9.7	11.9	10.6	1.02
	B	M1	9	11.1	13.5	12.4	.67	5	9.8	12.9	11.6	1.14
	L	M2	9	9.2	11.6	10.6	.78	4	10.3	11.4	10.9	.49
	B	M2	9	11.5	13.6	12.4	.70	4	10.9	12.2	11.6	.54
	L	M3	9	8.8	11.7	10.2	.99	4	9.1	10.8	10.1	.73
	B	M3	9	10.8	13.3	11.7	.82	4	10.5	11.5	11.1	.51

L = length
B = breadth

clearly evident, and a metric grid system was established to correspond with the previous sidewalls (see fig. 50). A permanent brass datum (stamped "AMNH 108") was set in concrete approximately 15 meters south from the original center of the mound.

The University of Georgia excavated approximately 40 cubic meters of fill in 1970. Subsequent excavations by the American Museum removed an additional 64 cubic meters. We estimate that less than 25 cubic meters of undisturbed fill remains (fig. 51).

STRATIGRAPHY

The stratigraphic profile for Seaside I is presented in figure 52 and the measured stratigraphic section is described on table 23.

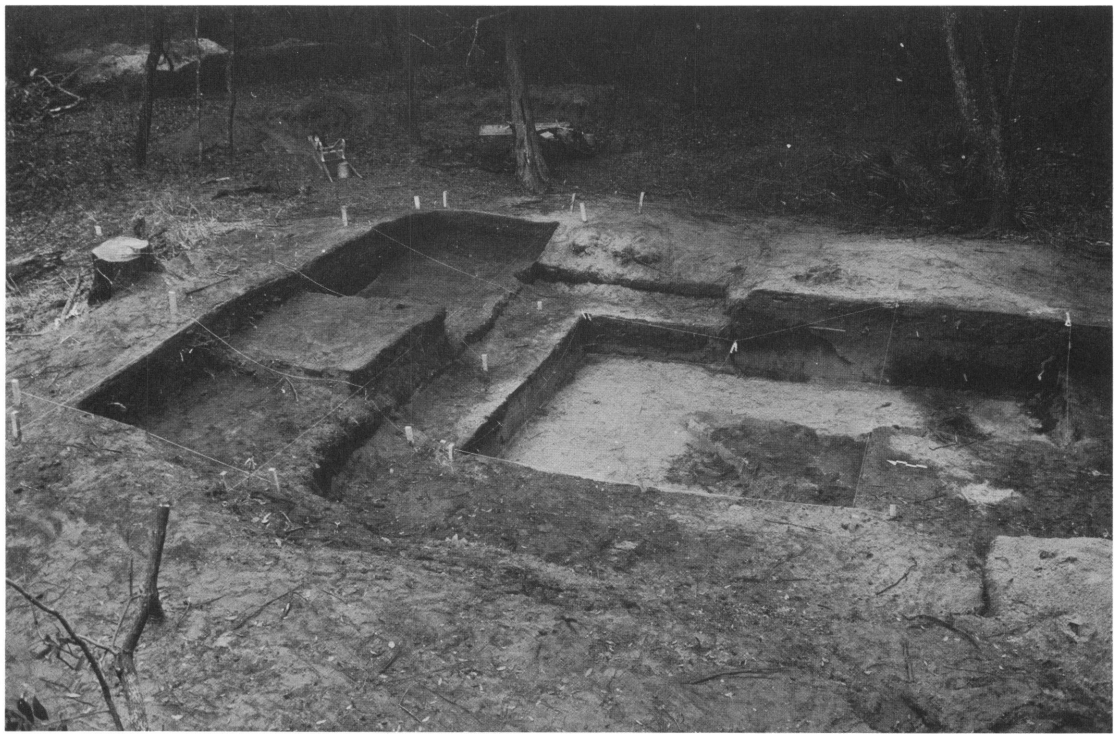


FIG. 51. Seaside I during excavations in January 1977. Photograph facing to the northeast.

The overall stratigraphy at Seaside I is similar to that noted throughout the Cunningham Mound group, but the situation is complicated somewhat by the presence of so many pre-mound pits and burials.

As usual, the primary humus apparently was burnt prior to ceremonial activity on this spot. Several pre-mound burials were then dug into Unit II humus. Burials 3 and 4 (described in the following section) were found in a single pre-mound pit. Smith (n.d.) also mentioned the presence of an infant skeleton in this pit, but that individual was not given a burial number. Nearby, three supine extended individuals (burials 6, 7, and 8) were found in a well-defined pit dug into the sterile substratum and apparently filled with reworked Unit II humus. Burial 10 was also found in an elongated pit, approximately 125 cm. by 35 cm. Burial 14 was found in a distinct pit which measured 65 cm. by about 250 cm.; this pit appeared to have been lined with logs, which had subsequently decayed into a black stain. Burial 15 was also found in a pre-mound pit, but only the cranial portions of the burials could be exposed. The schematic placement of all these pre-mound burials is shown on figure 53.

Also scattered about the surface of stratigraphic Unit II were a number of nonburial, pre-mound features:

FEATURE 2 (University of Georgia, 1970): Pit dug 1 foot deep into Unit II humus. Oysters from this pit have been radiocarbon dated to 440-460 B.C. ± 65 and 400 B.C. ± 110.

FEATURE 5 (University of Georgia, 1970): Large oval pit measuring 10.5 ft. long and 5.5 ft. wide; University of Georgia field notes indicate that two or three sand steps were present at the east end. Four apparent postholes were located at the west end. The pit was empty except for two potsherds in the fill.

TABLE 22
Postcranial Measurements (in Millimeters) and Indices, Seaside Mound Group

	Seaside Mound I					
	1		6		7,8 adults	
	Left	Right	Left	Right	Left	Right
Humerus						
Maximum length	—	—	—	—	—	—
Maximum diameter, midshaft	—	—	—	—	—	—
Minimum diameter, midshaft	—	—	—	—	—	—
Circumference, midshaft	—	—	—	—	—	—
Head diameter	—	—	—	—	—	—
Biepicondylar breadth	—	—	—	—	—	—
Clavicle						
Maximum length	—	—	—	—	—	(142)
Radius						
Maximum diameter, crest (midshaft)	—	—	—	—	18.4	18.5
Minimum diameter, crest (midshaft)	—	—	—	—	12.1	11.7
Maximum length	—	—	—	—	(285)	—
Head diameter	—	—	—	—	—	—
Ulna						
Maximum length	—	—	—	—	—	(310)
Femur						
Head diameter	—	—	—	—	—	—
Vertical diameter, neck	—	—	—	—	—	—
Horizontal diameter, neck	—	—	—	—	—	—
Maximum morphological length	—	—	—	—	—	—
Ant.-post. diameter, midshaft	28.6	29.0	—	—	34.2	—
Transverse diameter, midshaft	24.8	25.4	—	—	27.7	—
Circumference, midshaft	85.9	82.6	—	—	95.6	—
Ant.-post. diameter, subtroch.	—	—	—	30.1	30.3	28.1 28.7
Transverse diameter, subtroch.	—	—	—	33.9	35.2	36.3 35.1
Maximum diameter, head	—	—	—	—	—	—
Tibia						
Maximum length	—	—	—	—	(400)	—
Ant.-post. diameter, midshaft	—	—	—	—	34.0	32.6
Transverse diameter, midshaft	—	—	—	—	23.0	22.0
Circumference, midshaft	—	—	—	—	87.2	87.4
Stature (cm.)[a]	—		—		—	
Indices						
Pilastric index	115.3	114.2	—	—	123.5	—
Femoral mid-shaft index	—	—	—	88.8	86.1	81.8, 77.4
Tibial mid-shaft index	—	—	—	—	67.6	67.5

[a]Genovés, 1967; adult male femur.
( ), measurement estimate.

TABLE 22 — *(Continued)*

Seaside Mound II											
7,8 subadult		12A,B		8C		11		13A,B,C		14	
Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
—	218	—	—	—	—	—	—	—	—	—	—
—	17.7	—	—	28.8	—	—	—	—	—	—	—
—	11.9	—	—	16.4	—	—	—	—	—	—	—
—	49.4	—	—	65.9	—	—	—	—	—	—	—
30.0	31.6	—	—	—	—	—	—	—	—	—	45.7
—	40.4	—	—	—	—	—	—	—	—	—	—
—	—	(147)	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—
—	—	44.6	—	—	—	—	—	—	—	—	—
21.4	21.4	—	—	—	—	—	—	—	—	—	—
19.1	19.4	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	(475)	(475)	—	—	—	—
—	—	—	—	31.8	—	—	32.4	26.9	32.8	30.0	—
—	—	—	—	26.8	—	—	28.3	—	—	26.8	—
—	—	—	—	91.2	—	97.0	95.0	—	—	83.9	—
19.3	—	—	—	—	—	28.3	30.1	—	—	28.0	—
25.3	—	—	—	—	—	38.7	37.8	—	—	34.3	—
—	—	—	—	—	—	—	—	—	—	—	—
—	249	—	—	—	—	—	—	—	—	—	—
—	22.0	—	—	—	—	35.3	—	—	—	—	—
—	15.5	—	—	—	—	23.2	—	—	—	—	—
—	59.4	—	—	—	—	97.0	—	—	—	—	—
—		—		—		173.7±3.4		—		—	
—	—	—	—	118.7	—	—	114.5	—	—	111.9	—
76.3	—	—	—	—	—	73.1	79.6	—	—	81.6	—
—	70.5	—	—	—	—	65.7	—	—	—	—	—

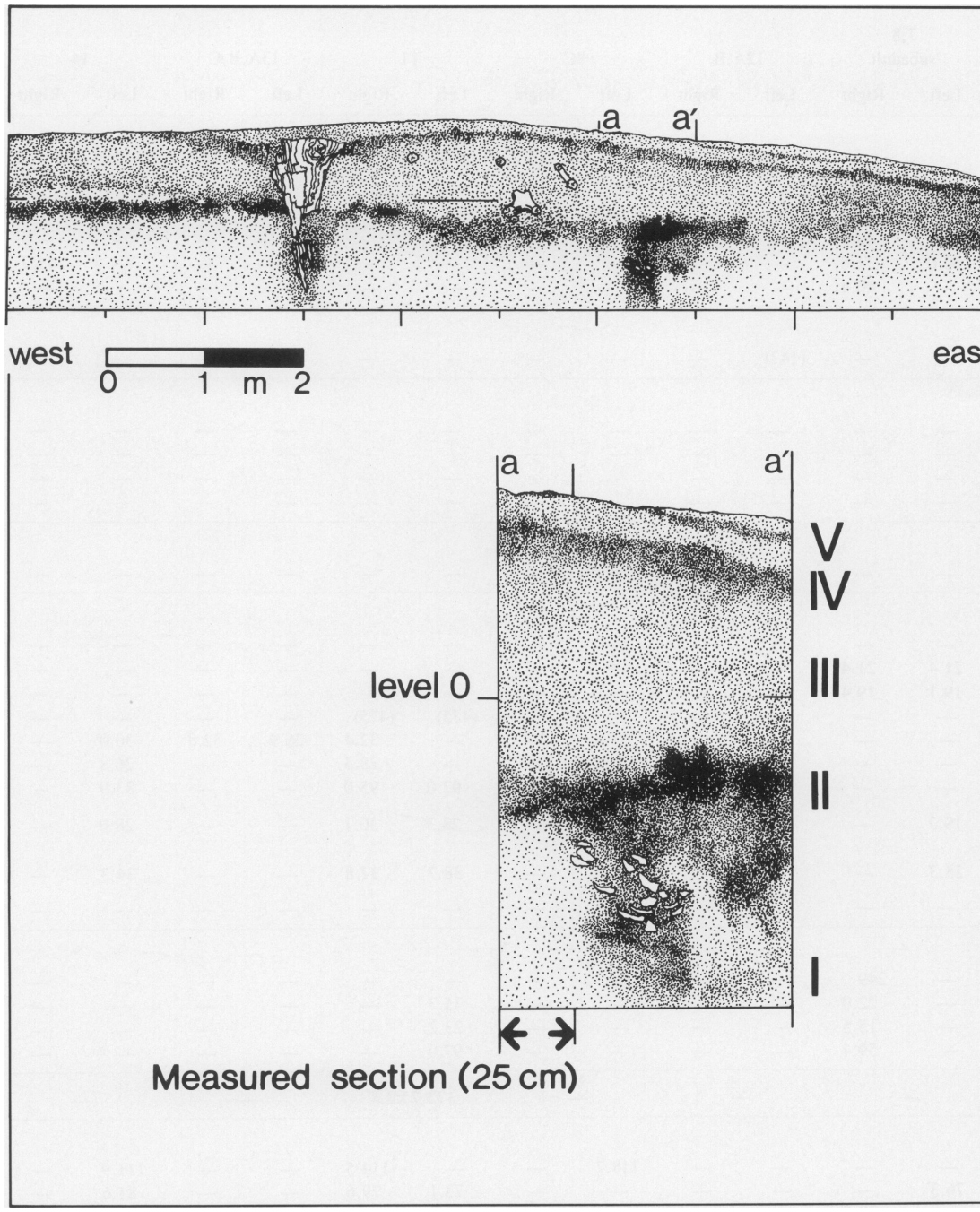


FIG. 52. Stratigraphic profile of Seaside I, north wall of F-trench.

FEATURE 6 (AMNH, 1977): Pit 25 cm. in diameter and 15 cm. deep (sq. B3, 80 cm. from east, 40 cm. from north); extends into Unit I and is filled with mottled humus.

FEATURE 7 (AMNH, 1977): Long irregular pit 1 meter wide at north end, tapering to 25 cm. at south and 1 meter in length (sq. F2, northern half); excavated through Unit II and filled with reworked Unit I.

FEATURE 8 (AMNH, 1977): Circular pit 1 meter in diameter (sq. F2, northern margin); extends into Unit 1 and filled with mixture of humus and oyster shell along southern perimeter.

FEATURE 9 (AMNH, 1977): Elongated pit approximately 1 meter in length (sq. F4, northwestern corner); extends into Unit I and filled with very dark humus (probably reworked Unit II).

FEATURE 14 (AMNH, 1977): Humus and shell-filled pit approximately 60 cm. in diameter (sq. F3, northern half); extends into Unit I and shell concentrates on southern margin of pit.

These burials and features obviously indicate that a great deal of ceremonial activity took place at this locality prior to the actual construction of the mound.

TABLE 23
Measured Stratigraphic Section of Seaside Mound I

Unit	Thickness (cm.)	Description
—	12	*Backdirt* (from 1970 University of Georgia test excavations). Contact abrupt.
IV	7-15	*Secondary humus* (10 YR 6/1: dry), light gray sand with several roots and several small flecks of charcoal. Logs from intrusive burials radiocarbon dated to A.D. 570 ± 125 (UGA-112). Contact abrupt.
III	55-60	*Mound fill* (10 YR 5/2: dry), grayish brown sand with several large hickory roots. Contact gradual.
II	18	*Primary humus* (10 YR 4/2: dry), dark grayish brown sand with charcoal flecks scattered throughout and a krotovina 2 cm. in diameter. Shell from pit in primary humus radiocarbon dated to 440-460 B.C. ± 230 (UGA-SC3), 270-390 B.C. ± 110 (UGA-104). Contact gradual.
I	95+	*Sterile substratum* (10 YR 7/3: dry), very pale brown sand. Bottom not exposed.

Seaside Mound I was constructed in a fashion similar to the rest of the Cunningham Mound group.[2] The mound fill was taken from several borrow pits evident around the perimeter, and then a poorly developed secondary humus developed over the mound itself.

The following intrusive features were noted in Units III and IV:

FEATURE 1 (University of Georgia, 1970): Small empty pit.

FEATURE 3 (University of Georgia, 1970): Large pit excavated into Unit III, covered with four or five parallel charred logs, the longest of which was burial 5 found directly under logs about 6 ft. long. University of Georgia field notes indicate that a ramp encircled the logs, especially evident at the southern edge of the logs. Charcoal from one log has been radiocarbon dated at A.D. 570 ± 125 (UGA-112).

FEATURE 4 (University of Georgia, 1970): A pit, 1 ft. 4 in. deep containing charcoal. Originated 1 ft. below surface.

[2]We must point out that our interpretation of the stratigraphy at Seaside I differs somewhat from that of the University of Georgia excavators (Smith, n.d.). In their preliminary report, Caldwell and his associates felt that a second "old humus" had developed over the refilled oval pit (Feature 5). This secondary soil development was taken to mean that a very long interval had passed between the excavation of Feature 5 and the actual building of the mound.

While we certainly agree that mound building must have been delayed for a long time after Feature 5 was made, we failed to find any second "old humus," despite our intensive excavations throughout Seaside I. We think that the dark layer encountered in Feature 5 was probably pre-mound backdirt derived from stratigraphic Unit II. Precisely the same situation occurred at Cunningham Mounds A and D, and at McLeod Mound. In addition, the Unit II humus appears much darker because of previous burning. Observation of the Unit IV humus (which occurs on the top of all nine mounds discussed) indicates that a post-Feature 5 humus could not possibly have formed in the time allotted. We know that in all cases, stratigraphic IV is at least 1500 years old, yet the A horizon is very weakly formed and in no way analogous to the band noted over Feature 5. We see no reason to think that the stratigraphy of Seaside I differs significantly from the other eight Refuge-Deptford phase mounds excavated on St. Catherines Island.

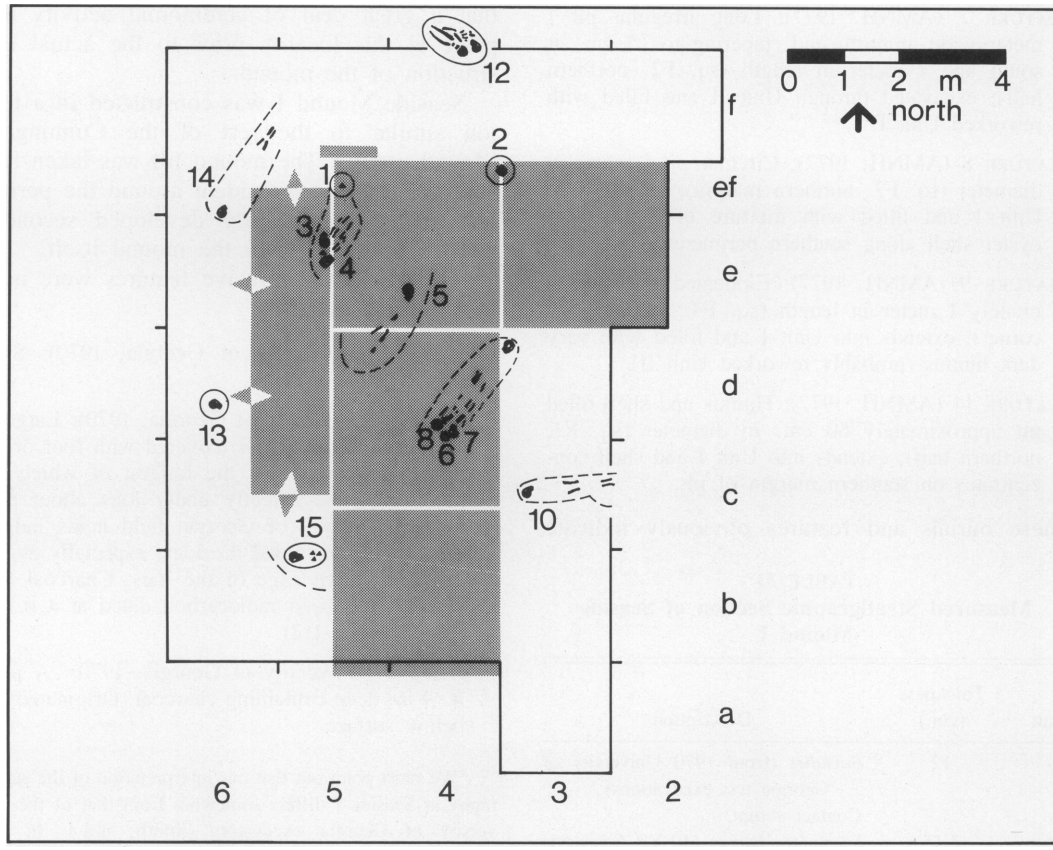


FIG. 53. Schematic diagram of burials at Seaside I. Shaded area indicates area excavated by the University of Georgia; dotted line indicates approximate pit outlines.

In addition, a large midden concentration (Feature 15) was encountered along the southern margin of Seaside I. This dark gray deposit contained abundant shells of oyster, clam, and conch, along with a variety of nonhuman bones. Shell from Feature 15 was radiocarbon dated to A.D. 730-700 ± 70. This post-mound midden would seem to correspond to the other habitation sites which have been noted throughout the Seaside tract on St. Catherines Island.[3] The University of Georgia tested these sites in 1970 (Smith, n.d.) and crews from the American Museum have also examined their contents. All seem to be Wilmington period and unrelated to the burial mounds (with the possible exception of intrusive burial 5, discussed later).

[3]George Clark has examined some of the Feature 15 clam shells and concludes that they must have been collected between December and January (see Appendix). The implications of this seasonality will be considered in the subsequent discussion of the subsistence and technology of these sites.

SKELETAL REMAINS

The following human skeletons were found on the pre-mound surface of Seaside I (see fig. 54)[4]:

BURIAL 3: bundle, head to the west; unavailable for study.

[4]Burials assigned numbers 9 and 11 in the field were later combined with other burials.

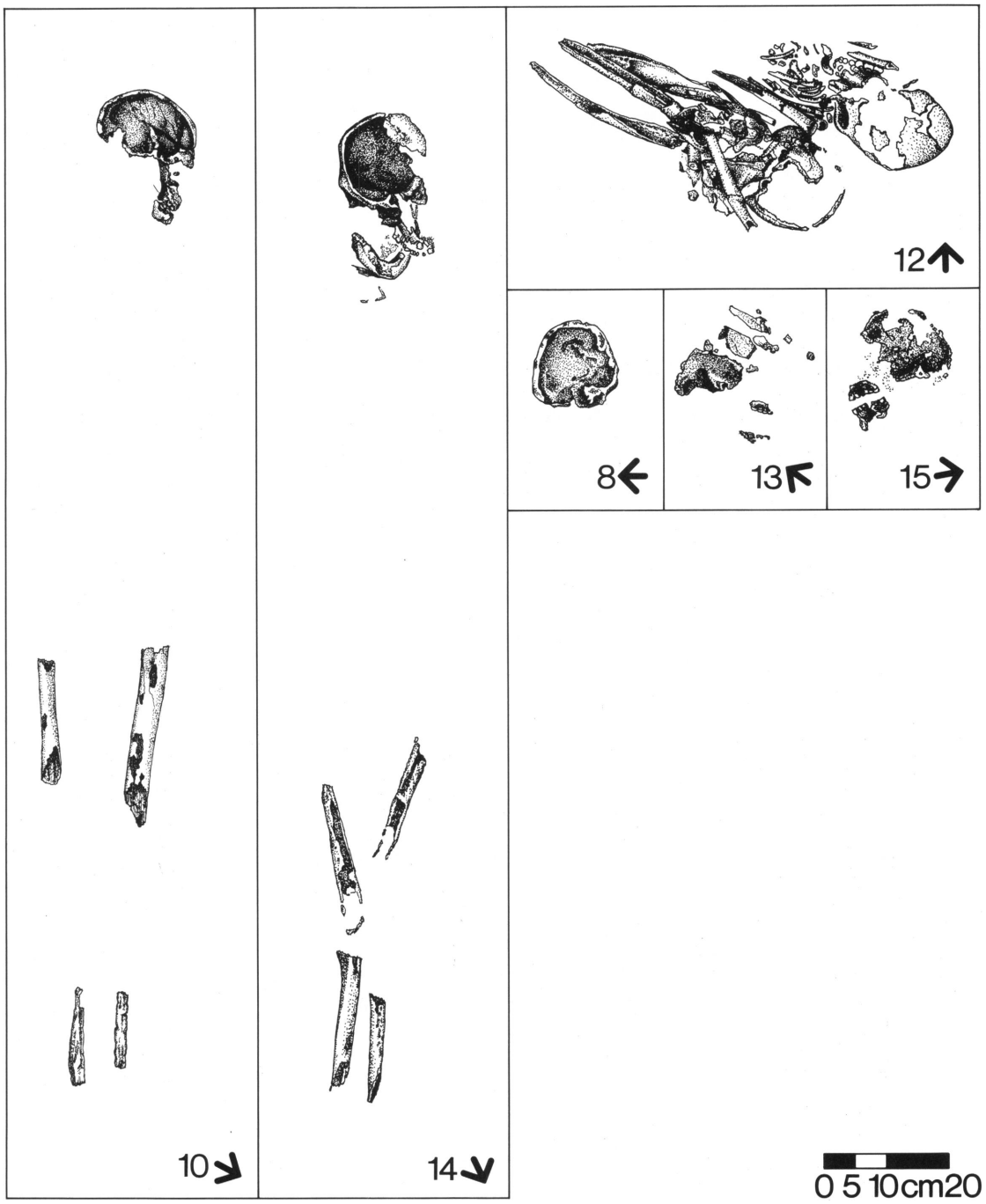


FIG. 54. Burials excavated by the American Museum of Natural History at Seaside I.

BURIAL 4: supine, extended individual with head to the west; unavailable for study (University of Georgia field notes indicate that an infant skeleton was included in pit with burials 3 and 4; that

TABLE 24
Sherd Frequencies at Seaside Mound I

Type	Surface	+109 - +100	+99 - +90	+89 - +80	+79 - +70	+69 - +60	+59 - +50	+49 - +40	+39 - +30	+29 - +20	+19 - +10	+9 - 0	−1 - −10	−11 - −20	−21 - −30	−31 - −40	−41 - −50	−51 - −60	−61 - −70	−71 - −80	−81 - −90	No Vertical Provenience	Univ. of Ga.	Total
	Depth																							
Wilmington Plain	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	1	2
Deptford Cord Marked	—	—	—	—	—	—	—	—	1	—	2	—	1	1	2	2	2	1	—	—	—	—	2	14
Deptford Check Stamped	—	—	—	—	—	—	—	1	2	1	1	2	4	5	16	5	2	2	1	1	—	—	6	49
Refuge Simple Stamped	—	—	—	—	—	—	—	—	3	3	—	1	1	1	4	—	2	1	—	—	—	2	3	21
Refuge Plain	—	—	—	—	—	—	2	2	2	1	3	4	2	1	7	5	—	—	—	—	—	3	6	38
Misc. Refuge	—	—	—	—	—	—	1	2	2	2	—	1	2	6	20	3	1	1	1	—	—	—	6	48
Total	—	—	—	—	—	—	3	5	10	7	6	8	10	15	49	15	7	5	2	1	—	5	24	172

individual was not given a burial number and it is unavailable for study).

BURIAL 6: adult; position unknown; fragments of occipital condyle, squamosal portion of the occipital, parietal, frontal, temporal, acetabulum, ilium, left and right clavicles, humerus, ulnae, left and right femora, talus, first metatarsal, fourth and fifth left metatarsals, two metacarpal heads, two thoracic neural arches.

BURIAL 7 AND 8: The skeletal material of individuals from these burials was mixed following excavation. Three individuals are represented, two adults and one subadult. At least one of the adults is a male. Adult fragments included left ilium, right clavicle, left and right humeri, left and right radii, left and right ulnae, two right proximal femora, left femur, patella, left and right tibiae, left and right fibulae, left and right calcanea, talus, left navicular, left cuboid, left first, second, third, and fourth metatarsals, first proximal foot phalanx, right capitate, first left metacarpal, second right metacarpal, two proximal hand phalanges (second, third, fourth, or fifth), ribs. One of the adults had a pseudoarthritic left ulna. The false joint lies directly inferior to the radial notch. Only the proximal segment of the specimen was examined as the remainder of the bone was lost following excavation.[5] The adult cranium of burial 8 was the only part of the burial group (6, 7, and 8) that was excavated by us. This male skull consists of a cranial reconstruction (left squamosal portion of the occipital, left parietal, and left temporal), and fragments of a right temporal; maxillary right third molar.

The subadult (8 ± 1) was represented by fragments of occipital, left and right temporals, left parietal, nasal, right zygoma, left maxilla, left and right mandibular corpora, left and right ilia, left and right ischia, left pubis, left humeral head epiphysis, right humerus (complete), right radius, right ulna, left and right femora, left and right tibiae, left and right fibulae, right calcaneus, left and right tali, right navicular, left and right cuboids, right first cuneiform, all metatarsals, two proximal foot phalanges (second, third, fourth, or fifth), left capitate, one metacarpal, ribs; mandibular left lateral incisor, left and right first premolars, left and right first molars, left second molar, maxillary left and right canines, left first and second molars, right lateral incisor.

[5]Stewart (1974, p. 881) has shown that the ulna is the most commonly affected bone in nonunion fractures noted among prehistoric skeletal samples.

BURIAL 10: male, adult; extended, supine, head to the west; fragments of occipital squamous, left parietal, left and right temporals, ethmoid (crista galli), left maxilla, left mandibular corpus, left and right femora, left and right tibiae. One extrasutural bone was present (os inca). Dentition represented by the mandibular left second and third molars and maxillary left first, second and third molars.

BURIAL 12: bundle burial with four individuals, A, B, C, and D: an adult female, an adult male, an infant, and a juvenile, respectively.

A. Cranial reconstruction (squamosal portion of the occipital, right temporal, right parietal, frontal, left and right nasals), fragments of left and right zygomas, left and right occipital condyles, left temporal, sphenoid, right parietal, ethmoid (crista galli), nearly complete mandible; mandibular left and right central incisors, left lateral incisor, left canine, left second and third molars, right second premolar, first and third molars, maxillary left central incisor, canine through third molar, right second premolar through third molar.

B. Cranial reconstruction (squamosal portion of the occipital, left temporal, left parietal), fragments of left zygoma, right temporal, ethmoid (crista galli), sphenoid, frontal, occipital, nearly complete mandible; dentition complete except mandibular right central incisor and maxillary right first premolar.

A and B postcrania for the most part could not be separated. Fragments included left and right ilia, left and right clavicles, left and right scapulae, left and right humeri, left and right ulnae, left and right femora, left patella, right tibia, a proximal foot phalanx (second, third, fourth, or fifth), right trapezoid, a metacarpal, ribs, first through sixth cervical vertebrae, first through ninth thoracic vertebrae, hyoid. Two pairs of ribs, right and left, are fused.

C. Infant, birth to 6 months; fragments of ilium, scapula, two hand or foot phalanges, ribs, neural arch segments of cervical vertebrae.

TABLE 25
Abraded Sherds Found at Seaside I

Spec. No.	Type	Wear I	II	III	IV	V
28.0/1320	Deptford Check Stamped	—	—	X	—	—
S-1	Deptford Check Stamped	—	—	—	X	—
28.0/1248	Deptford Check Stamped	—	—	—	—	X
28.0/1319	Deptford Check Stamped	—	—	X	—	—
28.0/1226	Deptford Check Stamped	—	—	X	—	—
28.0/1261	Deptford Check Stamped	X	—	—	—	—
S-6	Deptford Check Stamped	X	—	—	—	—
S-8	Deptford Check Stamped	X	—	X	—	—
28.0/1295	Deptford Check Stamped	—	X	—	—	—
S-10	Deptford Check Stamped	—	X	—	—	—
28.0/1251	Deptford Check Stamped	X	—	X	—	—
28.0/1276	Deptford Check Stamped	—	—	X	—	—
28.0/1290	Deptford Check Stamped	X	—	—	—	—
28.0/1409	Deptford Check Stamped	—	—	—	—	X
28.0/1253	Deptford Check Stamped	X	—	—	X	—
28.0/1242	Refuge Plain	—	—	—	—	X
28.0/1392	Refuge Plain	X	—	—	—	—
28.0/1412	Refuge Plain	X	—	—	—	—
S-3	Refuge Plain	—	—	—	X	—
28.0/1180	Refuge Plain	—	—	—	X	—
28.0/1394	Refuge Plain	—	—	—	X	—
28.0/1172	Refuge Plain	—	—	—	—	—
28.0/1174	Refuge Plain	—	X	—	X	—
28.0/1279	Refuge Plain	—	X	—	X	—
28.0/132	Refuge Plain	X	—	—	—	—
28.0/116	Refuge Plain	X	—	—	—	—
28.0/118	Refuge Simple Stamped	—	—	X	—	—
28.0/1309	Refuge Simple Stamped	—	—	—	X	—
28.0/1243	Surface too abraded	X	—	X	—	—
28.0/1273	Surface too abraded	—	—	X	—	—
28.0/1191	Surface too abraded	—	—	X	—	—
28.0/1223	Surface too abraded	—	—	X	—	—
28.0/1253	Surface too abraded	—	—	X	—	—
28.0/1243	Surface too abraded	—	—	X	—	—
28.0/1235	Surface too abraded	—	—	X	—	—
28.0/1278	Surface too abraded	—	—	X	—	—
28.0/1265	Surface too abraded	—	—	X	X	—
28.0/116	Surface too abraded	X	—	X	—	—
S-1	Surface too abraded	—	—	X	—	—
28.0/1188	Surface too abraded	—	—	X	—	—
28.0/1179	Surface too abraded	X	—	X	—	—
28.0/1274	Surface too abraded	—	—	X	—	—
28.0/1285	Surface too abraded	—	—	X	—	X
28.0/118	Surface too abraded	—	—	X	X	—
28.0/118	Surface too abraded	X	—	X	—	—
28.0/1208	Surface too abraded	X	—	X	—	—
28.0/1292	Surface too abraded	—	—	X	—	—
28.0/116	Surface too abraded	X	—	X	—	—
28.0/1205	Surface too abraded	X	—	X	—	X
28.0/1192	Surface too abraded	X	—	X	—	X
28.0/1240	Surface too abraded	—	—	X	X	—
28.0/1420	Surface too abraded	—	—	X	—	—
28.0/1269	Surface too abraded	—	—	X	—	—
28.0/1229	Surface too abraded	—	—	X	—	—

TABLE 25 — (*Continued*)

Spec. No.	Type	Wear I	II	III	IV	V
28.0/1388	Surface too abraded	X	—	X	—	—
28.0/1246	Surface too abraded	X	—	X	—	—
28.0/1186	Surface too abraded	X	—	X	—	—
28.0/126	Surface too abraded	—	—	X	—	X
28.0/1262	Surface too abraded	—	—	X	—	—
28.0/1185	Surface too abraded	—	—	X	—	—
28.0/1204	Surface too abraded	—	—	X	—	—
28.0/1249	Surface too abraded	—	—	X	—	—
28.0/1230	Surface too abraded	—	—	X	—	—
28.0/1291	Surface too abraded	—	—	X	—	—
28.0/1277	Surface too abraded	—	—	X	—	—
28.0/1241	Surface too abraded	—	—	X	—	—
28.0/1181	Surface too abraded	—	—	X	—	—
28.0/1284	Surface too abraded	—	—	X	—	—
28.0/1306	Surface too abraded	—	—	X	—	—
28.0/1225	Surface too abraded	—	—	X	—	—
28.0/1251	Surface too abraded	—	—	X	—	—
S-6	Deptford Cord Marked	—	—	X	—	—
28.0/1194	Deptford Cord Marked	—	—	X	—	—
28.0/1251,1268	Deptford Cord Marked	X	—	—	—	—
S-7	Deptford Cord Marked	—	—	X	—	—
28.0/1288	Misc. Refuge	—	—	X	—	—

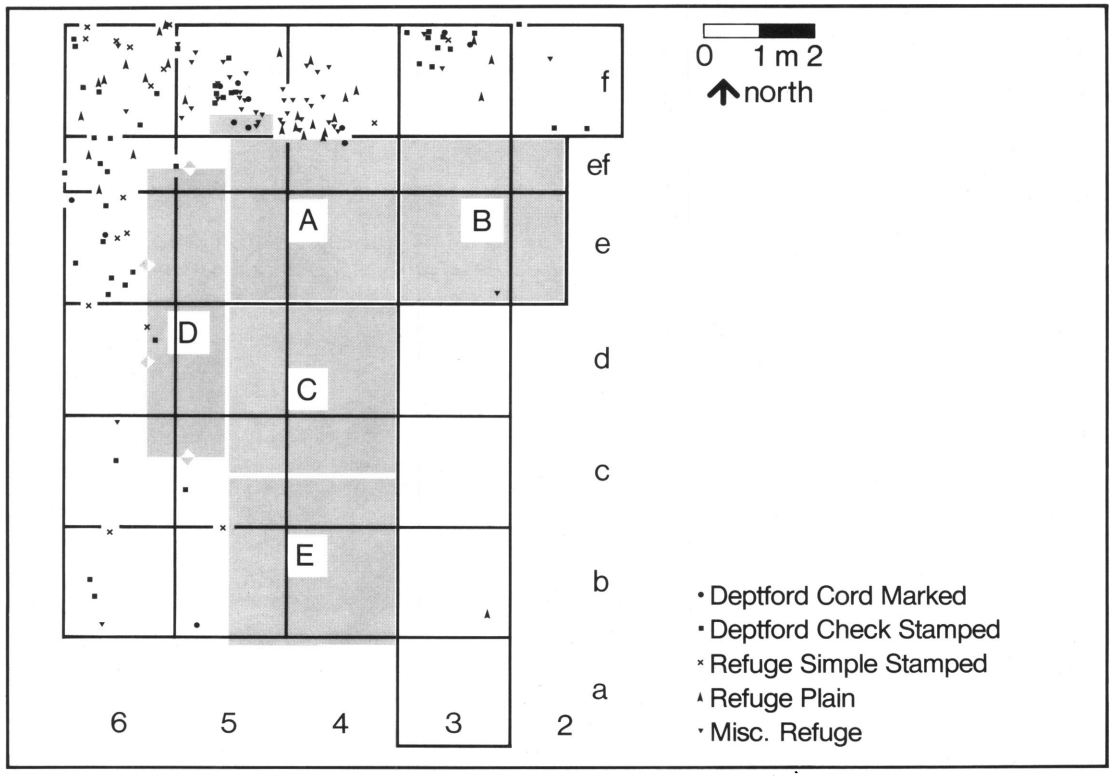


FIG. 55. Horizontal distribution of potsherds recovered by the American Museum of Natural History at Seaside I. Letters A through E denote area previously excavated by University of Georgia.

D. Juvenile, 5-10; fragments of left and right clavicles, left and right scapulae, left and right femora, a proximal hand phalanx (second, third, fourth, or fifth), ribs, two thoracic vertebral centra, a lumbar vertebral centrum; mandibular left second and third molars, right first premolar, second and third molars, maxillary left first premolar through third molar, right second premolar through second molar.

BURIAL 14: male, adult; supine, extended, head to the southwest; cranial reconstruction (squamosal portion of the occipital, left and right parietals), fragments of occipital condyle, occipital basilar portion, left and right temporals, sphenoid, left and right femora, left and right tibiae, first through seventh cervical vertebrae, first through ninth thoracic vertebrae. Extrasutural bones included two lamboidal ossicles, one right and one left, and an os inca; mandibular left third molar, maxillary right first premolar through third molar.

BURIAL 15: two individuals, a subadult cranium (A) and an adult cranium (B).

A. 12; fragments of temporal, parietals, enamel; mandibular left and right first and second molars, right lateral incisor and third molar, maxillary left second premolar through second molar, right second premolar.
B. Adult; fragments of right temporal, enamel, tooth roots; mandibular left third molar, right first premolar through third molar, maxillary left and right second and third molars, right first premolar through first molar.

The following individuals were found as intrusive burials into Seaside I:

BURIAL 1: female, 20-24; position unknown; fragments of sacrum, ilium, left and right femoral heads, tibia, talus.

BURIAL 2: male, adult; position unknown; cranial reconstruction (squamosal portion of the occipital, frontal, parietas), fragments of left and right temporals, left and right sphenoids, occipital.

BURIAL 5: adult (?); position unknown; fragments of left and right temporals, mandibular corpus, scapula (coracoid process); mandibular left and right second and third molars, maxillary left canine, second premolar, third molar, right third molar.

BURIAL 13: adult; position unknown as only cranium recovered; fragments of left temporal, left parietal, left mandibular corpus; mandibular left first premolar, first and second molars, maxillary left and right first molars, left second and third molars.

CERAMICS

A total of 173 potsherds have been recovered from Seaside I. During the earlier University of Georgia excavations, sherds were not assigned provenience, so the 29 sherds recovered in 1970 are listed by type only (table 24). All sherds recovered by the crews from the American Museum can be assigned three-dimensional provenience and are so listed in table 24 and figure 55.

Ceramics of the Refuge and Deptford phases predominate, and we note a somewhat higher frequency of Deptford Check Stamped and Deptford Cord Marked pottery. The sherds appear to be scattered throughout Units II and III, and they show no marked tendency to cluster. Once again, these sherds are probably inclusive within the fill.

One tetrapod (28.0/1237) was also found.

ABRADERS

More than 40 percent of the sherds recovered at Seaside I showed signs of abrasion. These 75 sherds are tabulated by type and kind of abrasion on table 25.

LITHICS

Two projectile points were recovered during American Museum excavations at Seaside I (see table 11 and fig. 20i, j). One of these (28.0/1184) was found isolated in Unit II fill. The second point (28.0/1177) was found in the sterile Unit I sand below Feature 1, which contained burials 6-8.

In addition, 23 flakes were found scattered throughout Units II and III. Most of the flakes were of a characteristic tan chert, and none of the flakes appear to have been utilized. A frag-

mented core of poor-quality chert was also found in the fill.

SEASIDE II

Seaside Mound II (9 Li 62) stands approximately 130 meters southeast of Seaside I. This mound is situated less than 20 meters west of the present marshy McQueens Inlet, and the locality affords a clear view of expansive North Beach. The mound is about 90 cm. high and covers approximately 300 square meters. A large borrow area is situated immediately northeast of the mound, and a smaller borrow pit is evident on the southwestern margin (fig. 56). There were no signs of previous excavation or disturbance.

A crew from the American Museum cleared Seaside II of palmettos, pine, and oak trees in November 1976, and a permanent brass datum (stamped "AMNH 106") was set in concrete 20 meters northwest of the center of the mound. The site was also excavated in January and March 1977. Approximately 50 cubic meters of fill were excavated, and we estimated that slightly more than 100 cubic meters remain undisturbed (fig. 57).

Stratigraphy

The stratigraphic profile of Seaside II is present on figure 58, and the measured stratigraphic section is described on table 26. The stratigraphy is quite similar to that of Seaside I and the mounds of the Cunningham Field group.

As was the case at Seaside I, several small, midden-like deposits were found on the surface of stratigraphic Unit II, and these seem to reflect a pre-mound occupation. The following pre-mound features were excavated:

Feature 1: Pit approximately 50 cm. in diameter

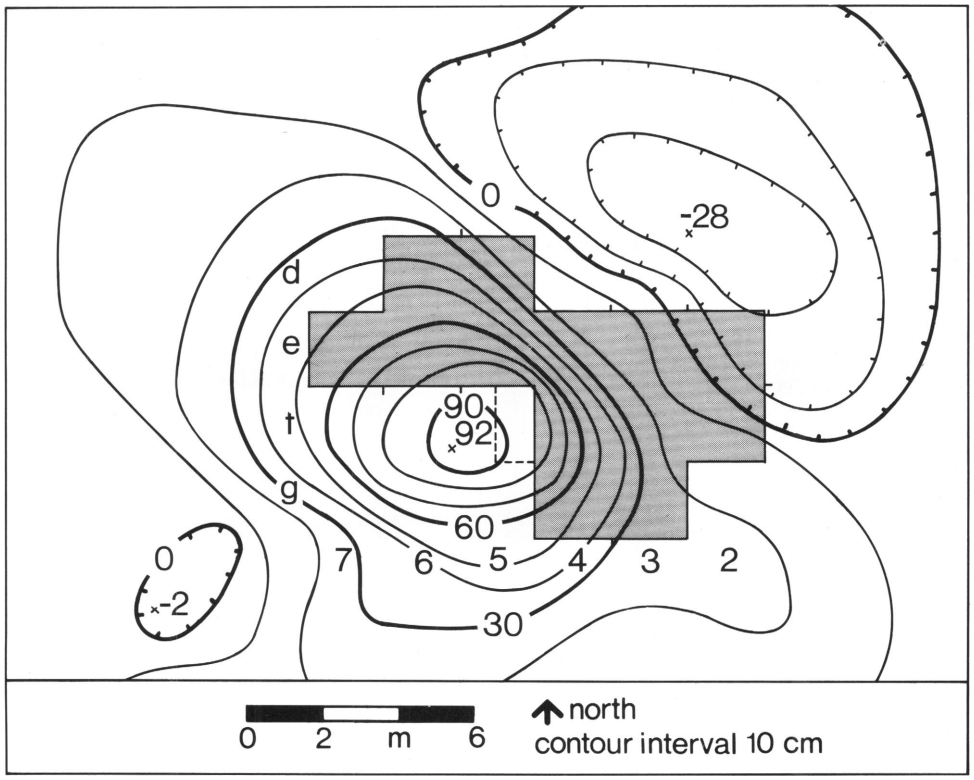


Fig. 56. Topographic map of Seaside II. Shaded portion indicates area excavated by American Museum of Natural History.

FIG. 57. Seaside II before excavations had been completed. Photograph taken in January 1977.

extending well into Unit I (see detail in stratigraphic profile, fig. 58); filled with oyster shells, which have been radiocarbon dated to 440 B.C. (UGA-1552) and 850-880 B.C. (UGA-1553).

FEATURE 2: Shell-filled pit dug through Unit II into Unit I; located immediately east of burial 5.

FEATURE 3: Oval pit measuring 40 cm. long by 30 cm. wide, beginning in Unit II and extending well into Unit I; filled with dense charcoal concentration, possibly a burnt stump.

FEATURE 4: Scatter of oyster shell atop primary humus, adjacent to Feature I.

FEATURE 8: Shell concentration scattered in Unit II; non-human bone contained in shell.

FEATURE 10: Shell scattered in Unit II.

FEATURE 11: Charcoal filled pit (only partly excavated); begins in Unit II and extends well into sterile substratum.

It was impossible in this case to determine whether the shell and charcoal features were created deliberately prior to mound construction, or whether they merely reflect *de facto* areas of earlier habitation.

We were unable to find sufficient charcoal in Unit II to permit dating of the initial burn prior to mound construction. After the site was burnt, several burials were placed in the humus of Unit II (see fig. 59). Burial 5 is in an extended position, resting on the left side facing south. Toward the eastern end of the mound, burial 11 was found, also extended with the head facing toward the southwest. The burials must have been interred in shallow graves, barely extending into the primary humus; no pits were evident during excavation. Perhaps these two individuals were directly covered by the mound fill without an actual pit burial. The final pre-mound feature was a bundle burial, designated burial 13. Three skulls and associated long bones were stacked in a sharply defined pit extending through the primary humus. The bundle burial is almost exactly in the center of the mound.

The mound then was constructed using reworked Unit I and II sands from nearby borrow pits. Several shells and potsherds were included in the fill. A number of intrusive burials then were placed in Seaside II. Several consist of simple scatters of burnt and unburnt human bone. Burial 8 (discussed in detail later) con-

sists of at least three individuals placed in a very shallow pit, barely beneath the mound surface. The bones of burial 8 were in excellent condition, and appear to have been broken into small fragments. A single radiocarbon sample from the upper mound fill dated A.D. 1420 ± 80 (UGA-1556) and probably relates to burial 8.

Skeletal Remains

The following pre-mound burials were found in Seaside II (see figs. 59 and 60):

Burial 5: adult; supine, extended, head to the east; fragments of parietal, left and right temporals, left and right occipital condyles, sphenoid, maxilla, left mandibular corpus and ascending ramus, left and right femora, left and right tibiae; mandibular left second premolar through third molar, right first and second premolars, right third molar, maxillary left canine through third molar, right first and third molars.

Burial 11: male, 35-39; supine, extended, head to the southeast; cranial reconstruction (squamosal portion of the occipital, left temporal, left and right parietals, left sphenoid), fragments of left temporal, left and right parietals, left and right sphenoids, occipital condyle, left maxilla, left and right mandibular corpora with associated left condyle, left and right ilia, right ischium, left scapula, left and right femora, left and right tibiae, left and right fibulae, calcaneus, metatarsals, left and right scaphoids, left and right lunates, right trapezium, left hamate, metacarpal diaphyses, ribs, first and second cervical vertebrae, three thoracic vertebrae, sacrum. Two extrasutural bones were present, an os inca and a left asterionic bone. Dentition included mandibular left first molar, maxillary left first premolar, first and third molars.

Burial 13: bundle burial consisting of three adult females, A, B, and C.

A. Cranial reconstruction (squamosal portion of the occipital, left and right parietals, right temporal, right frontal, right sphenoid), fragments of left temporal, maxilla.
B. Cranial reconstruction (squamosal portion of the occipital, left and right parietals, right temporal, frontal), fragments of left parietal, ethmoid (crista galli), sphenoid, maxilla; mandibular left lateral incisor, canine, first, second, and third molars, right central incisor, canine through third molar.
C. Cranial reconstruction (squamosal portion of the occipital, left and right temporals, left sphenoid), fragments of left and right occipital condyles, left temporal, mandibular left and right corpora and left ramus; mandibular right canine, left and right first premolars through third molars, maxillary left lateral incisor, left and right first, second, and third molars.

Postcrania of these three individuals were not separable. One os coxae was complete enough to be sexed female and given an age of 30-34. Other postcranial fragments included left and right ilia, left humerus, left and right radii, left and right ulnae, left and right femora of at

TABLE 26
Measured Stratigraphic Section of Seaside II Mound
(For location of the section, see figure 58.)

Unit	Thickness (cm.)	Description
IV	12	*Secondary humus*, very dark grayish brown sand (10 YR 3/2: dry), well-developed root mat, formed as A horizon of Unit III. Contact fairly indistinct.
III	76	*Mound fill*, dark brown sand (10 YR 4/3: dry), near top, grading to yellowish brown sand (10 YR 5/6: dry) near bottom. Charcoal associated with intrusive burial 8 radiocarbon dated to A.D. 1420 ± 80 (UGA-1556). Contact distinct.
II	17	*Primary humus*, very dark gray sand (10 YR 3/1: dry), charcoal flecks present, formed as A horizon of Unit I. Shell from pit in primary humus radiocarbon dated to 850-880 B.C. ± 80 (UGA-1553) and 440 B.C. ± 75 (UGA-1552). Contact gradual over 4-5 cm.
I	20+	*Sterile substratum*, brownish yellow sand (10 YR 6/6: dry). Bottom not exposed.

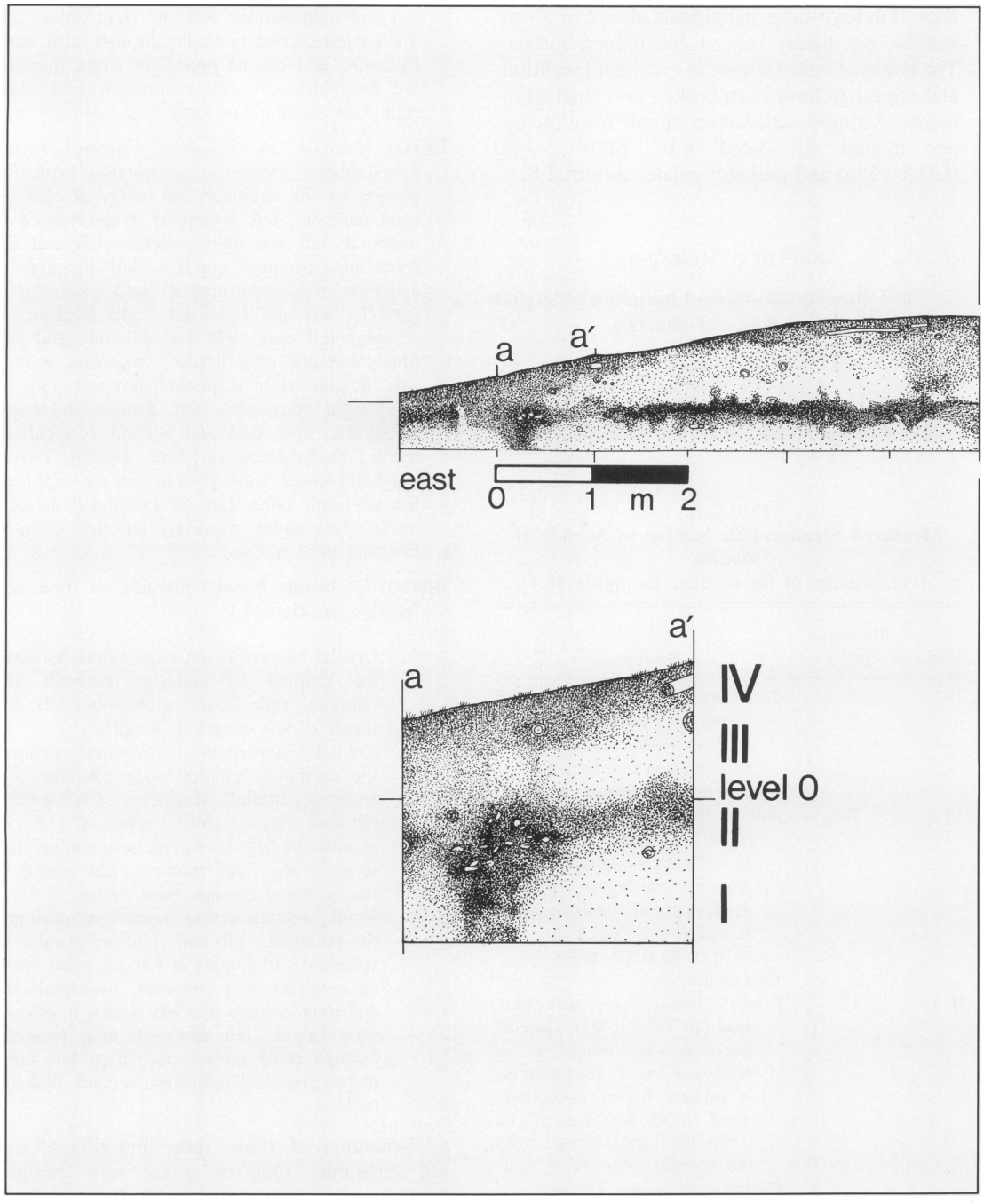
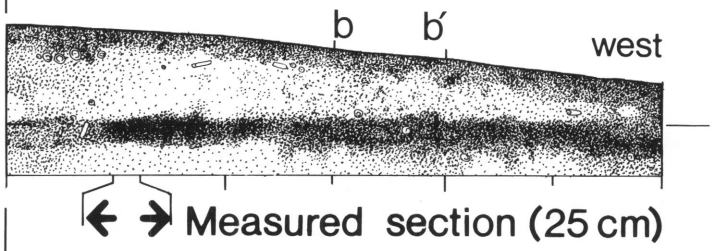
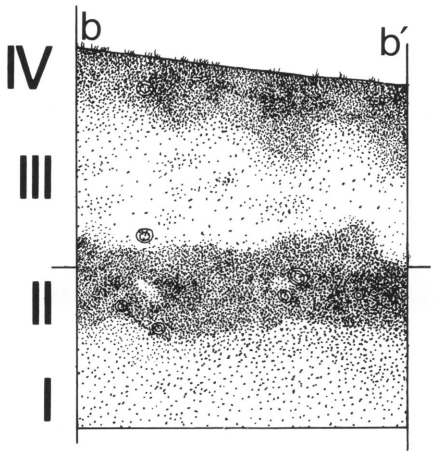


FIG. 58. Stratigraphic profile of Seaside II, south wall of E-trench.


b
b′
west
Measured section (25 cm)


b
b′
IV
III
II
I

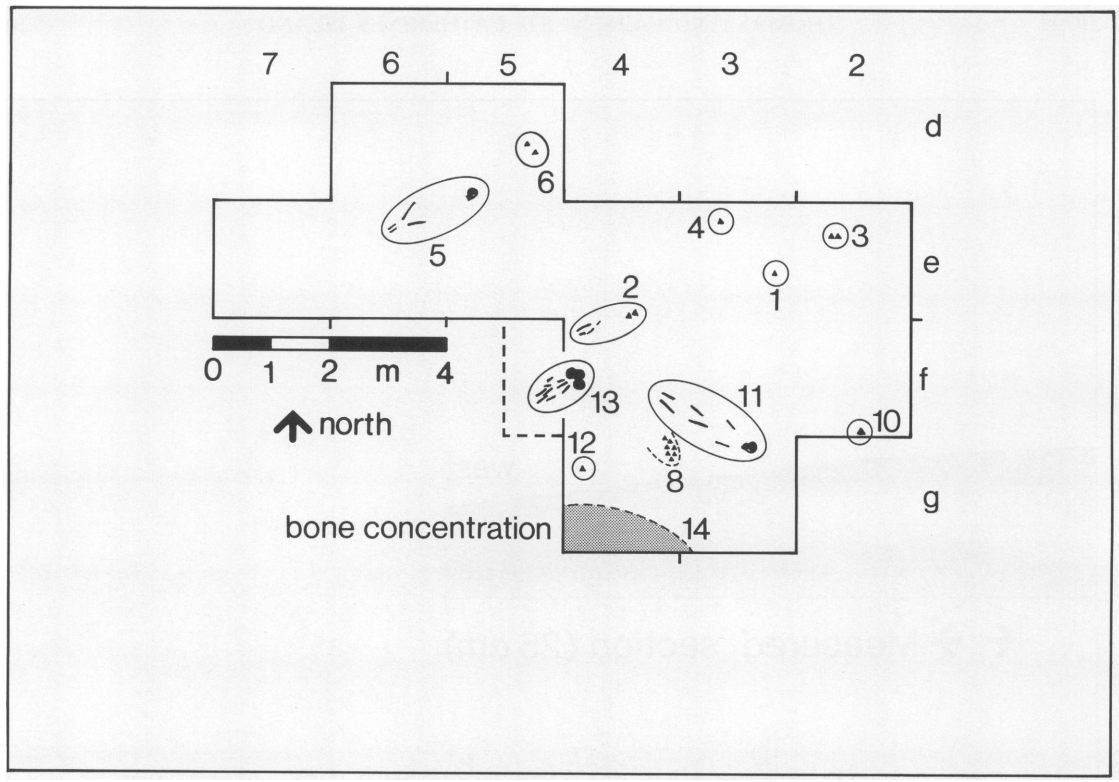


FIG. 59. Schematic diagram of burials at Seaside II.

least three individuals, left and right tibiae, left and right fibulae of at least two individuals, left calcaneus, left and right tali, first cuneiform, second cuneiform, third cuneiform, first metatarsal, third right metatarsal, metatarsal diaphyses, two proximal first phalanges, right scaphoid, right lunate, metacarpals, ribs, first through sixth cervical vertebrae, first through ninth thoracic vertebrae.

The following intrusive burials were found at Seaside II:

BURIAL 1: isolated temporal fragment.

BURIAL 2: adult (?); temporal fragments, tooth enamel; mandibular left third molar.

BURIAL 3: isolated temporal fragment.

BURIAL 4: male, adult; cranial reconstruction (squamosal portion of the occipital, right temporal, right parietal), enamel fragments. No postcrania were recovered for this individual.

BURIAL 6: diaphyseal fragments of one long bone.

BURIAL 8: bundle burial consisting of three individuals, A, B and C, an adult (?), a subadult and another adult, respectively.

A. Cremation; fragments of crania (15 flat) and long bone diaphyses (726).
B. 6-8; fragments of left and right parietals, left and right temporals, squamosal portion of the occipital. Adult dentition: mandibular left first and second premolars, right lateral incisor, first premolar, maxillary left central incisor, lateral incisor, canine, first molar, right lateral incisor, canine, second premolar, first and second molars. Deciduous dentition: mandibular left and right second molars, maxillary left and right molars, left second molar.
C. male, 18 ±; cranial reconstruction (squamosal portion of the occipital, left and right parietals, frontal), fragments of ilium, left scapula, left humerus, left and right radii or ulnae, left and right femora, right patella, left and right tibiae, left and right fibulae, right talus, cuboid, metatarsal diaphysis, proximal foot phalanx, right capitate, left hamate, second metacarpal, third left metacarpal, three hand phalanges (second, third, fourth, or fifth), ribs, sternum, first and sec-

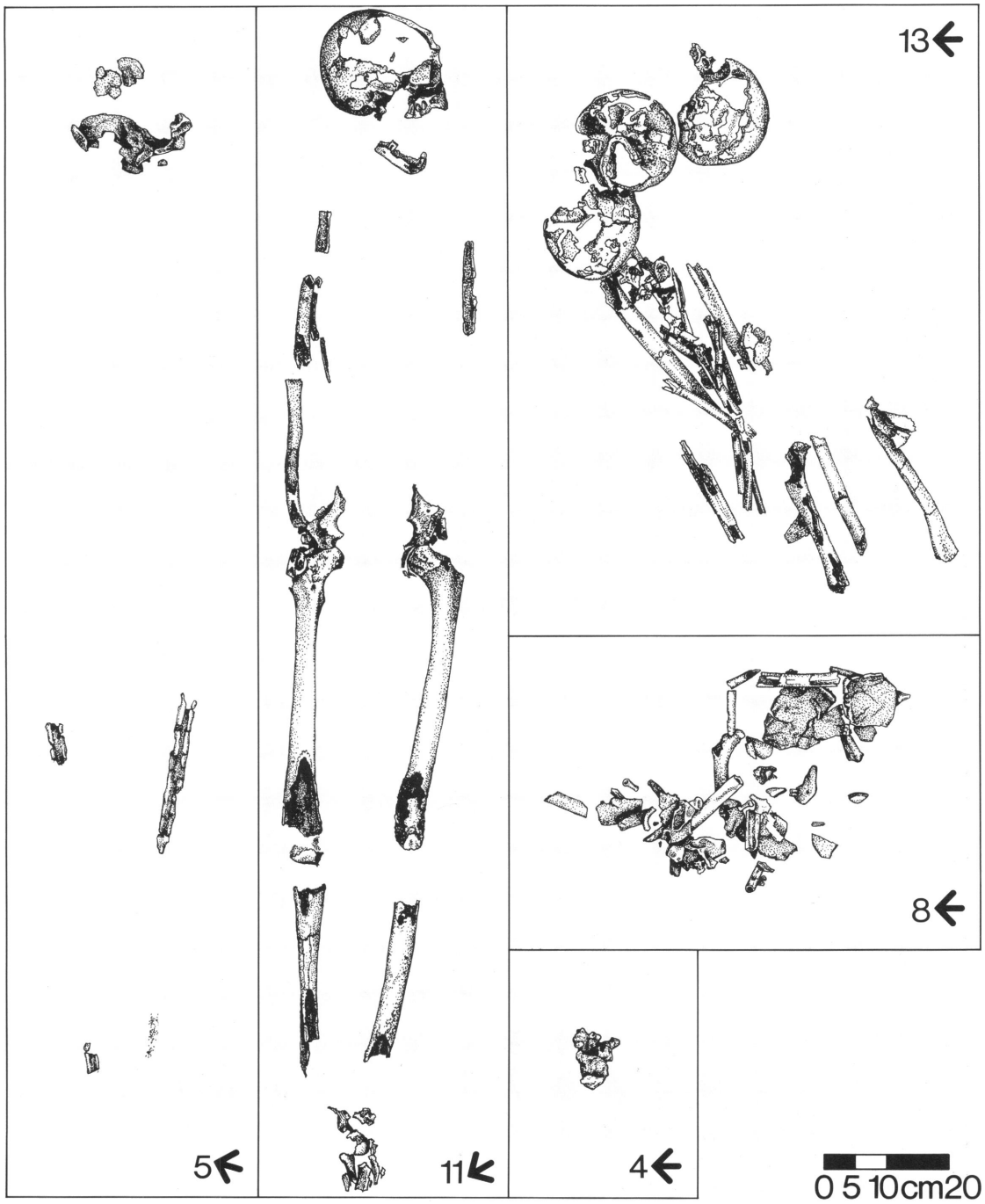


FIG. 60. Burials excavated by the American Museum of Natural History at Seaside II.

ond cervical vertebrae, second through ninth thoracic vertebrae; mandibular left central incisor through first premolar, first, second, and third molars, right canine through first molar and third molar, left maxillary canine, second premolar through third molar, right central incisor, canine, through third molar.

BURIAL 10: isolated long bone fragment.

BURIAL 12: diaphyseal fragments of one long bone.

BURIAL 14: female, 30-34; concentration of postcranial fragments including a left ilium, head of a right humerus, left and right femoral diaphyses, ribs, several calcined long bone fragments; unworn mandibular molar crown. Given the morphology of the auricular surface of the left ilium this tooth does not likely belong with the postcranial remains and is probably associated with a much younger individual whose skeletal remains are not represented in the burial area.

Burials assigned numbers 7 and 9 in the field were later combined with other burials.

CERAMICS

A total of 59 sherds were recovered during excavations at Seaside II. The depth distribution is provided on table 27, and the horizontal provenience is shown on figure 61.

Refuge period ceramics predominate and these sherds seem to be rather uniformly strewn throughout both the pre-mound surface and the Unit III fill. Figure 61 indicates that the Refuge Plain sherds seem to cluster in unit E7, but these sherds are obviously from the same pot. Once again, there seems to be no reason to doubt that the sherds are inclusive in the fill. These do not seem to be gravegoods.

ABRADERS

Eight abraders were found at Seaside II. Table 28 indicates the type of wear found on each.

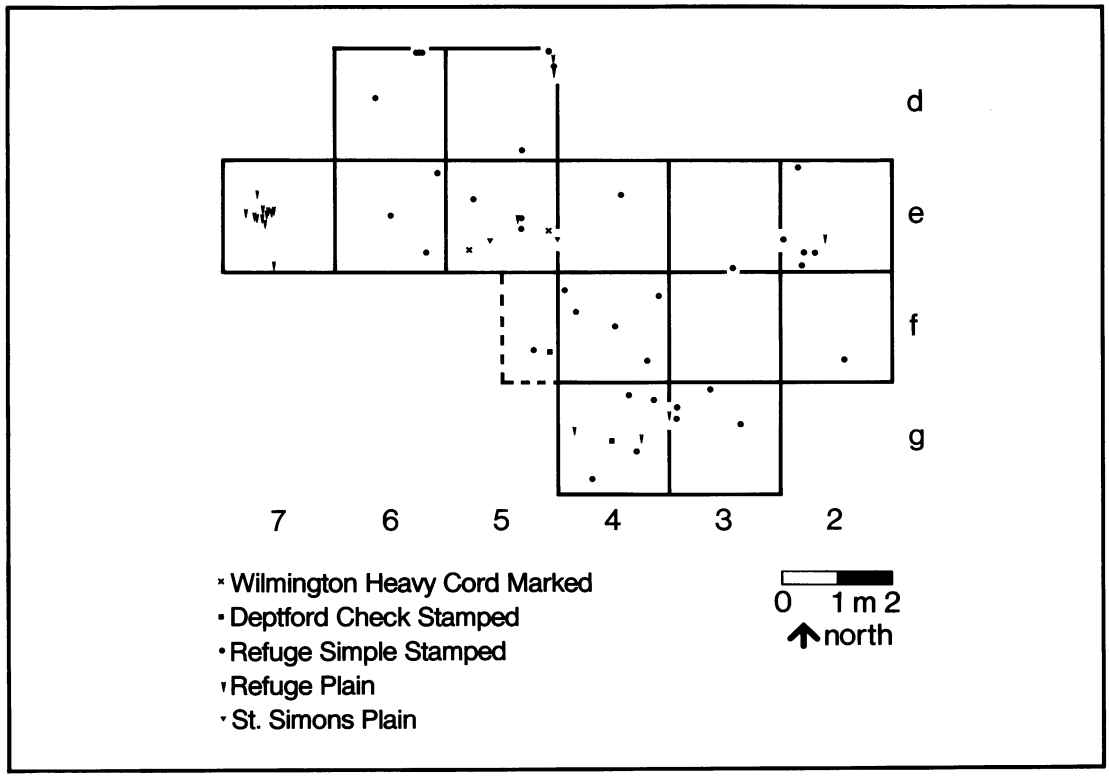


FIG. 61. Horizontal distribution of potsherds recovered at Seaside II.

TABLE 27

Sherd Frequencies at Seaside II

Type	Depth														
	+79 - +70	+69 - +60	+59 - +50	+49 - +40	+39 - +30	+29 - +20	+19 - +10	+9 - 0	−1 - −10	−11 - −20	−21 - −30	−31 - −40	−41 - −50	No Vertical Provenience	Total
Wilmington Cord Marked	—	—	—	—	1	—	—	—	—	—	—	—	—	—	1
Deptford Check Stamped	—	1	—	1	—	—	—	—	—	—	—	1	—	—	3
Refuge Simple Stamped	—	1	—	2	2	2	4	5	5	5	7	—	1	5	39
Refuge Plain	—	—	—	—	—	1	1	—	4	8	4	—	1	11	30
St. Simons Plain	—	—	—	—	—	1	—	—	—	—	—	—	—	—	1
Total	—	2	—	3	3	4	5	5	9	13	11	1	2	16	74

TABLE 28
Abraded Sherds Found at Seaside II

		Wear				
Spec. No.	Type	I	II	III	IV	V
28.0/1155	Refuge Simple Stamped	X	—	X	—	—
28.0/1386	Refuge Simple Stamped	—	—	X	—	—
28.0/1163	Refuge Simple Stamped	—	—	—	—	X
28.0/1149	Refuge Simple Stamped	—	—	—	—	X
28.0/1107	Refuge Plain	X	—	—	—	—
28.0/1422	Too abraded to type	—	—	X	—	—
28.0/1135	Too abraded to type	X	—	—	X	—
28.0/1215	Unidentified check stamped	—	—	—	—	X

Lithics

One nearly complete projectile point (28.0/1104, see fig. 20e) was found beneath burial 2. This point was found in completely sterile sand of Unit I. A second point fragment (28.0/1387, see fig. 20g) was found in unit F5, probably in Unit II. This point was probably broken upon impact.

Eleven isolated flakes were also found in the fill of Units II and III. None of the flakes appears to have been utilized and most are of a light tan chert, identical with that used to make projectile point (28.0/1387).

One chert scraper (fig. 20f) was also found in Unit III fill.

CHAPTER 5. CERAMICS

CHESTER B. DEPRATTER

More than 1000 sherds were recovered during the excavation of the Refuge-Deptford mounds on St. Catherines Island. In this Chapter, I discuss this series of sherds as a single analytical unit. As mentioned in previous chapters, most of the sherds came from the primary humus and secondary mound fill, so it comes as small surprise that most of the types relate to the Refuge and Deptford cultural periods. The presence of Wilmington and St. Catherines ceramics probably results from intrusive burials or later occupations near the mound surface. The total sherd counts are reproduced in table 29. The precise sherd counts on table 29 will differ somewhat from those presented on the vertical provenience charts of Chapters 3 and 4, depending on whether the matching sherds from a single pot are tallied together or separately. Before considering the St. Catherines ceramics in more detail, it is first necessary to examine the revised ceramic sequence for the northern Georgia coast.

DEVELOPMENT OF THE NORTH GEORGIA COASTAL CERAMIC SEQUENCE

Archaeological research along the Georgia coast prior to about 1930 was aimed primarily

TABLE 29
Ceramics Recovered from St. Catherines Island Mounds

	Cunningham D	McLeod	Seaside II	Cunningham A	Cunningham B	Seaside I	Cunningham C	South New Ground Field	Cunningham E
Residual clay tempered plain	—	—	—	—	—	—	1	1	—
St. Catherines Burnished Plain	—	6	—	—	—	—	—	—	—
Wilmington Cord Marked	—	—	1	—	—	2	32	—	—
Wilmington Plain	—	1	—	—	—	2	20	—	—
Deptford tetrapod	—	—	—	—	—	1	—	—	—
Deptford Complicated Stamped	—	—	—	—	—	1	—	—	—
Deptford Cord Marked	—	—	—	—	—	14	16	—	—
Deptford Check Stamped	—	23	3	—	—	49	50	—	—
Deptford Linear Check Stamped	—	9	—	—	—	—	—	—	—
Oemler Complicated Stamped	—	—	—	3	1	—	—	—	—
Sand tempered shell scraped	2	1	—	—	—	—	11	—	—
Abraded exterior surfaces	—	36	21	—	—	40	11	—	—
Refuge Dentate Stamped	—	—	—	—	—	11	1	—	—
Refuge Simple Stamped	36	302	39	—	—	21	18	—	—
Refuge Plain	16	77	30	—	—	38	52	—	—
Sand tempered decorated	1	3	—	—	—	1	5	—	—
Sand tempered plain	—	2	—	—	—	—	2	—	—
Sand and fiber tempered plain	1	—	—	—	—	—	—	—	—
St. Simons Incised	—	—	2	—	—	—	—	—	—
St. Simons Plain	—	—	1	—	—	—	37	—	—
	56	460	97	3	1	180	256	1	0

at the recovery of artifacts suitable for display or for personal collections. Little or no attempt was made to derive cultural historical interpretations from the materials collected (Jones, 1873; Thomas, 1891; Moore, 1897). The major problem facing these early workers was the total lack of a chronological framework for organizing the artifacts recovered. C. B. Moore (1897) excavated more than 50 mounds on the Georgia coast and recovered large quantities of pottery, including countless whole pots. But his identification of the "earthenware" was limited to purely descriptive terms, such as "complicated form of stamp," "usual diamond or square stamp," and pottery of the "ordinary type." William Holmes (1903) later organized ceramics collected by Moore and others into broad geographical groups based on form and decoration. His groups were atemporal, however, more on the order of the *ceramic traditions* of Willey and Phillips (1958, p. 161). Ceramics from the northern Georgia coast fell into Holmes's South Appalachian Group, which included all of Georgia, parts of Alabama, Florida, North Carolina, and South Carolina. The common element found throughout the South Appalachian area was the abundant use of paddle stamping as a decorative technique. We now know that this technique lasted for almost 3000 years.

Little systematic archaeological work was undertaken in the twentieth century until Preston Holder began research in Glynn County, late in 1936. Holder's excavations were conducted through the Works Projects Administration (Holder, 1938), as an extension of A. R. Kelly's earlier W.P.A. project in Bibb County, Georgia. Kelly's research on the Macon Plateau resulted in the definition of several ceramic types, designated by Greek letters, e.g., the "Delta" and "Alpha" wares (Kelly, 1938). However, Kelly was unable to develop a ceramic sequence because of the lack of stratigraphy at Ocmulgee, and it remained for Willey and Ford to establish a central Georgia sequence based on excavation at other Bibb County sites (Waring, 1968c, p. 295). Ford and Willey also introduced the binomial ceramic type designations, which they adapted from Willey's earlier experience in the southwestern U.S. (Williams, 1968). The binomial nomenclature replaced Kelly's Greek letter designations at Macon, and was also used by Caldwell and Waring in their 1939 papers on the Chatham ceramic sequence. This system is still in use today throughout the southeast (e.g., Ford and Griffin, 1937; Sears and Griffin, 1950; Broyles, 1967).

The W.P.A. excavations along the Georgia coast were directed, in part, toward establishing a chronological sequence which could be correlated with that available from Bibb County. But Holder's artifacts from Glynn County were entirely different from those recovered in Bibb County. Waring (1968c, p. 296) later described Holder's attempts to establish a chronology: "for many months [Holder] . . . floundered about 'bottled in circumambient fluid about the translucency of milk.' " Although excavations on several village sites in Glynn County eventually resolved the issue (in part), no sequence for the southern Georgia coast was ever published. Perhaps part of the difficulty was the lack of multicomponent sites with good stratigraphy, although the Evelyn site might be an exception (Waring and Holder, 1968). More recent research by Milanich (1976, 1977), Martinez (1975), and Cook (1977) has contributed to the development of the southern coastal ceramic sequence.

A W.P.A. project commenced in Chatham County in 1937, involving excavations at a number of mounds and stratified village sites (Caldwell and McCann n.d.a., n.d.b., n.d.c.; Caldwell, McCann and Cain, n.d.; Caldwell, 1943, 1952; Waring and Holder, 1968; Waring, 1968a; DePratter, n.d.b.). These excavations provided the stratigraphic control necessary for the definition of a ceramic sequence for the northern Georgia coast (Caldwell and Waring, 1939a, 1939b; McCann, 1940).

This ceramic sequence, defined entirely on the basis of Chatham County ceramics, was applied to the entire Lower Savannah Basin, since the area "is small and such influence as 'cultural lag' can be discounted, and a pottery complex can be considered as definitive of a cultural interval" (Caldwell and Waring, 1939b). The sequence was later expanded by Waring (1968b) and Caldwell (1971). Recent

reexamination of the W.P.A. Chatham County collections and extensive surveys in the coastal islands of Chatham County has resulted in a number of revisions in the Caldwell-Waring sequence (DePratter, 1975, 1977, n.d.a., n.d.b.; DePratter and Howard, 1977). This modified Chatham County sequence, which is subject to future revision, is presented as table 30. Ce-

TABLE 30
Ceramic Sequence for the Northern Georgia Coast

Periods	Phases	Ceramic Types	Dates[a]
			A.D. 1700
Altamaha	Altamaha	Altamaha Line Block Altamaha Incised Altamaha Plain Altamaha Check Stamped Altamaha Red Filmed	A.D. 1550
Irene	Irene II	Irene Incised Irene Complicated Stamped Irene Burnished Plain Irene Plain	A.D. 1400
	Irene I	Irene Complicated Stamped Irene Burnished Plain Irene Plain	A.D. 1300
Savannah	Savannah III	Savannah Complicated Stamped Savannah Check Stamped Savannah Fine Cord Marked Savannah Burnished Plain Savannah Plain	A.D. 1250
	Savannah II	Savannah Check Stamped Savannah Fine Cord Marked Savannah Burnished Plain Savannah Plain	A.D. 1200
	Savannah I	Savannah Fine Cord Marked Savannah Burnished Plain Savannah Plain	A.D. 1150
St. Catherines	St. Catherines	St. Catherines Net Marked St. Catherines Fine Cord Marked St. Catherines Burnished Plain St. Catherines Plain	A.D. 1000
Wilmington	Wilmington II	Wilmington Plain Wilmington Brushed Wilmington Heavy Cord Marked	A.D. 600
	Wilmington I	Wilmington Heavy Cord Marked Walthour Check Stamped Walthour Complicated Stamped Wilmington Plain	A.D. 500
	Deptford II	Deptford Complicated Stamped Deptford Cord Marked Deptford Check Stamped	

TABLE 30 — *(Continued)*

Periods	Phases	Ceramic Types	Dates[a]
Deptford		Refuge Simple Stamped Refuge Plain	A.D. 300
	Deptford I	Deptford Linear Check Stamped Deptford Cord Marked Deptford Check Stamped Refuge Simple Stamped Refuge Plain	400 B.C.
Refuge	Refuge III	Deptford Linear Check Stamped Deptford Check Stamped Refuge Plain Refuge Simple Stamped	900 B.C.
	Refuge II	Refuge Dentate Stamped Refuge Plain Refuge Simple Stamped	1000 B.C.
	Refuge I	Refuge Simple Stamped Refuge Punctated Refuge Plain Refuge Incised	1100 B.C.
St. Simons	St. Simons II	St. Simons Incised and Punctated St. Simons Incised St. Simons Punctated St. Simons Plain	1700 B.C.
	St. Simons I	St. Simons Plain	2200 B.C.

[a]Estimated dates in uncorrected C^{14} years.

ramic changes have been used to divide the last 4500 years of Chatham County prehistory into eight periods and 16 phases. Estimated dates for each phase, expressed in uncorrected radiocarbon years, are based on determinations reported by Caldwell (1971), Milanich (1977), and also those presented in Chapter 2 of this report. Several problems related to the development of this chronology have been discussed elsewhere (DePratter, 1977, n.d.b.), but a few specific issues must be mentioned here.

A major difficulty in establishing a chronology based on ceramics is that the ceramic change involves a continuum in which temper (grog), decoration, and form may change asynchronously. Any division of the ceramic sequence is therefore arbitrary, giving rise to many of the problems related to the use of ceramic "sequences" or chronologies. This weakness was recognized by Caldwell and Waring (1939b), but until now, there has been no vigorous attempt to remedy the situation for the coastal Georgia sequence. Caldwell and Waring (1939b, p. 134) suggested that "finer definitions of time can be made if we look upon each pottery complex as a sequence undergoing change [where] . . . the numerical occurrence of a type within a complex can be regarded as a time marker." The early portion of table 30 is modified from Caldwell and Waring (1939b) and Waring (1968b) based on this proposition.[1] Refuge and Deptford period ceramics are quite similar in form, paste, rim treatment, etc., but certain decorative techniques change gradually through time. Thus, Refuge Plain and Simple Stamped types remain

[1]Table 30 is a revised version of an earlier chronological sequence contained in DePratter (1977) and Thomas, Jones, Durham, and Larsen (1978). Revisions of the Refuge and Deptford period portions of the sequence are based on ceramic frequencies in the nine Refuge-Deptford period mounds which are the subject of this report.

essentially the same throughout the 1600 years of their existence, although detailed studies of rim form or other attributes may eventually allow some distinctions to be made within that time interval. On the other hand, Refuge and Deptford period minority decorative techniques (such as incising, complicated stamping, etc.) appear to have been present during more limited spans of time (see fig. 62).

It seems likely that the sequence given in table 30 can eventually be extended into perhaps 20 or so phases, based on the recognition of temporally significant ceramic changes. Such phase designations will not be identifiable in small collections which lack sherds representative of the entire range of types in use during a single time interval. In these smaller collections, identification will be possible only to the period level, whereas large collections will allow phase-level identification based upon the frequency of the minority types.

This ceramic sequence is based primarily on materials from the area between the Savannah River and the southern end of St. Catherines Island. Recent work on Sapelo Island (Simpkins and McMichael, 1976; McMichael, 1977) and Blackbeard Island (DePratter, 1977) suggests that the sequence might be applicable to that area with only minor modification to the later part of the chronology (Larson, n.d., 1958). The problems become more complex south of the Altamaha River (Milanich, 1977; Cook, 1977), although the same periods appear to be represented.

St. Simons Period Ceramics

A total of 40 St. Simons period sherds was recovered from the St. Catherines mounds, most of them from Cunningham Mound C (see table 29). Formal type descriptions for St. Simons period pottery have not been previously published, although Waring (1968a) has provided a great deal of information regarding both decorated and plain types. Type descriptions given by Sears and Griffin (1950) for the closely related types of Stallings Plain, Stallings Punctated, and Stallings Incised should only be applied to inland ceramics because of major differences between coastal and inland ceramics (Waring, 1968a, p. 160).

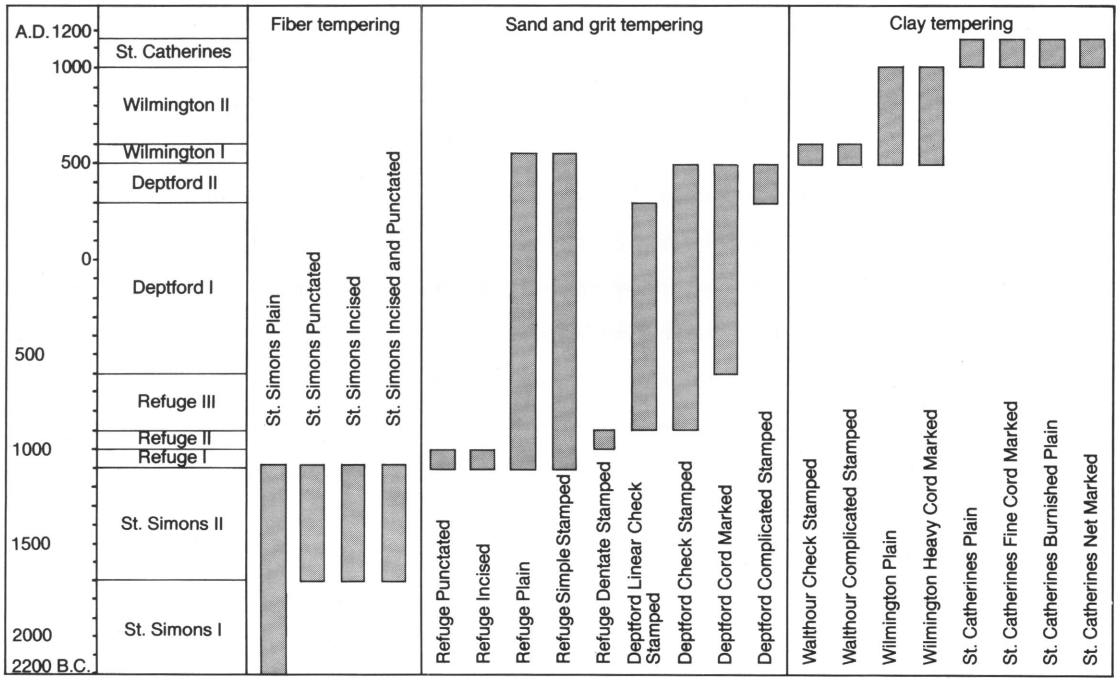


FIG. 62. Ceramic chronology for the northern Georgia coast up to A.D. 1200.

Type descriptions for coastal St. Simons Plain, St. Simons Incised, St. Simons Punctated, and St. Simons Incised and Punctated are as follows:

St. Simons Plain
(See figure 74)

Paste
Method of manufacture: Modeling and molding.

Temper: Vegetal fibers; occasionally fine to medium sand also present.

Texture: Medium to fine depending on sand content. Occasionally "soapy" feeling.

Color: Cores generally range from buff to black with several distinct layers often present; exterior surfaces generally buff to orange, occasionally brown to black; interiors buff to black.

Surface Finish
Both interior and exterior surfaces are smoothed but not burnished.

Shell scraping of interior sometimes present.

Decoration
None.

Form
Rim: Generally straight or slightly incurving, not tapered (see fig. 74).

Lip: Rounded or flattened; occasionally thickened.

Body: Simple bowls.

Base: Round to flattened.

Appendages: None.

Chronological Position of Type
Earliest pottery in coastal Georgia area. Exists as only pottery type in use between approximately 2200 and 1700 B.C. (St. Simons I Phase).

Comment
This type description is adapted, with some modification, from Waring's (1968a) description of ceramics from the Bilbo site.

St. Simons Punctated

Paste
Same as St. Simons Plain.

Surface Finish
Similar to St. Simons Plain but sometimes more carefully smoothed.

Decoration
Technique: single, discrete impressions made in vessel surface prior to drying of vessel. Impressions made with reeds, bone (?) fragments, periwinkle shells, and other objects providing a wide range of shapes ranging from circles and crescents through diamonds and irregular forms. Punctating implements sometimes pressed perpendicularly into vessel surface producing isolated punctates, while in other cases, the punctating implement was "dragged" or "trailed" between punctates producing a series of punctates connected by an incised line. A variation of this technique involved incising a line and then placing a series of punctates along it. Punctations also occasionally occur on vessels which also contain linear incising.

Design: At least two basic modes can be distinguished—random punctation and linear punctation. Random punctation consists of punctations (usually of a single shape on any given vessel) scattered randomly (i.e., without pattern) over all, or a portion, of a vessel's surface. Linear punctation was of two types. In some cases, the decoration consisted of individual punctates placed side by side in a linear (or occasionally curvilinear) arrangement. In other cases, the punctates were linear in arrangement but had a trailed or incised line connecting individual punctates. Linear punctation of both types is typically applied in two to 12 horizontal rows directly below the rim. Occasional widely spaced longitudinal rows or bands of punctates are also present.

Distribution: Punctation typically covers entire surface of vessel with exception of base. On some vessels, decoration was restricted to a horizontal band just below the rim. Occasional vertical bands also occur.

Form
Same as St. Simons Plain.

Chronological Position of Type
First made on Georgia coast about 1700-

1800 B.C. Appearance marks beginning of St. Simons II phase.

COMMENT

This type description is adapted, with some modification, from Waring's (1968a) description of ceramics from the Bilbo site.

ST. SIMONS INCISED

PASTE

Same as St. Simons Plain.

SURFACE FINISH

Same as St. Simons Plain with occasional smoothing.

DECORATION

Technique: Incisions made into vessel exterior with instruments of various shapes and diameters. Depth and shape of resulting incisions varies depending on shape of instrument and amount of pressure applied to incising instrument. Incisions range from broad, shallow trailed lines, to deeper rounded or angular incisions, to deep grooves which nearly cut through to the interior wall of the vessel.

Design: Most often occurs as a series of parallel, horizontal lines directly below rim. These may be met by vertical bands of incising which originate at the base of the vessel. Zones of short horizontal lines separated by undecorated areas also occur, but less frequently. Cross-hatch incising occasionally also occurs. Most incising is linear although curvilinear examples occasionally occur.

Distribution: Most frequently restricted to a narrow band directly below the rim but occasionally covering the entire exterior surface. Undecorated areas sometimes separate zones of incision.

FORM

Same as St. Simons Plain.

CHRONOLOGICAL POSITION OF TYPE

Dates to St. Simons II phase. May first appear slightly later than earliest occurrence of St. Simons Punctated.

ST. SIMONS INCISED AND PUNCTATED

PASTE

Same as St. Simons Plain.

SURFACE FINISH

Same as St. Simons Plain.

DECORATION

Technique: Combines both incising and punctation on same vessel. Occasionally more than one implement used in decorating of same vessel.

Design: Variable. Different combinations of linear and curvilinear incision with random and linear punctation.

Distribution: Same as St. Simons Incised.

CHRONOLOGICAL POSITION OF TYPE

St. Simons II phase.

COMMENT

Not previously described, but illustrated by Waring (1968a, fig. 72).

The St. Simons sherds at Cunningham C are all Plain, suggesting a St. Simons I occupation in the vicinity. Seaside II contained a single St. Simons Plain sherd and two St. Simons Incised sherds, which would seem to represent a St. Simons II occupation prior to mound construction.

REFUGE AND DEPTFORD PERIOD CERAMICS

Roughly 90 percent of the sherds recovered from the nine burial mounds on St. Catherines Island are from either Refuge or Deptford periods. Since these two ceramic periods have been confused in the past, I will briefly review the literature in an attempt to define concrete criteria for their identification.

Deptford ceramics were first defined as a single "complex" during W.P.A. excavations at the Evelyn site in Chatham County (Waring and Holder, 1968). Stratigraphy in the fill of the Mound C borrow pit at Evelyn indicated that Deptford ceramics predated the Swift Creek types previously identified at the Swift Creek site in Bibb County (Kelly, 1938). Subsequent excavation at the Deptford site near Savannah provided further evidence that Deptford ceramics were later than St. Simons types, but preceded Brewton Hill (Swift Creek/Deptford Complicated) and Wilmington complexes, as published by Caldwell and Waring

(1939b). In a companion paper (Caldwell and Waring, 1939a), type descriptions were provided for Deptford Simple Stamped, Deptford Linear Check Stamped, and Deptford Bold Check Stamped ceramics recovered from the Deptford, Evelyn, and several other Chatham County sites (Caldwell, 1952; DePratter, n.d.b.).

Chatham County excavations produced a tremendous quantity of pottery, perhaps 1 to 1.5 million sherds, and the initial type descriptions were an attempt to deal with the overwhelming number of sherds being recovered daily by W.P.A. crews (Caldwell and Waring, 1939a, 1939b). Some problems with the 1939 type descriptions have been discussed elsewhere (DePratter, 1977), and several revisions have been proposed as new information has become available (Waring, 1968b; Caldwell, 1971; DePratter, 1977). The greatest difficulty has been that several unrelated types were often subsumed under a single type name in the initial 1939 descriptions. The definition of St. Catherines Fine Cord Marked, for instance, combined traits for both St. Catherines Fine Cord Marked (clay-tempered) and Savannah Fine Cord Marked (sand and grit tempered). Similarly, the Deptford type descriptions also combined traits now ascribed to several distinct types, but unrecognized by Caldwell and Waring. Before revised Deptford type descriptions are provided, it is necessary to review the basis for the revisions.

The publication of "The Waring Papers" (Williams, 1968) provided a great many previously unpublished papers written by Antonio J. Waring. Among these is the report on Waring's excavations at the Refuge site, located on the Savannah River in Jasper County, South Carolina. The Refuge site, excavated in 1947, was an eroding midden composed primarily of freshwater mussel shells (Waring, 1968e). The 1110 sherds recovered in this excavation spanned the entire range of coastal pottery types, although the main occupation occurred during the previously undescribed Refuge period.

Waring divided the Refuge ceramics into five types: incised, punctated, dentate stamped, plain, and simple stamped. Waring also identified Deptford Simple Stamped, separating it from Refuge Simple Stamped by the "quality" of the stamping. Differences in paste and rim form were also noted.

Refuge ceramics are characterized by coarse and gritty paste. Vessels were manufactured by coiling, in contrast to the modeling common in the preceding St. Simons phase. Waring also described two distinctive traits, which are apparently restricted to the Refuge period. Eleven of the sherds were decorated on both interior and exterior; the exteriors were plain, simple, stamped, or punctated, whereas the interiors were either punctated or incised. In addition, 43 of the sherds had been abraded (see Chapter 3). All Refuge ceramic types, including those with abraded surfaces, were illustrated by Waring and Holder (1968, figs. 44-46).

Waring stressed the uniqueness of the Refuge site, and observed that Refuge sherds were present but rare at the Deptford site near Savannah. Waring also suggested that Refuge ceramics extended no farther south than the Savannah River, with their greatest distribution in South Carolina. He viewed Refuge as a means of filling the temporal gap between Bilbo or St. Simons fiber-tempered ceramics and the sand-tempered Deptford sherds. But in a paper originally written in 1955, Waring suggested that the Savannah locality was abandoned both before and immediately after the Refuge period (Waring, 1968b). Waring later obtained a single radiocarbon date of 970 B.C. ± 200 (M-267) in association with Refuge (Williams, 1968, p. 329). Recent archaeological literature has contained few references to the Refuge period, and only rarely is Refuge pottery specifically identified or discussed (Peterson, 1971; Stoltman, 1974).

A review of the literature, reanalysis of the available collections, and new surveys (DePratter, 1975; Zurel, Gresham and Hally, n.d.), however, suggest that unrecognized sites from the Refuge period are common over much of the eastern portion of the Georgia coastal plain, and also along the coast (DePratter, 1976).

Refuge ceramics were not identified in the 1939 sequence, but reanalysis of the Chatham County W.P.A. collections indicates that Refuge ceramics were present at most of the excavated sites. Refuge pottery, particularly Refuge

Simple Stamped, was overlooked because of its close similarity to Deptford (see Waring and Holder, 1968, fig. 45 a-h).

The Oemler series also has some bearing on the Refuge problem, but the series has never been described in print; Waring, however, spoke of Oemler ceramics as a "floating complex," with Deptford affiliation (Waring, 1968b, p. 220). Named after the Oemler site (Ch. 8), the Oemler series contains check stamped, complicated stamped, and plain types (Caldwell and McCann, n.d.a.). The check stamping consists of small, rhomboid or diamond checks, carefully applied to the vessel surface without overstamping. The complicated stamping is somewhat unusual, consisting of small, carefully executed line-filled triangles, nested diamonds, and other motifs (Waring, 1966). No curvilinear stamping was included in this type. The largest sample of Oemler Check Stamped or Oemler Complicated Stamped comes from the Oemler site, where these types were also associated with simple stamped ceramics identified by Caldwell as Deptford. Waring and Holder (1968, fig. 43) illustrated Oemler ceramics, labeled as Deptford Geometric Stamped.

More recent surveys have produced ceramics related to those originally described for the Refuge site. Peterson (1971) and Stoltman (1974) recovered Refuge and Deptford period ceramics from the Groton Plantation on the South Carolina side of the Savannah River. DePratter (1975) recorded a number of related sites on Skidaway Island, and Zurel, Gresham and Hally (n.d.) recorded a large number of sites farther south in McIntosh County. As a result of these recent surveys and a reanalysis of the W.P.A. Chatham County collections, the following revisions are suggested for the north Georgia coastal sequence. The revisions are based on the premise that changes in ceramics on the Georgia coast were the result of a continuous and unbroken development through time.

At sometime around 1100 B.C., changes in the ceramic tempering materials began on the Georgia coast. Sand and grit were gradually added to the fiber-tempered St. Simons ceramics, until eventually the sand and grit completely replaced the fibers (see fig. 62). The resulting sand and grit tempered incised, punctated, and plain ceramics are now identified as Refuge I phase types. Refuge Punctated and Incised were made for only a brief period. A new type, Refuge Simple Stamped, was added to the ceramic assemblage prior to the disappearance of incising and punctation. Simple stamping occurs on fiber tempered Stallings Island ceramics inland on the Savannah River (Claflin, 1931; Phelps, 1968), and it is likely that simple stamping originated in that area.

Between 1100 B.C. and A.D. 500, ceramics underwent gradual refinement in surface finish, slight change in rim form and vessel shape, and additive change in the occurrence of ceramic types. However, these changes represent a continuous development out of ceramic types which first appeared in the Refuge I phase. Table 30 shows these changes divided into five phases (Refuge I, II, and III, and Deptford I and II) based on distinctive ceramic series which were made during the estimated time intervals shown. Type descriptions for Refuge and Deptford ceramic types follow the discussion of the Refuge and Deptford phases.

Refuge I occupations, identifiable by the presence of Refuge Plain, Punctated, Incised, and Simple Stamped ceramics do not appear in the nine St. Catherines burial mounds, but examples are known from Skidaway Island (DePratter, 1975), Little Tybee Island (DePratter and Howard, 1977), and at the Refuge type site (Waring, 1968e). On the southern Georgia coast, the earliest Refuge I ceramics apparently lack both punctation and incision, so presumably the Refuge I designation will not apply in that area (Marrinan, 1975).

Refuge II on the north Georgia coast is defined by the presence of only three ceramic types: Refuge Plain, Refuge Simple Stamped, and Refuge Dentate Stamped. The Refuge type site contains the only well-excavated component of this phase, but several of the Skidaway sites may also belong to it (DePratter, 1975). Sites Li 139, Li 140, Li 142 on St. Catherines Island may also date to this phase but they have so far produced no Refuge Dentate Stamped. Lowered sea levels during the Refuge II-III interval may explain the rarity of Refuge

II phase sites (DePratter and Howard, 1977; 1978). Sites occupying areas exposed during a 1000-400 B.C. regression of sea level would have been covered by the subsequent rise of sea level to its present position, thus rendering those sites "invisible" to normal archaeological survey methods. This reduction in the number of readily observable sites may in part account for Waring's (1968b, pp. 220-221) statement that the northern Georgia coast was virtually unoccupied during the Refuge period.

Refuge III is marked by the addition of Deptford Check Stamped and Deptford Linear Check Stamped, the loss of Refuge Dentate Stamped, and the continued presence of Refuge Plain and Refuge Simple Stamped. Deptford Check Stamped, as defined here, combines a number of previously identified types: Deptford Bold Check Stamped (Caldwell and Waring, 1939a), Deptford miscellaneous checks (Waring, 1968a), and Oemler Check Stamped (Caldwell and McCann, n.d.a.). It now appears that a great deal of experimentation with check stamping occurred during the Refuge III phase. Rhomboid shaped checks, small rectilinear checks, and triangular checks were manufactured at this time, as was Deptford Linear Check Stamped (Waring and Holder, 1968, fig. 43 a-f, fig. 42 g-n). Through time, the rhomboid and triangle-shaped checks disappeared, and the rectilinear checks became larger. The larger (late) rectilinear checks were the basis for Caldwell and Waring's "Deptford Bold Check Stamped" designation. It is impossible to consistently separate the various forms and sizes of checks since they grade one into the other. A single type designation (Deptford Check Stamped) is employed here to include all the various check stamped ceramics dating to the Refuge and Deptford phases. The final component at the Bilbo site (Waring 1968a) dates to the Refuge III phase.

The succeeding Deptford I phase is marked by the continuation of all of those types found in Refuge III, with the addition of Deptford Cord Marked. This new type is most common around the mouth of the Savannah River and in inland areas, suggesting that cord marking may have originated somewhere inland from the coast. Cord marking occurs as a minority type on Deptford I sites throughout the northern-Georgia coastal area, however, including sites on St. Catherines Island.

The Deptford II phase is defined as the continuation of all the Deptford I phase types except Deptford Linear Check Stamped and by the addition of a single new type, Deptford Complicated Stamped. The name Deptford Complicated Stamped is used here instead of the original Brewton Hill Complicated Stamped designation (Caldwell and Waring, 1939a) for a number of reasons. First, the complicated stamping occurs late in the Deptford period and its appearance is apparently related to the spread of Swift Creek ceramic styles throughout the interior of Georgia (Kelly, 1975). No population intrusion of the sort described by Kelly (1975) and Cook (1977) for the Altamaha River area is present in the Savannah area or the northern Georgia coast. But apparently ideas relating to stamping of ceramics were diffusing from areas inland or farther south, since Deptford Complicated Stamped is quite similar to Swift Creek Complicated Stamped (cf. Snow, 1976; Caldwell and Waring, 1939a, fig. 26; Waring and Holder, 1968, fig. 47). The complicated stamped type is simply added to the previously existing ceramic complex, with little or no indication of further influence. Notched and folded rims characteristic of early and late Swift Creek ceramics, respectively, are extremely rare on the northern Georgia coast.

Oemler Complicated Stamped, previously described by Waring (1966, pp. 1-3; 1968b, p. 220) as a "floating" type, is excluded from table 30 because the lack of stratigraphic data prevents precise placement. In a previous paper (DePratter, 1977), Oemler Check Stamped and Oemler Complicated Stamped were placed into an Oemler phase which fell within the temporal limits estimated here for the Refuge III phase. Since completing that paper, I have decided that the original Oemler Check Stamped type (illustrated in Waring and Holder 1968, fig. 42 g-n and fig. 43 b, d-f as Deptford Check Stamped and Deptford Geometric Stamped, respectively) cannot be consistently separated from the smaller or less distinct examples of what was previously called Deptford Bold

Check Stamped. Therefore, all ceramics have been combined into the single type, Deptford Check Stamped. Deptford Check Stamped first appears in the Refuge III phase, when the earliest checks are small, rhomboid-shaped, triangular, or rectangular. It is in this time interval (900-400 B.C.) that Oemler Complicated Stamped (see Waring and Holder, 1968, fig. 43, a, c) probably belongs. But such a placement requires further testing.

With the end of the Deptford II phase, there was again a shift in the tempering material used, and, for the next 650 to 700 years, clay tempering occurred. The Wilmington I phase (formerly Deptford III of Caldwell, 1971) is the earliest to incorporate this change. Wilmington I phase ceramics are clay tempered but continue the cord marking, check stamping, and complicated stamping of the preceding Deptford II phase. Stamping becomes shallower and less distinct during the Wilmington I phase, and cord marking becomes by far the most common type. Complicated stamping and check stamping appear on clay tempered Walthour ceramics only briefly before carved paddle stamping was completely replaced by cord marking.[2] It is possible that the large fragments of partially fired clay used as tempering reduced the depth of the stamped impression to the point where they became shallow and indistinct (DePratter, 1975, plate 8). If so, stamping no longer served its primary function of coil compaction and was soon abandoned in favor of cord marking. In any event, carved paddle stamping soon disappeared and Wilmington Plain and Wilmington Cord Marked became the predominant types. The Wilmington II phase is characterized by these two types plus Wilmington Brushed, a minority type on most sites. A large number of Wilmington sites are known from the northern Georgia coast (Caldwell and McCann, n.d.a., n.d.c.; Caldwell, McCann and Cain, n.d.; Caldwell, 1943, 1952; Caldwell, n.d.; DePratter, 1974, 1975). It should be noted that previous authors including Caldwell (1958, p. 33) and Waring (1968b, p. 220) have viewed the transition from Deptford to Wilmington ceramics as evidence for an intrusion of a new group of people into the coastal area. We now think that Deptford developed into Wilmington, and we see no evidence available to support the migration hypothesis.

The St. Catherines phase follows the Wilmington II phase, and was first defined by Caldwell (1971; also see Steed, n.d.) based on work conducted on St. Catherines Island in 1969 and 1970. St. Catherines phase ceramics are characterized by finer clay tempering than that of preceding Wilmington types and by the increased care with which the ceramics were finished. The lumpy, contorted surface of Wilmington types was replaced by carefully smoothed and often burnished interiors and exteriors. St. Catherines Burnished is characterized by careful exterior burnishing, whereas surfaces of St. Catherines Plain are simply smoothed. St. Catherines Fine Cord Marked has more carefully applied and more consistently spaced crossed cord impressions than did its predecessor, Wilmington Heavy Cord Marked. A new type, St. Catherines Net Marked, is also included in the St. Catherines series, but it is rare at most sites. Examples of St. Catherines phase sites include Dotson (Caldwell and McCann, n.d.b.) and the Indian King's Tomb (Waring, 1968d), which has consistently been classified (incorrectly) as a Savannah I site.

Discussion of the remainder of the sequence shown in table 30 is unnecessary for the present purposes. For further information related to the later part of the sequence or to non-ceramic attributes of the phases previously discussed, the reader is referred to past syntheses by Caldwell (1952), Stoltman (1974), and the various other reports cited above. A forthcoming monograph (DePratter, n.d.b.) will report on previously unpublished W.P.A. sites, and will also contain a complete summary and synthesis of all modern archaeological surveys and excavations on the northern Georgia coast.

[2]Walthour Complicated Stamped and Walthour Check Stamped were previously identified as Deptford III Complicated Stamped and Deptford III Check Stamped, respectively, by Caldwell (1971) based on excavations on St. Catherines Island. No type descriptions were ever written by Caldwell for the Deptford III types, however, and I have renamed the types to prevent their being confused with the sand tempered ceramics of the Deptford period.

Refuge Punctated

Paste

Method of manufacture: Earliest examples modeled, later examples coiled.

Temper: Abundant sand.

Texture: Paste extremely sandy and friable on most examples; occasionally finer.

Color: Surface color most often reddish buff but occasionally gray to brown. Core usually same as exterior but in some examples it is sharply differentiated.

Surface Finish

Interiors range from smooth to poorly finished, but sandy texture apparent on all sherds. Shell scraping occasionally present.

Decoration

Technique: Punctation with a variety of pointed or blunted implements. Implements held either perpendicular or at angle to vessel surface.

Design: Linear or random punctations. Linear punctations in rows, sometimes in zones. Punctations occasionally combined with incising and dentate stamping.

Distribution: Often continuous over most of the exterior vessel surface, but occasionally zoned. Interior punctation is sometimes present on punctated, simple stamped, or incised sherds.

Form

Rim: Incurving to straight.

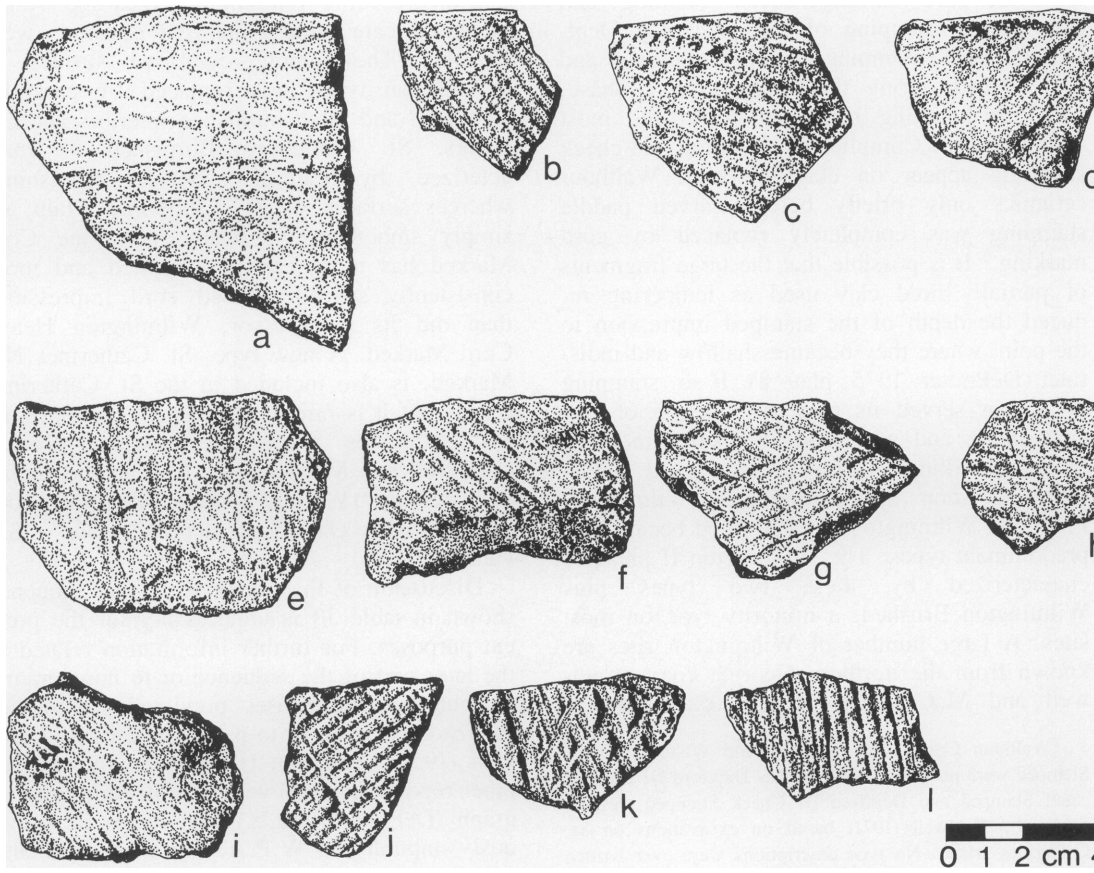


Fig. 63. Refuge Simple Stamped sherds from McLeod Mound: a., b., c., and d. are rim sherds.

Lip: Rounded to squared; occasionally stamped.

Body: Hemispherical bowls most common although deeper, straight sided jars also occur.

Base: Rounded.

CHRONOLOGICAL POSITION OF TYPE

Decoration is a continuation of punctation which originated on St. Simons Punctated. Vessel shapes are also a continuation of St. Simons forms. Refuge Punctated present only in earliest portion of Refuge I phase.

COMMENT

This type description is based on a preliminary description for "Aberrant incised and Punctated Pottery" which was included in a section of W.P.A. Quarterly Report (March 1, 1940). Additional information was drawn from the Refuge site report (Waring, 1968e) and the author's personal observations.

REFUGE INCISED

PASTE

Same as Refuge Punctated.

SURFACE FINISH

Same as Refuge Punctated.

DECORATION

Technique: Poorly executed, irregular incising done with a variety of blunt or pointed implements. Incisions usually shallow.

Design: Too few sherds available at present to allow determination of design.

Distribution: Usually restricted to zone just below rim on exterior; occasionally also found on interior.

FORM

Same as Refuge Punctated.

CHRONOLOGICAL POSITION OF TYPE

Represents a continuation of incising which originated in the St. Simons phase. Occurs only in earliest portion of Refuge I phase.

REFUGE SIMPLE STAMPED

(See figures 63, 64, 65, and 66)

PASTE

Method of manufacture: Coiling.

Temper: Grit and sand in considerable quantities.

Texture: Medium to coarse. Some sherds very sandy.

Color: Core is buff, red-buff, light gray or dark gray; occasionally two sharply differentiated colors appear in the same cross-section. Surface color ranges from buff through gray to black.

SURFACE FINISH

Interiors range from carelessly smoothed to finely finished.

Scraping occasionally present. Sandy paste makes interiors coarse on many sherds.

DECORATION

Technique: Stamped and malleated. Probably applied with dowel, bundle of sticks, or thong wrapped paddle. Changes in techniques may be temporally significant.

Design: Consists of arrangements of shallow, longitudinal grooves which may have a parallel arrangement or may be applied in a cross-stamped pattern.

Distribution: Over the entire exterior of vessel. Sometimes the decoration is obliterated at the base. When tetrapodal supports occur they too are decorated. Occasional interior decoration.

FORM

Rim: Straight or occasionally slightly flaring.

Lip: Squared or rounded and often tilted outward, giving the effect of beveling on the outer edge; sometimes lips are stamped.

Body: Conoidal jar or hemispherical bowl. On jars the equator is often slightly wider than the rim diameter.

Base: Conoidal or rounded. When tetrapodal supports occur the base is roughly squared.

Appendages: Tetrapodal supports occasionally present.

CHRONOLOGICAL POSITION OF TYPE

Develops from simple stamping found as a rare minority type on fiber tempered ceramics of the St. Simons series. Continues through Refuge I, Refuge II, Refuge III, Deptford I, and Deptford II phases. Early examples poorly

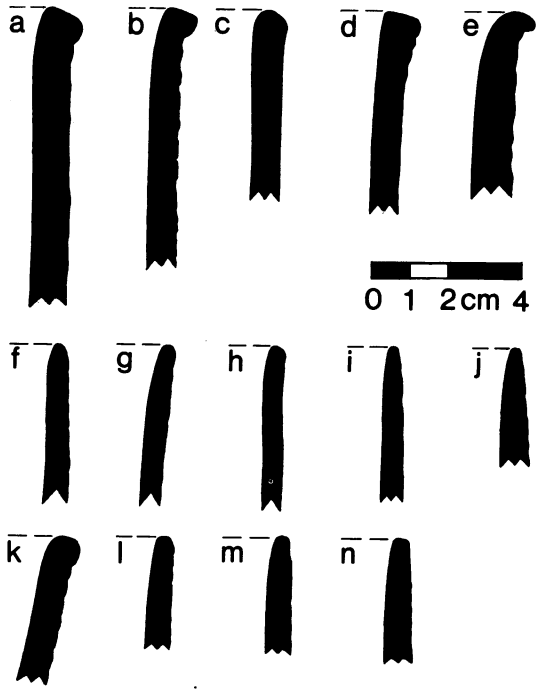


FIG. 64. Refuge Simple Stamped rim profiles from McLeod Mound.

executed (see Waring, 1968e: 200), usually on sandy hemispherical bowls. Cylindrical jars with rounded or conoidal bases become the only type. With controlled excavations on stratified sites, it may be possible to separate Refuge and Deptford varieties of simple stamped.

COMMENT

This type description is modified from Caldwell and Waring (1939a).

REFUGE PLAIN
(See figures 66, 67)

PASTE

Same as Refuge Simple Stamped.

SURFACE FINISH

Interiors range from carelessly smoothed to finely finished. Scraping occasionally present on interior surfaces. Exteriors exhibit same range of finishing as interiors. Both interiors and exteriors coarse and friable due to sand content.

DECORATION

Occasional interior punctation or simple stamping.

FORM

Same as Refuge Simple Stamped.

CHRONOLOGICAL POSITION OF TYPE

Same as Refuge Simple Stamped.

COMMENT

Not previously described for Georgia coast.

REFUGE DENTATE STAMPED
(See figure 68)

PASTE

Same as Refuge Simple Stamped.

SURFACE FINISH

Same as Refuge Simple Stamped.

DECORATION

Technique: Uncertain. Waring (1968e) suggests application with a single-cog rocker or roulette. Occasional sherds suggest a double or

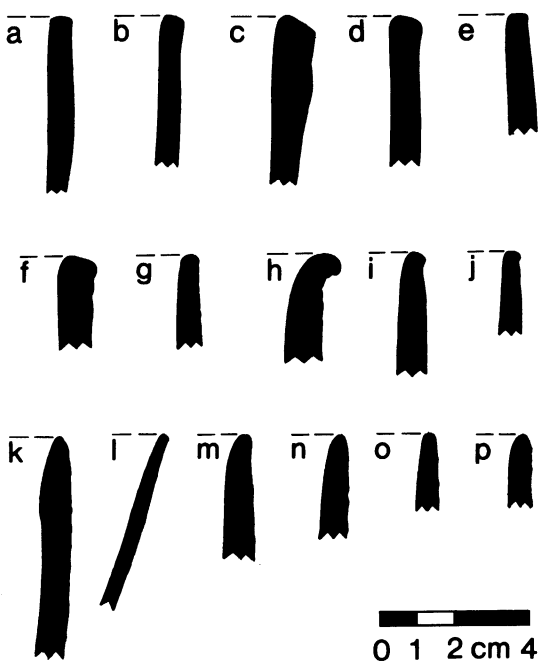


FIG. 65. Refuge Simple Stamped rim profiles from McLeod Mound.

FIG. 66. Rim profiles from various sites: a.-l. are Refuge Plain sherds and m.-p. are Refuge Simple Stamped sherds.

triple-cog roulette. Some examples indicate use of a narrow comblike implement.

Design: Impressions are characteristically fine and clear. Single, double, or occasionally triple lines of dentate stamping typically widely spaced without apparent patterning. Sometimes occurs in association with simple stamping or punctation.

Distribution: Scattered lines of dentate stamp distributed over the surface without apparent pattern. Occasionally occurs on interior vessel walls.

FORM

Same as Refuge Simple Stamped.

CHRONOLOGICAL POSITION OF TYPE

At the Refuge site this type occurred in a Refuge III context, but it may be slightly earlier or slightly later at other sites.

COMMENT

The small available sample of this type makes adequate description and temporal placement difficult. Future excavation of stratified sites may clarify these difficulties.

DEPTFORD LINEAR CHECK STAMPED

PASTE

Method of manufacture: Coiling.

Temper: Fine to medium quartz grit.

Texture: Medium to coarse, very sandy.

Color: Core continuous with color of both surfaces, meeting at a point of differentiation at the middle of the sherd cross-section. Occasionally the whole core is dark gray to black with a peculiar yellow or buff film on the exterior surface. This does not represent true filming but a color change incidental to firing. Exterior surface usually orange or buff; frequently dark gray to black. Interior surface ranges from buff through dark gray to black.

SURFACE FINISH

The interiors of the vessels were smoothed while the clay was damp, leaving a gritty, care-

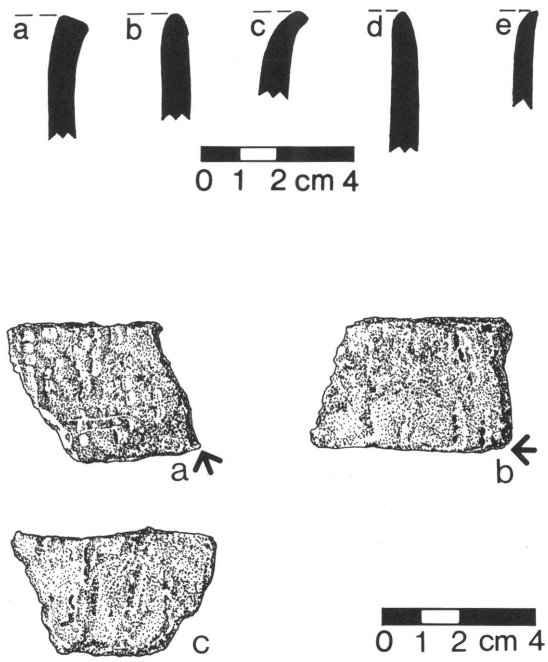


FIG. 68. Refuge Dentate Stamped sherds: a. and b. are abraded.

lessly finished surface. The marks of the smoothing implement are frequently visible.

DECORATION

Technique: The design may have been rouletted or rolled on the vessel wall with a carved wooden rocker or cylinder, although paddles were probably used in most cases.

Design: The design consists of a repeated parallel arrangement of two longitudinal lands which contain a series of finer transverse lands. The number of design elements on a single stamp ranges from one to eight. The design motifs are placed so carefully that the entire series of longitudinal lands has the superficial appearance of having been executed with a single stamp. The longitudinal lands are invariably heavier and usually higher than the transverse lands. There is considerable variation in the width of the longitudinal lands themselves, ranging from 2 mm. to 6 mm. They may be either rounded, sloped, or flat. A variation of this general design is one in which the transverse lands appear only in the alternating interspaces. The design is invariably applied in such a manner that the longitudinal lands intersect the rim obliquely. Several rim sherds show decoration of the *interior* in which bands of triangular or reed punctates proceed vertically down from the lip for a distance of 10 cm.

Distribution: Usually over the entire exterior of the vessel, but occasionally restricted to only a portion. Interior decoration on small percentage of sherds.

FORM

Rim: Straight to slightly flaring. Usually squared or stamped beveled, sometimes rounded. Occasionally an oval folded rim occurs.

Body: Cylindrical with a slight shoulder tapering to the base.

Base: Conoidal or occasionally rounded.

Appendages: None.

CHRONOLOGICAL POSITION OF TYPE

Appears late in the Refuge period or early in the Deptford period. Interior decoration and sandy paste suggest affinities with the Refuge period, but the lack of abraders indicates a slightly later date as does its usual association with Deptford Checked Stamped.

COMMENT

This type description is essentially as presented in Caldwell and Waring (1939a), although slight modifications have been incorporated.

DEPTFORD CHECK STAMPED

(See figures 69, 70, and 72)

PASTE

Method of manufacture: Coiling.

Temper: Fine to medium quartz grit.

Texture: Medium to coarse, often sandy.

Color: Core continuous with the color of both surfaces, meeting at a point of differentiation at the middle of the sherd cross section. Occasionally the whole core is dark gray to black with a peculiar yellow or buff film on the exterior surface. This does not represent true filming but a color change incidental to firing. Exterior surface usually orange or buff; frequently dark gray to black. Interior surface ranges from buff through dark gray to black.

SURFACE FINISH

The interiors of the vessels were smoothed while the clay was damp, leaving a gritty, carelessly finished surface. The marks of the smoothing implement are frequently visible.

DECORATION

Technique: Stamping with a flat, rectangular paddle.

Design: The design consists of a grill of raised lands which intersect to form squares, rectangles, rhomboids, or triangles. There is a characteristic variability in the size of the checks which range from 3 mm. to 10 mm. on the side. In many cases the lands may be as wide as the depressed areas are square, producing a very coarse, massive effect. The depressed areas are deep, sometimes attaining 3 mm., and are usually square-cut. Earlier examples are rhomboid-shaped, later examples are rectangular. There is an increase in size of individual checks through time.

Distribution: Over the entire exterior of the vessel.

FORM

Rim: Straight to slightly flaring.

Lip: Usually squared or stamped-beveled;

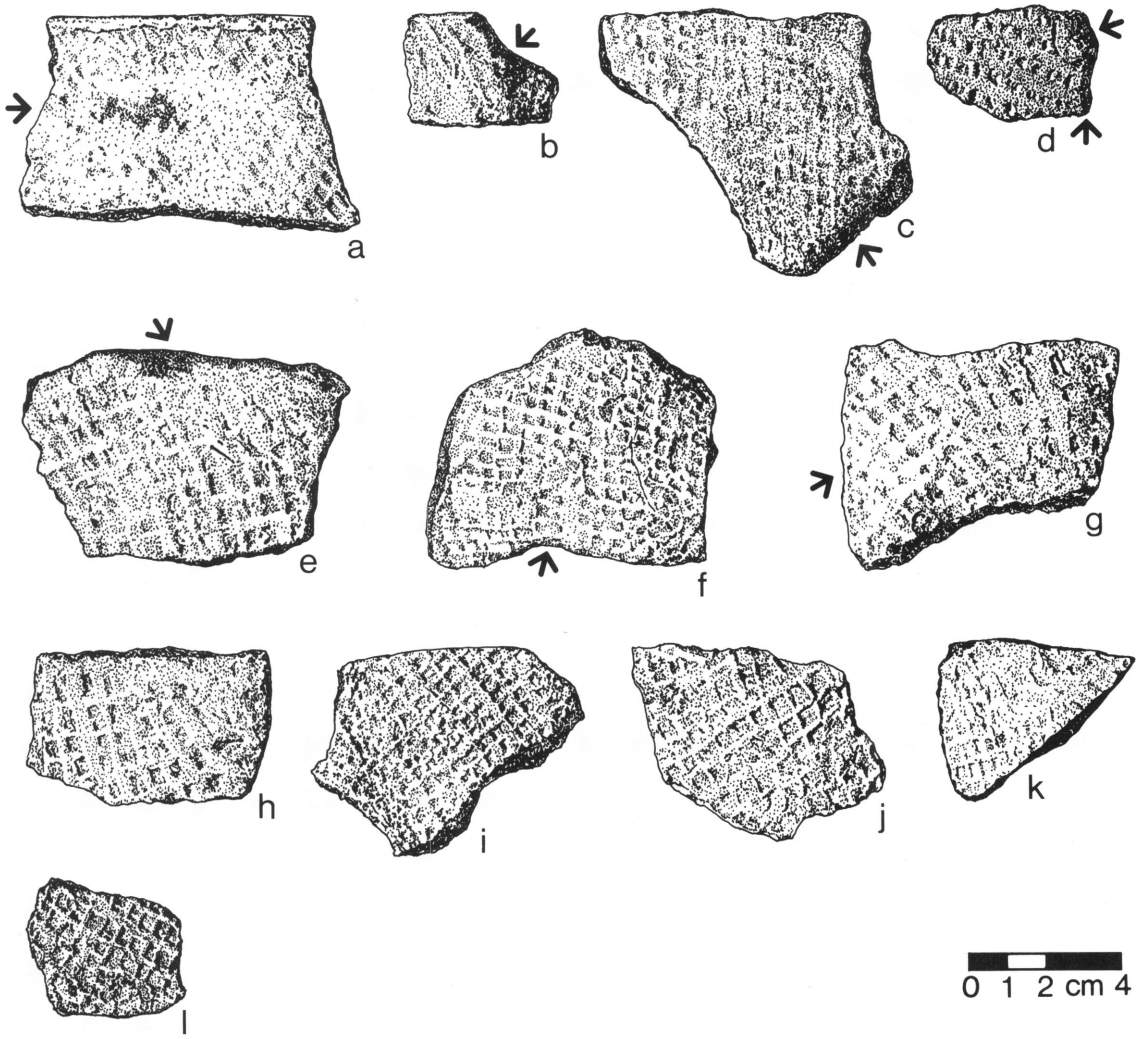


FIG. 69. Deptford Check Stamped sherds from Seaside I: a. and b. are rims; a., b., c., d., e., f., and g. are abraders.

sometimes rounded. Occasionally an oval folded rim is noted.

Body: Cylindrical with a slight shoulder tapering to the base.

Base: Round or conoidal; occasionally with tetrapods.

Appendages: Tetrapodal supports occasionally present.

CHRONOLOGICAL POSITION OF TYPE

Originates as diamond or rhomboid-shaped checks which become larger through time. Transition from diamonds to rectilinear checks occurs at the end of the Refuge II phase or the beginning of Deptford I.

COMMENT

Caldwell and Waring (1939a) originally called this type Deptford Bold Check Stamped. With the exception of dropping the "bold" term in their type designation, this type description is adapted from them with only minor changes.

FIG. 70. Deptford Check Stamped rim profiles from McLeod Mound.

DEPTFORD CORD MARKED
(See figures 71 and 72)

PASTE

Same as Deptford Check Stamped.

SURFACE FINISH

Same as Deptford Check Stamped.

DECORATION

Technique: Stamping with a cord wrapped paddle. Individual cords usually large and distinct.

Design: Individual cord impressions widely spaced and often not parallel. Usually impressions are vertical, occasionally oblique to rim. Cross-stamping uncommon.

Distribution: Sometimes in zone directly below rim, in other cases covers entire exterior of vessel.

FORM

Same as Deptford Check Stamped.

CHRONOLOGICAL POSITION OF TYPE

This type occurs during the two Deptford phases over most of the north Georgia coast, but a similar type may occur as early as Refuge II at the mouth of the Savannah River and in inland areas.

COMMENTS

Not previously described for the northern Georgia coastal area.

DEPTFORD COMPLICATED STAMPED

PASTE

Method of manufacture: Coiling.

Temper: Fine grit and sand in considerable quantities.

Texture: Medium to fine.

Color: Core ranges from buff through dark gray to black; exterior surface ranges from yellow through orange to black; interior surface: buff to black.

SURFACE FINISH

Interiors roughly smoothed, occasionally burnished. Tool marks are sometimes visible.

DECORATION

Technique: Stamped with a large and elaborately carved paddle.

Design: Characteristically fine, the lands low and quite distinct. The design elements consist of spiral interlocking scrolls, concentric circles, snowshoes, swirls, "figure sixes," and "figure eights."

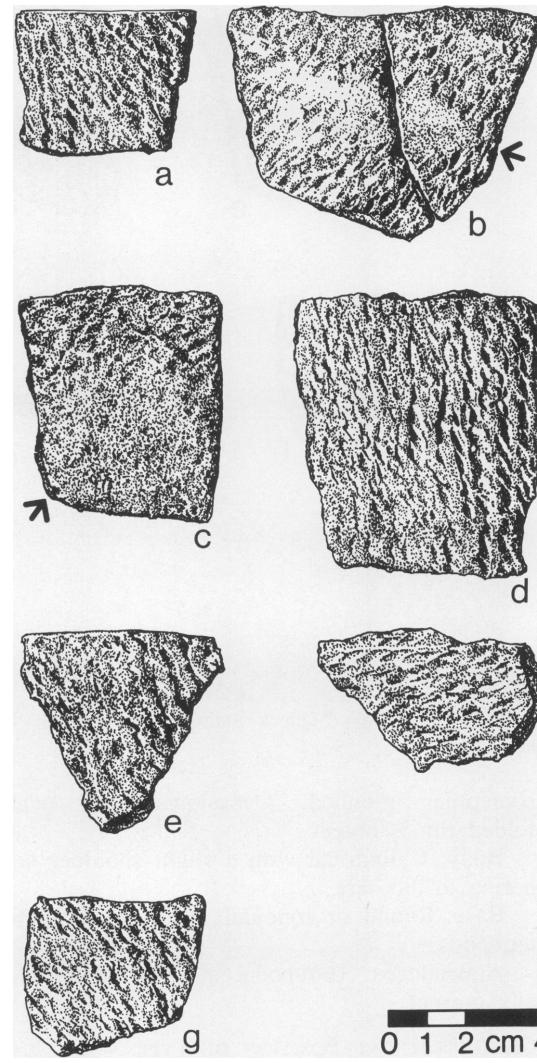


FIG. 71. Deptford Cord Marked sherds from Seaside I: a. is a rim; b. and c. are abraders.

FIG. 72. Rim profiles for Deptford series sherds: a.-i. are Deptford Check Stamped sherds and j.-n. are Deptford Cord Marked sherds.

Distribution: Usually over the entire exterior of the vessel, although plain areas set off by dentate stamping are occasionally present.

FORM

Rim: Straight, not tapered.

Lip: Squared, occasionally rounded.

Body: Cylindrical, elongated with straight, slightly flaring sides which taper down to the base.

Base: Round and conical. At the Deptford site, many vessels had tetrapods.

Appendages: Tetrapodal supports occasionally present.

CHRONOLOGICAL POSITION OF TYPE

Appears late in the Deptford period (Deptford II). Marked similarities to Swift Creek ceramics from farther south and west. Never very common in Chatham County; most common at the Deptford site (9 Ch 2).

COMMENT

This type description is adapted, with slight modification, from Caldwell and Waring's (1939a) description of Brewton Hill Complicated Stamped.

OEMLER COMPLICATED STAMPED

(See figure 73)

PASTE

Method of manufacture: Coiling.

Temper: Abundant fine sand; occasional medium grit.

Texture: Medium to fine. Not as coarse or gritty as Refuge or early Deptford types.

Color: Usually buff, red-buff, or gray on surface. Core occasionally differentiated, with grays and blacks predominating.

SURFACE FINISH

Interiors usually carefully smoothed, occasionally almost burnished, although some sherds are poorly smoothed. Shell scraping or brushing occasionally present.

DECORATION

Technique: Stamped with a carved paddle.

Design: A number of distinct motifs are present in Chatham County: a) nested diamonds, b) herring bone, c) alternating zones of triangle-filled pyramids and rows of diamond

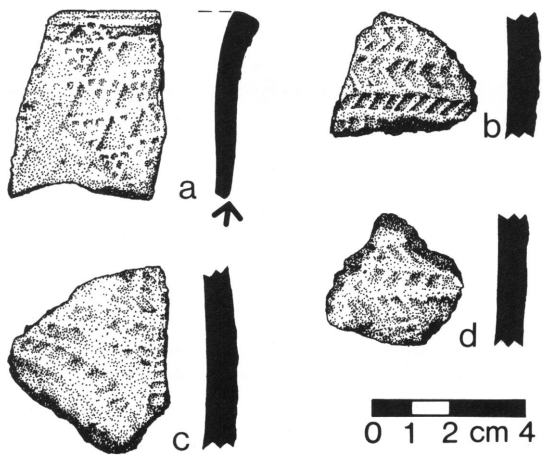


FIG. 73. Oemler Complicated Stamped sherds: a. is from Cunningham B (a rim and abrader); b., c., and d. are from Cunningham A.

shaped lozenges separated by heavy lines. No curvilinear stamping known to be present.

Distribution: Over entire surface.

FORM

Rim: Straight to slightly flaring; sometimes sharply everted.

Lip: Rounded to squared; often sharply planed forming broad flat lip.

Body: Cylindrical jar.

Base: Rounded.

Appendages: None.

CHRONOLOGICAL POSITION OF TYPE

Chronological position not certain due to lack of stratified sites. Probably dates to Refuge III.

COMMENT

Chatham County Oemler ceramics were originally described as a "floating complex" thought to be related to Deptford materials (Waring, 1968b, p. 220). No type description was ever written, but some notes made in the 1930s were employed in the composition of this type description.

As stated previously, more than 90 percent of the sherds recovered from the nine burial mounds on St. Catherines Island date to the Refuge or Deptford period (see table 29). Although these ceramics occurred both in mound fill and on pre-mound surfaces, it is possible to use the ceramic chronology to estimate the date of mound construction. Independent estimates of the same events can be made based on radiocarbon evidence (discussed in Chapter 7).

Although the sample sizes are too small for strict seriation, it is possible to use the data from table 29 and the generalizations on figure 62 to obtain a chronological estimate. The St. Catherines Island sites appear to fall into three major clusters, based on ceramic frequency alone. Cunningham D, Seaside II, and McLeod Mound all contain predominately sherds of Refuge Plain, Refuge Simple Stamped, Deptford Check Stamped, and Deptford Linear Check Stamped. Correlation with figure 62 suggests that these three sites date to the Refuge III phase. In addition, abraders are relatively common at these sites, as documented in chapters 3 and 4. The high proportion of abraders correlates with Waring's observations at the Refuge site (Waring, 1968e, p. 207).

Cunningham Mounds A and B are distinctive in that they were the only St. Catherines Island sites which produced Oemler Complicated Stamped. Of course, the small sample size (four sherds) limits our inference. It seems likely that the pre-mound surfaces at these sites were also occupied during the Refuge III phase.

The third cluster of sites consists of Cunningham C and Seaside I. Table 29 indicates that these sites contain three of the types contained in the first cluster (lacking Linear Check Stamped), plus several other distinctive types: Deptford Check Stamped, Deptford Dentate Stamped, Deptford Cord Marked, and a single example of Deptford Complicated Stamped. Based on the ceramic sequences presented earlier, it seems likely that Cunningham C and Seaside I contain at least two occupations. The earliest component is a Refuge II phase occupation. A later Deptford I occupation is indicated by the presence of Deptford Cord Marked and Complicated Stamped, and a decrease in the relative frequency of Refuge Simple Stamped sherds. The single Deptford Complicated Stamped sherd suggests a slightly later Deptford II phase utilization of the Seaside I locality. The Deptford tetrapod from Seaside I also suggests a Deptford II occupation. These estimates would date the pre-mound occupations of these sites, not necessarily the date of mound construction (see Chapter 7).

A number of additional sherds included in table 29 undoubtedly relate to the Refuge and Deptford periods, but cannot be assigned to a particular phase. These include the sand tempered, shell scraped sherds from Cunningham Mounds C and D, and the sand tempered plain and decorated undiagnostic sherds from Cunningham C and D, McLeod and Seaside I. These sherds comprise less than 3 percent of the total Refuge-Deptford ceramic assemblage, indicating that the ceramic types as defined above are suitable for dating the bulk of Refuge and Deptford period ceramics.

WILMINGTON AND ST. CATHERINES PERIOD CERAMICS

Five of the nine burial mounds contain ceramics from either Wilmington or St. Catherines periods. All of these sherds seem to

come from the mound fill, and it is likely that they were introduced with intrusive burials, as discussed in earlier chapters. Type descriptions for the Wilmington and St. Catherines period ceramics follow:

Wilmington Heavy Cord Marked
(See figure 74)

Paste
Method of manufacture: Coiling.

Temper: Crushed sherd or crushed, low-fired clay fragments—from 3 to 5 cm. in diameter.

Texture: The surface is fine but often lumpy.

Color: The color of the exterior and interior surfaces ranges from buff through reddish brown to dark gray. The core color is sometimes the same as that of the surfaces, but occasionally it is a sharply differentiated dark gray.

Surface Finish
Interiors are carelessly smoothed but lumpy due to the presence of large fragments of clay tempering. Shell scraping occasionally occurs on interiors.

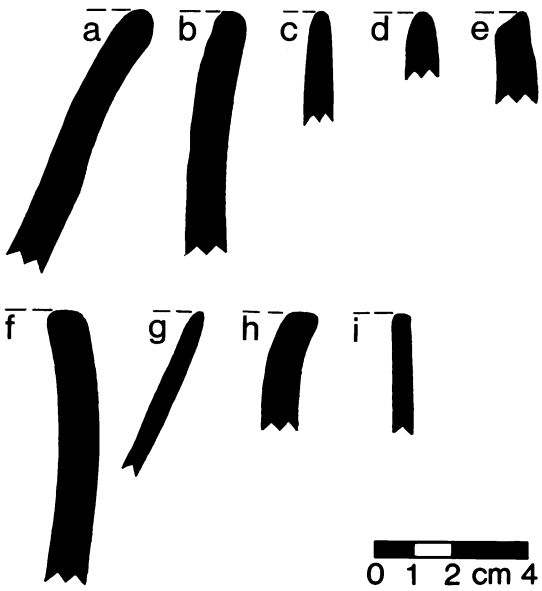


Fig. 74. Various rim profiles: a.-d. are Wilmington Heavy Cord Marked; e. is Wilmington Plain; f.-i. are St. Simons Plain.

Decoration
Technique: Stamping with a paddle wrapped with heavy cords.

Design: The cord impressions are characteristically large and have a vertical parallel arrangement. Cord impressions sometimes intersect the rim obliquely.

Distribution: Cord impressions over the entire vessel surface. Occasionally the edge of the cord wrapped paddle was used to stamp the base.

Form
Rim: Straight; occasionally slightly incurving.

Lip: Usually rounded but occasionally squared or stamped-beveled.

Body: The typical vessel form is cylindrical, lacking a shoulder and tapering down to the base.

Base: Round to slightly conoidal.

Appendages: None.

Chronological Position of Type
First appears during the Wilmington I phase. Similar to Deptford Cord Marked except for differences in temper in the two types.

Comment
This type description is adapted, with slight modification, from Caldwell and Waring (1939a).

Wilmington Plain
(See figure 74)

Paste
Same as Wilmington Heavy Cord Marked.

Surface Finish
Exterior finish ranges from careless smoothing to infrequent burnishing. Interiors are usually carelessly smoothed but lumpy due to presence of large fragments of clay tempering. Shell scraping commonly occurs on vessel interiors.

Decoration
None.

Form
Same as Wilmington Heavy Cord Marked.

Chronological Position of Type
Same as Wilmington Heavy Cord Marked.

Walthour Complicated Stamped

Paste

Same as Wilmington Heavy Cord Marked.

Surface Finish

Same as Wilmington Heavy Cord Marked.

Decoration

Technique: Stamping with a carved paddle.

Design: The design consists of curvilinear elements carved on a wooden paddle. Stamping is generally faint and overstamping is common. Concentric circles and figure eights are common design elements, although others may occur.

Distribution: The decoration covers the entire exterior of the vessel.

Form

Rim: Straight.

Lip: Rounded or carelessly squared.

Body: The conoidal jar and the hemispherical bowl are the most common forms.

Base: Round to slightly conoidal.

Appendages: None.

Chronological Position of Type

Same as Walthour Check Stamped.

Comment

This type description is adapted, with slight modification, from papers in the J. R. Caldwell collection, Department of Anthropology, University of Georgia.

Walthour Check Stamped

Paste

Same as Wilmington Heavy Cord Marked.

Surface Finish

Same as Wilmington Heavy Cord Marked.

Decoration

Technique: Stamping with a carved paddle.

Design: The design consists of a grill of raised lands which generally intersect to form squares or rectangles, although rhomboid-shaped checks occasionally occur. Checks range between 2 mm. and 10 mm. on a side. Impressions are usually shallow and indistinct. Overstamping is common.

Distribution: The decoration covers the entire exterior of the vessel.

Form

Rim: Straight, occasionally slightly flaring.

Lip: Rounded or carelessly squared. Occasionally stamped.

Body: The conoidal jar and the hemispherical bowl are the most common forms.

Base: Round to slightly conoidal.

Appendages: None.

Chronological Position of Type

Occurs only during the Wilmington I phase. Represents a development from Deptford Check Stamped. Manufactured for only a brief interval, probably less than 100 years.

Comment

This type description is adapted, with slight modification, from an earlier description contained in the J. R. Caldwell collection, Department of Anthropology, University of Georgia.

Wilmington Brushed

Paste

Same as Wilmington Heavy Cord Marked.

Surface Finish

Same as Wilmington Heavy Cord Marked.

Decoration

Technique: Combing or brushing with bundled sticks, grass, or other implements.

Design: The design consists of very fine, faint, and closely spaced combing or brushing impressions. Orientation of impressions relative to rim not known.

Distribution: On some vessels, brushing covers entire exterior surface. On others, body is cord marked and only base is brushed.

Form

Uncertain. Most available sherds appear to be from conoidal jars or hemisperical bowls similar to those on which Wilmington Heavy Cord Marked occurs.

Chronological Position of Type

Known primarily from sites with Wilmington II phase occupations. May also occur during the Wilmington I phase. A minority ware on sites where it occurs.

Comment

This type description is adapted, with slight modification, from an earlier description con-

tained in the J. R. Caldwell collection, Department of Anthropology, University of Georgia.

St. Catherines Fine Cord Marked

Paste

Method of manufacture: Coiling.

Temper: Crushed sherd or crushed, low-fired clay fragments. Fragments typically smaller than the tempering used in Wilmington Heavy Cord Marked.

Texture: Typically fine.

Color: Interiors and exteriors gray to buff. Core usually same as surface, but it is occasionally a sharply differentiated dark gray to black.

Surface Finish

Interiors carelessly smoothed, but not as lumpy as those of Wilmington Heavy Cord Marked due to the smaller size of the temper fragments. Interior shell scraping common.

Decoration

Technique: Stamping with a cord wrapped paddle.

Design: Cord impressions are medium to large. Cord impressions cross-stamped at approximately 45° angle to rim.

Distribution: Cordmarking covers the entire exterior of the vessel except for the base which is typically stamped with the edge of the cord wrapped paddle.

Form

Rim: Straight, or occasionally, slightly flaring.

Lip: Usually squared or rounded. Often cord marked.

Body: Cylindrical jars with occasional flaring rim; straight sides.

Base: Rounded.

Appendages: None.

Chronological Position of Type

Restricted to St. Catherines phase.

Comment

This type description is adapted, with slight modification, from Steed (n.d.).

St. Catherines Burnished Plain

Paste

Same as St. Catherines Fine Cord Marked.

Surface Finish

Interiors carelessly smoothed. Exteriors burnished. Burnishing often done in parallel alignments or resulting in undulating, "fluted" surface.

Decoration

None.

Form

Rim: Straight or incurving.

Lip: Squared or rounded.

Body: Several forms including hemispherical bowls, deep straight sided jars, and cazuela bowls.

Base: Rounded.

Appendages: None.

Chronological Position of Type

Restricted to St. Catherines phase.

Comment

This type description is adapted, with slight modification, from Steed (n.d.).

St. Catherines Net Marked

Paste

Method of manufacture: Coiling

Temper: Crushed sherd or crushed low-fire clay fragments. Clay fragments larger than those found in other St. Catherines types.

Texture: Surface is fine but often lumpy.

Color: Interiors and exteriors gray to buff, often orange. Core usually same as surface, but it is occasionally a sharply differentiated dark gray or black.

Surface Finish

Interiors are carelessly smoothed but lumpy due to the presence of large fragments of clay tempering. Shell scraping occasionally occurs on interiors.

Decoration

Technique: Stamping with a net wrapped paddle.

Design: Irregular stamping and overstamping of vessel surface, resulting in a rough, uneven surface. Both knots and webbing impressions visible on most sherds. Width of mesh varies ⅜″ (9.5 mm.) to ¾″ (19 mm.).

Distribution: Net impressions over entire vessel surface.

FORM

Rim: Straight, occasionally slightly incurving.

Lip: Usually squared or rounded.

Body: Occurs on both hemispherical bowls and deep cylindrical jars.

Base: Rounded.

Appendages: None.

CHRONOLOGICAL POSITION OF TYPE

Restricted to St. Catherines phase.

COMMENT

This type description is adapted, with slight modification, from Steed (n.d.).

ST. CATHERINES PLAIN

PASTE

Same as St. Catherines Fine Cord Marked.

SURFACE FINISH

Exteriors smoothed, but not burnished. Occasionally evidence of smoothed over shell scraping on both interiors and exteriors.

DECORATION

None.

FORM

Same as St. Catherines Burnished Plain.

CHRONOLOGICAL POSITION OF TYPE

Restricted to St. Catherines phase.

COMMENT

This type is previously undescribed.

SUMMARY OF CERAMIC IMPLICATIONS

The nine mounds produced more than 1000 sherds, the majority dating to the Refuge and Deptford periods. A chronological sequence based primarily on data from Chatham County and adjacent areas suggests that the occupation surfaces underlying three of the mounds (Seaside II, Cunningham D, and McLeod) date primarily to the Refuge III phase. The premound occupations at Seaside I and Cunningham C seem to be mainly Refuge II and Deptford I phases. Cunningham A and B contained only Oemler Complicated Stamped sherds, which may be Refuge III in origin. Cunningham E produced no pottery and South New Ground Mound contained only a single sherd, which probably dates to either Wilmington or St. Catherines period. Seaside II and Cunningham C each seem to have an earlier St. Simons phase occupation. Four mounds (McLeod, Seaside I, Seaside II and Cunningham C) contained Wilmington and St. Catherines phase sherds, probably introduced into the mounds in association with intrusive burials, or perhaps through later occupation of the mound surface. These ceramic sequences are compared with the radiocarbon evidence in Chapter 7.

CHAPTER 6. COMPARISONS

DAVID HURST THOMAS

Writing in 1952 (p. 316), Joseph Caldwell observed that "we know practically nothing about the people who lived on the Georgia coast during the Deptford Period. The distinctive Deptford pottery types, however, do provide some interesting chronological and distribution data concerning the Deptford Period, although we cannot yet guess their significance in terms of peoples or cultures." During the past 25 years, a good deal has been learned about the people of the Deptford (and to some degree Refuge) period, particularly with regard to their ceramics and subsistence practices (see Milanich, 1971). But very little data have come to light about mortuary practices for the Deptford and Refuge phases (see table 1). In fact, we do not know of a single Refuge period mortuary site anywhere in Florida or Georgia.

We fare little better with the Deptford period. In his useful review of the information available regarding the Deptford period, Milanich (1971, pp. 206-209) could find only three examples of earthworks at Deptford sites: the Mandeville site in southwestern Georgia, Table Point on Cumberland Island, Georgia, and at the Deptford site itself, in Chatham County, Georgia.

The Mandeville site was excavated in conjunction with a Smithsonian Institution salvage operation in the Chattahoochee River basin. Two mounds were excavated along with a large intermediate village area (Kellar, Kelly and McMichael, 1962). The Mandeville I component consists of a platform mound foundation both covered and underlain by late Deptford village debris. Two radiocarbon dates are available for the Mandeville I occupation (in corrected ages): A.D. 50-30 ± 150 (M-1042) and A.D. 950 ± 150 (M-1043). These dates seem to bracket the time of construction of this initial mound building phase at Mandeville. Later Swift Creek activities then expanded and enlarged the structures at Mandeville.

Milanich has excavated and described a shell ring located at Table Point on the northwestern margin of Cumberland Island, Georgia (Milanich, 1971, pp. 46-61). The Table Point site consists of a low shell and dirt ring which is about 220 feet in diameter. A Deptford period house was associated with the northeastern edge of the ring, and a single radiocarbon date of A.D. 70 (UGA-129) was obtained from a *Busycon* pick taken from the fill of the fire pit (Milanich, 1973). The function of the ring is uncertain; Milanich suggests that the structure was a defensive enclosure, although the possibility of ceremonial functions cannot be excluded.

Caldwell, McCann and Cain (n.d.) encountered two long trenches during W.P.A. excavations at the Deptford site in Chatham County, Georgia. One trench was only about 8 to 10 inches wide, but extended almost 90 feet in a curving line. The excavators think that an enclosure or palisade was probably set inside. A second trench was found, about 7 feet wide at the top, narrowing to about 4 feet near the bottom and extending some 40 feet. Although the excavators seem to think these trenches are Deptford in age, Milanich (1971, p. 207) suggested that construction could just as easily have occurred during later Wilmington period occupations at the site. The unpublished site descriptions are simply too sketchy to tell.

It seems clear that the earthworks are not at all comparable with the Refuge-Deptford sites excavated on St. Catherines Island. Deptford period burial mounds have been found occasionally in Florida and Georgia, but these sites do not seem similar either.

The Yent Complex of northwestern Florida and western central Georgia, for example, is contemporary with the Cunningham and Seaside Mounds, but the cultural associations are radically different. Sears (1963, table 1) listed the characteristics of the Yent complex as including copper pan pipes, plummets, gorgets, elaborate shell ornaments, monitor pipes, and

so forth. Obviously, the Yent Complex sites share more with the Hopewell sites of the midwest than with the simple mounds of the Georgia coast.

Gordon Willey (1949, p. 354) excavated two cremated burials in supposed Deptford context at the Carrabelle site, in Franklin County, Florida. These burials were placed within, or along the margin of, the village midden area. Caches of purposefully destroyed ceramics were found buried nearby. Willey also noted a mound near Back Bayou in Walton County, Florida. This low sand mound, excavated by Moore (1918, p. 541), was about 75 cm. high and about 8.5 meters in diameter. One badly decomposed burial was located, accompanied by a pierced stone pendant. Willey (1949, p. 221) concluded that "this little mound cannot be securely identified as to culture or sequence position, but the stone ornaments and the lack of pottery imply, in a general way, an early period." Elsewhere Willey (1949, p. 541) suggested it could be Deptford.

Also a problematical site is Evelyn Plantation, which provided the first stratigraphic evidence of the temporal position of Deptford ceramics (Waring and Holder, 1968, p. 140). The Evelyn site appears to be strictly a mortuary center, consisting of a low, rectangular platform mound and four small conical burial mounds. At least one of these small mounds is late Swift Creek, containing mica, galena, quartz crystals, and bar gorgets, along with several burials. But underlying the mounds tested is a well-defined Deptford occupation, and it may be that some of the small sand mounds were constructed during Deptford times. The site was not completely explored and the Waring and Holder publication deals primarily with the ceramic chronology, not discussing burial mound morphology in detail. Similarly, the Airport site on nearby St. Simons Island might have contained Deptford-age mortuary materials, but incomplete publication once again hampers any comparative effort. Other Deptford mounds have undoubtedly been excavated and not reported.

The most comparable site we can find to our St. Catherines mounds is the Oakland Mound, excavated by Florida State University (Morrell, 1960). Located along the Gulf Coastal Plain near Lloyd, Florida, the Oakland Mound is roughly oval, with diameters of 29 and 21 meters. The site stood almost 2½ meters above the original ground surface. Like the St. Catherines sites, the mound fill lacked layering and distinct internal structures. Two of the burials were clearly post-mound bundles, and it is uncertain whether the other two burials were interred before or after mound construction. Most of the ceramics at Oakland were Deptford, and at least three nearly whole vessels were recovered, although they were not in direct association with the burials. Assorted lithics were also found included in the mound fill. A single radiocarbon date is available from charcoal found in the primary humus (corrected age): 1150 B.C. ± 110 (Humble Oil Co., G-582). Thus the Oakland Mound is fairly similar to the Cunningham and Seaside Mounds, except that Oakland is somewhat larger, and no whole vessels or late sherds were found in the St. Catherines sites.

Obviously, little comparative data exist to use in our analysis of the Refuge-Deptford mounds on St. Catherines Island. We suspect that sites of this nature have been largely ignored because of their subtle appearance and because they lack spectacular material remains. But it seems equally likely that the unobtrusive nature of the sites has allowed many to escape the looting visited upon the better known, larger mounds. We would hope that our colleagues will ultimately excavate similar sites. But for now, we are forced to examine the St. Catherines data in virtual isolation, recognizing the sketchy nature of our suppositions and conclusions, and welcoming the confirmation or refutation which will surely come from sites yet unexcavated.

CHAPTER 7. IMPLICATIONS AND SOME SPECULATIONS

DAVID HURST THOMAS AND CLARK SPENCER LARSEN

American archaeology has undergone a revolution of sorts within the past two decades, a period of significant change which was fully anticipated by Joseph Caldwell (1959) in his timely article. In fact, it was Caldwell who defined the term "new archaeology," which has received so much usage in recent years (see Flannery, 1967; Willey and Sabloff, 1974, chapt. 6; Binford, 1977).[1]

Putting the polemics of "new" and "old" archaeology aside, a remarkable agreement remains within the contemporary archaeological community as to the ultimate objectives and goals of American archaeology: to construct cultural chronologies, to reconstruct lifeways now extinct, and to define the underlying processes which condition human behavior (see Binford, 1968; Deetz, 1970; Thomas, 1974a, 1979). Not only are these objectives relatively discrete—each often requiring different modes of fieldwork—but these objectives also tend to be hierarchical. An archaeologist investigating the prehistory of a region must first be concerned with matters of chronology. Once a working chronological sequence has been devised, he can consider the nature of the extinct lifeways which operated within that region. Only after both chronology and lifeways have been examined in detail can the modern archaeologist turn to matters of processes which, of course, generally require input from anthropological subdisciplines other than just archaeology.

These three objectives provide a useful framework in which to look at the archaeology of the Georgia coast. Waring (1968c) has reviewed the history of Georgia archaeology up to World War II, and it is clear that the major thrust by qualified archaeologists prior to 1950 was the unraveling of problems of cultural history and cultural chronology (see also Caldwell, 1952). The increased use of stratigraphic techniques of excavating and radiocarbon dating has refined the coastal sequence to the point that Caldwell, writing two decades after Waring, could note "that with another two dozen determinations we shall be able to describe cultural change during the later periods of this region in terms of 100 or even 50 year intervals" (Caldwell, 1971, p. 92). Knowledge of the coastal ceramic sequence has progressed to the point that Larson (1958) observed that no single sequence could provide fine enough control for the Georgia coast; Caldwell (1971) went so far as to suggest that a separate sequence might be necessary for each major estuary. Recent work by DePratter and others indicates that the coastal sequence has stabilized to the point that archaeologists can feel confident in moving on to other, more strictly anthropological concerns (DePratter, 1977, this paper; DePratter and Howard, 1977; see also Milanich, 1977).

As we would expect, archaeologists have been transcending chronological matters to consider the nature of past lifeways operating along the prehistoric Georgia coast. Of course, even in the days of C. C. Jones, archaeologists were concerned with such reconstruction, but the work of Moore (1897) is particularly illustrative of the pitfalls in attempting cultural reconstruction in the absence of a workable cultural chronology. The tone of such paleoanthropological reconstruction was set by Caldwell in 1958. More recent work has tended to concentrate on more specific regional reconstruction. Particularly noteworthy is the work of Stoltman (1974), Marrinan (1975), and DePratter (1976a, 1976b, 1977), on the lifeways of the early phases, that of Milanich (1971) for the Deptford period, and the research of Larson

[1]Woodbury (1954) is actually the first to use the term "new archaeology" in his review of Taylor's *A Study of Archaeology*, but Caldwell's usage is more consistent with current meaning (see also Wissler, 1917).

(1969), Pearson (1977), and others for the late prehistoric period. The archaeology of the coastal southeast is progressing to the point where regional syntheses are appearing for various aspects of the prehistoric lifeways, as for example Wing's (1977) synthesis of faunal remains discovered in several sites. We can probably expect further regional overviews as paleoanthropological data become more widely available.

Archaeology's ultimate goal is the explication of cultural processes; processual statements are, by their nature both *timeless* and *spaceless* (see Willey and Phillips, 1958; and Binford, 1962). It follows that processual studies are not regional in character. It is thus meaningless to discuss the status of processual studies in the American southeast. Processual explanations are independent of time and space, requiring that one draw data not only from the archaeological record, but also from ethnohistorical, ethnographic, and even contemporary sources. Willey and Phillips (1958, p. 5) noted that "so little work has been done in American archaeology on the explanatory level that it is difficult to find a name for it." Over the last two decades, a great deal has been said about processual archaeology, but when one comes right down to it, very little has been learned about the actual processes which condition human behavior. Studies such as the present ones can only attempt to provide particularistic data regarding the chronology and lifeway of the people who lived during Refuge and Deptford times. Processual synthesis must look far beyond the archaeological specifics to the underlying principles.

We commence our synthesis of the Refuge-Deptford mortuary complex with a discussion of the chronological implications of the early mound project. We feel fairly confident of the chronological findings because they conform to the independently derived ceramic chronology defined for the entire Georgia coast (see DePratter's discussion in Chapter 5). These cultural associations are bolstered by a total of 29 radiocarbon dates which have been processed from the Refuge-Deptford mounds on St. Catherines Island. The exact sequence of mound construction is rather more complex than we had initially suspected, but we have confidence in the combination of ceramic and radiocarbon estimates of age. Each mound witnessed a complex series of surprisingly periodic events; in fact, these events seem to be undecipherable for any one single site. It is only through the simultaneous analysis of the entire series of nine mounds that a firm sequence of construction emerges.

This chapter also introduces results from a very new method of dating, which provides a microchronology for archaeological sites. The results of Clark's studies on seasonal growth patterns in clam shells *(Mercenaria mercenaria)* are presented in full in the Appendix. In this section, we consider what these seasonal dates can tell us about the Refuge-Deptford mortuary complex.

The chronological findings are considerably more satisfying than are those results we group under the rubric of *lifeway*. The tone of this discussion is considerably more cautious, and the nature of the evidence is decidedly more circumstantial.

Part of this caution is due, of course, to the scanty nature of the comparative evidence, and also because we think that the St. Catherines data should not be extended too far beyond the margins of the Island itself. But more important than these factors is the character of the actual sites involved.

The depositional contexts at the Refuge-Deptford mounds are a complicated blend of sacred and secular activities. It seems that the bulk of the artifacts and sherds present was initially discarded at a nearby Refuge period habitation site in the form of *primary refuse* (Schiffer, 1976, p. 30). It also seems likely, particularly in the case of the abraders, that some of the artifacts were *de facto refuse*, still usable items which were discarded on abandonment (see Schiffer, 1976, p. 33). Then, through what Schiffer would term an *A-S process*, the secular refuse deposits were themselves reworked as the mound was built. Thus the archaeological contexts in which we found the artifacts refer to a sacred activity, the nature of most of the artifacts bespeak of a previous subsistence and technological function. In this sense, each mound is really two sites, one a

reworking of the other, and a good deal of information is available about both religious and profane activities. We believe we are obliged to explore some of these possibilities.

Our speculations might offend the sensibilities of some of our more empirically minded colleagues. By way of defense, we point out that speculation has always played a vital role in the scientific enterprise, as long as (1) the speculations are clearly labeled and (2) they do not take the place of hard-nosed hypothesis testing. Hypotheses can be derived, of course, from anywhere, and science provides no canons governing the genesis of good ideas (see, e.g., Kemeny, 1959, pp. 93-96; Hempel, 1966, pp. 14-16; Salmon, 1967, pp. 109-110). In each case, we speculate in order to provide suggestions for further research and all such speculation ultimately requires rigid scrutiny in the unflattering light of new, independent evidence. We also think that the paucity of relevant comparative data requires that we make the most of the evidence at hand. It is our position that as long as we are punctilious about presenting our "facts" (as was attempted in Chapters 3 and 4), we are compelled also to provide the reader with our hunches about what these stratigraphic, radiometric, ceramic, artifactual, and biological facts might mean in sociocultural terms. The pages that follow provide these interpretations and speculations based on our excavations of the Refuge-Deptford mounds of St. Catherines Island.

MICROCHRONOLOGY: SEASONAL DATING OF MOLLUSKS

Within the past decade, archaeologists have increasingly turned to analysis of settlement and subsistence patterns. A major difficulty in such studies is establishing *contemporaneity*, that is, charting sites which were occupied simultaneously. A variety of methods has been employed to determine the season of occupation including the presence of diagnostic plant macrofossils, fossil pollen, animal remains, and even the parts of insect larvae.

One of the most promising developments has been the use of bivalve growth patterns to determine the season of occupation at archaeological sites. The principle is simple: because bivalves add daily growth rings, one can determine when the animal was killed (harvested) by examining the terminal growth bands. Weide (1969), for instance, has studied growth rings of the Pismo clam to date an archaeological site in southern California, and Coutts has used the same principle on sites in New Zealand (Coutts, 1970, 1975; Coutts and Higham, 1971). With the exception of a preliminary study by Pearson (in press), little attention has been paid to such seasonal dating of mollusks along the coast of the southeastern United States.

In conjunction with the archaeological excavations described in Chapters 2 and 3, we collected a series of modern mollusks to determine the feasibility of seasonal dating on St. Catherines Island. George R. Clark II has conducted a study of the growth patterns of the quahog clam *(Mercenaria mercenaria)* and his preliminary results are reported in the Appendix.

Both archaeological and modern clam shells from St. Catherines show marked periodicity in growth. When growth is rapid, the clams add daily rings. But when they slow down and become inactive, the shells add only translucent, crossed-lamellar zones of stress. These stress zones are visible in the archaeological specimens and can provide information about the season in which the clams were harvested (and hence clues about prehistoric seasonality).

Extreme caution is in order here because the periods of optimal growth in clams vary significantly by region. Clams north of Virginia experience accelerated growth during the *summer*, but clams living between North Carolina and Florida grow most rapidly during the *winter*. This means that along the Atlantic coast, some *Mercenaria mercenaria* add summer stress lines, whereas others add winter stress lines.

Clark's study has been concerned primarily with establishing the precise seasonal growth characteristics for clams in the St. Catherines area. Although the research is still in progress, Clark has documented growth patterns for modern specimens collected over a two-year period. With this tentative growth framework established, Clark has examined several archaeological specimens from sites on St. Catherines

Island. Although this technique will prove most useful for seasonal dating of shell middens, some preliminary findings are available for the early burial mounds considered in this report.

Several shells were examined and, although most shells in the Central Tomb at McLeod Mound were oyster, we were able to find five clams sufficiently whole for Clark to section and examine. Assuming that the growth structure approximates the modern regimen, the McLeod clams must have been harvested in mid-winter, probably December or January. Whether or not the clams were freshly harvested for the burial ritual or taken from already existing middens remains to be seen. Moreover, the growth characteristics of the McLeod clams indicate that all specimens had very poor growth during the previous winter. This evidence suggests that the clams were harvested in the same year, and perhaps all at once. Two radiocarbon dates on the associated oyster shells place this time roughly at 450 B.C.

Several shells were also analyzed from Seaside Mound I. Clams were unavailable from most of the shell-filled pits, but several specimens were found in Feature 15. Once again, the growth patterns indicate a harvest date of December or January. Feature 15 is a midden deposit which occurs along the southern edge of the burial mound, and probably post-dates the major ceremonial activity.

Clark's thin-section studies are only in a preliminary stage, but we think these initial results justify the effort expended, and we look for more precise seasonal estimates as further archaeological samples are examined.

MACROCHRONOLOGY: RADIOCARBON DATING

Discussion of the radiocarbon dates has been postponed so that we can consider the problems and anomalies for all mounds simultaneously. Radiocarbon dating of any single event in mound-building is subject to errors from diverse sources: contamination from roots or stratigraphic mixture, previous burning on the site, laboratory error, and the statistical error inherent in the radiocarbon method itself. But when we examine all nine mounds together, a remarkably stable and consistent chronology emerges.

A total of 29 radiocarbon dates is available for the early mounds on St. Catherines Island. These dates are listed in table 4, and they are graphically arrayed on figure 75. Nearly one-quarter of the radiocarbon dates is derived from oyster shell, and certain problems can arise in the radiocarbon dating of shell. For one thing, shells tend to pick up varying and unknown amounts of dead carbonate from limestone; but the exchange problem mainly concerns terrestrial species rather than the marine shells considered here (see Rafter, 1955; Rubin, Likins and Berry, 1963; Ralph, 1971, pp. 6-7 and Michaels, 1973, pp. 161-162). Aware of the difficulties in shell dating, Caldwell and his associates conducted some limited experiments by matching charcoal and shell dates on St. Catherines Island. In addition, modern oyster shells from adjacent Sapelo Island were compared to the University of Michigan wood standard. These results indicated to Caldwell (1971) that oyster shell dates from the Georgia coast are not significantly different from determinations made on charred wood.

The physics aside, shell dates are also tricky because the actual provenience of the shell is itself a variable. Consider the case of the Central Tomb at McLeod Mound. The five burials were covered with a thick lens of mixed oyster and clam shells. Two samples of these oysters dated to 420 B.C. and 470 B.C. We also know from the thin-section studies discussed in the Appendix that the clams were gathered in mid-winter of the same year. But McLeod Mound is at present 1 km. from the nearest source of clam and oyster shells, so all shells incorporated in the mound must have been transported at least that far. If the shells were collected specifically as part of the mortuary ritual, then the radiocarbon and seasonal estimates accurately date the construction of the Central Tomb. But if the shells were simply transported from a convenient shell midden—as were the shells used for antebellum tabby—then the shell dates refer only to that midden, and not McLeod Mound at all. When shells are reused in this fashion, radiocarbon dates tell us only that the feature must have been constructed

sometime after the mollusks were killed, in this case, after about 450 B.C. How long after remains a problem.

Such problems almost always arise when one attempts to date single events because so many skewing factors can be involved. Why, for instance, do we have two different dates for shell from Feature I at Seaside II? Or why does the stump in Feature 3 have dates almost 100 years apart? Or why does the primary humus at Cunningham D have dates separated by 500 years? These are intriguing problems, but almost impossible to resolve based on only a smattering of dates from a limited set of cultural (or natural) features. In fact, the radiocarbon dates for any single mound seem to be conflicting and even contradictory when considered in isolation. Figure 75 indicates, for instance, 1700-year, 1500-year, and 1900-year discrepancies for McLeod, Cunningham D, and A, respectively. Taken by itself, each mound presents a confusing amalgam of radiocarbon dates.

Due to the reasons stated above, we emphasize the importance of the *overall patterning* of the radiocarbon dates. In fact, when one examines 29 dates from nine sites, it is surprising that any patterning emerges at all. But patterning is indeed present. Note that six distinct temporal clusters emerge on figure 75.[2] These clusters have been tested for internal statistical consistency, at the 0.05 level of probability (following procedures outlined in Thomas, 1976, pp. 249-250). That is, the dates in each cluster are statistically indistinguishable, and they presumably refer to the same temporal event. In addition, the clusters are all statistically distinct from one another, once again at the 0.05 level. It is truly surprising how the 29 independently determined radiocarbon dates align themselves into such tight temporal clusters. Under a null hypothesis of no association, one would expect such a suite of dates to distribute themselves randomly throughout the time-span of the sites. But in this case, the unexpected has occurred: six mean dates account for more than 90 percent of the available radiocarbon dates. The individual dates within any cluster are statistically identical—that is, they seem to estimate a single parametric age—and the clusters are distinct from one another. This is an unusual situation in radiocarbon dating.

1700 B.C. CLUSTER: The earliest cluster consists of two charcoal dates: one from the primary humus at McLeod Mound and one from the central pit at Cunningham Mound A. It is conceivable that the charcoal chunks in the primary humus at McLeod could be the result of a natural fire, perhaps started by lightning; but the Cunningham A date comes from charcoal contained in the Central Tomb. There can be no doubt that this feature at Cunningham Mound A results from a cultural event. Because the McLeod and Cunningham A dates are statistically indistinguishable, we think the most likely explanation is that the dates reflect early ceremonial (or at least cultural) activity at the two neighboring localities.

1300 B.C. CLUSTER: This cluster also consists of two charcoal dates from the primary humus, one from Cunningham C and the other from Cunningham A. These two dates are statistically identical, yet distinct from the earlier cluster and the later isolated date. The forest fire hypothesis is once again a possibility.

ISOLATED DATE: A single date of 1020-1050 B.C. was determined from charcoal in the primary humus at Cunningham Mound D. Assuming the validity of the clusters, this date could be in error, or perhaps represents an isolated activity at this time.

800 B.C. CLUSTER: Three dates cluster about 800 B.C.: a charcoal determination from the primary humus at McLeod, a charcoal date from Feature 1 at Cunningham B, and a shell date from Feature 1 at Seaside II. Once again, these dates are statistically indistinguishable, and they are distinct from all other earlier and later dates. While the two charcoal dates could possibly originate from a natural fire, the shell concentration at Seaside II clearly denotes a cultural activity. These shells could have been gathered, consumed, and discarded then reused in the mound construction; or the shells could have been collected specifically for the mound-

[2]The only known exception to this generalization is burial 8 at Seaside II, which appears to be an Irene phase intrusion, and is radiocarbon dated to A.D. 1420.

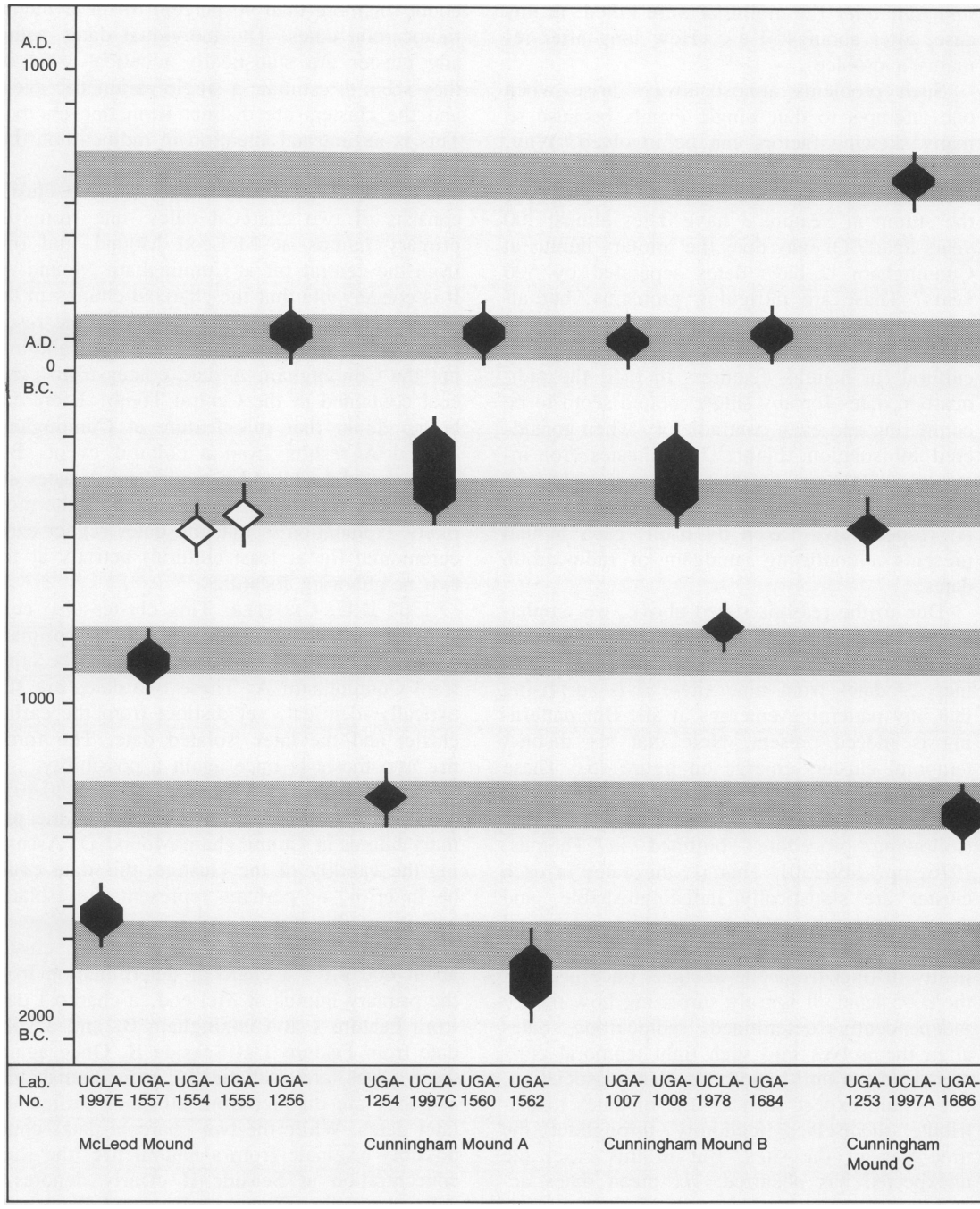
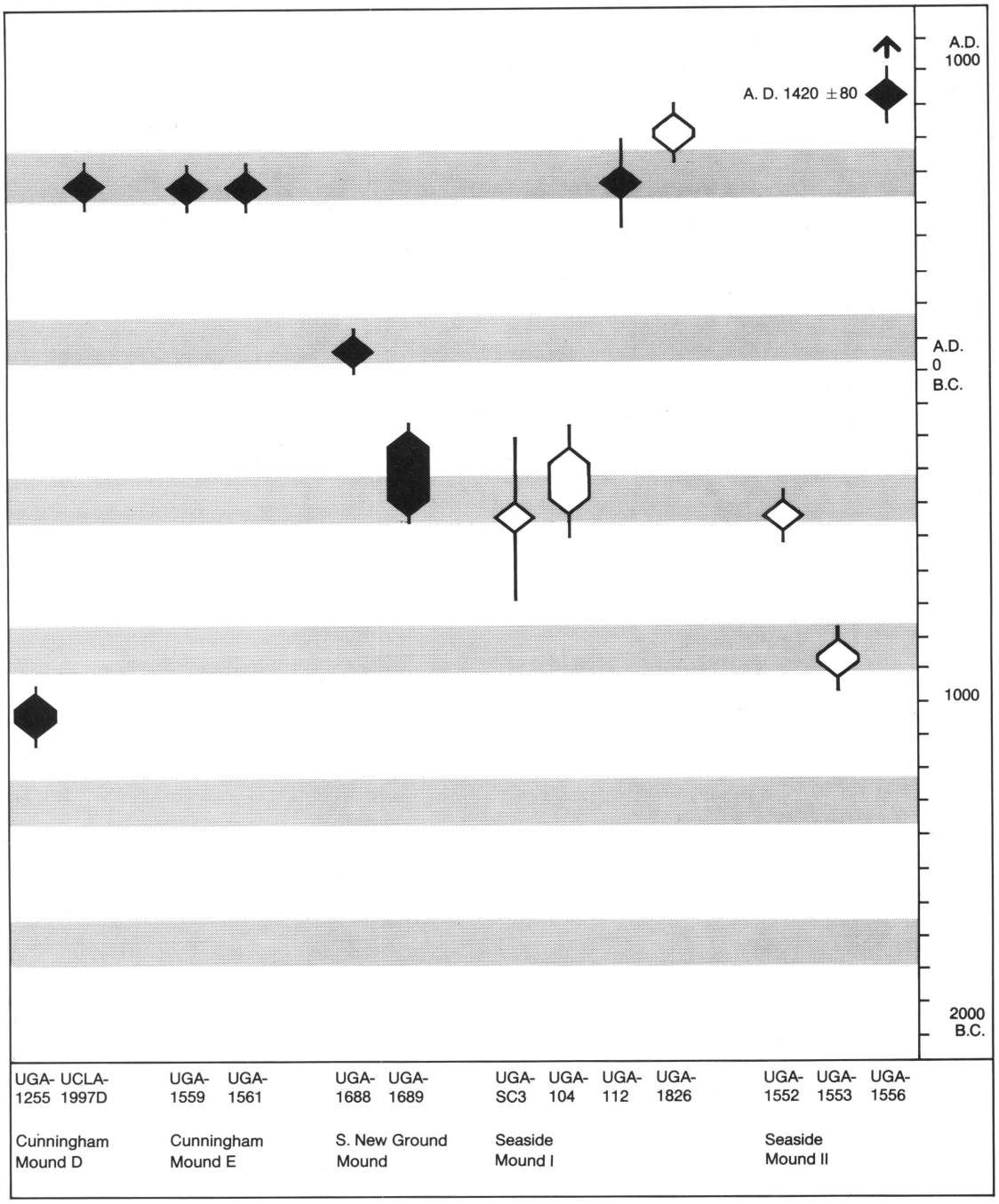


FIG. 75. Chart illustrating the clustering of the 29 radiocarbon dates available for the Refuge-Deptford mounds on St. Catherines Island. The shaded bars indicate the midpoint of each statistically significant cluster of dates. Each symbol touching one of the shaded bars is a member of that cluster. Only two dates (UGA-1255



and UGA-1556) fail to fall into one of the six clusters. The black symbols represent determinations on charcoal and the white symbols denote dates processed on oyster shell. The vertical bars connected to each symbol represent ± 1 sigma.

building episode. Whatever the situation, it seems clear that the cultural activity occurred at diverse places on St. Catherines Island about 800 B.C.

400 B.C. CLUSTER: Nine dates cluster about 400 B.C. (see fig. 75). In fact, every mound discussed here produced a 400 B.C. date except Cunningham Mounds D and E. Charcoal dates of this age are available from Cunningham Mounds A, B, C, and South New Ground. Contemporary shell dates arise from the Central Tomb at McLeod (two dates), Feature 2 at Seaside I, and Feature 1 at Seaside II. Once again, whereas a natural fire could conceivably explain the charcoal dates, the shell determinations would seem to disprove this possibility.

A.D. 140 CLUSTER: Five charcoal determinations define a mean date of A.D. 140: charcoal from the McLeod fill, two dates from the primary humus at Cunningham B, a primary humus date from Cunningham A, and a primary humus date from South New Ground. All four mounds are, of course, situated along the western periphery of the Cunningham Mound group.

A.D. 550 CLUSTER: This cluster consists of five charcoal and one shell date, four of which are from the eastern mound in the Cunningham Mound group (that is, Cunningham Mounds C, D, and E). At Seaside I, a log from intrusive Feature 3 and shell from the midden-like Feature 15 produced dates in this cluster.

ISOLATED DATE: A single isolated date of A.D. 1420 is associated with intrusive burial 8 at Seaside II.

Widespread contemporaneity such as this between so many sites is unusual, and demands explanation. One obvious suggestion would be that contemporary dates are due to forest fires, perhaps started by lightning. Certainly a forest fire could produce the widespread deposits of charcoal, and if this charcoal were dated by the radiocarbon method, the dates would cluster in the manner shown in figure 75. We know that such fires have occurred frequently throughout historic times, and lightning fires remain a recurring problem in the management of contemporary St. Catherines Island.

One difficulty with the forest fire hypothesis is that two of the clusters (800 B.C. and 400 B.C.) contain dates processed on shell removed from archaeological features. Placing oyster shells in a mortuary complex is an indisputably cultural event, wholly independent of a natural event like a forest fire. In addition, the 1700 B.C. and A.D. 550 clusters contain radiocarbon determinations processed on charcoal removed from definite mortuary features, such as the intrusive log tomb at Seaside I and the deep central pit at Cunningham A. Features such as these are unquestionably cultural in origin and hence the resulting radiocarbon determinations are independent of any widespread fire.

In fact, only a single cluster, that with mean A.D. 140, consists strictly of dates on isolated charcoal contained in the primary humus. All four sites in this cluster occur along the western periphery of the Cunningham Mound group, and could, in this case, result from a localized forest fire.

Thus, while the forest fire hypothesis cannot be completely rejected, this explanation leaves many questions unanswered, and fails to account for the entire body of chronometric data available for the early St. Catherines mortuary complex. We think a more satisfying explanation invokes the cultural factors responsible for these sites.

When were the mounds built? The most reasonable cultural explanation for the discrete clustering of radiocarbon dates is that the nine sites were used at periodic intervals, and that this activity involved burning the site each time. It would also appear that actual mound construction occurred rather late in the sequence of each site.

At McLeod Mound, for instance, the earliest burning detected on the site occurred about 1600 B.C., followed by a second burn about 850 B.C. Both of these radiocarbon determinations are from scattered chunks of charcoal found within the primary humus, so this burning must predate actual mound construction. Then the Central Tomb was constructed as a mass grave. The associated oyster and clam shells date to about 450 B.C. Whether the shells were collected specifically for this purpose or appropriated from a convenient midden remains uncertain. But it is clear that the Central Tomb must have been constructed prior to the building of the mound. Therefore, the mound structure at McLeod could not be older than 450

B.C., even though the first (probably ceremonial) activity occurred at this site over a millennium previously.

McLeod produced a later date of A.D. 125 from charcoal contained within the mound fill. Although this charcoal could possibly have resulted from yet another burning of primary humus followed by mound building which incorporated the charcoal as an inclusion, it seems more likely that the charcoal was associated with a burial placed as an intrusion into the already existing mound. If this is so, then the actual construction of McLeod Mound probably occurred after 450 B.C. but prior to A.D. 125. No later dates exist for McLeod Mound.

Similar sequences appear for the other mounds. Cunningham A began with the excavation of a large central pit, charcoal from which was dated to about 1800 B.C. (and correlates with burning at McLeod). The site may have been reburnt at 1270 B.C. and again at about 300 B.C. The latest date for Cunningham A is about A.D. 125, precisely the final date at McLeod. This sequence is mirrored at nearby Cunningham B: first burning about 756 B.C., second burning about 300 B.C. and final burning at A.D. 125. South New Ground Mound is almost identical: an early burning at about 300 B.C. and a final burning at about A.D. 70 (which is identical with the McLeod, and Cunningham A and B). Note also that these four sites are the westernmost mounds in the Cunningham Mound group. On the basis of these correlations, we think that all four of these mounds were probably constructed at the time of the final burning, about A.D. 125. (The independent implications from the cultural associations are considered in the next section.)

A second sequence occurs at the eastern mounds in the Cunningham group. Both Cunningham C and D began with early burning of the primary humus (1300 B.C. and 1000 B.C., respectively). Cunningham C was reburnt at about 480 B.C. (which correlates to activities at all four of the western mounds). Ceremonial activity at Cunningham Mounds C, D, and E also occurred about A.D. 570, when the primary humus was burnt for the final time. It seems clear that these three eastern mounds could not have been built prior to this time because the primary humus would have been covered with mound fill, so A.D. 570 seems a good estimate for the construction of Cunningham Mounds C, D, and E.

The Seaside Mounds also correlate with this reconstruction. Seaside I contains a shell-filled pit which dated to about 850 B.C.; obviously shells were gathered somewhere near the Seaside tract at about the time McLeod Mound was burnt. Both Seaside I and II contain shell features dated to about 400 B.C. and these shell dates correlate to burning at all four of the western Cunningham Mounds. We thus know that neither Seaside Mound could have been constructed prior to 400 B.C. Similarly, logs from an intrusive burial in Seaside I dated to A.D. 570, precisely the same date as the final burning at Cunningham C, D, and E. This intrusive burial corresponds to the date for the Feature 15 shell midden (and probably several other middens in the Seaside area).

We admit that this reconstruction is tenuous, but we are still struck by the overall pattern of periodicity which emerges for the nine mounds. Various sites were visited during the first two millennia B.C. We do not know what activities went on, but at least we can date charcoal of several small shell features from that time. At Cunningham A, a deep pit was excavated, burnt, and perhaps some burials were placed within. This activity stopped in the western part of the Cunningham Mound group about A.D. 125, and probably continued until about A.D. 570 at the other five sites. We suggest that this terminal activity also represents the actual mound building at all sites. Then, somewhat later, intrusive burials are added in Cunningham C and D, McLeod, and both Seaside Mounds. To our knowledge, only one of the intrusive burials date later (burial 8 at Seaside II) than about A.D. 600. This reconstruction is based strictly on the radiometric evidence; as we will see, our conclusions are strengthened by a consideration of the cultural materials associated with the mounds.

COMPARISON OF RADIOCARBON AND CERAMIC EVIDENCE

It is instructive to compare the radiocarbon dates discussed above with the ceramic chro-

nology presented earlier by DePratter (see Chapter 5). DePratter estimated the age of occupation at each site based on the relative ceramic frequencies. Although the sherd samples were too small for effective seriation, it was possible to assign appropriate ceramic phases to each site. When these phase estimations are compared with the 29 radiocarbon estimates (table 4), we find outstanding agreement (once the dates on figure 62 are corrected for the bristlecone factor). In general, almost all the radiocarbon dates fall within the St. Simons-Refuge-Deptford periods. The only exceptions are two dates from the Seaside Group, and these determinations can readily be explained because they are associated with intrusive burials.

The correlation between radiocarbon and ceramic chronology even holds up moderately well at specific sites. At Cunningham C, for instance, the ceramics suggested an early St. Simons occupation, followed by Refuge II and Deptford I components, and finally a later intrusive Wilmington component. One of the Cunningham C dates is about 1300 B.C. (late St. Simons), one date is 480 B.C. (early Deptford I), and the final date, A.D. 590-570, falls in the Wilmington phase. Similarly, the radiocarbon dates from McLeod generally bracket the Refuge III phase with the exception of a single St. Simons period date, as expected on the basis of ceramic frequencies. A reasonable correlation also occurs at Cunningham A, B, and D, and at Seaside I.

In short, the close correspondence between ceramic and radiocarbon evidence leaves little doubt that the major occupations at these sites occurred during Refuge-Deptford times, although earlier and later occupations can be documented at specific sites.

SUBSISTENCE AND TECHNOLOGY

Relatively little is known about the subsistence and settlement patterns of the Refuge period. Writing in 1960, Antonio Waring speculated that the Refuge complex did not extend farther south than Savannah (Waring, 1968e, pp. 207-208). More recent research has shown a widespread distribution of Refuge sites (see DePratter, 1976a), but the character of Refuge occupations seems such that they are easily overlooked. For one thing, most Refuge sites seem to lack shell midden or other evidence of long-term occupation (e.g., Zurel, Gresham and Hally, 1975; DePratter, 1976a, 1977). In addition, several St. Simons and Refuge components have been found below mean high tide, such as the Bilbo site (Waring, 1968a, p. 157), a large crescentic midden at Cannon's Point on St. Simons Island (Marrinan, 1975, 1976), and sites on Little Tybee Island (DePratter, 1977).

DePratter has suggested that these sites indicate a significant change in sea level and a correlative shift in St. Simons-Refuge-Deptford period subsistence patterns. DePratter suggests that sea levels during the St. Simons phase (about 2300 B.C.) were approximately 1.5 to 2 meters below the present mean level (DePratter, 1977). Sites from this period are relatively common and all contain abundant shell midden deposits, indicating that the St. Simons people relied at least in part on mollusks and fish from the marsh and lagoon areas. By 1100 B.C., sea levels had begun to drop and by about 800-700 B.C., seas had reached a point at least 3 or 4 meters below the present mean level. Thus while the very early Refuge subsistence was probably similar to the tidal marsh exploitation common in St. Simons times, the shellfish resources had so declined by 1000 B.C. and were no longer important in the Refuge subsistence pattern. Sea levels then rose by about 600 B.C. and reached the modern level about 400 B.C. This explanation, if correct, would explain why Refuge sites are conspicuously lacking in shell, whereas both earlier St. Simons and later Deptford sites occur as well-developed shell middens.

Mortuary sites generally offer little information relevant to subsistence studies, but the St. Catherines data are indeed suggestive and lend some support for DePratter's hypothesis regarding ecological changes during Refuge times. Although the fill at the Cunningham and Seaside sites contained hundreds of Refuge period potsherds, the only shell which appeared in these mounds occurred as deliberate features (such as the central pit at McLeod and the shell-filled pits at Seaside I and II). If we are

correct in our inference that the mound fill contained the reworked remnants of a previous Refuge occupation, then we are justified in concluding that these Refuge period sites on St. Catherines Island were not shell middens. Before they were disturbed, the Refuge period sites on the interior of the Island probably resembled the shell-less sites noted elsewhere on the Georgia coast.

But shell was not absent during Refuge times. Our earliest shell date on St. Catherines Island is from Feature 1 at Seaside I, the oyster shells dating to about 950 B.C. According to DePratter's reconstruction, sea levels at this time were considerably lower, and this was a time of depauperate shellfish resources. However, the Seaside I evidence indicates that shellfish were not completely absent. Somewhat later, shells were used to construct the Central Tomb at McLeod, and we know that these clams were gathered in December or January of about 450 B.C., during a time of apparently rising sea level and increasing shellfish. By about 400 B.C., shell had also been collected for use in three different features in the Seaside mounds. While this evidence is obviously circumstantial, the St. Catherines burial mounds seem to support DePratter's suggestions regarding the nature of Refuge subsistence. It is also clear that Refuge age sites will be difficult to locate, since most archaeological survey techniques along the Georgia coast rely almost exclusively on finding shell contained within archaeological sites. Because Refuge sites appear to lack shell, their archaeological visibility is greatly diminished.

Another distinguishing characteristic of the Refuge period is the presence of abraders made from discarded potsherds. Waring first noted the presence of abraded sherds at the Refuge site (Waring, 1968e, p. 207), and these curious artifacts have been found at archaeological sites throughout the Georgia coastal plain (see DePratter, 1976a). In fact, abraders seem to be diagnostic of the Refuge period. A large collection of abraded sherds is available from the fill of the Refuge-Deptford mounds on St. Catherines Island, comprising roughly one-third of the total sherd count.

The barrier islands lack local sources for stone, and sherd abraders are an obvious technological adaptation to such an environment. But the lack of suitable raw materials is a constant throughout the prehistory of Georgia, and we must ask why only the people of Refuge times made use of sherd abraders. Were they abrading something unique to Refuge times, or did the earlier and later people find some functional equivalent to ceramic abraders? Perhaps more effective trade networks during non-Refuge times provided more ready access to non-local stone. Whatever the ultimate resolution, we are left with the sherd abrader as a Refuge period phenomenon.

Another obvious question is: What were they abrading? Once again, we have no ready answer. But the sample of 150 sherd abraders from four of the St. Catherines burial mounds allows for a certain degree of speculation. Five kinds of wear were observed on the abraded sherds (see discussion under section on McLeod Mound), and the frequency of each kind of wear at selected sites is shown on figure 76.

Faceted abrasion (Type II) implies that the material abraded was relatively hard and resistant. Only 8.5 percent of the McLeod abraders and 5 percent of those at Seaside I show abrasion of this kind. Wear such as this would probably result from working wood, flat pieces of bone (such as scapulae or pelves) or perhaps even very soft stone. The low frequency of this wear patterning suggests that polishing hard objects occurred infrequently at the Refuge sites adjacent to McLeod and Seaside I.

Also infrequent is the occurrence of small drilled holes (characterized as Type V wear), although examples occur at Seaside I and II. We have no information as to how this wear was formed. It seems to be the by-product of some manufacturing process because the wear is unintentional, and certainly not the beginning of a perforation.

Grooved sherds were relatively frequent at McLeod (28 percent), but less common at Seaside I. This Type IV wear probably resulted from fine honing, although the wear is considerably more subtle than that commonly noted on the "sherd hones" of later sites. These abraders were probably held stationary, then

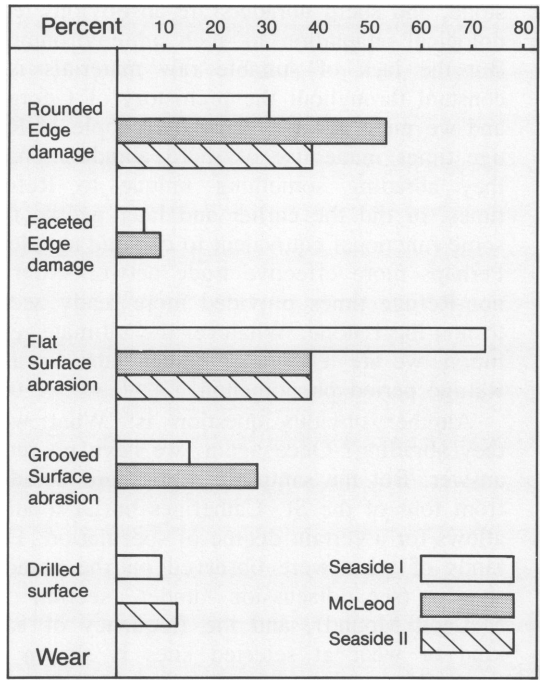


FIG. 76. Frequency and nature of abrasion on sherds from selected Refuge-Deptford sites on St. Catherines Island.

used as an abrasive surface against which bone or wooden objects were honed.

The most common wear pattern was edge rounding (Type I) and flat surface abrasion (Type III). Wear of this type must have occurred during the abrasion of some fairly soft medium, such as plant fiber, or more likely, animal skins. Edge rounding would occur when the sherd was held perpendicular to the surface being smoothed, and flat surface abrasion would result from holding the sherd flat in the palm of the hand. These two kinds of wear account for the majority of the abraders found at all sites.

Although we have surely not resolved the question of what medium was abraded at the Refuge-Deptford sites, our data do suggest a couple of hypotheses. First of all, abraders are probably examples of *manufacturing tools*, artifacts used for making other artifacts. The nature of the wear indicates that most abraders were used for working a soft, flexible medium, and we think the most logical candidate would be deerskin. Although further work is once again called for, we think it likely that the sites containing large numbers of abraders (particularly McLeod and Seaside I) had been the scene of extensive artifact manufacture, probably hide preparation. Several flakes were also found at these sites, suggesting perhaps manufacture or repair of stone tools. A brown chert side-scraper was also found in the McLeod fill.

Some hypotheses regarding subsistence behavior can also be derived from a consideration of the burial patterns which were practiced by the Refuge-Deptford mounds. Of those burials which could be assigned a burial posture, over half were in a supine, extended position and roughly one-third were buried as unarticulated bundles; three cremations and a single flexed burial were also encountered (see table 31). There can be little doubt that the extended and flexed individuals were buried shortly after death because decomposition and disarticulation of the bones would have probably occurred within a matter of weeks (see Ubelaker, 1974, p. 66). These individuals probably died on or near St. Catherines Island and were buried shortly thereafter.

But the individuals buried as bundles present more of an interpretive problem. Some ethnographic groups such as the Choctaw are known to have practiced "bone cleaning" of the deceased (Romans, 1775, p. 88). Bundle burials also result from the use of mortuary or charnel houses. One such mortuary house, for instance, was used during the Irene period at the Irene site (Caldwell and McCann, 1941, pp. 25-30). Abundant ethnographic accounts also exist for the use of temporary burial areas among southeastern tribes such as the Natchez (see Swanton, 1911, pp. 143-157), those from the northeast such as the Huron (e.g., Kidd, 1953, pp. 372-375) and the Iroquois (e.g., Fenton and Kurath, 1951), as well as several groups from the Mid-Atlantic area (see Ubelaker, 1974, pp. 10-11 for a summary).

However, we doubt that the Refuge-Deptford people of the Sea Islands used such mortuary houses. Of course none have been found, but so little work has been done on sites of this period that negative evidence is fatuous. We

think that the charnel house was an innovation which accompanied the more elaborate mound complexes of the midwestern Woodland and southeastern Mississippian sites. Baldly stated, we think that such elaborations are beyond the simple Refuge-Deptford complex discussed here.

Why, then, are bundle burials so prevalent? We think one clue might lie in the seasonality and periodicity of Refuge-Deptford settlements. Unfortunately, little is known about the sedentism and seasonality of Refuge-Deptford times (see, for example, the discussion in Caldwell, 1958, pp. 13-15; Milanich, 1971, pp. 111-115; Stoltman, 1974, pp. 230-236; Marrinan, 1975, pp. 96-102; DePratter, 1976a). It is not unreasonable, however, to assume that the coastal people of Refuge-Deptford times practiced an ecological adaptation based on seasonal exploitation of selected resources. Camps were probably moved at least two or three times annually (perhaps more) and special-function satellite sites were probably periodically inhabited subgroups graded on the basis of sex and age. Of course, little proof exists for this reconstruction, but on-going settlement pattern surveys on St. Catherines Island and elsewhere will doubtless clarify the picture within the next few years.

Despite paucity of information, the above reconstruction seems plausible. If so, then we are led to ask whether this seasonal round was based strictly on St. Catherines Island, or whether the mainland resources were also included. Milanich (1971, pp. 194) has suggested that the people of the Coastal Tradition (Deptford and pre-Deptford) employed a transhumant settlement pattern, moving inland during the fall to harvest nuts and berries and presumably spending much of the rest of the time exploiting marsh and maritime resources. We think that while the specifics will undoubtedly be revised on the basis of further excavations, Milanich is probably correct in suggesting a transhumant lifeway involving both Sea Island and mainland resources.

This hypothesized seasonal round has relevance to the mortuary patterns noted on St. Catherines Island for Refuge-Deptford times. We think it possible that individuals who died during the mainland portion of the seasonal round were saved for ultimate burial in the mounds of St. Catherines Island. Such a pattern would explain not only the frequency of bundle burials at these sites, but also the strange mixture of burials noted in the Central Tomb at McLeod. Remember that the tomb contained the remains of five females. Two seem to have died almost immediately prior to burial, but the others had obviously died weeks, or months, previously. We are suggesting the possibility that the individuals buried as bundles perhaps died on the mainland, and were then transported for burial on St. Catherines; the articulated individuals might well have died shortly before the mound itself was constructed. Hypotheses of this nature can only be tested by rigid archaeological technique examining both habitation and ceremonial sites, and employing sensitive indicators of seasonality, such as those discussed by Clark (this volume).

SOCIOPOLITICAL IMPLICATIONS

The burial mound excavations on St. Catherines Island were also conducted to answer questions regarding prehistoric sociopolitical organization. Milanich (1971) has considered the problem of Deptford and pre-Deptford social organization in detail, concluding that: "The prevalent Deptford Phase social unit was the band, composed of related nuclear families . . . Probably the Deptford Phase bands were patrilocal, typified by reciprocal band exogamy and virilocal marital residence pattern . . . Perhaps band moieties existed to facilitate exogamy" (Milanich, 1971, pp. 203-204). This ambitious reconstruction is based primarily on inference from previous sociocultural studies on band level societies by Steward (1955) and Service (1962). Milanich first postulated that these were a non-sedentary, hunter-gatherer people who followed a pattern of transhumance. Social anthropologists tell us that, all else being equal, people existing at this level of adaptive complexity should have a *band level* of sociocultural integration (Steward, 1955). According to Service's later (1971) analysis, the band level is regulated primarily by interrelations between related nuclear families. The

economy tends to be organized by, and takes place within, these band structures and the society lacks specialized economic or productive groups such as guilds. Also lacking are specialized occupational groups, economic institutions such as markets, and special consuming groups (or classes). By this commonly accepted interpretation, the band becomes the sole economic, political, and religious institution.

The ethnohistory of the Georgia coast sheds some light on the issue. Until recently, ethnohistorians have concluded that the coastal environment was seriously limited, and these poor land resources tended to constrain the horticultural potential to such a degree that the sixteenth-century Guale could survive only through a seasonally mobile annual round (see especially Larson, 1969). Larson contended that when compared with the well-developed contemporary Mississippian cultures, the Guale lacked cultural and social development at the chiefdom level.

In a recent paper, Grant Jones has challenged this interpretation of Guale sociopolitical organization (Thomas, Jones, Durham and Larsen, 1978, Chapter 3). Jones suggested that previous investigators have relied too heavily on the Jesuit view of the sixteenth-century Guale and that the sociocultural complexity along the Georgia coast has been seriously underestimated for late prehistoric and ethnohistoric times. Specifically, Jones's reconstruction of Guale social organization was as follows:

> Guale horticulture, I suggest, was sufficiently productive, in combination with other subsistence and productive activities, to account for the presence of permanent towns, a chiefdom level of social organization, temporary federations, chiefdoms under centralized leadership and long distance trade networks. The chiefdoms were characterized by dual features of political organization and an emphasis on matrilineal succession.

Jones's reconstruction provides vivid contrast to the traditional view of the Guale as loosely organized, shifting horticulturalists, and also raises serious questions about interpretations of the prehistoric record as well.

If we can no longer tacitly assume that the Guale were a dispersed, seasonally mobile population with a sub-chiefdom level of political organization, then we are surely not entitled to make such an assumption for the societies of Refuge-Deptford times, for which there is considerably less information available.

A problem also arises with equating band level organization to hunter-gatherer economics. The assumption of a hunter-gatherer economy for the Deptford and immediately pre-Deptford peoples seems a relatively safe proposition, and has been bolstered slightly by evidence presented in this paper under Subsistence and Technology. But Service (1971, p. 47) cautioned that not all wild-food foragers exist at the band level. A classic exception is the case of the northwest American coast where the environment is reputedly so munificent that these peoples lived in complex communities at the chiefdom level (see, e.g., Codere, 1950; Suttles, 1962; Drucker and Heizer, 1967). The band level is similarly transcended by a number of societies in aboriginal California, even though their economy lacked native agriculture (see e.g., Kroeber, 1939, p. 211; Heizer, 1958, p. 25; Bean and Lawton, 1976).

Could the Georgia coast also provide such a "munificent" environment as to allow non-agricultural societies to transcend the band level of sociocultural complexity? We think that the subject of prehistoric (and also ethnohistoric) social organization is a matter for considerable research, and the 1974-1977 excavations on St. Catherines provide some clues on the subject.

Peebles and Kus (1977, pp. 431) have considered the archaeological correlates of chiefdoms in some detail, suggesting that there are five major areas which distinguish chiefdoms from band level societies:

1. A nonvolitional, ascribed ranking of persons.
2. A hierarchy of settlement types and sizes which reflects their position in the regulatory and ritual network.
3. Settlements located in areas of local subsistence sufficiency.
4. Organization of productive activities which transcends the household level.
5. Correlation between predictable environmental fluctuations and society-wide efforts to deal with these changes.

Accepting these criteria for the moment, it be-

comes immediately clear that items 2 through 5 require more comprehensive subsistence and settlement data than is provided by mound excavation alone. Speculation without these important cultural ecological data would be premature.

The Refuge-Deptford mounds do, however, provide data relevant to the first criterion, that of ascribed ranking. In effect, we are forced to narrow the scope from the broad question of social organization to a more restrictive inquiry: was status allocated during Refuge-Deptford times in an egalitarian or an ascribed manner?

Status consists of those rights, duties, privileges, powers, liabilities, and immunities which accrue to a recognized and named social position (after Goldschmidt, 1960, p. 266 and Goodenough, 1965, p. 2). Social status is apportioned through a number of culturally determined criteria, the most universal of which are sex, age, and kinship. Each individual simultaneously possesses several different social statuses, or what Goodenough (1965) termed *social identities*. Each social position has its own collection of right and duties, and which identity is currently operating depends upon with whom the individual is presently interacting. The composite of the several identities maintained by a single individual is termed his or her *social persona* (Goodenough, 1965, p. 7; see also Binford, 1971, p. 17). It is this encompassing social persona which is reflected in the archaeological record.

Societies have developed two rather distinct ways of assigning social statuses. An *ascribed* status is one which is assigned to individuals without regard to innate differences or abilities. Ascribed statuses are assigned at the moment of birth, and the training for that status begins immediately. Alternatively, a society can provide for statuses that are *achieved*, requiring special qualities of the individuals involved (after Linton, 1936, p. 115). Achieved statuses are not filled at birth, but rather are left open and ultimately filled through competition and individual effort.

The mechanism of assigning status brings us from the level of the individual to the level of the entire society. Societies are termed *egalitarian* when the number of valued statuses is roughly equivalent to the number of persons with the ability to fill them (Fried, 1967, p. 33). That is, egalitarian societies lack the means to fix or limit the number of persons capable of exerting power. The key to leadership in an egalitarian society is experience and overall social standing; egalitarian societies are generally operative among hunter-gatherer societies (Service, 1971).

A ranked society, on the other hand, is one in which "positions of valued status are somehow limited so that not all those of sufficient talent to occupy such statuses actually achieve them" (Fried, 1967, p. 109). The social structure of ranked society embodies an intrinsic hierarchy, in which relatively permanent social stations are maintained, and people have an unequal access to the basic life-sustaining resources. Resources are controlled by localized kin groups rather than by individuals, and the major economic goods tend to flow in and out of a finite center (Fried, 1967, p. 117; but also see Peebles and Kus, 1977, pp. 427-431).

Archaeologists most commonly explore the workings of extinct social systems through analysis of mortuary customs, and an important assumption comes into play: persons who are treated differentially in life will be treated differentially in death (Peebles, 1971, p. 68). When the dead are separated from the living, they must be properly integrated into the world of the dead. Social ties exist between the living and the once-living, and the ceremonial connections at death reflect in large measure these social realities. Peebles (1971, p. 69) has emphasized the importance of studying human burials as the *fossilized terminal statuses of the individual*. While these terminal statuses are different from the statuses most commonly studied by ethnographers, those models defined by archaeologists are every bit as real as those observable among ethnographic cultures (see Harris, 1968, pp. 359-360).

With this discussion as background, we can now turn to the implications of the Refuge-Deptford burial mounds on St. Catherines Island. Is status inherited through achieved or ascribed mechanisms?

Sex could be determined on only such a small sample of the burials that the findings are without statistical significance. We must note, however, that of the skeletons which could be

sexed (33), nearly twice as many individuals are female (21) as male (12). All sites except Seaside I showed a preponderance of female burials. This trend is particularly evident at McLeod Mound, where the Central Tomb contained five female burials. These data are too scanty to provide much firm evidence, but we note in passing that the ethnohistoric Guale are known to have had an emphasis on matrilineal succession (Thomas, Jones, Durham and Larsen, 1978, Chapter 3).

As discussed earlier, deliberate grave goods were rare in the Refuge-Deptford mounds, but those items present showed no particular tendency to associate with either male or female burials. Most individuals were buried without grave goods (at least without those which have preserved), and no individual seemed to have received a disproportionate share of wealth.

Age at death could be estimated for nearly all the burials, and table 31 indicates that the vast majority (over 90 percent) of the individuals were fully adult at death. Preadult burials were extremely rare, and only a single infant was located (Seaside I, burial 12C, aged birth to 6 months). Only four juveniles were found: Seaside I, burial 12D, aged 5 to 10 years; Seaside I, burial 8, aged 8 ± 1 years; Seaside II, burial 8B, aged 6 to 8 years; Seaside I, burial 15A, aged 12 years.

Comparison of these data with life tables computed for various societies strongly indicates that preadults are under represented in the Refuge-Deptford mounds. Ubelaker (1974, tables 38 and 39), for instance, prepared life tables for sixteenth century-Late Woodland peoples in Maryland. Although the data are not strictly comparable, Ubelaker's figures indicate that between 35 percent and 40 percent of the deaths occurred before the age of 10, and he cites similar figures from other populations throughout the world (see Ubelaker, 1974, pp. 62-65; Weiss, 1973; also Swedlund and Armelagos, 1976, pp. 46-51). Of course, many problems plague the computation of life table statistics, and we cannot be certain that the low frequency of preadults is not due to poor preservation or the failure of the excavators to recognize such small and fragile bones. Nevertheless, we suspect that the proportions are roughly accurate.

If these figures can be trusted, then only one in three preadults was buried in the Refuge-Deptford mounds. This, of course, is precisely the expected pattern in societies which allocate status along egalitarian lines. All people are born with equal rights and duties, and status is acquired directly in proportion to one's accomplishments in life. Infants and juveniles have relatively little time or opportunity in which to acquire such status. Thus, if we assume that mound burial was a marker of one's "fossilized terminal status," as Peebles (1971, p. 69) has suggested, then the relatively low frequency of preadult burials would seem to support the egalitarian model of social organization among the Refuge-Deptford peoples.

While this discussion admittedly relies on negative evidence, we think that the skimpy data at hand do allow us some degree of generalization. We can find no reason to doubt Milanich's (1971) suggestion of a band level integration for the Deptford (and immediately pre-Deptford) peoples. We see no evidence at all for chiefdoms during Refuge-Deptford times. Specifically, we found no signs of ranking in the Refuge-Deptford mortuary complex. The mounds contained almost exclusively adult remains, a pattern wholly consistent with a model of achieved status distribution. At present, we lack the necessary subsistence and settlement data to actually validate an overall hypothesis of band structure, but the mortuary data certainly suggest this as the most likely possibility.

However, we urge extreme caution in inferring detailed mechanisms for this band structure. Specifically, we think that suggestions of patrilocal residence, reciprocal band exogamy, and virilocal residence patterns, as proposed by Milanich (1971, pp. 203-204), lack empirical support. These suggestions rely strictly on worldwide syntheses such as those by Steward (1955) and Service (1962, 1971), and considerable data have come to light which cast doubt on these mechanisms as cultural universals (see, e.g., Meggitt, 1968; Leacock, 1969, p. 4; Damas, 1969, p. 139; Thomas, 1974b).

BIOCULTURAL IMPLICATIONS

The burials are summarized in table 31 according to number of individuals, sex, age, and

cultural treatment by site. Of the 66 individuals only 33 (50%) were complete enough to be assigned sex. Only five (7.6%) individuals were subadult, indicating possible preference for placement of adults in these mounds. Thus, as discussed above, given both poor preservation and cultural treatment, demographic statements cannot be made.

The poor condition of the skeletal material limits us in making morphological or metric generalizations regarding this sample. However, from the remains that are present we are able to say that these people are quite sexually dimorphic; males have well developed areas of muscle attachment, females less so; males appear quite robust, females do not. Femoral pilaster and platymeria are marked, reflecting strenuous activity presumably associated with subsistence activities.

Pathology was not present except for an ulnar pseudoarthrosis and congenitally fused ribs. The lack of pathology could possibly indicate good health. However, the poor preservation of many skeletal elements may have masked pathological conditions, particularly those affecting long bones. Dental health is good. No gross hypoplasias were observed and in only a few individuals were small carious pits present (table 32). All specimens having dental caries have them in occlusal and buccal grooves of relatively unworn teeth. Pre-mortem tooth loss could not be observed as most alveoli were missing due to poor preservation. Dental attrition is extreme. Cusps on the first molars are worn flat in individuals in which the third molar has reached occlusal eruption, as defined by cusp polish. The grooves in these teeth, separating the cusps, are barely visible. There is, however, no dentin exposure in those individuals.

Comparisons with other coastal Georgia skeletal samples are also limited because of the small sample size from St. Catherines Island. Table 33 shows the range of variation of cranial measurements within other coastal samples. The Deptford site is a Deptford-Wilmington period sample excavated by the Works Projects Administration. Fifteen of these skeletons from this site were described by Frederick S. Hulse (n.d.a., pp. 44-47). Two Irene Period skeletal samples include the Irene Mound site (Hulse, 1939a, 1939b, 1941), also excavated by the Works Projects Administration, and skeletal material from Taylor Mound, Couper Field, and Indian Field recovered by the University of Florida (Zahler, 1976). No postcranial or dental measurements have been published from other Georgia coastal sites and this prevents us from making any further comparisons.

Like the dentitions from the Cunningham Mound Group and the Seaside Mound Group, dental attrition at the Irene Mound site was also extreme (Hulse, 1941). This is also true for the St. Simons group (Zahler, 1976). Hulse (n.d.a.) did not discuss attrition in the Deptford site sample. Comparisons beyond this point cannot be made as variables such as sex, age, diet, tooth position, disease, or food preparation have not been controlled in any of these samples. These variables have been shown to be important and must be ultimately considered (Molnar, 1971, 1972). It would be interesting to document changes in rate or kind of wear through successive periods on the Georgia coast, particularly in the light of the introduction of agriculture. But, until there is a control of those variables outlined above, conclusions cannot be made.

Hulse (1941) noted the infrequency of caries in the Irene sample, suggesting that these people were not agricultural. A similar situation seems likely for the St. Catherines Island sample. In contrast to this, caries frequency on St. Simons Island were quite high, occurring in almost every adult observed (Zahler, 1976). Perhaps the St. Simons skeletal material represents, in at least part, a protohistoric population, as some European trade items were associated with several of the burials from Taylor Mound (Cook and Pearson, n.d.). Thus, with increasing contact and possibly a shift toward a more agriculturally oriented economy with higher carbohydrate intake, dental health may have suffered.

Although caries frequency is subject to other environmental factors besides the carbohydrate component, the evidence seems to indicate that diet may be the causal factor for the Georgia coast, and other areas of the New World as well (Goldstein, 1948; Cook and Buikstra, 1973; Buikstra, 1977; Stewart, 1976).

TABLE 31
Burial Summary

Site	Number of Burials	Sex			Age				Treatment						
		Female	Male	Indeterminate	Adult	Indeterminate	Subadult	Non-Human	Bundle	Cremation	Flexed	Supine, Extended	Position Unknown	Primary	Intrusion
McLeod Mound	20	10	3	7	20	0	0	0	3	0	0	11	6	5	15
Cunningham Md. A	1	0	0	1	1	0	0	0	0	0	0	0	1	0	1
Cunningham Md. C	5	2	0	3	5	0	0	0	0	1	0	2	2	4	1
Cunningham Md. D	[a]8	1	1	3	5	1	1	1	1	1	1	1	1	1	5
Cunningham Md. E	1	1	0	0	1	0	0	0	0	0	0	0	1	0	1
South New Ground Md.	1	1	0	0	1	0	0	0	0	0	0	0	1	1	0
Seaside Mound I	13	2	5	10	12	1	4	0	2	0	0	2	9	9	4
Seaside Mound II	12	4	3	9	10	5	1	0	3	1	0	2	7	3	9
Totals	61	21	12	33	55	7	6	1	9	3	1	18	28	23	36

[a]Burials 3 and 5 described in Thomas, South, and Larsen, 1977 (not included in sex, age, and treatment summary).

TABLE 32
Dental Caries Frequency, Cunningham Mound Group and Seaside Mound Group

Site	Burial	Tooth	Number of Pits
McLeod Mound	1	M^3	1
McLeod Mound	11	^3M	3
Cunningham Md. C	5	^3M	4
Cunningham Md. C	5	^3M	3
Cunningham Md. C	5	M^3	1
Seaside Mound I	5	M^3	1
Seaside Mound I	5	^3M	1
Seaside Mound I	12A	^3M	1
Seaside Mound II	5	^3M	1
Seaside Mound II	5	M^3	1
Seaside Mound II	5	^2M	1
Seaside Mound II	5	^3M	1
Seaside Mound II	5	M^3	1

Hulse (1941) also noted that the Irene masticatory musculature was markedly developed particularly in the muscle attachment areas we noted in the St. Catherines sample for m. temporalis, m. massetericus and m. pterygeideus medialis.

In sum, the skeletal sample from these Refuge-Deptford mounds on St. Catherines Island represents a morphologically robust population enjoying seemingly good health. Until variables such as skeletal preservation, age and sex are controlled, statements regarding this population's relationship with other coastal Georgia samples are at best tentative. Rigid archaeological control of other sites is needed in order to place all skeletal material in a well-ordered chronological framework. This is important if we are to understand the effects that subsistence has had on the prehistoric human skeleton. Hopefully, with future work both in the field and in the laboratory, those aspirations will be realized.

RITUAL AND SYMBOLISM

Mortuary evidence is most commonly used by archaeologists to reconstruct ritual practices and religious beliefs now extinct. Although our data from the Refuge-Deptford mounds are scanty, certain inferences and outright speculations seem in order.

The most striking aspect of the early mortuary complex of St. Catherines Island is surely its *periodicity*. The six clusters of radiocarbon dates evident in figure 75 indicate that these sites were visited time after time, probably (although not necessarily) for ceremonial purposes. Sears (1963) has called such mounds *continuous-use* to distinguish them from the single-event mass graves, which are also found in the southeast. But the St. Catherines mounds differ in some important ways from the continuous-use mounds discussed by Sears, especially those of the apparently contemporary Yent Complex, which occur along the central west Florida coast. Not only do the Refuge-Deptford mounds of St. Catherines lack the spectacular copper and shell grave associations common for Yent Complex sites (see Sears, 1963, table 1), but the actual mound construction seems to come fairly late in the sequence of events. Caldwell summed up the situation rather nicely in his brief discussion of the early Seaside I tests: "we may start with a dimple and end with a pimple" (Caldwell, 1971). Over half of the individuals found in the nine mounds were buried prior to construction of the mound. Although we have no way of estimating the time lapse between interment and mound construction, radiocarbon and stratigraphic evidence indicates that in some cases this lapse could have been as much as two millennia.

In other words, the Refuge-Deptford mortuary complex began with the construction of cemeteries and only later evolved the use of mounds. The situation is badly clouded because of poor preservation of the skeletal materials, but we think this transition probably occurred between about A.D. 1 and about A.D. 600, after which the mounds were no longer used.

The Cunningham and Seaside mounds are characterized not only by their periodicity, but also by their *simplicity*. As Chapter 6 indicated, comparative data from this time period on the Georgia coast are almost nonexistent. Although we can only guess what perishable grave items have disappeared, the surviving evidence from St. Catherines Island indicates that grave goods

TABLE 33

Summary of Female and Male Cranial Measurements from St. Catherines Island (Cunningham Mound Group and Seaside Mounds), the Deptford site, Irene Mound and St. Simons Island (Taylor Mound, Couper Field, and Indian Field)

		St. Catherines Island			Deptford Site			Irene Mound			St. Simons Island		
Measurement	Sex	N	Range	$\bar{x}$	N	Range	$\bar{x}$	N	Range	$\bar{x}$	N	Range	$\bar{x}$
Bicondylar	F	1	—	(112)	10	114-117	118	37	103-129	117.7	—	—	—
breadth	M	1	—	(120)	5	123-126	124.7	36	113-139	126.6	—	—	—
Maximum	F	3	160-176	170	10	158-176	166.5	49	151-186	166.2	12	163-184	172.8
length	M	1	—	180	5	166-182	176.4	58	154-192	173.6	8	170-180	173.5
Maximum	F	1	—	144	10	131-144	136.8	47	125-154	140.7	9	124-140	136
breadth	M	1	—	(138)	5	132-146	141.8	50	122-163	143.8	8	133-145	140.6
Minimum frontal	F	2	91-102.6	96.8	10	87-96	90.3	45	82-102	89.9	10	83-96	91.5
breadth	M	—	—	—	5	91-98	94.0	44	82-102	93.4	8	93-101	97
Basion-bregma	F	1	—	134	—	—	—	23	120-143	133.5	7	125-141	134.8
	M	—	—	—	—	—	—	27	132-155	140.9	5	132-147	138.4
Bregma-auricular	F	1	—	124.1	—	—	—	16	95-127	113.8	—	—	—
point height	M	1	—	131.5	—	—	—	28	101-133	118.0	—	—	—

TABLE 33 — (*Continued*)

Measurement	Sex	St. Catherines Island N	Range	x̄	Deptford Site N	Range	x̄	Irene Mound N	Range	x̄	St. Simons Island N	Range	x̄
Orbital breadth, left	F	1	—	44.3	—	—	—	13	33 40	36.5	7	34-40	38.4
	M	—	—	—	—	—	—	23	36-42	39.3	6	38-41	40
Orbital height, left	F	1	—	45	—	—	—	17	32-38	35.0	6	30-36	33.8
	M	—	—	—	—	—	—	24	30-39	35.1	6	32-39	36.0
Orbital breadth, right	F	1	—	35.8	—	—	—	15	33-39	36.9	6	34-42	38.8
	M	—	—	—	—	—	—	23	36-43	39.2	7	34-44	40
Orbital height, right	F	1	—	35.7	—	—	—	20	31-39	35.1	6	31-37	34.5
	M	—	—	—	—	—	—	23	30-39	34.4	7	32-39	34.8
Palate length	F	1	—	47.6	—	—	—	21	47-58	52.6	9	46-60	51
	M	—	—	—	—	—	—	26	47-61	54.4	7	51-59	53.4
Palate breadth	F	1	—	36.5	—	—	—	34	49-72	62.6	10	29-44	37.8
	M	—	—	—	—	—	—	42	55-75	64.9	7	39-45	41.7

( ), measurement estimate

were only rarely used during Refuge-Deptford times. In fact, about the only clear-cut grave goods recovered were projectile points. Almost all the points recovered in the nine sites are complete. Because the Sea Islands are totally without local sources of stone, each point must have been carried a considerable distance, and it seems unlikely that many serviceable, unbroken lithics would be discarded in the village middens. Much more likely is the possibility that the points were deliberately included as grave furniture. The most obvious instance of this is burial 4 at Cunningham D. Although the contexts were badly disturbed by later slave burials, it seems clear that burial 4 was accompanied by a small cache of several complete projectile points, some point fragments, a scraper, and a quartzite hammerstone.

In addition to the projectile points, the cache bundle associated with burial 4 at Cunningham D contained a fragment of unworked smoky quartz (fig. 40k). Recent investigators have noted the presence of similar quartz stones (and especially crystals) at several late prehistoric sites. Hudson (1976, pp. 168-169, 356-357) and Howard (1968, pp. 79-80) have suggested that archaeologists fail to appreciate fully the significance of such unmodified stones. The Creeks termed such quartz objects *sapiyá* which are used by hunters to improve eyesight and to attract game. Interestingly enough, Creek informants have stated that the *sapiyá* medicines and lore were acquired from the Yamassee tribe of the Georgia and South Carolina coast. Similarly, the Florida Mikasuko once thought such crystals could ward off bullets; there is also evidence that such objects were important for success in warfare, rainmaking, hunting, and lovemaking (Sturtevant, 1954, p. 36). Olbrechts (1930, pp. 549-550) also documented similar functions for the sacred quartz of the early twentieth-century Cherokee. In all cases, quartz was handled with extreme care, and often kept in a buckskin pouch for use in hunting or warfare.

It is not farfetched to suggest a similar use for the cache found at Cunningham Mound D. Remember that the quartz talisman was found associated with an apparent projectile point manufacturing kit, and that the entire cache appeared to have been wrapped in a skin (or perhaps basket) container, which had long since disintegrated. While hardly conclusive, this evidence strongly hints at an association between quartz and some sort of prehistoric hunting and/or ritual activity. The cache certainly appears to be a flintknapper's kit which was intentionally included with the burial of individual 4.

Unfortunately, the churning and rather amorphous nature of the mound stratigraphy made detection of grave pits almost impossible, but we think all but 3 of the 18 points recovered were associated with human burials (see table 34). Two adult male burials were accompanied by projectile points (burial 7 at McLeod and burial 2 at Cunningham D), as were two females (burial 10 at McLeod and burial 3 at Cunningham C). Unfortunately, the dubious nature of these associations and the indeterminate sex on the majority of burials leave this issue unresolved.

We must also note the unusual provenience of three of the projectile points. Specimen 28.0/1100 was found about 20 cm. below the bottom of the central tomb at Cunningham A; specimen 28.0/1104 was found in a similar position below burial 2 at Seaside II; specimen 28.0/1177 was found well below Feature 1 at Seaside I. All three points were found isolated in the sterile yellow sands of stratigraphic Unit II, and would have gone undetected had not we routinely excavated the sterile sand below every cultural feature.

Why should three unbroken projectile points be found in undisturbed deposits directly below cultural features? Of course, rodent burrowing and root disturbance are possibilities, but they seem unlikely. Our hypothesis is that the points were deliberately placed below the cultural features, and we reproduce two ethnographic pictures (figs. 77 and 78) to support our suggestion.

The major ethnohistoric source for the sixteenth-century Georgia and Florida coast is René de Laudonnière, whose French expedition wintered near the St. Johns River in 1564. Laudonnière's account of a Florida burial scene contained the following description: "When a king dieth, they bury him very solumnly, and, upon his grave they set the cup wherein he was

TABLE 34
Projectile Points Recovered from Refuge-Deptford Mounds on St. Catherines Island

Specimen No.	Site	Association	Sex of Burial
28.0/504	McLeod	Burial 7	Male
28.0/783	McLeod	Burial 10 (?)	Female (?)
28.0/1100	Cunningham A	Below central pit	—
28.0/345	Cunningham C	Burial 3	Female
28.0/346	Cunningham D	central pit	—
28.0/350	Cunningham D	Burial 2	Male
28.0/351	Cunningham D	Burial 2	Male
7 points in cache	Cunningham D	Burial 4	?
28.0/766	Cunningham D	Burial 4 (?)	?
28.0/920	Cunningham D	None	—
28.0/1184	Seaside I	None	—
28.0/1177	Seaside I	Below Feature I	—
28.0/1104	Seaside II	Below burial 2	—
28.0/1387	Seaside II	None	—

wont to drink; *and round about said grave, they stick many arrows*, and weap and fast three days together, without ceasing" [cited in Swanton, 1946, p. 722, emphasis added]. The second French expedition was accompanied by an artist, Jacques Le Moyne who, after successfully fleeing the Spanish, produced a series of watercolors depicting the Indian life he had witnessed in the southeast. Although Le Moyne's originals have been lost, engravings from them were published in 1591 by the Flemish house of De Bry. Figure 77 shows Le Moyne's rendering of a Florida Indian mortuary scene, which squares almost perfectly with Laudonnière's account.

The Le Moyne pictures are reproduced here because they seem to provide analogies to the three anomalous spearpoints found beneath features in the Refuge-Deptford mounds on St. Catherines Island. Note particularly how the arrows were thrust into the ground, forming a decorative palisade around the margin of the small burial mound. Given enough time, the wooden portions would decay, and all that would be found in these Floridian mounds would be isolated stone tips, imbedded in the otherwise sterile sand underlying the mound itself. This was exactly the case at three of the St. Catherines mounds. While it stretches the point to claim that the Refuge-Deptford mortuary complex involved activities identical with those depicted by Le Moyne, the possibility can be tested by future excavation. We would caution that exploratory excavations should always be attempted below such mortuary features, to determine whether arrow or spearpoints might lie below.[3]

As noted in the earlier site descriptions, the Refuge-Deptford mounds share a distinctive stratigraphic profile, and one aspect of mound construction might conceivably have symbolic significance. Examine, for instance, the measured section for McLeod Mound (fig. 9). Note particularly the thin lines of clean, white sand (Unit IIIa) which occurs immediately over the primary humus. This light sand is obviously backdirt from the excavation of the Central Tomb. But note how the lens seems to be almost deliberately smoothed over the central pit. We ignored this feature at McLeod, thinking that the sand probably resulted from accidental penetration of Unit I during excavation

[3]We are not the first to suggest literal interpretation of the Le Moyne paintings. Cyrus Thomas also reproduced one of Le Moyne's paintings to explain a phenomenon he observed in a burial mound in Naples, Illinois. The Naples mound contained a series of bone awls stuck in the sand surrounding a burial; to Thomas, at least, the pattern seemed identical with that noted by Le Moyne for the Timucua (Thomas, 1887, p. 39; 1894, pp. 650-651).

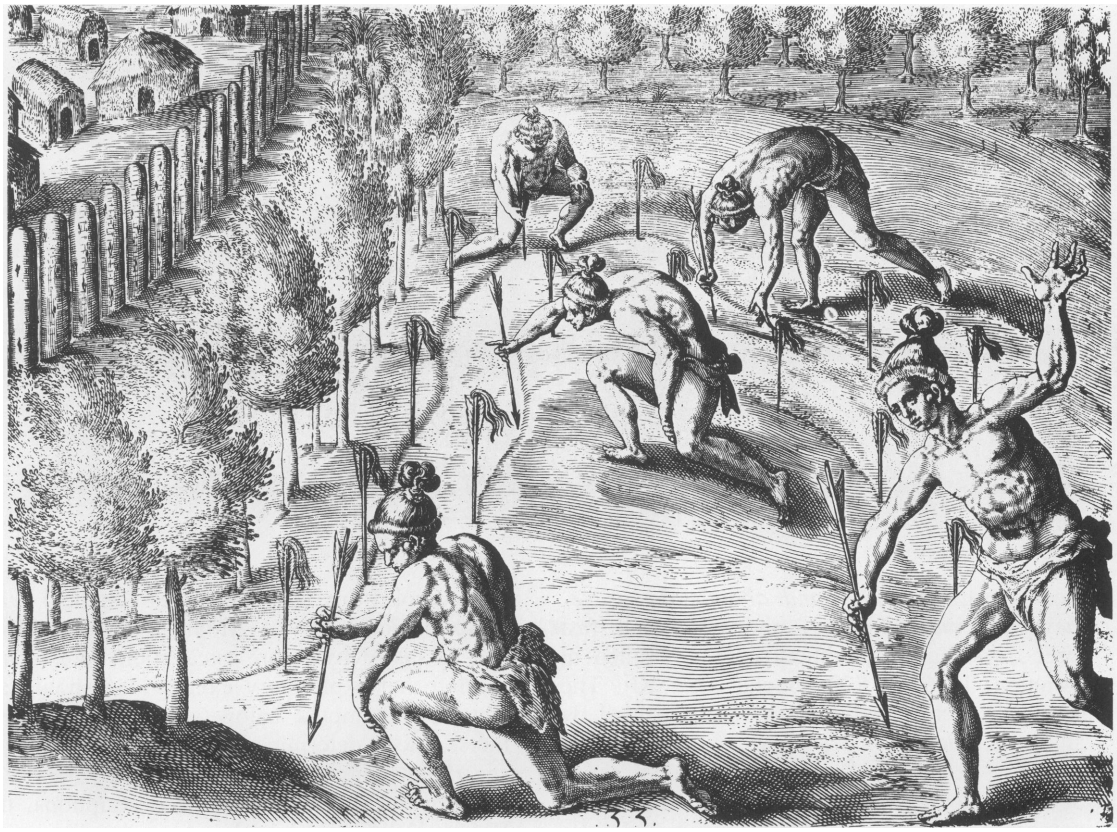


FIG. 77. A Timucua burial mound as it appeared in the sixteenth century. This is an engraving by De Bry from a painting by Jacques Le Moyne (Smithsonian Institution Photo number 1186-b-15).

of the Central Tomb. But nearly identical features were subsequently located at almost all of the western mounds of the Cunningham group namely, Cunningham Mounds A (fig. 23) and D (fig. 36) and at South New Ground Mound (fig. 49). A poorly developed lens also occurred at Seaside I (fig. 52).

In all five cases, the clean yellowish lens of sterile sand overlies the primary humus in the vicinity of a pre-mound pit. This relationship became so obvious that in our later excavations we were able to predict the presence of a central pit at Cunningham A just from examining the stratigraphic profile in figure 23. Subsequent excavation located the pit precisely where it was expected.

Although this is pure speculation, we cannot help but wonder if the black, charred humus was deliberately covered with bright sand as part of the Refuge-Deptford mortuary ceremony. Similarly, note that the oyster and clam shell lens at McLeod was placed over the Central Tomb *after* the five skeletons had been buried and the pit refilled. The shell would once again add a vivid white contrast to the surrounding burnt humus. Only excavation of similar features will adequately test this speculation.

The significance of the bird burial at Cunningham Mound D should be considered. Because the bones are so poorly preserved, the archaeological evidence tells us only that the bird was an osprey *(Pandion haliaetus)*, that the burial was intentional, and that the interment must have occurred sometime after the mound had been constructed (since the burial

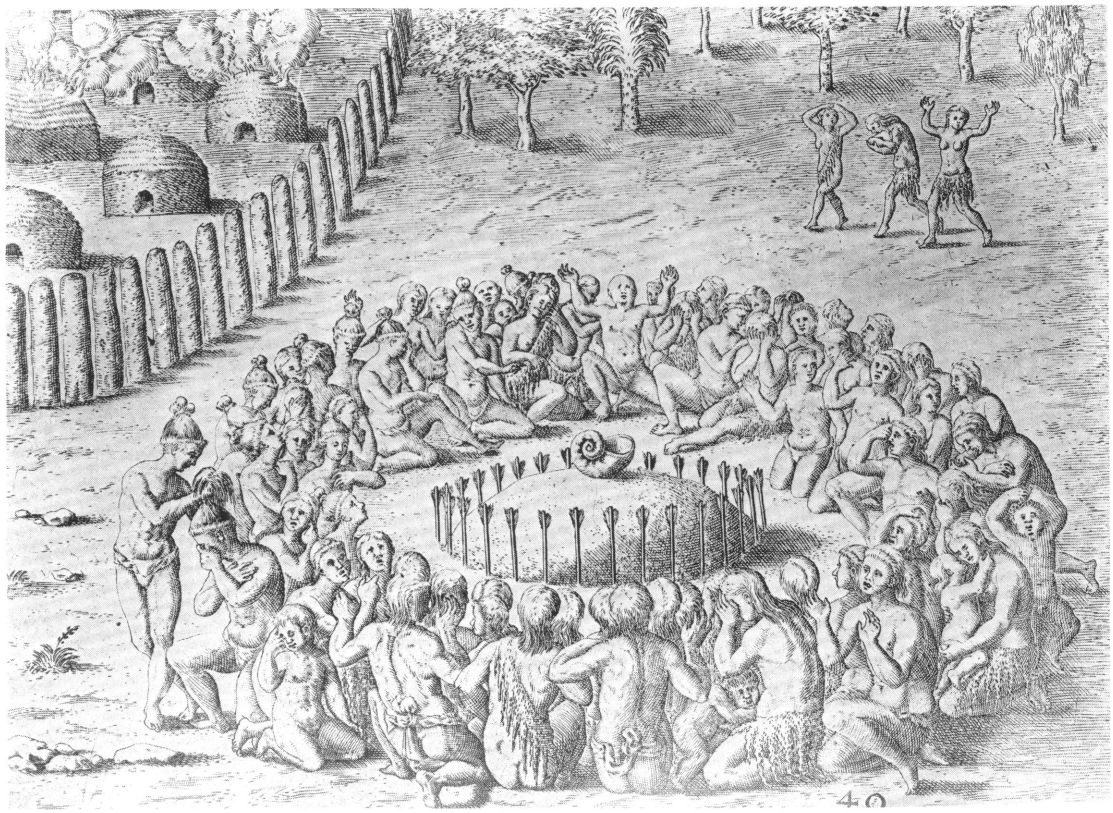


FIG. 78. De Bry engraving of a Le Moyne painting showing Florida Indians declaring war. Note particularly the way in which the arrows were thrust into the ground (AMNH neg. no. 324280).

did not penetrate the primary humus level). The osprey (or fish hawk) is a large bird, with a wingspan reaching 6 feet, and ospreys are the most widely distributed of all the Falconiformes. Ospreys still nest on St. Catherines Island, particularly on the north pasture.

Birds of prey, and particularly the Falconiformes, had major ceremonial significance among the ethnographic and late prehistoric Indians of the American southeast, functioning as artforms, clan names, omens of good or evil, and as ritual adornment. Representations of the falcon and the eagle are particularly common motifs on Mississippian ceramics and ornaments (e.g., Byers, 1962; Howard, 1968, p. 37). Waring and Holder's (1945) "forked-eye" motif denotes a widespread custom of eye painting designed to simulate the eye markings of a hawk or falcon; Howard thinks that this tradition may be more ancient than Mississippian times, and suggests that the markings are directly related to warfare symbolism, that is, "war paint" (Howard, 1968, p. 43).

Interestingly enough, Creek informants told Swanton that they carried buckskin pouches which contained red ocher and a sacred quartz crystal (Swanton, 1928, pp. 498-501). They would hold the crystal to their eye (to give them hawklike vision) and paint two marks about their eyes, similar to the "forked-eye" motif of the Southeastern Ceremonial Complex. While we certainly do not wish to overemphasize the fact, we should point out that the smoky quartz talisman (discussed above) and the osprey burial were found within 1.5 meters of each other at Cunningham D. Of course, this

site predates the Southeastern Ceremonial Complex by at least a millennium.

This final chapter has embraced a wide spectrum of explanation, ranging from rather well-documented implications (particularly the chronological, sociopolitical, and biocultural aspects of the data) to unabashed speculation, as in our musings about Refuge-Deptford ritual and symbolism. We hope that the reader will take care to distinguish our facts from our interpretations, and also to note our caution when we propose admittedly speculative points. As stated earlier, speculation is a perfectly valid scientific procedure, as long as it is recognized as such. In places, we are thinking aloud, in the hope that our hunches will foster further excavation, analysis, and debate. We are perfectly willing to withdraw any of our tentative propositions in order to make room for more concretely supported explanations. In the long run, if a few of our interpretations stand the tests of time and new data, then our efforts will have been worthwhile.

APPENDIX
SEASONAL GROWTH VARIATIONS IN THE SHELLS OF RECENT AND PREHISTORIC SPECIMENS OF *MERCENARIA MERCENARIA* FROM ST. CATHERINES ISLAND, GEORGIA

GEORGE R. CLARK II

The use of seasonal growth lines in bivalve mollusk shells to determine prehistoric human occupation patterns is a relatively new concept with considerable potential (Weide, 1969; Coutts, 1975; Ham and Irvine, 1975; Koike, 1975). To achieve this potential it is essential to determine the relationships between the seasons and the growth lines in an unambiguous fashion, and it is highly desirable to understand the fundamental causes, i.e., the environmental stimuli, as well. It is the objective of this study to examine the suitability of *Mercenaria mercenaria* for studies in seasonal occupation, and to determine whether this technique can make a contribution to the study of the older mounds on St. Catherines Island.

METHODS AND APPROACH

Growth lines involve variations in the character of an accreting tissue, such as the shell of a clam, in response to physiological or environmental stimuli (for a more comprehensive discussion, see Clark, 1974). The variations of particular interest in this report are those which reflect seasonal events, such as periods of exceptionally warm or cold temperatures, spawning, or seasonal storms.

Even casual examination (fig. 79) of specimens of *Mercenaria mercenaria* found living in the tide flats at St. Catherines Island confirms that seasonal variations ("growth rings") are present, and a polished section cut parallel to the direction of growth

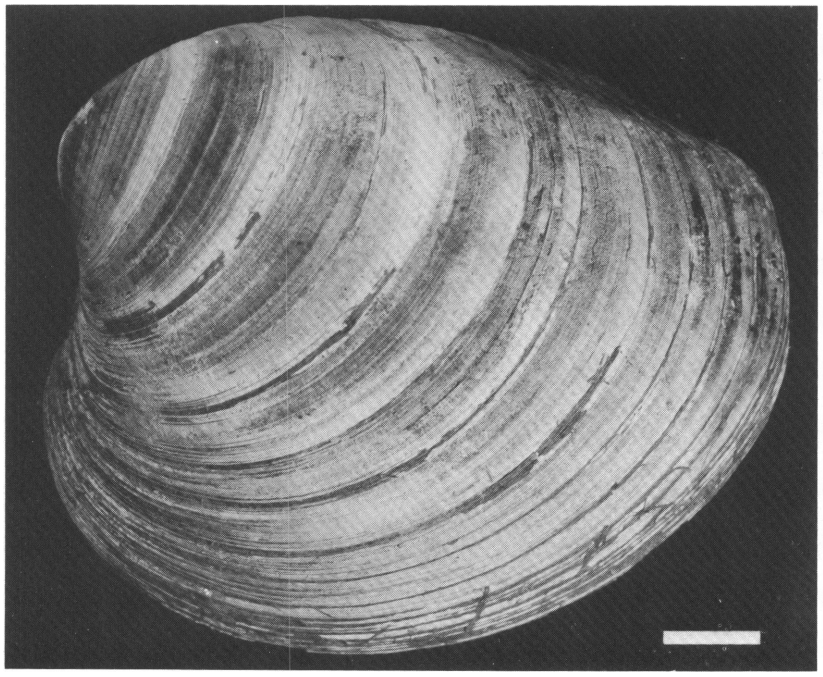


FIG. 79. Left valve of a specimen (SCR-01) of *Mercenaria mercenaria* collected alive on October 22, 1975. Growth "rings" are prominent on outer surface. Scale bar is 1 cm.

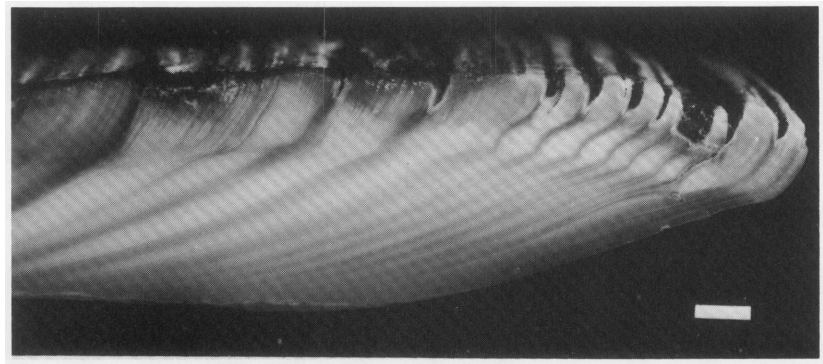


FIG. 80. Polished section and portion of outer surface of the same specimen (SCR-01). The growth "rings" can be seen to be related to internal variations in shell color. Scale bar is 1 mm. In this and all subsequent figures the direction of growth is to the right unless otherwise indicated.

(fig. 80) demonstrates that the external lines are related to internal features as well.

All detailed observations were made on petrographic thin sections with orientations similar to that of figure 80. Thin sections combine the principal advantages of the more commonly used acetate peels and polished sections in that they preserve both pigmentation and detailed microstructure on a single preparation. In addition, thin sections permit observations of the mineralogy and crystallography not possible on the other types of preparations. Although Barker demonstrated the utility of thin sections in his pioneering study of bivalve growth lines (Barker, 1964), and Ham and Irvine (1975) are strong advocates, the method has not received wide acceptance. This is largely due to the near-impossibility of making acceptable thin sections of bivalve shells with conventional high speed thin section equipment. All thin sections in this study were cut on the Buehler Isomet™ 11-1180 Low Speed Saw, a gravity fed diamond saw of exceptional stability operating at very low speeds and feed pressure. All grinding (and little was required) was accomplished by hand on a glass plate. It seems likely that the availability of saws such as this will lead to the more widespread use of thin sections in growth line studies.

The study has been divided into three phases, and will be reported in the same way. The first phase is the examination and characterization of all aspects of the shell which appeared to exhibit a seasonal variation. The second is the attempt to determine the relationships between particular characteristics and particular seasons. The third is the application of the results of the first two to the determination of the season of death—and presumably the season of harvesting—of shells found associated with human occupation sites.

SEASONAL VARIATIONS IN SHELL FEATURES

GENERAL SHELL FEATURES: Before considering the significance of various patterns of variations, it is important to define a few general features and regions of the shell. On figure 81, note that the shell has two structural layers (there are others present further from the margin), an outer prismatic layer and middle "homogeneous" (a useful if not strictly accurate term—see Kennish and Olsson, 1975) layer. Note also that this shell exhibits two distinct growth regions, a fast-growing (broad seasonal bands) "mature" region and a slow-growing (narrow seasonal bands) "senile" region. (The juvenile region is too far from the margin to appear in any of these sections.) Some shells have a more gradual transition between these regions, and of course some die before they reach the senile stage.

NOTCHES: The "growth rings" on the outer shell surface often appear in the sections as sharp depressions or *notches* (see figs. 82, 83, 95, 96, 106, 107). These commonly include shreds of organic matter, probably remnants of periostracum (outer organic shell layer, often removed by abrasion). The notches appear to be a result of shell growth during a period when the mantle (which secretes the shell) did not extend to the outer surface of the shell. This in turn suggests a period during which the shell remained nearly closed, preventing the mantle from extending to its usual position. As "growth rings" (both "annual rings" and similar features called "disturbance lines") are known to form in response to environmental stress, this seems to be a reasonable interpretation.

DISCONTINUITIES: In many instances the notch appears associated with a thin line extending more

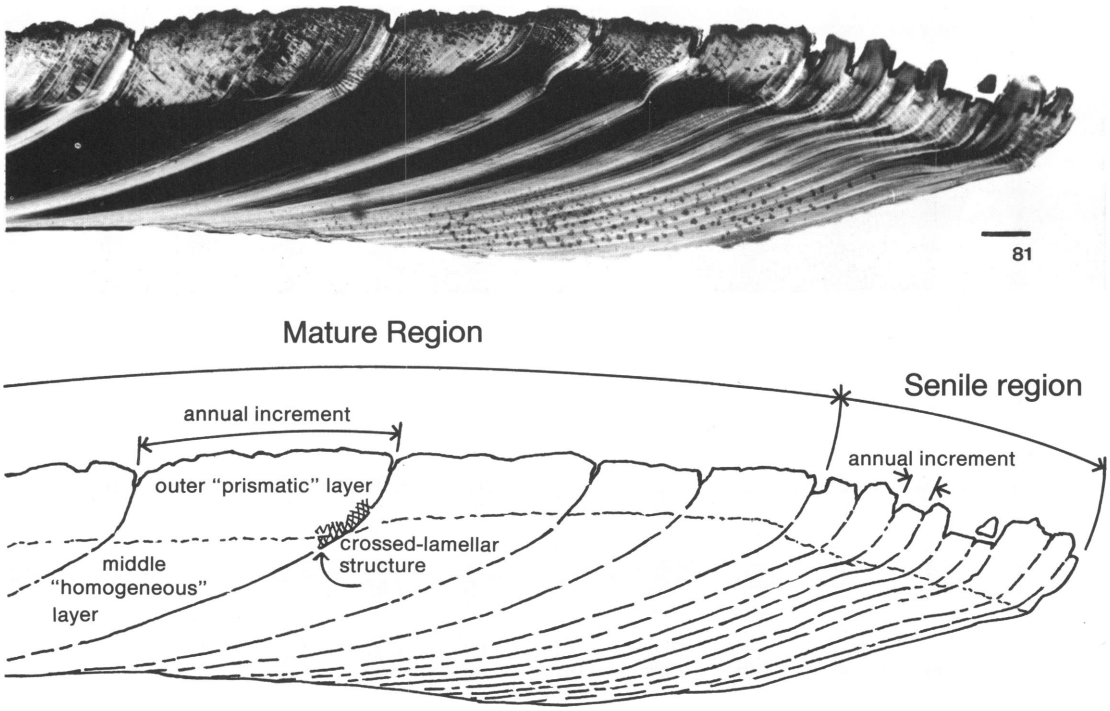
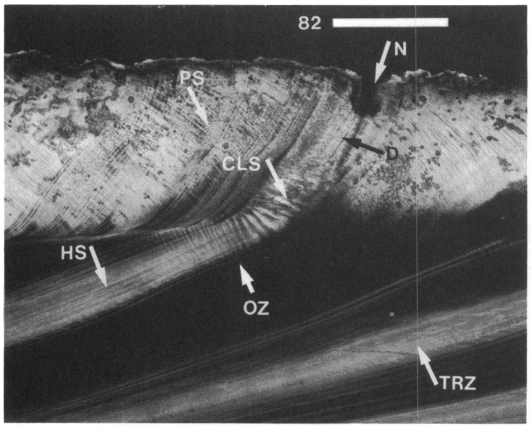


FIG. 81. Thin section of the same specimen (SCR-01). Note that the dark and light areas are due to differences in transparency rather than color. Scale bar is 1 mm. Tungsten illumination.



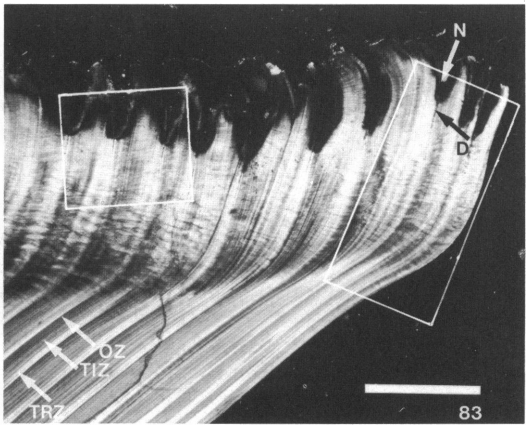


FIG. 82. Thin section of the mature region of the same specimen (SCR-01). Arrows indicate shell features on this and subsequent figures as indicated by the following code: B-Boundary between inner and outer shell layer; CLS-Crossed-lamellar structure; D-Discontinuity; GL-Fine growth line; HS-"Homogeneous" structure; L-Ledging; N-Notch; OZ-Opaque zone; PS-Prismatic structure; SZ-Stress zone (limits); TRZ-Translucent or transparent zone; TIZ-"Tinted" zone; UL-"Underline"; UD-Undulation. Scale bar is 1 mm. This and all subsequent thin sections are viewed with crossed polarizers unless otherwise indicated.

FIG. 83. Thin section of the senile region and margin of a specimen (SCR-34) collected alive on May 15, 1976. For explanation of symbols on arrows see figure 82. Scale bar is 1 mm. Small rectangle indicates approximate location of figure 96; large rectangle indicates figure 107.

deeply into the shell (figs. 82, 83, 95, 96, 106, 107). These discontinuities appear very different from the fine growth lines (to be discussed later), and under high power the surface appears finely pitted. It is tempting to consider them as markers for the most extreme stress, but it seems doubtful that they are solely responsive to environmental factors as they appear to occur only once during a particular season, rather than several times as would be the case if they reflected freezes, storms, or heat waves. It may be significant that they seem to form at precisely the same time as other features which will be discussed later.

TRANSPARENCY VARIATIONS: One of the most obvious seasonal features present is the great variation in transparency (figs. 81-86). This is particularly pronounced in the middle layer of the mature region, where a complete cycle (from one notch or discontinuity to the next, in the direction of growth) is normally characterized by a nearly opaque zone tapering (gradually or abruptly) into a translucent or nearly transparent zone. Note that the opaque zone is not dark in color; thus it appears white on polished sections (fig. 80) but dark in thin sections (figs. 81, 82, etc.). The translucent zone appears dark on polished sections but light in thin sections. The relative proportions of opaque and translucent shell can vary from increment to increment within (fig. 86) or between (figs. 82, 83, 85) specimens. Some specimens (figs. 83, 84, 85, etc.) appear to have an intermediate, "tinted" zone quite distinct from the opaque zone. It is quite possible that this tinted zone is actually present in all specimens but obscured by the opaque zone in most. This idea gains some support from observation of the middle layer of the senile region, where the normal trend (in the direction of growth) is from "tinted" to translucent or transparent (figs. 81, 83, 86-88).

Variations in transparency in the outer layer are less regular, but some observations can be made. Within the mature region, the outer portion of the outer layer is usually translucent; the inner portion will usually be opaque immediately following a notch, gradually becoming translucent at the outer part until the entire outer layer is translucent; then, corresponding closely to the point at which the middle layer changes from opaque to translucent, the inner part of the outer layer will switch from translucent to opaque. Finally, at the approximate position of the beginning of the notch, the entire outer layer will become highly translucent, and remain so throughout the area corresponding to the notch. Within the senile region, transparency in the outer layer tends to follow a pattern similar to that of the middle layer.

One last feature involving transparency requires mention. Within the middle layer, and especially well developed in the senile zone, are thin, slightly pigmented lines corresponding closely in position to the discontinuities discussed earlier. These are best seen in the outer portion of the middle layer, but do not extend all the way to the outer layer (figs. 89, 97-99). These are called "*underlines*" for the purpose of this study.

SURFACE PROFILE VARIATIONS: Although the notches are the most prominent variations in surface profile, other variations are found, especially in the mature region of the shells. One of the most obvious of these is the phenomenon of *ledging*, where the outer shell surface abruptly rises or falls without otherwise undergoing much change. Another, related phenomenon is that of *undulation*, where the outer shell surface rises and falls in an apparently rhythmic fashion. These two phenomena often occur together, beginning at about the point where the middle layer switches from opaque to translucent and continuing to the notch (fig. 90); in other specimens, either the ledging (fig. 91) or the undulation (fig. 92) will be more prominent.

BOUNDARY PROFILE VARIATIONS: Ledging can also occur along the boundary between the middle and outer layers (figs. 86, 93), but is frequently not observed (figs. 81, 94). There is no obvious relationship between boundary ledging and the surface profile, as would be expected if it were related to the position of the mantle.

CRYSTALLOGRAPHIC VARIATIONS: Two crystallographic changes can be observed in the outer shell layer of the mature region. One of these is the change from a prismatic to a coarsely crystalline crossed-lamellar structure in the vicinity of the notch. This can be readily observed at even relatively low magnifications, but is particularly obvious under crossed polarizers in the petrographic microscope (figs. 82, 84-86, 90-94). The other is the change in crystal orientation from one nearly perpendicular to the growth lines to one more nearly parallel to the outer shell surface. Again, this transition occurs in the vicinity of the notch (fig. 95), but it may be significant in that it precedes the notch itself.

The outer shell layer in the senile region is largely crossed-lamellar in structure throughout, and no obvious changes in structure occur here. There is often a variation in crystal orientation in the vicinity of the notch, but it commonly has a trend opposite that of the mature region, switching from an orientation more or less parallel to the outer surface to one more nearly perpendicular to the growth lines (fig. 96).

The middle shell layer has too fine a crystal structure to note the usual orientation of crystals, but there is a brief transition to a rather fine-grained crossed-lamellar structure in the immediate vicinity of the "underlines." This is the case in both the

mature (figs. 97, 98) and senile (figs. 99, 100) regions. These correspond closely to the position of the "discontinuity" but do not extend across the entire area corresponding to the notch.

VARIATIONS IN SPACING OF FINE GROWTH LINES: Fine growth lines are present on all the specimens, although they vary greatly in intensity and are further confused by the presence of subsidiary lines. Such lines have been thought to be approximately daily in frequency (Barker, 1964; Pannella and MacClintock, 1968; Coutts, 1974; Hall, Dollase and Corbató, 1974; Kennish and Olsson, 1975; Koike, 1973, 1975), but whether the periodicity is solar, tidal, or a combination of these factors is unresolved, as is the degree of accuracy with which it is recorded. Fortunately, it is not critical to this study to completely understand these lines, for regardless of their actual periodicity it seems safe to assume that they will be more closely spaced at times of slow growth and more widely spaced at time of fast growth.

The only area where the fine growth lines can be readily distinguished is in the outer shell layer in the mature region. Here the general pattern seems to be that the closest spacing is just before, during, and after the notch, and the widest spacing is in the region midway between notches (fig. 101). No consistent change in spacing occurs at the initiation of ledging, although some variations in spacing accompany the undulations.

RELATIONSHIPS OF FEATURES TO SEASONS

Recent specimens of *Mercenaria mercenaria* were collected and immediately killed on October 22, 1975, November 28, 1975, March 25, 1976, May 15, 1976, and March 23, 1977. Examination of the margins of these shells permits the direct observation of the particular shell features associated with fall, winter, and spring. Unfortunately, no specimens have yet been collected during the summer months, so this portion of the record must be extrapolated.

Nearly all the specimens collected alive were in the senile growth stage; this provides a satisfactory sample for the interpretation of shell features in the senile region, but leaves the interpretation of shell features in the mature region dependent upon only two specimens, one collected in November and the other in March.

POSITION OF MARGIN IN SENILE SHELLS: The margin of the shells collected on October 22 is slightly past the notch and discontinuity, but still within the zone of crossed-lamellar crystal structure in both outer and middle layers (figs. 99, 100, 102, 103). On the specimens collected on November 28, the margin appears to have progressed only slightly beyond that point; there is no evidence of the initiation of the tinted layer (figs. 87, 104, 105). In contrast, the specimens collected on March 25 appear to have nearly completed the tinted area (figs. 88, 106), and those collected on May 15 have actually initiated the crossed-lamellar zone in both outer and middle layers (figs. 83, 107).

POSITION OF THE MARGIN IN MATURE SHELLS: Although only two specimens were collected with the shell margins in mature growth, these were entirely consistent with the results for the senile shells. The specimen collected in November appeared to have essentially completed the transparent, crossed-lamellar zone in both middle and outer layers, but had not yet initiated the formation of opaque or tinted shell (fig. 108). The specimen collected in March appears to be at the transition from opaque to translucent shell in the middle layer, and just past the transition from transparent to opaque shell on the inner part of the outer layer (fig. 109).

INTERPRETATION: All these results are consistent with the interpretation that the translucent, crossed-lamellar zone is formed during times of warm water temperatures, and that growth slows, and presumably halts, during much of the summer and early fall. The fastest growth appears to take place during the winter and spring.

Although a summer growth check is contrary to the usual idea of an "annual" line, there is nothing fundamentally wrong with the concept. Mollusks have limiting temperatures at both the high and low ends of the scale, and the fact that most studies involving annual rings in *Mercenaria* have been made in areas where the lower limit is critical (Kerswill, 1941; Pannella and MacClintock, 1968; Rhoads and Pannella, 1970) is no argument against a population where the high limit is critical. Indeed, Kennish and Olsson (1975) have demonstrated that either high or low temperatures can cause growth halts, complete with crossed-lamellar shell structure, on *Mercenaria* in shallow bays in New Jersey. The concept of a summer growth halt also fits the data reported by Ansell (1968), who shows that *Mercenaria* has a winter growth halt in waters from Virginia to Canada, and a summer growth halt from North Carolina to Florida.

In the interpretations which follow, zones of translucent, crossed-lamellar shell will be considered "stress zones," or intervals of slow growth. Whether or not growth ever came to a complete halt for an extended period is uncertain, but the deep notches and "discontinuities" may indicate such events.

INTERPRETATIONS OF PREHISTORIC SHELLS

PRACTICAL LIMITATIONS: *Mercenaria* shells from prehistoric burial sites are commonly found fragmented and chemically altered by groundwater. The shell margin, critical for a study of this type, is not

the sturdiest part of the shell and is often not found among fragmental material; even when present, it may be too abraded for satisfactory study. Alteration processes commonly affect the marginal and inner surface of the shell, producing an "alteration rim" which obscures the record of the last few days (in juvenile and mature shells) or the last few months or years (in senile shells). Some fragments of shells may include the margin but be too small to include a full year's growth (essential to verify the seasonal patterns), especially in fast-growing mature or juvenile shells.

THEORETICAL LIMITATIONS: A second difficulty is the uncertainty about the environmental conditions in which the shells grew. Ansell (1968) and Kennish and Olsson (1975) provide evidence that the growth patterns of *Mercenaria* vary with latitude or temperature regime. It is not impossible that some of the patterns examined on prehistoric shells reflect differences in climate or microhabitat. Coutts (1970) and Coutts and Higham (1971) note that transport of large numbers of shells, such as those that make up middens, is exceedingly unlikely, but point out that individual shells have been known to be carried considerable distances. Such transport would not be unreasonable in the case of shells associated in small numbers with ceremonial structures such as burial mounds. For these reasons it is important to pay close attention to all aspects of the seasonal patterns, and not just the obvious features such as notches.

OBSERVATIONS: *McLeod Mound*. Five specimens of *Mercenaria* associated with burials 13-17 at McLeod Mound were sectioned and examined. Three could not be interpreted due to small size or alteration effects, but two displayed seasonal patterns very similar to those of the recent specimens. In both instances (figs. 110, 111) the position of the shell margin was somewhat beyond the position noted for late November deaths in recent shells; a good estimate might be December or January.

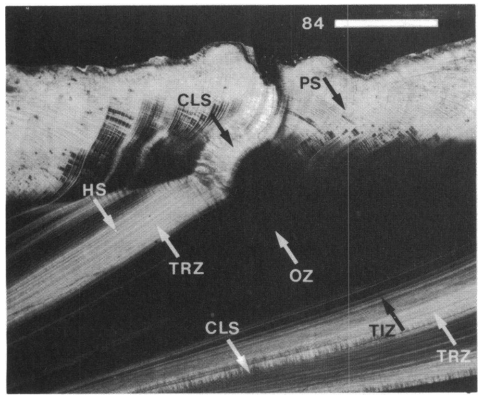
Both specimens (figs. 110, 111) also show poor winter growth during the second winter preceding the terminal year. At least one of the other shells, despite its obscured margin, shows the same effect. This is evidence, although admittedly not overwhelming, that these shells were all gathered in a single season.

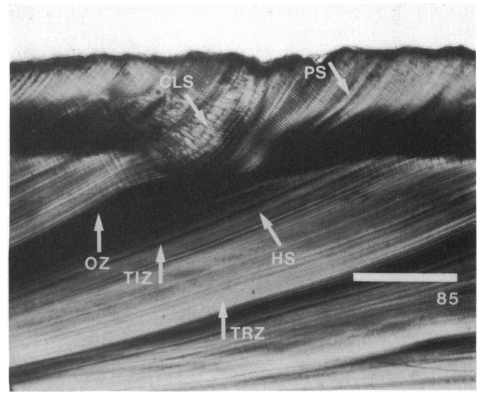
OBSERVATIONS: *Seaside I*. Eight specimens from Feature 15 were sectioned and examined. Three could not be used because the stress zones were weak or absent (these may have been juvenile shells, which have not yet been studied adequately). The remaining five had well-developed stress zones, but only three had completely "normal" (based upon recent *Mercenaria* from the area) growth patterns (fig. 112); one of the others had multiple notches and discontinuities in the stress zone, whereas the other exhibited a trend of *increasing* opacity for some distance beyond the growth halts (fig. 113). Despite this, all five ended their shell growth a short distance beyond the last stress zone; if the stress zones correspond to the summer growth halts of recent *Mercenaria* from the region, then the time of death was probably around December or January.

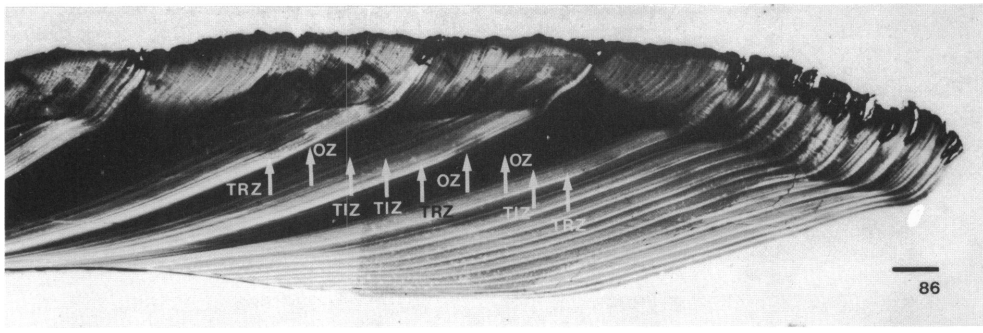
OBSERVATIONS: *Habitation sites*. Clam shells from several prehistoric shell middens on St. Catherines Island have been examined with some success. This research is still in progress and will be reported later.

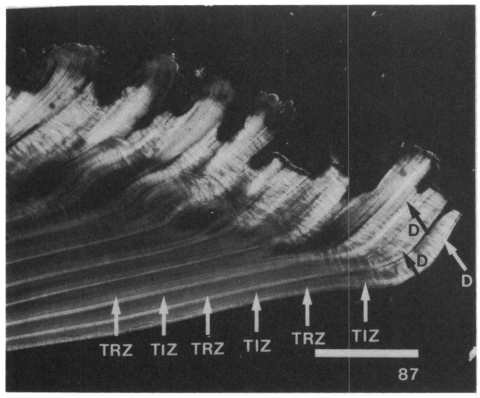
CONCLUSIONS. Of thirteen shells examined from two sites, six could not be interpreted due to weak or obscured growth patterns or insufficiently large fragments. Each of the other seven indicated that death had occurred about two months after a major stress period, and analogy with recent *Mercenaria* suggests that the shells were harvested in December or January. Caution is in order because two of the seven had growth patterns differing in detail from any so far observed in the recent *Mercenaria*, and the possibility exists that they came from a different environment; opposing this is the fact that these indicate the same season of harvesting as the five shells whose growth patterns do match those of recent shells.

Studies of this sort have great potential for seasonal dating of archaeological sites. Current analyses of larger samples promise to go further toward realizing that potential.









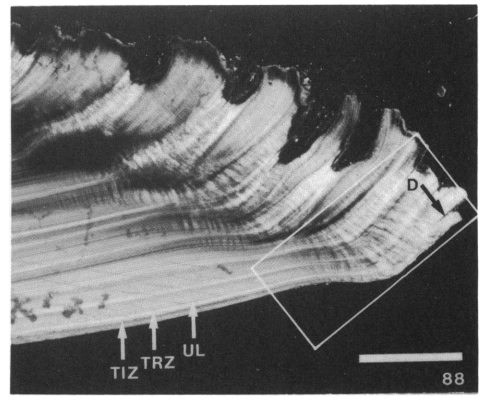


FIG. 84. Thin section of mature region of a specimen (SCR-11) collected alive on November 28, 1975. For explanation of symbols on arrows see figure 82. Scale bar is 1 mm.

FIG. 85. Thin section of mature region of a specimen (SCR-03) collected alive on October 22, 1975. For explanation of symbols on arrows see figure 82. Scale bar is 1 mm. Plane polarized light.

FIG. 86. Thin section of margin, senile region, and parts of mature region of a specimen (SCR-34) collected alive on May 15, 1976. For explanation of symbols on arrows see figure 82. Scale bar is 1 mm. Tungsten illumination.

FIG. 87. Thin section of senile region and margin of a specimen (SCR-12) collected alive on November 28, 1975. For an explanation of symbols on arrows see figure 82. Scale bar is 1 mm.

FIG. 88. Thin section of the margin and senile region of a specimen (SCR-22) collected alive on March 25, 1976. For an explanation of symbols on arrows see figure 82. Scale bar is 1 mm. Rectangle indicates approximate position of figure 106.

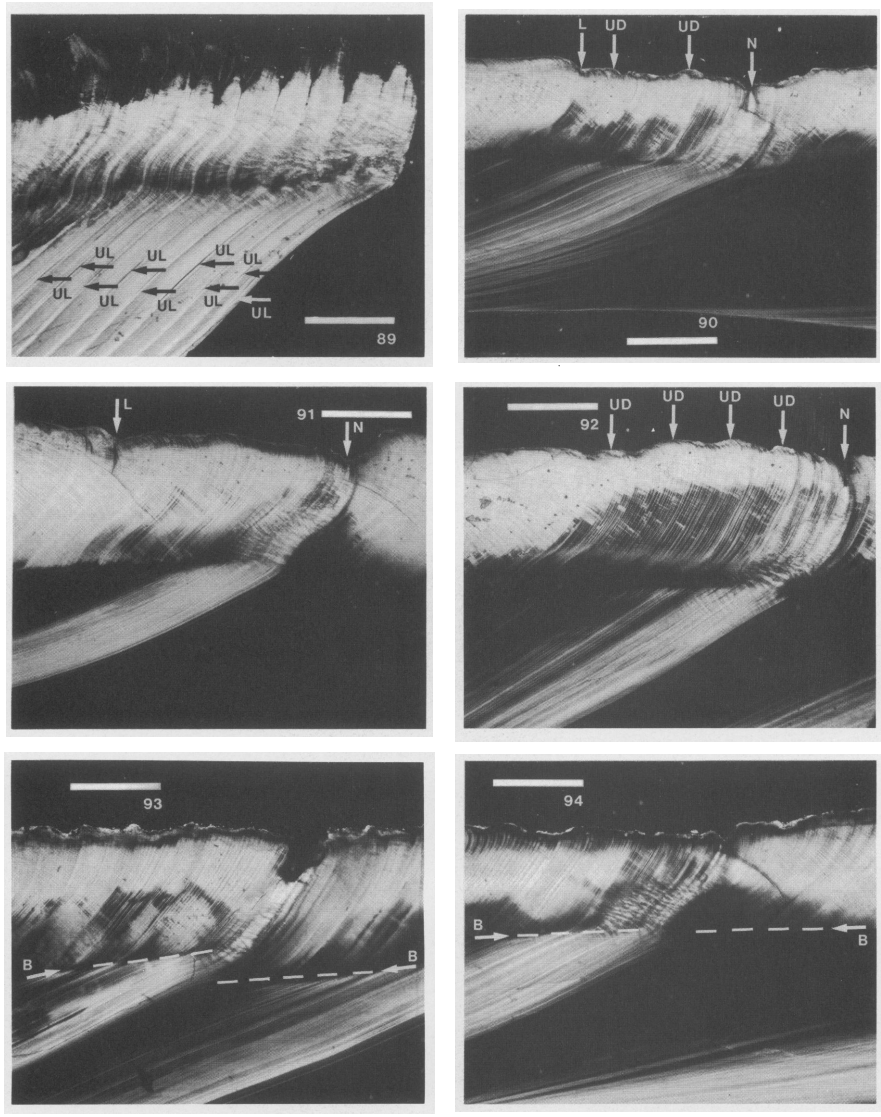


FIG. 89. Thin section of senile region and margin of a specimen (SCR-70) collected alive on March 23, 1977. For an explanation of symbols on arrows see figure 82. Scale bar is 1 mm.

FIG. 90. Thin section of mature region of a specimen (SCR-11) collected alive on November 28, 1975. For an explanation of symbols on arrows see figure 82. Scale bar is 1 mm.

FIG. 91. Thin section of mature region of a specimen (SCR-15) collected alive on November 28, 1975. For an explanation of symbols on arrows see figure 82. Scale bar is 1 mm.

FIG. 92. Thin section of mature region of a specimen (SCR-64) collected alive on March 23, 1977. For an explanation of symbols on arrows see figure 82. Scale bar is 1 mm.

FIG. 93. Thin section of mature region of a specimen (SCR-34) collected alive on May 15, 1976. For an explanation of symbols on arrows see figure 82. Scale bar is 1 mm.

FIG. 94. Thin section of mature region of a specimen (SCR-22) collected alive on March 25, 1976. For an explanation of symbols on arrows see figure 82. Scale bar is 1 mm.

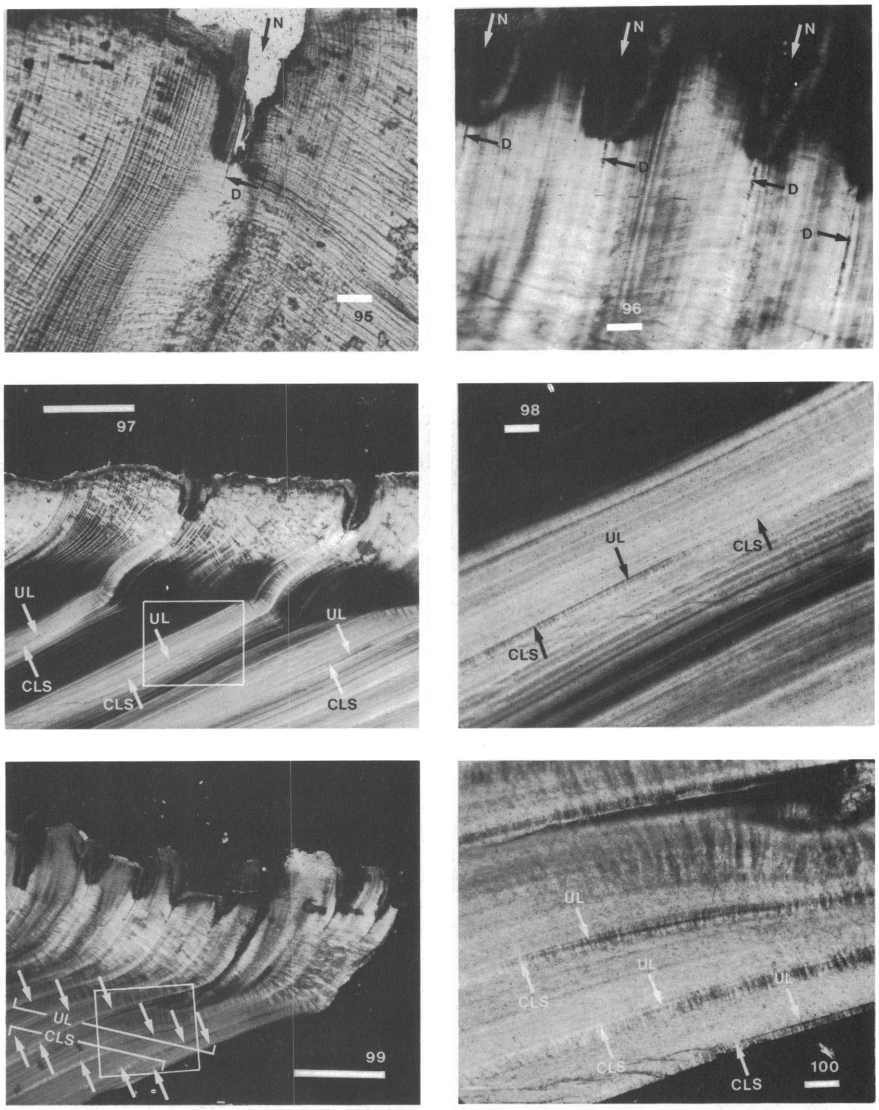


FIG. 95. Thin section of outer shell layer of mature region of a specimen (SCR-01) collected alive on October 22, 1975. For an explanation of symbols on arrows see figure 82. Scale bar is 0.1 mm. Plane polarized light.

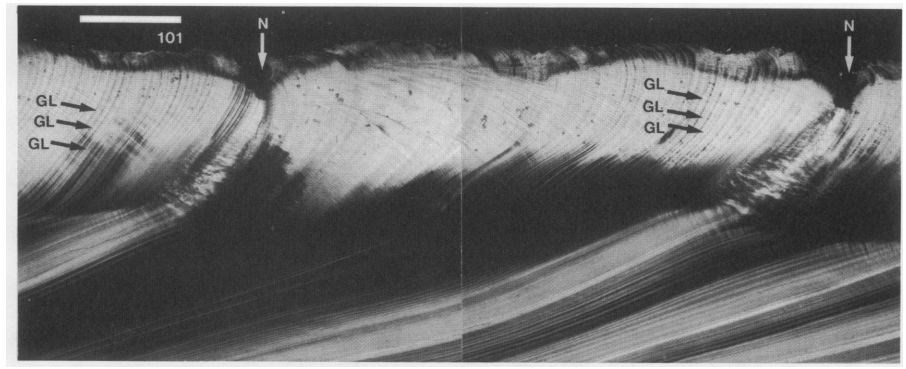
FIG. 96. Thin section of outer shell layer on senile region of a specimen (SCR-34) collected alive on May 15, 1976 (a higher magnification of a portion of the thin section seen in fig. 83). For an explanation of symbols on arrows see figure 82. Scale bar is 0.1 mm.

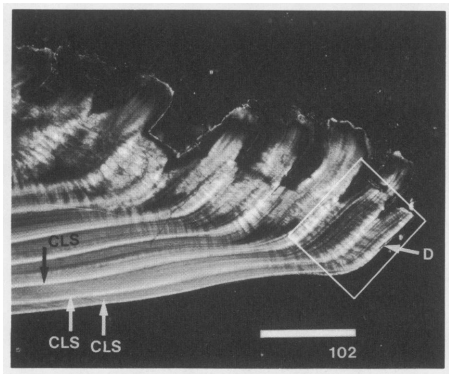
FIG. 97. Thin section of late mature region of a specimen (SCR-01) collected alive on October 22, 1975. For an explanation of symbols on arrows see figure 82. Scale bar is 1 mm. Rectangle indicates approximate position of figure 98.

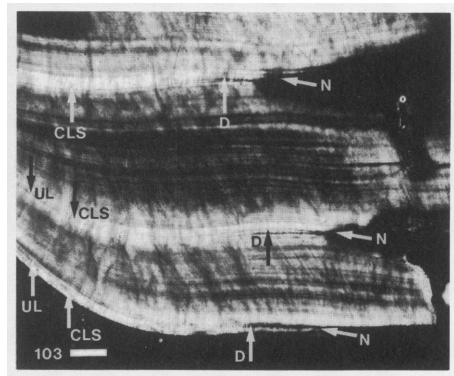
FIG. 98. Thin section of middle shell layer of a specimen (SCR-01) collected alive on October 22, 1975 (a higher magnification of a portion of the thin section seen in figure 97). For an explanation of symbols on arrows see figure 82. Scale bar is 0.1 mm.

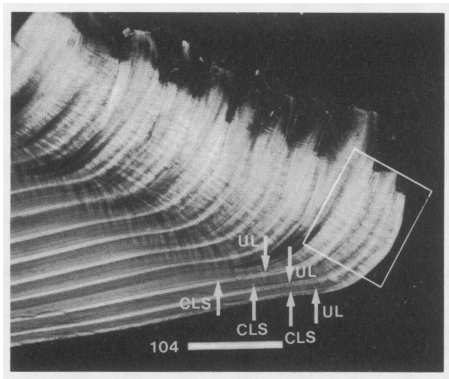
FIG. 99. Thin section of the margin and senile zone of a specimen (SCR-01) collected alive on October 22, 1975. For an explanation of symbols on arrows see figure 82. Scale bar is 1 mm. Rectangle indicates approximate position of figure 100.

FIG. 100. Thin section of the middle shell layer and inner surface in the senile region of a specimen (SCR-01) collected alive on October 22, 1975 (a higher magnification of a portion of the thin section seen in fig. 99). For an explanation of symbols on arrows see figure 82. Scale bar is 0.1 mm.









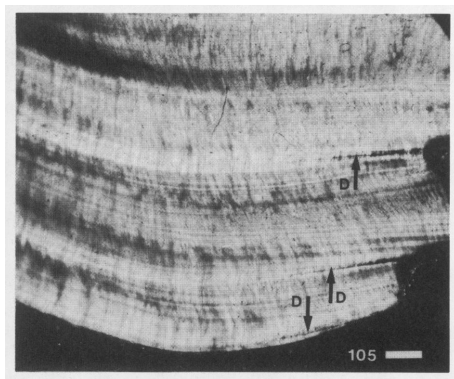


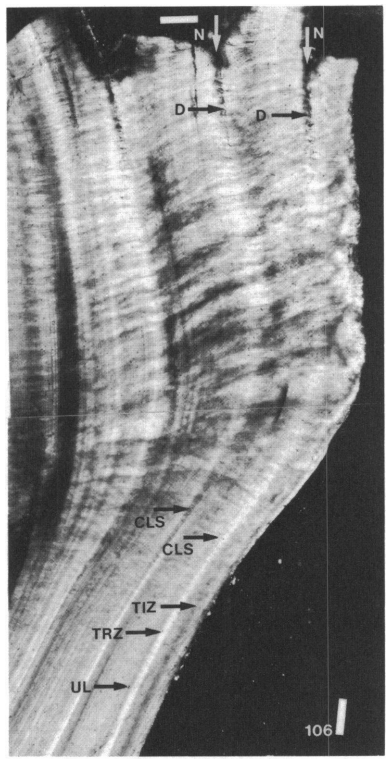
FIG. 101. Thin section of the outer shell layer and portions of the middle shell layer of the mature region of a specimen (SCR-15) collected alive on November 28, 1975. For an explanation of symbols on arrows see figure 82. Scale bar is 1 mm.

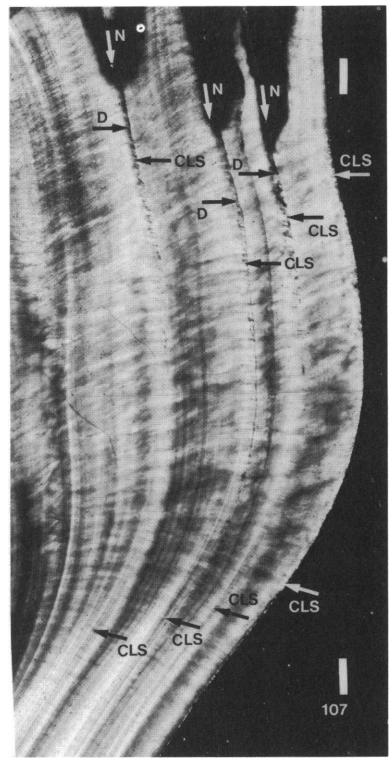
FIG. 102. Thin section of the margin and the senile region of a specimen (SCR-05) collected alive on October 22, 1975. For an explanation of symbols on arrows see figure 82. Scale bar is 1 mm. Rectangle indicates approximate position of figure 103.

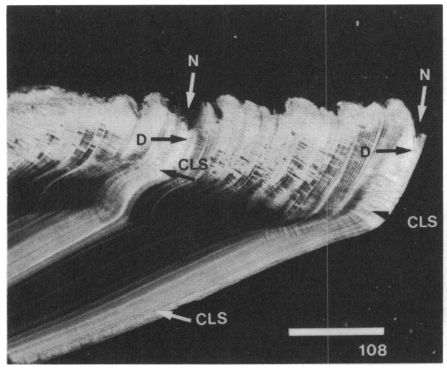
FIG. 103. Thin section of the margin of a specimen (SCR-05) collected alive on October 22, 1975 (a higher magnification of a portion of the thin section seen in fig. 102). For an explanation of symbols on arrows see figure 82. Scale bar is 0.1 mm. Direction of growth is down and to the right.

FIG. 104. Thin section of the margin and senile region of a specimen (SCR-15) collected alive on November 28, 1975. For an explanation of symbols on arrows see figure 82. Scale bar is 1 mm. Rectangle indicates approximate position of figure 105.

FIG. 105. Thin section of the margin and the outer shell layer of the senile region of a specimen (SCR-15) collected alive on November 28, 1975 (a higher magnification of a portion of the thin section seen in fig. 104). For an explanation of symbols on arrows see figure 82. Scale bar is 0.1 mm. Direction of growth is down and to the right.







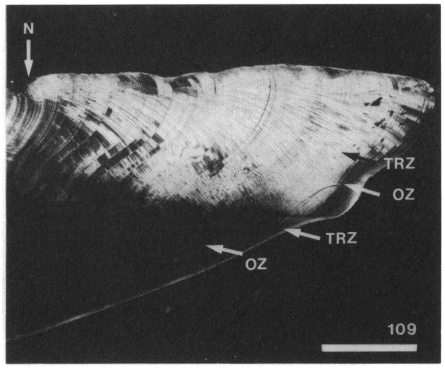
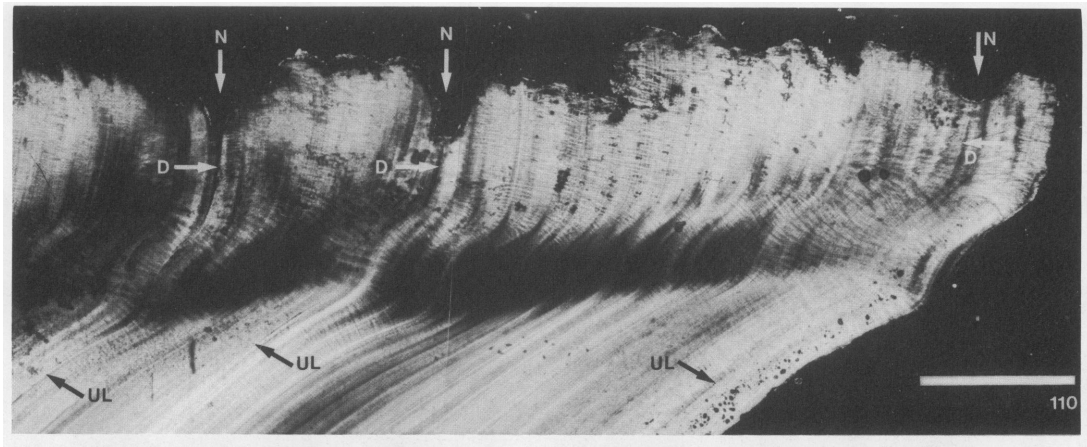


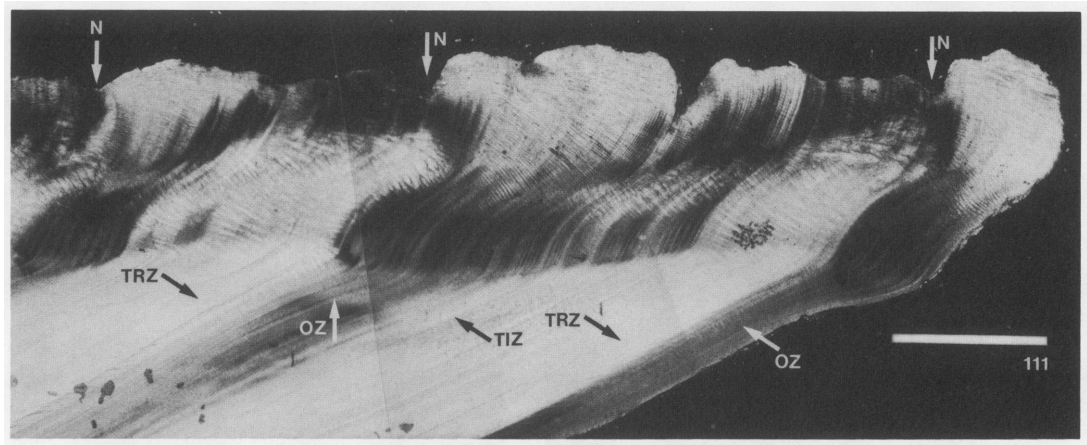
FIG. 106. Thin section of the margin and senile region of a specimen (SCR-22) collected alive on March 25, 1976 (a higher magnification of a portion of the thin section seen in fig. 88). For an explanation of symbols on arrows see figure 82. Scale bar is 0.1 mm. Direction of growth is up and to the right.

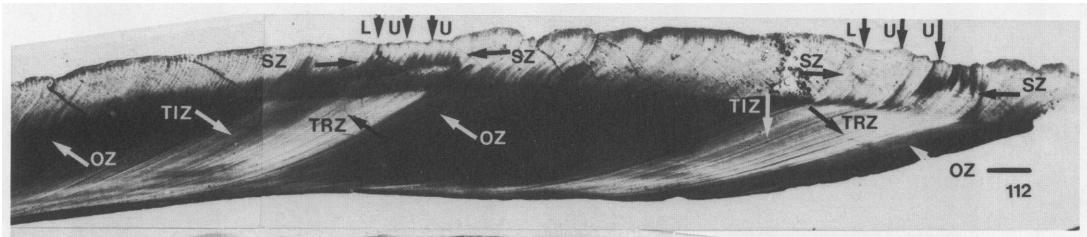
FIG. 107. Thin section of the margin and senile region of a specimen (SCR-34) collected alive on May 15, 1976 (a higher magnification of a portion of the thin section seen in fig. 83). For an explanation of symbols on arrows see figure 82. Scale bar is 0.1 mm. Direction of growth is up and to the right.

FIG. 108. Thin section of the margin and mature region of a specimen (SCR-11) collected alive on November 28, 1975. For an explanation of symbols on arrows see figure 82. Scale bar is 1 mm.

FIG. 109. Thin section of the margin and mature region of a specimen (SCR-63a) collected alive on March 23, 1977. For an explanation of symbols on arrows see figure 82. Scale bar is 1 mm.







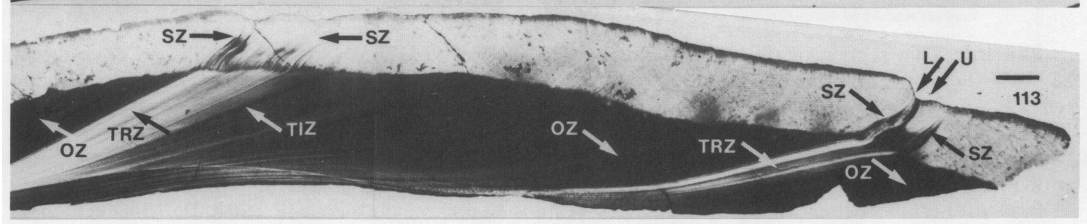


FIG. 110. Thin section of the margin and mature region of a specimen (SCA-508) associated with McLeod Mound. For an explanation of symbols on arrows see figure 82. Scale bar is 1 mm.

FIG. 111. Thin section of the margin and mature region of a specimen (SCA-509) associated with McLeod Mound. For an explanation of symbols on arrows see figure 82. Scale bar is 1 mm.

FIG. 112. Thin section of the margin and mature region of a specimen (SCA-651) associated with Seaside I. For an explanation of symbols on arrows see figure 82. Scale bar is 1 mm. Tungsten illumination.

FIG. 113. Thin section of the margin and mature region of a specimen (SCA-649) associated with Seaside I. For an explanation of symbols on arrows see figure 82. Scale bar is 1 mm. Tungsten illumination.

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