MISSISSIPPIAN PERIOD COMMUNITY ORGANIZATIONS ON THE GEORGIA COAST

By

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A DISSERTATION PRESENTED TO THE GRADUATE COUNCIL OF
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Chairman: Jerald T. Milanich
Major Department: Anthropology

This dissertation examines Mississippian Period cultural adaptations in a coastal environment as indicated by certain social, spatial, and temporal dimensions of community organization. Hypotheses concerning basic elements of adaptation are posited and an annual model of the aboriginal cultural system is constructed through an examination of sixteenth-century accounts and data from modern ecological sources. Preliminary investigations at the Kenan Field site on Sapelo Island, Georgia, are discussed in detail and the archaeological data are analyzed for evidence required to test the stated hypotheses and systems model. Analysis focuses upon subsistence information, architectural details, and the spatial distribution of material-culture elements.

Two primary conclusions are drawn from the research. The first is that the Savannah Phase, a Mississippian Period manifestation on the Georgia coast, was defined by a chiefdom-level cultural system that was distinctively adapted to the coastal environment. The second basic conclusion is that the Savannah Phase was followed by a period of cultural change that appears to be associated with late sixteenth century Spanish activities on the Georgia coast.

CHAPTER I
INTRODUCTION

This is an archaeological study of cultural adaptations on the Georgia coast during a latter portion of the Mississippian Period (ca. A.D. 1000 - 1540). Primary data are from preliminary investigations at the Kenan Field site on Sapelo Island, Georgia, and consist of settlement and subsistence details along with other information concerning material culture. Ethnohistoric accounts of the coastal inhabitants during the sixteenth century and published archaeological data provide additional evidence for analysis and interpretation.

Concepts and Theory

The study of settlement and subsistence from materials preserved in the archaeological record has proven to be a productive research orientation for the archaeologist. This mode of inquiry has its roots firmly set in the regional analysis and cultural ecology of Julian Steward (1938, 1955), with its archaeological application in the Viru Valley of Peru (Willey 1953).

A general definition of settlement pattern is "the way in which man disposed himself over the landscape on which he lived" (Willey 1953:101). As Willey later points out,

> settlements are a more direct reflection of social and economic activities than are most other aspects of material culture available to the archaeologist. . . [but] like most other facts, those of settlement are robbed of much of their importance when considered in isolation [Willey 1956:1].

Borrowing the ideas of social "microstructure" and "macrostructure" (Chang 1968:7), Bruce Trigger refined settlement pattern categories with the concepts of "microsettlement" and "macrosettlement" (Trigger 1968:54-55). Macrosettlement pattern analysis is the distributional study of habitation areas over the environment, while microsettlement analysis examines habitation components in relation to one another within a community or focuses on details of individual structures. Macroanalysis is concerned with intersite relationships and microanalysis with intrasite details.

Quantitative techniques, locational models, and ecological theory have provided a major impetus for development in settlement subsistence studies since the 1960's. It is very clear that the application of advanced analytic techniques, or even the study of settlement and subsistence pattern, is of limited value as a goal in itself. Rather, techniques and theories offer a key to the understanding and explanation of cultural systems. Central to this understanding is the concept of adaptation. This concept is a fundamental assumption in all ecological studies, including archaeological ones dealing with extinct cultural systems through analysis of settlement and subsistence data. Adaptation is, in very simple terms, the process of successful adjustment to and articulation with the environment. In the case of a cultural system, this success is demonstrated by the continued existence, or survival, of the system.

Structural elements of the materialist-hierarchic model of culture, explicitly used by Leslie White (e.g. 1969) and more implicitly by Julian Steward (e.g. 1955:184-185), consist of ideology, social

and political organization, and technology. Technology provides a base for the cultural pyramid and is the primary means of adaptation, implemented through productive arrangements ordered by social and political organization, and supported by ideological constructs.

The model is systemic and dynamic. It is dynamic in that cultural change is affected by alterations in the structural components, basically through thermodynamic increase as proposed by White (1969:363-393) and by modification in technology and productive arrangements as suggested by Steward (e.g. 1955:37). It is dynamic also in the sense that the elements are functionally related and interact with one another in the form of a cultural system. That is, culture is an interrelated whole.

Structured within a materialist framework, cultural ecology seeks to "explain the origin of particular cultural features and patterns which characterize different areas" (Steward 1955:36). However, the concept is "less concerned with the origin and diffusion of technologies than with the fact they may be used differently and entail different social arrangement in each environment"(Steward 1955:38).

Cultural ecology focuses on cultural adjustments to local environment by discerning those cultural features "which empirical analysis shows to be most closely involved in utilization of environment in culturally prescribed ways"(Steward 1955:37). Those features of culture basic to environmental utilization, the "cultural core," are those "most closely related to subsistence activities and economic arrangements." The core includes such social, political, and religious

patterns as are empirically determined to be closely connected with these arrangements" (Steward 1955:37).

Perhaps the most important deficiency within the cultural ecology method is that the role of dynamic interplay between culture and environment is minimized. The method is constructed to discern cultural features caused by adjustment to environmental factors. A feedback concept is missing; the treatment of culture as an interacting element within an ecosystem. Attention to feedback loops and cybernetic theory has proven important in archaeological research (see Plog 1975). However, the original formulation of cultural ecology remains a valuable basic research tool, and is used here with an awareness of the importance of system interactions within the environment.

Cultural ecology, with the added feedback dimension, is employed in this study as a data organizing tool and as a heuristic device. Essentially, the concept provides a general problem orientation for research and analysis. Ethnohistoric and archaeological data are analyzed for details of technology, subsistence activities, productive arrangements, social and political organization, and ideology, with reference to aspects of the local environment and material exchanges.

Problems and Hypotheses

The explication of prehistoric cultural adaptations along the southeastern Atlantic coast has received the increasing attention of archaeologists in recent years. This research is discussed in later chapters. It is sufficient to note here that major gaps exist in our knowledge. One such gap involves Mississippian Period adaptations

in the region. Although early ethnohistoric accounts indicate a marked degree of social complexity, there is little understanding of the range and function of the social components in terms of adjustment to environmental factors and dealings with other cultural systems.

Initial investigations during the summer of 1976 at the Kenan Field site on Sapelo Island suggested that more intensive, problem oriented research would yield substantial information on the adaptations of a late prehistoric coastal community. Kenan Field is located on an extension of land that juts out briefly about midway along the western side of Sapelo Island. The site is rather rectangular in shape, corresponding to the form of the land upon which it is situated. Salt marsh bounds Kenan on all but its eastern side. The Duplin River approaches the northwest corner of the field, and a portion of the south end is accessible through a small tidal creek (Figure 1). The site area, defined by the shell midden distribution, measures 60 hectares and contains 589 discrete shell middens.

Research efforts during 1976 concentrated on mapping and limited test excavation. Surface debris in the planted-pine stand that covers Kenan Field had been destroyed by fire, exposing the shell deposits, which were mapped. Pottery from the test excavations was predominately cord-marked and check-stamped Savannah-Phase wares, and much less frequently, Irene complicated-stamped pottery. Post holes marking construction activity were exposed beneath the 25 cm. plow zone. Since excavation was restricted to a small area, the only conclusions supported at this point were that at least a portion of the site

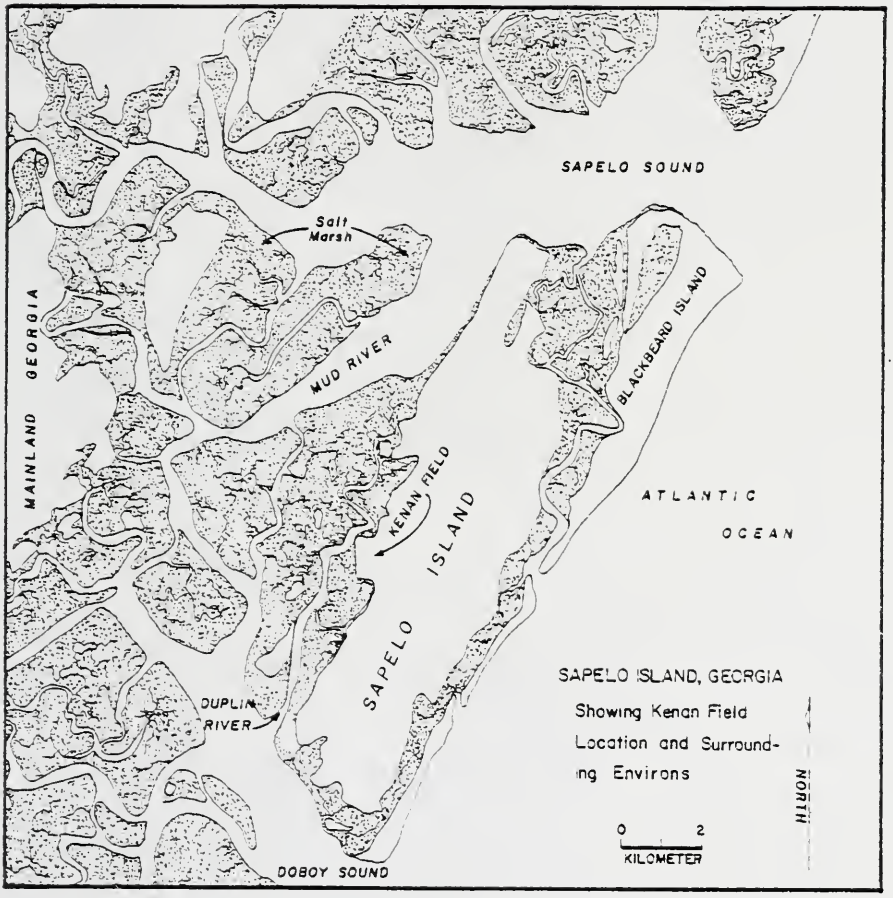


FIGURE 1
SAPELO ISLAND, GEORGIA

dated to the Mississippian Period and that detectable structural features were present.

The shell middens and other topographic features, including two earthen mounds and a long earthen embankment, were mapped to provide a model of the location and surface distribution of cultural features at the site. The map (Figure 2) shows rather ambiguous patterns of refuse deposition, probably because of sequential rearrangement of settlement components.

However, certain general patterns are evident. The map shows intricate linear and aggregate arrangements of midden deposits which suggest a complex village plan. At least four distinct areas may be defined:

(1) a separate clustering of shell middens in the northeastern portion of the site;
(2) linear arrangements in the central area;
(3) an arc-shaped pattern of large shell middens defining an area to the west of Mound 'A';
(4) an area more or less void of midden refuse in the southern portion of the site, south of the linear embankment and near Mound 'B'.

These spatial data are impossible to interpret because cultural associations are undemonstrated. Knowledge of the cultural provenience of the shell middens and the relationship between midden location and structural components are specifically required. Once these data are established, structural location should be predictable from refuse location. The hypothesis is that refuse was deposited by definable social units within the village, and that this deposition was in reference to structures that housed these units.

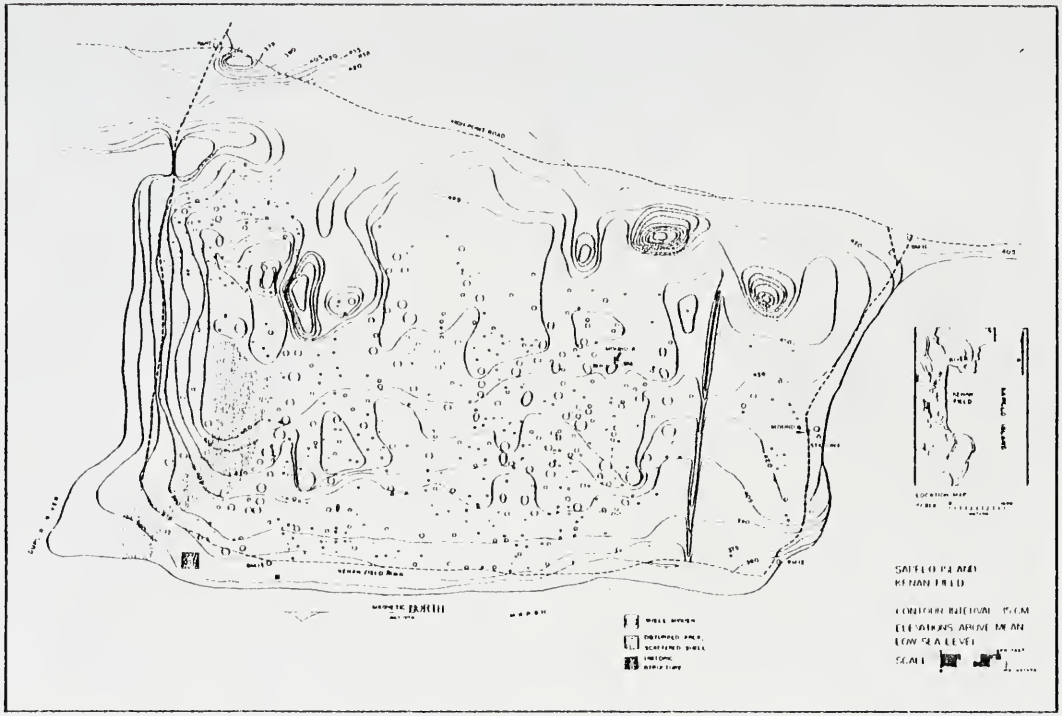


FIGURE 2
MAP OF THE KENAN FIELD SITE

Formally, the purpose of this dissertation is to test by advanced field methods the following hypotheses and their implications:

Hypothesis 'A': The Mississippian Period community at the Kenan Field site was characterized by a formal village plan which reflects the adaptations of a ranked society to environmental factors and relations with other cultural systems.

Testable Implications:

1. The spatial arrangement of structural remains is patterned.
2. Socially and/or functionally distinct structures are associated with particular areas of the village, and may show repeated construction in the same area.
3. Socially and/or functionally distinct structures are discernible in:
   a. Structural details;
   b. Associated subsistence refuse;
   c. Associated material culture.
4. Adaptations to the natural environment reflected by the village plan are discernible in:
   a. Form and distribution of structural remains;
   b. Communal food-storage facilities.
5. Adaptations to the social environment reflected by the village plan are discernible in:
   a. Defensive fortifications;
   b. Exotic materials.

Hypothesis 'B': Social organization of the Mississippian Period community at Kenan Field was an adaptation for procurement of strategic resources.

Testable Implications:

1. Social organization is discernible in:
   a. The village plan;
   b. Structural form and function;
   c. Distribution of contemporary and discrete material culture assemblages;
   d. Redistributive activities.
2. Productive arrangements are discernible in:
   a. Subsistence technology;
   b. Form of social units engaged in subsistence activities;
   c. Settlement location in relation to strategic resources;
   d. Seasonal and spatial occurrence of strategic subsistence resources.

CHAPTER II
METHODS

Mapping Procedures

The map of Kenan Field provides a surface-distribution model that is the basis for sampling and ultimately the basis for conclusions drawn from these data. The procedures used in mapping determine the accuracy of this base model and the amount of confidence that can be placed in it. Thus, the mapping technique is discussed in some detail.

Kenan Field was mapped using controlled transit-stadia transects. A base line of stations was set at 50 m. intervals along the western side of the site, between two permanent bench marks. Corridors, 50 m. to 75 m. wide, were defined extending east and west from these stations, from the western marsh edge to High Point Road.

The transit was positioned within a corridor in reference to the associated station. The rod-man then walked from one side of the corridor to the other in a north to south and south to north fashion, using the 2.5 m. space between the rows of planted pine trees as a guide. Within each corridor, every other tree row was walked and the intervening space was inspected. The location of shell middens was recorded with the transit, and shell-midden size and form were estimated. Dimensions of small middens were visually estimated and larger middens were paced. Shell midden center-point elevations, immediate surrounding surface elevations, and other surface elevations at approximately 15 m. intervals were recorded from a metric stadia rod. The mounds and other

earthworks were surveyed at smaller surface intervals, generally from 1 m. to 3 m. apart.

Survey thus proceeded down a corridor, the northern extent of reconnaissance being marked with flagging and the transit being moved at about 150 m. intervals. When the eastern end of a corridor was reached, the next to the north was surveyed back towards the western base line. The formerly flagged line now marked the southern extent of the new corridor and the northern side was flagged for future reference. Instrument position was re-established at the western end of the corridor in reference to the base-line station, and the accumulated transit error averaged over the number of set-up points used in the pair of corridors. Transit readings were then plotted on metric graph paper at a scale of 1:2000.

Crucial to the survey was the definition of shell middens. Shell middens were defined by noticeable concentrations of shell debris usually accompanied by a slight rise above the surrounding surface. Kenan Field was used for agriculture beginning perhaps earlier than 1800, and continued to be cultivated at intervals until 1951 when the pines were planted. This agricultural activity dispersed the shell deposits and makes definition of the smaller middens difficult. However the results of the map are accurate and replicable, as individual shell middens were re-located during the summer of 1977 using a transit and following the declinations and distances presented on the map. The only inaccuracies noted were the erroneous definition of two small shell middens and a single large shell midden. These were originally defined more by slight increases in surface elevation than by noticeable shell concentrations.

Sampling Procedures

The shell middens encountered at Kenan Field were divided into five classes based on size differences (Figure 3). The three larger diameter classes (A,B,C) were defined by natural breaks in frequency distribution and the smaller two (D,E) by a marked decrease in frequency. Measurement of those few middens which are elongated rather than annular were converted to averaged diameters for classification purposes.

The two classes of shell middens with the largest diameters were used to define sampling strata and substrata. The two earthen mounds were included within the largest diameter class for strata definition purposes.

Strata were formed by constructing Theissen polygons (see Kopec 1963, Haggett 1965:247-248) with the shell middens as referents. Each polygon defines that area which is closer to the designating shell midden than to any other midden of the same or larger class. Polygons were initially constructed with equal weight being placed on both Class A and Class B middens. This defined the sample substrata. Eleven strata were then defined by drawing polygons in reference to only Class A middens. The boundaries of these strata were then adjusted to accommodate the substrata within each polygon (Figure 4).

One of the polygon strata, Stratum F, was chosen for sampling. Stratum F confines an area of 51,033 square meters, contains 91 shell middens, and is divided into six substrata. Selection of this stratum for testing was non-random. It was chosen because of its

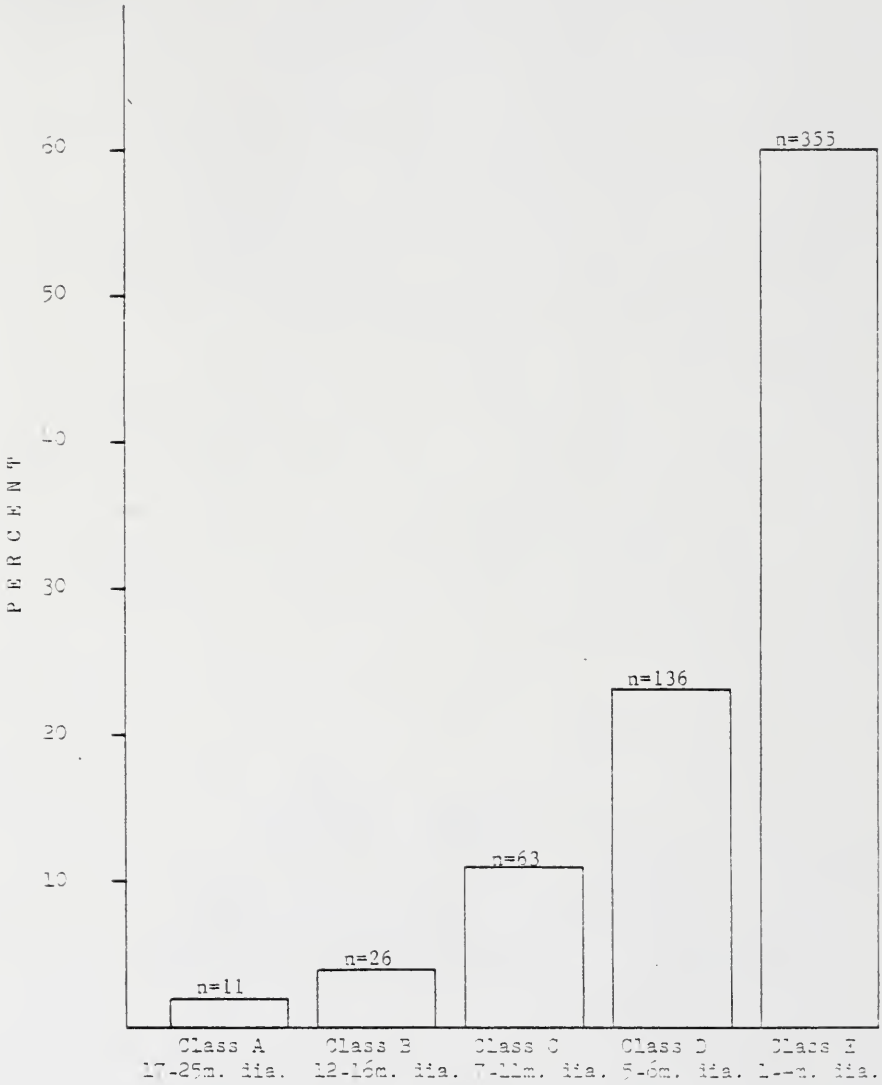


FIGURE 3
SIZE-FREQUENCY DISTRIBUTION OF SHELL MIDDENS AT KENAN FIELD

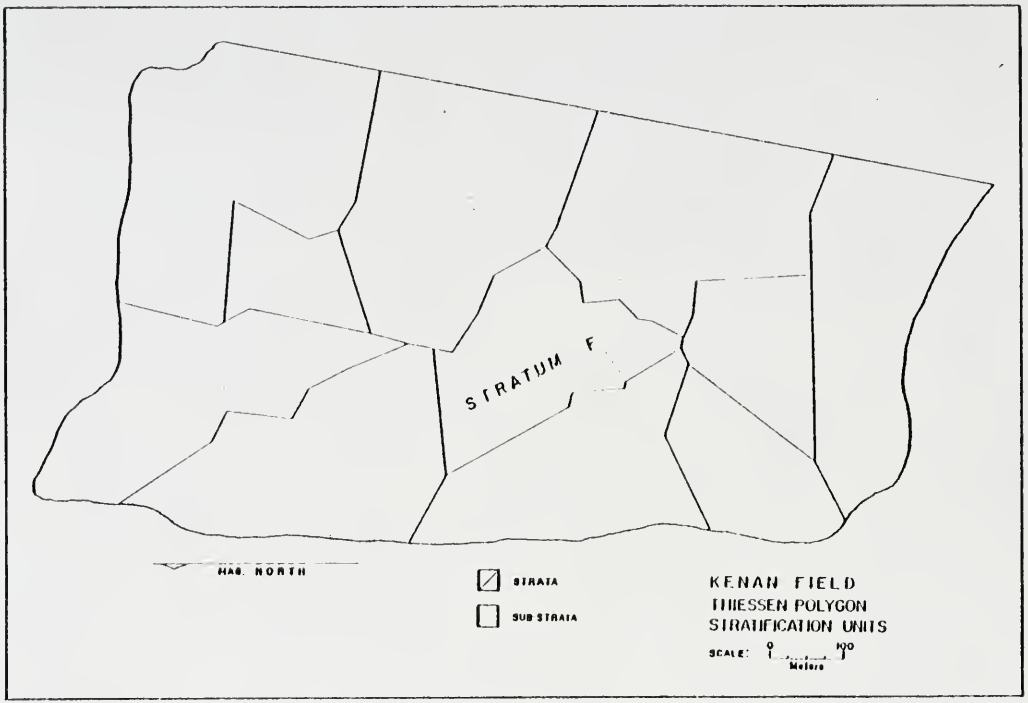


FIGURE 4
KENAN FIELD STRATIFICATION UNITS, SHOWING LOCATION OF RESEARCH STRATUM F

central position within the site, and because it encloses variable areas of shell midden arrangements, from the arch-shaped pattern west of mound A to the linear arrangement area in the central part of the site.

Initially, a random sample of each substratum within Stratum F was planned. Because of several unpredicted factors that will be discussed later, only three were investigated.

Each of these substrata was tested with a randomly selected transect. Sample transects were aligned between 11° and 15° east of north, determined by the arrangement of the planted-pine rows at the site. It is assumed that placement is unbiased in reference to the prehistoric component. The plow zone along the 1.9 m. transect lines was removed by a tractor with a rear-mounted dozer blade, and the transect surface was leveled by hand with shovels. All observed features were then mapped with an alidade, and artifacts were recovered and their provenience recorded.

The sole purpose of the sample transects was to expose structural locations. More extensive and formal excavation was required for definition of structural form and cultural associations. Far more structures were located by the transects that could be exposed by extensive excavation during the 14-week field period during the summer of 1977. Selection of structures to be more completely defined was non-random. It was decided that each structure within a transect required definition and that second level random sampling was inappropriate. Excavation was expanded in those transect areas

which contained the most structural activity. The sample is probably biased at this point towards the archaeologically more complex structures.

Structural areas were excavated in 2 m. x 2 m. and in 1 m. x 4 m. units. Each unit was excavated in levels to the base of the plow zone. The first excavation level extended 15 cm. beneath the surface and defined a zone of maximum agricultural disturbance. This zone in approximately every other excavation unit was screened through 1/4 in. or 1/4 in. x 3/4 in. mesh. Depth of the second excavation level was more variable but never extended more than 30 cm. beneath the surface. This level defined a less disturbed portion of the plow zone and cultural material from each excavation unit was recovered by screening, usually with 1/4 in. mesh hand screens. Excavation was terminated in most areas at the base of the plow zone and features which were intrusive into the underlying subsoil were mapped with an alidade or in reference to established grid stations.

Two structural areas were investigated outside of the sample design. Excavations were extended in the 1976 test area in an attempt to define that structure, and excavations were initiated in an area just west of mound A after a trial transect was cut that exposed structural elements.

In addition to structural area excavations, random samples were taken of each shell midden class within a substratum. The purpose of this was to secure a quantifiable sample of subsistence remains and determine the cultural association of the shell middens. A 25% sample of each shell midden class within each substratum was randomly

selected for testing. The actual sample fraction varies due to the number of shell middens per class per substratum. For example, by definition each substratum contains only one Class A or Class B shell midden. Thus, 100% of this class per substratum was tested.

Each selected shell midden was tested by placing a 1.5 m. x 2 m. test pit within the deposit. This test pit was divided into four unequal, horizontal sections (see Figure 5). Section A was excavated in 15 cm. levels to the base of the midden and the matrix was screened through 1/4 in. mesh. Excavation then continued until sterile subsoil was reached. Cultural material from each level was retained and the shell material was identified and weighed in the field.

Profiles of the eastern wall of each test pit were recorded, and Sections B, C, and D were excavated by natural stratigraphic levels. A total sample of approximately 1 liter from each level was recovered in Section C. These samples are reserved for future analysis. Sections B and D were independently screened through 1/4 in. mesh and processed the same as Section A. In addition, midden that passed through the screen was collected and processed by screening with 1/16 in. mesh in water to remove the soil matrix. Recovered material was then spread on plastic sheets to dry. This material was manually sorted in the field and the faunal remains were separated from the shell debris and artifacts. The debris was retained and samples were later processed by chemical flotation ($ZnCl_2$) to recover plant and animal remains that were overlooked in the field.

The field methods used at Kenan Field were designed to provide data for testing the stated hypotheses. Execution of these methods

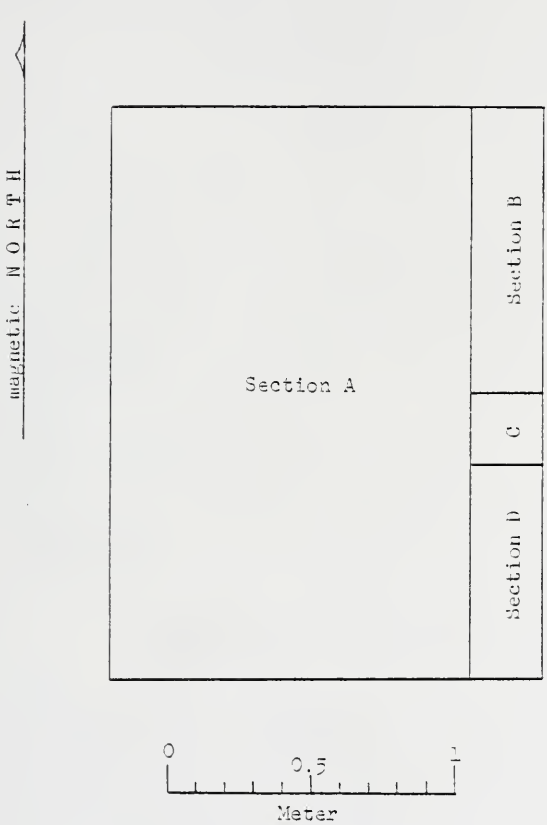


FIGURE 5
STANDARD FORMAT OF SHELL-MIDDEN TEST PITS

required more field time than was originally predicted. The main reason for this was the unanticipated number and large size of structures that were encountered.

A significant amount of data was gathered, but execution of the sampling design is incomplete. For this reason the final statistical treatment and their conclusions must await additional field work. The study presented here is preliminary in this respect; however, enough information is available at this point for partial resolution of the hypotheses.

Faunal and Floral Analyses

Fauna from the Kenan Field excavations were identified using the comparative collections of the Zooarchaeology Laboratory, Florida State Museum. Skeletal elements recovered from each provenience unit were identified to the lowest reliable taxon and elements of each taxon were weighed. Minimum number of individuals were determined for species identified from shell-midden test pits and undisturbed features. Faunal material recovered from general excavations in the structural areas was fragmented due to agricultural disturbance and required a different format for the presentation of analysis results. This faunal material was summarized by the relative skeletonal-weight contribution of each identified species within specific contexts.

Floral remains encountered at Kenan Field were identified to the lowest reliable taxon using the comparative collections and references of the Herbarium at the University of Florida.

Pottery Analysis

Pottery recovered from the Kenan Field excavations was analyzed to provide evidence of both diachronic and synchronic variability. Analysis focused on identification of surface treatment and design elements, tempering components, and rim forms. Tempering, as used here, refers to aplastic inclusions with the pottery paste.

Classification of tempering material conforms to categories used in previous type descriptions of Southeastern pottery (see March 1934, Southeastern Archaeological Conference 1938). It should be noted that although these aplastic categories are widely used and are apparently reliable, their simple definitions have remained implicit. Sand tempering is self-explanatory and refers to fine grains of sand, sherd or grog tempering denotes crushed fragments of potsherds included within the paste, and grit tempering refers to coarse granules of sand. Sherd tempering is a nominal category, while the sand and grit categories are ordinal. Analysis in the present study considers the presence and relative proportions of tempering materials within each potsherd, and thus is basically an ordinal quantification. A sample of the analysis forms used for the pottery analysis is shown in Figure 6 and a flow chart of the analysis procedure is presented in Figure 7.

The screening techniques employed in the field recovered many very small sherds. These sherds were usually impossible to identify with any confidence and they were considered to contain little information beyond that presented in the larger sherds. Therefore, a sampling system was devised to remove small sherds from detailed analysis. Separation by size was accomplished by placing pottery

Roman Field 1977 Pottery Analysis — Analyst: M E S

Excavation Unit: XXX R XXX — Level: 15-28 cm. — Cat. No. 342

Recovery Technique: 1/4" mesh — Structural Assoc.: Structure #2

Decoration	Temper	Fiber	Sand	Sand/Grog	Sand/Grit	Grog	Grog/Sand	Grog/Grit	Grit	Grit/Sand	Grit/Grog		
Punctated													
Incised													
Simple Stp.													
Cross Simple Stp.													
Linear Chk. Stp.													
Bold Chk. Stp.													
Chk. Stp.			1		2		1			2			
Fine Chk. Stp.													
Heavy Lnr. Crd.													
Heavy Tan. Cross Crd.													
Heavy Tan. Cross Crd.													
Fine Lnr. Crd.				2		1	2						
Fine Reg. Cross Crd.						1	1 (1)						
Fine Ran. Cross Crd.							1						
Rect. Comp. Stp.													
Curv. Comp. Stp.													
Filfot Stp.													
Burnished Plain				1		3							
Plain			1 (2)	2							1 (3)		
Unidentified			1							1			

Notes:

(1) shell-smoothed interior (2) St John's Plain (3) Rim

(4) (5) (6)

(7) (8) (9)

FIGURE 6
POTTERY ANALYSIS FORM

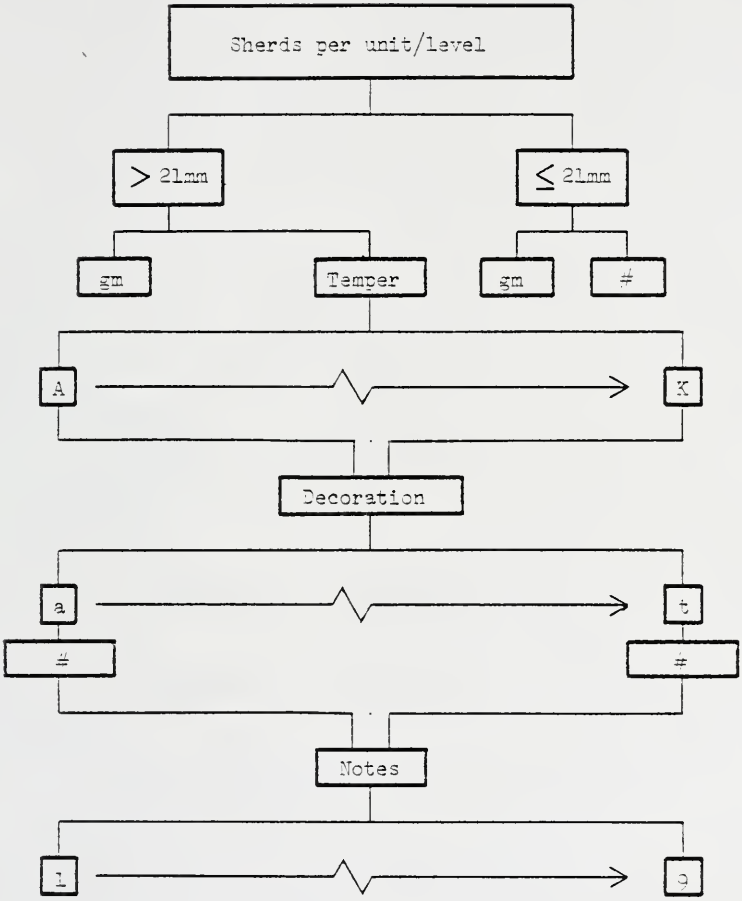


FIGURE 7
FLOW CHART OF PROCEDURES USED IN POTTERY ANALYSIS

from each provenience unit in a Clorox bottle neck with an inside diameter of 21 mm. Those sherds passing through the bottle neck were counted and weighed, and small rim sherds were removed for additional analysis. Those sherds larger than 21 mm. remained within the analysis process.

These larger sherds from each provenience were divided into groups with common tempering and surface treatment. The number of sherds within each group was recorded and notes were made of other traits such as shell-smoothed interiors and hone marks. All rims and a large sample collection were set aside for additional analysis and typology. Typologies were based on published type descriptions and comparative collections in the Florida State Museum, University of Florida Department of Anthropology, and the West Georgia College Archaeological Laboratory.

Lithics and Other Artifacts

Stone material was rare at Kenan Field. Those lithic artifacts which were encountered were identified by material and form, and when possible by function. Another rare category was pottery artifacts, i.e. re-utilized potsherds, consisting of a few sherd hones and one possible spindle whorl. Neither bone nor shell artifacts were recognized.

Spanish ceramics were infrequent and were not temporally distinctive. These consisted of three body fragments of olive jar that could have been manufactured as early as 1500 until later than 1800 (see Goggin 1960).

CHAPTER III
PERSPECTIVES ON MISSISSIPPIAN PERIOD COASTAL ARCHAEOLOGY

Environmental Summary

Aspects of the Georgia coast have captured the attention of scientists from several disciplines for many years. A great amount of published work reporting coastal research is scattered through the journals of each speciality. A useful summary of some of this research recently has been published (Johnson et al. 1974) and a study of the coastal environment from an anthropological point of view has been presented by Lewis Larson (1970). These two major works are used rather freely in the following summary description.

The coastal environment has been altered since the late prehistoric period by agricultural and industrial activities. Thousands of acres of delta-swamp forest around the mouths of freshwater rivers were cut during the late eighteenth and nineteenth centuries. These areas were dyked and became productive rice fields. Highland forest areas were also cut and the land planted during the plantation era, and low wet lands were drained to provide even more agricultural land. Clearing and draining continued well into the twentieth century. Even today some low mainland areas are being drained to provide pulpwood acreage (e.g. Gray 1933, Bonner 1964).

These changes in the landscape must have displaced and in many cases destroyed large segments of the biotic community. Certainly, repercussions were felt throughout the coastal environment. The late

perhistoric environment can, nevertheless, be approximated with modern ecological data. This information must be used critically and assessed with a knowledge of historic alterations. For example, vegetation and animal communities documented within a drained slough of a barrier island are of limited value as a base for prehistoric exploitation inferences.

Climate along the Georgia coast is rather moderate with warm to hot summers and cool winters. Annual rainfall averages around 50 inches and temperature averages just below 70° F. There are about 300 freeze-free days a year in the Brunswick area of the middle Georgia coast. Temperatures exceeding 90° F. begin to occur in May and continue into September while freezing temperatures usually begin during the last part of November and end during March. Precipitation is from frontal activities during the late fall and winter, and thundershowers during the spring and summer. These thundershowers are frequently localized and may inundate small areas while leaving nearby locales completely dry. Normally about half of the annual rainfall occurs between June and September, but tropical storms often account for heavy rains in August and September. Table 1 shows monthly rainfall and temperature readings for Sapelo Island during 1960, 1965, and 1970, along with average statistics from Brunswick.

The Georgia coast defines the eastern edge of the Southern Temperate Deciduous Forest Biome (Shelford 1963:56-88). This biome contains three major communities or faciations: the oak-hickory forest which extends from around the Fall Line into the Piedmont and upper Coastal Plain; pine lands or barrens which extend from the northern edge of the Coastal Plain to within several miles of the

TABLE 1
MONTHLY TEMPERATURE AND RAINFALL STATISTICS

	JAN.	FEB.	MARCH	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	AVERAGE
SAPELO ISLAND, GA.													
1970													
Temp. Range (F.)	14-78	18-71	33-80	43-88	51-88	63-97	68-95	70-95	57-94	52-87	23-78	29-80	43-86
Mean Temp. (F.)	44	50	60	68	73	79	81	82	80	72	57	56	67
Rainfall (inches)	3.3	4.3	5.0	1.0	4.6	0.8	5.6	7.4	2.7	5.6	0.6	2.8	3.6
1965													
Temp. Range (F.)	24.76	26-77	34-85	45-88	53-96	59-91	67-93	66-94	65-89	43-89	38-79	28-75	46-86
Mean Temp. (F.)	53	54	58	68	74	76	80	81	80	69	61	53	67
Rainfall (inches)	1.1	3.7	9.1	1.0	1.6	4.9	4.9	5.3	11.2	1.5	0.8	4.2	4.1
1960													
Temp. Range (F.)	23-77	27-72	26-80	40-84	49-95	?-95	71-99	69-97	64-89	50-87	40-84	23-75	44-86
Mean Temp. (F.)	53	52	51	67	72	79	84	82	79	72	63	48	67
Rainfall (inches)	1.7	7.7	4.1	3.7	2.9	4.8	4.5	9.9	9.8	1.9	1.6	0.5	4.4
BRUSNWICK, GA.													
Normal Estimates													
Temperature (F.)	55	57	61	68	76	81	82	82	79	71	62	56	69
Rainfall (inches)	2.3	2.9	3.8	3.1	3.6	5.5	7.3	7.0	9.1	4.5	1.5	2.6	4.4

Sources: U.S. Department of Commerce 1960, 1965, 1970, 1972

coast: and the magnolia and maritime forest which defines an irregular strip containing the coastal islands and adjacent mainland.

Progressively younger geological deposits form the Coastal Plain from the Piedmont to the Atlantic Ocean. The Fall Line represents a late Mesozoic shore line. Relatively thin Cretaceous sediments occur at the edge of the Fall Line and as sea level dropped, younger and thicker surface deposits were formed approaching the present coast line. The youngest, Holocene, formation occurs along the ocean sides of the barrier islands.

Most of the coastal area is the result of Pleistocene formations. As one crosses the coastal plain towards the Atlantic, relic coastal features such as beach ridges, islands, hammocks and former marshes may be observed. The most obvious are within several miles of the Atlantic, just east of the Miocene Coastal Plain formation. Although deposits thicken towards the present coast, surface elevation gently drops from around 100 meters above sea level in the upper Coastal Plain.

Rivers that empty into the Atlantic along the Georgia coast have their headwaters in three physiographic provinces. The Savannah River originates in the Blue Ridge, the Altamaha in the Piedmont through the Ocmulgee and Oconee Rivers, and the other rivers are Coastal Plain in origin (see Figure 8). These river systems provided the most practical link between the coast and inland areas during the aboriginal period. It has been argued (Larson 1970:73-117) that the pine barrens had a low exploitation potential given late prehistoric subsistence technology. The pine barrens was also an effective cultural barrier, although permeable through the Altamaha and Savannah Rivers.

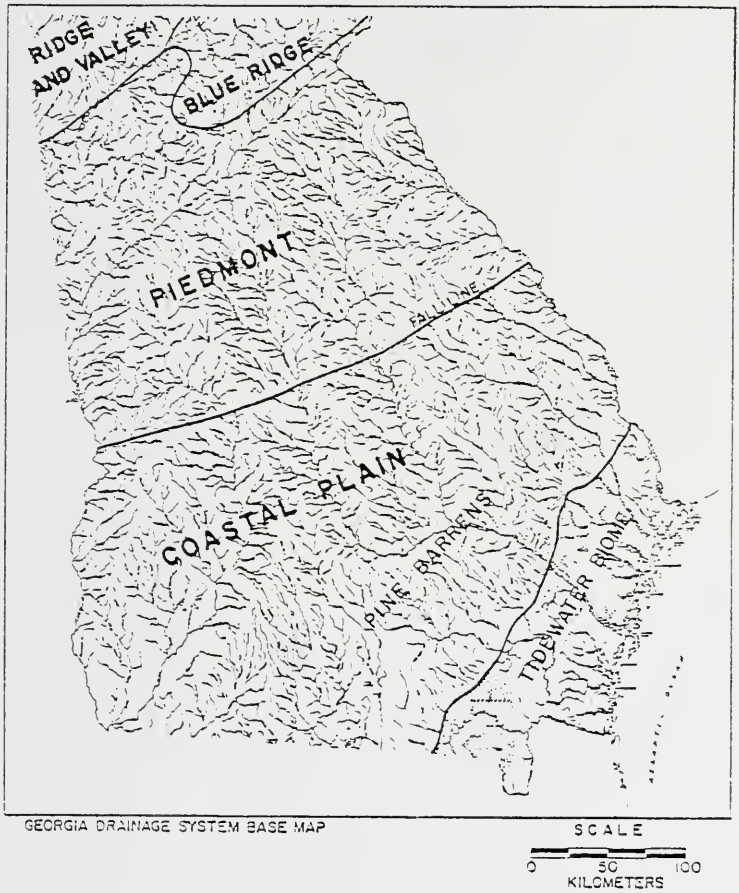


FIGURE 8
MAJOR PHYSIOGRAPHIC PROVINCES OF GEORGIA
SHOWING LOCATIONS OF THE TIDEWATER BIOME AND THE PINE BARRENS

The Georgia coast is defined by plant and animal communities that are distinctive from the adjoining pine barrens. Topography of the coast is also distinctive. The western edge of the coastal section is delineated by the marsh system that accompanied the Wicomico barrier island formations. Eastward of this Pleistocene geological formation are remanent features of later beach ridges, barrier islands, hammocks, and marshes that extend parallel to the present coast line. Today these mainland Pleistocene features form a system of highland hammocks surrounded by freshwater swamp. The most recent Pleistocene formation, Silver Bluff, defines the active system of barrier islands and salt marsh that separates the mainland from the open ocean. Tidewater actions are most pervasive in the most recent formations; however, the tides also cause fluctuating water levels in the freshwater rivers beyond the impact of salinity. Because of the influence of tides throughout the coastal section, hereafter this area is referred to as the Tidewater Biome. In summary, the Tidewater Biome includes the present barrier islands and extends to the western edge of the Wicomico formation (see Hoyt and Hails 1967, Hoyt 1968).

The Tidewater Biome may be divided into three environmental areas based on biotic and abiotic differences. These areas Larson (1970) defined as the Strand Section, the Marsh and Lagoon Section, and the Delta Section.

While use of these environmental divisions is maintained in this review, exception is taken to the previous areal definitions of the Marsh and Lagoon Section. The western extent of this section has been defined by the impact of salinity and the pine barrens are shown bordering this salinity zone (see Larson 1970:8). The Tidewater

Biome extends a considerable distance to the west of this former boundary, to an irregular line reaching approximately 75 kilometers inland. Pine barrens begin to occur at this inland point. The present areal definition of the Tidewater Biome and the pine barrens agrees well with the observations of William Bartram in 1773 (Harper 1958:19).

The Strand Section faces the open Atlantic and is composed of the beach with its dunes, shore and offshore areas. Most of the plant and animal resources of aboriginal importance in the strand occur more regularly and abundantly elsewhere on the coast. The exceptions are sea turtle, which is a seasonal visitor that nests on the beaches, and coquina, a small bivalve that occurs in some abundance along the shore. The strand may have been visited to harvest sea turtles, their eggs, or coquina, but there is little evidence of aboriginal occupation in the area. Only two sites have been reported on the southern Atlantic coastal strand. One is located on Cumberland Island (Milanich, personal communication) and the other is in Brunswick County, North Carolina (South 1976:10). The strand appears to have been of limited, if seasonal, economic importance during aboriginal times.

The Marsh and Lagoon Section is separated from the ocean by the strand, and is composed of high ground, marshes, tidal streams and lagoons. This section is the largest, the most physiographically diverse, and contains the greatest number of species in the Tidewater Biome. Archaeological sites occur most frequently on the high-ground areas within this section.

The barrier islands, hammocks, and mainland high-ground areas are examples of what Shelford (1963:67-73) identified as Magnolia Forest, although Live Oak (*Quercus Virginiana* Miller) was probably

the climax, or near-climax, dominant (e.g. Johnson et al. 1974: 44-55, Wharton 1977:185-188). The climax questions aside, this forest community includes live oak, laurel oak, water oak, pignut hickory, red cedar, southern magnolia, red bay, American holly, and cabbage palm as major overstory species. Understory species include wax myrtle, saw palmetto, and yaupon along with many herbs and vines.

Floral species of the marsh are less diverse and are frequently monospecific. Vegetation occurs in zones dependent on salinity and inundation factors. The most extensive of these salt marshes are composed of smooth cordgrass, needlerush, and giant cutgrass. Those areas along the landward edge of the marsh which are flooded for only a short time each day contain grasswort, saltgrass, sea oxeye, and sea lavender.

Although salt-marsh plants had no direct value as an aboriginal subsistence resource, the marsh was essential in the food chain of species which were of economic importance. The three primary producers in the salt marsh are smooth cordgrass, mud algae, and phytoplankton. Tidal flow brings essential nutrients into the marshes and carries enriched nutrients and detritus back into the estuary. The energy stored in the producers flows through the ecosystem through a grazer food chain and a detritus food chain. Only about 5% of marsh production is consumed in the grazer food chain. The remainder is available to detritus and suspended-algae consumers. Primary detritus and algae consumers include species such as fiddler crabs and molluscs. Most, if not all, of the estuarine fish species either feed on marsh detritus and suspensions, eat species that are detritus consumers, or both.

That portion of the salt marsh which is next to high ground provides an important feeding habitat for raccoons seeking high-marsh crabs and the eggs of diamondback terrapins. The high-marsh plant cover evidently also supplies an important food source for marsh rabbits. Both the low aquatic marsh and the high marsh are feeding grounds for marsh mink, which search for fish, mussels, crabs, and eggs. Fish in the low marsh and estuaries are taken by otters. Both otter and marsh mink use the high ground adjacent to the marsh as a nesting area. Various wading birds such as white ibis and little blue heron also feed in the salt marshes.

Mammals inhabiting the high-ground areas in the oak forest include white-tailed deer, opossum, raccoon, cottontail rabbit, and bobcat. The white-tailed deer population presently on the coast is genetically diverse, due to the introduction of deer from various areas of the east in game management activities. Aboriginal coastal deer may well have been a smaller subspecies (Odocoileus virginianus nigribaris Goldman and Kellog) which has been identified on Blackbeard and Sapelo Islands (Golley 1962:204). The average weight of the Blackbeard deer is around 60 pounds (Lund et al. 1962 in Johnson et al. 1974:59). This weight is about 40 pounds less than the average weight of other Georgia deer. A metric study of archaeological specimens could establish whether or not this subspecies was prevalent on the coast during prehistoric times.

A fourth and rather distinct environmental zone occurs within the Marsh and Lagoon Section. This zone is defined by low areas of freshwater swamp that are beyond tidal influence. The water supply of this swamp is predominately rain water. Freshwater swamp occurs

in relic marshes along the mainland in areas which are away from the river deltas. A similar phenomena exists within the low interiors or sloughs of the barrier islands. Little is known about the ecology of these freshwater swamps. Vegetation appears similar to that of the upper reaches of the freshwater river, with cypress, tupelo, and ash as possible dominates. The barrier island slough systems are slightly brackish, especially where they empty into the salt marsh. Wading birds form nesting colonies in the sloughs during the spring and, lacking predatory fish, sloughs also provide important breeding grounds for reptiles and amphibians. Food for the reptiles is provided by the nesting birds.

One aspect of the mainland freshwater swamps that certainly affected aboriginal occupation was that they effectively dispersed highland areas and their resources. Highland oak forest occurs in patches throughout the swamp and movement between these forest areas was to some degree impeded by the swamp lands. Since the swamps appear to have been of limited exploitive value, the forest resources which were of aboriginal importance occurred in dispersed sections. Larson (1970:292-297) has pointed out that the dispersed condition of highlands combined with limited pockets of relatively fertile soil restricted the size and distribution of Indian agricultural plots. Lacking natural soil renewal systems, like alluvial deposition, even the more fertile soils are rapidly exhausted in the high-ground areas. Based on ethnohistoric evidence, the late aboriginal inhabitants of the coast responded to these fertility restrictions with a shifting agricultural regime. Maize, beans, and squash were cultivated in these swidden plots by small social units scattered over the coastal area. Aboriginal agricultural on the coast is discussed further in the ethnohistoric section of this chapter.

The final environmental section in the Tidewater Biome is the delta area. The Delta Section is defined by the course of freshwater rivers. These rivers become increasingly deltaic and brackish as they approach saltwater. The Delta Section is low and frequently inundated, expecially during spring floods. Vegetation in the delta is water tolerant, grading towards increasing salt tolerance as the deltas approach the salt marsh. Although subject to the tides, deltas are composed primarily of fresh water. Much of the area consists of fresh to slightly brackish swamps containing cypress and gum as dominates, with increased vegetation in the higher areas (Wharton 1977:60-62). As with the freshwater swamps, very little is known about the ecology of delta swamps. Brackish species, such as fiddler crab, inhabit some delta-swamp areas. Deer, otter, and raccoons also occur in portions of the swamp; however, it appears that each of these mammals is far more abundant and accessible in the Marsh and Lagoon Section.

Anadromous fish are the most distinctive inhabitants of the delta rivers, and were probably the resources of aboriginal importance. Species such as American shad, glut herring, striped bass, and sturgeon enter the rivers during the spring to spawn. While the abundance of anadromous fish would have made aboriginal exploitation profitable for short periods of time, there is little in the Delta Section to sustain a more permanent population.

In summary, the tidal streams and oak forest are the richest biotic environments on the coast. As Larson (1970:33) concludes,

> The Lagoon and Marsh Section with its diversity of ecology, with its variety and abundance of resources, was potentially and actually an area of considerable aboriginal importance. The Coastal Sector populations resided almost exclusively within this section, and concentrated almost entirely upon its resources.

Coastal Georgia during the Sixteenth Century

Guale Ethnohistory

That portion of La Florida now known as the Georgia Coast was occupied by two aboriginal linguistic groups during the sixteenth and seventeenth centuries. The Timucua occupied the area from around Cumberland Island and the Satilla River in Georgia south into northeast Florida. A group known to the French as Ouade, the Spanish as Guale, and the English as Wallie extended north from the Timucuan area to around St. Catherines Island. Guale was actually the name of a single town and its chief on St. Catherines Island. The name was also used by the Spanish to refer to the entire area from the Timucua to St. Catherines.

There is little ethnohistoric information about the area between St. Catherines Island and the Savannah River. This portion of the coast perhaps encompassed the northern limits of Guale and the southern limits of Cusabo. While the northern and southern extent of the groups called Cusabo are unclear, the area from the Savannah River north along the South Carolina coast to around Charleston inlet seems to have been almost exclusively the land of Cusabo (Swanton 1922:16-17, 1946:128).

The distinction between Guale and Cusabo was at least partially due to Spanish divisions of the coast into administrative areas. There may have been some cultural differences as well, but at least the Cusabo just north of the Savannah River and the more southern Guale were far more similar than they were different. The main distinction may have been a degree of political integration. While

there is evidence that the entire Guale province was under some form of control of a single head-chief, no such arrangement is indicated among the Cusabo. However, it appears that the head-chieftainship was a rather ephemeral office. The position may have developed as a result of Spanish definition of the province and a requirement for a single aboriginal representative.

The Guale and Cusabo spoke a common Muskogean language. When the French under Jean Ribault visited the Guale in 1562, a Cusabo guide had no difficulty communicating with the Guale. In addition, a grammar composed by Spanish missionaries among the Guale was evidently used by missionaries among the Cusabo. The most convincing evidence of a common language is a statement by Governor Pedro Menendez Marques in 1580 that the Indians of Santa Elena, i.e. the southern Cusabo, were of the same linquistic province as the Guale. There are several linguistic traits which indicate with little doubt that the Guale were Muskogean speakers (see Swanton 1922:18 passim).

Timucuan has been classified recently as a "Language Isolate" that was distinct from Muskogean (Crawford 1975:65-66). Timucuan was divergent from Muskogean to the degree that priests who spoke Timucuan found it necessary to employ interpreters when communicating with the Guale (Swanton 1922:15).

Most of the subsequent discussion is focused on available information concerning the Spanish-defined Guale. This information is directly applicable to at least the southern-most Cusabo. Likewise, I have occasion to employ accounts from the southern Cusabo for additional information about the Guale.

Ethnohistoric information pertaining to the Guale is limited, however certain basic structural elements of this coastal culture may be definèd. The Guale were swidden agriculturalists with settlements organized into towns; they had a well-developed political structure composed of micos and several other offices; and their kinship networks probably had a matrilineal structure and post-marital residence was probably matrilocal Many details of this general structure were shared by other Muskogean groups in the southeast, although the Guale were distinctive in several respects.

The Guale resided in towns, each with a mico as political head and representative. Groups of towns were united with allegiance to a mico in one of the towns. There seem to have been three such regional town groups and three regional micos. When Governor Pedro de Ibarra visited the Guale in November of 1604, he met in council with the micos and other officials from each region at or near St. Simons Island, Sapelo Island and St. Catherines Island (Swanton 1922:81,89). The location of these meetings may be used approximately to divide the Guale area into northern, middle and southern town regions. Additional evidence for these regional town groups is that following the 1597 massacre of Franciscan missionaries, the mico of Asao is spoken of as the head of the southern group of Guale towns. There was also a head mico for the entire Guale province. This individual is said to have exacted tribute and was feasted upon his visits to various towns in the province (Swanton 1922:84).

There is some evidence that indicates succession to the town-mico office was structured within a defined kingroup. Don Juanillo of St. Catherines Island is spoken of in 1597 as the "eldest son and heir of the cacique of the island of Guale" (Barcia 1951:181). Given matrilineal kinship organization, this individual was probably the eldest nephew of the Guale mico and this relationship was expressed by a father-son terminology. It is unclear whether the offices of regional and provincial mico were ascribed or achieved. Don Juanillo is also referred to as the one, "whose turn it was to be head mico of that province [Guale]" (Swanton 1922:84). Distinctions between the use of the terms cacique and mico are ambiguous. Actual differences between offices may be implied, however Spanish use of the terms is inconsistant.

Guale political structure was composed of several officials other than the mico. The Spanish called these individuals mandadors, aliaguitas, and other principal Indians (Serrano y Sans 1912 in Larson 1978:124). These officers were certainly an integral part of the Guale town councils. The councils that met with Governor Ibarra probably contained the political nexus of each Guale town that was represented.

Guale political structure appears similar to that of inland Muskogean groups. Micos were also the leaders of Creek towns. The role of the Creek mico is well illustrated by Speck (1907:113) as,

> to receive all embassies from other tribes, to direct the decisions of the town council according to his judgment, and finally to stand as a representative of the town in foreign negotiations.

The Creek council contained various officials and advisors of the mico, including most frequently a heniha with peace functions and a tastanagi with war functions (Swanton 1928:276-334).

The Guale micos had some control over the goods of production. A Guale mico called Oade gave Ribault's men food supplies in 1562. "This good Indian was ready to do the favor as they were to ask it, and he commanded his subjects to fill our boat with corn and beans" (Laudonnière 1975:43). A short time later the French returned to Oade for additional supplies. Oade sent word to Covecxis, another Guale mico and referred to as his brother, requesting corn and beans for the French. The next morning supplies arrived from Covecxis (Laudonnière 1975:45).

Guale councils met in large council houses which were functionally equivalent to Creek square grounds. There are only a few accounts of these structures for the Guale, however each town probably had a council house. These building were circular in shape and were usually quite large. Individual apartments or cabins raised above the floor lined the walls along the inside of the building, and in the center of the structure was an open space for a fire and activities.

Two accounts of council houses are given in San Miguel's record of his 1595 visit among the southern Guale. At the town of Asao, San Miguel witnessed a chunky game which was followed by a black drink ceremony in the council house. "The Spaniards, caciques and important Indians sat down, each on a bed which was supported by poles from the floor" (Garcia 1902 in Larson 1978:129). San Miguel (Garcia 1902 in Larson 1978:131) describes another Guale council house as being,

> circular in shape, made of entire pines from which the limbs and bark had been removed, set up with their lower ends in the earth and the tops all brought together above like a pavillion or like the ribs of a parasol. Three hundred men might be able to live in one: it had within around the entire circumference a continuous bed or bed stead, each well fitted for the repose and sleep of many men, and because there was no bed-clothing other than some straw, the door of the cabin was so small that it was necessary to bend in order to enter; and due to the cold although it was spring when we arrived; and so that one may not feel the cold at night and may sweat without clothing it is sufficient to cover the doorway at night with a door made of palmetto.

The best descriptions of a Guale council house are given by Jonathan Dickinson in 1699, more than 100 years after San Miguel. The Guale had become dispersed by this time and their middle Georgia coast territory was mostly abandoned. Some groups had moved to mission villages closer to St. Augustine and others had fled to their Carolinean neighbors and the English (see Swanton 1922:90-92). The description given by Dickinson applies to those Guale who had moved to mission villages along the south Georgia and northeast Florida coast. Just north of St. Augustine he visited the town of Santa Cruz, which contained a large council house. Dickinson and his party

> were directed to the Indian war-house: it is built round having sixteen squares; on each square is a cabin built and painted which will hold two people; the house being about fifty foot diameter. In the middle of the top is a square opening about fifteen foot. This house was very clean, and fires being ready made nigh our cabins [Andrews and Andrews 1945:87-88].

A little later the Quaker party visited a town called St. Mary's where they were

> conducted to the war house, as the custom is, for every town hath a war-house. Or as we understood these houses were for their [the Indians] times of mirth and dancing, and to lodge and entertain strangers. This house is about 81 foot diameter built round, with 32 squares, in each square a cabin about 8 foot long of good height being painted and well matted. The

> center of this building is a quadrangle of 20 foot being open at the top of the house, against which the house is built thus. In this quadrangle is the place they dance having a great fire in the middle. One of the squares of this building is the gateway or passage in [Andrews and Andrews 1945:89].

These accounts indicate Guale council houses were remarkably similar to Creek Tcokofas, also called round houses, rotundas, sweat houses, or hot houses. Tcokofas were part of the Creek ceremonial structure complex which also included a square ground, defined by three or four opposing rectangular sheds, and a ball ground. Tcokofas were winter council houses and the square ground construction served this purpose during the summers. Guale council houses may have combined the functions of the Creek Tcokofa and square ground. At least some Guale towns also contained ball grounds, as evidenced by the San Miguel account. The similarity between Guale council houses and Creek Tcokofas is apparent in the description of a Tukabachee round house.

> The main structure is supported upon twelve [emphasis in original] pillars, one end sunk in the ground. They are disposed in a circle about 9 or 10 ft. apart, making a space within of about 120 ft. circumference, in the centre of which, upon the ground, is the sacred fire. The roof over this circle is a cone terminating in a point over the fire some 20 odd feet high. The rafters extend down from the apex of the cone beyond the twelve pillars, which are about 8 ft. high, to within 4 or 5 ft. of the ground, which space, of 4 or 5 ft., is closed entirely with earth. Between the pillars and the extreme exterior, a space of several feet, are seats of mats, like those of the sheds [in the square ground] [Hitchcock Ms. notes in Swanton 1928:179-180].

There is much less ethnohistoric evidence concerning domestic structures and storage facilities in the Guale area. All that is said of domestic structures is that, "all of the houses are small, because, as they have little reason to keep in them, they make them only for shelter" (Garcia 1902 in Larson 1978:131). Domestic structures shown in the De Bry engravings that relate to the

general Timucua area are all small and round, and are possibly applicable to the Guale (see Lorant 1946:39-115). Father Oré notes that granaries were common throughout La Florida and that "in them the Indians place the maize they keep for their sustenance; it is a type of barn supported by four posts, high and bulky, raised from the earth"(Oré 1936:24). It is not mentioned whether these storehouses were domestic or communal. It assumed that both types existed. Considering Guale political organization, the mico's granary was also probably the community storehouse.

Some Guale towns were palisaded but once again there is little information on this point. A town called Yfusinique, in the northern portion of the Guale province, was stockaded and provided a defensible location for the perpetrators of the 1597 Guale revolt (Swanton 1922: 88). Palisaded towns were certainly common elsewhere along the coast, as shown in the De Bry engravings of the Virginia area and northeast Florida towns (Lorant 1946).

Much more conclusive evidence is needed about Guale social organization, but it appears that kinship and post-marital residence followed a Creek pattern. Polygamy was an aboriginal condition that the priests were determined to abolish. The Guale were equally resolved to maintain their marriage form. When confronted with the Christian demand, the Indians replied: "If I leave her, I will not have anyone to give me to eat and if I do not enter the house where my children are, and if I do not bring them food and wood, they will perish" (Oré 1936:101). This statement strongly indicates that a house was the property of the wife. When a man had more than one wife, he alternated his residence between the houses and provided

each household with food and services. Thus post-marital residence appears to have been matrilocal. Since children lived in the house and locality of the mother, and assuming that the place of social orientation and pre-marital residence were the same, then a matrilineal kinship organization is certainly suggested.

Marriage to a mico may have resulted in modification of the matrilocal residence rule. The relations of a mico are cited by the priests to illustrate their missionizing difficulties, and they urged the mico to set a "good" example for his people. Referring to the "principal cacique" or head mico of the Guale province, Father Oré (1936:101-102) states that,

> During the time of his [the head mico's] apostacy he took into his house as a concubine and mistress one of his sisters-in-law, the sister of his own wife, with whom he lived all that time. By her he had three children, and by his own wife four children. . . . The fathers said the reformation of morals should start with him. All they accomplished with him was that he put her in a separate house, which was an ancient custom of the chiefs who placed in a separate house each one of the women or lovers they had. Even then the Indians complained: "Until now the cacique had in one house two women and children; now he has two houses and in each house he has a woman as if he were a pagan." The Indians urged him to marry her. Neither did he nor she wish, nor did anyone dare to marry her, for it was a custom that no one should marry or speak to the wives or the lovers of the caciques.

These statements indicate that upon marriage the wives of a mico were imported to his locality. The mico, his wives, and children evidently resided in the area of his consanguineous kin group, his matrilineage. Sororal polygyny is indicated as the marital form in this case, but this may not have been the exclusive form. It may well be that when wives were sisters, they resided in the same house and when from different matrilineages, they lived in separate houses (cf. Larson 1978:126).

These inferences have important implications for the Guale social and settlement system. Marriage to a mico probably provided a mechanism for social mobility in a ranked society. Upon marriage the woman moved from her matrilineage to the locality of the mico and there began a descent group spatially separate from that of her own orientation, though still connected through consanguineous ties. The children of the mico would have been members of their mother's descent group rather than that of the mico, but they probably held a degree of prestige higher than that associated with their matrilineage alone through their relationship with the mico. The wife's matrilineage may have accrued additional prestige through affinal ties with the mico and his lineage. Social taboos surrounding the wives would have served to solidify the position of the wife and her offspring in the residential area of the mico. The taboos also would have made the rank of this new matrilineage segment more secure.

Guale lineages were probably arranged into clans or sibs, although there is no direct evidence to support this claim. There is a vague reference to the Timucua that may apply to the Indians of La Florida in general. Father Oré (1936:107) states that the Indians "consider themselves related, provided they have the same names or lineages even if there is a difference of a hundred degrees."

Analogy with Creek social organization may be used to supplement our information about Guale social organization. Descent group membership for the Creek was reckoned through the female line. Given a male ego, members of his descent group included his mother, mother's brothers,

mother's sisters and their children, mother's mother and her sisters and their children, ego's sisters and thier children, and ego's brothers. Each domicile was owned by the wife. The household was principally composed of a husband, wife, and their unmarried children. Older sons and daughters whose spouses had died, plus the offspring of the widow, and occasionally an orphan and war captives were included in the household. The nucleus of the domestic unit was the nuclear family. Households of the same matrilineage commonly resided in the same area of a town, the husbands being imported from other descent groups and the sons leaving upon marriage to reside with their wives and their lineages (see Swanton 1928:79-97, 170-171).

Different matrilineages were united through mythical ancestry to form exogamous sibs. It should be noted that the term "clan" is used by Swanton (1928:114) to refer to these matrilineal groups which acknowledge common descent. However according to Murdock (1949:41-78), they properly define sibs. Sibs are distinguished from clans in the Creek case because husbands retain their own lineage and sib identity.

Analogy with the Creek pattern becomes less secure past this point. Creek sibs were organized into phratries which were in turn divided into moieties. Creek towns were designated either Red or White depending upon their moiety affiliation and ball games were played between towns of opposing colors. San Miguel's account of a Guale chunky game indicates that the teams were from different towns, possibly suggesting town moieties, but this is the only hint we have of a dual division of Guale towns.

Certainly, the Guale political structure indicates an integration beyond the individual town level. The dynamics of this are unclear, but some Guale towns were surely allied through kinship ties. The account previously cited from Laudonnière refers to Oade and Covecxis as brothers. A literal interpretation is unwarranted, but kinship between the two micos is definitely suggested. The micos were probably either members of the same lineage or sib and shared reciprocal responsibilities through this relationship.

A Systems Model of the Sixteenth Century Guale

What we know of Guale social and political organization is made more intelligible with an examination of the resource base which supported the cultural system. It is possible to construct an annual model of Guale social, subsistence, and settlement systems based on a small amount of ethnohistoric evidence and a heavy reliance upon modern ecological data. A graphic presentation of the systems model is provided in Figure 9 for reference in the following discussion. Essentially the model provides a testable hypothesis for archaeological investigation. Since it is predominately constructed with evidence contained in accounts of early historic period (pre-1600), elements of a purely aboriginal form should be represented. The most intensive acculturation of the Guale accompanied the renewed mission efforts that followed the 1597 Guale revolt.

The Guale planted corn, beans, and squash. Agricultural fields were small and scattered throughout the highland areas of the coast. Within the highland areas fertile soils occur in small pockets,

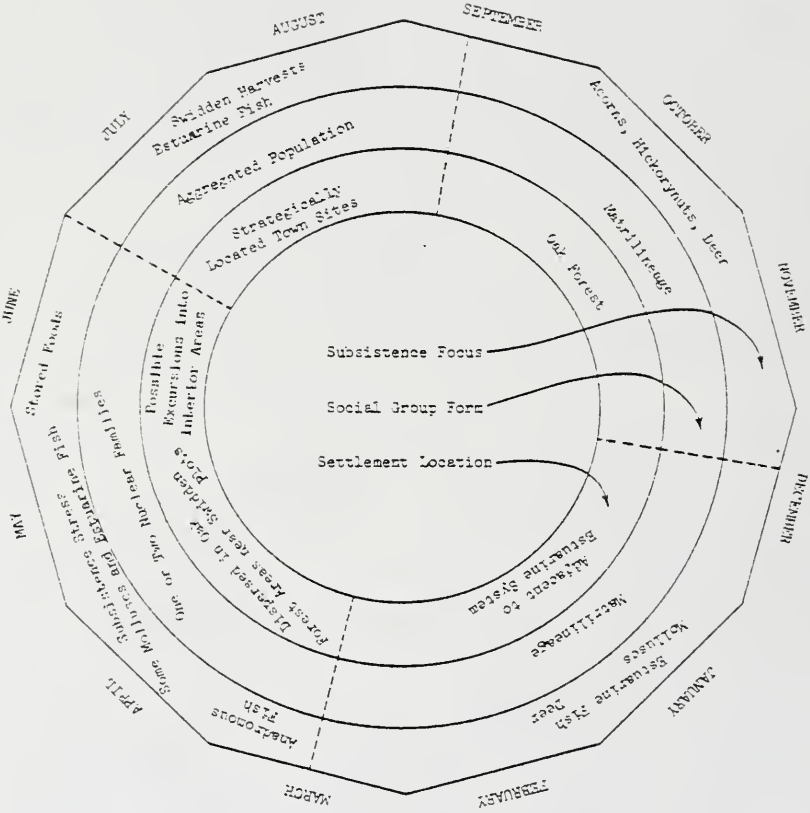


FIGURE 9
ANNUAL SYSTEMS MODEL FOR THE SIXTEENTH-CENTURY GUALE

presumably limiting the size of fields within an already restricted area. The sandy coastal soil is marginally fertile at best, requiring fallow periods between plantings for renewal (see Larson 1970:292-297). Discussing agriculture of the Guale around St. Catherines Island in 1570, Father Sedeno states that,

> the few Indians that are there are so scattered; because as they do not have that with which to clear the trees for their fields they go where they find a small amount of land without forest in order to plant their maize: and as the land is so miserable they move with their households [sus ranchos] from time to time to seek other lands that they can bring to productivity [Zubillaga 1946 in Larson 1970:295-296].

As Larson points out, the "small amount of land without forest" probably refers to fallowing fields.

Accounts from the area immediately north of Guale also serve to illustrate the scattered nature of the Indian fields and in addition supply information about the social units involved in cultivating the swidden plots. Father Juan Rogel, a Jesuit missionary among the Orista, states that settlements are dispersed because,

> the land will not support it [nucleated settlement], because it is very quickly weakened and miserable and exhausted. And thus the same ones say that because of this they move around so spread out and shift so regularly [Zubillaga 1946 in Larson 1970:294].

If my analogy with Creek social organization is correct, it appears that the swidden plots were cultivated by related households of a matrilineage, most usually two nuclear families. Again from Orista, Father Rogel says that in the early spring,

> those members of those twenty households [casas] distributed themselves on twelve or thirteen farms [estancias] that were some twenty leagues, some ten, some six, some four from one another: and there were only two inhabitants that planted [maize] around there [around the mission] [Zubillaga 1946 in Larson 1970:294].

Crops from the swidden fields were harvested in mid-summer. Father Rogel indicates that planting occurred in the early spring, probably just after the period of freezing temperatures which continue into March. Harvest occurred in late June or early July. This harvest was accompanied by a feast through which the scattered swidden families were brought together in a single location. Produce from the scattered fields supplied the feast. The town larder, the mico's granary, was probably replenished at this time, grain from the preceding year being now depleted. Support of these inferences is found in a statement by Father Rogel that,

> it happened that the alferez, Juan de la Vandera, deputy governor of your grace in Santa Elena, was at a Escamacu feast [in late June or early July 1570] and forced by necessity ordered three or four caciques, there were Escamacu and Orista and Ahoya, that they bring him certain [numbers of] canoes of maize by a certain day to Santa Elena [Zubillaga 1946 in Larson 1970:195].

Guale populations were nucleated and sedentary for a time following the harvest. The next subsistence phase indicated in the ethnohistoric accounts involved a population dispersal to gather acorns. Father Rogel arrived at Orista in 1569 during the harvest period. He says that,

> this was the time that they were together, which was two and one-half months; and the acorn harvest arrived, all left me alone, and they were in these forests, each one in his area [cada uno por su cabo], and they do not assemble except for certain feasts that they hold twice in two months, and it is not always in one area [cabo] but one time here and another in another place [Zubillaga 1946 in Larson 1970:281].

It would appear from this statement that the Guale resided in towns from the first part of July until the middle of September. The dates given by Rogel and his statement about gathering acorns agree with contemporary information about oak trees and their fruit. Acorns, as well as hickorynuts, begin to fall from their trees in late August and continue until early December. Acorns, especially

those from white oaks, germinate soon after dispersal, requiring immediate collection to retard spoilage (Olson 1974:695,698.)

Oaks within the Tidewater Biome usually occur in stands covering several acres. Precise data about the size and composition of these stands are lacking; however, groves of 20 large live oaks (Quercus virginiana Mill) are common and much larger stands exist. On Sapelo Island during December of 1977, the ground beneath live oaks was covered with acorns. This was perhaps the result of a good year for acorn production, associated with the preceding unusually cold winter on the coast. An estimated bushel of acorns was spread beneath each large live oak.

Considering these estimates, the yield per season from a single large live oak would be 120 pounds of acorns containing 50 pounds of meat. The stand of 20 trees would produce about 1000 pounds of acorn meat per season (see Olson 1974:Table 3). Divided over a 15-week acorn dispersal period, the stand would yield on the average of 65 pounds of acorn meat every week. This converts to 180,000 calories per week, capable of supporting about 13 individuals for 7 days, considering a per capita per day intake of 2000 calories. Presumably more than one oak grove would have been visited per week, increasing the size of the group that could have been sustained by the acorn harvest. The caloric value of acorns is a low estimate of 600 calories per 100 grams, based on pecans, hickorynuts, and walnuts (Watt and Merril 1963:44,34,65).

The point of this acorn assessment is to demonstrate that the food energy available from the acorn harvest was substantial, and capable of supporting larger groups in one area than the one or two

nuclear families that were involved in the swidden cultivation. Of course the acorn harvest was accompanied by other subsistence activities, the most important being deer hunting. White-tailed deer are also drawn to oak groves during the fall to feed on the acorn crop (see Larson 1970:247). Deer hunting and acorn gathering were complementary subsistence activities. Deer feed in the early morning and late afternoon, and are far less active during the remainder of the day. Acorn gathering could have taken place throughout the daylight hours. The acorn season is also the only period of the year when deer regularly occur in groups, making a communal hunt possible.

The social organization and procurement model for the fall subsistence phase suggested by the ethnohistoric and ecological data is one of population dispersal from large towns sometime in September, primarily to gather acorns and hunt white-tailed deer. The seasonally abundant resources connected with oak groves were capable of supporting several families in a single location. Acorns were locally abundant, but perished soon after they fell to the ground. This type of resource is most effectively harvested by many persons over a short period of time.

Oak stands are scattered over the sections of highland along the coast. The oak groves defined within a highland section may have been revisited after new acorns had dropped, perhaps by the same group in a cyclical pattern. Following a Creek social organization pattern, the subsistence group probably defined a single matrilineage with four or five nuclear families forming the social core. The

entire matrilineage may have been employed in communal deer hunts using a surround or similar technique, or the older males in the group may have ambushed the deer at their feeding grounds. The deer hunt would have occurred in the twilight hours, and either technique would have been productive.

Father Rogel also says that the acorn gathering groups came together twice in two months at different locations for feasts. This suggests a settlement component defined by towns composed of temporary and changing populations, as opposed to the seasonally stable population of the summer towns. The sites of summer towns and the periodic towns may have been the same. A mico, his wives and children, and members of his lineage were probably permanent occupants of the town site, and exploited nearby oak groves during the acorn season.

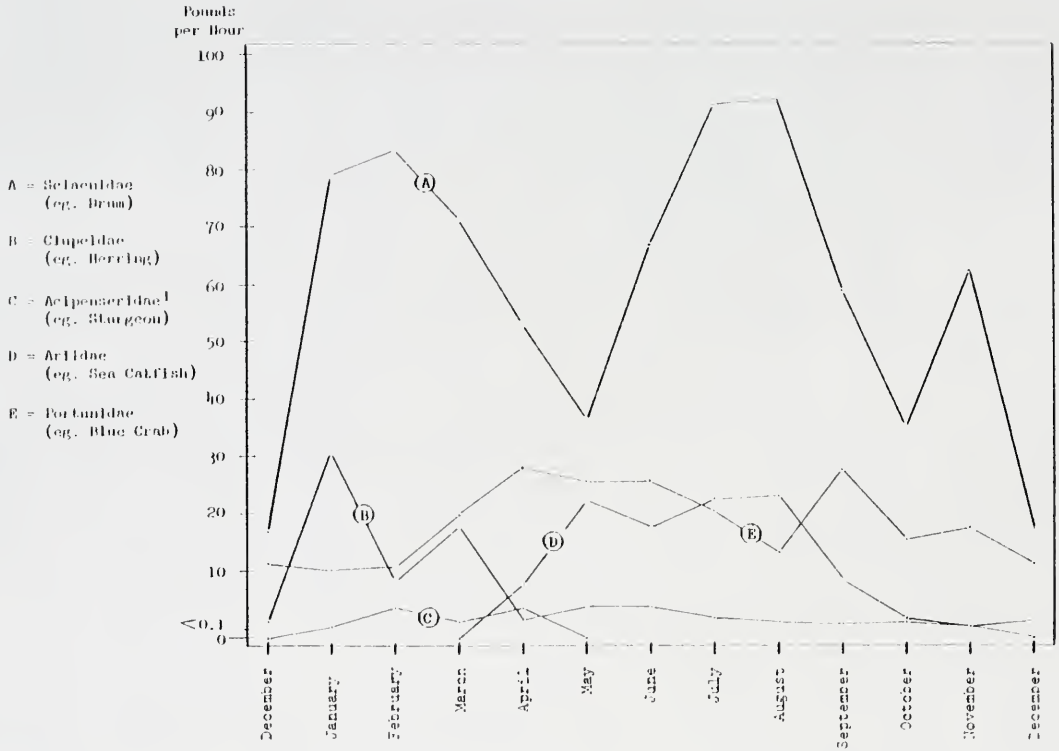
Town sites would have served as storage areas for surplus produce acquired during the acorn season, possibly in the form of tribute to the mico. The feasts would have been an occasion to settle disputes, debate political matters, and an opportunity to develop social relations with individuals outside of the matrilineage. The produce brought in for the feast probably included not only white-oak acorns and venison for immediate consumption, but also less perishable commodities. Acorns from red-oak species (e.g. *Quercus laurifolia* Michaux, *Q. shumardii* Buckley) and hickorynuts (e.g. *Carya tomentosa* Nutall, *C. glabra* Sweet) could have been successfully stored until the spring (see Olson 1974:699; Bonner and Maisenhelder 1974:271). Dried venison and deer skins were other storable items. Red-oak acorns require processing to leach

out bitter tannin before they are edible (see Larson 1970:269, 281-282). Since they may be stored, the leaching process could have been completed after the acorn season was over.

A semi-permanent settlement pattern is suggested for these lineage subsistence groups. Settlements were probably located in relation to acorn resources. Since dispersement of oak groves is restricted to circumscribed highland areas, the resources of several oak stands could have been exploited from a single settlement location. When these resource areas were exploited beyond the point of supporting the lineage, the settlement would have shifted to another location.

The next subsistence phase in the model relies heavily upon ecological inference. Subsistence is hypothesized to have shifted to a reliance on estuarine fish and shellfish following the acorn season and continuing until the March agricultural activities. White tailed deer probably continued to be exploited, but by the individual hunter through stalking because deer were now much more solitary. It is also likely that some stored nuts were processed and eaten during this period. A matrilineage form of social grouping probably remained the basic settlement and subsistence unit; however, settlements were now dispersed within a more restricted environmental area. Settlement probably shifted from scattered locations over the highland oak-grove areas to those highland areas adjacent to tidal streams which permitted access to the estuarine system.

The seasonal abundance of five families common in the tidal streams of the Georgia coast, and which are also commonly represented in the archaeological record, is presented in Figure 10. The fishery



*Data Source: Mahood et al. 1974b:Table 4, Table 9

[1]Data from Doboy Sound and Sapelo Sound Estuaries (Mahood et al. 1974a:Table 2, Table 4)

FIGURE 10
MONTHLY OCCURRENCE OF FIVE FAMILIES IN GEORGIA TIDAL STREAMS

data are from trawl catches in tidal streams from around the Satilla River up to the Savannah River. The information was collected over a three-year period, from October 1970 until September 1973 (Mahood et al. 1974b). Only those streams large enough to admit a trawl vessel, measuring approximately 80 feet in length, were sampled in this way. Furthermore, since trawling was restricted to the deeper portions of the streams, those peripheral areas along the banks are not represented. However as trawl sampling was intensive and the sample size was quite large, the results are considered to be a reasonable indication of the seasonal variation of fishes in the tidal streams.

Species within certain families of fish were becoming more abundant in the tidal streams between January and March of the hypothesized subsistence phase. A large portion of the increased abundance of Sciaenidae is due to the occurrence of spot (Leiostomus xanthurus Lacepede) in tidal streams near Sapelo Island. Several other Sciaenidae are also present, including spotted sea trout (Cynoscion nebulus Cuvier), Atlantic croaker (Micropogon undulatus Linnaeus), and star drum (Stellifer lanceolatus Holbrook) (see Mahood et. al 1974b:31-32). Sciaenidae as a family actually occurs year-round on the Georgia coast, but are most common during two seasonal periods, from January through March and from June through August. The seasonal abundance of Sciaenidae also varies depending upon their location on the coast. For example, during the winter months Sciaenidae are more common in the warmer waters of the south of Sapelo Island than in the cooler estuarine waters of the middle and northern Georgia coast (see Mahood et al. 1974b:Table 4).

Sciaenidae occurring near Sapelo Island during the winter are represented by small to medium-sized species. Spot reach a weight of around 340 gm. and a length of about 40 cm. Star drum are also small, reaching a length of about 25 cm. and weighing perhaps 900 gm. Atlantic croaker are quite stocky, weighing as much as 2.3 kg. and attaining a length of 45 cm. Sea trout are a larger species, reaching a length of 65 cm. and a weight of 3.2 kg. (Mahood et. al 1974b: 32-33, Breder 1948:192-195).

Members of the Clupeidae family frequently occur within the tidal streams of the Georgia coast from January through March. Schooling species of Clupeidae which are present in tidal streams near Sapelo Island during this period consist of blueback herring (Alosa aestivalis Mitchill), menhaden (Brevoortia sp.), Atlantic herring (Clupea harengus harengus Linnaeus), and gizzard shad (Dorosoma cepedianum LeSueur). However, only the Atlantic herring is found in the Sapelo Island tidal streams exclusively during this winter period, and as with Sciaenidae; the Clupeidae family is more abundant in the southern coastal waters during the winter (Mahood et al. 1974b:23-24).

Shads and herrings of this family are anadromous. They inhabit the tidal streams during the winter, prior to spawning in freshwater rivers during the spring. Thus, the winter occupants are mostly mature individuals. The species represented around Sapelo Island are composed of small mature individuals, ranging in length from 20 cm. to 45 cm. and perhaps weighing between 250 gm. and 900 gm. (Mahood et al. 1974b:23-24).

Sturgeons (Acipenser sp.) are a large anadromous fish and are available in the tidal streams only during the winter and early spring months. The winter sturgeon population consists of mature individuals, as they spawn in freshwater rivers during the spring. Atlantic sturgeon (Acipenser ozyrhynchus Mitchell) range from around 30 cm. to 90 cm. in length and mature individuals perhaps weigh around 6 kg., although individuals reaching a length of more than 5 m. have been recorded (Mahood et al. 1974b:23, Breder 1948: 41-43).

The American oyster (Crassostrea virginica Gmelin), and other marine molluscs were probably exploited during the winter period. Subtidal oysters are rare in the coastal estuaries. The Georgia coastal oysters are intertidal and form beds on the firmer parts of the tidal stream banks. These oysters spawn throughout the warmer months of the year, continuing well into the fall. During the spawning period, oysters are in poor condition and are diseased. A parasitic fungus, Labyrinthomyxa sp., infects the intertidal oysters at a high rate from June through December. The oysters are predominately free from infection between January and May (Hoese ?1968).

Factors associated with this disease are poorly understood, but the oysters appear most susceptible during the warmer months when they are in poor condition. The fat and carbohydrate components of oysters are lowest during the spawning period and markedly higher from October to around April. Protein is highest during August, but also increases from December to February (Lee and Pepper 1956). Present inhabitants of the Georgia coast refer to oysters of

the warmer months as being "thin and milky," and they are seldom eaten.

The most productive time, in terms of energy return, to harvest intertidal oysters is during the winter and early spring months. There is a 33% reduction in the meat weight of heavily diseased oysters, diminishing the energy return from this species during the warmer months (see Ray et al. 1953). Even undiseased oysters yield lower meat weight in response to their summer spawning condition. Referring to commercial oysters of the North Carolina coast and the south in general, Chestnut (1951:159) states that,

> Oysters may develop their sex products to spawn in [as late as] the fall months, with the consequence that they are in poor condition immediately after spawning, and yield a low volume in meat content. A month or longer may be required to recover from spawning. . . .

While the late aboriginal occupants of the coast may have occasionally gathered oysters during other periods, this was probably due to subsistence stress or failures in other subsistence activities.

The common link between the winter resources is that most occur as groups within the tidal streams. Sturgeon are probably the exception. The shad, herring and Sciaenidae tend to move in schools or at least groups, and oysters occur in discrete beds. Thus, these winter resources occur in clusters that are dispersed within the tidal streams and are spatially analogous to the fall acorn and white-tailed deer resources. The difference is that the winter species, with the exception of oysters, are more mobile. However in aboriginal times, as today, there were probably certain favored fishing places and to this extent the location of fish in the tidal streams was predictable. The same section of tidal stream could have been repeatedly fished.

Owing to this, settlements were presumably much more stable during the winter months.

Social-group composition for the winter subsistence activities was probably the matrilineage as in the fall. Since subsistence resources occurred in clusters within the tidal streams, these could have been most effectively exploited by several individuals at one time.

The particular technology employed was perhaps influenced by factors beyond those imposed by the nature of the resources. Water temperatures during the winter range around 10° C. (50° F.) to 15° C. (59° F.) (Mahood et al 1974b:Figure 12). Air temperature during the winter months is frequently around or below freezing. These uncomfortable temperatures certainly restricted procurement to a technique that minimized water contact. All the fish species discussed above could have been caught with hook and line; however, more than one fishing technique may have been employed. Bottom-feeding species of Sciaenidae may have been captured with basket traps, and cast nets may have been used to catch members of the Clupeidae family. Sturgeon were most probably procured exclusively with hook and line, as these individuals are too large to effectively catch with cast nets or basket traps. Procurement of oysters would have been little trouble, as they are easily harvested at low tide by dislodging them from their bed with a stick.

The winter procurement season was followed by spring planting, thus closing the annual subsistence cycle. The March planting period has already been discussed in respect to swidden activities and the social dispersion that it entailed. The matrilineage social group

temporarily fissioned into nuclear family groups. The primary settlement and subsistence unit was now composed of one or two nuclear families.

The period defined by the growth of crops was certainly a time of subsistence stress on the coast. With few exceptions, potential resources were neither abundant nor clustered within the tidewater environment. For example in May of 1565 while among the Timucua, Laudonniere speaks of a famine time when there is little to eat except a few acorns, certainly from red oak, and fish (Laudonnière 1975:121-130).

Food supplies stored in the granaries of Guale towns probably postponed the shortage for a short time. A few festive occasions may have served to redistribute this stored food. For example early in the spring in April 1566, Pedro Menendez returned two slaves captured by the Guale (St. Catherines) to Orista. This, along with the Governor's visit, was cause for festivities. On this occasion, "many Indian women [came], carrying maize, fish boiled and roasted, oysters and many acorns. . . ." (Meras 1964:175). The maize and acorns were certainly stored foods from the preceding year. The oysters were probably fresh, but were surely the last of the season. The fish may have been anadromous, taken from freshwater spawning runs.

Several anadromous species occur on the Georgia coast. Shads, herrings and sturgeons enter the freshwater rivers to spawn and are available in quantities for a short period of time. The period of migration varies somewhat with the species, but spawning is generally

a spring activity. Blueback herring (A. aestivalis Mitchill) ascends the rivers in the spring, hickory shad (A. mediocris Mitchill) in the late winter and spring, American shad (A. sapidissima Wilson) from January to March, and the Atlantic sturgeon (A. oxyrhynchus Mitchill) during the spring and summer (Dahlberg 1975:37, Larson 1970: 177). Juvenile American shad and blueback herring have been caught as far inland as the Oconee and Ocmulgee Rivers, over 200 km. from salt water (Smith 1968). This probably indicates that some mature individuals spawn well upstream during the spring.

The temporary abundance of anadromous species was certainly noticed by the aboriginal occupants in a period which was otherwise defined by scarcity. These fish may have been exploited by groups of families during the spring after the fields were planted. This subsistence trek possibly carried the Guale families well upstream, beyond the Tidewater Biome.

The period following the late June harvest, as I have discussed, was accompanied by a population aggregation in the towns. This large, seasonally sedentary settlement continued until the fall acorn harvest. Although the cultivated foods were certainly important during this time, there was probably a renewed interest in estuarine resources. This period corresponds with the second seasonal abundance peak in the tidal stream species. The Sciaendae family and sea catfish are prominent summer inhabitants.

Many species of Scianenidae are abundant in the tidal streams near Sapelo Island during the summer months. Most notably these species include red drum (Sciaenops ocellata Linnaeus), black drum

(Pogonias cromis Linnaeus), Atlantic croaker (Microgogon undulatus Linneaus), and star drum (Stellifer lanceolatus Holbrook). Atlantic croaker and star drum were discussed as a winter resource, but are more common in the tidal streams during the summer. The red and black drums can be very large fish. Black drum reach a weight of about 34 kg. and a length of around 1.5 m. However the maximum length reported in trawl catches on the Georgia coast is about 50 cm., suggesting a more usual weight of about 10 kg. Red drum are generally a larger species, reaching a length of 1.1 m. and a weight of 66 kg. (Mahood et. al. 1974b:31-33, Breder 1948:194-197).

Two species of saltwater catfish are abundant in the tidal streams during the summer. Sea catfish (Arius felis Linnaeus) are most common. This species reaches a length of about 45 cm. and a weight of about 500 gm. is usual. Gafftopsail catfish (Bagre marinus Mitchill) are less common but slightly larger, reaching a length of 55 cm. and weighing as much as 1.8 kg. (Mahood et al. 1974b:25, Zimm and Shoemaker 1955:63).

Procurement technology at this time perhaps shifted to techniques that employed larger numbers of people. A wide range of fishing techniques could have been used in the tidal streams during the warm summer months, including hook and line, basket traps, and any of several netting techniques. Larson (1970:184-191) has argued against the use of weirs along the Georgia coast. The basis for his argument centers around the exceptionally high tides and unstable bottom conditions in this area. These conditions would have made constructions unstable and the weirs would have required continual repair.

This hypothesis about the use of weirs on the Georgia coast is carefully thought out and cannot be reproached based on present information. The hypothesis is, however, in dire need of testing with data from experimental archaeology. At this point an alternative hypothesis may be proposed for testing. While conditions that appear prohibitive to permanent weir constructions exist along the beach, the mouths of rivers, and in most other estuarine areas, small tidal traps could have been constructed at certain locations within the estuary. Only those areas immediately adjacent to large intertidal oyster beds have a stable substrata. Weirs may have been constructed in these areas, as they appear to lack the factors that mitigate against construction in other tidal waters.

Whether weirs or some other subsistence technology was employed, the oyster beds were probably at least one focal point for aboriginal subsistence activities, as several species apparently feed here at high tide. The most important to the aboriginals may have been the Sciaenids (see Dahlberg 1972:351). Catfish and other species are probably attracted to oyster beds by the presence of many associated small invertebrates. Wells (1961) recorded an average of 43 species associated with oyster beds in North Carolina. Durant (?1968). recovered from 11 to 21 species from intertidal oyster beds along the Georgia coast. Most of these recorded species are small organisms such as annelids and boring sponges, and predators such as conch and oyster drills. These species, along with oysters, provide a concentrated food source for fish that is available when the oyster bed is covered by the tide. Oyster beds have never been sampled in a way to provide firm information on this point, but it is entirely logical that the beds provide a localized feeding habitat for many fishes at high tide.

It should be stressed that the subsistence stages presented in the above model deal with what are considered to be the primary resources available within a given season, those which supplied concentrated sources of exploitable energy. Resources other than those discussed were certainly exploited and were certainly important, such as wild grapes in the fall and several types of berries during the spring and early summer. Deer would have provided an important food source throughout the year, along with smaller mammals like raccoons and rabbits. With a few important exceptions, it is the abundance rather than the presence of particular resources that varies with the season.

In summary, it is hypothesized that the Guale annual cycle was composed of four distinct settlement and subsistence systems. Each seasonal subsistence activity was executed by particular social units. The form of each social group was a response to the nature of the resources and the technology used for exploitation.

Although the model portrays the seasonal activities as static, in reality, the seasonal boundaries were certainly more flexible. Seasonal divisions would have shifted somewhat due to yearly fluctuations in resources. For example, the acorn harvest is variable from year to year and from grove to grove (Larson 1970:280). Poor harvest years would have prolonged the summer subsistence period and caused the winter subsistence phase to begin somewhat earlier. Some overlap exists between the seasonal resources.

Four basic levels of settlement are indicated in the model. The smallest settlement was composed of one or two nuclear families during the agricultural season in the spring. This family settlement

pattern was quite dispersed throughout the coastal area. The second type of settlement unit was composed of a matrilineage comprised of 20 to 25 individuals. This lineage settlement had dispersed locations during the acorn harvest in the fall. Settlement location became more concentrated during the winter near the estuary.

It is likely that town sites were permanently occupied by a mico, his wives and children, and perhaps his lineage. These residents would have exploited areas adjacent to the settlement throughout the year. The town sites were probably located in an area which could support a small sedentary population. This location would have been in an area which maximized access to productive resource zones. That is, town sites were in a location which provided direct access to productive estuarine areas, oak forest, and agricultural land. These settlements were the location of periodic feasts held during the fall, spring and probably winter subsistence seasons. During these feasts the population level at the town site increased sharply for short periods of time.

Town sites were also the centers for population aggregation during the summer months and contained a relatively large and sedentary population. The regional micos and provincial mico resided in certain towns. These towns probably formed the apex of the settlement structure and contained the largest summer population.

The political and social structure suggested by the ethnohistoric accounts and the model indicate that Guale socio-political organization was a form of chiefdom. A segmented and ranked system is clear, although the exact form and components remain to be adequately demonstrated. It would seem safe at this point to assume that the

micos and their lineages formed the apex of the socio-political hierarchy. Micos were certainly at the top of the power structure, but the mode of status and power acquisition is unclear. At least the position of town mico appears to have been ascribed rather than achieved, as the ehtnohistoric information suggests a line of succession to this office. Further, since another account indicates some micos were related, it is probable that micos came from certain lineages or sibs. In sum, aside from all the ambiguities that exist, the Guale social system was segmented and these segments were ranked.

The function of the chiefdom organization may be understood in terms of the annual model. Like the model, the interpretation should be considered tentative and subject to verification and revision. But even if certain details of the model prove to be inaccurate, the basic nature of the interpretation should be valid if the general form of the model is correct.

The Guale chiefdom may be understood in terms of information processing and to a lesser extent the redistribution of goods. Elman Service (1962:143) has pointed out that one characteristic of a chiefdom is "the presence of centers which coordinate economic, social and religious activities." Guale towns or town sites functioned in this respect during the various subsistence phases. The seasonal nature of the resource base, along with the dispersed distribution of seasonal subsistence items, required an organization and scheduling mechanism for the maintenance of the cultural system. The consturction and execution of this mechanism lay beyond the capacity of individual subsistence groups.

The variant information held by each subsistence group was channeled into town sites during periodic feasts that were held during the fall, winter and spring subsistence phases. This information was processed, probably by councils, at the feast times and decisions were made about future subsistence activities. The office of mico probably functioned to voice and legitimize this decision.

The chiefdom was essentially a socio-political mechanism by which diverse information was acquired, processed, and then redistributed as a summary decision. Knowledge held by individual groups about resources that were abundant in certain areas and scarce in others was funneled into single locations. A coordinated dispersal of the subsistence groups into mutually exclusive resource areas followed decisions based on these data.

The chiefdom organization would have been perhaps most important towards the end of a subsistence season, when timing decisions had to be made about subsistence and settlement shifts. Information available to each group about decline of continued abundance of current food resources and about the availability of new resources was processed and a determination made about the appropriate course of action.

Chiefdoms and their potential for information processing is well illustrated in a recent discussion by Peebles and Kus (1977). The Guale case supports their arguments. Speaking of hierarchical social segments they point out that,

> information is filtered at the lower levels and passed on to the higher level regulator in summary form. The higher level

> regulator can then deal with a variety of events that cannot be simultaneously handled by the lower level units. For cultural systems, hierarchical arrangements not only increase the system's ability to process energy and information, but facilitate greater internal complexity and external variability [Peebles and Kus 1977:428].

The authors emphasize the importance of ritual in this information transfer and decision process and argue that redistribution and ecological specialization should be abandoned as requisites for chiefdoms.

Earlier assessments of ranked social organization stressed the importance of ecological differentiation and the redistributive function of the chief. For example, Service (1962:143-148) emphasized ecological differentiation and sedentariness as major factors in the development of chiefdoms. Goods from distinctive environmental zones were channeled to the chief and were then redistributed so that diverse food sources moved to the people rather than the contrary. Overall production was increased, creating a surplus which supported the chief and perhaps craft specialists. The surplus could be drawn upon by the population during the times of scarcity.

This surplus and redistributive argument has been made of followed by others (e.g. Fried 1967, Adams 1975), and remains a useful base for archaeological explanation although it is usually difficult to detect in the preserved elements of material culture. It seems fairly obvious that both information processing and redistribution are important functions of a chiefdom. The importance of one or the other probably increases depending upon the particular environmental context and subsistence technology. In areas with marked zonation of contemporaneous subsistence resources, the redistributive

function becomes most important. The function of information processing becomes more crucial to the maintenance of the system in environments containing seasonally homogeneous but spatially dispersed food resources. Redistribution actually remains a primary characteristic in either case. What changes is the material reallocated; goods in the former and information in the latter case. Any particular chiefdom is likely to include both aspects.

Redistribution of stored foods was an important, though secondary function of the Georgia coast chiefdoms. The creation of seasonal surpluses, housed in the mico's granary, provided some support for the population during the period of spring scarcity. The town granary was replenished following the swidden harvest period. This summer larder probably supported community activities such as council meetings, public building construction and repair, large ceremonial and festive events, and the entertainment of foreign and neighboring dignitaries. Warfare might also be included, but the densely populated towns would have been at their defensive peak and more vulnerable during other seasons of the year when the resident population was much smaller.

The nature and diversity of information processed by the system would have changed dramatically during the summer months. Ecological information was more homogeneous since the population was nucleated and exploited a more restricted estuarine environment. Attention at this time may have been focused more on inter-town relationships; their maintenance, termination, or realignment.

An excursion into the impact of western contact and mission activities on this complex cultural system would require a seperate treatise. Certain elements of the system were surely already affected by European influences, since the model is constructed with data from between 1560 and 1600, more than 40 years after Allyon's first contact with the coastal groups and in the midst of deliberate acculturation attempts by the early missionaries. The earliest Jesuit efforts ended in failure and the Franciscans were temporarily thwarted until after the Guale revolt of 1597. An example of the cultural disruption that accompanied slightly later mission activities is provided in an account by Father Oré that describes Spanish retaliation immediately following the 1597 revolt.

> Since all the Indians were hidden in the woods, the governor could neither punish them nor get in touch with them. They burned the foodstuffs of the Indians: the Indians themselves already burned their houses when they left. On this account and due to what followed, during the subsequent years they had no maize harvest. Moreover since they were removed from the sea, they could neither fish nor gather shellfish, with the result that they suffered great hunger. Though the Indians sowed, it was little, while the Spaniards destroyed it every year [Oré 1936:95].

Two of the main areas to be changed by the missionaries were aspects of social organization and subsistence. The priests were committed to the elimination of Guale polygyny and in the process destroyed social networks which the marital form maintained. Missionaries also required a sedentary population to whom they could adminster Christian doctrines. The Guale finally became sedentary and agricultural, although population size decreased. According to my interpretation of the Guale Chiefdom, this settlement and subsistence change would have destroyed the primary function of the aboriginal socio-political organization.

Archaeological Assessments

The Mississippian Period is a temporal segment of Southeastern prehistory which begins roughly around 700 A.D. with developments at the Cahokia site and continues until the middle of the sixteenth century. The De Soto expedition of 1539 is used to mark the end of this period, as the disruptions and diseases which followed De Soto did much to alter aboriginal culture in most of the Southeast (e.g. Griffin 1967:189-191, Larson 1970:2, Willey 1966:292-310).

The term "Mississippian" refers to a number of related cultural forms which developed during this period of time. The nuclear area and nominator for this "Formative-level culture" (Willey and Phillips 1958:163-170) is the central Mississippi River Valley. Regional variants of the culture developed in other areas of the Southeast, each defining distinctive adaptations to particular environmental and historical contexts (e.g. Caldwell 1958). Some common features of this adaptation are a central position of agriculture in the economy, fully sedentary villages, relatively large populations, pronounced social segmentation, platform mound construction, and elaborate ceremonialism. I am concerned here with developments on the Georgia coast during the Mississippian Period and their relation to Mississippian events and processes occurring elsewhere in the Southeast, particularly in Georgia.

This period on the Georgia coast is defined by two cultural phases called Wilmington and Savannah. Some would also include the Irene Phase within the terminal portion of this period, however indications are that Irene is an early historic aboriginal phase. I briefly review in this section the available evidence for each of

these phases and provide an assessment of the associated cultural forms and the changes that occurred on the Georgia coast during the Mississippian Period. Important locations discussed in the text are shown in Figure 11.

Wilmington Phase (ca. 700 - 1000 A.D.)

Wilmington-Phase sites, defined in terms of a distinctive pottery type, have an extensive coastal distribution. Wilmington heavy cord-marked, sherd-tempered pottery (Caldwell and Waring 1939a: 113-116, Caldwell 1952:316-317) is commonly found at coastal sites from around the St. Marys River at the Georgia-Florida border north into North Carolina.

Wilmington pottery along the Georgia coast is most frequently heavy linear cord marked and tempered with large pieces of ground sherd; however, tempering materials and paste characteristics can be quite variable. While sherd tempering is most common, non-plastic inclusions may frequently range from sand to larger quartz grit. About 14% of the Wilmington Cord-Marked sherds identified from St. Simons Island had sand and grit inclusions in the paste to the exclusion of ground-sherd fragments (Martinez 1975:70). Wilmington pottery identified at the Groton Plantation was exclusively sand tempered (Stoltman 1974). Variability in the composition of paste and tempering materials is expectable, and probably results from variation in the physical properties of exploited clay sources. It may well be that riverine clays used in the Groton-Plantation area were suitable for pottery manufacture without inclusion of additional tempering materials.

GEORGIA DRAINAGE SYSTEM BASE MAP

SCALE

0 50 100
KILOMETERS

L E G E N D

A SAVANNAH RIVER
B MEDWAY RIVER
C ALTAMAHA RIVER
D SATILLA RIVER
E ST. MARYS RIVER
F OGEECHEE RIVER
G OCMULGEE RIVER

1 WILMINGTON ISLAND
2 OSSABAW ISLAND
3 ST. CATHERINES ISLAND
4 SAPELO ISLAND
5 ST. SIMONS ISLAND
6 CUMBERLAND ISLAND
7 AMELIA ISLAND

8 GROTON PLANTATION
9 EBENEZER CREEK
10 IRENE MOUND SITE
11 DEPTFORD BLUFF
12 NORMAN MOUND
13 BIG MORTAR-SNUFFBOX
14 OCMULGEE BIG BEND
15 MACON PLATEAU

FIGURE 11
IMPORTANT LOCATIONS DISCUSSED IN THE TEXT

Wilmington pottery occurs infrequently south of the St. Marys River, for example at sites on Amelia Island (Bullen and Griffen 1952, Hemmings and Deagan 1973). This northeastern Florida area was the home of a different and longer-lasting cultural phase known as St. Johns (Goggin 1952). The northern boundary of Wilmington is more poorly defined, but South (1976) reports Wilmington pottery along the southern portion of the North Carolina coast. Distribution probably ends somewhere in North Carolina. The sherd-tempered ware is very rare in Virginia, although cord marking remains a popular decorative technique for a long period of time (Evans 1955).

There is reason to believe that the Wilmington pottery distribution is associated with variant cultural adaptations. Anderson (1975) has shown that north of the Santee River in South Carolina the pottery is distributed along inland rivers up to the Fall Line as well as along the coast. This possibly suggests a coastal and interior riverine adaptation, and perhaps seasonal settlement shifts. South of the Santee River, Wilmington sites are most commonly located along the coast and are rarely encountered in inland, riverine contexts beyond the Tidewater Biome. The southern Wilmington sites are located either adjacent to tidal streams and salt marsh or in upland, oak-forest areas in shell-free contexts. A tidewater settlement and subsistence system is indicated for the southern Wilmington sites, however additional cultural similarities and differences remain to be demonstrated.

Arguments about the origin of Wilmington are speculative at this point. Caldwell (1958:33-34) regards Wilmington as a coastal intrusion

with marked differences, primarily in pottery, from the preceding Deptford Phase. The tetrapodal, check-stamped, sand-tempered Deptford pottery was replaced by linear cord-marked, sherd-tempered, cylindrical jar forms of Wilmington. He suggests coastal North or South Carolina as the origin of this intrusion, but also points out that burial mounds, defined as Wilmington-Phase trait, are absent in the northern areas. This unshared trait led him to conclude that "the original Wilmington homeland may not be easy to discover" (Caldwell 1958:34).

That Wilmington burial mounds exist at all is a debatable point. As Stoltman (1974:24-27) has argued, none of the supposed Wilmington mounds can definitely be attributed to the Wilmington Phase. Certainly none of these mounds have burials associated with Wilmington pottery vessels, nor have any of the burials been dated to the Wilmington Period with Carbon-14 estimates.

New evidence presented by South (1976) gives some support to the northern-origin hypothesis. South suggests that Wilmington Cord Marked pottery is a late component and Hanover Fabric-Marked pottery the earlier component of what he calls the Wilmington Ware Group. While both components of this group extend from North Carolina south to around the Charleston area, only the Wilmington component extends further south. As I understand South, this indicates that Wilmington developed out of Hanover and spread south along the Atlantic coast into Georgia after the Deptford Phase. South stops short of actually saying this, but it is the logical conclusion of his chronology and distribution argument.

Others have suggested that Wilmington was affiliated with interior Georgia. Waring (1968) proposed that the coastal Wilmington intrusion was contemporary and somehow associated with the Mississippian movement into the Macon area. Recent Carbon-14 dates suggest that Wilmington precedes the Macon Plateau period and that his theory is probably an error. Milanich and others (1976) have suggested that some interior coastal plain riverine sites with cord-marked pottery are simply interior Wilmington sites. Recent investigations along the Ocmulgee Big Bend area (Snow 1977) have shown an extensive distribution of small sites with cord-marked pottery. This pottery series, called Ocmulgee Cord Marked, has broad folded rims, cross and linear cord marking, and usually sandy to temperless paste. While the variant paste could result from differences in clay sources, the other characteristics seem to distinguish this series from Wilmington pottery. Firm temporal determinations are needed for the Ocmulgee Cord-Marked pottery series before any adequate assessment of coastal interior relationships can be made.

Turning away from questions of origins and interior affinities, an examination of the Wilmington Phase in its secure Georgia coastal setting is more important for our present purposes. As previously mentioned there appear to be two types of Wilmington sites in the Tidewater Biome: marsh-edge, shell-deposit sites and highland oak forest sites. More is known about the marsh-edge sites than the less visible shell-free, oak-forest sites.

The Walthour site, located on Wilmington Island at the mouth

of the Savannah River, is a Wilmington-Phase marsh-edge site. This site consists of intermittent deposits of shell midden extending parallel to the marsh. Caldwell (1958:34) says that at the Walthour site, "shell heaps were several feet high and a solid bank of oyster shell lined the edge of the tidewater marsh from which shell fish were secured." This linear arrangement also characterized the Deptford site, located on a bluff along the Savannah River (Caldwell and McCann ?1940). The stratigraphic position of Wilmington-Phase pottery over that of the Deptford Phase was clearly demonstrated from tests along the bluff. A number of features and burials were encountered at the Deptford Bluff but their cultural proveniences were undemonstrated. They were assumed to belong to either the Deptford or Wilmington Phases. Features included wall trenches and numerous pits filled with midden debris, but no house patterns were recognized. Forty-two burials in flexed or extended positions were also excavated along the bluff, but these lacked accompaniments that would indicate their associated phase.

Additional information concerning Wilmington-Phase shell midden sites comes from barrier islands along the central Georgia coast. Carbon-14 estimates from two Wilmington-Phase shell middens on St. Catherines Island indicate dates of A.D. 735 $\pm$ 115 and A.D. 905 $\pm$ 200 (Caldwell 1970). This temporal position is supported by a Carbon 14 date of A.D. 820 $\pm$ 70 from a Wilmington shell midden on St. Simons Island (Milanich 1977). The Wilmington midden tested on St. Simons was one of many shell deposits scattered along the marsh edge at Cannon's Point. Another shell midden in this area contained mixed

components ranging from the fiber-tempered pottery of the St. Simons Phase to Wilmington Phase. Refuse appears to have been deposited along the marsh edge for a considerable period of time, at least until the Wilmington Period (Martinez 1975:60-66).

The Wilmington marsh-edge middens suggest a settlement and subsistence pattern with an estuarine focus. There is little information available about subsistence other than the obvious exploitation of marine molluscs, primarily oysters. The only analysis of Wilmington faunal components is a small sample gathered from the midden on St. Simons Island (Martinez 1975:60-63, 90-95). Fauna other than molluscs included white-tailed deer, raccoon, mink, pine snake, mud turtle, diamondback terrapin, eagle ray, drum, sheepshead, sea catfish, herring, and mullet. Remains of at least two deer and two diamondback terrapin were identified; however, the remaining species could have been represented by only one individual each. The small vertebrate sample prohibits reliable seasonal determinations, but subsistence evidently involved exploitation of a variety of habitats including freshwater, estuarine, and terrestrial areas. Based on earlier arguments presented about oysters, it would seem that a major portion of the midden was deposited during the winter or early spring. The turtles, pine snake, and catfish possibly suggest that deposition was in the early spring period, as these species are generally inaccessible during the cool winter months.

Wilmington pottery was found scattered behind the midden deposits at Deptford Bluff and St. Simons Island. This may indicate that residences were located adjacent to the linear area of refuse deposition, but again no house patterns of this phase have been identified.

The presence of Wilmington-Phase sites in interior areas of the Tidewater Biome is documented by three recent surveys. The first is a survey of the Big Mortar-Snuffbox Swamp in Long and McIntosh Counties, Georgia (Zurel, Gresham and Hally 1975). The next survey is of the Ebenezer Creek watershed, located between the Ogeechee and Savannah Rivers (Fish 1976, 1978). The third is of the Groton Plantation along the northern side of the Savannah River (Stoltman 1974). The Big Mortar-Snuffbox Swamp is located on the mainland opposite Sapelo Island and the other two survey areas are along the western edge of the Tidewater Biome (cf. Fish 1976:2, 1978:334). The Groton Plantation appears to be located just beyond the Tidewater Biome, but the Wicomico Formation briefly turns at the Savannah River and extends far enough northwest to include the surveyed area (see Cooke 1936). Groton Plantation is, nevertheless, in a marginal tidewater context.

These interior coastal sites with Wilmington components are located on river bluffs and on pockets of well-drained soil surrounded by freshwater swamp. The upland locations of these sites indicate a dispersed settlement pattern that probably results from seasonal exploitation of oak-forest resources such as acorns and deer (cf. Stoltman 1974:216). The bluff locations would have provided access to the large rivers and these sites may have been utilized for oak forest as well as riverine exploitation.

Present evidence allows only a tentative assessment of the Wilmington subsistence system. It appears that small groups exploited oak-forest resources during the fall and a wide range of terrestrial

and estuarine food sources during the winter and early spring. At some part of the year, perhaps during the spring, they may have relied on riverine resources. It is clear that Wilmington-Phase settlements were small and scattered, and never large and nucleated. This suggests a rather low level of socio-cultural integration. We may expect that the Wilmington Phase was associated with small, semi-nomadic hunting and gathering groups organized at a band level of socio-cultural integration (see Service 1962:107-108).

This band-level organization adapted to the Tidewater Biome evidently had a substantial history. The same general dispersed settlement pattern in the oak forests and along the estuaries long preceded the Wilmington Phase. Although pottery styles changed through time, this basic cultural form applies to populations who lived on the coast since the appearance of pottery at approximately 2500 B.C., and perhaps even earlier. A single exception to this organizational level may have been the Late Swift Creek coastal settlement, as evidenced by the large mound and village complex along the lower Altamaha River at the Evelyn Site (Waring and Holder 1968:140). Little is known about this intrusion, but it seems to have a short life and was possibly an unsuccessful colonization attempt by a more culturally advanced interior group (see Cook 1978 for other speculations about Late Swift Creek and Kelvin on the Georgia coast).

Evolutionary changes certainly occurred during this 3500-year period of coastal prehistory, such as slowly increasing sedentariness and gradual population growth. However subsistence technology and socio-political integration appears to have remained remarkably stable.

Milanich (1971) has called this conservative adaptation the "Coastal Tradition." Whether the cultural phases of this tradition were intrusions along the coast or in situ developments, as Milanich argues, the coast appears to have been occupied by band-level cultures for a long period of time.

Savannah Phase (ca. 1000 - 1540 A.D.)

The Savannah Phase marks the end of the band level of socio-cultural integration and the beginning of more complex socio-political arrangements on the Georgia coast. This change evidently resulted from modifications in existing Wilmington-Phase adaptations rather than purely technological advancements or invasion and displacement by some exotic group. The Savannah Phase is characterized by nucleated settlements, platform mounds, and the extensive use of single locations as cemeteries resulting in burial mound constructions. Cord-marked pottery decoration persisted but now was defined by finer marking and crossed as well as linear designs. Check-stamped, complicated-stamped, and burnished-plain pottery were added to the Savannah complex, as well as more specifically Mississippian shapes such as cazuelas.

Settlement locations occupied during the Wilmington Phase continued to be used during the Savannah Phase. The dispersed Wilmington-Phase settlement pattern applies to the Savannah Phase as well, but was now part of a more complex cultural system. This was also the time of population growth on the coast as evidenced by the greatly increased number of Savannah-Phase archaeological sites. For example in the Big Mortar-Snuffbox Swamp (Zurel, Gresham, and Hally 1975), there are 4.5 times as many Savannah-component sites (n=18) as Wilmington-component sites (n=4).

Most of our information about the Savannah Phase comes from excavations around the mouth of the Savannah River. The Irene Mound site, located on a bluff overlooking the river about five miles above the city of Savannah, is considered the classic example of a Savannah-Phase ceremonial center (Caldwell and McCann 1941). This site is quite small, covering approximately 2 hectares (5 acres), and its Savannah-Phase features are a platform mound with seven construction levels and ascending ramps, most of the interments in an adjacent burial mound, numerous long wall trenches that divide the site into segments, and three small domestic-like structures (Features 26, 53, 56) located within the enclosed segments. Each construction stage of the platform mound was associated with rectangular buildings and the final platform stages were also surrounded by enclosing walls.

Several important conclusions may be drawn from internal evidence from the Irene Mound site. The energy expended in construction of the platform mound is greater than that which can be explained by the size of the population resident at the site. Labor forces beyond the site must have been employed for construction. The enclosed portions of the site indicate internal spatial organization, and again this plan probably functioned to organize activities beyond those of the small resident population. One of the enclosed areas extends south and west of the platform mound and defines a large, open plaza-like area. This area and the platform-mound buildings were probably associated with activities involving a larger, but less visible segment of the Savannah-Phase population.

The Savannah-Phase portion of the Irene site certainly reflects only a segment of a functioning cultural system. The social function of this segment may be hypothesized based on the construction features represented at the site. The platform mounds and enclosures indicate socio-political authority in terms of organization of a sufficient labor force for their construction. The domicile-like structures suggest that the site was also a small residential area. The size of these houses suggests that they were primarily nuclear family residences. While there is little else that would distinguish these structures as high-status residences, their presence at a site which is otherwise defined by communal features indicates that they denote an integral part of the socio-political structure. It appears that the site was occupied by a central political figure, and probably his immediate relatives. The division into two enclosed areas may have separated the lineage of the chief from his wife or wives and his children, although much more evidence is needed to demonstrate this.

The social position of the Irene site needs to be considered when comparing the Savannah-Phase material culture represented at the site with other Savannah sites. It should be remembered that the Irene site was a Savannah-Phase political and ceremonial center rather than a purely residential area. Chronologies developed within the Savannah Period have ignored the possibility of social distinctions so clearly suggested at the Irene site.

Ideal Savannah-Phase divisions consist of an early ceramic complex, Savannah I, defined by fine cord-marked and burnished-plain

pottery. The later pottery complex, Savannah II, is defined by the addition or at least increased abundance of check-stamped pottery, the addition of complicated-stamped designs, and the continuance of cord marking and burnishing. The cazuela burnished-plain forms continued to be made but vessels with other surface treatments consisted of jars with flaring rims and small bowls (see Caldwell 1952, Caldwell and Waring 1939a, cf. Caldwell and Waring 1939b).

The Savannah II complex was characteristic of pottery recovered from the Irene site. The Savannah I complex was identified from mound contexts such as the Deptford burial mound (Caldwell and McCann nd.), Haven Home or Indian King's Tomb (Waring 1968), and several other mound and village areas around the mouth of the Savannah River. Caldwell (1952:318) suggested that several mounds in the central Georgia coast area may also be of the Savannah I period.

That Savannah II is later than Savannah I is, with a single exception, totally a logical chronology and without stratigraphic support. The exception is the Norman Mound in McIntosh County, Georgia (Larson 1957). Here the sub-mound levels contained high frequencies of Savannah Fine Cord-Marked pottery at the expense of Savannah Check-Stamped pottery. The central shell core and the mound fill contained increased amounts of the check-stamped variety. Check-stamped and burnished-plain pottery accompanied the Savannah Phase burials. While the stratigraphy supports Savannah II as being later than Savannah I at the Norman Mound, it is important that pre-mound and mortuary strata are being compared. The pottery differences could still be explained in terms of a mortuary versus domestic association, rather than by temporal differences.

It is probably significant that on St. Simons Island, Savannah Cord-Marked pottery appears to have increased through time at the expense of check-stamped decorations, suggesting that Savannah I is later than Savannah II. This may indicate that the two complexes are actually contemporary; however, based on present evidence conclusive arguments can be made neither for chronological nor social differences in the Savannah pottery complexes. It is likely that both processes were operating in the manufacture, use, and deposition of pottery and we must be aware of the two possibilities.

A certain amount of regionalization occurred during the Savannah Phase that appears to be directly associated with the two major freshwater river systems. The two Savannah-Phase regions may be defined as the Savannah Region and the Altamaha Region. Their boundaries are somewhat amorphous, probably because of sparse information, but can be tentatively defined. The Savannah Region extends from around the Coosa River in South Carolina to the Medway River in Georgia and the Altamaha Region includes that area of the Georgia coast from the Medway River to around the Satilla River. A marginal extension of the Altamaha Region continues as far south as Amelia Island, however occupation appears to have been concentrated to the north. Each region is confined to the Tidewater Biome.

Both regions share the main diagnostic traits of the Savannah Phase such as extensive use of burial mounds, nucleated settlement, and fine cord-marked, check-stamped, and burnished-plain pottery. The distinctive features of the Savannah Region include platform mounds and a relative abundance of complicated stamped pottery; however,

these two elements are uncommon even in the Savannah Region. Only one platform mound other than that at the Irene site is documented in the region, and it is assumed to be a Savannah-Phase construction without direct evidence. This mound, Indian Hill, was investigated by C.B. Moore and is located on St. Helena Island, South Carolina. This truncated mound was about 13 ft. high, its base measured 138 ft. by 129 ft., and its level summit was 62 ft. across. Moore (1898:164) says that, "a number of post-holes from which the wood had rotted, still unfilled, were found in four distinct levels. . . . No burials were met with and we must regard the mound at Indian Hill as erected for domiciliary purposes."

Savannah Complicated-Stamped pottery is a clear indication of interior contact with the coast. The coastal pottery is decorated with figure-eight, various concentric circles, and nested-diamond stamped designs. The similarity with Wilbanks stamped pottery in northern Georgia is so striking that for several years Wilbanks was referred to as Savannah Complicated-Stamped pottery (see Fairbanks 1950: Wauchope 1966). Sears (1958) named the northern Georgia pottery complex "Wilbanks." Etowah Complicated-Stamped designs, also a Mississippian Period northern Georgia type, also are found on Savannah Complicated-Stamped pottery. Etowah designs include nested diamonds and other rectilinear elements in addition to the later Wilbanks designs such as figure eights, concentric circles and scrolls. The infrequency of complicated-stamped pottery with these designs in the Savannah Region may indicate that many are actually trade wares. Savannah-Phase cazuela bowls are another indication of interior

Mississippian Period influences, but unlike the complicated-stamped pottery, this form has a widespread Savannah-Phase distribution.

The Altamaha Region lacks many of the outward signs of interior influences. The negative evidence includes the absence of platform mounds and much less Savannah Complicated-Stamped pottery. The Savannah-Phase pottery complex in the Altamaha Region is at variance with the pottery types defined for the Savannah Region. While details of these differences are presently undemonstrated, many archaeologists working on the coast have noted that the Savannah River type descriptions are only partially applicable to the central Georgia coast during Savannah or later Periods (Caldwell 1970; Larson 1955, 1958; Milanich 1977). Definition of these differences is an important problem for current research on the coast. A conclusion that can be drawn at this point is that this variation seems to be associated with the Altamaha Region.

Arguments could be made that the Savannah Phase in the Altamaha Region is simply the result of spreading influences from the Savannah Region. However, certain developments just prior to the Savannah Phase along the Ocmulgee River near the Fall Line suggest that this may have been an additional direction of Altamaha Region influences. The Macon Plateau Phase at Ocmulgee clearly represents the intrusion of a fully agricultural, stratified population with fortified, planned villages containing temple mounds and buildings with politico-religious functions. The estimated temporal range of the phase extends from around 900 to 1100 A.D., making it comtemporary with the beginning of the Savannah Phase (see Fairbanks 1956, Wilson 1964).

The Macon Plateau Period was rather short and transportable material culture elements such as pottery and religious paraphernalia were sytlistically simple. These factors may explain the sparsity of observable Macon elements during the Savannah Phase. The multitude of negative evidence proposed for the Altamaha Region is insecure grounds for assessment, however if one considers that social changes were responsible for developments in the Savannah Phase, then the possibility of Macon Plateau influences becomes more credible.

That the Savannah Phase was built directly upon a Wilmington socio-cultural system and included descendents of the Wilmington population is a long-standing hypothesis. Cord-marked pottery and sherd tempering are only two indications of Wilmington affiliations. Based on his Savannah I distinction, Caldwell (1952:317) says that this period "follows Wilmington, apparently without a sharp break and might easily have been named 'Late Wilmington.'" When discussing the Savannah II Period he concludes that it may be "regarded as a fusion of the old coastal culture with Middle Mississippian influences from the interior" (Caldwell 1952:318).

Savannah-Phase settlement pattern also shows a continuation of parts of the Wilmington system. Sites with Savannah-Phase components occur in the same locations as Wilmington and earlier phase sites (see Stoltman 1974; Fish 1976; Zurel, Gresham and Hally 1975). Savannah settlements are located throughout the Tidewater Biome in dispersed highland areas surrounded by swamp, on river bluffs, and on well-drained land along or near the estuaries. Important Savannah Phase additions were nucleated settlements near estuaries and occasional

small settlements along the freshwater rivers beyond the Tidewater Biome. One of these interior riverine settlements is represented by a site (9Ap10) located along the upper Altamaha River in Appling County, Georgia. Savannah Check-Stamped and Fine Cord-Marked pottery was identified from surface collections at this site (Snow 1977:42).

Nucleated settlements are rather infrequent and rarely have been investigated. Extensive excavations have been carried out only at the Irene site. Major nucleated settlements are found on Ossabaw Island at Middle Settlement (9Ch158) and Bluff Field (9Ch160)(Pearson 1977), on St. Simons Island at Cooper's Field and Indian Field (Wallace 1975), on Cumberland Island at High Point (NPS 9Cam35) (Ehrenhard 1976), and on Sapelo Island at Kenan Field and Bourbon Field. Only the Cooper's Field and Kenan Field sites can be assigned to the Savannah Phase with confidence. Indian Field and probably Bourbon Field are Irene and Sutherland Bluff-Phase sites. Pearson (1977) argues, based on surface collections and limited test excavations, that both large sites on Ossabaw Island are Irene Phase. While the pottery recovered from Middle Settlement suggests an Irene-Phase provenience, assignment of Bluff Field is based on 14 sherds and is hardly secure. Further investigations will probably show that nucleated sites occur on other barrier islands and perhaps the adjacent mainland, particularly near the junction of major freshwater rivers with estuaries as at the Irene site. It also appears that this settlement form continues into later periods, but usually in different locations.

Savannah-Phase subsistence probably also followed the Wilmington pattern. Considering interior influences, it is probable that agriculture was practiced but there is no direct evidence. There are no

analyses of faunal materials associated with closed Savannah-Phase contexts, but the numerous shell midden deposits attest an estuarine focus. The high-ground swamp sites were probably, as during the Wilmington Phase, occupied for the exploitation of oak-forest resources. The interior riverine locations were possibly bases for the exploitation of anadromous fish. The nucleated estuarine settlements possibly indicate that subsistence technology involved a larger-group effort that that represented by the scattered settlement pattern.

It is obvious that much more information is needed before secure conclusions can be drawn concerning many parameters of this prehistoric adaptation. However, it is important that for the first time the available evidence suggests a cultural system much like the one presented in the ethnohistoric model. The Savannah-Phase system may have assumed this general form.

There is some evidence that the Savannah Phase extended into the historic period, but a terminal date is uncertain. One of two dogs buried in a Savannah-Phase cemetary at Cooper's Field was accompanied by the musket ball that was evidently the cause of death. Wallace (1975:121-141) concludes, through rather complicated and debatable means, that the burial complex was associated with a mortuary building and perhaps a mound. Pottery in the disturbed soil over the burials indicates extensive use during the Savannah Phase, and the dog was probably killed and buried late in that period. This evidence suggests that the Savannah Phase survived into the period of European contact. We tentatively mark the end of the Savannah Period at 1550 A.D., however it could have ended any time between 1521 when

Allyon's men visited the coast and the last decade of the sixteenth century. There would have been little evidence of Spanish contact during this time since military and missionary activities were sporadic and generally unsuccessful.

In conclusion, the Savannah Phase provides an example of a Mississippian Period acculturation process. Details of this process will undoubtedly become more clear as research progresses; however, some general suggestions can be offered at this time. As Ralph Linton has concluded, there are two common features of culture contact and the transfer of culture elements.

> First, borrowing [of culture elements] is normally a reciprocal process, and second, its logical, although by no means always its actual, end product is the amalgamation of the two cultures involved, resulting in a new culture differing in certain respects from either of its parent cultures [Linton 1940:491].

What we know of the Savannah Phase demonstrates the latter point. It was a blend of elements from the Wilmington Phase and those from a more complex cultural configuration, i.e. an interior, chiefdom-level cultural system. The result was a distinct cultural system adapted to the coastal environment. The central role of agriculture was certainly diminished in the infertile coastal soils, and hunting and gathering remained of primary importance. The "culture elements" transferred to the coast appear to have been primarily social and political. This resulted in the reorganization of Wilmington settlement and subsistence systems towards greater productivity.

Invasion and annihilation, transformation, and incorporation are three broad categories that define the nature of cultural contacts between socieites of unequal socio-political complexity (Fried 1952).

Savannah-Phase developments may be understood in terms of a mixture of incorporation and transformation, but possibly without the violent military action that Fried includes in these processes. For the Savannah-Phase case, the process appears to have involved incorporation and alteration of the existing cultural form under an exotic social and political superstructure. This process commonly applies to marginal areas such as the Georgia coast, in which the natural resources are of limited importance to the more complex cultural system. To the degree that the contact area is isolated, the foreign superstructure is precluded from continual contact with and support from the parent culture and becomes an integral part of the contact-cultural system.

Irene-Sutherland Bluff Phases (ca. 1540-1680)

This period on the Georgia coast is composed of Irene and Sutherland Bluff Phases. The Irene Phase is defined by a Pine Harbor variant that is restricted to the Altamaha Region and an Irene variant that is restricted to the Savannah Region. The Irene Phase is followed by the Sutherland Bluff Phase in the Altamaha Region. Since this period is properly beyond the scope of the present inquiry, discussion is limited to a few comments and certain factors which have direct bearing on the Savannah Phase. The Altamaha and Savannah Regions continued to define areas of distinctive but related material culture assemblages and were probably associated with culturally similar populations. This Savannah-Phase pattern was intensified and may be recognized with greater clarity during the Irene Phase.

The beginning date for the Irene Phase is as illusive as a terminal date for the Savannah Phase. The Irene Phase has long been considered an early historic aboriginal manifestation (e.g. Caldwell 1952:319-320) and was the coastal variant of a widespread Lamar horizon style that began somewhat earlier in central Georgia (see Fairbanks 1952:294-298). Brass and iron spikes (ship spikes?) have been found in the fill of an Irene-Phase burial mound on St. Simons Island (Wallace 1975:58-59; Milanich 1977:140) and glass beads were found with a bundle burial in the Townsend Mound, which was probably an Irene-Phase mound and located in McIntosh County, Georgia (Moore 1897:20-23).

While European material is only rarely encountered in Irene contexts, the effects of contact can be seen in other aspects of the Irene Phase such as the termination of platform mound construction at the Irene site and a dietary shift from wild plant and animal resources to increasing amounts of cultivated plant foods (see Wallace 1975:223-242).

The Irene Phase appears to have begun rather abruptly. There was probably a short period of transition involved, if designs on pottery vessels are accepted as evidence. A few pottery vessels at the Irene site were stylistically transitional between Savannah and Irene (Caldwell and McCann 1941:36-37, 42). It is fairly certain that although pottery styles changed, the Irene population were descendents of the Savannah population. Evidence for this is found in a genetically related tooth anomaly that was found in both Irene Phase and Savannah Phase burials at the Irene site (see Hulse 1941).

Increased contact with interior Lamar groups is indicated by the filfot-stamped designs on Irene pottery and the possibly increased occurrence of urn burials on the coast. There is some suggestion that this contact was coincident with the Guale revolt of 1597, although not necessarily restricted to this event. Father Oré (1946:100) indicates that during and immediately after this revolt some of the Guale moved to live with inland groups where they intermarried, had children, and subsequently returned to the coast. Such a movement, or series of movements, could have resulted in the shift from the Savannah Phase to the Irene Phase. In each particular case movement was probably to interior groups with whom previous contact and ties had been developed, so that upon return to the coast the regional patterns developed during the Savannah Phase were maintained and became more visible archaeologically.

The Irene Phase in the Altamaha Region is defined as Pine Harbor and contains Irene pottery like that of the Savannah Region with the addition of a type with incised Southern Cult motifs called McIntosh Incised (Larson 1955, 1958a). Other Southern Cult items are found in increased frequency in the Altamaha Region such as engraved conch shell gorgets, ceremonial celts of stone and copper, and clay figurines (Larson 1958b). The southern boundary of the Altamaha Region moved slightly north to an area between the Altamaha and Stailla Rivers where the southern limit of the Pine Harbor complex is defined (Larson 1958a), and the marginal Savannah-Phase areas to the south were abandoned.

The Savannah Region during the Irene Phase is more difficult to assess, however it also seems to have retained much of its Savannah Phase areal definition. The Irene Complex here excludes frequent Southern Cult motifs (Larson 1958b). The Irene Phase in the Savannah Region appears to have lasted for a longer period of time that that in the Altamaha Region and in the seventeenth century was associated with English rather than Spanish activities. Spanish mission efforts in Georgia following the Guale Revolt were concentrated on the central and southern coasts and it is here that subsequent changes are most apparent. The Irene Phase on the central coast appears to have been restricted in time and may have been associated with Guale groups immediately prior to and during the intial establishment of mission villages, and with those Guale who lived beyond direct contact with the priests.

Spanish mission activities were successful during the seventeenth century when most of the Guale became Christian Indians and resided in mission villages. Sometime during this period pottery types gradually changed to include rectilinear-stamped and cross simple stamped designs on a variety of vessel forms such as inverted-bell shaped jars, "flower pot" shaped jars, and occasionally shallow flat bottomed bowls. This full Mission Indian Phase on the Georgia coast is known as Sutherland Bluff (see Larson 1958a, Kelso 1968).

Distinct lines can be drawn between Pine Harbor and Sutherland Bluff only by viewing them at temporal or stylistic extremes. While there are definite distinctions at both ends of the Pine Harbor Sutherland Bluff continuum, the middle ground appears to be a mixture of stylistic traits belonging to both. For example, urns that are an

Irene-Phase shape may be decorated with opposing line blocks of the Sutherland Bluff Phase. Sometime prior to 1650, most of the Pine Harbor elements appear to have been discontinued and Sutherland Bluff traits become more clearly recognizable. Southern Cult motifs were apparently restricted to the Pine Harbor complex and to the extent that these were pagan ideological symbols, their disuse can be understood in terms of replacement by Christianity.

The end of the Sutherland Bluff Phase is marked by the movement of Guale mission villages to locations closer to the protection of St. Augustine in 1680 due to increasing English pressures from the north (see Swanton 1922:90-92).

CHAPTER IV
INVESTIGATIONS AT KENAN FIELD

Kenan Field was occupied throughout most of the aboriginal period. The strategic location of Kenan Field in relation to tidal streams as well as the highland oak forest that occurs along the periphery of Sapelo Island offered a prime settlement location, in terms of optimal access to subsistence resources, for the various aboriginal groups.

While the St. Simons, Deptford, Wilmington, Irene, and Sutherland Bluff Phases are represented at Kenan Field, the most intensive occupation occurred during the Savannah Phase and during what appears to have been a transitional period between the Savannah and Irene Phases. Transitions are among the most difficult cultural phenomena to discern with archaeological data, especially where most of the evidence is from disturbed contexts and consists of decorations on pottery, as is the case here. Transitions and simply repeated deposition in a single location provide similar archaeological records in such cases, and are often impossible to distinguish. The interpretation of a Savannah-Irene Phase transition at Kenan Field is due to the persistence with which Savannah and Irene-Phase pottery types occur within the same contexts.

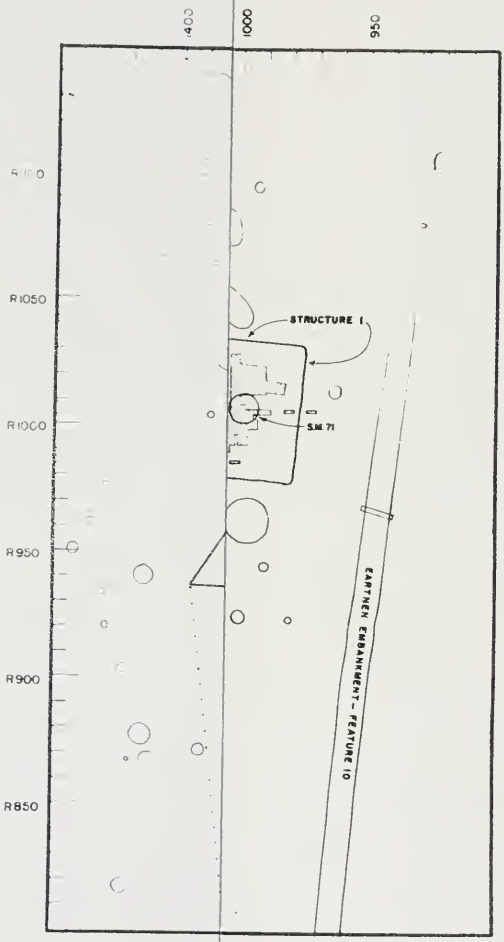
Discussion in this chapter is focused upon description and interpretation of the archaeological remains encountered at Kenan Field. Information concerning the structures is discussed first, followed

by an examination of the shell middens. The final part of the chapter is devoted to interpretations derived from analyses of oyster and clam shell.

Certain general information is required prior to proceeding with the discussion. Attention is directed to the base map of excavations presented in Figure 12. This plan shows the locations and spatial relationships of shell middens, sample polygons, mechanical transects, excavation units, structures, and earth works. Also for general reference, a list of the faunal species identified from all investigated contexts at Kenan Field is provided in Table 2. Much of the seasonal interpretation in the discussion rely upon fishery data. Figure 13 shows the seasonal occurrence of the various fish species identified at Kenan Field and these data provide a basis for seasonality conclusions.

The cultural provenience of contexts at Kenan Field is determined by association with specific pottery types. As discussed in Chapter III, most established pottery typologies for the coast are derived from data obtained from around the mouth of the Savannah River and appear to be only partially applicable to the middle Georgia coast.

Analysis of pottery from Kenan Field indicates that the established types are of general utility, however important typological differences do exist. At Kenan tempering is variable within and between surface treatment classes and much of this variability appears to be synchronic, as surface treatment is more constant than tempering material. However, there are definite associations between surface treatment and tempering material, and along with some vessel-form information this allows assignment of much of the pottery to existing types.



FIELD

d Surrounding Area

m Shown at Margins

50

ters

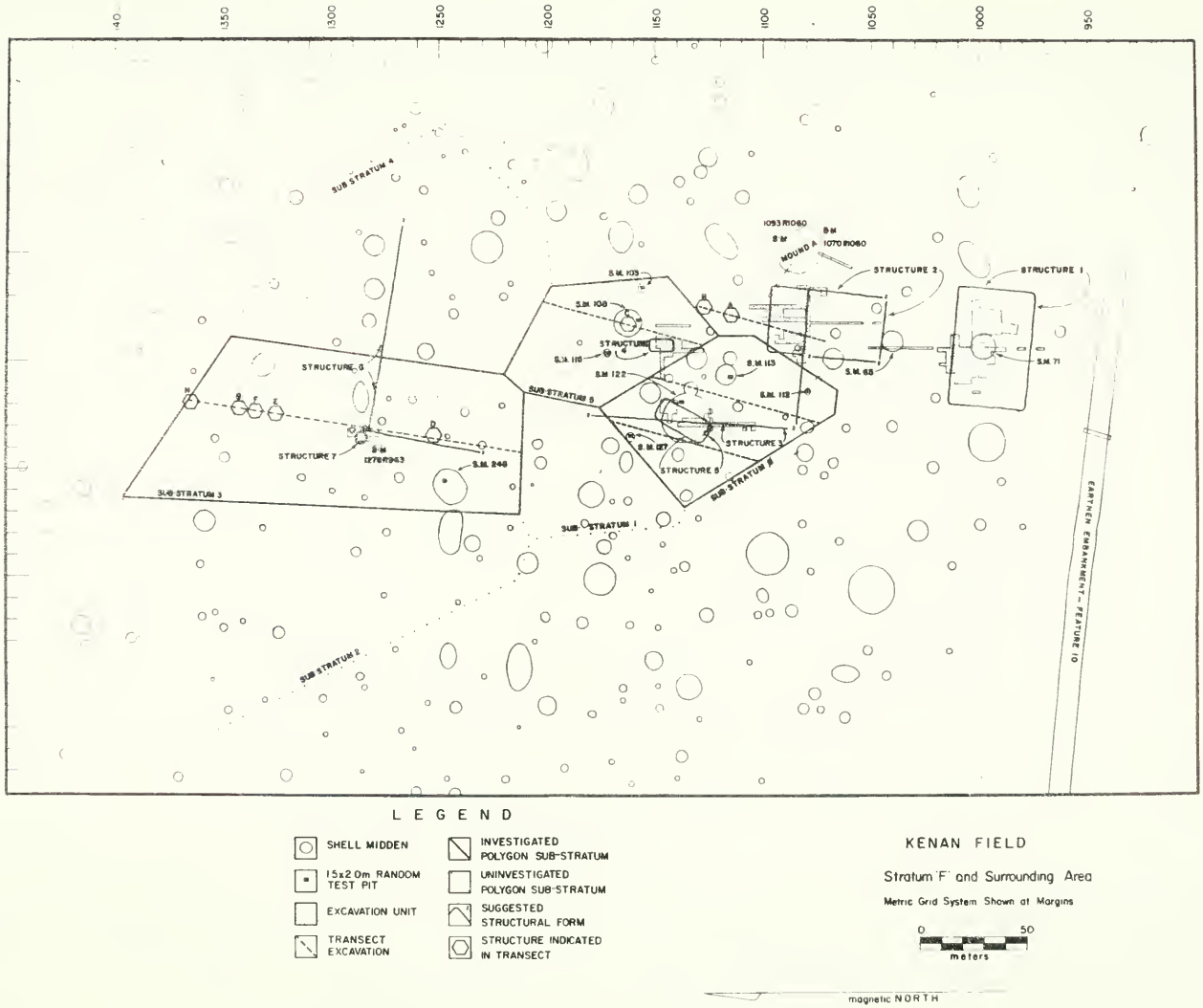


FIGURE 12
BASE MAP OF INVESTIGATIONS AT KENAN FIELD

TABLE 2
FAUNA IDENTIFIED FROM KENAN FIELD EXCAVATIONS

Scientific Name	Common Name
Mammal:	
Homo sapiens	Human
**Bos taurus*	Cattle
**Sus scrofa*	Swine
Odocoileus virginianus	White-Tailed Deer
Procyon lotor	Raccoon
Mephitis mephitis	Striped Skunk
Lutra canadensis	River Otter
Mustela vison	Mink
Sylvilagus sp.	Rabbit
Sciurus niger	Fox Squirrel
Sigmodon hispidus	Cotton Rat
Peromyscus sp.	Mouse
Scalopus aquaticus	Eastern Mole
Order Cetacea	Whale/Porpoise/Dolphin
Reptile:	
Terrapene carolina	Box Turtle
Malaclemys terrapin	Diamondback Terrapin
Deirochelys reticularia	Chicken Turtle
Chrysemys sp.	Cooter/Slider
Kinosternon subrubrum	Mud Turtle
Chelonia mydas	Atlantic Green Turtle
Alligator mississippiensis	American Alligator
Thamnophis sp.	Garter/Ribbon Snake
Coluber constrictor	Racer
Masticophis flagellum	Eastern Coachwhip
Agkistrodon piscivorus	Cotton Mouth
Anolis carolinensis	Anole
Ophisaurus sp.	Glass Lizard
Rana sp.	True Frog
Bufo sp.	Toad
Bird:	
Zenaidura macroura	Mourning Dove
Aix sponsa	Wood Duck
Meleagris gallopavo	Turkey
Order passeriformes	Song Bird

TABLE 2 - CONTINUED

Scientific Name	Common Name
Fish:	
Bagre marinus	Gafftopsail Catfish
Arius felis	Sea Catfish
Lepisosteus sp.	Gar
Pogonias cromis	Black Drum
Sciaenops ocellata	Red Drum
Stellifer lanceolatus	Star Drum
Cynoscion nebulosus	Spotted Sea Trout
Micropogon undulatus	Atlantic Croaker
Archosargus probatocephalus	Sheepshead
Paralichthys sp.	Flounder
Elops sp.	Ladyfish, Ten-Pounder
Mugil sp.	Mullet
Family Clupediae	Herring/Shad
Order Rajiformes	Skate/Ray
Crustacean:	
Callinectes sapidus	Blue Crab
Balanus sp.	Barnacles
Mollusc:	
Crassostrea virginica	American Oyster
Mercenaria mercinaria	Quahog Clam
Ensis directus	Common Razor Clam
Modiolus demissus	Ribbed Mussel
Busycon perversum	Perverse Whelk
Urosalpinx cinerea	Oyster Drill

* Encountered rarely in upper plow zone, probably represents a recent intrusion.

SPECIES	January	February	March	April	May	June	July	August	September	October	November	December
Gafftopsail Catfish [a] *B. marinus*	-	-	-	+	+	+	+	∂	+	+	+	-
Sea Catfish [b] *A. felis*	-	-	-	+	∂	∂	∂	∂	+	+	+	-
Black Drum [a] *P. cromis*	-	-	-	-	+	+	+	+	∂	+	-	-
Red Drum [a] *S. ocellata*	-	-	-	-	-	+	+	+	∂	+	-	-
Star Drum [b] *S. lanceolatus*	+	+	+	+	∂	∂	∂	∂	∂	-	-	+
Spotted Sea Trout [a] *C. nebulosus*	+	+	+	+	∂	+	+	+	+	+	+	+
Atlantic Croaker [b] *M. undulatus*	+	+	+	+	∂	∂	∂	∂	+	+	+	+
Sheepshead [a] *A. probatocephalus*	-	-	-	-	-	-	+	-	-	-	+	-
Flounder [a] *Paralichthys sp.*	+	+	+	+	+	+	+	∂	∂	∂	+	+
Ladyfish [a] *Elops sp.*	-	-	-	+	+	+	+	+	+	+	+	-
Herring/Shad [b] Clupeidae	+	+	+	∂	∂	∂	∂	∂	+	+	+	+
Mullet [a] Mugilidae	+	-	+	+	+	+	+	+	-	-	+	-
Longnose Gar [c] *L. osseus*	-	-	+	+	+	+	+	+	+	+	-	-

Explanation of Symbols: - absent
+ present
∂ abundant

Sources: [a]Mahood et al. 1974b:23-40
[b]Mahood et al. 1974a:Tables 5, 6, 7, and 8
[c]Estimated from Swift et al. 1977

FIGURE 13
SEASONAL OCCURRENCE OF FISH WITHIN TIDAL STREAMS NEAR SAPELO ISLAND

To stress the differences between the Kenan Field pottery and the established types, the types presented here are termed "Altamaha Variants" due to their suspected regional association. Future technological analyses of pottery and examination of the physical properties of coastal clays, along with stratigraphic evidence from elsewhere in the Altamaha Region, will undoubtedly add needed precision to the type descriptions (see Appendix). A technological analysis of pottery from Kenan Field and from sites on St. Simons Island is now in progress and has begun to yield significant results (see Saffer 1978). Additional analysis by Ms. Saffer will provide a basis for her Master's Thesis, to be completed in the near future.

Descriptive-analysis information concerning the pottery from specific contexts at Kenan Field is presented in figures, while interpretations of these data, i.e. types, are presented within the text. The original tempering categories used for the pottery analysis (see Figure 6) are collapsed for presentation. For example, "Grit and Sand," "Sand and Grit," and "Grit" are combined to form a single "Grit-Tempered" category. Sand was ever-present within the pottery paste and does not provide a meaningful distinction except when occurring to the exclusion of other tempering materials. The results of the rim analysis are shown in Figure 14 and Tables 3, 4, 5, 6, 7, and 8.

Structure #1

Structure #1 is located approximately 100 m. southwest of Mound A in the south-central portion of Kenan Field (Figure 15, Figure 16). Topography in this area is influenced by borrow activities associated with the construction of a low earthen embankment (Feature 10) that extends east to west across Kenan Field at a point about 50 m. south

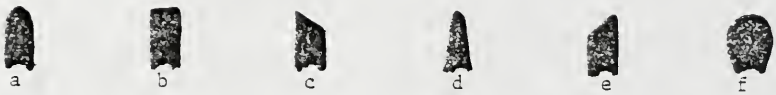
ORIENTATION

A Excurvate

B Incurvate

C Straight

LIP SHAPE



a Rounded

b Squared

c Exterior Beveled

d Constricted

e Interior Beveled

f Expanded

ADDITIONAL TREATMENT

1 Turned

2 Folded

3 Flattened

4 None

FIGURE 14
KEY FOR RIM-ANALYSIS RESULTS PRESENTED IN TABLES 3, 4, 5, 6, 7, AND 8

TABLE 3
RIM CHARACTERISTICS OF PLAIN POTTERY

Association	Temper	Orientation			Lip Shape						Additional Treatment			
		A	B	C	a	b	c	d	e	f	1	2	3	4
Structure #1	Sand	0	2	6	4	4	0	0	0	0	0	0	1	7
	Grog	2	1	1	2	1	1	0	0	0	0	0	0	4
	Grit	0	1	2	1	1	0	1	0	0	0	0	0	3
Structure #2	Sand	1	5	10	10	5	1	0	0	0	1	0	3	12
	Grog	1	4	13	8	6	3	0	1	0	2	0	0	16
	Grit	2	1	10	7	2	1	3	0	0	2	0	1	10
Structure #4	Sand	3	6	10	6	9	2	0	2	0	1	2	4	12
	Grog	2	2	2	3	2	1	0	0	0	0	0	0	6
	Grit	1	3	4	4	3	1	0	0	0	0	0	1	7
Structure #5	Sand	2	5	15	14	5	2	0	1	0	0	1	5	16
	Grog	1	3	8	8	2	2	0	0	0	1	0	0	11
	Grit	4	2	17	10	8	3	0	2	0	6	0	0	17
Structure #7	Sand	0	0	2	1	0	0	1	0	0	0	0	0	2
	Grog	0	1	0	1	0	0	0	0	0	0	0	0	1
	Grit	1	4	1	3	1	0	2	0	0	0	0	1	5
Shell Midden Test Pits	Sand	0	1	0	1	0	0	0	0	0	0	1	0	0
	Grog	0	0	0	0	0	0	0	0	0	0	0	0	0
	Grit	0	0	1	1	0	0	0	0	0	0	1	0	0
Total	Sand	6	19	43	36	23	5	1	3	0	2	4	13	49
	Grog	6	11	24	22	11	7	0	1	0	3	0	0	38
	Grit	8	11	35	26	15	5	6	2	0	8	1	3	42

TABLE 4

RIM CHARACTERISTICS OF BURNISHED-PLAIN POTTERY

Association	Temper	Orientation			Lip Shape						Additional Treatment			
		A	B	C	a	b	c	d	e	f	1	2	3	4
Structure #1	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0
	Grog	2	3	1	0	3	0	0	3	0	2	0	0	4
	Grit	0	0	0	0	0	0	0	0	0	0	0	0	0
Structure #2	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0
	Grog	0	0	1	0	0	1	0	0	0	0	0	0	1
	Grit	0	0	1	0	0	0	0	1	0	0	0	0	1
Structure #4	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0
	Grog	0	0	0	0	0	0	0	0	0	0	0	0	0
	Grit	0	0	0	0	0	0	0	0	0	0	0	0	0
Structure #5	Sand	0	1	0	0	0	1	0	0	0	0	0	1	0
	Grog	1	2	0	2	0	1	0	0	0	1	0	0	2
	Grit	0	0	0	0	0	0	0	0	0	0	0	0	0
Structure #7	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0
	Grog	0	0	0	0	0	0	0	0	0	0	0	0	0
	Grit	0	0	0	0	0	0	0	0	0	0	0	0	0
Shell Midden Test Pits	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0
	Grog	0	1	0	0	0	0	0	1	0	0	0	0	1
	Grit	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	Sand	0	1	0	0	0	1	0	0	0	0	0	1	0
	Grog	3	6	2	2	3	2	0	4	0	3	0	0	8
	Grit	0	0	1	0	0	0	0	1	0	0	0	0	1

TABLE 5
RIM CHARACTERISTICS OF CHECK-STAMPED POTTERY

Association	Temper	Orientation			Lip Shape						Additional Treatment			
		A	B	C	a	b	c	d	e	f	1	2	3	4
Structure #1	Sand	8	0	8	10	1	5	0	0	0	2	0	4	10
	Grog	0	0	0	0	0	0	0	0	0	0	0	0	0
	Grit	13	3	11	12	5	8	2	0	0	4	0	4	19
Structure #2	Sand	0	0	1	0	0	0	0	0	1	0	0	0	1
	Grog	0	0	0	0	0	0	0	0	0	0	0	0	0
	Grit	2	0	3	2	1	0	0	2	0	0	0	1	4
Structure #4	Sand	1	0	4	2	0	3	0	0	0	1	0	2	2
	Grog	0	0	0	0	0	0	0	0	0	0	0	0	0
	Grit	4	0	1	3	0	2	0	0	0	1	0	1	3
Structure #5	Sand	1	0	1	2	0	0	0	0	0	0	0	1	1
	Grog	0	0	0	0	0	0	0	0	0	0	0	0	0
	Grit	3	0	11	7	2	3	0	2	0	2	0	2	10
Structure #7	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0
	Grog	0	0	0	0	0	0	0	0	0	0	0	0	0
	Grit	3	0	0	2	0	1	0	0	0	1	0	0	2
Shell Midden Test Pits	Sand	0	0	1	1	0	0	0	0	0	1	0	0	0
	Grog	0	0	0	0	0	0	0	0	0	0	0	0	0
	Grit	2	0	2	2	1	1	0	0	0	0	0	0	4
Total	Sand	10	0	15	15	1	8	0	0	1	4	0	7	14
	Grog	0	0	0	0	0	0	0	0	0	0	0	0	0
	Grit	27	3	28	28	9	15	2	4	0	8	0	8	42

TABLE 6

RIM CHARACTERISTICS OF FINE LINEAR CORD-MARKED POTTERY

Association	Temper	Orientation			Lip Shape						Additional Treatment			
		A	B	C	a	b	c	d	e	f	1	2	3	4
Structure #1	Sand	0	1	1	1	1	0	0	0	0	0	0	0	2
	Grog	0	0	5	0	3	1	0	1	0	0	0	2	3
	Grit	1	0	0	1	0	0	0	0	0	0	0	0	1
Structure #2	Sand	1	0	1	1	1	0	0	0	0	0	0	1	1
	Grog	1	2	3	1	1	3	0	1	0	2	0	1	3
	Grit	0	0	0	0	0	0	0	0	0	0	0	0	0
Structure #4	Sand	0	0	1	1	0	0	0	0	0	0	0	0	1
	Grog	0	1	1	0	0	1	0	0	1	0	0	0	2
	Grit	0	0	1	0	1	0	0	0	0	0	0	0	1
Structure #5	Sand	0	1	0	1	0	0	0	0	0	0	0	1	0
	Grog	1	4	9	4	2	7	1	0	0	0	0	4	10
	Grit	0	0	1	0	0	1	0	0	0	0	0	1	0
Structure #7	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0
	Grog	0	0	0	0	0	0	0	0	0	0	0	0	0
	Grit	0	0	0	0	0	0	0	0	0	0	0	0	0
Shell Midden Test Pits	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0
	Grog	0	1	0	0	0	1	0	0	0	0	0	0	1
	Grit	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	Sand	1	2	3	4	2	0	0	0	0	0	0	2	4
	Grog	2	8	18	5	6	13	1	2	1	2	0	7	19
	Grit	1	0	2	1	1	1	0	0	0	0	0	1	2

TABLE 7

RIM CHARACTERISTICS OF FINE REGULAR-CROSSED CORD-MARKED POTTERY

		Orientation			Lip Shape						Additional Treatment			
Association	Temper	A	B	C	a	b	c	d	e	f	1	2	3	4
Structure #1	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0
	Grog	1	2	2	0	3	2	0	0	0	1	0	1	3
	Grit	0	0	0	0	0	0	0	0	0	0	0	0	0
Structure #2	Sand	0	0	1	0	0	1	0	0	0	1	0	0	0
	Grog	2	4	7	5	4	4	0	0	0	1	1	2	9
	Grit	1	0	2	1	2	0	0	0	0	0	0	0	3
Structure #4	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0
	Grog	1	1	2	0	2	2	0	0	0	1	0	1	2
	Grit	0	0	2	2	0	0	0	0	0	0	0	1	1
Structure #5	Sand	0	0	1	0	0	1	0	0	0	1	0	0	0
	Grog	3	6	2	7	1	2	1	0	0	0	0	4	7
	Grit	1	0	1	1	1	0	0	0	0	1	0	0	1
Structure #7	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0
	Grog	0	0	0	0	0	0	0	0	0	0	0	0	0
	Grit	0	0	0	0	0	0	0	0	0	0	0	0	0
Shell Midden Test Pits	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0
	Grog	1	0	0	0	0	1	0	0	0	0	0	0	1
	Grit	0	0	1	0	1	0	0	0	0	0	0	0	1
Total	Sand	0	0	2	0	0	2	0	0	0	2	0	0	0
	Grog	8	13	13	12	10	11	1	0	0	3	1	8	22
	Grit	2	0	6	4	4	0	0	0	0	1	0	1	6

TABLE 8
RIM CHARACTERISTICS OF CURVILINEAR COMPLICATED-STAMPED POTTERY

Association	Temper	Orientation			Lip Shape						Additional Treatment			
		A	B	C	a	b	c	d	e	f	1	2	3	4
Structure #1	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0
	Grog	0	0	0	0	0	0	0	0	0	0	0	0	0
	Grit	2	0	3	2	3	0	0	0	0	0	0	1	4
Structure #2	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0
	Grog	0	0	0	0	0	0	0	0	0	0	0	0	0
	Grit	2	0	1	1	2	0	0	0	0	1	0	0	2
Structure #4	Sand	1	0	1	2	0	0	0	0	0	0	0	0	2
	Grog	0	0	0	0	0	0	0	0	0	0	0	0	0
	Grit	1	0	2	2	1	0	0	0	0	0	0	0	3
Structure #5	Sand	3	0	1	2	0	2	0	0	0	0	0	2	2
	Grog	0	0	0	0	0	0	0	0	0	0	0	0	0
	Grit	10	0	3	4	6	3	0	0	0	2	0	0	11
Structure #7	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0
	Grog	0	0	0	0	0	0	0	0	0	0	0	0	0
	Grit	0	0	0	0	0	0	0	0	0	0	0	0	0
Shell Midden Test Pits	Sand	0	0	0	0	0	0	0	0	0	0	0	0	0
	Grog	0	0	0	0	0	0	0	0	0	0	0	0	0
	Grit	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	Sand	4	0	2	4	0	2	0	0	0	0	0	2	4
	Grog	0	0	0	0	0	0	0	0	0	0	0	0	0
	Grit	15	0	9	9	12	3	0	0	0	3	0	1	20


N
.D
ROX.
JRFACE
TURES
5
RS

FIGURE 16
STRUCTURE #1

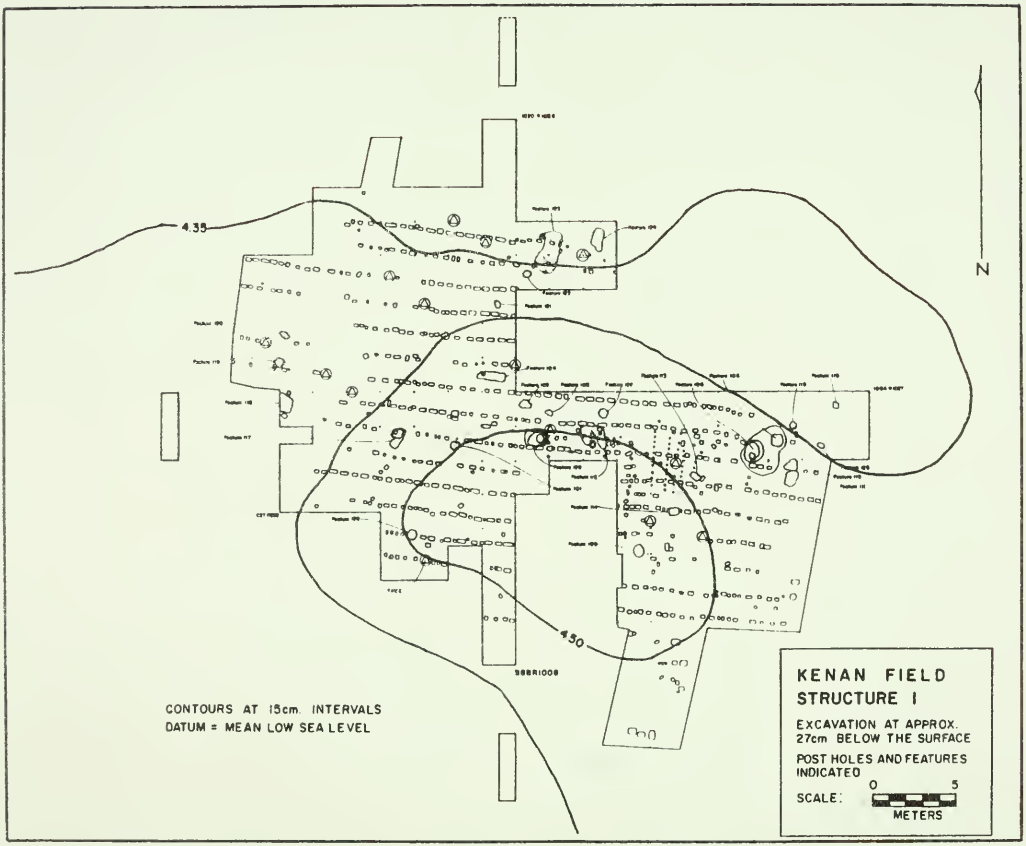
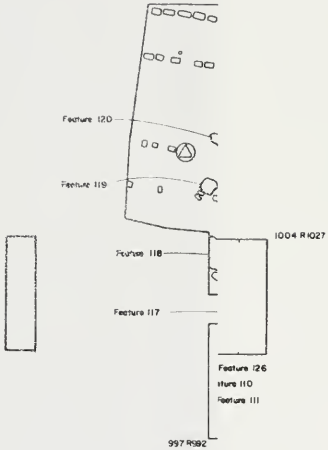


FIGURE 15
PLAN OF STRUCTURE #1 SHOWING SURFACE CONTOURS PRIOR TO EXCAVATION



AN FIELD
CTURE I

ATION AT APPROX.
BELOW THE SURFACE

OLES AND FEATURES
ED

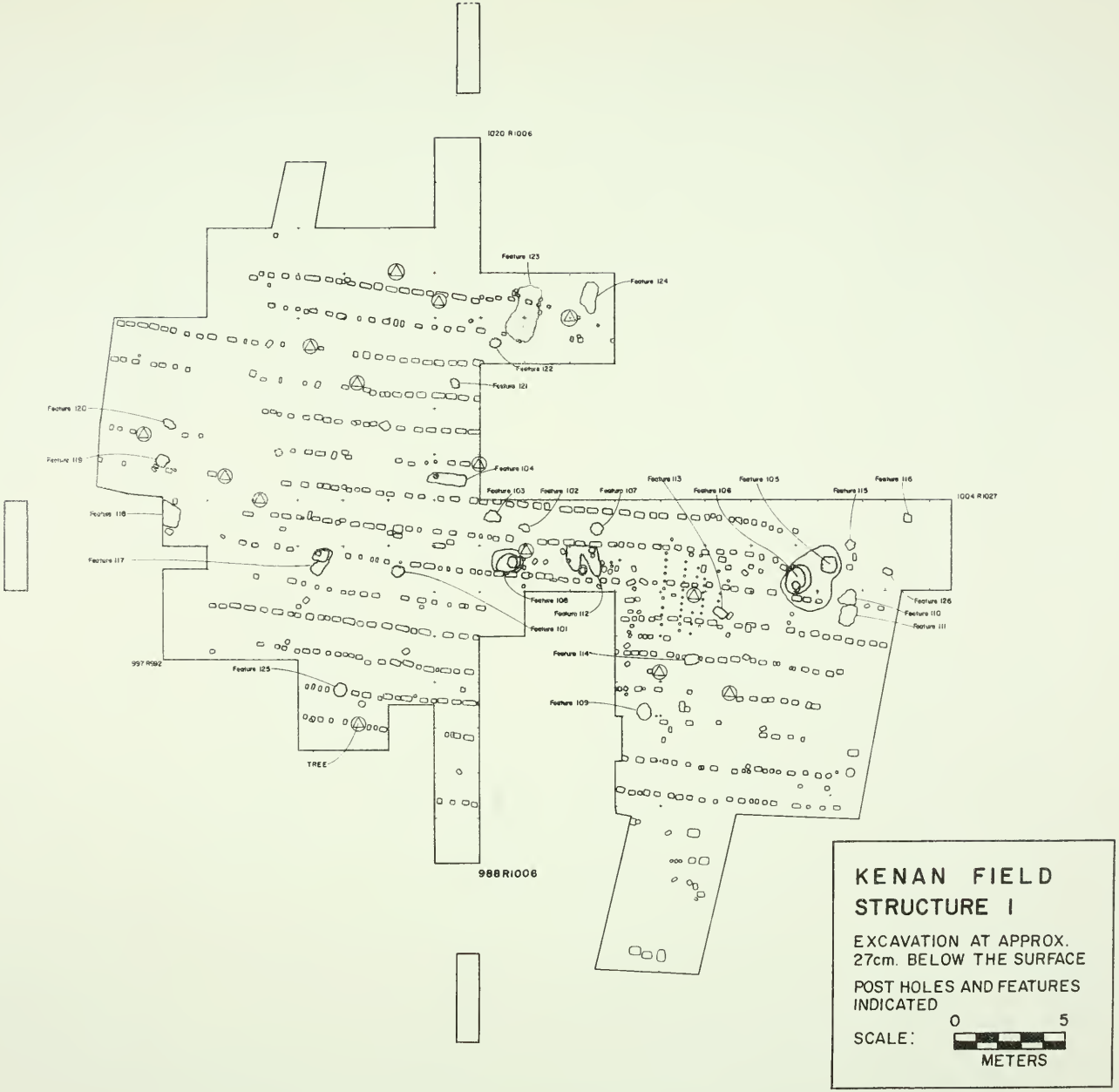
0 5

METERS

of the structure. Additional alteration of the surface in this area consists of an increase of 20 cm. to 30 cm. in elevation in the interior of Structure #1 which apparently defines a low artificial mound. This mound was mistakenly identified as a shell midden during initial mapping and was designated Shell Midden #71. Excavation revealed soil rather than shell composition of the mound. Severe leaching of the soil below the plow zone made identification of mound construction details impossible; however, surface contours indicate that a primary borrow area was located just northeast of the mound.

Cultural material in the Structure #1 area was for the most part restricted to the plow zone which extended 27 $\pm$ 2 cm. beneath the surface. This plow zone was defined by rich brown soil containing scattered shell. Tan sandy subsoil extended from the base of the plow zone to more than a meter beneath the surface without further stratigraphic distinction. The subsoil was heavily leached and had a sterile appearance. Fiber-tempered plain and incised pottery was occasionally found in small clusters within this zone, as if the pottery was associated with features whose definition had been lost to the subsoil leaching process. Subsoil in the low mound area was also heavily leached, however here pottery was predominately grit and sand-tempered plain with small amounts of check-stamped, fine cord-marked, and curvilinear complicated-stamped pottery in addition to frequent fiber-tempered potsherds. This pottery was evidently included within the fill of the mound.

Preliminary tests in the southwest portion of the Structure #1 excavation, conducted during the summer of 1976, exposed a series of


1020 R1006
Feature 123
Feature 124
Feature 122
Feature 121
Feature 120
Feature 119
Feature 104
Feature 118
Feature 117
Feature 103
Feature 102
Feature 107
Feature 113
Feature 106
Feature 105
Feature 115
Feature 116
1004 R1027
Feature 108
Feature 112
Feature 101
Feature 126
Feature 110
Feature 111
Feature 114
997 R992
Feature 125
Feature 109
TREE
988 R1006
KENAN FIELD
STRUCTURE I
EXCAVATION AT APPROX.
27cm. BELOW THE SURFACE
POST HOLES AND FEATURES
INDICATED
SCALE:
0
5
METERS

rectangular post holes. Testing was continued on a more extensive scale during the following summer in an attempt to define the boundaries and form of the structural features. Controlled units were excavated extending north to south and east to west across the structure area. In addition, the plow zone was mechanically removed in areas northwest and southeast of the controlled units.

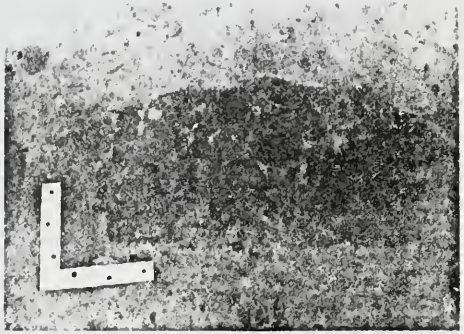
Excavation exposed 17 major lines of rectangular post holes. Spacing between these lines was very consistent, with an average and mode of 1.5 m. measured from the center of one post-hole line to the next. Standard deviation of these measurements was 6 cm., indicating that spacing was standardized with little variability. The major axis of the post-hole lines was also rather consistent, oriented approximately 95° east of north. The lines wavered slightly through their course, but retained constant spacing, suggesting that construction of each post-hole line was in reference to one previously constructed. The length of individual post holes was far more variable than the width, which ranged from 18 cm. to 40 cm. with over 90% measuring about 20 cm. across. Length varied from 15 cm. to 60 cm. with most post holes measuring around 40 cm. The rather constant width indicates an implement measuring no more than 18 cm. wide was employed in construction of the post holes.

Only the basal portions of the rectangular post holes were present, and these never extended more than a few centimeters into undisturbed subsoil. Walls of the post holes along their width were straight, the eastern wall inclined gently from an indented base, and the western wall was usually straight to slightly sloped. The bottom of most

post holes were deepest at the base of the inclined eastern end, near the center of the post holes. These deepest points probably mark post positions, however no post molds were apparent. Judging from those cases where enough of the shallow post holes remained to allow an adequate determination, the form was consistent from one line of post holes to the next. The western rather than eastern end was inclined in a couple of instances, but these were exceptions without persistence and lacked an apparent pattern. In one case a shallow depression connected three post holes within a line, indicating that the post holes may have been constructed in the base of a wall trench.

The maximum depth of the post holes varied slightly in relation to surface elevation. Where surface elevations were around 4.35 m. or less, the bases were from 26 cm. to 35 cm. below the surface. Bases ranged from 30 cm. to 40 cm. below the surface where elevations were around 4.50 m., in the vicinity of the low mound and in the eastern portion of the excavation area. Assuming that the post holes were dug to a rather uniform depth, this suggests that some surface alteration has taken place since the post holes were constructed.

Several inferences may be drawn from the post-hole data. The form indicates the holes were dug with an implement with straight sides and flat edges. Field experiments conducted with a heavy "No. 2" agricultural hoe, with a blade 20 cm. wide and 15 cm. deep, virtually duplicated the post hole form (Figure 17). The tool used in constructing the post holes was probably either a hoe or other



PLAN

PROFILE

RECTANGULAR POST HOLE OF STRUCTURE #1, STATION 1011.7 R991.1

PLAN

PROFILE (lower in plan photograph)

EXPERIMENTAL HOLES DUG WITH A HOE

FIGURE 17

COMPARISON OF EXPERIMENTAL HOLES WITH ARCHAEOLOGICAL POST HOLES

implement of very similar shape. The persistent sloping eastern sides of the holes indicate that most were dug from the west in a rather consistent fashion, and the equal distance between post hole lines indicates spacing was an important consideration.

An immediate interpretation is that the "post holes" are the result of hoe agriculture of the plantation period. Several details may be explained by following this argument. Hoe agriculture was prominent on the Georgia coast during the plantation period and groups of slaves often hoed together, in the same direction, down the crop rows(e.g. Bascom 1941). The regular spacing and slightly wavering orientation of the lines can be explained by viewing them as a result of hoe agriculture.

Problems arise when the agriculture argument is pursued. The post holes are the result of a single event rather than a seasonally recurrent agricultural procedure. The post holes were also free of massive root disruptions that would be expected if their function were for planting. My own attempts to dig a hole 30 cm. deep with a hoe were successful only with difficulty. An older Sapelo Island resident on the Kenan Field crew, who was also a seasoned gardener and farm laborer, agreed that a foot was excessively deep to dig with a hoe. However, Sea Island cotton, sugar cane, and mulberry trees are plantation-period crops that were planted in rows about 5 ft. (ca. 1.5 m.) apart. On the other hand, the cotton and cane were planted in ridges rather than in the bottom of furrows, and mulberry trees were spaced 10 ft. from one another within each

row (Coulter 1940:71,93,115). Neither these nor other Sea Island crops, such as rice, corn, or indigo, can adequately explain the rectangular post holes (see Gray 1933).

Other evidence makes the hypothesis of an agricultural function even more insecure. The relationship between the depth of the post holes and the present surface becomes significant when considered in terms of topographic patterns in the area. Those post holes with bases closer to the present surface are within the borrow area of the earthen embankment that is located south of Structure #1. Since the depths of these post holes are generally less than those in the eastern portion of the structure and those intrusive into the low earthen mound, it is likely that the borrow activity post dates construction of the rectangular post holes.

The earthen embankment was initially thought to be an old field road, a circumstance which would neither confirm nor deny the origin of the post holes since a road probably would have been constructed sometime after agriculture had been initiated at Kenan Field. A mechanical cut was excavated through the embankment in order to obtain construction details. The fill of the embankment was composed of light gray sand without evidence of loading or intrusive features. Also absent, perhaps significantly, was any indication of dual depressions near the top surface that would indicate use as a road. The most important observation was that the embankment had been built upon undisturbed top soil, indicating that the earthwork and therefore the rectangular post holes had been constructed prior to extensive agriculture. A shallow pit containing

charred wood fragments was observed in the profile. This feature originated in the topsoil and was overlain by the embankment fill. Feature 10 apparently post-dates Structure #1 and pre-dates agricultural use of at least this section of Kenan Field. The possibility exists that the earthwork is prehistoric or protohistoric in origin.

Available evidence indicates the rectangular post holes were constructed prior to plantation period agriculture; however, their cultural association remains to be demonstrated. The constant 1.5 m. space between the post-hole lines is somewhat less than a Spanish estado which equals about 1.69 m. (see Swanton 1922:48). This unit of measurement may have been used on the Georgia coast during the mission period or slightly earlier and 1.5 m. is probably within the range of variability for this Spanish measurement (e.g. Foster 1960: 57). Spacing is the only suggestion of a Spanish association as artifacts in the Structure #1 area were exclusively aboriginal. Spanish direction or influence in construction is possible; however, evidence presented below suggests that this is unlikely.

The post hole form and arrangement indicates lines of shallowly set posts that probably supported a very large and low platform. This type of structure is without precedent on the Georgia coast; however, very similar floor plans have been documented at the Winford Site in Mississippi (McGahey 1969). These Mississippian Period structures at the Winford Site were defined by multiple, evenly spaced lines of round post molds that were confined to a rectangular to square area and surrounded by a wall trench. A single large post mold, probably indicating a roof support, was positioned in the

center of these structures. While this floor plan is strikingly similar to Structure #1 at Kenan Field, the Winford structures are much smaller. The largest measures a little more than 12 m. to the side, while Structure #1 measures at least 29 m. along its north-south axis and at least 36 m. along its east-west axis.

Ethnohistoric accounts offer little aid in interpretation of Structure #1. Guale council houses, discussed earlier, were often quite large and did have raised cabins along their inside walls. DeBry engravings (Lorant 1946:93) show Timucuan chiefs and other officials, engaged in a black-drink ceremony, seated upon a narrow platform which defines an open plaza-like area. Narrow platforms are also shown in various other circumstances (Lorant 1946:75, 99, 103, 111). In addition, charnal houses on the coast consisted of elevated platforms contained within a roofed structure. The form of Structure #1 can be explained by none of these ethnohistoric examples; however, it is clear that platform-construction techniques were employed by the coastal aborigines.

Much later accounts of Southeastern aboriginal structures, whose forms may have considerable antiquity, more closely conform to the floor plan though still not the size indicated by Structure #1. Creek square-ground buildings were open-sided sheds which contained rows of benches (see Swanton 1928) and Seminole chickees were open-sided houses with elevated floors (see MacCauley 1887).

Features

The floor plan of Structure #1 thus seems to indicate the distinct possibility that it was an aboriginal construction.

Spatially associated features and cultural materials support this possibility. Twenty-six features other than post holes were encountered at the base of the plow zone in the area covered by rectangular post holes. Five features (#117, #118, #122, #123, #124) were defined by light-gray ashy soil which appeared to be the result of heat, perhaps from small fires built directly above these points. A similar set of features (#102, #103, #111, #112, #116) was defined by organic stained soil containing dispersed fragments of charred wood. Another group of features (#104, #119, #120, #121, #125, #126) was formed by organic stains without charred material. None of the above features were associated with cultural material and all extended into the subsoil in an amorphous manner and had poorly defined bases. These features were probably the result of activities such as fires and organic deposition which occurred immediately above the features in a zone now defined by plow disturbance.

Only a few conclusions can be drawn from the stain features. They tend to be located between the lines of rectangular post holes and in two cases (#112, #123) post holes follow their subsoil outline. This suggests that at least in some cases the activities denoted by these features were contemporary with the structure.

The remaining features were more distinctive. Two hearths (#106, #108) were located between the same two lines of rectangular post holes. Feature 106 measured 1 m. in diameter at the base of the plow zone, extended 45 cm. below the surface, and was basin shaped. Burned oyster shell fragments, charred wood, and a few bone fragments were encountered in the upper portion of the hearth.

Fragments of one small catfish (Bagre marinus), an unidentified snake, and an unidentified small mammal were represented in the skeletonal remains (Table 9, Table 10). The hearth was surrounded by sterile, bright-yellow sand which appeared to be a result of heat radiating from the hearth into a prepared surface associated with hearth construction. Rectangular post holes immediately south of Feature 106 were intrusive into the heat altered, prepared surface however this surface disrupted a line of post holes along its northern side. Assuming the two post-hole lines were contemporary, the construction sequence of the hearth and rectangular post holes appears contradictory. This probably indicates that the hearth and post holes were contemporary. The southern intrusion may have been due to additional construction or rebuilding in this area after the hearth had been prepared, while the northern area remained open.

The other hearth (#108) was located 12.5 m. west of Feature 106. This hearth measured 85 cm. in diameter at the base of the plow zone, extended 42 cm. beneath the surface, and was basin shaped (Figure 18). A thin layer of burned oyster shell covered the upper portion of the hearth at the base of the plow zone and was concentrated in a small area on the eastern side of the feature. Hearth fill beneath the burned shell formed at least two discernible layers and the surrounding subsoil was thermally altered. This hearth abutted a line of rectangular post holes immediately to the south and the upper fill layer of the hearth was intrusive into a portion of one of these post holes.

Feature 108, as Feature 106, was evidently constructed in reference to the lines of rectangular post holes. Layers of mottled

TABLE 9
VERTEBRATE FAUNAL CLASSES REPRESENTED IN FEATURES AT KENAN FIELD

Provenience	Recovery Technique	Total Grams	Grams per Cubic Meter	% Grams Identified	Percent Mammal	Percent Reptile	Percent Fish	Percent Bird
Feature #105 Shell Matrix	X	3.3	110	79	100	0	0	0
	W	0.1	30	33	0	0	100	0
	Z	0.3	80	38	71	14	14	0
Feature #106	X	3.6	91	75	96	0	4	0
	W	0.4	20	75	0	0	100	0
	Z	0.5	25	60	33	33	33	0
Feature #108	X	0.4	7	0				
Feature #109	X	132.0	216	95	54	6	40	1
	W	0.5	2	17	0	0	100	0
	Z	0.1	1	100	0	0	100	0
Feature #201	X/W	8.5	71	54	28	43	29	0
Feature #202	X	42.2	246	90	20	60	20	0
	W	0.6	6	50	0	0	100	0
Feature #204 Shell Matrix	X	49.8	200	87	87	7	6	0
	W	26.8	223	42	45	13	43	0
Sub-Shell Matrix	X	5.4	36	76	71	17	12	0
Feature #205	X	18.4	153	85	82	8	10	0
	W	0.4	13	0				
Feature #206	X	32.3	115	97	50	8	45	0
	W	1.5	25	27	0	25	75	0
Feature #208	X	0.8	9	100	0	88	12	0
Feature #219	X	0.0						
	W	5.6	37	77	19	0	81	0
Feature #401	X	56.2	141	90	50	0	2	8
	W	1.6	12	38	0	0	100	0
	Z	4.9	30	24	0	9	91	0
Feature FOA#1	X	10.9	85	83	34	65	1	0
	W	0.5	10	100	0	80	20	0
Feature FOA#2	X	557.8	1859	74	51	29	20	0.1
	W	34.8	348	86	24	5	72	0
Feature FOA#3	X	129.8	324	90	96	4	0.1	0
	W	3.2	32	94	97	0	3	0

Explanation of Recovery Technique Symbols: X = 5-inch mesh; W = 1/16-inch mesh, water screened; Z = Zinc Chloride flotation of water-screened samples.

TABLE 10
MINIMUM NUMBER OF INDIVIDUALS PER VERTEBRATE SPECIES
IDENTIFIED FROM FEATURES AT KENAN FIELD

Provenience	Mammal					Reptile					Fish														Bird		
	White Tailed Deer	Raccoon	River Otter	Rabbit,	Eastern Mole	Diamondback Terrapin	Red Turtle	Snake	Glass Lizard	Anole	Frog/Toad	Unid. Catfish	Sea Catfish	Gafftopsail Catfish	Gar	Black Drum	Red Drum	Star Drum	Spotted Sea Trout	Atlantic Croaker	Sheepshead	Flounder	Lady Fish, Ten-Pounder	Herring/Shad	Mullet,	Skate/Ray	Unid. Bird	Wood Duck	Turkey
Feature #105	1	.	.	.	.	.	.	.	.	◇	◇	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Feature #106	.	.	.	.	.	.	.	◇	.	.	.	1	.	○	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Feature #109	2	.	.	.	.	.	1	.	.	.	.	5	1	1	1	.	.	.	.	.	.	.	.	◇	.	1	1	.	.
Feature #201	.	.	.	.	.	.	.	1	.	.	.	.	.	1	.	1	.	.	.	1	1	.	.	.	.	.	.	.	.
Feature #202	1	.	.	.	.	.	1	.	.	.	.	.	1	1	.	.	.	.	1	.	.	1	.	.	1	○	.	.	.
Feature #204																													
Shell Matrix	1	○	.	.	.	1	.	.	○	.	○	2	.	1	1	1	.	.	.	○	.	○	.	.	○	○	.	.	.
Sub-Shell Matrix	1	.	.	.	.	1	1	.	.	.	.	1	○	1	○	.	.	.	.	.	.	.	.	.	○	.	.	.	.
Feature #205	.	.	.	.	1	.	.	.	.	.	1	1	.	.	.	1	.	.	.	.	1	.	.	.	.	.	.	.	.
Feature #206	1	.	.	.	.	.	.	○	.	.	.	.	1	1	1	2	.	.	.	.	.	.	.	.	.	.	.	.	.
Feature #208	.	.	.	.	.	1	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Feature #219	.	1	.	.	.	.	.	.	.	.	.	1	1	1	.	.	.	.	.	2	.	1	.	.	1	1	.	.	.
Feature #401	1	1	1	.	.	.	1	.	.	.	◇	.	.	.	.	○	.	.	.	.	.	.	.	.	○	○	.	1	1
Feature FOA#1	1	.	.	.	.	1	1	.	.	.	.	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Feature FOA#2	2	1	.	1	1	1	1	○	.	.	.	4	.	1	4	3	.	○	1	1	.	.	○	1	3	1	1	.	.
Feature FOA#3	1	1	.	.	.	.	1	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	○	.	.	.	.

Explanation of Symbols: ○ Identified from elements recovered by 1/16-inch mesh, water screening technique.

◇ Identified from elements recovered by Zinc-Chloride flotation of water-screened samples.

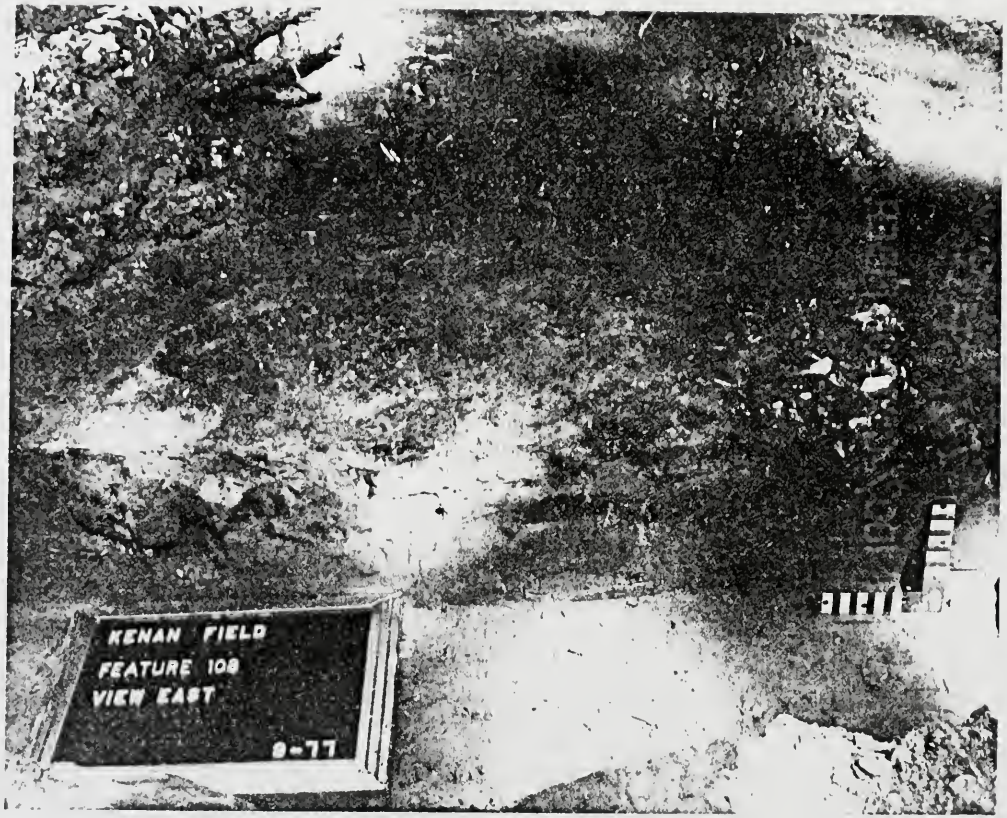


FIGURE 18
FEATURE 108

fill in the feature indicate the hearth was periodically cleaned and resurfaced. During one of the final cleaning activities, the edge of the refinished hearth intruded into an adjacent post hole. This event is important because it demonstrates that an aboriginal activity post-dates construction of a rectangular post hole. A sample of the burned oyster shell associated with Feature 108 submitted for Carbon-14 analysis dated to A.D. 1155 $\pm$ 75 (795 $\pm$ 75 B.P.; UM-1390), indicating that the hearth and therefore the rectangular post holes date to the Savannah Phase.

The final set of features in Structure #1 consisted of shell filled pits. Four of these (#110, #113, #114, #115) were extremely shallow, extending only a few centimeters into the subsoil. The others (#101, #105, #109) were well-defined. Feature 101 was a small refuse pit that measured 30 cm. in diameter at the base of the plow zone, extended approximately 40 cm. beneath the surface, and had slightly flaring to straight sides and a rounded base. The cultural association of this feature is unclear as it was neither spatially informative in terms of a relative chronological position, nor was it associated with any artifacts. The pit fill was composed almost exclusively of oyster shell. Window-screened samples of the fill were collected, however these remain to be sorted and analyzed. Visual inspection of the samples indicates the fill also contained a few small fragments of bone.

A second refuse pit (#105) was intrusive into the prepared surface associated with Feature 108. Feature 105 measured approxmiately 70 cm. in diameter at the base of the plow zone, extended

35 cm. beneath the surface, had flaring sides and a rounded base. Material within this feature was restricted to oyster shell and a few bone fragments. Species represented in the skeletal material include one white-tailed deer, a frog or toad, an anole, and unidentified fish (Table 9, Table 10). The location of this feature near the hearth suggests it may have been a deposition facility for associated refuse. The anole is of some non-economic interest, as this small lizard is commonly found around old buildings and thus provides a faunal indication of the existence of an aboriginal structure in the area (see Conant 1975:88).

Feature 109 was a large shell-filled pit that was intrusive into the low earthen mound associated with Structure #1 (Figure 19). The pit measured approximately 1.1 m. in diameter at the base of the plow zone, extended 80 cm. beneath the surface, had rather straight but irregular sides, and a flat base. A thin layer of humic soil covered the base of the pit and was overlain by the matrix composed principally of oyster shell. Bottom portions of the shell matrix had been pushed into the soil beyond the sides of the pit.

Potsherds encountered in the shell matrix of Feature 109 were exclusively sand-tempered plain with coarse paste and shell-smoothed interiors and exteriors. Coil fractures were prominent and most sherds appeared to be portions of a single vessel with straight sides and a round but very irregular lip. Typologically these sherds probably represent a central Georgia coast variant of the Deptford pottery complex.

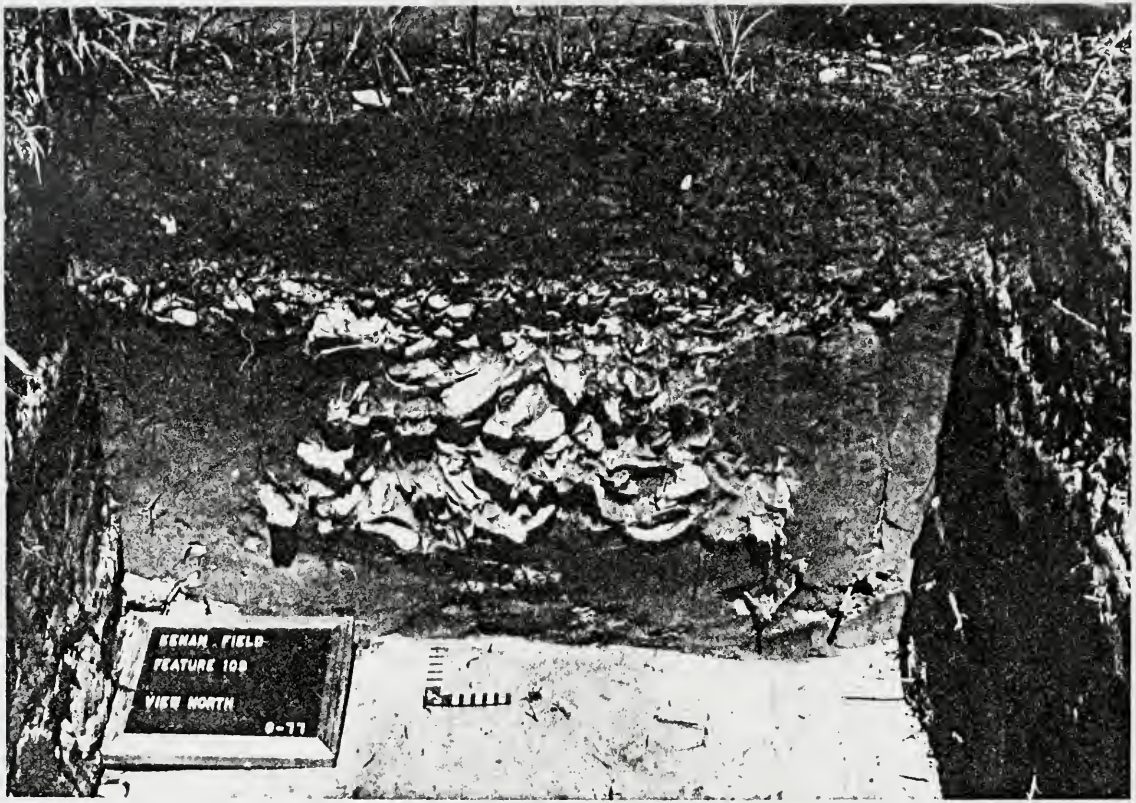


FIGURE 19
FEATURE 109

A relatively high density of bone fragments was associated with Feature 109 (Table 9, Table 10). Identified fauna include portions of at least two white-tailed deer, one mud turtle, several species of fish, and an unidentified bird.

The fill of Feature 109 appears to be redeposited material from an older Deptford shell midden since the feature is intrusive into the low earthen mound which contains fill associated with more recent potsherds. Secondary deposition of the matrix also suggests that its function was for something other than a refuse facility. The most likely interpretation is that this feature is a large post hole which was a construction element of Structure #1. Shell was probably packed around a rather large post to secure its position in the sandy coastal soil. Those portions of the shell matrix that intrude through walls in the base of the pit may have been the result of tilting the post to pack the surrounding shell support. Whether the post was a single roof support analogous to the Winford structures or only one of others which are in unexcavated areas of Structure #1 is an open question. Alternatively, the post may have had a a symbolic rather than a construction function, for example as a designator of clan or lineage association(e.g. Hau'ofa 1971:158).

Another series of construction elements that appear to be directly associated with Structure #1 were located north of Feature 109 in the area between the two hearths. These elements were small post molds, 7 cm. to 10 cm. in diameter, which extended approximately 40 cm. beneath the surface. The post molds had straight sides that tapered to a pointed base, indicating they mark positions of

small posts which were driven into the ground. These posts were spaced from 30 cm. to 40 cm. apart within a line, forming 4 or 5 lines which extended perpendicular to the orientation of the rectangular post holes. A separate construction element is indicated by the posts, possibly a drying rack or elevated storage facility that extended above the platform of Structure #1.

The vicinity of the low earthen mound at Structure #1 was associated with an array of round and rectangular post holes that departed from the normal linear arrangements. This may indicate that the mound was associated with a distinctive structural element, or possibly subsequent building activities. However, the function of the low mound may have been totally practical. It seems significant that the linear series of small post molds and the hearths are located near the periphery of this mound. An elevated area would have functioned to drain this section of Structure #1 and its associated features, and the mound may have been constructed for this purpose.

To summarize, present evidence indicates that Structure #1 was a large, low platform. This platform was constructed over a low mound which drained the interior area and associated features. Overall dimensions and form of the structure are unknown at this point. The only terminal construction element encountered during the present investigation was a segment of the northern edge of the platform. The edge was defined by a line of rectangular post holes identical to those that formed the platform foundation. This north side seems to have been open and lacked obvious roof supports. Refuse appears

to have been deposited and small fires, perhaps smudge fires to repel coastal insects, seem to have been made in areas under the platform between the lines of support posts. If this interpretation is correct, the floor sections were probably easily moved and replaced. Small sections of platform around the hearths may have been left open. Alternatively, the constructed hearth-beds may have extended to the platform floor (e.g. Cranstone 1971). The large post hole in the interior of Structure #1 may suggest that the platform was covered by a roof, however a symbolic function for the post is equally plausible at this point.

An excavation trench, composed of controlled units measuring 1 m. x 4 m. was extended north of the northern edge of Structure #1. This trench intercepted Shell Midden #65 and continued approximately 4 m. beyond its northern periphery. Lines of rectangular post holes were encountered just beyond the northern margin of the shell midden, 34.5 m. north of the edge of Structure #1. The post holes mark the southern extent of Structure #2, which is discussed later.

Cultural Material Recovered from the Plow Zone

As previously stated, most of the cultural material in the Structure #1 area was restricted to the plow zone. Aside from the features, any cultural debris associated with the occupation and utilization of the structure was confined to this disturbed zone. It has been suggested (e.g. Binford et al. 1970, Roper 1976) that the lateral displacement of cultural debris due to plowing can be restricted, and that meaningful spatial associations may still be discernible. Plow scars extending north to south were occasionally

observed on the surface of the subsoil at Kenan Field, indicating that some dispersion was the result of plowing. However, since much of the plantation-period agriculture on the coast was accomplished with hoes, it was hypothesized that the degree of lateral displacement was very small. While hoeing would radically displace the vertical location of material, it would laterally disturb only small areas.

The distribution of cultural material within the lower plow zone at Structure #1 does suggest patterns which appear to be associated with underlying structural elements. The three classes of cultural material that were recovered by screening the lower plow zone in the structural area and from the adjacent northern test trench are included in these distribution plots. The density of pottery, bone, and stone per excavation unit was determined by calculating the weight of each class per volume of excavation. These figures were standardized to grams per cubic meter and were assigned to one of four groups as determined by standard deviations from the mean density of each class. The absence of material defines a fifth group which was excluded from calculations of the mean and standard deviations. Pottery was sorted by size and only those sherds with dimensions greater than or equal to 21 mm. were considered in the density calculations. Densities of bone and stone were not manipulated in this way because most consisted of small fragments and sorting by size would have resulted in a considerable loss of information.

The structure #1 excavation area is divided into four rather distinct zones based on the weight-density distribution of pottery, bone, and stone recovered from the lower plow zone. These zones are referred to as Area 'A' which defines an interior section of Structure #1 extending south of the 1004 grid line; Area 'B' which defines the northern edge of the structure between the 1010 and 1018 grid lines; Area 'C' which defines the area north of Structure #1, excluding Shell Midden #65, between the 1018 and 1051 grid lines; and Shell Midden #65 between the 1031 and 1039 grid lines.

Percentages of pottery by surface-treatment class, along with design-variant and tempering ratios, associated with each of these zones are presented in Figure 20. Excavation levels are shown combined for pottery associated with Shell Midden #65, as the midden forms a discrete unit. Pottery recovered from the subsoil and the rectangular post holes is also shown in Figure 20. Non-fiber-tempered pottery in the subsoil was restricted to the fill of the sub-structural mound.

The pottery inventory from the Structure #1 area indicates that this portion of Kenan Field was occupied sporadically during the St. Simons, Irene, and possible Sutherland Bluff Phases. High frequencies of fine cord-marked and check-stamped pottery evince an intensive occupation during the Savannah Phase.

The sub-structural mound was evidently built after an initial Savannah-Phase occupation, as Savannah Check-Stamped, Fine Cord-Marked, and Burnished Plain pottery types provide the <u>terminus post quem</u> for construction. Two sherds of complicated-stamped pottery were

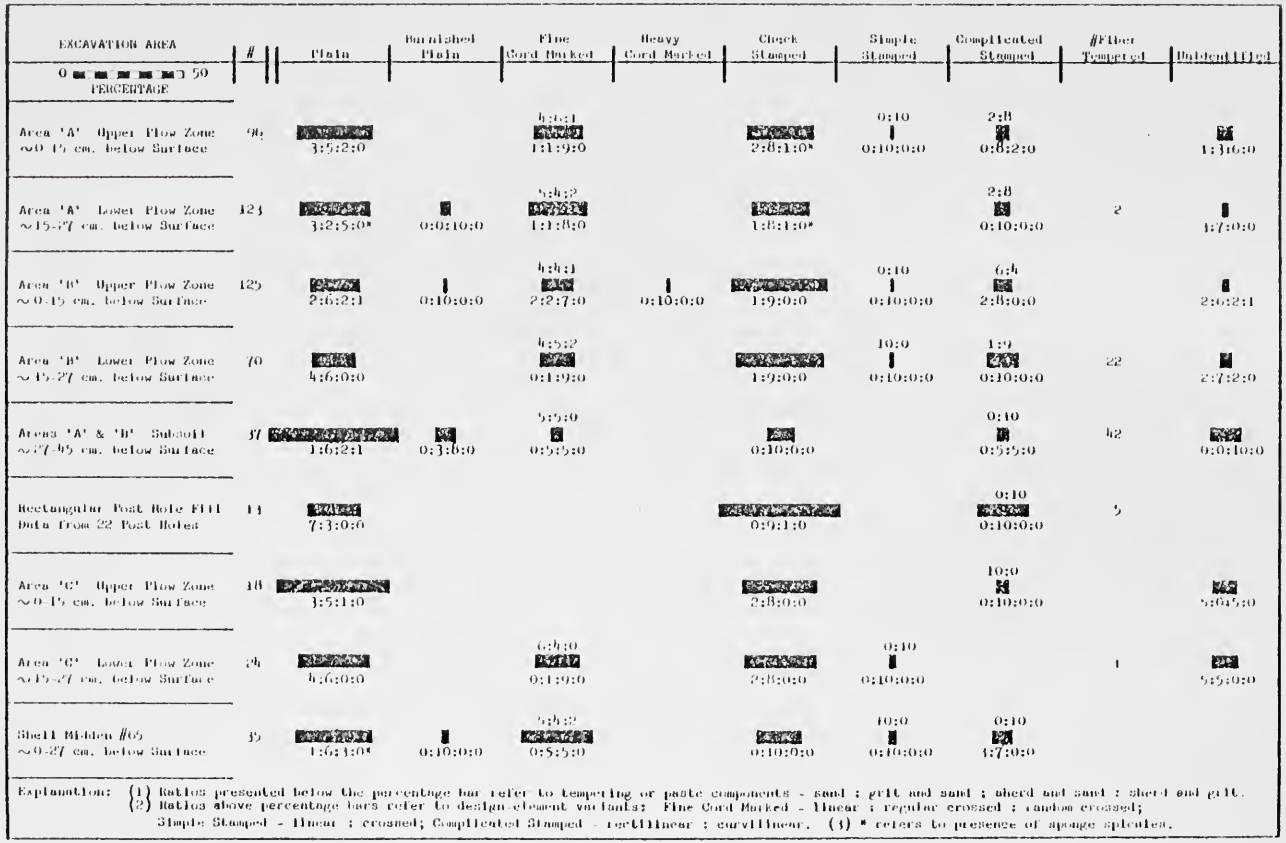


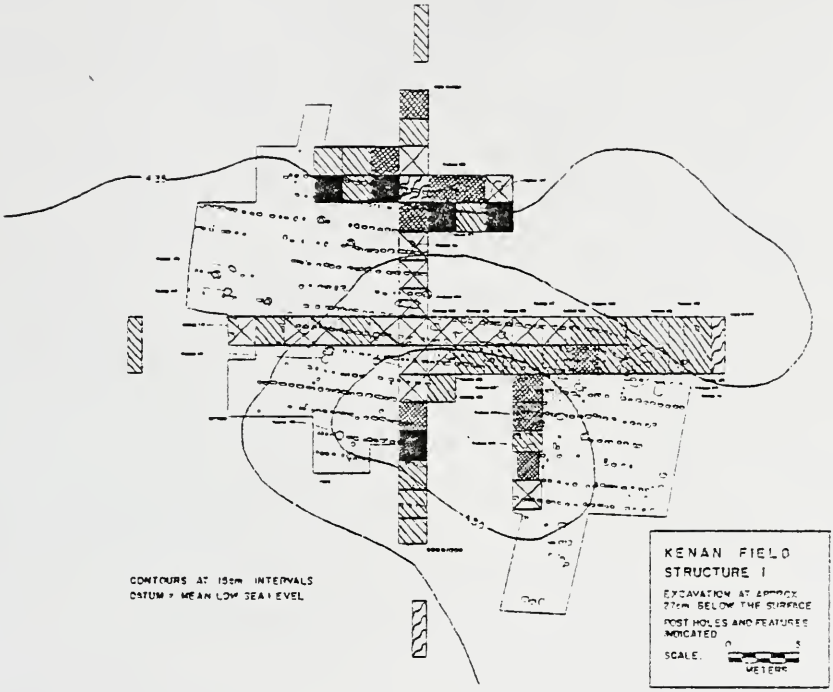
FIGURE 20
DESCRIPTIVE SUMMARY OF POTTERY FROM THE STRUCTURE #1 EXCAVATION AREA

encountered in the mound fill. One of these is a good example of Savannah Complicated-Stamped pottery (Figure A-3C) and the other is overstamped with what may be indistinct portions of Irene Filfot elements. The latter sherd is considered to be an incidental inclusion in the mound fill.

Sherds were infrequent in the fill of rectangular post holes and provide insecure evidence of the cultural association. An uncritical appraisal of the associated potsherds would yield an Irene Phase terminus post quem based on the presence of three filfot-decorated sherds. However, the Carbon-14 estimate for the intrusive hearth indicates that an Irene-Phase association is much too late and that the rectangular post holes probably date to around the twelfth century A.D. and the Savannah Phase. The inclusion of Irene-Phase pottery within the post holes may have resulted from later deposition in old post positions. An alternative explanation is the possibility that small amounts of filfot-decorated pottery were being made during the Savannah Phase.

The high incidence and distribution of Savannah-Phase pottery within the plow zone suggests the direct utilization of Structure #1 during this period. The distribution of pottery, bone, and stone in relation to the structure indicates distinctive activity areas. Pottery densities along the north wall may represent material swept under the platform in order to keep the area to the north free of debris (Figure 21).

Percentages of Savannah Check-Stamped pottery increase at the north wall (Area 'B) and in Shell Midden #65. The distinct tempering differences between the fine cord-marked and check-stamped



Grams	
0	
1 - 23	
24 - 108	
109 - 193	
194 - 325	
(unscreened)	

Mean = 108.49 grams

Standard Deviation = 83.99 grams

FIGURE 21
WEIGHT-DENSITY DISTRIBUTION OF POTTERY AT STRUCTURE #1

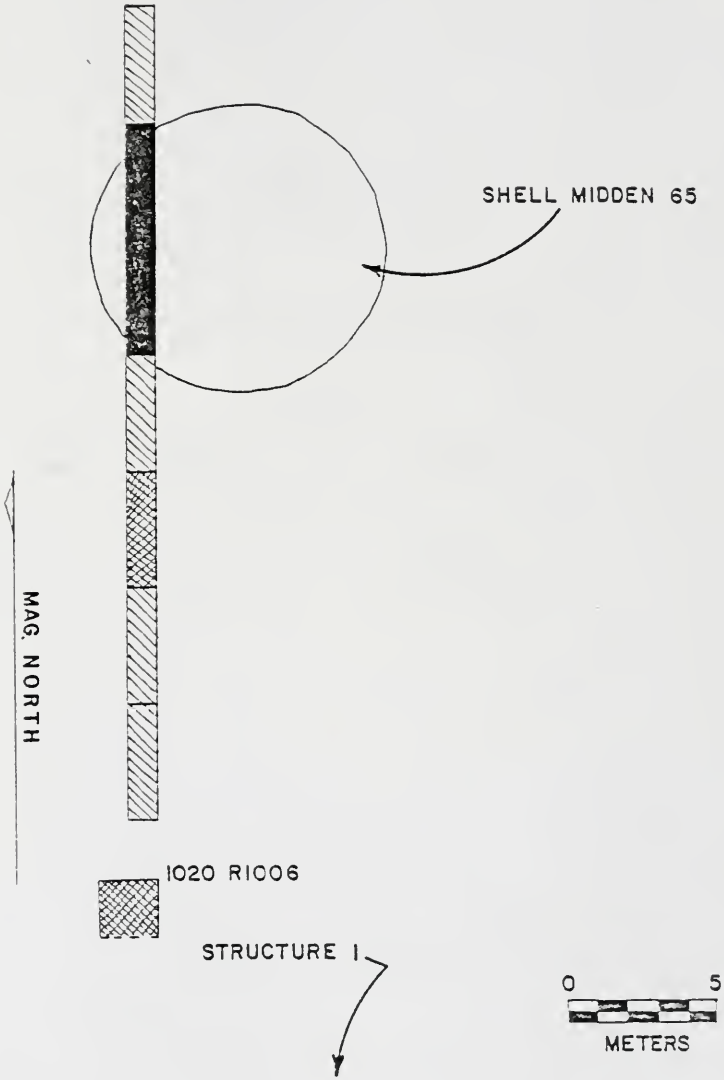
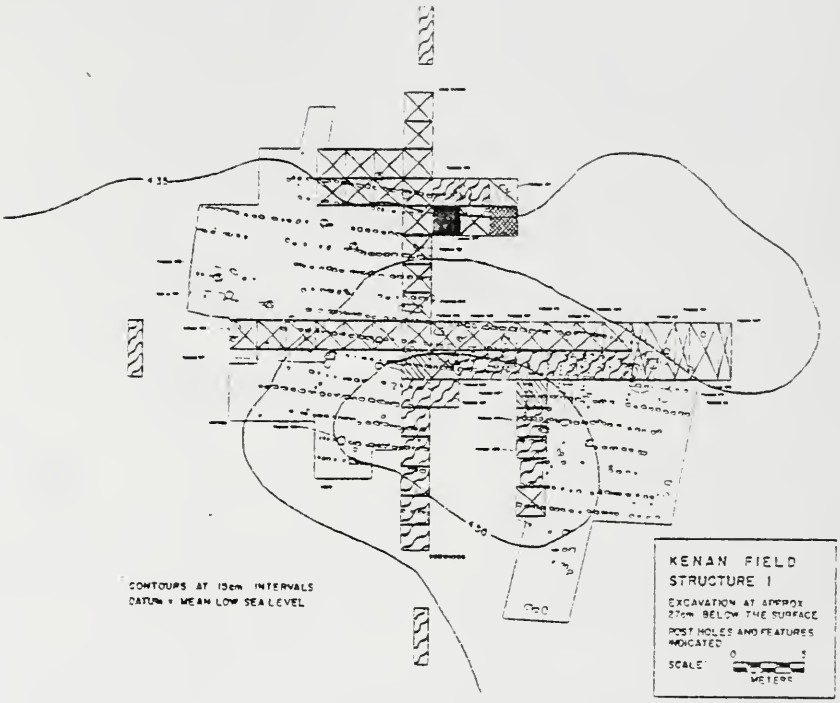


FIGURE 21 - CONTINUED

pottery surely indicate that different processes were involved in the manufacturing of the two wares, and this was probably related to social and/or functional differences in the use of the pots.

The circumstances defining pottery-use are difficult to discern. Based upon evidence just from the Structure #1 excavation, a functional and social significance is suggested. However as is discussed later, a comparison of the pottery associated with Structure #1 with that of Structure #2 suggests that a social explanation may be more accurate.

To follow the functional-and-social argument, the plain and fine cord-marked pottery may have been used in food-preparation activities while the check-stamped pottery may have been used as containers at political or religious events. The variable distribution of food remains at Structure #1 tends to support this hypothesis (Figure 22, Table 11, Table 12). Fauna from the interior of Strucutre #1 are diverse. Species include several kinds of fish plus turtles, a small song bird, white-tailed deer, and raccoon. Fauna associated with the shell midden consist of white-tailed deer, an Atlantic green turtle, and probably a box turtle, along with many oysters and a few other molluscs. The faunal material along the north wall is associated with the features rather than directly with the overall pottery component along the wall. The open area north of the wall was free of all but small unidentified fragments of bone, further indicating that this location was intentionally cleared of debris. High frequencies of plain and cord-marked pottery are associated with food debris within the structure while



Grams	
0	Mean = 52.97 grams
1 - 53	Standard Deviation = 173.78 grams
54 - 228	
229 - 403	
404 - 890	
(unscreened)	

FIGURE 22
WEIGHT-DENSITY DISTRIBUTION OF BONE AT STRUCTURE #1

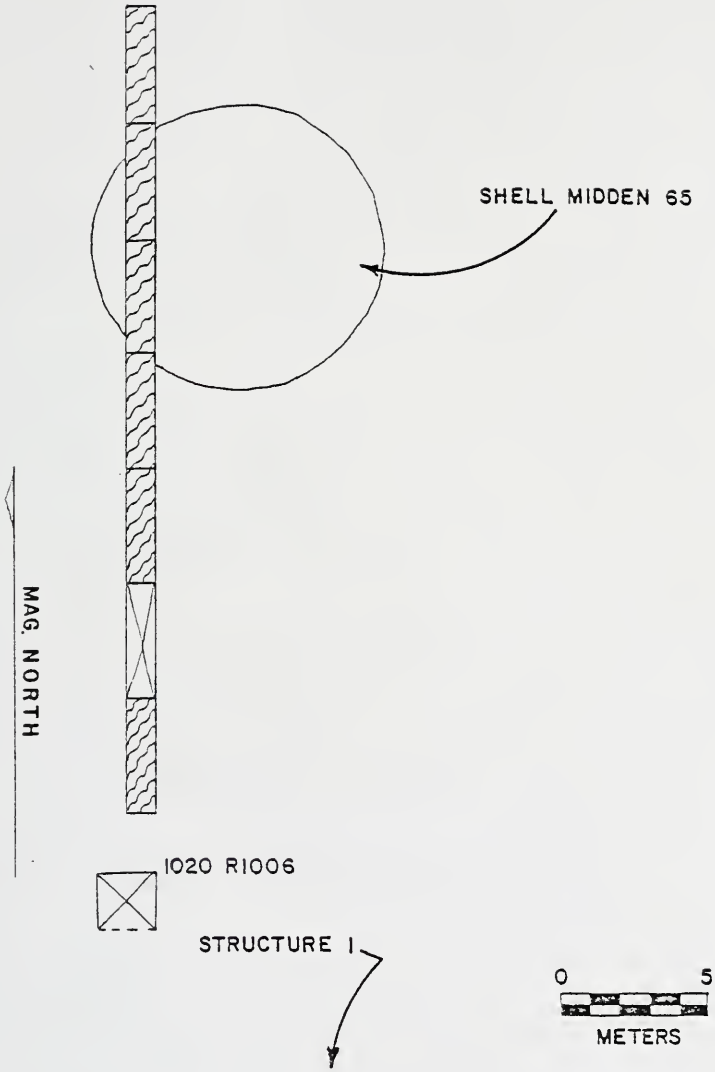


FIGURE 22 - CONTINUED

TABLE 11

VERTEBRATE FAUNAL CLASSES REPRESENTED AT STRUCTURES OF KENAN FIELD

Provenience	Total Grams	% Grams Identified	Percent Mammal	Percent Reptile	Percent Fish	Percent Bird
Structure #1 - Area 'A' 15-27 cm. below Surface	104.6	91	75	16	8	1
Structure #1 - Area 'B' 15-27 cm. below Surface	46.4	95	87	12	1	0
Structure #1 - Area 'C' 15-27 cm. below Surface	4.5	80	69	31	0	0
Shell Midden #65 0-27 cm. below Surface	28.1	99	61	34	0.4	0
Structure #2 - Area 'A' 15-30 cm. below Surface	444.7	88	50	38	11	0.2
Structure #2 - Area 'B' 15-30 cm. below Surface	112.1	77	63	28	9	0
Structure #3 15-28 cm. below Surface	153.7	85	64	31	6	0
Structure #5 15-28 cm. below Surface	1845.0	86	70	24	6	0.1
Structure #4 15-28 cm. below Surface	136.6	74	57	29	13	0
Shell Midden #108 15-30 cm. below Surface	110.9	92	81	17	2	0
Structure #7 15-30 cm. below Surface	114.9	92	81	15	3	0

TABLE 12

VERTEBRATE SPECIES IDENTIFIED AT STRUCTURES OF KENAN FIELD, EXPRESSED BY RELATIVE SKELETAL WEIGHT OF SPECIES PER CLASS

Provenience	Mammal	Human	White-Tailed Deer	Raccoon	Striped Skunk	River Otter	Beaver	Fox Squirrel	Cotton Rat	Mouse	Eastern Mole	Whale/Porpoise/Dolphin	Reptile	Box Turtle	Diamondback Terrapin	Chicken Turtle	Cooter/Slider	Mud Turtle	Atlantic Green Turtle	Alligator	Alligator Lizard	Racer	Eastern Coachwhip	Corn Snake	Anole	Glass Lizard	Frog/Toad	Fish	Gar	Catfish	Sea Catfish	Black Drum	Red Drum	Star Drum	Spotted Sea Trout	Atlantic Croaker	Sheepshead	Flounder	Ladyfish, Ten-Pounder	Herring/Shad	Mullet	Skate/Ray	Bird	Song Bird	Mourning Dove	Wood Duck	Turkey
Structure #1 - Area 'A' ~15-27 cm. below Surface	.	●	O	.	.	.	.	.	.	.	.	.	●	.	●	.	O	.	.	.	.	.	.	.	.	+	.	O	●	.	O	.	.	.	.	.	.	.	O	.	.	.	●	.	.	.	.	.
Structure #1 - Area 'B' ~15-27 cm. below Surface	+	●	.	O	.	.	.	.	.	.	.	.	●[a]	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	●	.	.	.	.	.	●	.	.	.	.	.	.	.	.	.	.	.	.	.
Structure #1 - Area 'C' ~15-27 cm. below Surface	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Shell Midden #65 ~0-27 cm. below Surface	.	●	.	.	.	.	.	.	.	.	.	.	O[a]	.	.	.	.	.	●	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Structure #2 - Area 'A' ~15-30 cm. below Surface	.	●	.	.	.	+	.	.	.	.	.	.	.	●	+	.	O	.	.	+	+	.	.	.	.	.	.	●	●	O	●	+	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.
Structure #2 - Area 'b' ~15-30 cm. below Surface	.	●	O	.	.	O	.	.	.	.	.	.	●[a]	.	.	.	O	.	.	.	.	.	.	.	.	.	.	O	●	.	O	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.
Structure #3 ~15-28 cm. below Surface	.	●	O	.	.	.	.	.	.	.	.	.	.	●	.	.	O	.	.	.	.	.	.	.	.	.	+	●	●	O	●	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Structure #5 ~15-28 cm. below Surface	.	●	O	+	.	O	+	.	.	+	+	O	●	.	.	O	.	+	+[b]	.	.	.	.	+	●	●	●	●	.	.	O	.	+	.	.	.	+	.	.	.	.	.	.	●	.	.	.	.
Structure #4 ~15-28 cm. below Surface	O	●	O	.	.	.	.	.	.	.	.	.	●	+	.	.	.	.	.	.	.	.	.	.	.	.	.	O	●	●	●	.	.	.	●	+	.	.	.	O	.	.	.	.	.	.	.	.
Shell Midden #108 ~15-30 cm. below Surface	.	●	.	.	.	O	.	.	.	.	.	.	●	O	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	●	●	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Structure #7 ~15-30 cm. below Surface	.	●	.	.	.	.	.	.	.	.	.	.	.	●	.	●	●	.	.	.	.	.	.	.	.	.	.	.	●[c]	.	●	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

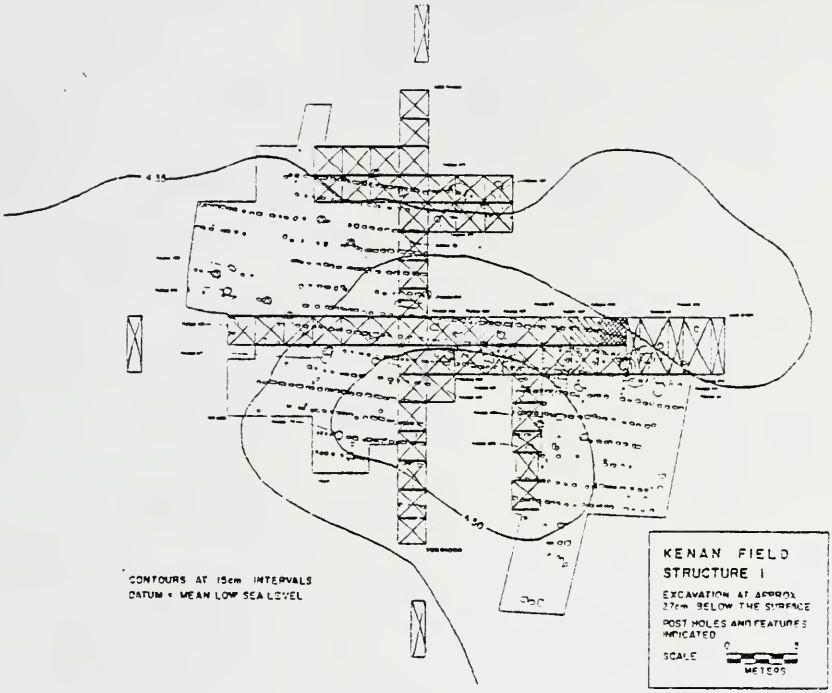
Explanation of Symbols: ● Greater than 10% of total skeletal weight of identified species per class.
O Greater than 1% but less than 10% of total skeletal weight of identified species per class.
+ = Greater than 0% but less than 1% of total skeletal weight of identified species per class.

Explanation of Super-Scripts: [a]Material Identified only to Family Emydidae. [b]Material Identified only to Family Colubridae. [c]Material Identified only to Family Ariidae.

high frequencies of check-stamped pottery are associated with a refuse deposit located in a plaza-like area and along the edge of the structure where pottery fragments may have been swept from the plaza.

Stone material had a similar distribution. Lithic densities shown in Figure 23 were determined by weight per cubic meter, however in each case a single fragment is represented. The heavier density northwest of the hearth (Feature 105) defines the location of an unworked quartzite fragment and the lighter density defines the location of a small, triangular projectile point made of red chert. Stone fragments associated with Shell Midden #65 consist of a red chert flake and a worked greenstone fragment with smoothed face and edge. The lithic distribution suggests that the use, maintenance, or disposal of stone implements was confined to these areas, as was much of the food refuse.

A few exotic potsherds were also encountered in the Structure #1 area. Two St. Johns Check-Stamped sherds (Figure A-4C) and two St. Johns Plain sherds were associated with Area 'A' and a single example of St. Johns Plain pottery was recovered from Shell Midden #65. This type of pottery was made in northeast Florida during the St. Johns II Period and is considered to be contemporary with the Savannah Pottery Complex (Goggin 1952:36, 53-58). St. Johns II extends into the early historic period when it is associated with the Timucua. The presence of this pottery in Structure #1 indicates a relationship, perhaps through trade, with northeastern Florida groups. This further suggests that the structure may have been the



Grams	
0	Mean = Not Applicable
2 - 19	Standard Deviation = Not Applicable
20 - 42	
(unscreened)	

FIGURE 23
WEIGHT-DENSITY DISTRIBUTION OF STONE AT STRUCTURE #1

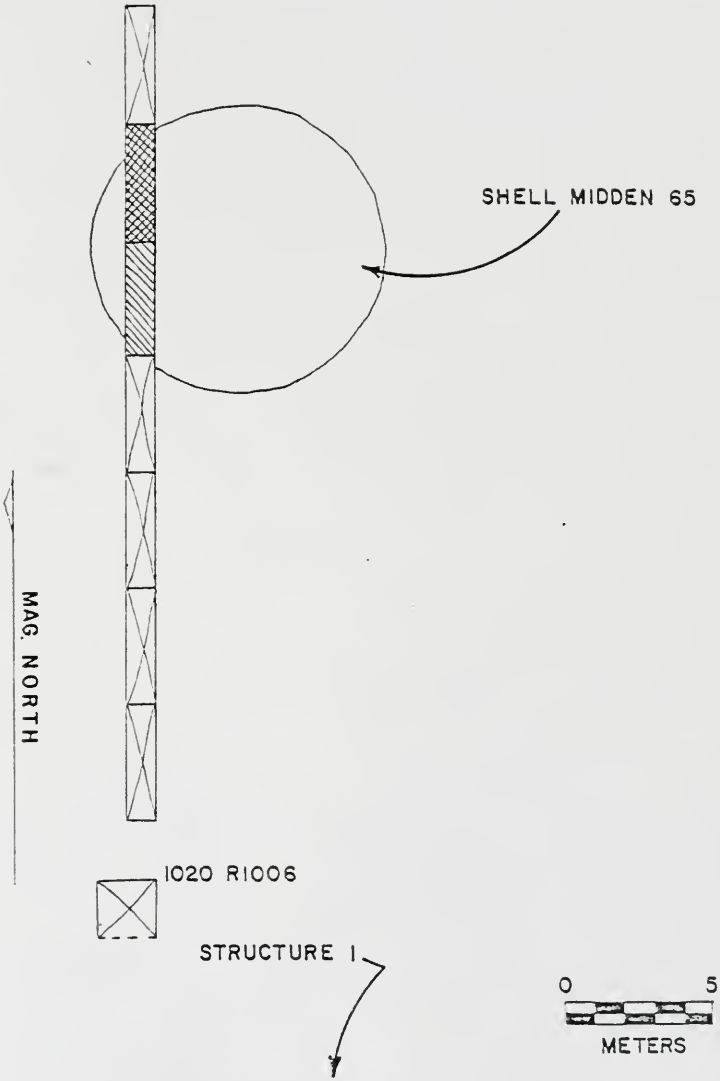


FIGURE 23 - CONTINUED

location of trade-related activities, or at least that exotic material was used in events associated with the occupation of the structure. Exotic pottery was also encountered directly beneath the matrix of Shell Midden #65. These four body sherds (Figure A-4E) were decorated with Late Swift Creek designs (see Jennings and Fairbanks 1939, Waring and Holder 1968:Figure 47k). Deposition of these sherds pre-dates the Savannah-Phase shell midden and thus provides support for the generally accepted chronological position of Late Swift Creek.

Conclusions

Structure #1 appears to have been a large platform that was constructed and used during the Savannah Phase. The large size of Structure #1, its association with a sub-structural mound and an open plaza-like area and the presence of contemporary exotic material, i.e. St. Johns pottery, indicates that it functioned as a community oriented facility. Certainly, communal labor was responsible for the energy expended in construction of this structure.

While Structure #1 definitely appears to have been a community building, it also seems to have been a residence. Hearths, refuse pits, and diverse faunal remains within the structure indicate that it was the location of food-preparation activities. The small size of the refuse pits suggest they contain the food debris of a small social unit and perhaps even denote single meals. It may be speculated that the dual hearths indicate that this social unit was polygamous. Conclusions based on a partially excavated structure must remain tentative; however, present evidence is well explained by viewing this community structure as the residence of a high-ranking political or religious official.

Species identified within the interior of Structure #1 suggest that it was primarily occupied during the early spring and warm summer months. The association of oysters with the anole and frog or toad in Feature 105 indicate that this refuse was deposited during the early spring portion of the oyster season, as reptiles are dormant during colder weather. The anadromous herring or shad may also belong to this season, however the infrequency of this family could indicate an off-season catch. Distinct warm weather species are the snake, turtles, gafftopsail catfish, and black drum.

There are much less data for the other areas of Structure #1, however the spotted sea trout may indicate a more restricted seasonality for the north-wall faunal deposit as this species is most common during the month of May. Shell Midden #65 was composed almost entirely of oyster shell, suggesting it was probably the result of a winter activity. White-tailed deer and Atlantic green turtle were the more important vertebrates represented in the shell midden and both could have been procured during the winter months. The only exception to winter seasonality was the rare occurrence of box or water turtle (Family Emydidae). The presence of this family within an otherwise winter deposit may be consistent as these turtles occasionally emerge from hibernation on warmer days to bask in the sun.

The Atlantic green turtle is not reported on the Georgia coast today, however in Florida these turtles nest on beaches during May and June. They are said to enter tidal streams during other times of the year to feed (see Carr 1952:352-353; Larson 1970:197). Considering the association of the green turtle with the winter

deposit of oysters in Shell Midden #65, it is likely that this turtle was harvested from a tidal stream. It is probably significant that a humerus rather than shell fragments were found in the shell midden, as this indicates that the sea turtle was butchered elsewhere.

The faunal evidence thus suggests discrete seasonal deposits in the Structure #1 area. The shell midden marks a winter event which, from the size of the deposit, supported a number of people. Its location in the plaza-like area may indicate it is the debris of a winter festive occasion. Faunal remains at the north wall appear to be associated with a much smaller event that perhaps occurred during the spring. The human tooth fragment recovered from this area is difficult to interpret; however, its occurrence may reflect a natural dental loss or extraction. The interior of Structure #1 seems to have been occupied for a longer period of time during the warmer months, further suggesting it may have been a residental area.

Speculated dimensions of Structure #1 are shown in Figure 12. With the exception of the north wall, the structural boundaries are based upon several assumptions. The eastern and western sides are assumed to be delimited by the large shell middens located just beyond the extent of the structure. These untested middens may be formed of winter subsistence debris that was associated with the occupation of the structure. The southern boundary of Structure #1 is assumed to be located between the two southernmost excavation units, as the more northern unit contained cultural material and the southern unit contained none. Given these criteria, Structure #1 measures approximately 55 m. along its east-west axis and 35 m. along its north-south axis.

Structure #2

Structure #2 is located just west of Mound 'A'. Topography in this area is uniform and disrupted only by the mound and its encircling borrow pit. Mound 'A' is roughly dome-shaped, has a circumference of 60 m. at its base, and extends 2.45 m. above the surrounding surface (Figure 24, Figure 25).

Elements of Structure #2 were initially exposed in a mechanical transect. This transect was excavated for the purpose of testing the mechanical method, and its location is non-random. Rectangular post holes, as at Structure #1, were exposed in the base of the transect. Controlled excavation units were extended from the transect to define the form of the structure and recover associated cultural material. As at Structure #1, cultural material was restricted to the plow zone and subsoil features. Soil profiles were also the same, except the plow zone was slightly deeper in the Structure #2 area and usually extended 30 cm. below the surface.

Basic elements of Structure #2 consist of lines of rectangular post holes and two shallow wall trenches. Orientation of the post hole line is the same as those at Structure #1, approximately 95° east of north. One wall trench (#214) extends parallel to the lines of post holes, turns south at the eastern side near Mound 'A', and turns north at the western side. The other wall trench (#215) extends to the west from the southwest corner of Feature 214. Based on profiled sections, these wall trenches had straight sides, flat bottoms, rounded corners at their base, and extended 35 to 40 cm. below the surface. Alluvial deposits were formed in the base of

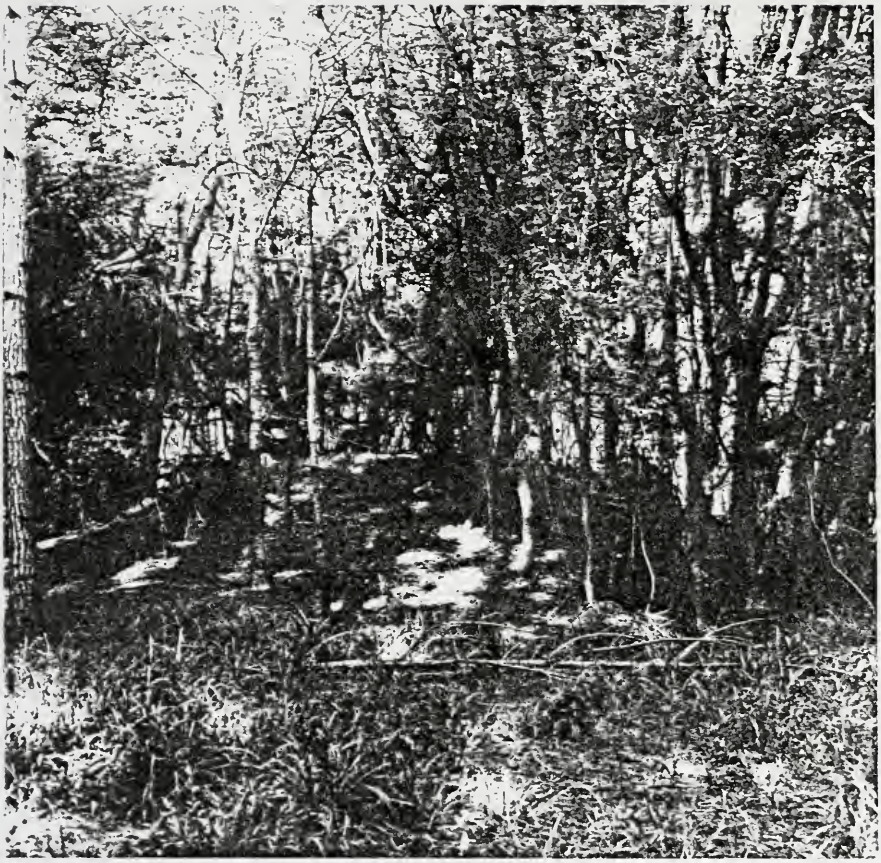
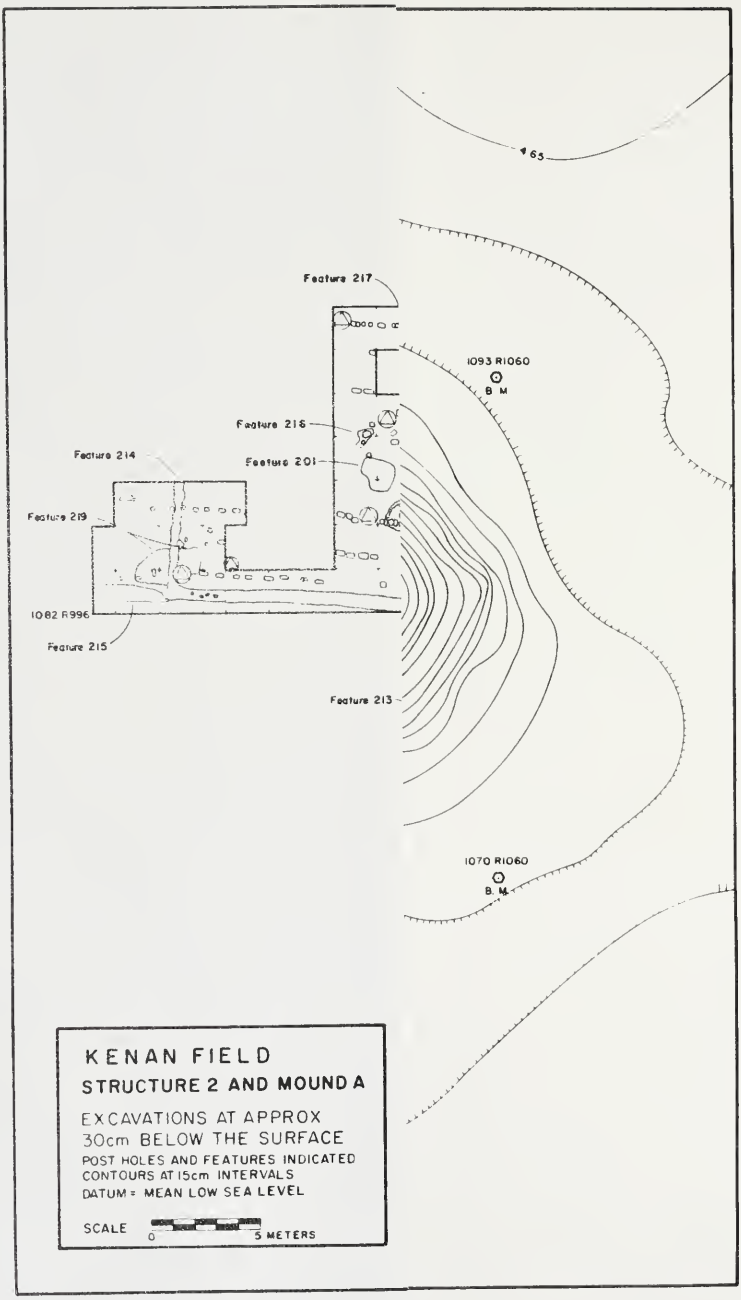


FIGURE 24
MOUND 'A' AT KENAN FIELD
VIEW TO THE WEST

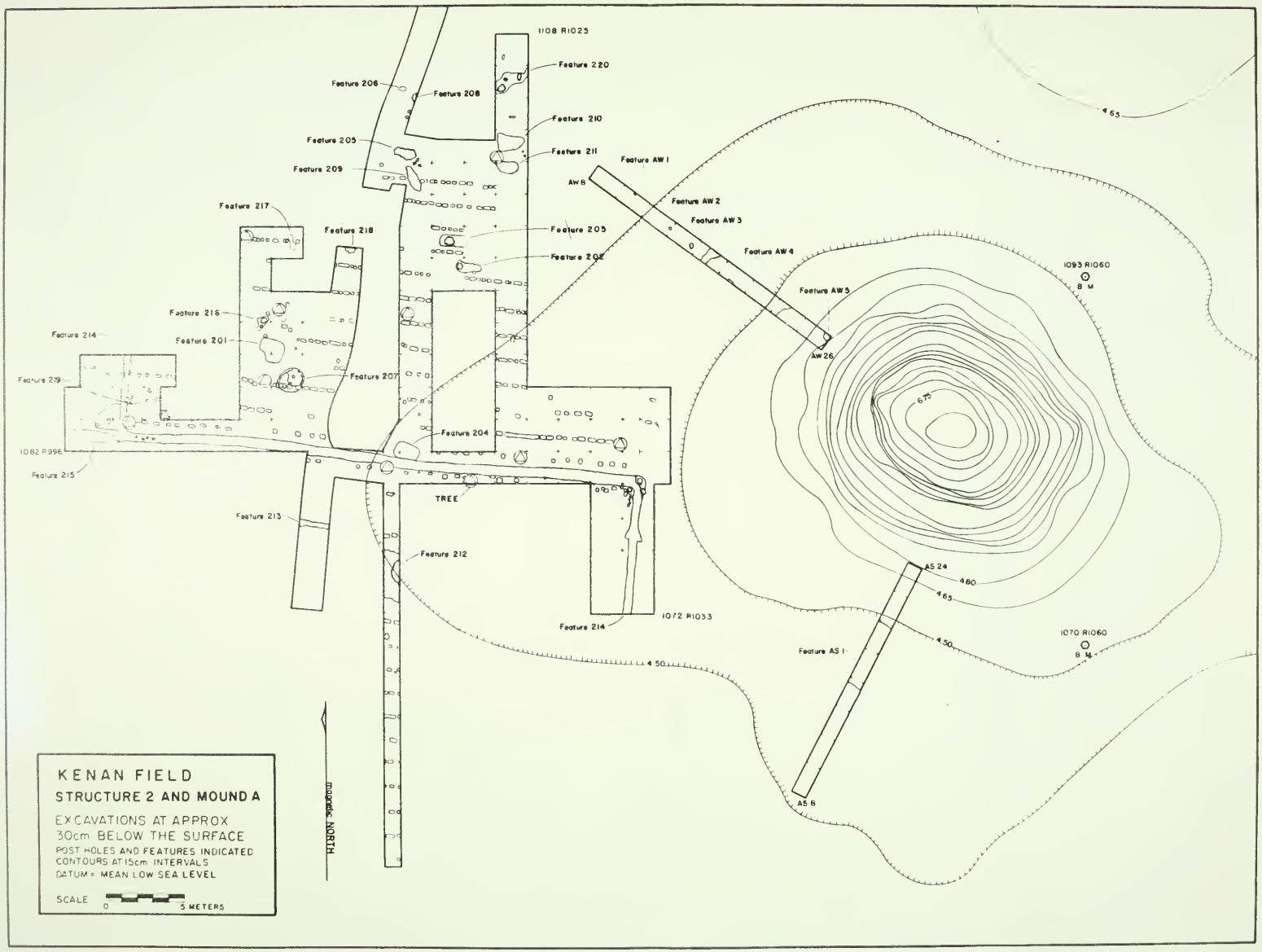
FIGURE 25
STRUCTURE #2 AND MOUND 'A'


465
Feature 217
1093 R1060
B. M
Feature 216
Feature 201
Feature 214
Feature 219
1082 R996
Feature 215
Feature 213
1070 R1060
B. M
KENAN FIELD
STRUCTURE 2 AND MOUND A
EXCAVATIONS AT APPROX
30cm BELOW THE SURFACE
POST HOLES AND FEATURES INDICATED
CONTOURS AT 15cm INTERVALS
DATUM = MEAN LOW SEA LEVEL
SCALE
0
5 METERS

the wall trenches, indicating they remained open for a period of time following construction. The fill of a portion of Feature 214 near the southwest corner was carefully removed and revealed four small depressions that extended 2 cm. to 4 cm. beneath the base of the wall trench. These depressions evidently mark the positions of closely-set posts that once formed a light wall. Round as well as rectangular post holes were present at the southeastern corner of the wall trench and probably indicate the locations of several support posts. South of this corner the sides of the wall trench were disrupted at right angles as if the posts had been pulled down along both sides of the wall.

Extensive excavation was confined to the area north of the wall trench, while a line of 1 m. x 4 m. units were extended to the south. Although a large portion of Structure #2 was exposed, its form remains illusive. It is clear that the structure was basically defined by a platform analogous to Structure #1; however, the wall trench makes Structure #2 distinctive.

It appears that the light wall constructed within the wall trench divided the platform into two sections. Twelve lines of rectangular post holes were located north of the partition. These were spaced an average of 1.54 m. apart with a standard deviation of 8 cm., and were usually 1.5 m apart. The two lines of post holes separated by the wall trench were also 1.5 m. apart, perhaps indicating that the partition was constructed in reference to existing lines of platform posts. Spacing was irregular for a distance of about 10 m. south of the partition, suggesting that this area was


KENAN FIELD
STRUCTURE 2 AND MOUND A
EXCAVATIONS AT APPROX
30cm BELOW THE SURFACE
POST HOLES AND FEATURES INDICATED
CONTOURS AT 15cm INTERVALS
DATUM = MEAN LOW SEA LEVEL
SCALE 0 5 METERS
MAGNETIC NORTH
1108 R1025
Feature 220
Feature 206
Feature 208
Feature 210
Feature 205
Feature 211
Feature 209
Feature AW 1
AW 8
Feature AW 2
Feature AW 3
Feature 217
Feature 218
Feature 203
Feature 202
Feature AW 4
Feature AW 5
1093 R1060
8 M
Feature 216
Feature 214
Feature 201
Feature 207
Feature 219
AW 26
6.75
Feature 204
1082 R996
Feature 215
TREE
Feature 213
Feature 212
AS 24
4.80
4.65
1072 R1033
Feature 214
4.50
1070 R1060
8 14
Feature AS 1
4.50
AS 8
4.65

associated with a different construction element. Regular spacing resumed south of this location and continued to a point just north of Shell Midden #65. The partition seems to have formed an enclosing wall along the southeast and northwest sides of the structure. The north and south sides of the platform appear to have been open, as was the northeast side adjacent to Mound 'A'. There is no information concerning the southwest portion of the structure.

The rather confusing form indicated for Structure #2 is probably due to incomplete exposure of structural elements. It is also quite possible that the structure was subject to sequential construction that altered existing floor plans. The maximum dimensions of Structure #2, assuming the platform covered the entire area at one time, are 30 m. from east to west and 50 m. from north to south. Although the lines of rectangular post holes are oriented as those of Structure #1, the two structures are aligned perpendicular to one another.

Features.

Twenty features were recognized at the base of the plow zone in the Structure #2 excavation area. These features included organic-stained areas and shell pits as at Structure #1. Three hearths and three large post holes were also encountered, in addition to the wall trenches that have been previously described.

The organic-stained features (#202, #203, #210, #211, #212, #216, #217, #220) contained scattered fragments of charcoal and occasionally (i.e. #202, #203, #220) limited areas of shell fragments were present along their upper surface. Two of these features

(#202, #203) were completely excavated. The remainder were examined only in plan-view at the base of the plow zone.

Feature 202 was an oval organic stain located between two lines of rectangular post holes, approximately 5 m. south of the northern extent of Structure #2. A scattered lense of shell fragments and a single conch shell were located in the extreme western end of the feature at the base of the plow zone. Brown-stained soil containing dispersed fragments of charred wood defined the matrix which faded into the subsoil at a depth of 35 cm. to 60 cm. below the surface. Bone fragments (Table 9, Table 10) and nine fiber tempered plain potsherds were recovered from the upper 15 cm. portion of the feature.

Feature 202 appears to be a more completely preserved example of stain features such as those recognized in Structure #1. It marks the location of food remains and a small fire. In the present case, food remains extended slightly into the subsoil, probably suggesting that the debris had been deposited in a shallow depression between the post-hole lines. Associated fiber-tempered sherds are probably incidental and due to the intrusion of the feature into the subsoil zone which normally contains this early pottery.

Feature 203 was located between the two lines of rectangular post holes situated immediately north of Feature 202. The eastern portion of this feature was inadvertently lost to excavation. The remainder was roughly rectangular with rounded corners and extended 35 cm. to 45 cm. beneath the surface. A lense of scattered shell was restricted to the western side of the feature and the matrix consisted of brown sand and dispersed charred wood fragments. This

matrix was void of artifacts or bone fragments. Feature 203 probably defines the extreme base of a refuse deposit and fire area similar to that suggested by Feature 202; however, only the scars of this activity remain impressed in the subsoil.

The three hearths encountered at Structure #2 were quite dissimilar and each probably served a different function during its period of use. Feature 201 was composed of 10 cm.-thick consolidated surface of baked clay, sand, and shell fragments. Several complete, uncharred oyster valves lay on the top surface of this feature at the base of the plow zone, indicating that the original hearth form was intact. The hearth contained bone fragments (Table 9, Table 10) and a single sand-tempered plain sherd. Subsoil immediately surrounding the hearth and to a depth of approximately 75 cm. beneath the hearth sufrace was thermally altered, indicating that small but intense fires were built in this location. Rectangular post holes north of Feature 201 shifted away from the hearth, probably due to the risk of fire-damage to the platform. This also suggests that the area immediately surrounding the hearth was open.

A second hearth (#207) was located just southeast of Feature 201. This hearth was examined only in plan view at the base of the plow zone. Feature 207 was defined by a circular area of bright yellow sand that was mottled around its periphery. The hearth was enclosed by a narrow shell-filled trench along its northwestern side and a series of small post molds along its eastern side. Rectangular post holes were intrusive into the southern portion of

Feature 207, indicating that the hearth pre-dates construction of the platform supports. The cultural context of the hearth is unclear; however, the enclosed northwest side may have functioned as a wind shield and the eastern posts may have supported a small rack of grill.

Feature 219 is another hearth that pre-dates Structure #2. The northwestern portion of the wall trench is intrusive through the center of this feature. The hearth was defined by dark organic soil that contained charred fragments of wood, a few bone fragments (Table 9, Table 10), and a single sand-tempered plain potsherd. The hearth had flaring sides and a rounded base that extended 40 cm. beneath the surface. Subsoil surfaces immediately surrounding the hearth were thermally altered. A charred-wood sample from Feature 219 was submitted for Carbon-14 analysis and returned an age estimate of 295 $\pm$ 70 A.D. (1660 $\pm$ 70 B.P.; UM 1389), suggesting a Deptford Phase association.

Four shell-filled refuse pits were encountered in the Structure #2 excavation area. Two (#205, #208) were located north of the structure, another (#209) was intrusive into the final northern line of rectangular post holes, and the other (#218) was partially exposed at the end of the mechanical transect within the interior of the structure.

Feature 205 was an oval to rectangular pit with flaring sides and a rounded base that extended 55 cm. beneath the surface. The fill consisted primarily of oyster shell but also contained

bone fragments (Table 9, Table 10), quahog clam shell, four fiber tempered plain sherds, and two baked clay objects. The potsherds were evidently deposited at the same time as the food refuse, suggesting that this feature is associated with the St. Simon's Phase. The baked-clay objects may have been used in lieu of stones for cooking, and possibly indicate that this feature was an abandoned earth oven.

Feature 208 was a small circular pit with flaring sides and a rounded base that extended 65 cm. beneath the surface. The eastern edge of the feature extended underneath the side of the mechanical transect just north of Structure #2, and thus was unexamined. The fill of this pit was composed of oyster shell, a few fragments of bone (Table 9, Table 10), and seven fiber-tempered plain potsherds. The associated pottery suggests that Feature 208 was a St. Simons Phase refuse facility.

Feature 209 was an elongated-oval pit with sloping sides and a rounded base that extended 50 cm. beneath the surface. The pit was intrusive into the northern line of rectangular post holes associated with Structure #2. Fill of this feature consisted primarily of oysters, but also contained fragments of ribbed mussel, razor clam, and quahog clam, along with barnacles and a single whole quahog clam that was partially open with the hinges touching. Neither pottery nor vertebrate remains were encountered. The exclusive mollusc remains within this feature suggest that the debris accumulated over a short period of time, and prehaps represents

a single harvest of shellfish and their consumption. Feature 209 probably post-dated the Savannah Phase, based on indications discussed later in this section that Structure #2 is a Savannah-Phase construction.

Identification of Feature 218 as a refuse pit is conjectural as this feature was only partially exposed in the mechanical transect. The feature is mentioned here to document its existence and location.

Two other shell-filled pits in the Structure #2 area appear to be large post holes rather than refuse facilities. Feature 206 was recognized in the base of the mechanical transect north of the structure and its relationship to Structure #2 is uncertain. Another large shell-filled post hole (#204) was located just north of the partition between the two platform sections. Although the wall trench intrudes into the southern margin of this post hole, associated pottery suggests that Feature 204 is generally contemporary with Structure #2.

Feature 206 was an oval to rectangular pit with slightly flaring sides and a rounded base that extended 85 cm. beneath the surface. Separate areas of shell and dark humic soil define the fill of this feature. The shell portion was composed primarily of oyster shell but also contained bone fragments (Table 9, Table 10), and two small sand-tempered sherds. This shell matrix filled the bottom half of the pit, became restricted to an area 20 cm. in diameter in the upper third of the feature, and then expanded again in the upper most preserved portion of the post hole. Humic soil filled the remainder of the pit. It seems that a post measuring about 20 cm. in diameter was placed in the center of the pit, shell debris was then

packed around the post, soil fill was added, and a final layer of shell was added to the upper portion of the post hole.

Feature 204 was rectangular with rounded corners, had sloping sides and a flat to slightly rounded base that extended 65 cm. beneath the surface. A post hole 20 cm. to 25 cm. in diameter penetrated 18 cm. below this base in the southern portion of the feature. The upper 30 cm. level of the feature was defined by a dense matrix of oyster shell and the fill beneath this consisted of mottled brown soil containing scattered shell and a few bone fragments (Table 9, Table 10). The dense oyster-shell matrix also contained bone fragments along with broken pieces of quahog clam. Pottery was restricted to this shell matrix and consisted of two Savannah Check-Stamped sherds, two Savannah Fine Cord-Marked sherds, and a single Savannah Burnished Plain sherd, along with several sand, grit, or sherd tempered plain potsherds.

The associated pottery indicates that the feature was constructed no earlier than the Savannah Phase. The shell matrix was also precedent to the wall trench that intruded into its southern margin. However as suggested earlier, the wall trench appears to have been constructed in reference to existing lines of rectangular post holes. Thus, Feature 204 could pre-date the wall trench and still be contemporary with the rectangular post holes and the platform. The prominence of Savannah-Phase pottery types within the feature, and in the plow zone above and presumably associated with Structure #2, indicates that the large post and the platform are at least generally contemporary. The wall trench is perhaps only a moment later. The large, deeply-set post may have supported a roof over the

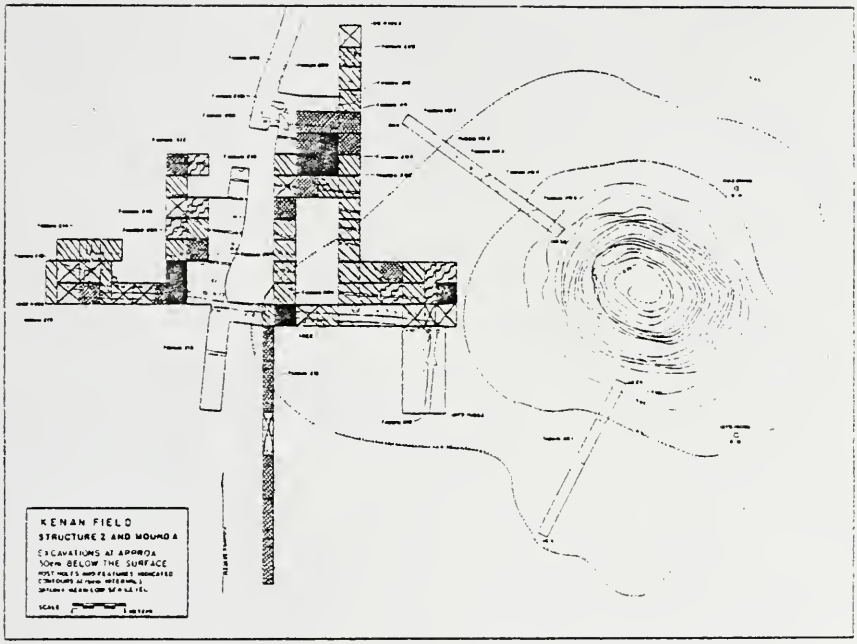
platform; however, more evidence concerning the form of the structure and the existence of other roof supports is required before this can be demonstrated.

The final feature in the Structure #2 area was an irregular trench (#213) encountered in the base of the mechanical transect about 5 m. south of the wall trench. Feature 213 was from 30 cm. to 40 cm. wide, had an irregular base that extended a maximum of 35 cm. beneath the surface, and was filled with an alluvial deposit. This trench is in line with rectangular post holes to the east, and is probably a result of the removal of the platform support posts in this area and the subsequent natural filling of the remaining depression.

Cultural Material Recovered from the Plow Zone

Weight-density distributions of pottery, bone and stone recovered with ¼ in. mesh from the lower plow zone in the Structure #2 area are presented in Figures 26, 27, and 28. Structure #2 is divided into two zones based on the location of the east to west portion of the wall trench (#214). Area 'A' refers to a zone extending north from the wall trench. This zone presumably contains material associated with the platform segment north of the partition and the area immediately north of the platform. Area 'B' refers to the excavation extending south of the wall trench. This zone presumably contains material associated with the platform segment located south of the partition.

Pottery within Area 'A' was dense at the northern edge and interior margin of the platform. Within this location, pottery was

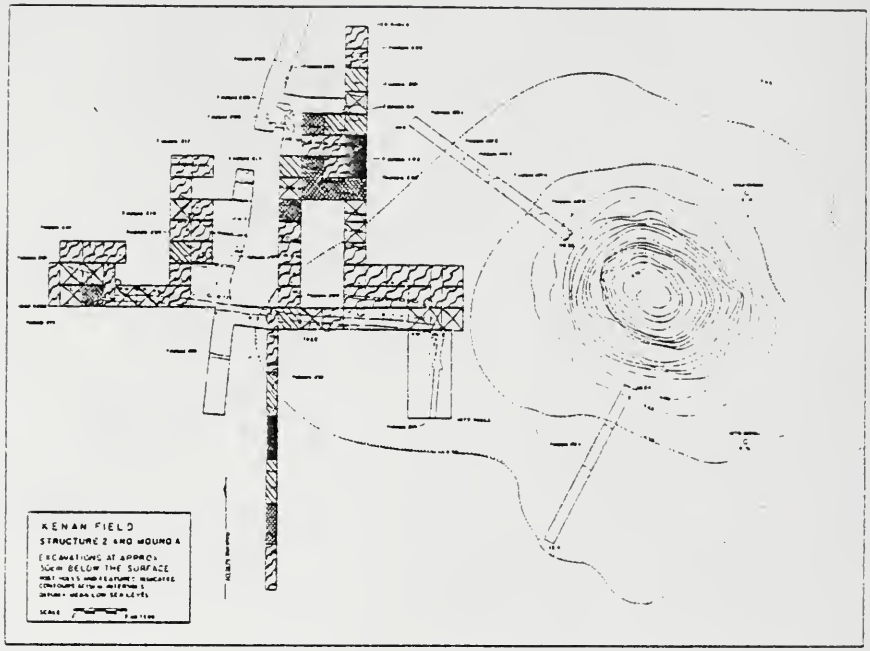


Grams	
0	
1 - 25	
26 - 103	
104 - 181	
182 - 396	
(unscreened)	

Mean = 103.67 grams

Standard Deviation = 76.92 grams

FIGURE 26
WEIGHT-DENSITY DISTRIBUTION OF POTTERY AT STRUCTURE #2

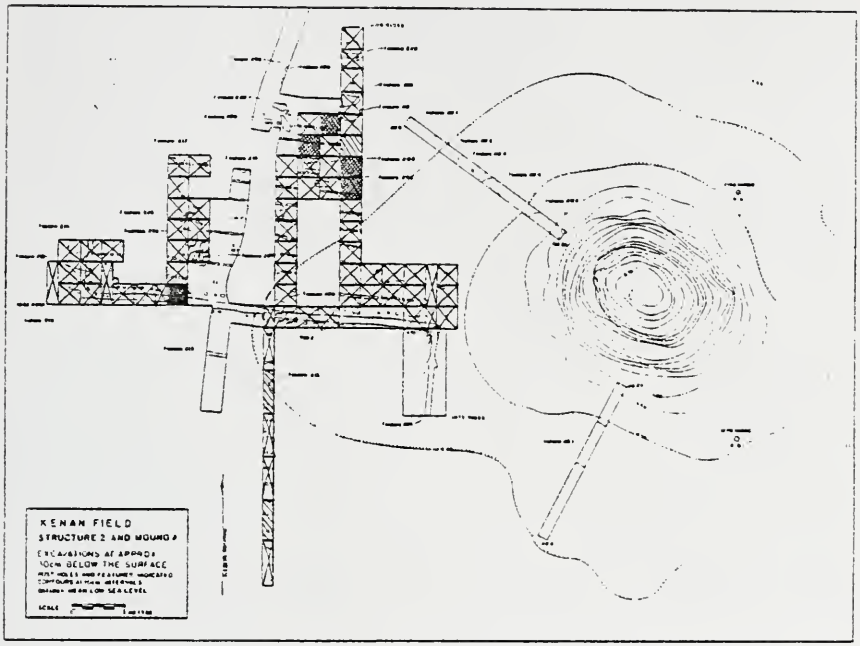


Grams	
0	
1 - 22	
23 - 51	
52 - 80	
81 - 123	
(unscreened)	

Mean = 22.86 grams

Standard Deviation = 27.71 grams

FIGURE 27
WEIGHT-DENSITY DISTRIBUTION OF BONE AT STRUCTURE #2



Grams	
0	Mean = Not Applicable
3 - 4	Standard Deviation = Not Applicable
5	
6 - 7	
145	
(unscreened)	

FIGURE 28
WEIGHT-DENSITY DISTRIBUTION OF STONE AT STRUCTURE #2

most dense in the area above and adjacent to the organic stain feature (#203). A few dense areas of pottery also occurred in dispersed locations within the interior and along the margins of the platform segment. Pottery was infrequent north of the platform and within most areas of the interior.

A summary of the pottery recovered from Area 'A' is presented in Figure 29. Savannah-Phase types dominate the pottery inventory, suggesting extensive use of the area during this period. Savannah Fine Cord-Marked and plain pottery are most common, followed by Savannah Check-Stamped pottery. Minority wares are Irene Filfot Stamped and Incised pottery, San Marcos Complicated-Stamped and Simple-Stamped pottery, Savannah Burnished-Plain and Complicated-Stamped pottery, and St. Simons Plain and Incised pottery.

The weight-density distribution of faunal material in Area 'A' follows the same general pattern as the pottery. Dense areas are restricted to a location along and inside of the northern edge of the platform. The organic-stained features (#202, #203) are probably associated with part of this faunal material, as dense areas are located above and adjacent to their subsoil positions. Low but rather uniform densities of faunal material occur north of the platform and in interior areas. Bone fragments in Area 'B' are more unevenly distributed, indicating distinct depositional locations and suggesting that different disposal patterns were associated with the northern and southern platform segments.

A summary of the faunal material recovered from the lower plow zone in Area 'A' and Area 'B' is presented in Table 11 and

EXCAVATION AREA	#	Plain	Burnished Plain	Fine Cord Marked	Check Stamped	Simple Stamped	Complicated Stamped	Incised	#Fiber Tempered	Unidentified
0 ■ ■ ■ ■ ■ 150 PERCENTAGE										
Str. 2A Upper Plow Zone ~0-15 cm. below Surface	396	2:4:4:1	5:3:3:0	1:5:2 1:2:8:0	1:8:1:0	6:4 0:10:0:0	3:7 2:7:1:0	2:7:1:0	1	3:5:2:1
Str. 2A Lower Plow Zone ~15-30 cm. below Surface	234	3:5:3:0	2:2:6:0	2:6:2 1:1:8:0	1:9:1:0	5:5 0:10:0:0	2:8 0:10:0:0		16	2:6:2:0
Str. 2B Upper Plow Zone ~0-15 cm. below Surface	113	2:5:3:0	0:0:10:0	3:6:1 1:2:7:1	1:9:1:0	0:10 0:10:0:0	7:3 0:3:3:4	0:10:0:0		0:4:6:0
Str. 2B Lower Plow Zone ~15-30 cm. below Surface	84	1:7:2:0	3:7:0:0	3:8:0 1:3:7:0	0:10:0:0	10:0 0:10:0:0	0:10 5:5:0:0		7	0:10:0:0
Str. 4 Upper Plow Zone ~0-15 cm. below Surface	167	3:6:1:1		5:5:1 1:4:5:0	2:5:3:0	6:4 5:5:0:0	4:6 4:8:0:0	10:0:0:0	1	1:9:0:0
Str. 4 Lower Plow Zone ~15-30 cm. below Surface	177	4:5:1:1		4:4:1 0:4:6:0	4:6:0:0	4:6 7:3:0:0	2:8 1:7:0:0		16	0:10:0:0
Shell Midden #108 ~15-30 cm. below Surface	119	3:6:1:0		7:3:0 1:5:5:0	4:6:0:0	8:3 1:8:0:0	4:6 4:6:0:0		2	

Explanation: (1) Ratios presented below the percentage bar refer to tempering or paste components - sand : grit and sand : sherd and sand : sherd and grit.
(2) Ratios above percentage bars refer to design element variants: Fine Cord Marked - linear : regular crossed : random crossed; Simple Stamped - linear : crossed; Complicated Stamped - rectilinear : curvilinear.

FIGURE 29
DESCRIPTIVE SUMMARY OF POTTERY FROM EXCAVATIONS AT STRUCTURE #2, STRUCTURE # 4, AND SHELL MIDDEN #108

Table 12. Identified species are diverse within both zones, indicating that activities involving the consumption of a variety of foods were associated with both sections of the platform. The most important animal species, based on recovered skeletal weight, appear to have been white-tailed deer, gafftopsail catfish, gar, black drum, diamondback terrapin, and probably box turtle.

Lithic artifacts recovered from Structure #2 consist of several small unifacial flakes of red or cream-colored chert and a single greenstone celt fragment. The celt fragment and most of the flakes were recovered from the lower plow zone and are shown on the distribution map in terms of grams per cubic meter of excavation. The single high-density area just north of the wall trench marks the location of the celt fragment. Chert flakes in Area 'A' are restricted to a location along and inside the northern edge of the platform and to an area just above one of the hearths (#207). Flakes occur in scattered locations within Area 'B'. The chert flakes are probably the result of retouching stone implements, and their distribution indicates the locations of this activity.

Conclusions

The area defined by Structure #2 at Kenan Field was occupied sporadically during St. Simons, Irene and Sutherland Bluff Phases. Intensive use of this area occurred during the Savannah Phase. The distribution of pottery, faunal material, and stone in the lower plow zone indicates distinct depositional patterns that are associated with two areas of the structure, suggesting that much of this cultural material is contemporary with and a direct result of activities

associated with the occupation of Structure #2. Dominance of Savannah Phase pottery types within the two distinct depositional areas indicates that the structure was utilized during this period.

Based on present evidence it appears that Structure #2 was a large, low platform divided into two major segments by a partition. Construction of the structure certainly relied on organized communal labor and its use certainly involved public functions. More information is available concerning the northern platform segment than the southern segemnt. Refuse in the northern segment was basically restricted to a location near the northern edge of the platform. The relatively high densities of food remains and fragments of pottery vessels, along with retouch flakes and refuse facilities (i.e. #202, #203), indicates that this debris location was a focal point for at least a segment of the social activities that occurred within the structure. Food was consumed and its remains were discarded, pottery vessels were broken, and stone implements were maintained in this area. The only hearth (#201) associated with the northern platform, and which is probably contemporary with the debris location, is situated about 15 m. to the southwest. As most associated faunal material was within rather than around the hearth, it seems that food was prepared here but consumed and disposed in the debris location. The two refuse facilities were associated with small fires; however, these appear to have functioned as smudge fires or perhaps for heat rather than for cooking.

The suggestion that food preparation was spatially distinct from food consumption and other activities indicates that a formal,

structured arrangement governed activities within the structure. This surely distinguishes Structure #2 from domestic contexts in which food preparation and consumption are, spatially and socially, closely related events. Separation of these events in the northern segment of Structure #2 suggests that food was consumed by persons other than those who prepared it. While the food presumably was prepared by women, the maintenance of stone implements was probably a male activity. Thus, chert flakes in the refuse area may suggest that the food was consumed by men.

The social segment associated with this inferred male-activity area is suggested by its context within a community structure. It seems quite possible that this portion of Structure #2 was the location of small councils or deliberations involving community affairs. Although the spatial organization of this portion of the platform is quite formal, the occurrence of more mundane activities such as sharpening stone tools or weapons suggests that this location also may have been utilized as a male meeting place on more informal occasions. Considering that food consumption was separated from preparation activities, it also is probable that consumption was isloated from food production. In other words, it is probable that the male social segment associated with the structure was supported by the community, at least in circumstances of the council event.

This interpretation of the spatial distribution within the northern platform segment clearly implies that the Savannah-Phase society was ranked. Members of the inferred council may be hypothesized, based upon the sixteenth century accounts discussed

earlier, as being the chieftain and officials within the political hierarchy and/or the male heads of lineages or sibs within the community. Indications of the precise social composition of the group is obscure in the disturbed archaeological context; however, it does appear that the segmented, hierarchical social organization present during the sixteenth century is at least generally applicable to the prehistoric Savannah-Phase community at Kenan Field.

The southern platform area was evidently distinct from the northern platform, as indicated by the partition and different depositional patterns. Unlike the northern platform, pottery was much more evenly distributed, faunal material was distributed more erratically, and chert flakes occurred less frequently. Excavation in the southern platform area was too restricted to provide a clear indication of the form of the spatial distributions; however, it appears that different activities were associated with this location.

Species identified from the northern and southern platform areas suggest that the structure was utilized during the summer. The fish represented at Structure #2 are all available in the estaurine streams during the warmer months of the year, from June through October. The turtles are available only during the warmer months, as are the snakes encountered in the northern platform segment, and thus complement the seasonal indications offered by the fish species. Mammals within the structure could have been procured throughout the year, but considering the other species, these also may have been the result of summer hunting activities.

While the fauna indicate that the interior of Structure #2 was primarily utilized during the summer, it seems that at least the southern portion of the platform was associated with discrete winter events. As discussed previously, Shell Midden #65 appears to have been a winter refuse deposit located at the southern edge of Structure #2 in the plaza-like area. The contents of this midden indicate a rapid seasonal deposition and its size and location suggest that it may have been the result of a single festive occasion.

Indications are that Structure #2 was a complex Savannah-Phase community building. This building was internally divided into two major segments that probably served to define social space and distinguish activity areas. The structure was primarily used during the summer, but was also associated with discrete and short-term winter events in the plaza-like area.

The basic platform-construction elements, opposing orientations, and separation by a plaza-like area, indicate that Structure #1 and Structure #2 were elements of a Savannah Phase public-building complex. Although basic construction elements were identical, the two buildings apparently had different functions. Structure #1 may have been the location of a high-status residence as well a some unidentified community functions, while Structure #2 and the plaza area seem to have been oriented towards community affairs such as council meetings, winter festive events, and probably other public functions.

A comparison of the percentages of Savannah-Phase pottery types associated with Structure #2 with those of Structure #1 indicates that distinctive kinds of pottery were used within each structure.

Structure #1 contained more Savannah Check-Stamped pottery while a high percentage of Savannah Fine Cord-Marked pottery was associated with Structure #2. As discussed previously, there appears to be social and/or functional factors involved in the manufacture, use, and deposition of these Savannah-Phase wares. It was suggested that at Structure #1 the distribution of pottery was associated with functional and social factors. While functional relationships may exist, it seems that different social contexts may be responsible for the opposing occurrence of the two pottery types.

Present evidence is insufficient to completely resolve the factors related to the pottery distinctions; however, it is probably significant that the high incidence of check-stamped pottery is associated with what is interpreted as a communal/status-residence structure, while the fine cord-marked pottery is associated with a structure that is interpreted as the location of community political or religious events. This suggests that the social context of pottery-use varied within the two structures. Social inferences are necessarily limited at this point; however, it is clear that each of these community constructions was associated with a distinctive and contemporary pottery assemblage.

Structure #3

Structure #3, also designated Feature 301, consists of a long wall trench located in a central portion of Kenan Field about 90 m. northwest of Mound 'A' (Figure 30). This wall trench is oriented about 4° east of north, making it extend perpendicular to the orientation of the rectangular post-hole lines

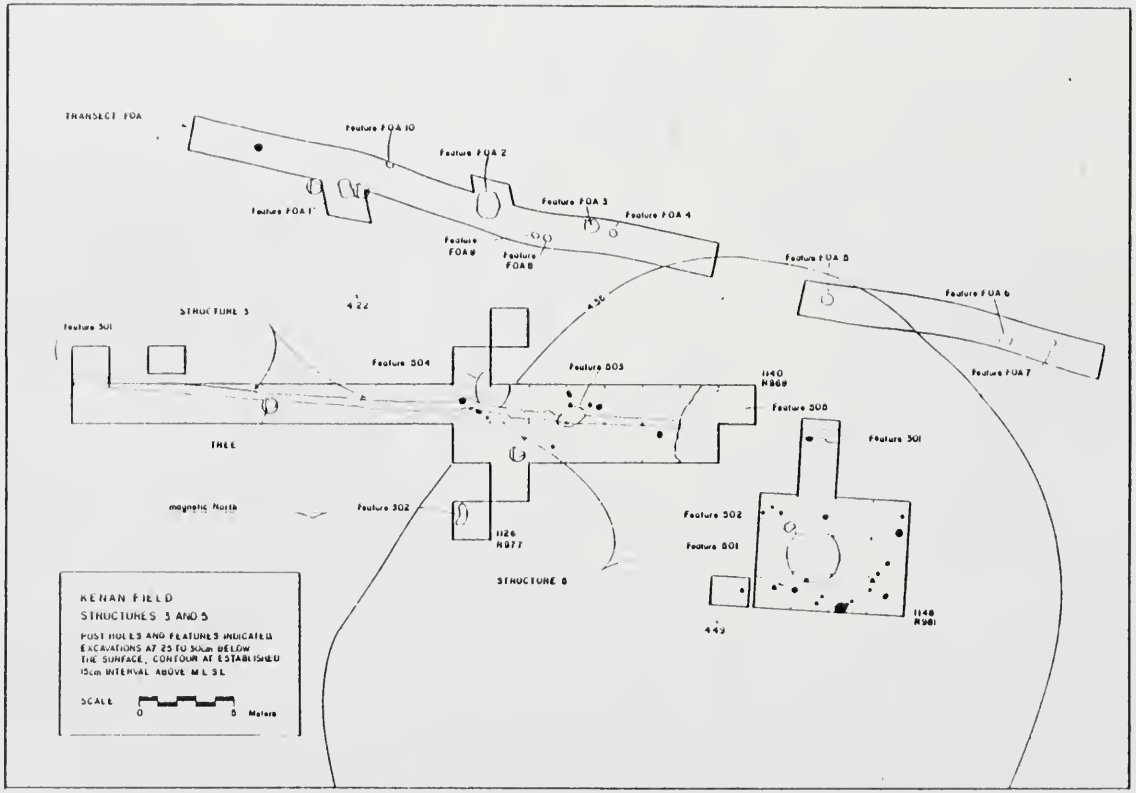


FIGURE 30
STRUCTURE #3 AND STRUCTURE #5

and exposed wall trench segment (#215) of Structure #2. This may indicate that Structure #3 is connected with he Structure #2 wall trench; however, the opposing orientations could be fortuitous.

Feature 301 probably contained a light wall, although no post molds were recognized. Edges of the wall trench were disrupted in places that probably mark the positions of posts that were torn down. The trench also sways briefly to the west in another location, possibly indicating a slight construction flaw. Feature 301 was encountered at the base of a 25 cm. to 30 cm. plow zone in the southern portion of the excavation area, however in the northern excavation area it was precedent to features and a shell midden. The shell midden includes occupation debris associated with a Savannah-Phase structure mixed with later refuse of the Irene and Sutherland Bluff Phases.

The wall trench varied from 40 cm. to 55 cm. wide at its upper preserved surface, extended approximately 50 cm. beneath the surface, and had a flat to slightly rounded base and flaring sides. The base of the trench was filled with 10 cm. to 15 cm. of irregular and alternating bands of gray and tan sand that appeared to be a result of alluvial deposition. The upper portion of the trench was filled with dark brown sand.

Small sections of Feature 301 were excavated at the northern and southern exposed limits of the wall trench. The cross-section information presented above relies on these profiled areas. Pottery recovered from trench fill consisted of one Savannah Check-Stamped

sherd and a small, undiagnostic curvilinear complicated-stamped sherd with grit and sand tempering.

Feature 301 appears to have been constructed during the Savannah Phase, but prior to the occupation of a later Savannah-Phase structure. The wall trench measures more than 40 m. in length, suggesting that it is a portion of a substantial construction; however, its ultimate form and function are unknown.

Structure #5

Structure #5 is located at Shell Midden #122 in a central portion of Kenan Field (Figure 30). The shell midden rises a maximum of 25 cm. above the surrounding surface and measures approximately 30 m. in diameter. This midden is a disturbed accumulation of refuse that is the result of multiple depositions occurring from the Savannah to the Sutherland Bluff Phases. The earliest, Savannah-Phase portion of the refuse probably defines debris associated with the occupation of Structure #5.

The plow zone usually extended around 28 cm. beneath the surface within Shell Midden #122, but was far more variable than in other areas excavated at Kenan Field and ranged from as little as 20 cm. to as much as 30 cm. in depth. This variability is probably the natural result of plowing or hoeing witin shell. Excavation levels used in the Structure #5 area only partially followed the variable stratigraphy. The first level extended 15 m. beneath the surface and defined a zone of maximum disturbance. The second level extended from 15 cm. to either the base of the shell deposit or the surface of observable features. This second zone

rarely extended more than 30 cm. beneath the surface and defined the area of variable disturbance. This is important for the weight-density distributions that are presented later because uncontrolled disturbance factors are affecting the density of recovered cultural material. That is, variability shown on the distribution plots are the result of aboriginal deposition plus changing disturbance factors.

The exposed segment of Structure #5 appears to be the eastern side of a long, rectangular building. Construction elements consist of round post holes measuring from 10 cm. to 60 cm. in diameter. The post holes form two parallel lines that are about 4 m. apart. Post-hole orientation turns to the west in the northeast portion of the excavation, evidently marking the location of a corner. The parallel lines of postholes probably indicate that Structure #5 had a raised bed or platform along its interior, suggesting a floor plan similar to Guale town houses as described in the ethnohistoric accounts. Complete excavation is required to verify the form and interpretation, however existing information indicates that the building was about 24 m. long and 14 m. wide, assuming that the western and southern sides of the structure extend to the margin of the shell deposit.

Features

Six features were recognized at the base of the shell deposit in the Structure #5 excavation area. Most of these are located between the dual lines of post holes, and thus appear to have been beneath the elevated bed along the interior of the structure.

Feature 501 defines a circular area of bright yellow, sterile sand located in the northeast corner of the structure. This feature was observed only in plan view and its function is uncertain. The occurrence of areas of bright yellow sand also was noted at Structure #1 and Structure #2 in association with hearths. No evidence of fire was recognized at Feature 501, however a small irregular charred area (#502) was located just to the southwest and is possibly associated. The sterile yellow sand appears to form a prepared surface in Structure #5 and surely marks a distinctive, although problematical, activity area.

Feature 503 consists of a 5 cm. to 8 cm.-thick deposit of ash and burned-shell fragments within a consolidated sand matrix that is also located underneath the hypothesized platform. This feature was the location of a small fire or coals that probably provided heat for this section of the interior platform. Feature 503 immediately overlaid the wall trench (#301) discussed earlier, suggesting that very little time spearated the removal or destruction of the wall and the construction and use of Structure #5.

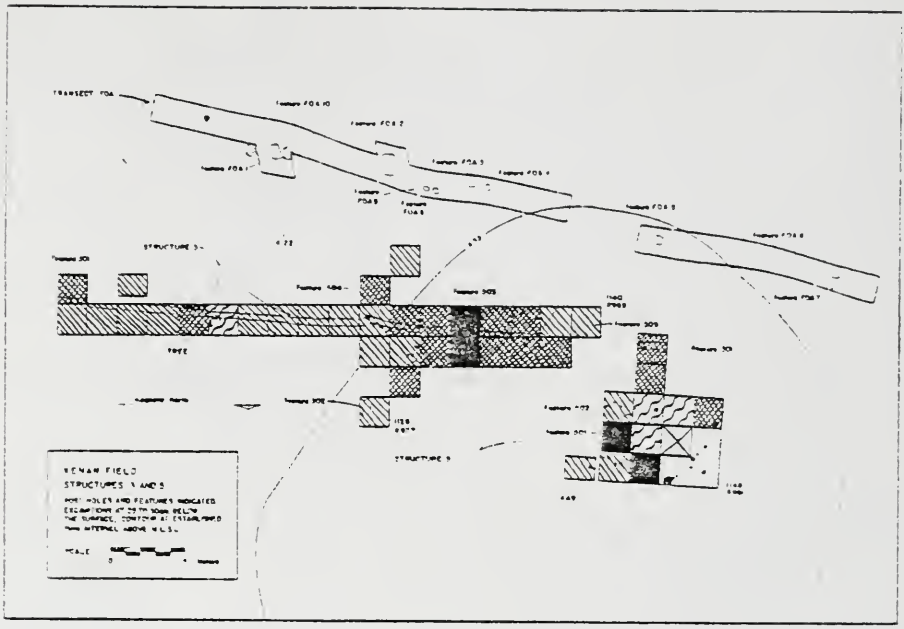
Feature 504 is an incompletely exposed area defined by organic-stained soil containing dispersed shell fragments. This feature is located between the two lines of post molds at or near the southeast corner of Structure #5. The Structure #3 wall trench appears to define a portion of the eastern margin of Feature 504; however, this is probably allusive and simply due to the organic stain being hidden by the darker fill of the wall trench. The stained area is perhaps the imprint of refuse that was deposited in this location beneath the platform.

Feature 505 defines a partially exposed lense of crushed and scattered shell located in an interior portion of Structure #5. This feature appears to be the result of shell debris being trampled into the floor within a restricted central area of the structure. The shell debris covered the Structure #3 wall trench, indicating that the trampled shell was deposited after Structure #3 was abandoned.

The final feature (#302) encountered in the Structure #5 excavation area is defined by a small area of burned shell and charred wood fragments. This feature evidently marks the position of a small fire, however its cultural and structural association are unknown.

Cultural Material Recovered from Plow Zone

Portions of Structure #3 and Structure #5 were exposed within two separate excavation areas. These two areas are considered a single excavation. Weight-density levels of cultural material recovered from the lower plow zone with 1/4 in. mesh are shown in Figures 31, 32, and 33. For data presentation the excavation is divided into two zones, designated as Structure #5 and Structure #3. Structure #5 defines that portion of the excavation extending north of the 1122 grid line, an area contained within the boundaries of Shell Midden #122. The Structure #3 zone defines that portion of the excavation extending south of the 1122 grid line. This zone overlays the Structure #3 wall trench; however, the associated cultural material appears to be roughly contemporary with Structure #5 and the shell midden. As previously stressed, disturbance within the Structure #5 zone is a variable and uncontrolled factor. Distributions within this zone are considered on a gross level because of this lack of precision.

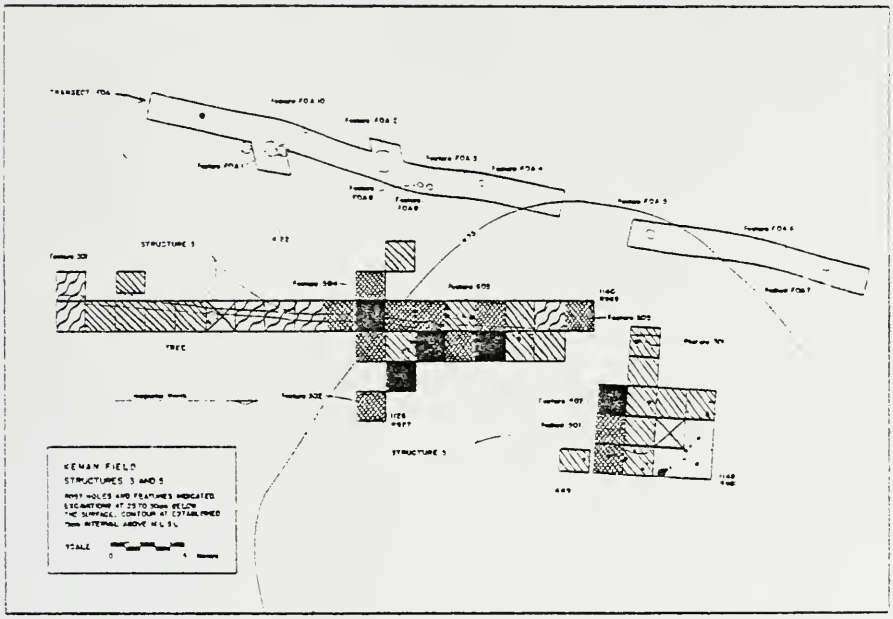


	Grams
	0
	1 - 25
	26 - 186
	187 - 347
	348 - 1259
	(unscreened)

Mean = 186.14 grams

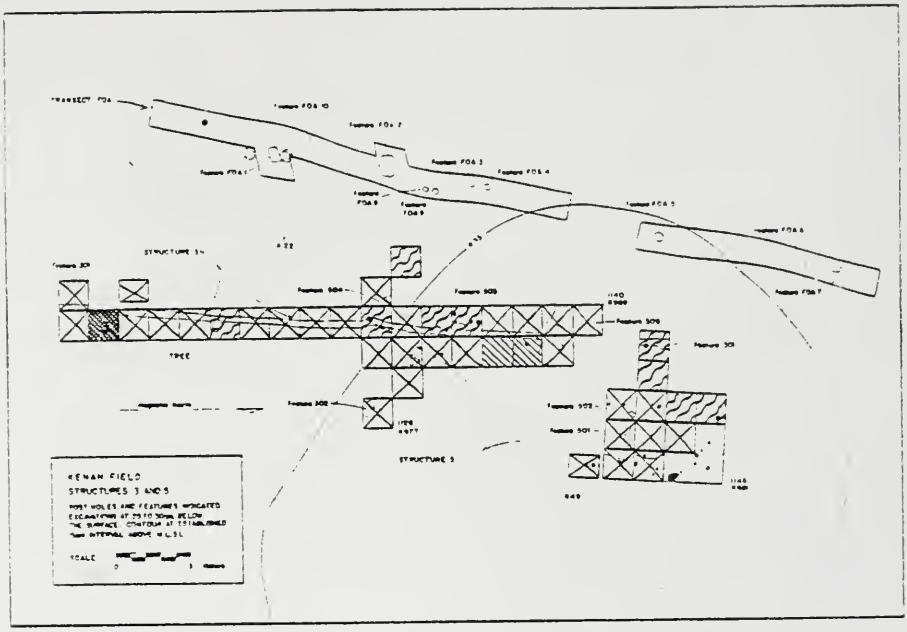
Standard Deviation = 160.34 grams

FIGURE 31
WEIGHT-DENSITY DISTRIBUTION OF POTTERY AT STRUCTURE #3 AND STRUCTURE #5



Grams	
0	Mean = 90.61 grams
1 - 14	Standard Deviation = 75.02 grams
15 - 90	
91 - 166	
167 - 285	
(unscreened)	

FIGURE 32
WEIGHT-DENSITY DISTRIBUTION OF BONE AT STRUCTURE #3 AND STRUCTURE #5



Grams	
0	Mean = 5.54 grams
1 - 5	Standard Deviation = 9.35 grams
6 - 15	
16 - 25	
(unscreened)	

FIGURE 33
WEIGHT-DENSITY DISTRIBUTION OF STONE AT STRUCTURE #3 AND STRUCTURE #5

Pottery is most dense in the Structure #5 zone and less frequent but more evenly distributed in the Structure #3 zone. A descriptive summary of the pottery is presented in Figure 34. A pottery inventory of both zones contains virtually identical percentages of surface treatments and similar tempering and design variant rations. Plain pottery, usually grit tempered, is the most common ware. Major diagnostic types consist of Irene Filfot-Stamped, Savannah Fine Cord-Marked, and Savannah Check-Stamped pottery. Minority types consist of San Marcos Rectilinear Complicated Stamped, San Marcos Simple-Stamped, Irene Incised, Irene and Savannah Burnished Plain, and Savannah Complicated-Stamped pottery.

Exotic pottery was rare and restricted to the Structure #5 zone. A single sherd of St. Johns Plain was recovered from the shell matrix. Directly beneath the shell matrix, and possibly associated with the occupation of Structure #5, a fragmented sherd (see Figure A-4B) that closely resembles Little Manatee Zone-Stamped pottery was encountered (see Willey 1949:Plates 36g, 37e, 37f). This Weeden Island-Period pottery type is roughly contemporary with the Savannah Phase and possibly represents trade material.

The weight-density of bone is also greatest within the Structure #5 zone and a light-density cluster is apparent within the Structure #3 zone. Identified classes and species of fauna are presented in Table 11 and Table 12. Species are most diverse in the Structure 5 zone and in both zones the more important species, judging from skeletal weight, are white-tailed deer, diamondback terrapin, longnose gar, gafftopsail catfish, and black drum.

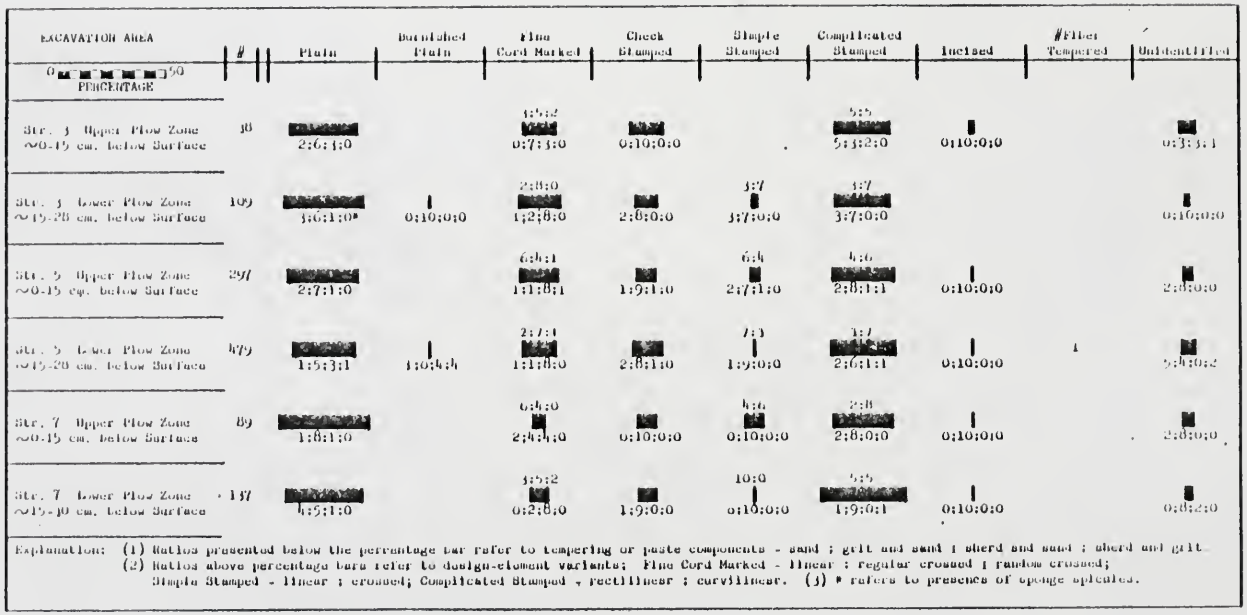


FIGURE 34
DESCRIPTIVE SUMMARY OF POTTERY FROM STRUCTURE #3, STRUCTURE #5, AND STRUCTURE #7

Lithics consisted of unutilized waste flakes of red or cream colored chert. A small edge-fragment of a polished celt was encountered in the Structure #5 zone, as was most of the lithic debris. The waste flakes were small and formless and occasionally showed bulbs of percussion. A piece of cream-colored chert containing a portion of its cortex was recovered from the Structure #3 zone. The location of this fragment is designated by the high density symbol of the weight-density map.

Conclusions

Exposed elements of Structure #5 suggest that it was a large town house that was very similar to those described in the ethnohistoric accounts. The obvious difference is that the structure appears to be rectangular rather than circular. Whether this is a temporal and/or functional difference remains to be demonstrated, as the disturbed context provides a poor base for inferences concerning activities that occurred within the structure.

Structure #5 appears to have been occupied during the late Savannah Phase. It is impossible to physically distinguish which portion of the shell midden is directly related to the structure; however, the midden and features associated with Structure #5 clearly post-date abandonment of the Structure #3 wall. Structure #3 seems to have been constructed sometime after Savannah-Phase pottery was made, based upon a single diagnostic sherd within the trench fill. Savannah-Phase pottery types also define the earliest pottery within the shell midden, indicating that initial deposition occurred during this period. It is likely that this initial deposition defines occupation debris associated with Structure #5.

The high incidence of Irene-Phase and Sutherland Bluff-Phase pottery types within the shell midden evinces continued refuse deposition in the Structure #5 location after the Savannah Phase. As much of the shell debris was located above features associated with the structure, it appears that the deposition continued for some time after the Savannah-Phase building was abandoned, presumably into the Irene and Sutherland Bluff Phases.

The relative proportions of pottery types within the Structure #3 zone indicate that this area had a similar occupational history. Lighter densities of cultural material within this zone suggest that it was a peripheral deposition and activity area associated with Structure #5 and the shell midden.

Faunal material from the excavation defines a combined inventory of species exploited throughout the occupational sequence. Shell Midden #122 forms a seasonally mixed deposit containing summer and winter species and the fauna in the peripheral Structure #3 zone are primarily species that are available during the warm summer months, although the mammals may have been exploited at other times.

Oyster shell forms the bulk of Shell Midden #122 and represents a prominant cold-weather species. Quahog clam were present within the midden and, based on analysis results presented later, these were harvested primarily during winter. Several of the identified fish species also are present in the tidal streams at times during the late fall and winter, such as Atlantic croaker, sea trout, and mullet, and the catfishes could have been taken as late as November.

However, as a group the identified fish are all available during the warmer months and were probably gathered at this time. Mammalian species could have been hunted throughout the year with the possible exception of the individual representing the order Cetacea. This individual was identified from a single tooth and if a porpoise or dolphin is represented, it is probably the result of summer procurement activities. Thus at some point within or perhaps throughout the occupation sequence, subsistence activities involved exploitation of summer as well as winter species.

Structure #4

Structure #4 is located 50 m. north of Structure #2, just beyond the southwestern margin of Shell Midden #108 (Figure 35). Excavation was initiated in this area in response to a series of post holes that were encountered in the base of a randomly selected mechanical transect (Transect F5A). Features, rectangular post holes, and round post holes were recognized at an undisturbed tan subsoil zone located approximately 28 cm. beneath the surface. A plow zone consisting of brown humic sand with scattered shell fragments extended to this depth. As elsewhere at Kenan Field, the first excavation level extended 15 cm. beneath the surface and defined a zone of maximum disturbance. The second excavation level continued from 15 cm. to the base of the plow zone. Excavation was discontinued at the subsoil surface and intrusions were recorded. Cultural material from the second excavation level was recovered by screening with 1/4 in. mesh and less frequently with 1/4 in. x 3/4 in. expanded mesh.

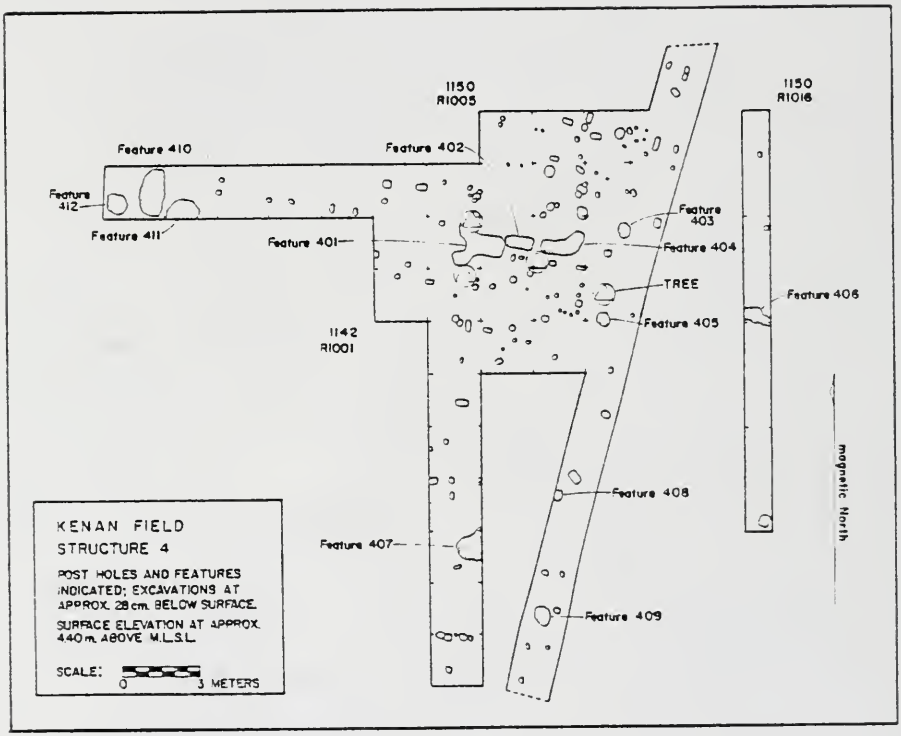


FIGURE 35
STRUCTURE #4

Post holes were dispersed over the excavation area, and most were arranged without a discernible pattern. The only recognized pattern appears to be the southeastern corner of a rectangular structure. The other post holes indicate that this was an area of considerable construction activity; however, it is impossible at this point to define structural forms and associations. The rectangular post holes were evidently portions of constructions unlike Structure #1 and Structure #2, as their orientations are neither aligned nor regularly spaced. The designation "Structure #4" refers specifically to the rectangular structure; however, cultural material listed under this heading is certainly the combined result of a series of occupations.

Features

Twelve features were encountered at the base of the plow zone in the Structure #4 excavation area. Four features (#408, #410, #411, #412) were observed only in plan and were defined by irregularly shaped areas containing pieces of charred wood and shell fragments. Features 410, 411, and 412 were clustered in the western portion of the excavation and may define an extensively-used hearth location. The cultural and structural association of the features are unknown.

Three features (#403, #405, #407) were organic-stained areas containing charred wood fragments. Features 403 and 405 formed the positions of small fires. Neither faunal material, pottery, nor stone was associated with these lenses. Feature 407 is the result of a burned pine tree-root system and is probably a natural rather than cultural phenomenon.

Two features, (#406, #409) were defined by organic stains. Whether these are the imprints of refuse deposition or the results of other activities are unknown, as are their cultural provenience.

Features 401, 402, and 404 were roughly rectangular areas of dense shell debris arranged linearly within a single location. These features are probably functionally similar and are perhaps the result of repetitive activities within a defined space. Feature 401 was excavated and Features 402 and 404 were examined only in plan at the base of the plow zone.

The overall form of Feature 401 was an elongated basin (Figure 36). The feature extended 65 cm. beneath the surface, had a slightly rounded base, and gently sloping sides. Shell debris formed shallow appendages at the northwestern and southwestern corners of the pit. One appendage was disturbed by an existing pine tree and shell debris in the other covered a square post hole (20 cm. x 20 cm.) and a rectangular post hole (38 cm. x 18 cm.). The square post hole extended 22 cm. beneath the shell and contained a post mold, 10 cm. in diameter, along its northern side. The rectangular post hole extended 5 cm. beneath the shell. Fill of the post holes was shell-free, indicating that they pre-date the shell deposition. However, their positions adjacent to Feature 401 within the appendage indicates that they were functionally related to the use of the feature. Posts within these holes possibly supported a grill or cover which surmounted the elongated pit.

The fill of Feature 401 was composed mostly of oyster shell. Pieces of quahog clam and razor clam were far less frequent and

FIGURE 36
FEATURE 401

occasionally fragments of ribbed mussel occurred in pockets measuring 8 cm. to 12 cm. in diameter. Bone fragments were relatively scarce, but species of mammal, reptile, fish, and bird are represented (Table 9, Table 10). In addition two charred hickory nuts (Carya sp.) and a possible black-cherry seed (Prunus sp.) were encountered in the upper portion of the feature and two flies were recovered by zinc-chloride flotation of samples from the center of the shell matrix. Charred-wood fragments were infrequent and dispersed throughout the matrix and were more concentrated along the base of the pit. Subsoil beneath the feature was slightly altered due to heat. Shell debris was not burned and only a few mammal fragments showed direct evidence of fire. Pottery within the shell matrix consisted of two San Marcos Simple-Stamped sherds, seven San Marcos Check Stamped sherds, and three grit or sand-tempered plain sherds. Two of the check-stamped sherds are portions of the basal angle of a shallow dish or plate and another check-stamped sherd is a rim fragment of a large jar with a flaring rim.

It is likely that Feature 401 is an abandoned food-preparation facility which was filled with food debris and other refuse shortly after disuse. Pottery types within the feature indicate that it was filled during the Sutherland Bluff Phase and as this was the final aboriginal occupation in the area, use of the pit as well as the fill contents probably dates to this period. The zone of charred wood fragments in the base of the feature and the superficial heat alteration of the subsoil indicates either that fires were constructed in the pit for a short period of time or that it was associated with

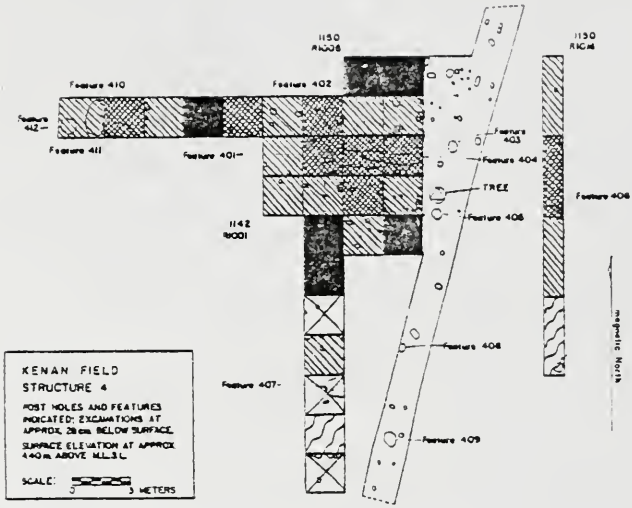
fires or coals that radiated a small amount of heat. Construction of a grill over the pit would suggest that the former may be the case; however, use of the feature as an earth oven is suggested by its form and depth.

Cultural Material Recovered from the Plow Zone

Two separate excavation areas, one composed of 1 m. x 4 m. units just east of the mechanical transect and the other composed of 2 m. x 2 m. units just west of the mechanical transect, are combined to define the Structure #4 excavation. Weight-density levels of cultural material recovered with 1/4 in. or 1/4 in. x 3/4 in. expanded mesh from the lower plow zone are shown in Figures 37, 38, and 39.

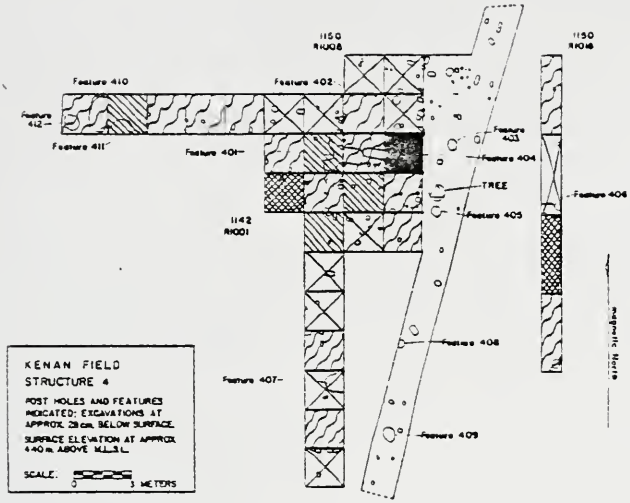
Pottery is most dense in areas surrounding the shell-filled features (#401, #402, #404), and is frequent immediately above these features, adjacent to the hearths (#410, #411, #412) and north of Feature 406. Pottery is less dense in areas south of the shell-filled features and Structure #4.

A descriptive summary of the pottery recovered from the upper and lower plow zones is presented in Figure 29. Plain pottery forms the majority category and diagnostic types were about evenly distributed among Irene Filfot-Stamped, San Marcos Simple Stamped, Savannah Check Stamped, and Savannah Fine Cord-Marked pottery. Irene Filfot-Stamped and San Marcos Simple-Stamped potsherds were slightly more common in the lower plow zone, and Irene Incised pottery was rare and restricted to the upper plow zone. St. Simons pottery was almost exclusively recovered from the lower plow zone and probably represents sherds disturbed from the subsoil level by plowing in addition to those dislocated by aboriginal construction activities.



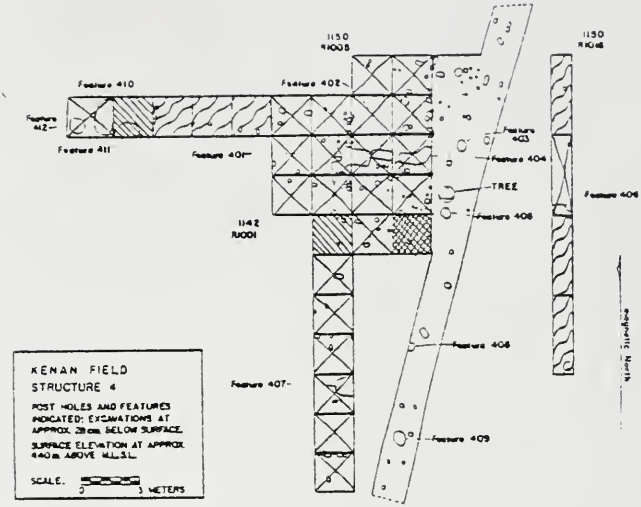
Grams	
0	Mean = 307.21 grams
1 - 75	Standard Deviation = 231.41 grams
76 - 231	
232 - 463	
464 - 996	
(unscreened)	

FIGURE 37
WEIGHT-DENSITY DISTRIBUTION OF POTTERY AT STRUCTURE #4



Grams	
0	Mean = 17.62 grams
1 - 17	Standard Deviation = 17.99 grams
18 - 36	
37 - 55	
56 - 80	
(unscreened)	

FIGURE 38
WEIGHT-DENSITY DISTRIBUTION OF BONE AT STRUCTURE #4



Grams	
0	Mean = Not Applicable
1	Standard Deviation = Not Applicable
2	
125	
(unscreened)	

FIGURE 39
WEIGHT-DENSITY DISTRIBUTION OF STONE AT STRUCTURE #4

Bone fragments were most dense above Feature 404, southwest of Feature 401, and south of Feature 406. Faunal material was infrequent or absent elsewhere in the excavation. Identified classes and species of fauna are shown in Table 11 and Table 12. Based on relative skeletonal weight contributions per class, the most important species were white-tailed deer, box turtle, gafftopsail catfish, sea catfish, black drum, and Atlantic croaker. Human remains are represented by a shaft fragment of a radius.

Single lithic fragments are represented by each weight-density symbol in Figure 39. The high-density symbol refers to a cortex fragment of cream-colored chert. The remaining stone consisted of small, unutilized cream-colored chert flakes and a basal fragment of a projectile point. Lithic material from the upper plow zone consisted of a few cream-colored chert flakes, and another cortex fragment of cream-colored chert.

Shell Midden 108

Information from Shell Midden #108, a disturbed refuse deposit measuring about 13 m. in diameter located just northeast of the Structure #4 excavation, suggests that its deposition is at least partially contemporary with the occupation of the Structure #4 area. The lower, minimally disturbed portion of this shell midden that was exposed in the mechanical transect was manually excavated and the matrix was screened through 1/4 in. mesh. In addition, a small test pit was excavated in an adjacent part of the midden as a portion of the shell-midden test program.

Pottery within the transect-exposed section of the shell midden was essentially the same as that recovered from the Structure #4 excavation (Figure 29). The small sample of pottery from the test pit was more divergent, containing less complicated-stamped pottery and more fine cord-marked pottery. Nine San Marcos Simple-Stamped sherds were encountered beneath the shell matrix within this test pit, suggesting that at least portions of the shell midden were deposited during the Sutherland Bluff Phase, as the simple-stamped pottery was also a component within the shell matrix.

The only possible exotic pottery recovered from Shell Midden #108 was from the transect excavation. Three sherds that are similar to Crooked River Complicated-Stamped pottery were encountered within the shell matrix (see Figure A-4A). This pottery type is generally considered to pre-date the Wilmington and Savannah Phases; however, its association with later types in the shell midden suggests otherwise (see Willey 1949:384).

The variant pottery inventories from the two locations within Shell Midden #108 may be partially due to substantial differences in sample size; however, it is likely that the midden was deposited over a period of time and its contents are culturally heterogeneous. That is, Shell Midden #109 appears to be the result of repeated refuse deposition in a single locality during the Savannah, Irene, and Sutherland Bluff Phases. The transitional period between Savannah and Irene is probably also represented within the midden.

To add to the complexity, the disturbed shell midden probably contains occupation debris that is associated with a structure.

Two rectangular post holes, oriented east to west, were present immediately beneath the shell matrix within the shell midden test pit. Fill of these post holes was composed of humic sand with scattered shell and their bases extended approximately 20 cm. beneath the sehll matrix. As the fill was primarily humic sand rather than shell, it appears that the post holes were constructed prior to the shell midden deposition. Construction elements, perhaps associated with the rectangular post holes, also were encountered beneath the shell midden in the mechanical transect. These elements consisted of a large shell-filled post hole extending approximately 35 cm. beneath the shell midden and a series of small, round post holes located north of the shell-filled one. Whether all the structural elements are portions of a single construction or define multiple building sequences is unknown.

Faunal components of the shell midden within the transect are presented in Table 11 and Table 12. The shell matrix was composed primarily of oyster shell, however quahog clam, razor clam, and ribbed mussel were represented. Vertebrate fauna from the transect excavation were infrequent and defined primarily of white-tailed deer, while reptiles and fish were rare. Fish remains were more frequent in the shell-midden test pit, further indicating the heterogeneous nature of the shell deposit.

Conclusions

Pottery types within the plow zone of the Structure #4 excavation suggest that this area was occupied during the St. Simons, Savannah, Irene, and Sutherland Bluff Phases. Construction

activity in this location was intensive and is perhaps associated with consecutive occupations from the Savannah Phase to the Sutherland Bluff Phase. It is unlikely that a St. Simons Period structure is represented, as structural elements were intrusive into its subsoil provenience. A transitional period also may be represented by a portion of the Savannah and Irene-Phase pottery types.

Shell Midden #108 appears to be roughly contemporary with the occupation sequence in the Structure #4 area, and probably defines a portion of the refuse debris consequent to the habitation of the poorly-defined structures. However the shell midden was deposited over other structural elements, and surely contains debris relating to this occupation as well. The cultural provenience of this sub-midden structure perhaps dates to the Savannah Phase, based on the earliest pottery types represented within the midden. Considering the faunal components within the shell midden and the Structure #4 area, it seems that seasonal factors may be responsible for the two contexts. Repeated deposition in the shell midden and multiple construction in the Structure #4 area suggests that this refuse-deposition pattern persisted from sometime later in the Savannah Phase into the Sutherland Bluff Phase. Species identified from the Structure #4 area suggest that deposition was primarily during warm summer months, as the fish represented are all available in the tidal streams from May through October. The box turtle and diamondback terrapin probably also were collected during the summer period, however the white-tailed deer and raccoon may have been procured throughout the year.

Fauna identified from the shell midden are primarily winter species. Molluscs are the prominant cool-weather representatives. Fish remains are relatively rare within the shell midden and restricted to four species: sea catfish, gafftopsail catfish, black drum, and longnose gar. The incidence of fish within the shell midden also appears variable, as a much greater percentage of fish bone was recovered from the shell midden test pit than from the transect excavation. It seems that warm-weather subsistence refuse was occasionally deposited within the shell midden, however the bulk of the midden was composed of winter shell debris.

Although considerable post-deposition disturbance inhibits conclusions, several inferences may be drawn and a hypothesis formed to explain the available evidence. There appears to have been a shift in refuse deposition patterns sometime during the Savannah Phase, after the abandonment of the structure which pre-dates most of the shell deposit. Building activities possibly were initiated at this time adjacent to the abandoned structure. Food remains, primarily of summer species, accumulated within the new habitation area and small piles of refuse were deposited nearby in the location of the abandoned structure. Bulky mollusc remains were also deposited adjacent to the habitation area during the winter. There seems to have been a general continuity in this pattern of structural location and refuse deposition during the Irene and Sutherland Bluff Phases.

It may be hypothesized that the initial shift to this pattern was a result of year-round, or at least more continual, settlement

beginning late in the Savannah Phase. It is impossible to isolate details of this transition with present evidence; however, part of the change appears to have involved more intensive utilization of oysters while resident at Kenan Field.

There is an immediate problem with this year-round settlement hypothesis. Other than the molluscs, there are no distinctively winter species present in the faunal inventory. Atlantic croaker and mullet are available during the winter and the catfishes are present in the tidal streams as late as November, however as a group the fish are all summer species. It is very unlikely that subsistence relied exclusively on molluscs during the winter as their caloric value is quite low. The only other animals that could have been taken during the colder months are the white-tailed deer and rabbit, and these may have complemented the shell-fish diet.

The fairly secure context of Feature 401 provides evidence of subsistence resources utilized during the terminal portion of aboriginal occupation in the Structure #4 area. The occurrence of river otter, wood duck, turkey, and Prunus sp. at Kenan Field is restricted to this Sutherland Bluff-Phase feature. The remaining species are more usual and include oysters, clams, ribbed mussel, white-tailed deer, raccoon, mud turtle, black drum, mullet, and a skate or ray. The frog or toad represented is probably an incidental inclusion within the refuse debris. Species within the fill are seasonally variable, suggesting that the refuse accumulated over a period of several months. The fish and turtle probably were procured during the warm summer months, black cherries during the late

summer, the hickory nuts during the fall, the molluscs during the winter, and the birds and mammals could have been taken throughout the year. Flies within the feature may indicate that raw refuse was being deposited within the pit. Their occurrence on the coast today is most noticeable during the summer and fall. It is perhaps no coincident that the flies were very common during the field season at Kenan Field, and this indicates that the flies may be very recent and represent an "excavation-contaminant" in the faunal inventory.

Structure #6

Structure #6 is the northwest corner of a palisade located 220 m. northwest of Mound 'A' near the center of Kenan Field (Figure 40, Figure 41). Elements of Structure #6 were encountered in the base of a randomly-selected mechanical transect (F3A) and 30 cm. of plow zone was manually removed immediately west of the transect to expose a complete section of the palisade. All construction elements and features were intrusive into a tan-subsoil horizon at the base of the plow zone. Exposed elements of Structure #6 consist of portions of the western and northern sides of the palisade (Structure 6A) and a small square construction (Structure 6B) located immediately north of the palisade at its corner.

Structure 6A is defined by rectangular post holes measuring about 25 cm. wide and from 40 cm. to 90 cm. long. The northern two post holes along the western wall were profiled. The northern most post hole (Station 1281.5 R970.4) extended 72 cm. beneath the surface, had a slightly rounded base and vertical sides (Figure 42).

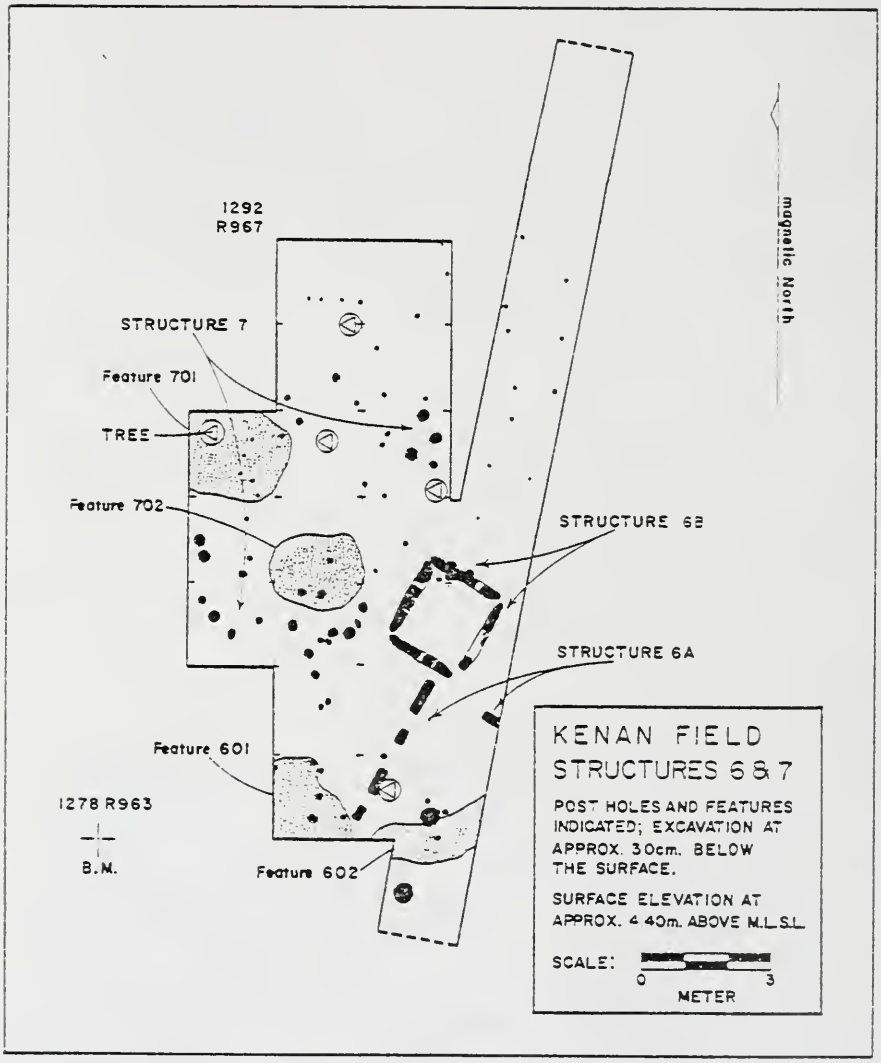


FIGURE 40
STRUCTURE #6 AND STRUCTURE #7

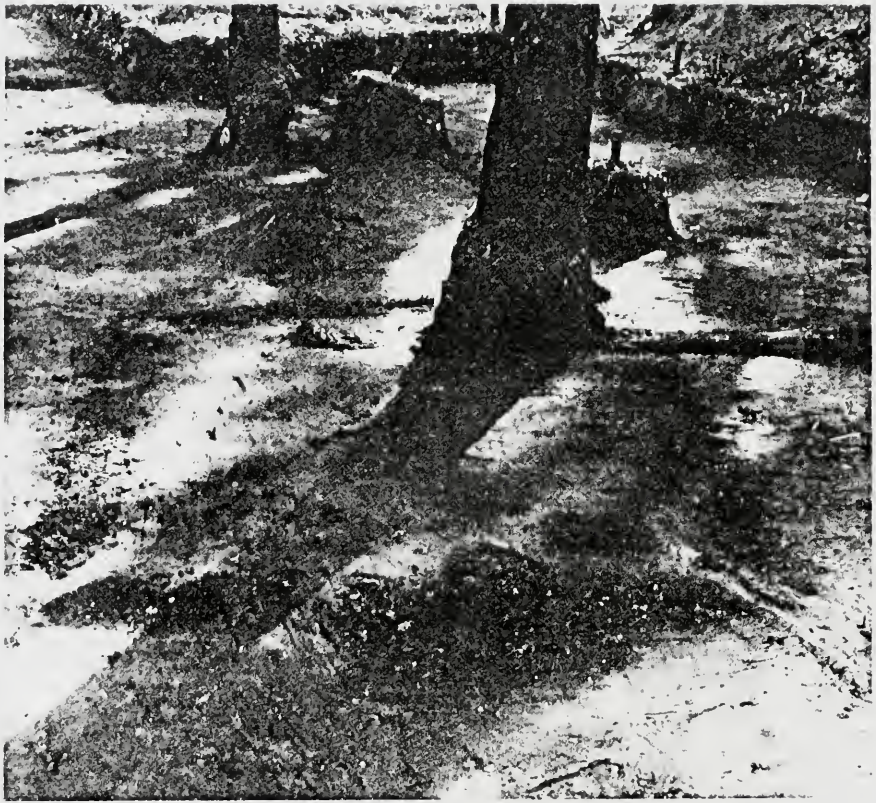


FIGURE 41
STRUCTURE #6 WITH SENTINEL STATION IN FOREGROUND, VIEW TO THE SOUTHWEST

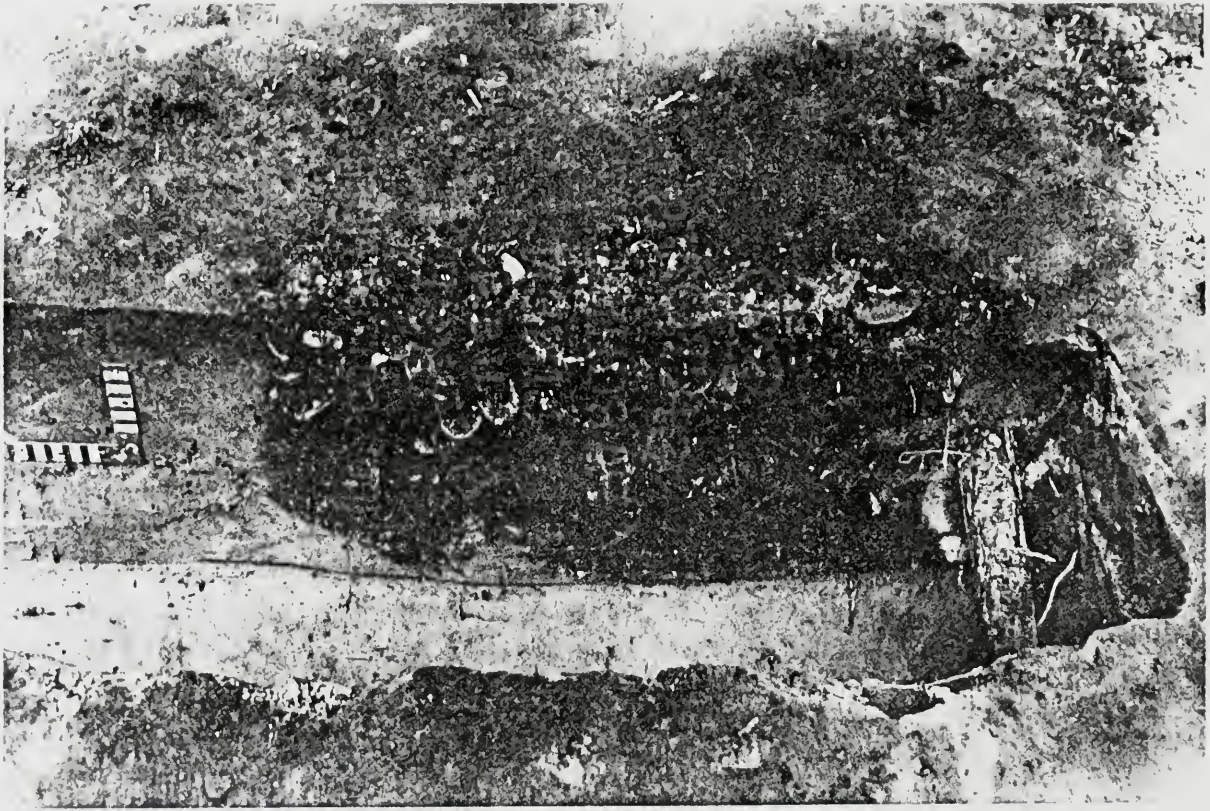


FIGURE 42
RECTANGULAR POST HOLE OF THE PALISADE, VIEW TO THE NORTHWEST

Fill of the post hole consisted of humic sand and oyster shell. A possible post position, defined by a disrupted base and darker humic sand, was observed in the southern portion of the fill. A single Irene Incised sherd was recovered from the fill, suggesting that the post hole was constructed during or after the Irene Phase. The post hole immediately to the south (Station 1280.5 R969.9) extended 62 cm. beneath the surface, had a rounded base, a vertical southern wall, and a slightly inclined northern wall. The fill contained humic sand and oyster shell.

The palisade appears to have been constructed of a series of deeply-set posts that were spaced short distances apart within a line. Small posts may have been set between these support posts to form a continuous wall. An entrance in the palisade is indicated by a 1.25 m. wide space along the northern wall at the corner.

Structure 6B was probably a sentinel station. This structure is defined by four wall trenches that form a square with open corners. The wall trenches vary from 20 cm. to 30 cm. in width and delimit a square measuring 2 m. to the side. Dark humic sand and oyster shell mark the positions of closely-set posts within the wall trenches. A 70 cm.-wide space in the eastern wall trench was void of posts, indicating that the doorway was adjacent to the opening in the palisade. The eastern wall trench was profiled. The trench was semi-circular in cross section and extended approximately 45 cm. beneath the surface. Three eroded complicated-stamped sherds with grit tempering, a plain grit-tempered sherd, and an Irene Filfot-Stamped sherd were encountered in the fill, suggesting that the wall

trench was constructed during or after the Irene Phase, as was the main palisade.

Two features (#601, #602), several small post holes, and two large round post holes were located within or near Structure #6, however their relationship to the palisade is uncertain. Feature 601 was defined by mottled yellow sand and Feature 602 by bright yellow sand. Their function and cultural provenience are unknown. The two large post holes were located just inside the western wall of the palisade and one (Station 1276.7 R970.0) was profiled. The main body of this post hole extended 50 cm. beneath the surface, had a round bottom, a sloping southern side, and an abrupt northern side. A post position, 18 cm. in diameter, protruded through the base along its northern side and extended 72 cm. beneath the surface. Fill of the post hole and post position was composed of humic sand and oyster shell. Two plain grit-tempered sherds and a Savannah Fine Cord-Marked sherd were recovered from the fill, suggesting that the post hole was constructed during or after the Savannah Phase.

In conclusion, while only a small part of Structure #6 was exposed, it is likely that the palisade was a very large aboriginal structure constructed sometime after Irene-Phase pottery types were being manufactured. If the orientation of the northern palisade wall is extended to the east, a series of large shell middens appear to be deposited just along the outside. Considering the location of these refuse deposits, the northern wall was at least 90 m. long. There can be little doubt that the palisade served a defensive purpose.

The similarity between the rectangular post holes of the palisade and the rectangular post holes of Structure #1 and Structure #2 deserves mention. However their vertical forms are different, certainly due to distinctive construction requirements involved in erecting a palisade as opposed to a low platform.

Structure #7

Structure #7 is located just beyond the northwest corner of the palisade (Figure 40). Excavation was initiated in this area to investigate a location near the palisade for possible associations. Features and round post holes were recognized at an undisturbed subsoil zone at approximately 30 cm. beneath the surface. A plow zone consisting of brown humic sand and occasional shell fragments extended to this depth. Standard excavation units were 2 m. x 2 m. squares. The first excavation level extended 15 cm. beneath the surface and approximately defined a zone of maximum disturbance. The second excavation level extended from 15 cm. to the base of the plow zone and was slightly less disturbed. Standard excavation was discontinued at the subsoil surface and intrusions were recorded. Cultural material from all excavation levels was recovered by screening with 1/4 in. mesh.

Structure #7 is defined by an irregular series of post holes that enclose an open space and two features (#701, #702). The form of this structure appears to be circular, measuring about 6.5 m. in diameter. Major construction elements are represented by post holes measuring from 25 cm. to 30 cm. in diameter. The irregular positions of the post holes suggests that posts of the

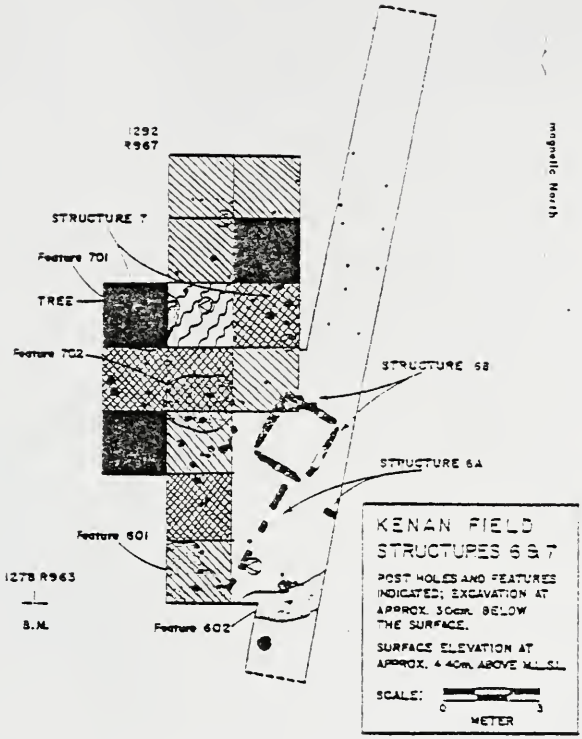
building were subject to replacement and slight repositioning over a period of time. A space in the southeastern section of the wall indicates that the doorway was located opposite the sentinel station of the palisade. Small post holes or post molds, 5 cm. to 18 cm. in diameter, were situated among the larger post holes, within the interior at the features, and in an area north of the structure. These possibly mark the positions of minor wall posts and small rack or drying facilities within and outside the structure.

Features within the interior of Structure #7 were defined by irregular areas of bright-yellow mottled sand. Feature 701 was located along the northwestern side of the building and Feature 702 was situated near the southeastern side, adjacent to the doorway. Several post holes were intrusive into these features and are possibly related to their function. The position of these deposits within Structure #7 indicates they are contemporary with the use of the building, however their function is unresolved.

Cultural Material Recovered from the Plow Zone

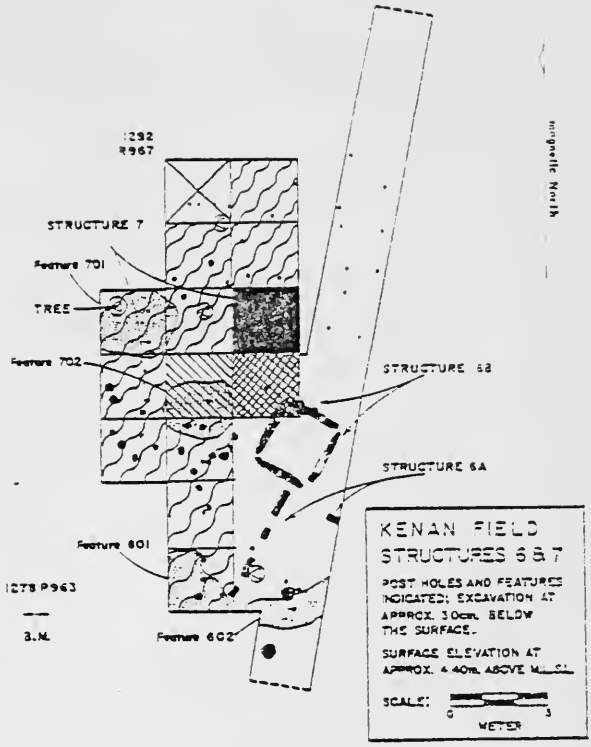
The weight-density distributions of pottery, bone, and stone recovered from the lower plow zone in the Structure #7 excavation are presented in Figures 43, 44, and 45.

Pottery is most dense above Feature 701 and in locations immediately northeast and southwest of the structure. Areas within the building were usually associated with dense concentrations of pottery, but also contained an area defined by low density. Light densities occurred within the doorway and north of the structure.



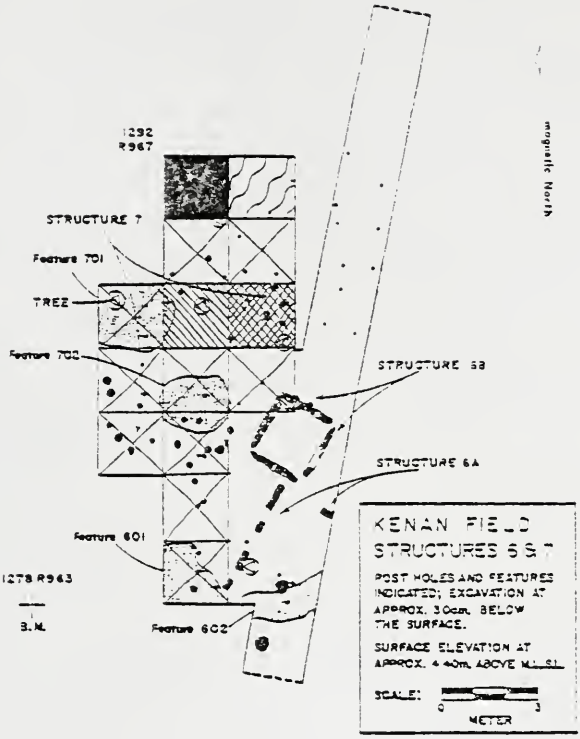
Grams	
0	Mean = 179.29 grams
22 - 101	Standard Deviation = 76.32 grams
102 - 179	
180 - 257	
258 - 297	
(unscreened)	

FIGURE 43
WEIGHT-DENSITY DISTRIBUTION OF POTTERY AT STRUCTURE #7



Grams	
0	Mean = 8.69 grams
1 - 8	Standard Deviation = 10.38 grams
9 - 20	
21 - 32	
33 - 40	
(unscreened)	

FIGURE 44
WEIGHT-DENSITY DISTRIBUTION OF BONE AT STRUCTURE #7



	Grams
	0
	11
	24
	62
	133
	(unscreened)

Mean = Not Applicable

Standard Deviation = Not Applicable

FIGURE 45
WEIGHT-DENSITY DISTRIBUTION OF STONE AT STRUCTURE #7

The area south of Structure #7 was more variable, containing dense and light concentrations of pottery. A descriptive summary of the pottery recovered from the upper and lower plow zones is presented in Figure 34. Irene-Phase pottery is most frequent and Savannah-Phase pottery is slightly less common. Plain and Irene Complicated-Stamped sherds comprise the majority categories, followed by Savannah Check Stamped and Savannah Fine Cord-Marked pottery and small amounts of San Marcos Simple-Stamped, San Marcos Complicated-Stamped, and Irene Incised Pottery.

Bone fragments were most dense along the interior of Structure #7 just north of the doorway. A dense concentration occurred within the doorway and a light density of faunal material was present near the center of the building. Low densities occurred elsewhere in the excavation area. Identified classes and species of fauna are shown in Table 11 and Table 12. White-tailed deer is the only mammal represented, fish are limited to salt-water catfish and black drum, and reptiles consist of diamondback terrapin, mud turtle, and cooter or slider.

Lithics were restricted to the lower plow zone within the northern interior of Structure #7 and to an area in the northern portion of the excavation. The high-density symbol north of the structure marks the location of a small hammerstone. The remaining lithics consist of unutilized flakes of red or cream-colored chert which occasionally retain portions of their limestone cortex.

Conclusions

Pottery types identified from the Structure #7 excavation indicate that this area was occupied primarily during the Savannah and Irene Phases. Considering the distribution of pottery within and around the structure, it appears that the building was associated with both of these phases. Structure #7 was either built and intially occupied during the Savannah Phase and continued to be used during the Irene Phase or was occupied only during a transitional period when both pottery complexes were manufactured. In either case, a period of transition is indicated, but whether it was rapid or gradual in terms of changing pottery complexes in unclear. The infrequent Sutherland Bluff-Phase sherds may be minor associations of the Irene component or the result of later deposition.

It appears that Structure #7 was occupied prior to construction of the palisade. Irene-Phase pottery within the fill of palisade construction elements may represent sherds formerly associated with Structure #7. The proximity of the building relative to the palisade possibly indicates that the defensive fortification was built while Structure #7 was still standing. If this is the case, it may be speculated that later use of Strucutre #7 was related to the palisade and that the fortification was an Irene-Phase construction.

On the other hand if the Savannah-Irene Phase transition involved the manufacture of both Irene and Savannah pottery types for a period of time, then the palisade and Structure #7 may be associated with this transitional period. The presence of Irene-Phase pottery types to the exculsion of Savannah-Phase types within the palisade

construction elements is certainly due to the small number of sherds encountered and is by chance, as Irene-Phase pottery is usually more recent that that of the Savannah Phase and since diagnostic sherds of both phases were encountered in the immediate vicinity. The palisade nevertheless appears to post-date Structure #7; however, very little time may have separated the two constructions.

Structure #7 was perhaps a non-domestic building, however its function is poorly documented in the archaeological record. Use of the structure evidently involved food consumption and food debris was discarded primarily along the wall just north of the doorway and within the doorway. However, the paucity of faunal material and the limited number of species represented in the remains suggests that food consumption was a relatively minor event. The negative evidence of a food-preparation facility provides some support for this inference.

Identified fauna associated with Structure #7 suggest a warm weather occupation, however the infrequency of bone fragments limits the validity of seasonal estimates. The turtles represented are most active during the warmer months and saltwater catfish and black drum are present in the tidal streams from May through October. The white-tailed deer may have been procured during the summer months, however they are year-round inhabitants of the coast.

A minor event associated with the occupation of Structure #7 was the manufacture of stone tools. The occurrence of chert flakes with portions of their cortex indicates that raw materials were being processed. The primary deposition area for debitage was just north of the doorway within the structure, suggesting

that stone-working activities were pursued within the sheltered interior of the building. Another manufacturing location is probably indicated by the hammerstone and flakes encountered just north of Structure #7. The battered edges of the hammerstone may be the result of flaking the chert by percussion.

In conclusion, Structure #7 is a Savannah-Irene Phase building possibly associated with an Irene or Irene-Savannah Phase palisade during the latter part of its occupation. The small, round structure seems to have been a location of male activities, as suggested by the stone-working debitage, and was also the setting for food consumption and its resulting debris. Deposition of cultural material was patterned within and around the structure and most debris accumulated within the building, often just north of the doorway. Rebuilding or a replacement of posts is indicated by the posthole arrangements that define Structure #7 and its use may have changed over time. While the function(s) of this structure is unclear, it may be suggested that at one point it was inhabited by the sentinel(s) of the palisade who was supported with prepared foods from community stores and occasionally made stone tools. The identified species in the faunal debris suggest that Structure #7, and perhaps the palisade, was functionally important during the summer months.

Mechanical Transect Test Excavations

Five mechanical transects were excavated at Kenan Field to provide information concerning the location of aboriginal structures (see Figure 12). The initial transect (Structure #2 transect) was excavated as a test of the mechanical method and its location was

non-random. Location of each remaining transect was aligned and random within a specified polygon substratum. Selection of Sub-Stratum Ø, 3, and 5 for testing was non-random, as these substrata were chosed to provide maximum north-south coverage of Stratum 'F'. Each transect was excavated to the base of the plow zone where intrusions were recorded with an alidade. For present purposes, structural locations within the transects are defined by two or more post holes or a wall trench. Single post holes and isolated features, although recorded, are removed from consideration.

Structure #2 Transect

As previously discussed, elements of Structure #2 were exposed in this non-random transect. Two additional indications of structures were encountered in the northern section of the transect. Structure 'A' was defined by 18 round post holes measuring from 8 cm. to 20 cm. in diameter. These post holes were dispersed over a 6.5 m.-long section of the transect without obvious patterning. Structure 'B' was defined by 4 rectangular post holes, as at Structures #1 and #2, along with 2 round post holes and a single large rectangular (55 cm. x 40 cm.) post hole containing a central post mold (12 cm. in diameter). These post holes were located over a 3 m.- long area in the extreme northern portion of the transect. Three of the rectangular post holes formed a line oriented 9° east of north, suggesting that Structure 'B' may be the southern edge of a construction similar to and associated with Structures #1 and #2.

Sub-Stratum Ø

Two mechanical transects, designated FOA and FOB, were excavated in Sub-Stratum Ø. Structural locations were encountered in neither transect; however, a series of features defined by concentrations of shell debris were recognized in the base of transect FOA (Figure 30). Features FOA 1, FOA 2, and FOA 3 were excavated.

Feature FOA 1 was a roughly rectangular (95 cm. x 60 cm.) pit with sloping sides and a slightly rounded base that extended 65 cm. beneath the surface. The pit fill was composed primarily of oyster shell along with pieces of quahog clam shell, a few bone fragments, and potsherds. Charred-wood fragments were infrequent and dispersed throughout the fill, and became more concentrated in the base of the pit. Vertebrate skeletonal material was rare but elements of at least two unidentified catfish, a diamondback terrapin and mud turtle, and a white-tailed deer (one tarsal fragment) were represented (Table 9, Table 10). Pottery within Feature FOA 1 consisted of a grit-tempered plain sherd and three Savannah Fine Cord-Marked sherds, indicating that the pit was filled during or after the Savannah Phase.

Feature FOA 2 was an oval to rectangular (1.45 m. x 1.25 m.) pit with sloping sides and a flat base that extended 54 cm. beneath the surface. A 15 cm.-thick layer of organic-stained soil containing dispersed charred-wood fragments was present in the base of the pit. This layer was overlain by a concentration of oyster shell along with pieces of quahog clam shell, one busycon shell, bone fragments, a single claw fragment of a blue crab (*Callinectes* sp.) and potsherds. Three charred fragments of hickory nut (*Carya* sp.) also were recovered from the shell matrix. Vertebrate skeletonal remains,

representing many species of fish, turtle, mammal, and an unidentified bird, were concentrated in the base of the shell layer (Table 9, Table 10). Pottery was restricted to the shell layer and consisted of 32 Savannah Fine Cord-Marked sherds, seven Savannah Burnished-Plain sherds, a sand-tempered plain sherd, and one small grit-tempered sherd with a poorly defined curvilinear complicated-stamped design. The prominence of Savannah-Phase types indicates that the fill was probably deposited during this period.

Feature FOA 3 was a round (80 cm. diameter) pit with slightly inclined sides and a rounded base that extended 67 cm. beneath the surface (Figure 46). Fill of this bowl-shaped feature was defined by three deposits. The base of the pit contained a 10 cm. to 15 cm. thick layer (Level I) of organic-stained soil, charred wood fragments, oyster shell, pieces of quahog clam shell, bone fragments, and a few potsherds. This layer was covered by 5 cm. to 15 cm. of sterile tan sand with dispersed wood fragments (Level II), which was in turn overlain by a matrix (Level III) composed primarily of oyster shell along with pieces of quahog clam shell, bone fragments, and potsherds. Two charred fragments of hickory nut (Carya sp.) were recovered from Level III.

Classes and species of vertebrate fauna identified within the total fill of Feature FOA 3 are presented in Table 9 and Table 10. Fauna represented in Level I included at least one white-tailed deer, a longnose gar, and an unidentified turtle. Faunal material was more frequent in Level III where elements of at least one white-tailed deer, one raccoon, one longnose gar, and one mullet were represented.

FIGURE 46
FEATURE FOA 3

Pottery within both levels indicated that deposition probably occurred during the Savannah Phase. Pottery encountered in Level I consisted of nine Savannah Cord-Marked and two Savannah Burnished Plain sherds, and within Level III there were 14 Savannah Fine Cord Marked sherds, eight Savannah Burnished-Plain sherds, a Savannah Complicated-Stamped sherd, and a Savannah Check-Stamped sherd.

A sample of charred wood from Level I was submitted for Carbon 14 analysis, and returned an age estimation of 980 $\pm$ 70 A.D. (970 $\pm$ 70 B.P.; UM 1388). This estimate indicates that Feature FOA 3 was used during the earliest portion of the Savannah Phase and suggests that the associated pottery types accurately define the phase association of the pit fill.

Features FOA 1, FOA 2, and FOA 3 appear to be a set of functionally similar facilities. The exclusive occurrence of Savannah-Phase pottery types within their fills suggests that each is a Savannah Phase phenomenon. Charred-wood fragments within the bases of the features indicate they were the locations of small fires or perhaps embers. The pits probably functioned as earth ovens and were subsequently filled with refuse.

A recurrent seasonal occupation is suggested by the refuse deposited in these abandoned earth ovens. The bulk of the fill in each pit was composed of oyster shell, representing a species considered to be indicative of winter subsistence activities. Clam shells within the fills support this winter seasonality. Distinctive warm-weather species were rare in Features FOA 1 and FOA 3, suggesting that deposition during this season was minimal.

Hickory nut shell within Feature FOA 3 may suggest that deposition also occurred during the fall months, however the nuts could represent stored food. A concentration of warm-weather faunal remains was present in the base of the shell matrix in Feature FOA 2 indicating a discrete warm-weather refuse deposit. Species of fish represented in this deposit are all available in the tidal streams from May through September. The identified reptiles are accessible at this time and the mammals also could have been taken during these warm summer months. It is unclear whether the hickory nut shell was associated with this deposit or with the overlying shell matrix, however fall subsistence activities also are indicated.

The presence of the refuse facilities in the FOA transect prompted a field hypothesis that they were associated with a Savannah-Phase structure. To test this hypothesis, controlled excavations were extended east of the transect where the Structure #3 wall trench was subsequently encountered. As previously discussed, this construction appears to be associated with an early portion of the Savannah Phase and thus provides some support for the field hypothesis. Given the exposed straight section of the wall indicated by Structure #3, it is difficult to demonstrate whether the refuse facilities are located within or outside the enclosure. However an additional hypothesis may be formed that the refuse-filled earth ovens are the result of Savannah-Phase domestic activities that occurred outside the enclosure.

Sub-Stratum 3

A single mechanical transect, designated F3A, was excavated in Sub-Stratum 3. Elements of the palisade (Structure #6) were exposed in the base of this transect and have been discussed previously. One structural location (Structure 'D') was observed within the palisade and four structural locations (Structures 'E', 'F', 'G', 'H') were encountered beyond the palisade in the northern portion of the transect.

Structure 'D' was defined by 15 round post holes, measuring from 10 cm. to 25 cm. in diameter, associated with an accumulation of crushed shell within a humic-soil matrix. The post holes were scattered on both sides of the humic deposit and extended over a 5 m.-long section of the transect. Beyond these observations patterning was indistinct, however a small living floor surrounded by post positions may be demonstrable through additional excavation.

Structure 'E' was defined by 11 round post holes, measuring from 10 cm. to 20 cm. in diameter, separated by two areas of bright yellow, mottled sand. These elements were spread over a 7 m. long section of the transect without demonstrating an obvious form.

Structure 'F' was located 20 m. north of Structure 'E' and was defined by a narrow wall trench (10 cm. to 15 cm. across) situated immediately south of an area of bright yellow, mottled sand. The width of the wall trench suggests that it supported the wall of a small, perhaps domestic structure. No other wall trench was encountered that would indicate the opposing wall of the building.

Structure 'G' was located 10 m. north of Structure 'F' and was defined by a dense humic matrix of crushed shell and charred wood fragments. This accumulation was spread over a 6 m.-long section of the transect and possibly defines a living floor.

Structure 'H' was located in the extreme northern portion of the transect and was defined by small areas of charred-wood fragments, accumulations of scattered shell debris, and a single location of bright yellow, mottled sand. It is unclear whether these deposits are actually associated with a structure or with some other cultural activity.

Sub-Stratum 5

A single mechanical transect, designated F5A, was excavated in Sub-Stratum 5. Elements of Structure #4 and Structure 'C' were exposed in the base of the transect. Both received detailed attention in an earlier section of this chapter.

Shell Midden Tests

Shell middens were sampled with controlled 1.5 m x 2.0 m. test pits (see Chapter 2). A random sample of at least 25% of shell middens of each size class were sampled within Sub-Stratum Ø and Sub-Stratum 5. Only the polygon-defining shell midden was tested in Sub-Stratum 3 (Figure 12). Selection of Shell Midden #71 for sampling was non-random, as this test was conducted to obtain information concerning its association with Structure #1. As previously stressed, "Shell Midden #71" is a misnomer and actually defines a sub-structural mound. Following is a summary of the randomly-selected shell middens that were tested per size class per Sub-Stratum:

Sub-Stratum Ø:	Class A - Shell Midden #122	(22 m. diameter)
	Class C - Shell Midden #113	(9 m. diameter)
	Class D - Shell Midden #127	(5 m. diameter)
	Class E - Shell Midden #112	(3 m. diameter)
Sub-Stratum 3:	Class B - Shell Midden #245	(15 m. diameter)
Sub-Stratum 5:	Class B - Shell Midden #108	(13 m. diameter)
	Class C - Shell Midden #103	(7 m. diameter)
	Class E - Shell Midden #115	(4 m. diameter)

The shell middens were composed primarily of oyster shell, along with pieces of quahog clam shell and razor clam shell, fragments of vertebrate faunal remains, potsherds, and very rarely unutilized flakes of red or cream-colored chert. All middens were disturbed by agricultural activities but occasionally a thin zone of undisturbed midden was observed in the base of the deposit (Figure 47). Bases of the shell middens usually were irregular and disrupted, probably due to a combination of agricultural disturbance as well as aboriginal activities. Shallow pits filled with shell were apparent in the profiles of Shell Middens #108, #112, #113, and #115, and sub-midden features were encountered in Shell Middens #112 and #127. Sampling units were designed to gather information concerning the contents of the shell middens rather than to delineate features, thus definition of the shallow pits and other intrusions is incomplete.

A descriptive summary of the pottery encountered within each shell midden is presented in Figure 48. The positions of shell middens in this chart are ordered by decreasing percentages of complicated-stamped pottery. Decreases in complicated-stamped pottery are accompanied by increases in fine cord-marked pottery. Plain pottery is common in each shell midden while the percentages of check-stamped sherds are more erratic. Simple-stamped pottery was

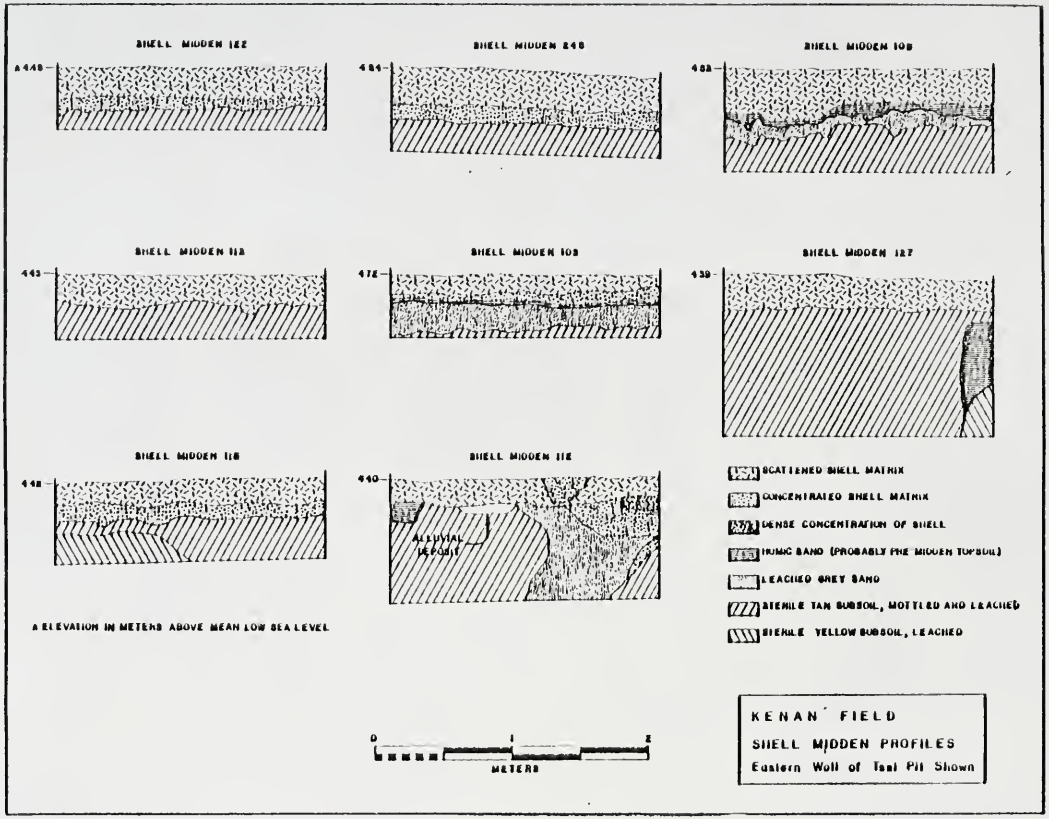


FIGURE 47
SHELL MIDDEN PROFILES

EXCAVATION AREA	#	Plain	Burnished Plain	Fine Cord Marked	Check Stamped	Simple Stamped	Complicated Stamped	Unidentified	Notes
0 ■ ■ ■ ■ ■ 50 PERCENTAGE									
Shell Midden #115 ~0.20 cm. below Surface	17	4:6:0:0		0:10:0 0:0:10:0	0:10:0:0		7:3 5:5:0:0		One plain, sand tempered sherd encountered beneath shell @ 30-45 cm.
Shell Midden #65 (str. #5) ~0.40 cm. below Surface	46	0:5:5:0	0:10:0:0	5:5:0 0:0:10:0	0:10:0:0		4:6 0:10:0:0	2:7:1:0	Pottery encountered only within shell matrix.
Shell Midden #107 ~0.20 cm. below Surface	22	4:6:0:0		3:7:0 3:3:3:0	0:10:0:0		1:9 1:9:0:0	0:10:0:0	Pottery encountered only within shell matrix.
Shell Midden #71 (Str. #1) ~0.40 cm. below Surface	14	5:5:0:0		5:5:0 5:5:0:0	0:10:0:0		2:8 0:10:0:0	0:10:0:0	Pottery encountered only within shell matrix.
Shell Midden #114 ~0.25 cm. below Surface	11	4:4:2:0		7:3:0 3:3:3:0			3:7 0:10:0:0		Pottery encountered only within shell matrix.
Shell Midden #45 ~0.45 cm. below Surface	40	4:2:4:0		4:6:0 2:1:7:0	0:10:0:0		1:9 0:10:0:0	0:10:0:0	One fine regular crossed cord-marked, grit tempered sherd encountered beneath shell @ 45-60 cm.
Shell Midden #103 ~0.20 cm. below Surface	13	2:6:2:0			0:10:0:0		0:10 0:10:0:0		One check-stamped, grit tempered sherd encountered beneath shell @ 30 cm.
Shell Midden #108 ~0.30 cm. below Surface	14	4:6:0:0		4:6:0 0:7:3:0	3:7:0:0	2:8 2:8:0:0	5:5 0:10:0:0		Nine cross-simple stamped, grit tempered sherds encountered beneath shell @ 30-45 cm.
Shell Midden #112 ~0.20 cm. below Surface	13	0:5:5:0		2:8:0 0:0:10:0	0:10:0:0				Pottery encountered only within shell matrix.

Explanation: (1) Ratios presented below the percentage bar refer to tempering or paste components - sand : grit and sand : sherd and sand : sherd and grit.
(2) Ratios above percentage bars refer to design element variants: Fine Cord Marked - linear : regular crossed : random crossed; Simple Stamped linear : crossed; Complicated Stamped rectilinear : curvilinear.

FIGURE 48

DESCRIPTIVE SUMMARY OF POTTERY RECOVERED FROM SHELL MIDDEN TEST PITS

present only in Shell Midden #108 and burnished-plain sherds were restricted to Shell Midden #122.

Attention is directed to the small and variable sample size of pottery represented in each shell midden. This undoubtedly has an adverse effect on the reliability and comparative validity of the samples. A comparison of data from the sample test pits in Shell Midden #122 and Shell Midden #108 with the larger sample of pottery recovered from related excavations at Structure #5 and Shell Midden #108 indicates that while the small samples accurately reveal the occurrence of major pottery groups, they provide inadequate information concerning the relative proportions of pottery within each deposit.

There are at least two basic reasons for this inconsistency. First, the sample size is probably too small to accurately reflect proportions of pottery within the total shell deposit. Second, it is likely that at least the larger shell middens are the result of multiple depositions in a single location and their contents are heterogeneous. As previously discussed, the presence of Savannah, Irene, and Sutherland Bluff-Phase pottery types within Shell Middens #108 and #122 provides evidence of repeated deposition. The pottery data, in acknowledgement of the sampling problems, are assessed in terms of the presence of pottery types rather than their relative proportions. Information available from the larger excavations at Shell Middens #108 and #122 is considered when interpreting these middens.

Most of the shell middens are associated exclusively with Savannah and Irene-Phase pottery types. These deposits are Shell Middens #103, #113, #115, #127, and #245. Types within these middens consist of Savannah Check-Stamped, Savannah Fine Cord-Marked, and Irene Filfot-Stamped pottery. Shell Midden #103 lacks Savannah Fine Cord-Marked pottery while Shell Midden #113 lacks Savannah Check-Stamped sherds.

Shell Middens 108 and 122 are associated with the Sutherland Bluff Phase in addition to the Savannah and Irene Phases. The Sutherland Bluff-Phase pottery consists of San Marcos Simple-Stamped and Complicated-Stamped sherds. Savannah Burnished-Plain pottery is added to the Savannah Complex and Irene Incised pottery to the Irene Complex in Shell Midden #122.

Shell Midden #112 appears to be associated exclusively with the Savannah Phase. Savannah Fine Cord-Marked and Savannah Check Stamped pottery are the only types identified from this deposit.

Classes and species of vertebrate fauna identified from each shell midden are presented in Table 13 and Table 14. Most of the species represented are available on the coast only during the warmer months of the year. All of the identified fish are present in the tidal streams from May through October and the reptiles were probably also procured at this time. The identified mammals are available throughout the year.

Several species represented in the shell middens appear to be intrusive and non-economic. Eastern moles are burrowing animals and are thus considered intrusive. Cotton rats and mice would have

TABLE 13

VERTEBRATE FAUNAL CLASSES REPRESENTED IN SHELL MIDDEN TEST PITS AT KENAN FIELD

Provenience	Recovery Technique	Total Grams	Grams per Meter Square	Grams Recovered per Meter Square	Percent Mammal	Percent Reptile	Percent Fish	Percent Bird
Shell Midden #115	X	30.3	45	87	57	12	31	0
~0-20 cm. below Surface	W	9.7	81	34	27	36	36	0
Shell Midden #122	X	113.6	148	75	52	26	22	1
(Structure #5)	W	15.6	111	37	47	19	34	0
~0-32 cm. below Surface								
~ 32-45 cm. below Surface	X	13.0	36	81	58	31	10	0
	W	1.5	21	40	0	50	50	0
Shell Midden #127	X	11.0	16	75	66	31	2	0
~0-28 cm. below Surface	W	0.0						
Shell Midden #71	X	5.8	8	98	100	0	0	0
(Structure #1)	W	4.7	36	32	13	33	53	0
~0-30 cm. below Surface	Z	0.4	5	50	0	50	50	0
Shell Midden #113	X	14.6	24	58	81	12	7	0
~0-25 cm. below Surface	W	10.7	97	64	41	4	54	1
Shell Midden #245	X	152.5	141	78	48	11	40	0
~0-45 cm. below Surface	W	23.4	117	36	31	19	48	0
	Z	0.6	5	67	0	25	75	0
Shell Midden #103	X	92.9	194	88	67	25	8	0
~0-20 cm. below Surface	W	20.8	231	56	14	8	79	0
Shell Midden #108	X	32.8	46	69	43	11	46	0
~0-30 cm. below Surface	W	5.6	43	48	15	48	37	0
Shell Midden #112	X	16.7	35	87	82	3	14	0
~0-20 cm. below Surface	W	7.6	84	38	10	17	72	0

Explanation of Recovery Technique Symbols: X = ¼-inch mesh; W = 1/16 inch mesh, water screened; Z = Zinc Chloride Flotation of water-screened samples.

TABLE 14
MINIMUM NUMBER OF INDIVIDUALS PER VERTEBRATE SPECIES
IDENTIFIED FROM SHELL-MIDDEN TEST PITS

	Mammal					Reptile									Fish													Bird	
	White-Tailed Deer	Raccoon	Rabbit	Cotton Rat	Mouse	Eastern Mole	Box Turtle	Diamondback Terrapin	Mud Turtle	Snake	Soft-Shell	Garter/Ribbon	Cotton Mouth	Anole	Frog/Toad	Wild Catfish	Sea Catfish	Gafftopsail Catfish	Bar	Black Drum	Red Drum	Star Drum	Spotted Sea Trout	Atlantic Croaker	Flounder	Herring/Shad	Mullet	Skate/Ray	Song Bird
Shell Midden #115																													
0-20 cm. below Surface	1	.	1	(2)	.	(1)	.	.	.	.	.	.	.	.	(1)	6	(1)	(1)	.	(1)	.	.	.	.	.	.	(1)	.	.
Shell Midden #122 (Structure #5)																													
0-32 cm. below Surface	2	1	1	(1)	.	.	1	.	.	1	.	.	.	(1)	(1)	11	1	1	1	(1)	.	.	.	.	.	.	(1)	(1)	1
32-45 cm. below Surface	.	1	1	.	.	.	.	1	.	.	.	.	1	.	(1)	2	.	(1)	1	.	.	.	.	.	.	.	(1)	.	.
Shell Midden #127																													
0-28 cm. below Surface	.	.	1	.	.	.	.	1	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	.	.	.	.	.
Shell Midden #71 (Structure #1)																													
0-30 cm. below Surface	1	.	(1)	.	.	.	.	.	.	(1)	(1)	.	.	(1)	.	.	.	.	.	.	.	.	.	.	.	.	(1)	(1)	.
Shell Midden #113																													
0-25 cm. below Surface	1	.	(1)	.	.	(1)	.	1	.	.	.	.	.	.	.	1	.	.	1	(1)	.	.	.	(1)	.	(1)	(1)	.	.
Shell Midden #245																													
0-45 cm. below Surface	2	1	.	.	(1)	.	.	1	1	.	.	.	.	.	(1)	5	.	1	(1)	4	.	(1)	.	.	(1)	(1)	(1)	(1)	.
Shell Midden #103																													
0-20 cm. below Surface	1	.	1	.	.	.	1	.	1	.	.	.	.	.	.	8	2	1	1	1	.	.	(1)	.	.	.	.	.	.
Shell Midden #108																													
0-30 cm. below Surface	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	11	1	1	(1)	(1)	.	.	.	.	.	.	.	.	.
Shell Midden #112																													
0-20 cm. below Surface	1	.	.	.	.	.	.	1	.	(1)	.	.	.	.	(1)	3	.	1	(1)	2	.	.	.	.	.	.	.	.	.

Explanation of Symbols: ( ) Identified from elements recovered by 1/16 inch mesh, water-screening technique.

been attracted to the open refuse presented by the shell middens and their occurrence can be explained by their scavenging nature. The anole in Shell Midden 122 perhaps is associated with Structure #5, as was the case in Structure #1. Toads or frogs recur with such persistence that one begins to suspect these may have been minor food items. However frogs and toads are naturally present where their small-insect food source occurs, such as would be expected around recently-deposited refuse. Further down the refuse food chain, the snakes may have been attracted to the shell middens to feast on the frogs and scavenging rodents. Snakes may have entered the aboriginal subsistence system at this point.

There is considerable variability in the density of vertebrate faunal remains from shell midden to shell midden. As with the pottery, this is probably at least partially due to the internal variability of the refuse deposits. Changing densities appear to be irrespective of shell midden size or cultural-phase association. There is an association between the weight-density of oyster shell and the weight-density of vertebrate faunal remains, indicating that the intensity of refuse deposition within each midden location was similar from season to season. That is, those middens resulting from dense deposits of shell during the winter were also the locations of dense vertebrate refuse during the summer. The implication of this is that refuse deposition had a formal spatial structure that persisted throughout the year.

The repeated occurrence of Savannah-Phase with Irene-Phase pottery types within the shell middens strongly suggests that this

refuse was deposited during a transition between the two phases. The association of seven of the eight shell middens that were sampled with this transition adequately demonstrates an intensive utilization of oysters. Two of these midden-locations continued to be used during the Sutherland Bluff Phase, however the recurrent transitional pattern is broken prior to this time. The deposition of winter and summer refuse in the transitional middens, along with the similar seasonal-density levels within each midden, suggests that settlement was year-round.

There is a marked difference between the transitional shell middens and the Savannah-Phase middens. There were only two pure Savannah-Phase shell middens, indicating that prior to the transitional period the utilization of molluscs was infrequent while resident at Kenan Field. One of these shell middens (#112) was very small, while the other (#65) was directly associated with Structure #2 and appears to have been the result of a winter festive event. Thus while a winter occupation at Kenan Field is indicated during the Savannah Phase, it seems to have been associated with special social occasions and perhaps otherwise with small segments of the population. Most of the Savannah-Phase refuse was associated with Structures #1 and #2 which, as previously discussed, were primarily utilized during the warm summer months.

Analysis of Clam and Oyster Shell

The growth of quahog clams is very sensitive to changes in their environment. These changes are manifest and observable in the growth rings in their shells. While analysis of these rings can provide

empirical data concerning a number of environmental questions, the sensitivity of clams also creates a problem, as it is sometimes difficult to distinguish just which environmental change is being reflected in the shell.

Shell growth is most rapid from the spring through the fall months, and during this period growth is somewhat slower during the hot summer months when spawning is most common. This spring-summer-fall period is associated with a broad band of closely-spaced growth lines in the shell. Winter is the period of very slow growth and this is marked by a narrow, recessed band of lines in the shell which is referred to as a growth check. The warm temperature/cold temperature distinction is most obvious in northern environments where there are considerable contrasts in seasonal temperatures, while in southern temperate regions this distinction is less dramatic.

Clams also are sensitive to other alterations in their habitat. Growth seems to be subject to tidal rythms and variations in salinity, and in northern regions it is even possible to distinguish daily growth increments in the shell (Pannella and MacClintock 1968, see also Haskin 1954). It seems likely that growth also responds to non-periodic changes in the natural environment and other external stimuli, such as sudden unseasonal temperature changes or even harrassments of individual clams by predators.

Clam shells from the randomly-tested shell middens and several sub-surface features at Kenan Field were analyzed for information concerning the season of clam harvest, i.e. the time of death of individual clams. Virtually all clam shells were fragmented, whether

they were recovered from disturbed shell middens or from undisturbed features. An effort was made to reconstruct broken shells in order to avoid repetitive information from individual clams. In addition, only those shell fragments which contained two or more winter-growth checks and which retained at least a portion of their margins were analyzed. The pieces of clam shell were sorted into four seasonal groups based upon the position of the final winter-growth check relative to the margin of the shell. The following characteristics were used to define each seasonal group.

1. Fall Harvest: The space between the final winter-growth check and the margin is from 2/3 to equal the distance which separates the final two growth checks.
2. Winter Harvest: The final winter-growth check occurs at the margin.
3. Spring Harvest: The space between the final winter-growth check and the margin is 1/3 or less the distance which separates the final two growth checks.
4. Summer Harvest: The space between the final winter-growth check and the margin is from 1/3 to 2/3 the distance which separates the final two growth checks.

A fifth group was comprised of those clam shells which did not permit seasonal interpretations. Shells represented in this indeterminate group were apparently from older individuals whose growth checks were clustered along their margins.

The percentage of shells assigned to each seasonal group per provenience is shown in Table 15. Most of the clams appear to be the result of fall harvests, but winter and spring harvests also are well represented. Very few clams were harvested during the summer.

The clam shells from Features 109, FOA 2, and FOA 3 were re-sorted by the same analyst to check the reliability of the method. A comparison of the results of the two analyses shows that the procedures

TABLE 15
SEASONAL HARVEST DISTRIBUTION OF
QUAHOG CLAM BY PERCENTAGES

Provenience	Number Of Observations	Indeterminate	Fall Harvest	Winter Harvest	Spring Harvest	Summer Harvest
Shell Midden #112	21	52%	60%	30%	10%	-
Shell Midden #115	45	38%	43%	14%	4%	-
Shell Midden #103	33	27%	50%	29%	21%	-
Shell Midden #113	26	50%	38%	38%	15%	8%
Shell Midden #108	72	25%	43%	23%	32%	-
Shell Midden #245	90	17%	29%	36%	33%	-
Shell Midden #122	84	25%	57%	19%	21%	5%
Feature #109						
First Analysis	52	29%	49%	22%	27%	3%
Second Analysis	52	23%	20%	35%	40%	5%
Feature #204	19	26%	71%	14%	14%	-
Feature #205	17	24%	-	46%	54%	-
Feature FOA 1	11	18%	78%	11%	11%	-
Feature FOA 2						
First Analysis	97	26%	55%	26%	19%	-
Second Analysis	57	49%	7%	41%	45%	7%
Feature FOA 3						
First Analysis	24	-	58%	21%	21%	-
Second Analysis	24	8%	36%	32%	32%	-

used here are not totally reliable. The number of summer harvests remains quite low, however, there is a general shift in percentages from fall to winter and spring. This change in Features FOA 2 and FOA 3 is largely the result of classifying fall harvests of the first analysis as indeterminate during the second analysis, with the result of increased winter and spring percentages. The source of error within the analysis of shell from Feature 109 is more difficult to assess. Here again there is a shift from fall to the winter and spring, however this is unrelated to increases in the indeterminate group.

One source of difficulty with the clam-shell analysis that is presented above is due to expectations that are implicit in the format chosen for data presentation rather than any inherent invalidity of the analysis method and its results. The percentage format provides a discrete category for each observation and presents this data in terms of percentages within each seasonal category. Use of this format assumes interpretations in terms of absolutes. That is, x percentage of the clam shell represents a fall harvest, x percentage a winter harvest, etc. Such absolute interpretations are simply inappropriate given the analysis procedure used for assigning individual pieces of shell to each category. It also may be inappropriate given the multiple variables associated with clam growth in southern waters.

While the analysis results are only partially reliable upon an individual-observation and absolute level, they appear to be much more reliable when considered in terms of statistics which summarize

the total observations per provenience. The fall, winter, spring and summer categories were issued numerical ranks, from 1 to 4 respectively. Each shell fragment was then assigned a numerical value as determined by the rank of its associated category and means along with standard deviations were calculated for each provenience. The results of these calculations, presented at $\pm$ 1 standard deviation from the group mean, are shown in Figure 49. Results of the first and second analyses now overlap at 1 standard deviation, suggesting reliability at this level of presentation. The means cluster in the late fall, winter, and early spring periods. Standard deviations cluster in the fall and winter, and frequently extend into the spring.

Consideration of one final factor is necessary before seasonal inferences may be drawn from these data. Winter-growth checks were crucial to the analysis procedure and definition of the clam-harvest periods was directly related to the winter category. That is, winter is the independent variable and the other categories are dependent variables. It is therefore important at this point to define more accurately the months associated with this clam-shell defined winter category so that an estimation may be made of the time represented by the means and within the range of the standard deviations that cluster about this winter category.

Winter-growth checks in clam shell are due to decreased growth during cold weather. Shell growth stops when water temperature declines to about 7° C. and resumes when the temperature increases to about 9° C. (Belding 1912 in Chestnut 1951:164). The surface

Provenience	Sample Mean ± 1 s.d.
Shell Midden #112	1.50±.71
Shell Midden #115	1.71±.71
Shell Midden #103	1.71±.81
Shell Midden #113	1.92±.95
Shell Midden #108	1.88±.88
Shell Midden #245	2.04±.80
Shell Midden #122	1.73±.95
Feature #109	
First Analysis	1.84±.92
Second Analysis	2.30±.85
Feature #204	1.43±.76
Feature #205	2.54±.52
Feature FOA 1	1.33±.71
Feature FOA 2	
First Analysis	1.64±.79
Second Analysis	2.52±.74
Feature FOA 3	
First Analysis	1.63±.82
Second Analysis	1.95±.84

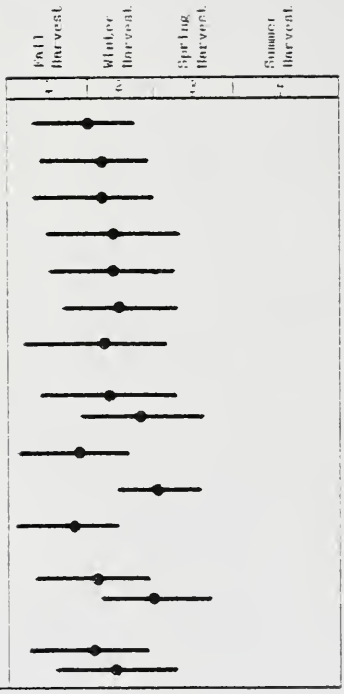


FIGURE 49
PRIMARY HARVEST SEASONS OF QUAHOG CLAMS
AS INDICATED BY SAMPLE MEANS AND STANDARD DEVIATIONS

temperature of water in the larger tidal creeks and rivers near Sapelo Island reaches yearly lows of about 12° C. during January and February, and during these months the water temperature in small tidal streams is probably a little lower (see Mahood et al. 1974b: Figure 12). These temperatures indicate that shell growth never completely ceases, but is slowest during these months. Thus, the winter-harvest category of slow growth indicated for clam shells from Kenan Field is considered to be defined by the months of January and February. The fall-harvest category therefore extends through December and the spring-harvest category begins in March.

Considering the means and standard deviations presented earlier, an estimate may be made of the seasonal period depicted by these statistics. The mean periods of harvest shown in Figure 49 are confined to a period from about December through February. The standard deviations extend this range into the late fall and early spring months. These data support the conclusion that clams were primarily harvested during the winter months. Procurement activities may have been initiated with some intensity during the late fall and probably continued into the early spring.

There appears to be some variation in the harvest period which corresponds with the contexts of the clam shell. Clam shell from shell middens are more homogeneous than clam shells from features. Clam from midden contexts exhibit means that appear to be associated with January. Means from the features are more variable, possibly indicating that deposition within the features was temporally more diverse than deposition in the shell middens.

Most of the clam shells are associated with Savannah and Savannah-Irene Phase contexts. The St. Simons Phase is probably represented by Feature 205 and the shells from Feature 109 are probably from the contents of a redeposited Deptford-Phase shell midden. Clam shells associated with the Irene and Sutherland Bluff Phases may be included within the samples from Shell Midden 108 and Shell Midden 122. Larger samples representing each cultural phase are required, however at this point the pattern of winter exploitation of clams appears to extend beyond the Savannah and Savannah-Irene Phases.

There may have been a shift from the winter-harvest season sometime during the Irene Phase. Analysis of clam shells from two Irene-Phase shell middens on Ossabaw Island indicates that deposition occurred primarily in the spring and continued during the summer and fall (Pearson 1976). However, there must be some doubt whether this shift is real or merely the result of the different analysis procedures that were employed by Pearson and myself. While the techniques used by Pearson are probably reliable, his procedures seem to have produced results that are only partially valid.

The validity problem is due to a bias created by second level sampling. Broken clam shells, damaged shells, and those representing individuals over five years old were considered unsuitable for analysis. The remaining 57 complete shells from the two shell middens were cross-sectioned with a diamond saw and the sections were examined for seasonal growth patterns. However most of the clam shells within the middens were represented by fragments, therefore Pearson's analysis is of a minority sample comprised of complete shells. As the shell

middens were apparently undisturbed, much of the clam-shell breakage was probably the result of extracting the meats. Thus, the unbroken shells may represent clams which were considered undesirable by the aboriginals. An alternative hypothesis is that usually only one valve of the clam was broken when extracting the meat. For whatever reason, there appears to have been an aboriginal selection process involved in the preparation and/or consumption of clams, and only the minority representatives of this process are considered in the clam-shell analysis. It seems reasonable to criticize the validity of the analysis results given a sub-sample which is questionable in terms of being representative of the sample.

While seasonality conclusions concerning the Irene-Phase shell middens need to be re-examined, the Ossabaw data do provide evidence of differences in the preparation of clam for consumption that appears to be associated with the Savannah and Irene Phases. The number of complete clam shells recovered from the two shell middens on Ossabaw Island is in sharp contrast to the rare number of complete clam shells recovered from the earlier contexts at Kenan Field. Both valves were broken to extract the meat at Kenan Field and either processing techniques were different or a greater number of clams were considered inedible after they were harvested.

It is difficult to draw firm conclusions at this point, but I suspect that a greater number of clams were harvested but not eaten during the Irene Phase. Pearson's conclusions would apply to this group of clams and his seasonality estimates may be quite accurate if restricted to this group. At least some of the diseases

and weight-loss which affect oysters during the warmer months probably also affect clams, as the quahogs are filter feeders and spawn during the warm weather. It is hypothesized that the complete clam shells within the Ossabaw shell middens are from these diseased clams and ones in very poor condition. In addition, it is proposed that the large group of broken shells in the Irene-Phase deposits contain many shells that represent winter harvests. The implication of these hypotheses is that subsistence patterns changed from winter harvests of clams during the Savannah Phase to the additional exploitation of clams in warm months during the Irene Phase. Additional evidence for such a change and a probable explanation are discussed in the concluding chapter of this study.

Intertidal Oysters

Oysters represented in contexts from Kenan Field appear to have been gathered from beds within the intertidal zone. These beds occur along the banks of tidal streams. Large, concentrated beds of oysters are located where soil substrata are broad and firm. Oysters also are dispersed in narrow strips all along the edges of tidal streams. The large, nucleated beds were certainly the more important locations for the aboriginals, as these offered a concentrated source of oysters. In addition, these nucleated beds were probably associated with a number of other estaurine species that were of dietary importance to the Indians.

Oyster shells from Kenan Field were analyzed to provide information concerning two problems. The first objective was to quantify the caloric contribution of oysters to the aboriginal diet. It has been suggested that although oyster shells form the

the bulk of midden deposits along the coast, the caloric value represented by oysters is quite low (see Larson 1970:318-320, see also Parmalee and Klippel 1974, Byrd 1976). The second objective was to compare oysters represented within aboriginal contexts with those which now live on the coast. It was felt that this comparison might offer information concerning differences between and similarities among prehistoric and modern inter-tidal oyster populations, and provide a base for adaptive inferences concerning both cultural and natural systems.

Oyster shells from the shell-midden test pits and several undisturbed features were analyzed in the field. Complete and fragmented oyster shells that were recovered with 1/4 in. mesh from Section A of the test pits and from measured-volume samples of the features were analyzed. Size measurements, to the nearest millimeter, were secured from the left valve of oyster shells which retained their umbos and at least a portion of their margins. Measurement of height was the maximum distance from the tip of the umbo to the ventral valve margin and measurement of length was the maximum distance between the anterior and posterior margin, measured parallel with the hinge axis (see Galtsoff 1964:18). Counts and weights were made of right and left valves, and shell pieces and fragments were weighed. Weights were obtained to the nearest 1/2 oz. on postal scales and were then converted to metric equivalents.

Additional calculations were required to summarize the field data into more manageable and comparable units. Means and standard deviations were calculated for the shell-size measurements recorded for each provenience unit. The total oyster-shell weight per measured

volume was determined and this figure was standardized to kilograms per cubic meter of matrix. The number of oysters represented within each cubic meter was determined by dividing the total weight of oyster shell per cubic meter by the average weight of left plus right valves recovered from the deposit. The number of oysters present within the entire shell midden or feature then was calculated by multiplying the number per cubic meter by the estimated volume of each deposit.

The meat-weights of oysters from Kenan Field, along with evidence concerning differences between perhistoric and modern intertidal oyster populations, were determined by comparisons with allometric relationships established for modern intertidal oysters from North Inlet Estuary, Georgetown, South Carolina (see Dame 1972). Caloric values for the Kenan Field oysters were determined based upon 66 calories (food-energy or kilocalories) per 100 gm. of meat for raw oysters as shown in standard food-value tables (Watt and Merril 1963:42).

Average meat-weights and calories per oyster per provenience are shown in Table 16. The meat-weights are based upon the relationship between oyster-shell lengths and soft-body weight that was quantified for the South Carolina intertidal oysters. The caloric value for the average oysters at Kenan Field is very low, rarely exceeding 4 calories per oyster. The number of oyster-calories and number of 2000-calorie days represented by oysters within each shell midden or feature are shown in Table 17. It is evident that many oysters would be required if the aboriginal diet relied upon this mollusc

TABLE 16
LENGTHS AND HEIGHTS OF OYSTER SHELL
WITH ESTIMATED CALORIC VALUES OF AVERAGE OYSTERS

PROVENIENCE	N	Oyster Height ($\bar{y}_1$s)	Expected Oyster Length	Oyster Length ($\bar{y}_1$s)	Increase	Grams Meat Per Oyster	Calories Per Oyster
Shell Midden #112							
~15-20 cm. b/s	57	6.4±1.46	2.92	4.3±0.30	32%	5.41	3.57
Shell Midden #115							
~15-28 cm. b/s	40	7.3±0.99	3.20	4.5±0.56	29%	6.26	4.13
Shell Midden #127							
~15-28 cm. b/s	76	6.2±1.20	2.86	4.2±0.93	32%	5.01	3.31
Shell Midden #103							
~15-22 cm. b/s	92	6.3±1.42	3.49	4.8±0.86	27%	7.72	5.10
Shell Midden #113							
~15-25 cm. b/s	43	5.9±0.99	2.76	4.1±0.73	33%	4.63	3.06
Shell Midden #108							
~15-30 cm. b/s	74	6.1±1.13	2.83	4.2±0.84	33%	5.01	3.31
Shell Midden #245							
~15-40 cm. b/s	137	7.7±2.13	3.32	4.2±0.95	21%	5.01	3.31
Shell Midden #122							
~15-32 cm. b/s	108	6.7±1.33	3.01	4.2±0.67	28%	5.01	3.31
Feature #109							
~30-45 cm. b/s	141	8.5±2.26	3.55	4.6±0.79	23%	6.72	4.44
Feature #204							
~25-45 cm. b/s	190	7.0±2.02	3.38	4.2±0.92	20%	5.01	3.31
Feature #205							
~25-50 cm. b/s	214	8.9±2.16	3.67	4.8±1.00	15%	5.41	3.57
Feature #206							
~20-70 cm. b/s	613	8.1±2.66	3.44	3.8±0.93	09%	3.62	2.39
Feature FOA 2							
~30-50 cm. b/s	95	8.0±2.22	3.41	4.8±1.32	21%	5.41	3.57
Feature FOA 3							
~30-55 cm. b/s	291	8.9±2.51	3.67	4.4±0.92	17%	5.32	3.34
~50-65 cm. b/s	19	8.2±2.75	3.46	4.0±0.79	14%	4.23	2.82

Note: Measurements are in centimeters

TABLE 17
FREQUENCIES AND CALORIC VALUES OF OYSTERS
WITHIN ARCHAEOLOGICAL DEPOSITS AT KENAN FIELD

PROVENIENCE	Oyster Shell Weight (Kg.)	No. Oysters Per Cubic Meter	Number of Oysters Per Cubic Meter	Oyster Calories Per Cubic Meter	Number of Oysters Per Deposit	Oyster Calories Per Deposit	Number of 2000-Calorie Days Per Deposit
Shell Midden #112	43.8	87.6	2,263	8,079	3,199	11,421	6
Shell Midden #115	57.4	77.7	2,007	8,290	7,062	29,165	15
Shell Midden #127	44.2	63.1	1,630	5,396	8,961	29,662	15
Shell Midden #103	78.2	142.2	3,674	18,735	31,106	158,642	79
Shell Midden #113	40.4	64.1	1,656	5,067	26,338	80,593	40
Shell Midden #108	50.6	67.5	1,744	5,772	69,446	229,865	115
Shell Midden #245	170.5	170.5	4,405	14,581	311,371	1,030,638	515
Shell Midden #122	104.3	130.4	3,369	11,150	409,813	1,356,483	678
Feature #109	37.8	343.6	8,876	39,411	3,373	14,976	7
Feature #204	52.9	252.1	6,513	21,557	1,303	4,312	2
Feature #205	22.8	379.3	9,799	34,981	1,704	6,297	3
Feature #206	42.8	238.0	6,148	14,695	1,660	3,967	2
Feature FOA 2	255.1	500.2	12,922	46,131	6,719	23,988	12
Feature FOA 3 (upper)	22.4	149.3	3,857	14,811	849	3,258	2
Feature FOA 3 (lower)	3.4	84.3	2,178	6,141	131	369	-

alone. To provide an energy intake of 2000 calories per day, around 500 oysters would have to be eaten. Viewed from another angle, over 300 oysters would be required to equal the food-energy provided by a kilogram of lean venison.

Substantial size differences exist between the oyster shells from Kenan Field and those documented from the South Carolina coast. This difference is shown in the relationship between shell length and shell height. Relying upon the allometric relationship between length and height established for the modern population, the length of the prehistoric oyster shells was predicted from their height. This expected length assumes that the same population size-parameters apply to both populations. The expected shell length is consistently less than the actual shell length of the prehistoric oysters (see Table 16). The Kenan Field oysters are an average of 23.6% longer than that which would be expected if the modern and prehistoric population parameters were the same. In other words, the prehistoric oysters are consistently longer than modern oysters with the same shell heights.

Two important conclusions may be drawn from the oyster data. The first concerns oysters as a low energy subsistence resource. The second involved the impact of human exploitation upon the oyster population and the feed-back process that this exploitation set into motion.

While is is clear that the caloric value of oysters is low, it is equally clear that a great many oysters were harvested and eaten by the aboriginals. The reasons for this exploitation may

be hypothesized based upon the seasonal position of oysters within the subsistence system along with a consideration of the ecology of oysters. It seems reasonable to assume that oysters and clams were harvested at the same time, as both species occur within the same habitat. Granting this assumption, the oysters were primarily harvested during the winter months. However based upon the faunal inventories from shell middens and features at Kenan Field, it appears that no other distinctive winter species were exploited. An occasional fish may have accompanied the diet of molluscs, but it is likely that only mammals provided a significant additional meat source during the winter months. Of plant foods, it is probable that stored acorns and hickory nuts were also important during the winter. The charred hickory nut shells within the features at Kenan Field may be evidence of this reliance upon stored food.

It therefore seems that few species were exploited during the winter and that oysters assumed an important dietary position at this time. Although some species of fish were abundant in the tidal streams, these may have been unexploited or only occasionally procured because of a combination of factors involving the fishing technology used during the cold weather. White-tailed deer were dispersed during the winter and were probably hunted by individuals using stalking techniques. While venison was certainly important, its availability was probably sporadic and unpredictable.

The exploitation of oysters may be understood by considering that the other winter subsistence resources were available sporadically

either because of purely technological reasons in the case of fish or because of a combination of technology and animal behavior in the case of white-tailed deer. Although oysters provided a low food energy resource, they were a very predictable resource in time and space. It is predictable that healthy, fat oysters occur during the winter and the location of oyster beds is constant from year to year. It is very likely that oysters were exploited in spite of their low caloric value and because they were a predictable, abundant, and easily procured resource that was available when other resources were unpredictable and scarce (see Meehan 1977 for similar arguments).

The size differences between the Kenan Field oysters and modern oysters become significant when considered in terms of the dietary importance of oysters and their seasonal exploitation. Both cultural system and oyster population benefited from the oyster harvests. The cultural benefit was a constant low-level energy source during the winter. The oyster population profited with increased vigor that followed yearly exploitation.

Unexploited intertidal oyster beds are overcrowded, placing a heavy demand upon available nutrients. By far most intertidal beds today are unexploited and are overcrowded. As competition for available space increases, oyster shell length decreases and shell height increases. The oysters are literally packed into the beds and their shell dimensions extend up rather than from side to side as they grow. The oyster population sampled by Dame is certainly an example of an overcrowded bed and the relationship between shell height and shell length that he established reflects this condition.

The increased relative length of the shells from Kenan Field indicates that competition for space was less in the prehistoric oyster population. Oysters within this population grew more from side to side than those in modern, unexploited populations.

The increased lateral growth of the prehistoric oyster was certainly the result of human exploitation. Periodic and selective exploitation of oysters decreases the population density and provides more lateral space for growth. Growth space and nutrient levels are increased if the larger, mature oysters are harvested from the beds during the winter. The young oysters and spat from summer spawning then need not compete with large oysters for space and food, and their growth rate must be accelerated. That aboriginal oyster harvests were selective of large oysters there can be no doubt. Figure 50 provides a graphic demonstration of this by comparing the height-distribution of oysters from an intertidal bed near Sapelo Island with those from Shell Midden #245 at Kenan Field.

The prehistoric exploitation of oysters provides an example of a positive feed-back system in operation. The mechanics of this system are inferred from contexts at Kenan Field but they are probably also applicable to other prehistoric and protohistoric cultural phases, and other areas of the coast. Oyster populations became more vital and contained healthier and faster-growing oysters due to the seasonal gathering of larger oysters from the beds. This in turn assured the cultural system a healthy supply of large oyster during future winter months, barring some natural

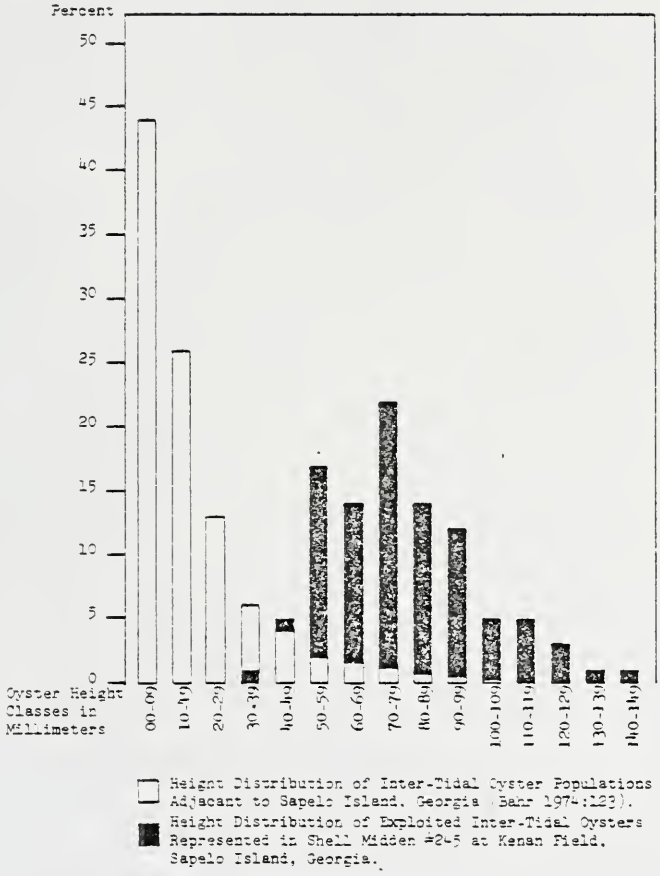


FIGURE 50
COMPARISON OF OYSTER SHELL HEIGHTS
AS REPRESENTED IN A MODERN INTERTIDAL POPULATION
WITH THOSE EXPLOITED DURING THE MISSISSIPPIAN PERIOD

catastrophe. Once initiated, the positive feed-back mechanism probably reached an equilibrium rather quickly. As long as the oyster populations were selectively exploited during the winter months, positive benefits would have been recognized by both the natural and cultural systems. If oyster gathering was discontinued during the winter, the oyster beds would have become overcrowded. If gathering was initiated at any large scale during the spawning season, there would have been a reduction in spat and therefore a reduction in the number of mature oysters during a later winter season.

CHAPTER V
CONCLUSIONS

The hypotheses formulatied prior to the test excavations at Kenan Field were focused upon the resolution of adaptative questions that were synchronic in nature rather than diachronic. More information concerning cultural change was gathered by the investigations and less information was obtained concerning community spatial organization at a single point in time than was anticipated by the hypotheses. The result of this is that although the original hypotheses can only be partially resolved, it is possible to discern temporal changes in Mississippian Period cultural adaptations.

Tests of the Hypotheses

Most of the archaeological evidence from Kenan Field concerns the Savannah Phase and the transitional Savannah-Irene Phase. Implications for each phase are considered independently in the following discussion.

Hypothesis 'A'

Hypothesis 'A' states that the Mississippian Period community at the Kenan Field site was characterized by a formal village plan which reflects the adaptations of a ranked society to environmental factors and relations with other cultural systems.

The first testable implication states that the spatial arrangement of structural remains is patterned. Evidence of this for the Savannah Phase is the patterned arrangement of Structure #1 and Structure #2. The enclosure wall referred to as Structure #3

also indicates a formal arrangement of space within the village. Reorganization of space during the Savannah Phase, perhaps due to expansion, is indicated by the position of Structure #5 over Structure #3.

The patterned arrangement of structural remains for the Savannah Irene Phase is shown by the relationship between the palisade and Structure #7. A transitional association of the palisade lacks firm evidence at this point. However, the major defensive structure surely protected the village elements of its associated phase and as many more transitional contexts were identified at Kenan Field than Irene-Phase contexts, it seems reasonable to assign the palisade to this transitional phase. Granting this logic, the palisade itself provides evidence of patterned spatial arrangements during the Savannah-Irene Phase.

The second testable implication states that socially and/or functionally distinct structures are associated with particular areas of the village, and may show repeated construction in the same area. Evidence of this for the Savannah Phase is the community building complex defined by Structure #1, Structure #2, and the plaza area. Mound 'A' is probably another segment of this community oriented complex, and all of these elements are located within a circumscribed area of Kenan Field. Savannah-Phase structures that contrast with the community-oriented complex are Structure #3, which functioned as an enclosure, and Structure #5, which was probably a functionally and socially distinct community structure. Evidence of repeated construction within the same location is lacking for the

structures as a whole, however indications of numerous support posts at the corner of the partition within Strucutre #2 and suggestions of floor-plan alterations within that structure indicate that the building was the location of rebuilding activities. Additional information is required for a more complete assessment of the arrangement of functionally and socially distinct structures within the Savannah-Phase village, for example information is lacking at this point for domestic structures.

The discrete distribution of functionally and/or socially distinct structures of the Savannah-Irene Phase is indicated only by the palisade and Structure #7. Both are functionally distinct and as the palisade was built with spatial consideration to a village (and vice versa), its location was relative and discrete. Evidence of rebuilding at Structure #7 indicates that its location was formalized. Here again more cultural and spatial data are required concerning other Irene-Savannah Phase structures.

The third testable implication states that socially and/or functionally distinct structures are discernible in structural details, associated subsistence refuse, and associated material culture. Data from both the Savannah and Savannah-Irene Phases satisfy this implication. Structures were distinctive in construction details, in the distribution of subsistence refuse and elements of material culture, and in the kinds of subsistence refuse and material culture. The functional and social distinctions implied by these data are discussed throughout Chapter IV and supply a basis for the consideration of other testable implications that are presented here.

The fourth testable implication states that adaptations to the natural environment reflected by the village plan are discernible in the form and distribution of structural remains and in communal food-storage facilities. Present data fail to satisfy this implication, as the overall village plan and its elements are undemonstrated for either the Savannah Phase or the Savannah-Irene Phase. On an individual-structure level, an adaptation to the natural environment is indicated by the sub-structural mound at Structure #1 that provided drainage for areas beneath the platform.

The fifth testable implication states that adaptations to the social environment reflected by the village plan are discernible in defensive fortifications and exotic materials. Although the entire village plan is recognized at this point for neither the Savannah Phase nor the Savannah-Irene Phase, investigations did reveal the data required to partially satisfy this implication. Evidence of adaptations for the Savannah Phase consists of the association of exotic material with the community structures. St. Johns pottery within Structure #1 indicates that this status-residence/community structure functioned in contexts that involved the acquisition of pottery vessels from groups in northeast Florida. This indicates that the role of activities within the structure was adjusted to dealing with foreign cultural systems. To determine whether this was through trade or face-to-face interaction requires additional evidence. Stone is another exotic material that was associated with Savannah-Phase contexts. The source of the stone was probably the lower Piedmont Province. Its presence indicates a social adaptation in terms of its acquisition, as its source lay in interior regions that were associated with other cultural systems.

Evidence of adaptations to the social environment for the Savannah-Irene Phase is found in the existence of a defensive fortification. The palisade was a cultural adaptation to a hostile social environment. Small amounts of stone within Savannah-Irene Phase contexts indicate that some relationship still existed with the Piedmont.

It formally may be concluded that available evidence strengthens the validity of Hypothesis 'A'. Full support of the hypothesis cannot be granted, as the testable implications are only partially satisfied. Given the major structural elements of the aboriginal communities which were investigated, it seems safe at this point to conclude that both the Savannah and Savannah-Irene Phase communities at Kenan Field were characterized by a formal village plan. Evidence from Structure #1 and Structure #2, as discussed in Chapter IV, strongly indicates that the Savannah-Phase society was segmented and ranked. Construction of the palisade during the transition period indicates organized labor that was probably also the product of a ranked society.

Hypothesis 'B'

Hypothesis 'B' states that social organization of the Mississippian Period community at Kenan Field was an adaptation for procurement of strategic resources.

The first testable implication states that social organization is discernible in the village plan, structural form and function, the distribution of contemporary and discrete material culture assemblages, and in redistributive activities. Implications of a

complex social organization for the Savannah Phase are from data concerning structural form and function and the distribution of contemporary and discrete material culture assemblages. The form of Structure #1 and Structure #2 indicates they were constructed by an organized community-labor force that certainly required the management of an office or role with central authority. The energy expended in construction must have been great, considering the tasks involved in acquiring timbers from the forest, transporting them to the site, further preparation of the timbers for construction elements, digging post holes or wall trenches for the platform supports, constructing the floor for the platform, and surely many other activities as well. The constant spacing of structural elements indicates that construction was carefully planned and executed with supervision. The energy expended in construction would have been replenished by foods procured by others, probably through the office responsible for supervison and direction, as the laborers were diverted from their own subsistence activities. Thus, the structures also provide indirect evidence of some form of redistributive network.

Implications of function are expressed in the form and associations of these Savannah-Phase structures. On a general functional level they were surely the location of activities which involved community concerns, as their size alone would seem to preclude any other primary usage. Although basically similar forms are evidenced for both structures, it appears that each was a functionally distinct community structure. Particular deposition patterns

were associated with each structure and Structure #2 appears to have had its own internal spatial divisions as well. The occurrence of distinctive pottery assemblages within each structure indicates the use of particular kinds of pottery within functionally different contexts. It seems very likely that the function of pottery vessels was directly related to the variant activities associated with each structure and that these activities had a social referent. That is, the pottery was probably not only functionally distinctive but also associated with particular social contexts. The depositional patterns within each structure, along with the hearths and other features, are interpreted as evidence for the use of the northern section of Structure #2 as a council house and for the use of Structure #1 as a high-status residence. These interpretations are not meant to be exclusive of other community-oriented activities. For example, the use of Structure #1 as a residence probably was associated with a set of social obligations that were required of the status position; such as entertaining foreign dignitaries (as evidenced by the St. Johns pottery?), giving feasts, settling disputes, providing food and lodging for visiting kinsmen and travelers, etc. At this point only portions of the social superstructure of the Savannah-Phase community are implied by evidence at Kenan Field; however, inferences proposed here strongly indicate that the Savannah-Phase society was segmented and ranked.

Implications of social organization for the Savannah-Irene Phase are from data concerning structural form and function. Construction of the palisade provides evidence of an organized and directed community-labor force. Arguments that this indicates

complex social organization with hierarchical social segments follow the essential logic that was proposed when discussing construction of the Savannah Phase community structures. Although a complex social organization is indicated for both the Savannah Phase and the Savannah-Irene Phase, the implications of the structural data of each phase are distinctive. The Savannah-Phase community-structures indicate a cultural system with energy focused upon internal organization and its maintenance, along with social or material exchanges with foreign cultural systems. The Savannah-Irene Phase palisade, on the other hand, indicates a cultural system that has focused its internal organization and energy upon external factors that require a defensive posture.

The second testable implication states that productive arrangements are discernible in subsistence technology, the form of social units engaged in subsistence activities, settlement location in relation to strategic resources, and the seasonal and spatial occurrence of strategic subsistence resources.

Subsistence technology indicated for the Savannah Phase involved the procurement of seasonally distinctive sets of resources. Occupation at Kenan Field appears to have been primarily during the summer and during this time estuarine fish were an important and probably a crucial subsistence resource. Most of the fish represented in Savannah Phase contexts appear to have been small individuals and were usually bottom feeders. This may suggest the use of fish baskets or nets in shallow waters. However, based upon the vertebra size of some of the drum (especially black drum), these

individuals were far too large to be caught in baskets and too powerful to be retained by fiber nets. It is unlikely that a single technology was used to capture every species represented. Hook-and-line or liesters may have been used to procure the large fish along with some of the smaller individuals. However quantities of smaller fish were evidently of greater dietary importance, and the empoundment technique necessary for their capture was certainly a primary element of summer subsistence technology.

Although the kind of empoundment that was used remains unclear, it is possible to conclude that it was an activity that involved a number of people. Nets required two or more people for their use in fishing, probably in addition to others who were involved in manufacturing and repairing nets, and probably still others to acquire and process fibers used in making the nets. The use of fish baskets would have been somewhat less complex, but the same general set of activities would have been required. As kinship permeates and binds primitive society, it may be inferred that the people immediately involved in the set of fishing-related activities were kinsmen. The social unit defining this kin-group was certainly larger than a nuclear family, however its precise form is obscure. It is assumed that the kinsmen formed some kind of extended family.

Savannah Phase subsistence technology during the fall involved gathering hickory nuts and probably acorns and white-tailed deer; however, Kenan Field appears to have been largely unoccupied except during the summer. Subsistence activites turned to molluscs, particularly oysters, during the winter. The large shell midden between

Structures #1 and #2 was the only large deposit of winter refuse of the Savannah Phase encountered at Kenan Field and this midden is interpreted as debris from a festive event and probably indicates a temporary population influx to the village at a time during the winter.

The location of Kenan Field indicates that access to strategic resources of the summer, i.e. fish, was maximized. The village site is located at the linear mid-point of the Duplin River, which extends along the western side of Sapelo Island and drains its marsh through a seemingly endless number of small tidal creeks. The river and creeks were surely an important local source of fish during the summer. Winter oysters also would have been close at hand with the intertidal zone of these streams. Fall and winter resources would have been readily available from the highland oak forest that bounds the periphery of Sapelo Island (see McMichael 1977) and would have provided an important subsistence zone. However, it appears that subsistence resources available during the fall and winter had the potential of being quickly exhausted within the restricted island environment, given a relatively large consuming population. On the other hand, summer fish resources are to some extent self-replenishing with a restricted environment, as many species enter and exit streams with the tides. This stable estuarine resource provided a firm dietary base during the summer and was most probably directly related to and permitted a permanent and relatively large summer population at Kenan Field.

Indications of the relationship between social organization and subsistence during the transitional Savannah-Irene Phase are obscure.

The same basic resources exploited during the Savannah Phase continued to be important, and seasonal divisions in subsistence seem to apply to both phases. Winter resources were exploited extensively and perhaps intensively during the transitional period. Changes in subsistence technology are not readily apparent, and neither are evident changes in any other implicative characters of productive arrangements. Changes were primarily in the settlement system, as Kenan Field was now permanently occupied. The argument just discussed concerning exhaustible resources on the island during the fall and winter has implications, as this suggests that Savannah-Irene Phase populations were somewhat smaller and/or that they had adjusted technologically and socially to permanent settlement.

It formally may be concluded that the validity of Hypothesis 'B' is strengthened rather than fully supported. Much more evidence of productive arrangements is required concerning the social form of productive units and the variable elements of subsistence technology of both the Savannah Phase and the Savannah-Irene Phase. Social organization was evidently complex and stratified for both phases; however, more empirical data are required to assess the form of domestic units, the overall village plans, and the dynamics of the inferred redistributive networks.

Consideration of the Sixteenth-Century Model and Cultural Change

Details of the Savannah-Phase community at Kenan Field support the systems model presented in Chapter III, but evidence also indicates that portions of the model may require adjustment. The Savannah-Phase community appears to correspond closely with the social-settlement-subsistence system presented in the model for the summer months.

The basic system predicted by the model consisted of a ranked society which was nucleated in strategically-located towns during the summer and procured estuarine fish. The archaeological evidence firmly supports the existence of these basic elements of the summer system. However, the predicted reliance upon agricultural products during the summer is unsubstantiated by the archaeology. The absence of charred corn-cobs in archaeological contexts may suggest that the importance of agriculture was overestimated in the model. However, its absence cannot be taken as evidence for the nonexistence of agriculture. It may be that corn and other cultigens were associated with contexts other than those investigated, for example within the hearths of domestic structures or around granaries. Also if corn-cobs were discarded without burning, little evidence would remain in the archaeological record. Pollen analysis of soil samples taken at Kenan Field may provide new evidence for agriculture, but it is likely that modern contamination will eliminate firm conclusions.

The model also predicts that settlement was dispersed during the fall, winter, and spring. As the intensive Savannah Phase occupation was restricted to the summer, this suggests that the dispersement portion of the model is generally correct. There was some occupation at Kenan Field during the other seasons and this is also expected by the model. The singular large winter refuse deposit between Structures #1 and #2 provides some evidence of temporary non-summer population-increases for festive occasions. The few other winter refuse deposits associated with the Savannah Phase suggest that the winter-subsistence system posed in the model may exaggerate the importance of fish.

Savannah-Phase data from Kenan Field are well explained by the annual systems model. While adjustments are possibly in order for details of the fall, winter, and spring segments of the model, certain diagnostic elements of the system are substantiated. These basic elements are a ranked society, aggregated populations during the summer in strategically located town sites, and temporary population influxes to these town sites during other seasons for festive occasions. Considering these elements and their position in the systems model, it may be concluded that the cultural form presented in the model is at least generally correct. The Savannah Phase was evidently defined by a chiefdom-level cultural system which was distinctively adapted to the Georgia coastal environment. While a redistributive system appears to have been an important part of the cultural system, the importance of information processing is indicated by winter festive events at the community-structural complex at Kenan Field.

Evidence of the Savannah-Irene Phase is poorly anticipated by, and even conflicts with, the sixteenth-century systems model. Year round occupation and a fortified village are the more obvious contrasts with the Savannah Phase. However, continuities with the Savannah Phase are indicated by the exploitation of the same subsistence resources and both phases were evidently associated with ranked societies. Savannah-Phase pottery types continue to be manufactured in addition to, or perhaps immediately prior to, Irene-Phase pottery types. It is very probably that both archaeological phases were associated with the same population, although distinguished by time and circumstances.

Time and circumstances are the elements which require definition, and unfortunately only hypotheses can be presented at this time. It appears that the archaeologically-known Savannah Phase was defined by the proto-historic aboriginal culture on the Georgia coast, and that this culture and its archaeological counterpart may have extended well into the early historic period. The basis for this statement is that evidence of the Savannah Phase is well-predicted by the model derived from sixteenth-century accounts of the Guale, while the later Savannah-Irene Phase evidence shows marked contrasts with the model.

Although it seems that the basic prehistoric cultural form persisted into the late sixteenth century, there were surely changes in the Savannah-Phase system prior to the transitional period that is recognized in the archaeological record. One suggestion of earlier changes is expressed in construction differences between the large community structures at Kenan Field and the council houses described in the ethnohistoric accounts. The prehistoric community-structures are much larger and are probably more internally complex than the sixteenth-century council houses. The reasons for this are probably quite complicated, however one cause may have been related to the effects of population decline associated with endemic diseases which probably resulted from European contact. Smaller aboriginal populations would have provided a smaller energy base for construction of community buildings and also would have led to decreased energy capture for the cultural system. An architectural indication of this may be the smaller community structures.

The transitional phase represented in the archaeological record was probably the culmination of a period of gradual change associated with

various aspects of European contact. The archaeologically-visible transition surely represents a considerable change in the aboriginal system and a cultural adjustment to a new social environment. This new environment was quite possibly defined by increased Spanish missionary and military activities associated with the 1597 Guale Revolt. It is unlikely that an absolute period of time can be established for the full transition from the aboriginal system to the mission system, as the nature and time of cultural change seems to have varied somewhat from group to group. For example, not all Guale groups participated in the revolt as some had already adjusted to the Spanish and mission-village life. Even for a time following the 1597 revolt, it is unlikely that all Guale resided in mission villages. It may be expected that more purely aboriginal culture elements persisted for a longer period of time in these non-mission villages.

The time of the Guale Revolt does provide evidence that the proposed annual system remained at least partially intact until 1597, as the revolt appears to have been directly associated with the seasonal scheduling routine of the annual system. The Guale Revolt occurred on September 13, 1597 (Lanning 1935:84, see also Oré 1936:73), during the interface between the summer and fall phases of the system. This was the best time and probably the only time of the year that an organized revolt could have been executed. Considering the pre-missionized Guale settlement and subsistence system, the revolt apparently was scheduled to maximize the strategic offensive and defensive advantages of the system. Sufficient organizational and man-power

levels were available in the summer towns and the revolt would have been followed by a normal dispersion of the population into the oak forest, making Spanish retaliation difficult. In effect, the September revolt capitalized upon the offensive advantages of a large summer population and the defensive advantages of population dispersement in the fall. In addition, the Guale Revolt occurred without conflict with the distinctive subsistence activities associated with the two seasonal phases.

In review, it is proposed that the shift from a complex seasonal settlement system to a permanent settlement system was a historical phenomenon that was an aboriginal adjustment to Spanish pressures. A permanent settlement system persisted after the transition in the form of stable mission villages. Coastal Indians who lived beyond daily contact with the priests also may have permanently resided in villages; however, the dynamics of this are unclear. The Irene-Phase sites on Ossabaw Island may represent such groups. Changes in the subsistence system certainly followed year-round settlement, whether in mission villages or elsewhere. Obvious changes were probably increased dependence upon agriculture with the aide of metal hoes and instructions of the priests. More subtle changes would have occurred as the form of environmental interaction changed.

One example of new culture-environment exchanges may have been an alteration in the procurement of molluscs. Given the nature and distribution of subsistence resources on the coast, year-round occupation would have been a hazardous pursuit even with improvements provided by European technology to make agriculture more productive.

Resources are simply too dispersed and seasonally distinctive to offer any one village location a large, dependable food supply throughout the year, from year to year. It is very likely that food shortages were common in permanently occupied villages and that oysters were exploited during times other than the winter in order to relieve this stress. The effect would have been devastating to the positive feedback mechanism that formerly guarded oyster procurement, and would have resulted in a greatly lowered supply of oysters.

Discussion of the Spanish impact and aboriginal adjustments is limited here. The brief discussion presented above was necessary in order to show contrasts with the Savannah Phase and to suggest that the Savannah-Irene Phase is not only stylistically transitional but also contains subsistence elements of the Savannah Phase with settlement elements of the mature mission period.

An intricate set of problems await future research. From all indications the Savannah Phase was associated with a complex cultural system that was distinctively adapted to the coastal environment. Much more evidence is needed to sort out many of the details involved in this adaptation. Basic archaeological deficiencies on the coast, including aspects of chronology, typology, settlement and subsistence, remain to be solved before many anthropological questions can be approached and resolved. However, our knowledge of Georgia coastal archaeology has progressed to a point where we can begin to ask serious anthropological questions and expect at least partial answers in return.

APPENDIX
POTTERY TYPES RECOGNIZED AT KENAN FIELD, INCLUDING POSSIBLE ALTAMAHA VARIANTS

Savannah Check Stamped - Possible Altamaha Variant (Figure A1).

Method of Manufacture: Coiling.

Temper: Usually grit, infrequently sand or grog.

Decoration: Pottery design consists of a grill of raised lines which define small squarish indentions. Stamping usually occurred prior to final finishing of the lip. Stamping was occasionally smoothed over, resulting in indistinct impressions on the pottery.

Form: The rim is usually slightly excurvate, and is rarely incurvate. The rim also is occasionally straight, however the high incidence of straight rims shown in Table 5 is probably due to a bias created by a large number of small rim-sherds in which only straight orientations were recognized. Lip shape is usually rounded and is occasionally squared or exterior-beveled. Only rarely is the lip constricted, expanded, or interior-beveled. The lip also is occasionally turned or flattened, and is rarely or never folded. The thickness of body sherds averages between 6 mm. and 8 mm.

Savannah Fine Cord Marked - Possible Altamaha Variant (Figure A2).

Method of Manufacture: Coiling.

Temper: Usually grog, occasionally grit, rarely sand. Grit and sand tempering is more common in the transitional Savannah-Irene Phase contexts.

Decoration: Vessel shows impressions of cordage. The design consists of either fine-linear impressions or regular-crossed impressions. Some of the regular-crossed impressions appear to be over-stamped linear imprints, while others appear to reflect the use of an open-weave textile. Random-crossed impressions are rare and frequently are associated with thick basal sherds. The decoration was applied prior to final lip treatment in some cases, and after final lip treatment in other cases.

Form: The rim is usually straight or slightly incurvate, and is occasionally excurvate. Excurvate rims are more frequent on regular-crossed cord-marked sherds. As with the check-stamped pottery, the number of sherds with straight rims shown in Tables 6 and 7 is probably exaggerated. The lip shape is usually rounded, squared, or exterior-beveled, and is rarely constricted, interior-beveled, or expanded. The lip also is occasionally flattened, is less frequently turned, and is rarely folded. Turned lips are slightly more common on regular-crossed cord-marked sherds. Many squared and beveled lips appear to be the result of stamping the lip with a cordage-wrapped paddle. The thickness of body sherds averages between 7 mm. and 9 mm.

Savannah Burnished Plain - Possible Altamaha Variant.

Method of Manufacture: Coiling.

Temper: Usually grog, rarely small amounts of grit or sand.

Decoration: Exteriors are burnished, interiors are occasionally burnished. Smoothed-over vertical tooling marks are frequently present along the exterior just below the lip.

Form: Rim is usually incurvate, and is occasionally excurvate or straight. Lip shape may be either rounded, squared, exterior-beveled, or interior-beveled. Occasionally the lip also is turned or flattened. The thickness of body sherds averages between 5 mm. and 7 mm.

Note: Many of the plain grog-tempered sherds may actually be indistinct Savannah Burnished-Plain sherds.

Irene Filfot Stamped (Figure A3-A).

Method of Manufacture: Coiling.

Temper: Usually grit, rarely sand.

Decoration: The only design element is the filfot cross. Over-stamping is frequent and it is usually difficult to distinguish individual filfots. Identification of complete design elements is usually impossible given small sherds.

Form: Rim is usually excurvate and is rarely or never incurvate. Straight rims occur, but probably without the frequency indicated Table 8. Lip shape is usually rounded or squared, and is infrequently exterior-beveled. The lip also is occasionally turned or flattened, and is rarely or never folded. Appliqued strips that are notched, pinched, and/or hollow-reed (?) punctated frequently occur just below the lip. The thickness of body sherds averages between 7 mm. and 8 mm.

Other Pottery Types.

Savannah Complicated Stamped (Figure A3-C).
Decoration consists of concentric circles. Tempering is grog.

Irene Burnished Plain.
Distinguished at Kenan Field based upon the presence of relatively large amounts of grit and sand tempering.

Irene Incised (Figure A4-C).
Delicate incised motifs occur just below the lip. Tempering is grit or sand.

San Marcos Rectilinear Complicated Stamped (Figure A3-D, E).
Decoration consists of opposing line blocks. Tempering is either grit or sand. Its reported occurrence at Kenan Field may be over estimated, as incomplete elements of the line block are easily confused with the linear portion of an incomplete Irene filfot.

San Marcos Simple Stamped.
Stamping may be either linear or corssed. Impressions appear to have been made with a narrow dowel-like implement. Tempering is usually grit and occasionally sand. The single rim encountered was excurvate with a rounded lip. An interior portion of one body sherd was either slipped or painted black.

Unidentified Block Incised (Figure A4-F).
Raised blocks are given relief by excised areas between the raised surfaces. Excising apparently occurred while pottery was in a leather-hard state. Tempering consisted of small amounts of grit. The one sherd encountered at Kenan Field was from Structure #2.

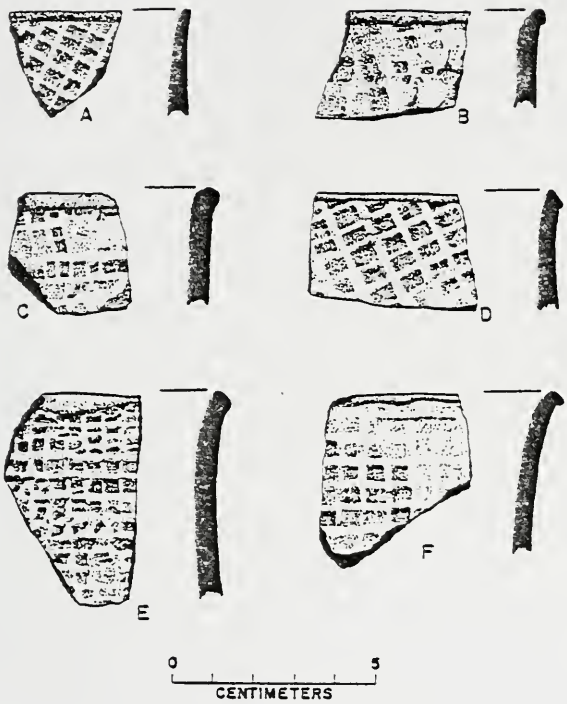


FIGURE A 1
SAVANNAH CHECK-STAMPED POTTERY

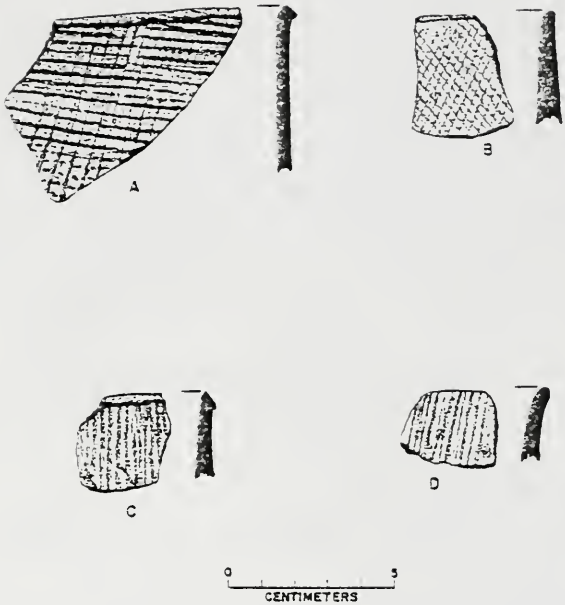


FIGURE A2
SAVANNAH FINE CORD-MARKED POTTERY

FIGURE A3
COMPLICATED-STAMPED POTTERY

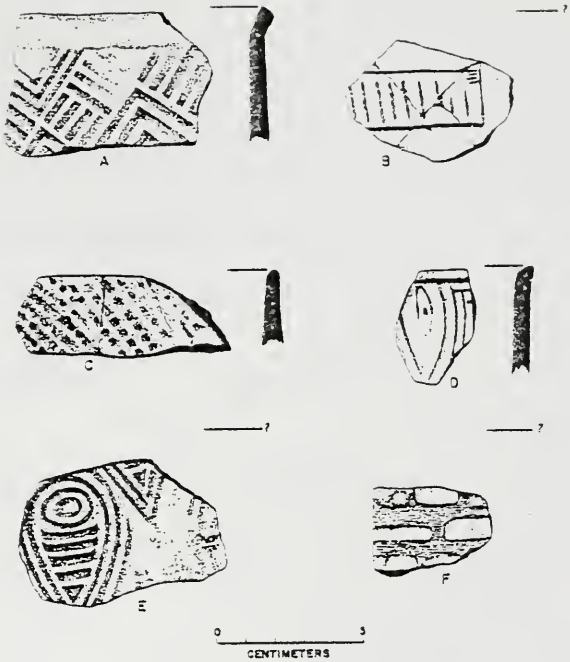


FIGURE A4
MISCELLANEOUS POTTERY

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I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

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December 1978

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