This document has been checked for information on Native American burials. No images considered to be culturally insensitive, including images and drawings of burials, Ancestors, funerary objects, and other NAGPRA material were found.

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MISSISSIPPI PERIOD ARCHAEOLOGY OF THE GEORGIA COASTAL ZONE

MORGAN R. CROOK, JR.

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MISSISSIPPI PERIOD ARCHAEOLOGY OF THE GEORGIA COASTAL ZONE

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INTRODUCTION

This document represents an effort to synthesize existing archaeological information concerning the Mississippi Period (A.D. 900-1540) in the Georgia coastal zone. Its purpose is to provide an operating plan for the protection of important cultural resources of this period on the coast. As with the other 35 operating plans being developed for Georgia's cultural resources, this one provides basic information for effective management and protection. This basic information includes synthesis and evaluation of the available archaeological information, identification of data needs, formulation of significance criteria, and development of an ideal plan for preservation and protection (see Crook 1985).

The specific tactic taken to meet the integration, evaluation, and management goals is development of a model-based assessment of the Georgia coastal Mississippi Period. Rather than presenting "the final word" about this temporal segment of coastal prehistory, it is hoped that the particular perspectives developed here will provide a starting point for gaining a greater knowledge about the nature of cultural adaptation on the coast and also provide a tool for making informed decisions about management of our steadily decreasing data base.

This examination of the Mississippi Period is ecologically and anthropologically based. First, the environmental setting of the period is described, based on current data, and critical environs and their associated subsistence resources are identified. Next, a structural model of native coastal culture is developed which integrates environmental information with 16th century ethnohistoric accounts. Third, existing archaeological information is reviewed. Finally, the archaeological information and structural model are compared and recommendations are made concerning research and management needs.

THE COASTAL ZONE ENVIRONMENT

Environmental aspects of the Georgia coast have captured the attention of researchers in several disciplines over the years and published works reporting these studies are scattered through the journals of each specialty. A useful summary of some of the ecological research has been published (Johnson et al. 1974) and a study of the coastal environment from an anthropological point of view has been presented by Larson (1980). These two works are used freely in the following summary description of the coastal zone environment.

The Georgia coast 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 also were cut and the land cultivated during the plantation era, and low wetlands were drained to provide even more agricultural land. Clearing and draining continued well into the twentieth century and today some low mainland areas are being drained to provide additional pulpwood acreage (see 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 Mississippi Period physical 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 basis for prehistoric exploitation inferences.

Climate along the coast is rather moderate with warm to hot summers and cool winters. Annual rainfall averages around 125 centimeters and temperature averages about 20 degrees centigrade. Temperatures exceeding 32 degrees centigrade begin to occur in May and continue into September while freezing temperatures usually begin in late November and end during March. Precipitation along the coast is from frontal activities during the late fall and winter, and thundershowers occur 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, with heavy rains in August and September due to tropical storms (U.S. Department of Commerce 1960, 1965, 1970, 1972).

The Georgia coast forms 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 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 deposit, the Holocene formation, occurs along the ocean side 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 kilometers of the Atlantic, just east of the Miocene Coastal Plain formation. Although deposits thicken towards the present coast line, 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 River in the Piedmont through the Ocmulgee and Oconee Rivers, and the other rivers are Coastal Plain in origin. These river systems provided the most practical link between the coast and inland areas during the aboriginal period. It has been argued (Larson 1980:35-65) that the pine barrens section of the Coastal Plain had a low exploitation potential given late prehistoric subsistence technology. The pine barrens also would have been an effective cultural barrier, although permeable through the Altamaha and Savannah Rivers.

The Georgia coast is associated with plant and animal communities that are distinctive from the adjoining pine barrens. Topography of the coast also is distinctive. The western edge of the Coastal Zone is delineated by the relic marsh system that once accompanied the Wicomico barrier island formations. Eastward of this Pleistocene feature are remnants 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 marshes which, along with Holocene formations, separates the mainland from the open ocean (see Hoyt and Hails 1967; Hoyt 1968).

The Coastal Zone may be divided into four environmental areas based on biotic and abiotic differences. Three of these areas Larson (1980) defined as the strand section, the lagoon and marsh section,

and the delta section. The fourth section is defined here as the interior coastal zone. This environmental section extends inland from the western edge of the Princess Ann formation, a highland area that extends along the marsh edge on the mainland, to the western edge of relic marsh system associated with the Wicomico formation. This section includes inland swamps containing dispersed highland areas. Thus, the Coastal Zone is considered to extend from the present barrier islands inland approximately 80 kilometers to the western edge of the Wicomico relic marsh system (Figure 1). This definition agrees with the observations of William Bartram in 1773 regarding the location of the bordering pine barrens (see 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 archaeological sites have been reported on the southern Atlantic coastal strand. One is located in Brunswick County, North Carolina (South 1976:10) and the other is located on Cumberland Island (Ehrenhard 1976:60). The strand section appears to have been of limited, if seasonal, economic importance during aboriginal times.

The lagoon and marsh section is separated from the ocean by the strand, and is composed of high ground, marshes, tidal streams, and lagoons. This section of the coast is physiographically diverse and contains the greatest number of plant and animal species. 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 question 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.

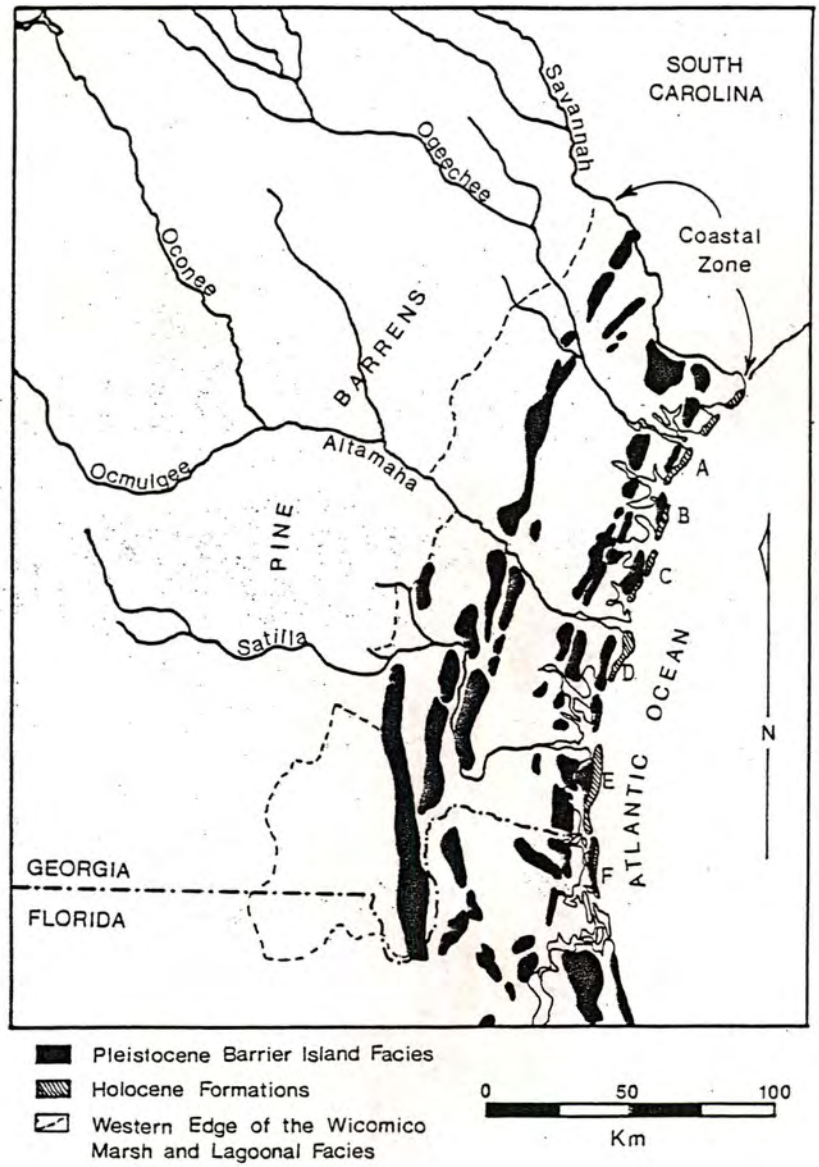

FIGURE 1

Major Geological Formations of the Coastal Zone
A-Ossabaw Island; B-St. Catherines Island; C-Sapelo Island
D-St. Simons Island; E-Cumberland Island; F-Amelia Island

(Adapted from Bennison 1975)

Although salt-marsh plants apparently 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 marsh 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 five percent of marsh production is consumed in the grazer food chain, while 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.

Portions of the salt marsh adjacent to high ground provide 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, and both otters and 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, opposum, raccoon, cottontail rabbit, and bobcat. The white-tailed deer population now 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 27 kilograms (see Johnson et al. 1974:59), about 18 kilograms 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.

The interior coastal zone is composed of the geological remnants of former lagoon and marsh environments, defined today by swamp and hammocks which are beyond tidal influence. The water supply for this swamp is predominately rainwater. Freshwater swamp occurs in relic marshes along the mainland in areas away from the river deltas. A similar phenomena exists within the low interiors or sloughs of the barrier islands. Little is known of the ecology of these swamps, but the vegetation appears to be similar to that of the upper reaches of the freshwater rivers, 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 would have affected aboriginal occupation was that they effectively dispersed the 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 seem to have been of limited exploitive value, the forest resources which were of aboriginal importance occurred in dispersed sections. Larson (1980:206-209) 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, such as 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.

The final environmental area in the coastal zone is the delta section. This section is defined by courses of freshwater rivers which become increasingly deltaic and brackish as they approach saltwater. The delta section is low and frequently inundated, especially 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 increasing vegetation in the higher areas (Wharton 1977:60-62). As with the freshwater swamps, little is known about the ecology of delta swamps. White-tailed deer, otter, and raccoons are found in portions of the delta; however, it appears that each of these species is far more abundant and accessible in highland areas of the lagoon and marsh section.

Anadromous and freshwater 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 appears to have been little in the delta section to sustain a more permanent population.

THE STRUCTURAL MODEL

Early ethnohistoric accounts of aboriginal life on the Georgia coast contain important clues concerning socio-political organization and economy. When considered within an environmental context, these clues may be used to construct a structural model of the native coastal culture. This model may be viewed in either of two ways: as a systemic hypothesis subject to archaeological testing, or as a model of an "ideal type" native coastal culture in a Max Weber sense.

As a systemic hypothesis, or set of interconnected hypotheses, the model represents the first step in reconstruction of coastal culture as it existed at the time of European contact. The next step would involve segregating and operationalizing each hypothesis for archaeological testing, then refining the model based upon the supporting or contradicting test results.

Viewed as an "ideal type" model, it is recognized that archaeological reconstruction will never fully exhaust or completely reflect the concrete reality of the aboriginal Georgia coast. Rather, the model has value because it provides a clear basis for comparison; it provides a structural framework for evaluating archaeological information. This information may be assessed based upon its convergence or divergence from the ideal type. Use of the model in such a way permits not only the evaluation of diverse archaeological data from a particular segment of time, but also allows changes through time to be assessed in reference to a constant gauge.

Ethnohistoric Summary

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. Another group known to the French as Ouade, the Spanish as Guale, and the English as Wallie extended north from the Timucuan territory to around St. Catherines Island. Guale actually appears to have been 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.

Although it was occupied, there is little ethnographic information about the area between St. Catherines Island and the Savannah River. This portion of the coast seems to have been included in the northern limits of Guale and the southern limits of the province of Orista, Escamacu, or Cusabo. While the exact northern and southern extent of the 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 their territory (see Swanton 1922:16-17, 1946:128).

Distinctions between Guale and Cusabo were at least partially due to Spanish divisions of the coast into administrative areas. There may have been some cultural differences as well, but the Cusabo just north of the Savannah River and the more southern Guale appear 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 this head chieftainship was a rather ephemeral office. The position may have developed as a result of Spanish definition of the province and Spain's requirement for a single Guale representative.

Guale and Cusabo groups 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 evidently was used by missionaries among the Cusabo. The most convincing evidence of a common language is a statement by Governor Pedro Menéndez Marques in 1580 that the Indians of Santa Elena were of the same linguistic 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 as a "language isolate" that was distinct from Muskogean. 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; Crawford 1975:65-66).

Much of the following discussion is focused on available information concerning the Spanish-defined Guale. This information is considered to be directly applicable to the Cusabo. Considering the marked similarity between the two groups, accounts of the Cusabo also will be used to supply additional information about the Guale.

Although ethnohistoric accounts of the Guale are limited, certain basic structural elements of this coastal culture may be defined. The Guale clearly were swidden agriculturalists with a settlement organization which included towns; they had a well-developed political structure composed of micos and several other offices; their kinship networks probably had a matrilineal structure; and post-marital residence was probably matrilocal. Many details of this general picture were shared by other Muskogean groups in the southeast, but 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 locations of these meetings may be used 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 who 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 to indicate that 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" (Barcía 1951:181). Given matrilineal kinship organization, the Guale mico was probably the maternal uncle in a relationship expressed by a father-son terminology. It is unclear whether the offices of regional and provincial mico were ascribed or achieved. Don Juanillo also is referred to as the one "whose turn it was to be head mico of that province" (Swanton 1922:84). Distinctions between use of the terms "cacique" and "mico" are ambiguous. Actual differences between the offices may be implied; however, Spanish use of the terms appears to be inconsistent.

Guale political structure also contained several officials other than the mico. The Spanish called these individuals mandadors, aliaguitas, and other principal Indians (Serrano y Sanz 1912 as translated 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 nucleus of each Guale town that was represented.

Guale political structure appears quite similar to that of inland Muskogean groups. Micos also were the leaders of interior Creek towns. The role of the Creek mico is well defined by Speck (1907:113) as being "to receive all embassies from other tribes, to direct the decisions of the town council according to his judgement, and finally to stand as a representative of the town in foreign negotiations." The Creek council was composed of 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).

Guale micos seem to have had some control over goods of production. A mico called Oade gave Ribault's men food supplies in 1562. "This good Indian was as 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 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 seem to have been functionally equivalent to Creek square grounds. There are only a few accounts of these structures; however, each town probably had a council house. These buildings were circular in shape and usually were quite large. Individual apartments or cabins elevated above the floor lined the walls along the inside of the building, and in the center 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 as translated in Larson 1978:129). San Miguel describes another Guale council house as being circular in shape with a raised patform along the inside walls and capable of holding 300 men (García 1902 as translated in Larson 1978:131).

The best descriptions of Guale council houses are given by the shipwrecked 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 moved to mission villages along the south Georgia and northeast Florida coast. Along the southern Georgia coast, Dickinson and his party visited the town of 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 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].

Dickinson also visited a similar council house at the town of Santa Cruz, just north of St. Augustine (Andrews and Andrews 1945:87-88).

These accounts indicate Guale council houses were very 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 complex served this purpose during the summer. 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 an historic description of a Tukabachee round house (see Swanton 1928:179-180).

There is less ethnohistoric evidence about 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" (García 1902 as translated in Larson 1978:131). Domiciles shown in the De Bry engravings which relate to the general Timucua area are all small and round, and are perhaps 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).

Some Guale towns were palisaded but once again there is little information. 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 southeastern coast, as shown in the De Bry engravings of the Virginia area and northeast Florida towns (Lorant 1946).

Much more conclusive evidence is needed concerning Guale social organization, but it appears that kinship and post-marital residence followed a Creek pattern. Polygyny 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 indicates that the house was, in some sense, property of the wife. If 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 difficulties when they urged the mico to set a good example for his people. Referring to the "principal cacique" of the Guale province, Father Oré (1936:101-102) states that:

> During the time of his 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 marry her, for it was a custom that no one should marry or speak to the wives or lovers of the caciques.

This account indicates that upon marriage the wives of a mico were imported to his locality. The mico with his wives and children evidently resided in the area of his consanguineous kin group, his matrilineage. Sororal polygyny is suggested 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 (contrast with Larson 1978:126).

These inferences have important implications for the Guale social and settlement system. Marriage to a mico would have provided a mechanism for social mobility in the 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 status higher than that associated with their matrilineage alone through their relationship with the mico. The wife's matrilineage also may have accrued additional status 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 organized into clans or sibs, although there is no direct evidence to support this claim. There is a vague reference for the Timucua that may apply to the Indians of La Florida in general. Father Oré (1936:107) says 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 much later historic Creek social organization may be used to supplement information about Guale social organization. Descent group membership among 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 their 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 or war captives were included in the household. The core of the domestic unit was the nuclear family. Households of the same matrilineage commonly resided in the same area of town, the husbands being imported from other descent groups and the sons leaving upon marriage to reside with their wives and 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 those matrilineal groups which acknowledge common descent. However, according to Murdock (1949:41-78) these properly define sibs because husbands retain their own lineage and sib identity.

Analogy with the Creek system becomes less secure past this point. Creek sibs were organized into phratries which were in turn divided into moieties. Creek towns were designated as 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.

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 indicated. The micos were probably either members of the same lineage or sib and shared reciprocal responsibilities through this relationship.

The Annual Model

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 the Guale social, subsistence, and settlement system based upon ethnohistoric evidence and modern ecological data. A graphic depiction of the annual model is provided in Figure 2 for reference in the following discussion. Since the model is predominately constructed with evidence contained in accounts of the early historic period (pre-1600), elements of a purely aboriginal form should be represented. The most intensive acculturation of the Guale appears to have accompanied the renewed mission efforts that followed the 1597 Guale revolt.

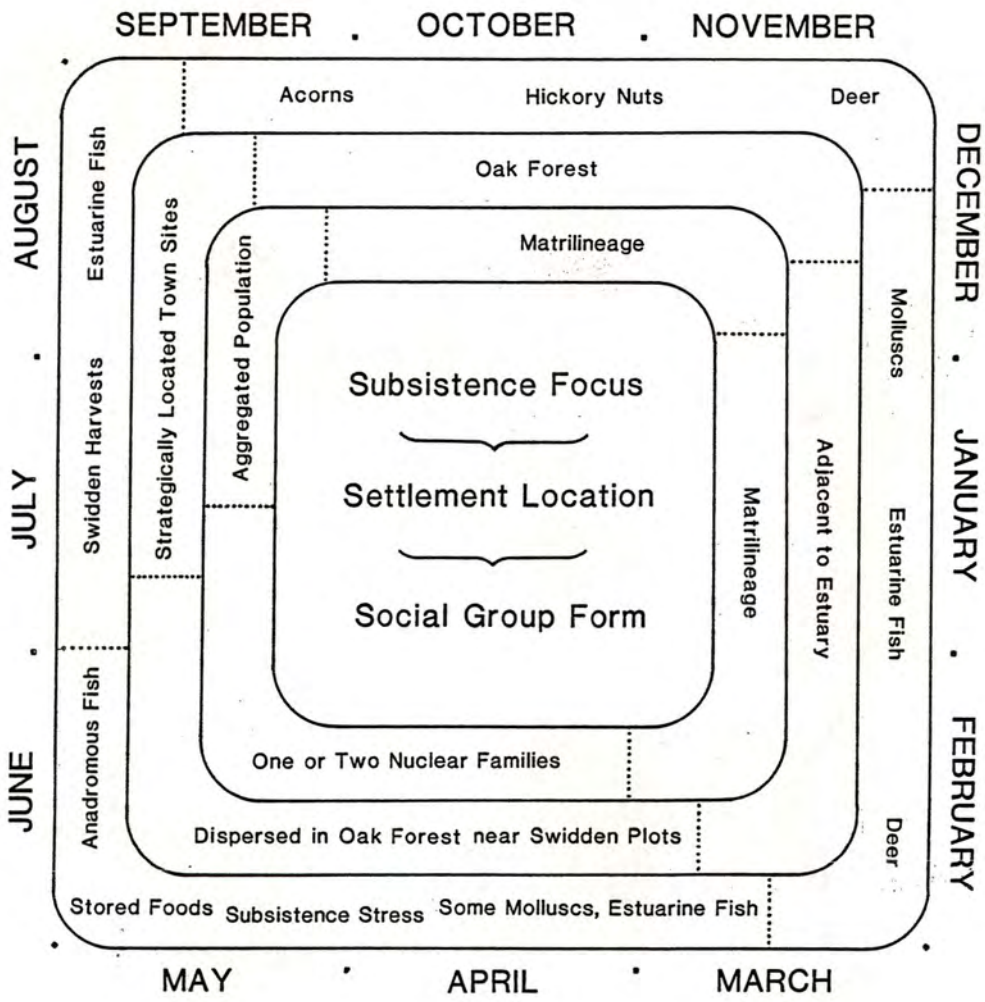

FIGURE 2

The Guale Annual Model

The Guale planted corn, beans, and squash. Swidden fields were small and scattered throughout the highland areas of the coast. Within the highland areas fertile soils occur in small pockets, 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 (Larson 1980:206-209). Discussing Guale agriculture 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 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 as translated in Larson 1980:208].

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

Accounts from the coastal area north of the Guale also serve to illustrate the scattered nature of the 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 as translated in Larson 1980:207). If analogy with Creek social organization is correct, it appears that the swidden plots were worked 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 as translated in Larson 1980:206).

Crops from the swidden fields were harvested in mid-summer. Father Rogel indicates that planting occurred in 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 households were brought together in a single location. Produce from the dispersed 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 (Zubillaga 1946 as translated in Larson 1980:207):

> ...it happened that the alférez, 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. . . .

Guale populations were nucleated and sedentary following the harvest during the summer. The next subsistence phase indicated in the ethnohistoric accounts involved population dispersal to gather acorns. Father Rogel arrived at Orista in 1569 prior to the acorn-gathering period. He remarked 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 as translated in Larson 1980:196].

It would appear from this statement that the Guale resided in towns from the first part of July until the middle of September when they dispersed to gather nuts. Acorns, as well as hickory nuts, 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). Elsewhere, it is said that "...Father Rogel thought that the Indians of Orista had left him because of their fear of losing the fruit of the acorn which they kept stored through the year for their sustenance" (Barcía 1951:151).

Oaks within the coastal zone 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 Miller) are common and much larger stands exist. On Sapelo Island during December of 1977, an estimated bushel of acorns had fallen to the ground beneath each large live oak.

Considering this estimate, the yield per season from a single large live oak would be 54 kilograms of acorns containing 23 kilograms of meat. The stand of 20 trees would produce about 460 kilograms of acorn meat per season (see Olson 1974:Table 3). Divided over a 15-week acorn dispersal period, the stand would yield an average of 29.5 kilograms 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 2,000 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 harvest or providing an excess amount of acorns. The caloric value of

acorns used above is a low estimate of 600 calories per 100 grams, based on pecans, hickory nuts, and walnuts (Watt and Merrill 1963:34,44,65).

The point of this acorn assessment is to demonstrate that the food energy available from the nut harvest was substantial and capable of supporting larger groups in one area than the one or two nuclear families that were involved in the cultivation of swidden plots. Of course the acorn harvest also would have been accompanied by other subsistence activities, the most important being deer hunting. White-tailed deer also are attracted to oak stands in the fall to feed on the acorn crop. Deer hunting and acorn gathering would have been 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 also is 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 on the ground. This type of resource is most effectively gathered 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 and residential group was probably defined by a matrilineage segment with four or five nuclear families forming the social core. The entire group may have been employed in communal deer hunts using a surround or similar technique, or men of the group may have ambushed deer at their feeding grounds. The deer hunt presumably would have occurred during 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 produce acquired during the acorn season, probably in the form of tribute to

the mico. The produce presumably 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 hickory nuts (e.g. Carya tomentosa Nutall, C. glabra Sweet) could have been successfully stored until 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 1980:188,197). Since they may be stored, the leaching process may have been completed after the acorn season was over.

A shifting settlement pattern is suggested for these lineage subsistence groups in the fall. It seems clear that settlements would have been located in relation to acorn resources. Since oak groves are dispersed within circumscribed highland areas, the resources of several oak stands could have been exploited from a single settlement location. When this resource area was exploited beyond the point of supporting the lineage, the settlement would have shifted to a more productive 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 shell fish following the acorn season and continuing until the March swidden activities. White-tailed deer probably continued to be exploited, but by the individual hunter by stalking because deer were now more solitary. It is also likely that stored nuts were eaten during this period. A matrilineage form of social grouping probably remained the basic settlement and subsistence unit. However, settlements now would have been 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 four families of fish common in tidal streams of the Georgia coast, and which also are commonly represented in the archaeological record, is presented in Figure 3. The fishery 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 about 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 reflection of the seasonal variation of fish in the tidal streams.

Species within certain fish families become more abundant between January and March of the hypothesized winter subsistence phase. A large portion of the increased abundance of Sciaenidae is due to the occurrence of spot (Leiostomus xanthurus Lacepede) in tidal streams

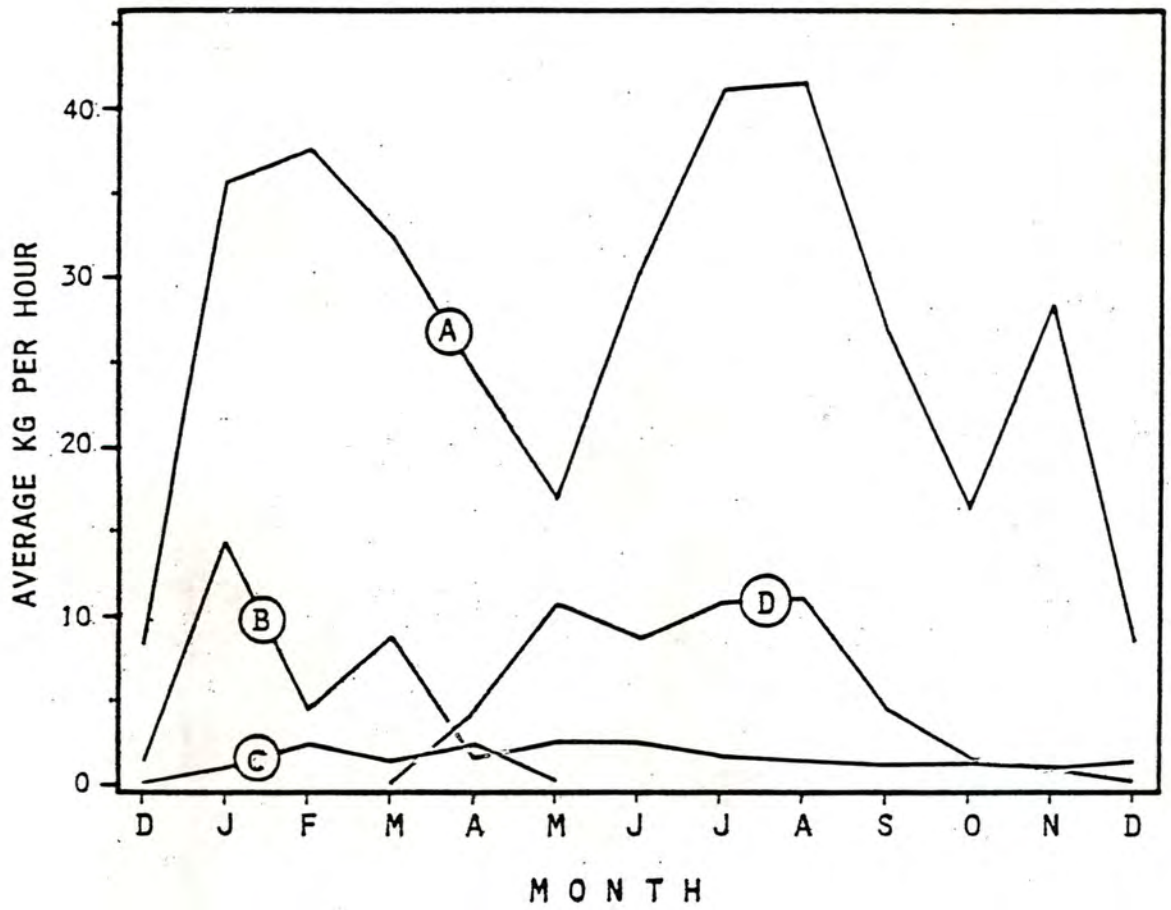

FIGURE 3

Monthly Occurrences of Four Fish Families in Georgia Tidal Streams (From Mahood et al. 1974a:Tables 2 and 3; 1974b:Tables 4 and 9)

along the middle Georgia coast. Several other Sciaenidae also are 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 actually occur year-round on the Georgia coast, but are most common during two seasonal periods, from January through March and again from June through August. This seasonal abundance also varies relative to location along the coast. For example, during the winter months Sciaenidae are more common in the warmer waters of the southern coast than the cooler estuarine waters of the middle and northern Georgia coast (see Mahood et al. 1974b:Table 4).

Considering samples taken from the middle of the Georgia coast, Sciaenidae during the winter are represented by small to medium-sized species. Spot reach a weight of about 340 grams and a length of about 40 centimeters. Star drum also are small, reaching a length of around 25 centimeters and weighing perhaps 900 grams. Atlantic croaker are quite stocky, weighing as much as 2.3 kilograms and attaining a length of 45 centimeters. Sea trout are a larger species, reaching a length of 65 centimeters and a weight of 3.2 kilograms (Mahood et al. 1974b:32-33; Breder 1948:192-195).

Members of the Clupeidae family also are found frequently within the tidal streams from January through March. The schooling species of Clupeidae include blueback herring (Alosa aestivalis Mitchell), menhaden (Brevoortia sp.), Atlantic herring (Clupea harengus harengus Linnaeus), and gizzard shad (Dorosoma cepedianum LeSueur). However, only Atlantic herring is found in the tidal streams exclusively during this winter period and, as with the Sciaenidae, the Clupeidae family is more abundant in southern coastal waters during the winter (Mahood et al. 1974b:23-24).

The shad and herring of this family are anadromous, inhabiting tidal streams during the winter prior to spawning in freshwater rivers during the spring. Thus the winter occupants are mostly mature individuals, ranging in length from 20 centimeters to 45 centimeters and probably weighing somewhere between 250 grams and 900 grams (Mahood et al. 1974b:23-24).

Sturgeons (Acipenser sp.) are a much larger anadromous fish which 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 in the spring. Atlantic sturgeon (Acipenser ozyrhynchus Mitchell) range from around 30 centimeters to 90 centimeters in length and mature individuals weigh around 6 kilograms, although individuals reaching a length of more than 5 meters have been recorded (Mahood et al. 1974b:23; Breder 1948:41-43).

The American oyster (Crassostrea virginica Gmelin) and other estuarine molluscs were probably exploited most intensively during the

winter period. Subtidal oysters are rare along the coast. The Georgia 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 season, oysters are in poor condition and are prone to diseases. A parasitic fungus, Labyrinthomyxa sp., infects the 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 to be most susceptible during the warmer months when they are already in poor physical condition. Their fat and carbohydrate components are lowest during the spawning period and are markedly higher from October to around April. Protein is highest during August and also increases from December to February (Lee and Pepper 1956). Present inhabitants of the Georgia coast refer to oysters of warmer months as being "thin and milky" and they are seldom eaten.

The most productive time to harvest oysters, in terms of energy return, is during the winter and early spring months. There is a 33 percent reduction in the meat weight of heavily diseased oysters, diminishing the energy return 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 North Carolina 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 the spawning months, this was probably due to subsistence stress or failures in other subsistence activities.

The common link among these 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. The resources are dispersed within the tidal streams and are spatially analogous to the fall acorn and white-tailed deer resource set. An important difference is that the winter species, with the exception of oysters, are more mobile within their environment. However, in aboriginal times, as today, there were probably certain favored fishing places which provided a measure of predictable success. To the extent that the same general section of the estuary could have been repeatedly fished, winter settlements were presumably more stable than those of the fall. It may be expected that residential groups were composed of matrilineage segments as in the fall. Since subsistence resources occurred in clusters in the tidal streams, these could have been effectively exploited by several individuals at one time.

The particular fishing technology employed by the Guale was perhaps influenced by factors beyond those imposed by the nature of the resources. Water temperatures during the winter range from about 10 degrees centigrade to 15 degrees centigrade and air temperatures are frequently around freezing (see Mahood et al. 1974b:Figure 12). These uncomfortable temperatures, coupled with the relatively high coastal humidity, may have 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 technique may have been employed. Bottom-feeding species of Sciaenidae may have been captured with basket traps, while cast nets may have been used to catch members of the Clupeidae family. Sturgeon were probably caught exclusively with hook and line as these individuals are too large to easily capture 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 with a stick or by simply pulling clumps from their bed by hand and breaking off the larger oysters.

The winter subsistence season was followed by spring planting, thus closing the annual cycle. The March planting period was discussed previously in respect to swidden activities and the social dispersion that this entailed. The matrilineage social group temporarily split into nuclear family groups. The primary settlement and subsistence unit now was composed of one or two nuclear families.

The period defined by the growth of crops would have been a time of subsistence stress for the Guale. With few exceptions, potential resources were neither abundant nor clustered within the coastal environment during the spring. For example in May of 1565, when among the Timucua, Laudonnière spoke of a famine time when there was little to eat except a few acorns and fish (Laudonnière 1975:121-130).

Food stored in the granaries of Guale towns probably postponed the shortage for a time. A few festive occasions would have served to redistribute this food. For example early in the spring in April 1566, Pedro Menéndez returned two slaves captured by the Guale 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...." (Méras 1964:175). The maize and acorns were certainly stored foods from the preceding year. The oysters presumably would have been fresh, but were probably 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 short periods of time. The period of migration varies somewhat with the species, but spawning is generally a spring activity. Blueback herring (A. aestivalis Mitchell) ascends the rivers in the spring, hickory shad (A. mediocris Mitchell) in the late winter and spring, American shad (A. sapidissima Wilson) from January to March, and the Atlantic sturgeon (A. oxyrhynchus Mitchell)

during the spring and summer (Dahlberg 1975:37; Larson 1980:113). Juvenile American shad and blueback herring have been caught as far inland as the Oconee and Ocmulgee Rivers, over 200 kilometers from the estuary (Smith 1968), indicating that some mature individuals spawn well upstream.

The temporary abundance of anadromous species was surely noted by the Guale 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 excursion may have carried the fishermen well upstream, beyond the coastal zone.

The period following late June swidden harvests, as previously discussed, was accompanied by population aggregation in towns. This large, seasonally sedentary settlement continued until the fall acorn harvest. Although cultivated foods were unquestionably important during the summer, there was probably a renewed interest in estuarine resources. This period corresponds with the second seasonal abundance peak in tidal-stream species, composed principally of catfish and members of the Sciaendae family (Figure 3).

Many species of Sciaendae are abundant during the summer months. Most notable of these species are red drum (Sciaenops ocellata Linnaeus), black drum (Pogonia cromis Linnaeus), and star drum (Stellifer lanceolatus Holbrook). Atlantic croaker and star drum were discussed as winter resources, but are more common during the summer. The red and black drums can be very large fish. Black drum reach a weight of about 34 kilograms and a length of around 1.5 meters. However, the maximum length reported in the trawl catches was about 50 centimeters, suggesting a more usual weight of about 10 kilograms. Red drum are generally an even larger species, reaching a length of 1.1 meters and a weight of 66 kilograms (Mahood et al. 1974b:31-33; Breder 1948:194-197).

Two species of saltwater catfish are abundant in the tidal streams during the summer. Hardhead catfish (Arius felis Linnaeus) are most common. Individuals may reach a length of 45 centimeters and weight of about 500 grams is usual. Gafftopsail catfish (Bagre marinus Mitchell) are less common but larger, reaching a length of 55 centimeters and weighing as much as 1.8 kilograms (Mahood et al. 1974b;25; Zimm and Shoemaker 1955:63).

Procurement technology at this time may have shifted to techniques employing large numbers of people. A wide range of fishing techniques could have been used in the warm waters during the summer, including hook and line, basket traps, and any of several netting techniques. Larson (1980:119-125) has argued against the use of weirs on the Georgia coast because of the exceptionally high tides and unstable bottom conditions characteristic of the area. These conditions would have made constructions unstable and the weirs would have required continual repair.

An alternative hypothesis may be presented. 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. Only those areas adjacent to large intertidal oyster beds have a stable substrata. Weirs could have been constructed in these areas. High tidal ranges would have remained a problem, but could have been remedied by carefully scheduling removal of fish captured in the weir.

Whether weirs or some other subsistence technology was used, the oyster beds were probably a focal point for subsistence activities, as several species apparently feed here at high tide. The most important to the Guale may have been the Sciaenids (see Dahlberg 1972:351). Catfish and other species presumably are attracted to the 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 beds along the Georgia coast. Most of these species are predators such as conch and oyster drills. These species, as well as the oysters, provide a concentrated food source for fish that is available when the bed is covered by the tide. Oyster beds have never been sampled in a way to provide firm information on this point, but it seems probable that oyster beds provide a localized feeding habitat for many fish at high tide. In fact, fishermen today frequently anchor their boats adjacent to a submerged oyster bed and cast hook and line in its vicinity.

It should be noted that the subsistence stages presented above deal with what are considered to be primary resources available on the coast within a given season. Resources other than those discussed certainly were exploited and surely were 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 small mammals such as raccoons and rabbits. With a few important exceptions, it is the abundance rather than presence of particular resources that varies with the season.

In summary, four distinctive settlement and subsistence components are indicated within the Guale annual cycle. Each seasonal subsistence activity was executed by particular social units. The form of each social unit was a response to the nature of the resources and the technology available for exploitation.

Discussion

Although the Guale annual model portrays the seasonal activities as static, in reality seasonal boundaries would have been more flexible. Seasonal divisions would have shifted somewhat due to yearly fluctuations in the resources. For example, the acorn harvest would have been variable from year to year and from grove to grove. Poor harvest years would have prolonged the summer subsistence period and caused the winter phase to begin somewhat earlier. Some overlap

exists between the seasonal resources.

Four basic levels of settlement are defined 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 dispersed over fertile areas of highland within the coastal zone. The second type of settlement was composed of a matrilineage segment comprised of 20 to 25 individuals. These settlement groups were spread over highland areas near oak groves in the fall to gather acorns and hunt white-tailed deer. The same or very similar residential groups moved to scattered locations adjacent to the estuary in the winter to fish, gather oysters, and hunt deer.

It is likely that town sites were permanently occupied by a mico, his wives and children, and segments of his matrilineage. These residents would have exploited areas near the town throughout the year. Location of the town would have been in an area 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. Town sites also were centers for aggregation during the summer months when they contained relatively large stable populations. The regional micos and provincial mico resided in certain towns which formed the apex of the settlement structure and contained the largest summer populations.

The political and social structure alluded to in the ethnohistoric accounts and outlined in 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 seems safe to conclude that the micos and their lineages formed the apex of the socio-political hierarchy. Micos were 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 ethnohistoric information indicates a line of succession to this office. Further, since another account indicates that some micos were related, it is probable that micos came from certain lineages or sibs. In sum, aside from all the questions that remain, the Guale social system was segmented and these segments were ranked.

The function of the Georgia coastal chiefdom organization may be understood in terms of the annual model. Like the model, the interpretation is subject to verification and revision as new data become available. However, even if certain details of the model should prove to be inaccurate, the basic nature of the following functional interpretation should remain valid if the general structure 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. As Service (1962:143) has pointed out, one characteristic of a chiefdom

is "the presence of centers which coordinate economic, social and religious activities." Guale towns 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.

Construction and execution of this mechanism lay beyond the capacity of individual subsistence groups. Variant subsistence resource information held by each subsistence group was channeled into town sites during the periodic feasts held during the fall, winter and spring subsistence phases. The information was processed by councils or more informally at the feast times, and decisions were made about future subsistence activities. The office of mico would have functioned to sanction the decisions.

The Guale chiefdom may be seen as a socio-political mechanism by which diverse ecological 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 subsistence groups into mutually exclusive resource areas would have followed decisions based on these data.

The chiefdom organization would have been perhaps most important towards the end of a subsistence season, when social coordination was critical and timing decisions had to be made about subsistence and settlement shifts. Information available to each group about decline or continued abundance of current resources and about the availability of new food resources would have been processed and a determination made about the appropriate course of action. The net result was a socially coordinated procurement system with the capacity to capture more energy per capita than would have been possible if each subsistence group had operated in isolation.

Mechanisms of information processing have been recognized as important elements in understanding the function of various social and political aspects of cultural systems in general (e.g. Johnson 1978; Moore 1983). Chiefdoms and their potential for information processing is well illustrated in a discussion by Peebles and Kus (1977), and 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. Resources from distinctive environmental zones were channeled to the chief and were then redistributed so that diverse resources 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 times of scarcity.

This surplus and redistribution argument has been made or 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 is clear that both information processing and redistribution are important functions of a chiefdom. The importance of one or the other increases dependent upon the particular environmental context and subsistence technology. In areas with contemporary but environmentally distinctive subsistence resources, the redistributive function would become most important. The function of information processing would become most important in environments containing seasonally homogeneous but spatially dispersed food resources in variable supply. Redistribution actually remains a primary characteristic in either case. What changes is the material reallocated: the resources in the former case and information about resources in the latter case. Any particular chiefdom is likely to include both aspects.

Redistribution of stored foods was an important, although secondary function of the Guale chiefdom. 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. 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 when the resident population was much smaller.

An examination of the impact of western contact and mission activities on this indigenous cultural system is beyond the scope of this document. However, the reader should be aware that certain elements of the system were probably already affected by European

influences, as the model is constructed primarily with data from between 1560 and 1600, more than 40 years after Allyon's possible 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. A letter from the Jesuit Father Rogel to the Spanish Governor of La Florida in 1570 outlines Jesuit difficulties among the Orista and indicates that major aspects of the native adaptive system remained intact as of that date. He writes that the main reason for Jesuit failure was because the Orista

> ...are so scattered, being without any fixed abode for nine out of twelve months of the year. Even then, if they moved from one place to another all together, there would be some hope that by accompanying them one might make some impression by repetition (like water dripping on a hard stone). But each one goes his own way, and thus I have experienced the converse of the principle which your excellence has so much at heart, that the faith must spread in this land. What I find is the opposite, that to win any of the blind and wretched souls of these provinces, it is necessary first to give orders that the Indians join together and live in settlements, and cultivate the land to secure sustenance for the whole year. After they are firmly settled, let the preaching be introduced. Because if this is not done, even though the religious go among them for fifty years they will have no more success than we had these four years that we have gone among them - which is none, not even the hope or semblance of any. To gather them together in this manner, your excellency will understand, will require tremendous labor and a very long time, in order to do it lawfully as God our Lord commands, not forcing them nor with arms. There are two reasons for this: first, because they have been accustomed to live in this way for many thousands of years, and to want them to cease this manner of life seems to them equivalent to death; secondly, even though they should wish to do so, the soil will not permit it, being thin and miserable and quickly worn out. They themselves say it is for this reason that they live so scattered out and wander so much [Zubillaga 1946 as translated in Sturtevant 1964:172-173]

An example of the cultural disruption that accompanied later mission activities is provided in an account by the Franciscan Father Oré (1936:95) that describes Spanish retaliation following the 1597 Guale 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.

The main areas to be changed by the missionaries were aspects of social organization, settlement, and subsistence. The priests were committed to the elimination of Guale polygyny and in the process destroyed social networks which the marital form maintained. The missionaries also insisted on a sedentary population to whom they could administer Catholic doctrines. Some of the Guale finally became sedentary and agricultural, and others abandoned the coast. Introduced diseases contributed to a general population decline; however, the Spanish-induced settlement and subsistence shift would have added depopulation pressures by destroying the primary function of the native socio-political system and thereby the adaptative advantage which the system provided. A complex structure for processing diverse ecological information, making scheduling decisions, and coordinating group dispersals would have been inappropriate for a sedentary agricultural population on the coast. It is likely that the induced agricultural system was incapable of supporting populations as large as those of the native system. That the Guale resisted so strongly what appeared to the missionaries to be the promise of a more secure existence leaves little doubt that the aboriginal socio-political system and subsistence technology was a more successful adaptation to the coastal environment.

GEORGIA COASTAL MISSISSIPPI PERIOD:

THE ARCHAEOLOGY

Background

Archaeological interest in the Georgia coast spans almost a century, and the accumulated information is only now beginning to provide a picture of the nature and complexities of life on the coast during the Mississippi Period (refer to Figure 4). Archaeological investigation first focused on burial mounds and their contents (Moore 1897, 1898). After Moore there was a lapse in work on the coast until excavations sponsored by the Work Projects Administration (WPA) during the mid-1930's and 1940's. The WPA archaeology at the Irene Mound Site (Caldwell and McCann 1941), the Deptford Site (Caldwell and McCann n.d.; Waring and Holder 1968), the Bilbo Site (Waring 1968a), and on St. Simon's Island (Holder 1938a, ms.) provided a basic chronological sequence for the Georgia coast (Caldwell and Waring 1939a, 1939b; Waring 1968c). Later work by Waring at the Refuge Site (1968b) and, during the 1950's, with Larson (Waring and Larson 1968) at the Late Archaic shell ring on Sapelo Island helped complete the chronological sequence and provide many basic details concerning material culture.

The 1960's and 1970's witnessed a renewed surge of archaeological investigation along the coast, particularly on the barrier islands. Joseph Caldwell and his students conducted surveys and limited excavations on St. Catherines Island (Caldwell 1971), Skidaway Island (DePratter 1978), and Ossabaw Island (Pearson 1977); David Thomas and associates (Thomas et al. 1978), are continuing to survey and excavate sites on St. Catherines Island; Lewis Larson and his students surveyed and tested sites on Sapelo Island (Crook 1978; Juengst 1980); Charles Fairbanks and Jerald Milanich and their students surveyed and tested sites on the northern end of St. Simons Island (Marrinan 1975; Martinez 1975; Wallace 1975; Milanich 1977), and Cumberland Island (Milanich 1971); and the National Park Service completed a cultural resource survey of Cumberland Island (Ehrenhard 1976).

Research on the coastal mainland has been much less intense. Aside from the WPA excavations in Chatham County, mainland research was limited to Evelyn Plantation at the mouth of the Altamaha River in Glynn County (Waring and Holder 1968), and the Eulonia Mound (Waring 1968d), the Norman Mound (Larson 1957), and the Pine Harbor Site (Larson 1980) in McIntosh County. An extensive surface survey of McIntosh County and portions of Liberty, Chatham, and Glynn Counties was undertaken by Larson in 1952 in an effort to locate Mission Period archaeological sites (Larson 1953, 1958, 1978).

Since about 1970 numerous survey projects have been conducted on the mainland and marsh islands in response to legislated requirements

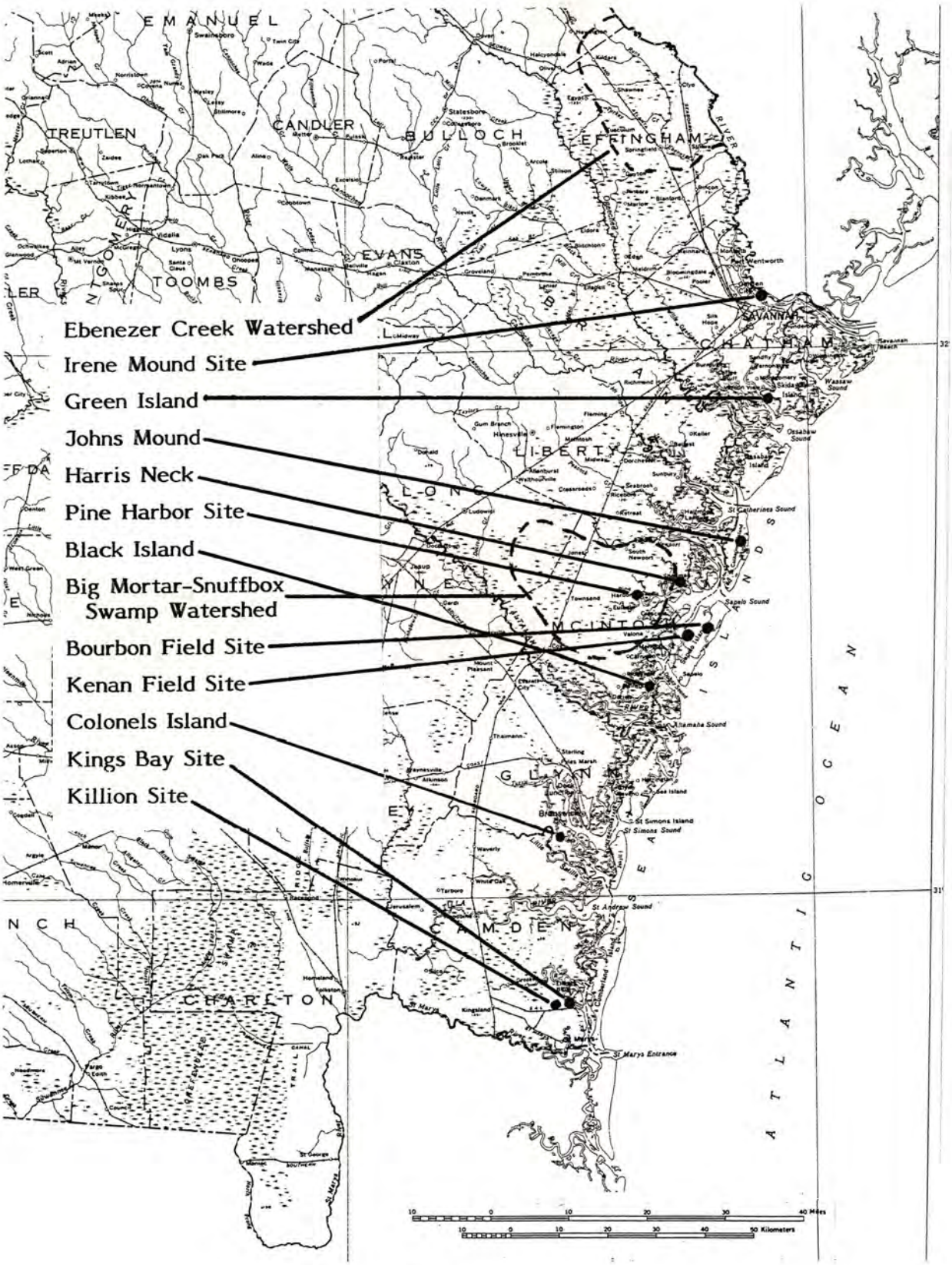

FIGURE 4

Archaeological Locations (adapted from USGS "Georgia" 1966)

for cultural resource assessments. Most of these have been limited in scope and concerned with small areas. Four of the assessment projects, however, have covered large areas of the mainland and are notable for yielding significant results. These are surveys of Ebenezer Creek Watershed along the northwestern edge of the coastal zone in Effingham and Screven Counties (Fish 1976), the Big Mortar-Snuffbox Swamp Watershed in the central area of the coastal zone in Long and McIntosh Counties (Hally, Zurel, and Gresham 1975), Colonels Island in the marshes of the central coastal zone in Glynn County (Sheldon 1976; Steinen 1978, 1984), and Kings Bay Naval Submarine Base in the southern portion of the coastal zone in Camden County (Smith 1978, 1982; Smith et al. 1981).

Given the relatively large amount of archaeological research conducted on the Georgia coast, a synthesis of the information is possible and long overdue. Over the past 15 years or so, research has been concerned with chronology and its refinement, and more recently, about gathering and analyzing subsistence remains. It will be evident in the following discussion that refinements in chronology and subsistence are still needed. However, the state of our knowledge has advanced to the point where additional questions can be addressed to provide answers to a new series of important socio-cultural issues. Issues such as defining social organization, community patterning, economic systems, and political structures within and among the aboriginal coastal communities are critical to a more complete understanding of the adaptive system. Unless these issues begin to be commonly addressed, our knowledge of the aboriginal Georgia coast will be limited to pottery types and species lists.

The following discussion of the Coastal Mississippi Period presents basic information concerning the nature and distribution of sites dating to the Savannah Phase and Irene Phase of Georgia coastal archaeology. Rather than attempting to discuss every known site, the goal of the discussion is to recognize general patterns indicated in the archaeological record concerning the distribution and nature of sites in order to identify a basic structure for the cultural adaptive system.

The Savannah Phase on the Georgia coast begins around 900 A.D. without a sharp break between it and the preceding Wilmington Phase. Rather, the Savannah Phase represents a mature cultural tradition that developed from the Wilmington Phase, probably with external influence. Basic elements of the long-standing conservative coastal tradition consisting of estuarine and oak forest exploitation by seasonally mobile populations appear to have continued in an evolved form during the Savannah Phase. The most important change may have been a shift in socio-political organization from a prior band-level organization to that of a chiefdom with hereditary chiefs and social segmentation. The Savannah Phase is characterized by nucleated large settlements, dispersed smaller settlements, platform mounds, and the intensive use of single locations as cemeteries resulting in burial mounds. Pottery decorated with cord impressions continued to be made but, unlike

Wilmington wares, Savannah Phase vessels were decorated with finer cord 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 Mississippian shapes such as cazuelas. Savannah pottery was tempered with either grog or with grit and sand.

Some archaeologists (e.g. Caldwell 1971; Steed 1972; DePratter 1979) recognize a transitional phase, named the St. Catherines Phase, as separating the Wilmington and Savannah Phases. This transition is considered to last for 150 years. Grog tempering of the preceding Wilmington Phase is thought to continue during the St. Catherines Phase with finer cord marking and plain surface treatments, along with the addition of net marked pottery. Pottery of the Savannah Phase is seen to be grit tempered with cord marked, check stamped, plain, and occasional complicated stamped surface treatments. St. Catherines and Savannah Phase pottery types usually occur within the same sites on the coast. The frequency of each type does, however, appear to vary from context to context within particular sites.

Although a transitional St. Catherines Phase may appear reasonable on stylistic grounds, there are few archaeological data to substantiate it. Proponents for the phase point to excavation results from John's Mound on St. Catherines Island (Larsen and Thomas 1982). Here St. Catherines-type pottery was found in pre-mound features and with burials in the Stage I mound construction to the exclusion of Savannah-type grit tempered pottery. Burials associated with the Stage II mound construction contained St. Catherines and Savannah pottery types along with sherds representative of later phases.

Other evidence indicates that the grog tempered St. Catherines wares and the grit tempered Savannah wares are contemporary. At the Kenan Field Site on Sapelo Island, fine cord marked grog tempered pottery and check stamped grit tempered pottery exhibited distinctive associations within what is thought to be a contemporary community structure complex. This association has been interpreted as indicating social or functional differences in the use of the two wares rather than any chronological difference (Crook 1978; Saffer 1978). At the Bourbon Field Site, also located on Sapelo Island, St. Catherines-type pottery and Savannah-type pottery were found to be significantly correlated within midden deposits and to exhibit meaningful spatial patterns (Crook 1984), providing another indication of contemporaneity.

The St. Catherines problem is far from being resolved. However, acceptance of the St. Catherines Phase as fact in future research may prove to be confusing at best and could serve to blind researchers to important social and cultural issues. For present purposes, the Savannah Phase is considered without any internal division of formal transitions or sub-phases.

The Irene Phase follows the Savannah Phase and represents either the terminal late prehistoric or proto-historic aboriginal occupation on the Georgia coast. There is increasingly secure evidence that the Irene Phase continues well into the early historic period; however, whether the shift from Savannah to Irene occurred during late prehistoric times or was associated with the early contact period remains an unanswered question.

The shift from the Savannah Phase to the Irene Phase appears to be more abrupt than that seen from the Wilmington Phase to the Savannah Phase. Filfot stamping and incising became common decorative treatments during the Irene Phase and grit became the exclusive tempering medium of pottery. Plain and burnished plain pottery continued to be made, but check stamping and cord marking decorative techniques were discontinued. Burial mounds continued to be used during the Irene Phase, but platform mound construction evidently ceased. There also seem to have been changes in settlement patterns and perhaps subsistence, but the nature of these changes remain to be adequately documented.

Published absolute dates for Mississippi Period and closely related contexts on the Georgia coast are shown in Figure 5. The available Savannah Phase dates extend from about 800 A.D. to 1440 A.D., with the earliest dates from the southern coast possibly referring to a late variant of the Wilmington Phase. The two available C-14 determinations from Irene Phase contexts date to the 15th century and are nearly identical to the later Savannah Phase dates. That Irene Phase ceramics continued to be used during the early historic period is indicated by a 17th century date from a context on Sapelo Island that yielded both Irene and Mission Period San Marcos pottery. A similar context at Kings Bay yielded an early 15th century date, suggesting that San Marcos-type pottery also may have been made in pre-contact times.

The question of when the change from the Savannah Phase to the Irene Phase occurred should be answered when more absolute dates from secure contexts become available. The use of thermoluminescence dating of pottery in addition to C-14 dating of carbon or shell would be particularly valuable in resolving this important temporal issue.

Irene Mound Site

The Irene Mound site, located on a bluff overlooking the Savannah River about 10 kilometers above the city of Savannah, is considered the classic example of a Savannah Phase ceremonial center. The Irene Mound site is quite small, covering about 2 hectares, 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 located within the enclosed segments. Each construction phase of the platform mound was

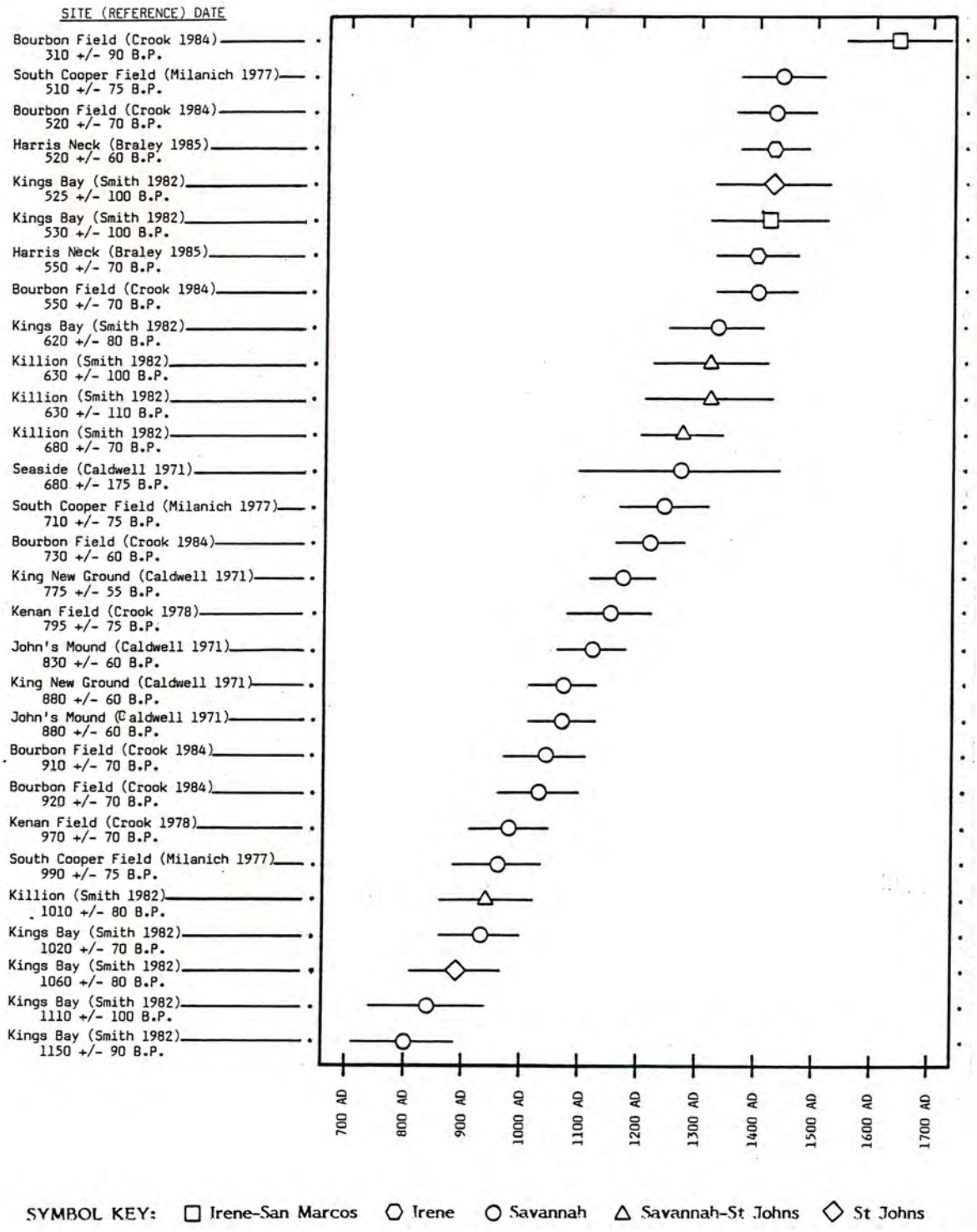

FIGURE 5

Coastal Mississippi Period C-14 Dates
(dates are uncorrected)

associated with rectangular buildings and the final platform stages were enclosed with palisades.

Several important conclusions may be drawn concerning the Savannah Phase from internal evidence at 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 construction of palisades around the summits of the final platform mound constructions at the site indicate that a defensive posture was assumed sometime late within the Savannah Phase occupation. The reasons for this defensive need are unclear, but it may be assumed that palisade construction was in response to a real external threat.

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

Irene Phase features at the Irene Mound site consisted of a final earthen mantle on the platform mound, additional burials in the burial mound, construction and use of a semi-subterranean wattle-and-daub mortuary structure, a large circular structure interpreted as a

rotunda or council house, several walls that divided the site into segments or connected architectural features, and two small domestic-like structures that were rectangular with rounded corners. One of the small houses had also been used during the Savannah Phase and the other had been built in the same location of an earlier Savannah Phase house.

Abandonment of the platform mound and construction of mortuary and rotunda structures clearly indicate a dramatic change in activities at the Irene Mound site. It appears that the site remained a special function center during the Irene Phase. A shift in socio-political structure is suggested by replacement of platform mound structures with the rotunda, and both a new emphasis on burial and different mortuary treatment is indicated by the mortuary structure. The Irene Mound site seems to have become a central mortuary and the location of council meetings.

The change from the Savannah Phase to the Irene Phase, as shown at the Irene Mound site, occurred over a brief interval of time. This is indicated by use of the same domestic structure during both the Savannah and Irene Phases. Osteological evidence also indicates that Savannah Phase and Irene Phase burials at the site represent members of the same genetic population (Hulse 1941).

The initial chronological distinction between the Savannah and Irene Phases was recognized at the Irene Mound site and elsewhere in the lower Savannah River area. Attempts also were made to subdivide the Savannah Phase into finer chronological divisions. 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; DePratter 1979; cf. Caldwell and Waring 1939b).

The Savannah II complex was characteristic of pottery recovered from the Irene Mound 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, an hypothesized chronology without clear stratigraphic support. The exception is the Norman Mound in McIntosh County (Larson 1957). Here the sub-mound levels contained high frequencies of Savannah Fine Cord Marked 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 (Milanich 1977; Martinez 1975), 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 Phase pottery complexes. It is likely that both processes were operating in the manufacture, use, and deposition of pottery and, as with St. Catherines typologies, we must be aware of the two possibilities.

Altamaha and Savannah Regions

A certain amount of regionalization occurred during the Savannah Phase that appears to be loosely 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, 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.

Both regions share the main diagnostic traits of the Savannah Phase such as extensive use of burial mounds, nucleated and dispersed settlements, 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.

These two elements are, however, uncommon even in the Savannah Region. Only one platform mound other than that at the Irene Mound 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. The truncated mound was about 13 feet high, its base measured 138 feet by 129 feet, and its level summit was 62 feet 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-eights, 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 Mississippi Period northern Georgia type, are also 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 also may vary slightly with the pottery type descriptions defined for the Savannah Region. While details of the ceramic 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. However, it may well be that the problem is due more to the normative Savannah River type descriptions than significant differences in the manufacture of pottery. In addition, much of the variability seems to be in paste characteristics and, as Saffer (1978) has argued, the variable aplastic inclusions may be associated with exploitation of physically different clay sources.

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 at the beginning of 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 appears to represent 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 1,100 A.D., making it contemporary 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 stylistically 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, the possibility of Macon Plateau influences becomes more credible if one considers that social changes may have been responsible for developments in the Savannah Phase.

Known Savannah and Irene Phase sites are located throughout the coastal zone on barrier and marsh islands, along the marsh edge on the mainland, on highland areas within low swampy areas of the interior mainland, and on bluffs along the major freshwater rivers. Several types of sites appear to be associated with these environmental settings, including small procurement stations, short-term base camps, seasonal hamlets, large nucleated villages, and ceremonial centers.

Barrier Islands

Survey and testing has been carried out to some extent on each of Georgia's major barrier islands and each has been shown to contain Savannah and Irene Phase occupations. Evidence of intensive occupation, however, is confined to those islands lying north of Cumberland Island. Cumberland Island (Ehrenhard 1976) and the adjacent mainland appear to contain marginal Savannah Phase occupations and virtually no Irene Phase occupations (see Larson 1958). Large Savannah and Irene Phase sites containing multiple burial mounds are found on Sapelo and Ossabaw Islands. These sites, referred to as aggregate village sites, are located to maximize access to estuarine resources and almost certainly were centers of considerable economic and political importance.

The Kenan Field Site on Sapelo Island is the only aggregate village site to be intensively tested (Crook 1978). This site is located adjacent to the marsh and contains two burial mounds, a long earthen embankment, and possibly a low platform mound. The site is defined by 589 discrete shell middens spread over an area of 60 hectares. Testing results at Kenan Field indicate the site was primarily occupied during the Savannah Phase, with a lesser but significant occupation also indicated for an early portion of the Irene Phase.

Information resulting from the Kenan Field investigation includes details concerning community structures and subsistence. Post hole patterns interpreted as the remains of two raised platform structures were discovered adjacent to the larger earthen burial mound at the site. The two structures remain incompletely excavated, but existing information indicates that each was quite large, one measuring 31 meters wide and 55 meters long. A nearly sterile plaza was located between the two platform structures, and each structure was associated with Savannah Phase cultural materials which suggested that distinctive activities were associated with each.

The Kenan Field platform structures were most probably an integral part and manifestation of the socio-political complex

represented at the site. The platform structures-plaza-burial mound complex was surely the center of a variety of community activities and is indicative of a relatively high level of socio-political organization. In contrast with the Irene Mound site, the Kenan Field site also appears to have had a large resident population. Within the Savannah Phase settlement structure, the Irene Mound site may best be considered a vacant ceremonial center containing a small attendant population. Kenan Field, however, appears to have been both a socio-political center and large residential area during the Savannah Phase.

Subsistence remains from subsurface features and from the plow zone midden at Kenan Field indicate an intense focus upon estuarine and oak forest resources. The vertebrate species represented in the faunal remains suggest that most are the result of warm season subsistence activities. Limited late fall or winter occupation also is indicated for the Savannah Phase at Kenan Field, based upon mollusc and other species present in two shell middens and several subsurface refuse pits. Most of the tested shell middens were, however, primarily associated with the early portion of the following Irene Phase.

Present information indicates that Kenan Field was a major Savannah Phase socio-political center that contained a large resident population during the warm summer months and sporadic residential occupations during the cool winter months. It also appears that the communal structures may have been occupied by a small, perhaps elite, social group on a year-round basis. More field work is needed to complete excavations at Kenan Field and provide the missing pieces of information that would clarify the nature of community organization, subsistence, and seasonality represented at the site.

Irene Phase occupation at the Kenan Field Site seems to have occurred during the earliest time of the phase and is denoted by a mixture of Savannah and Irene Phase ceramic traits. This seemingly early Irene Phase component was associated with structural remains and shell middens. The structures consisted of a small, round house located near the corner of a large sectional-wall trench building that was initially thought to be a palisade. Limited additional investigation proved the construction to be a closed structure rather than a palisade and Mission Period ceramics were found along with Irene Phase pottery. Formal definition of this unusual structure and its associations must await additional investigation. The early Irene Phase shell middens tested at Kenan Field contained both Irene Filfot Stamped pottery and Savannah Check Stamped pottery. Faunal species represented in the shell middens indicate oak forest-estuarine exploitation during both cool and warm weather seasons of the year.

The Bourbon Field site is a smaller multi-component site that also is located on Sapelo Island (Crook 1984). The Savannah Phase component at the site covers some 9 hectares and is characterized by a dense linear occupation zone containing three equally spaced high

density occupation clusters. Occasional isolated low-density occupation areas occur beyond the high density area. Savannah Phase shell middens are located within and adjacent to the dense occupation area. Subsistence remains associated with Savannah Phase humic and shell midden contexts indicate a focus upon estuarine fish and shell fish, along with white-tailed deer and hickory nuts of the oak forest. The Savannah Phase settlement at the Bourbon Field site consisted of a formal arrangement of space that may have been the result of repeated occupation by at least three contemporary extended family households beginning sometime during the warm summer months and extending into the late fall-winter season when molluscs and hickory nuts were gathered.

The size and complexity of the Savannah Phase component at Bourbon Field contrasts sharply with the Savannah Phase at Kenan Field. Occupation at the two sites also appears complementary. While intensive occupation at Kenan Field appears to have occurred during the summer, that at Bourbon Field appears to have continued into the late fall-winter season. The Savannah Phase settlement at Bourbon Field seems to represent a seasonal hamlet, perhaps composed of a few extended families. Considering its proximity to Kenan Field, it seems likely that occupants of the hamlet may have resided at Kenan Field during the summer months along with similar social groups. Towards the end of the summer, the large Kenan Field population seems to have split into smaller social groups and dispersed into smaller settlements for the fall season.

The Irene Phase component at Bourbon Field appears later than that at Kenan Field, as it was associated with a correlated ceramic assemblage containing both Irene Phase and later Mission Period aboriginal pottery types. Occupation at Bourbon Field covered an extensive area during the Irene Phase, more than 13.7 hectares. Settlement was characterized by several discrete high density zones dispersed within a large area containing lower densities of occupation debris. The spaced and separate high density occupation zones are interpreted as the remains of contemporary, extended family households, or perhaps small clusters of related nuclear family households. Subsistence remains from Irene Phase shell middens indicate occupation during the summer and continuing into the late fall-winter period. Oak forest and estuarine species are well represented in the subsistence remains. Whether occupation was seasonally recurrent or year-round is undetermined. Unlike previous occupations at Bourbon Field, subsistence refuse appears to have been deposited exclusively in shell middens. This suggests that refuse disposal was formalized; that refuse was being dumped on the shell middens beyond the primarily winter mollusc season.

Data from both Kenan Field and Bourbon Field have definite limitations and biases. Investigations at Kenan Field were restricted to a relatively small zone - approximately 3.5 hectares - within the 60-hectare site. Therefore, extension of the available information to the site as a whole may be justly criticized. It is also important to

remember that excavation of the Kenan Field structures remains incomplete. The Bourbon Field investigations were designed to provide basic information concerning the nature and distribution of each component represented at the site. Although indications of structural remains were present and recorded, none were exposed. While yielding important new information about the Savannah and Irene Phases, the Sapelo Island investigation results are best considered as preliminary assessments rather than indisputable conclusions.

Investigations on Ossabaw Island (Pearson 1977, 1979) have resulted in the definition of distinctive settlement hierarchies for the Savannah Phase and the Irene Phase. The Bourbon and Kenan Field sites appear to fit well into the top levels of the Ossabaw Island settlement structure. Pearson's settlement data resulted from survey, surface collection, and limited subsurface testing. His sample consisted of 65 sites, 12 containing Savannah Phase components and 61 containing Irene Phase components. Each site was ranked according to its surface area, and the resulting site-size classes were compared in reference to a set of environmental variables that included soil type, vegetative type, distance from the marsh, and distance to tidal creeks.

Pearson concluded that the Savannah Phase pattern was "nucleated." The pattern was dominated by a single large settlement that was centrally located with respect to a few smaller settlements on the island. The large settlement also was optimally located in respect to the examined set of environmental factors.

Pearson found the Savannah Phase pattern to contrast with an Irene Phase pattern consisting of a large optimally located site and many smaller sites. He describes the Irene Phase pattern as being "dispersed" and found the smaller sites to exhibit a wide range of variability in respect to their environmental associations.

The value of the Ossabaw Island study is that it examines the locations of known sites on the island with respect to a carefully considered set of environmental variables and offers evidence of distinctive settlement hierarchies for the Savannah and Irene Phases. There are, however, two major weaknesses in the study. First, very little confidence can be placed in the precise sizes presented for each of the considered sites. Pearson's data from each site are primarily the result of surface collection and very limited subsurface testing. It is assumed that the boundaries of a particular component at a site are the same as the site as a whole. Although this was a necessary assumption in Pearson's analysis, it would be surprising if true. Related to this basic problem is the likelihood that more recent Irene Phase materials are over-represented in surface-collection samples from the sites and that earlier Savannah Phase components may be well represented in untested subsurface deposits.

The second weakness is that Pearson considers the island as

essentially a closed settlement system. This assumption leads him to conclude a "nucleated" structure for the Savannah Phase and a "dispersed" structure for the Irene Phases. The fact is that the spatial dimensions of any particular settlement system on the coast are a long way from being archaeologically documented. It seems likely, however, that the settlement system of particular Ossabaw Island groups extended beyond the boundaries of the island to include nearby marsh islands and the mainland. This broader perspective would reverse Pearson's conclusion of "nucleated" and "dispersed" settlement patterns. Viewed beyond the island, the "nucleated" Savannah Phase Ossabaw structure may be only the barrier island segment of a larger, dispersed Savannah Phase system. Similarly, the "dispersed" Ossabaw Irene Phase structure could be nucleated when viewed in a broader perspective.

Marsh Islands

Work on a few of the marsh islands clearly shows that Savannah and Irene Phase sites are present. Surveys of Green Island near Savannah (Crook 1975) and Black Island in McIntosh County (DePratter 1973) document the presence of sites located around the edge of the islands. Although inadequately tested, many of the sites appear to date to the Savannah and Irene Phases. The sites range from isolated small shell middens to large expanses of shell midden located adjacent to waterways. DePratter (1973:6) recovered deer, turkey, and acorn remains from one Savannah Phase shell midden on Black Island, indicating that subsistence included exploitation of oak forest species as well as estuarine molluscs and, perhaps, suggesting that occupation occurred during the late fall and winter.

Intensive testing on a marsh island has been conducted only at sites on Colonels Island in Glynn County (Steinen 1978, 1984). Here the sites consisted of thin linear deposits of shell midden in contrast with the more usual discrete shell middens or dense blanket middens on Black and Green Islands. The investigated sites on Colonels Island all were severely plow disturbed. Savannah and Irene Phase pottery was found in the disturbed middens, along with pottery from earlier coastal phases. A wide variety of faunal material, including white-tailed deer, turtles, and several species of estuarine fish was recovered, but their cultural association is uncertain. Steinen suggests that the marsh island sites represent fall and winter hunting-fishing-gathering camps and concludes that "marsh islands served as areas for the exploitation of seasonally available resources in the diffuse subsistence system of the coast" (Steinen 1984:170). Although possible, this conclusion, or any other, finds little support in the badly disturbed middens of Colonels Island.

Princess Ann Formation

Few archaeological investigations have been conducted along the mainland edge of the Georgia coast, but Savannah and Irene Phase sites are known and appear to be quite common. Site locations are

concentrated along a strip of highland, the Princess Ann Formation, that extends parallel to marsh all along the coast. Single burial mounds associated with small occupation areas with discrete shell middens, such as the Norman Mound in McIntosh County (Larson 1957), and single burial mounds associated with large linear occupation zones containing discrete shell middens, such as the Pine Harbor Site in McIntosh County (Larson 1980), are known. Both Savannah Phase and Irene Phase components are documented. Subsistence appears to have focused on both estuarine and oak forest resources. In addition, maize was recovered from Irene Phase contexts at the Pine Harbor Site. Larson (1980:226) concludes that one excavated shell midden at the Pine Harbor site represents the refuse accumulation of a single winter season by a nuclear family. As plausible as this interpretation may be, the overall structure and season of occupation at the Pine Harbor site remains in question. Given the linear orientation and considerable size of the site, it seems likely that it was formed as a result of repeated and slightly shifting occupations, perhaps seasonal as Larson suggests, through the Savannah Phase and into the Irene Phase.

Further south along the Princess Ann Formation in Camden County, survey and testing at the Kings Bay Naval Submarine Base documents the existence of other Savannah Phase sites (Smith et al. 1978, Smith 1982). A total of 23 aboriginal sites were encountered through an intensive survey effort. Of these, 11 contained Savannah Phase components. These showed a strong tendency to be located on well-drained soils of the Princess Ann Formation near the marsh.

Two of the sites with Savannah Phase components (Kings Bay Site and Killion Site) were subjected to secondary testing. Smith concludes (1982:503) that the Killion Site with its discrete shell middens was formed by repeated occupations by small groups of people, perhaps consisting of several nuclear family households. The season of occupation is not well documented within the recovered subsistence remains. Smith suggests, however, that the site may be interpreted as "a small camp, occupied in early spring by a few families, during a period of subsistence stress. The time toward the end of the winter, when most stored food supplies were exhausted but before the establishment of garden plots, might have been spent in camps like this" (1982:505).

The Savannah component at the Kings Bay site was represented by several concentrations of Savannah cord marked pottery within a blanket midden along a bluff. Smith interprets the Savannah Phase component as a multi-seasonal homestead occupied by nuclear family or lineage-size groups (1982:506). The occurrence of species suggesting both warm and cool weather subsistence activities leads Smith to argue that the possibility exists "that the site was occupied at several times during the year, or even continuously through the year. The

optimal location certainly would have made multi-seasonal occupation feasible" (1982:508).

Savannah Phase manifestations at Kings Bay and on the lower Georgia coast appear marginal to its expression in middle and northern coastal areas. While distinctive Savannah Phase pottery does occur on the lower coast, much of the Savannah Phase ware is difficult to distinguish from that of the preceding Wilmington Phase (see Espenshade 1981) leading to creation of a "Wilmington-Savannah" typological category. St. John's components, known best along the northeast Florida coast, also occur frequently along the southern Georgia coast. Together Savannah, Savannah-Wilmington, and late St. John's pottery define the Mississippi Period pottery complex.

The lower Georgia coast during the Mississippi Period appears to have been a real boundary between the classic Savannah Phase cultures to the north and the St. John's cultures to the south. The expression of each appears subdued within the boundary area, and it may be expected that cultural adaptation here was influenced from both areas and also differed significantly with each. Much more information remains to be reported from recent investigations at Kings Bay. Hopefully the nature of adaptation within this boundary area will become more clear along with the cultural processes responsible for its manifestation.

Interior Coastal Zone

The interior mainland of the coastal zone has been investigated less than other areas. There are, however, two excellent survey reports for interior areas that provide basic information concerning sites and their cultural associations. The first is a survey of the Big Mortar-Snuffbox Swamp Watershed in Long and McIntosh Counties (Hally, Zurel, and Gresham 1975). The survey area extended from the Princess Ann Formation west to a point approximately 30 kilometers inland. Approximately 80 percent of the survey area was defined by low, poorly drained, flat land associated with swamps containing small dispersed highland areas. The western edge of the survey area contained broken highlands associated with the Altamaha Sand Ridge, a relic barrier island geological feature. Appproximately 90 percent of all aboriginal sites were located on well-drained highland soils within the watershed.

A total of 18 sites were found that contained Savannah Phase components and 8 with Irene Phase components. The sites were all small, usually covering less than one-fourth hectare, and marked by surface scatterings of pottery and occasionally chert projectile points and flakes. The only large shell midden sites were located along the Princess Ann Formation on bluffs overlooking tidal creeks and salt marsh. The most intense aboriginal occupation within the interior of the watershed appears to have occurred during the Savannah and Irene Phases. The authors conclude that the small sites located on dispersed highland areas within the swampy interior probably

represent brief occupations by small groups of people (Hally, Zurel, and Gresham 1975:118).

The second investigation of an interior coastal zone area is an extensive survey of the Ebenezer Creek watershed, located along the eastern edge of the coastal zone just south of the Savannah River (Fish 1976). As with the Big Mortar-Snuffbox survey, most of the sites in the interior were located on dispersed highland areas of well-drained soil. A total of 14 Savannah Phase sites were discovered. Two of these also had Irene Phase components. Six of these sites were located on bluffs overlooking the Savannah River or adjacent to creeks. Another was located outside the survey zone on a bluff overlooking the Ogeechee River. The remaining seven sites were located in interior sections of the swamp: one along the edge of a Carolina Bay and six on rises or ridges within the swamp. The larger sites occurred along river bluffs, while small sites yielding few artifacts were located in interior swamp areas.

Larger sites along the bluffs were associated with dense cultural deposits containing diverse artifact assemblages indicating a variety of activities. The small interior sites were associated with sparse artifact assemblages indicative of brief occupations associated with a limited range of activities. Artifacts included pottery and chert flakes, along with occasional projectile points, nutting stones, and hammerstones.

Taken together, the two interior surveys provide important information concerning Mississippi Period settlement within the interior coastal zone. Two basic types of sites are indicated: large intensively occupied sites along the rivers, and small, briefly occupied sites on highland areas within the interior swamp. Most of the sites appear to date to the Savannah Phase, possibly indicating a decreased utilization of the area during the Irene Phase. Excavation has occurred at none of these sites, so inferences are necessarily limited. It seems reasonable, however, to suspect that the small interior settlements were the result of exploiting plant and animal resources of highland oak forests and surrounding swamps, particularly nuts and white-tailed deer. Use of the well-drained highland areas for dispersed agricultural fields also is probable. The river bluff settlements would have had access to oak forest resources along with the important addition of freshwater and spawning fish.

DISCUSSION AND RECOMMENDATIONS

The Mississippi Period Adaptation

Aboriginal occupation on the Georgia coast during the Savannah and Irene Phases of the Mississippi Period resulted in the formation of a complex array of archaeological sites. These sites are spread throughout the coastal zone on well-drained soils of barrier islands, marsh islands, and the mainland. Archaeological sites of the period include ceremonial centers, large villages, small villages or hamlets, and short-term camps or resource-procurement stations.

The adaptive pattern characteristic of the Savannah and Irene Phases was based upon an intense focus on the estuarine and oak forest subsistence resources found in the coastal zone. The dispersed settlement pattern indicated for the period suggests that the aboriginal groups dispersed through the coastal zone to exploit the subsistence resources available in each area. There is increasing archaeological evidence that dispersal was in a seasonal cycle, but details of this cycle remain to be adequately documented in the archaeological record. There also is some evidence of a shift from wide-spread settlement dispersal to a more nucleated, or at least a less dispersed, settlement pattern during the Irene Phase.

An estuarine-oak forest settlement and subsistence system was clearly central to Mississippi Period adaptation in the coastal zone. It also is clear that basic elements of this adaptive system - the Coastal Tradition - are deeply rooted in earlier coastal prehistory, beginning perhaps as early as 2,000 B.C. The Mississippi Period is directly associated with the development of a Mature Coastal Tradition, marked by ceremonial centers, large villages, and probably a dramatic population increase on the coast. These developments indicate that the cultural system had become more complex and was capable of extracting more energy from the coastal environment than earlier cultural systems. There is indirect evidence (Larsen 1978) that maize agriculture may have become important and integrated into the Coastal Tradition at the beginning of the Savannah Phase. Other major changes in the adaptive system were certainly socio-political in nature, resulting in greater energy capture from the coastal environment through more effective organization of people in the execution of the subsistence technology.

Evaluation of the Structural Model

The structural model developed previously for contact period aboriginal culture on the coast contains many elements that appear to agree with available archaeological data. The model predicts accurately, on a general level, the types and locations of Mississippi Period sites observed in the archaeological record. Large

strategically located village sites, smaller sites located near tidal streams along the marsh, small interior highland sites, and sites along the freshwater rivers are all identified in the model.

The function and seasonality of each type of site represented in the model remain unconfirmed in the archaeological record. Evidence from sites at Kings Bay, Sapelo Island, and the Big Mortar-Snuffbox Watershed indicate that large villages primarily occupied during the summer, smaller settlements occupied either multi-seasonally or during the fall-winter season, and small sites occupied for very short periods of time do exist. Much more information is needed to assess the validity of the seasonal and functional site types presented in the model. A greater quantity of quality information about the function and seasonality of sites within a wide range of coastal environments is required before components of the model can be confirmed, rejected, or revised.

A serious consideration of the model and its implications for the archaeological record indicates the potential for exceedingly complex formation processes at archaeological sites on the coast. For example, a town site occupied year-round by a small elite group, during the summer by a large population, and periodically during the fall and winter by large groups would result in a complex archaeological record. Unraveling the record would require intensive and extensive excavation with techniques that gather subsistence and artifact remains from contexts associated with each settlement component represented in the town, followed by analysis techniques that would provide clear indications of the seasons represented in the subsistence remains and the activities reflected by the artifacts. This assumes adequate preservation, limited post-depositional disturbance, the technical ability to accurately gather and analyze the data, and the financial resources to conduct such an investigation. Gathering data to reconstruct the social dimensions of each seasonal component would require additional effort and expertise, focusing primarily on complete excavation of house floors followed by critical analysis and comparison of their associations.

The structural model in a real way presents a challenge for future research and interpretation. It defines a cultural structure that may have existed on the Georgia coast, one that appears elegantly adapted to the coastal environment. Available archaeological data suggest that the model eventually will prove to be basically accurate for the Savannah Phase and probably the earliest portion of the Irene Phase. As has been pointed out, in its present form, the model is static and normative. Only the archaeological record will provide the information required to identify variabilities in the structure that provide a basis for refining the model and achieving a greater understanding of the nature of Mississippi Period cultural adaptation in the coastal zone.

Research Needs

Several basic research needs may be identified for future investigation of Mississippi Period sites in the coastal zone. These revolve around needed information concerning the community structure and economy characteristic of the Savannah Phase and Irene Phase. Specifically, additional information concerning the distribution, function, and seasonality of Mississippi Period sites throughout the coastal zone is needed, along with information concerning the social composition of the local group associated with each site. Once this information is gathered, it will be possible to reconstruct basic details of inter-site and intra-site community organization and its associated social dimensions for each phase. Similarities and differences between the two phases may then be identified and explanations attempted.

Fundamental changes in the way archaeological research is conducted on the coast are required to gather the quantity and quality of information needed to successfully approach questions about community structure and economy. The data base currently is biased towards barrier island sites. Much more survey and excavation data now are needed for mainland sites along the Princess Ann Formation, in the interior coastal zone, and in the delta section. In addition, most of the available information is the result of survey and limited subsurface testing. With the exceptions of a large-scale excavation at the Irene Mound site and rather substantial testing at the Kenan Field site, excavation has resulted in limited exposure of components and their structural associations. The excavation of 2 X 2 meter squares placed in shell middens and in dispersed locations across a site simply is inadequate for gathering information concerning details of community structure. Additional large-scale excavation is needed to provide this information. A multi-phase research design, each phase with specific goals, is essential for fruitful investigation at any particular site.

Initial definition of the gross internal structure of the archaeological component or components present at a site would provide the information required to realize the information potential of the site. This may be achieved through a variety of testing methods that provide broad coverage of the site area. Spatially limited testing will certainly fail to reveal, even in the most general way, the internal complexity and types of information available at a site.

Assuming successful preliminary investigations, the second phase would focus on critical definition and examination of contexts associated with single components represented at the site. This would involve more intensive testing in distinctive areas of the site shown in the initial phase to have the greatest information potential. This may, for example, include intensive testing in both dense and sparse occupation areas to gather information concerning subsistence, seasonality, and initial evidence of features such as burials, refuse pits, and house forms. This research phase would provide basic

settlement and subsistence information about the site.

It should be stressed that close attention to context is required to accurately interpret information at this stage for the development of other research questions that may be addressed at the site. While this seems obvious, unappreciated context can result in faulty interpretation and the development of a flawed data base. For example, the exclusive recovery of subsistence remains from shell middens at coastal sites could lead to conclusions that overemphasized the dietary importance of estuarine species. With a few exceptions, it can be argued that shell middens are primarily estuarine refuse disposal features and that oak forest subsistence refuse also was deposited in humic midden areas of the site. Unless both contexts are examined and preservation differences taken into account, only a biased picture of subsistence is possible.

The third phase of investigation would focus on excavation of house forms and other structures across the site area in an effort to gather information concerning household composition, social organization, and internal community organization, along with the range of activities associated with each. Extensive excavation using sophisticated field and analysis techniques would be required for a successful investigation. This third phase of investigation never has been conducted at a coastal site and is sorely needed. In fact, reconstruction of the Mississippi Period adaptive system ultimately requires this type of extensive investigation at several of each type of site represented in the coastal zone.

The phased research design outlined above does not pretend to identify exclusive important research needs. It does, however, point out the need for sophisticated and well-considered approaches for gaining the information needed to understand the nature and complexities of the Mississippi Period adaptive system. Archaeological research is a creative process that requires both rigorous techniques and creative solutions to answer difficult questions. It is the responsibility of the individual archaeologist to recognize significant questions at particular sites and design an appropriate strategy for their solution.

Management Recommendations

The original density of Mississippi Period sites in the coastal zone appears quite high. Based on available data from Ossabaw Island, settlement on the barrier islands appears to have been quite dense with sites occurring at a rate of at least 1.4 per square kilometer. Data from marsh islands and from the mainland edge adjacent to tidal streams and marsh suggest that similar site densities also occur in these areas. Survey data from the Big Mortar-Snuffbox Watershed suggest an overall density of about .03 Mississippi Period sites per square kilometer in the interior coastal zone. As much of the inland area is composed of uninhabited swamp, this density figure is misleading. The density of sites located on inhabitable highland

areas in the swamp approaches .17 per square kilometer, and although much less frequent than in the other coastal settlement areas, suggests significant settlement in the interior coastal zone.

Site disturbance and destruction in historic times has seriously damaged the quality and quantity of information available from Mississippi Period sites in the coastal zone. Modern agriculture and pulpwood operations have disturbed all but a precious few coastal Mississippi Period Sites. Many of the disturbed sites retain important information, but retrieving this information is complicated by the difficult problem of reconstructing contexts, to the extent possible, and evaluating the data within the obscurities of disturbance. Total destruction of sites also has occurred all too frequently, particularly as a result of development on some of the barrier islands and in developed portions of the mainland. Severe ground disturbance associated with construction of commercial, industrial, and residential buildings, and their accompanying roads, parking lots, and utilities have destroyed an undocumented number of Mississippi Period sites. The information contained in these sites is forever lost but is hopefully duplicated in surviving sites elsewhere along the coast.

Those remaining undisturbed, or minimally disturbed, sites should be preserved and protected whenever they are encountered. As our knowledge of the coastal Mississippi Period increases, significant new and complex questions will be identified, and it is likely that answers to many of these questions will require data from intact sites. A representative sample of disturbed sites containing intact or reconstructable contexts also should be preserved to augment a permanent data base.

The significance of Mississippi Period coastal sites, whether disturbed or undisturbed, can be determined by their potential to contribute information required to reconstruct the complex dimensions of cultural adaptation. Each type of Mississippi Period site in the coastal zone is equally important, for each reflects one element of the adaptive system and contributes one piece of information for complete understanding of that system.

Our understanding of Mississippi Period cultural adaptation in the coastal zone has only recently begun to develop. A difficult set of questions is beginning to be recognized, questions that require new approaches in data recovery and analysis for resolution. These new approaches will inevitably require a greater expenditure of time, energy, and money than less sophisticated current methods. Mitigation decisions concerning data recovery, avoidance, or preservation of a particular threatened site should seek to weigh the significance of the site and determine the possibility of avoidance, the need for active preservation, and the cost of data recovery. With the prospect

of data recovery becoming exceedingly more complex and costly, avoidance or preservation should become more attractive options.

Effective management of Mississippi Period sites in the coastal zone requires recognition of significant sites early in the planning stages of ground-disturbing projects. Early recognition of significant sites may permit simple redesign and their avoidance, or integration of sites within the design and their preservation. Data recovery should rarely be the only available mitigation option.

COMMENTS

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Building on Lewis H. Larson's 1969 study (revised and published, see Larson 1980), Crook has developed an explanatory model for the settlement, subsistence, and social organization system(s) present on the Georgia coast during the late prehistoric period. The model, presented in schematic and narrative form, is developed largely from environmental and ethnohistorical data and is applicable to the Mississippian period ancestors of the Guale Indians. It can now serve as a basis for the generation of research questions which are the focus of future cultural resource management (CRM) studies undertaken on the Georgia coast. The office of the state archaeologist and the community of practicing Georgia archaeologists should be proud of his effort, one of 35 such plans being developed for the state.

Archaeologists working in CRM on the Georgia coast will welcome Crook's synthetic model, since it provides them with almost ready-made hypotheses to put in their proposals sent in response to RFP's. Crook, however, does not take the reader the final step and explain how to operationalize (i.e., actually field test) his model. But it can be done (e.g., see R. Smith 1982). Testing the model as a part of future studies of Mississippian period sites will allow better use of those archaeological resources, make more efficient use of CRM funding, and help planners, archaeologists, and those who provide the funding to answer that thorny question: What is significant and what is not?

Comments about the model can be offered on two levels. One is operational: How can we be sure archaeologists will not only try to test the model, but test it properly regarding such things as selection of research questions vis-a-vis a specific site, utilization of appropriate sampling and collection techniques, and application of suitable analytical techniques? Presumably, if proper field and laboratory techniques are employed, we will all reach the same conclusions regarding the data. The second level of critique is the model itself. Is it reasonable, based on the data it synthesizes? Is it testable?

To police a scientific discipline is difficult. The Society of Professional Archeologists has been trying to maintain standards through its program of licensing and grievance. It is a costly process. As I have stated elsewhere (Milanich 1982:10), I believe a better way is scholarly exchange, especially peer review before, during, and after projects. Join the Society for Georgia Archaeology

and the Southeastern Archaeological Conference; send copies of your CRM proposals to your colleagues for review and ask potential contractors to do the same. Budget project funds so that colleagues can visit and critique your ongoing field research, and make sure contractors have peer review of your reports. Once a site is excavated and the money spent, it is too late to try to do a post hoc testing of hypotheses derived from Crook's model.

I have long felt that the greatest problem in CRM work is that of significance--determining the scientific worth of the site. If a three-phase plan for archaeological research is adhered to (and it does not matter if the work is CRM-oriented or financed by the National Science Foundation; there is no difference), I believe the significance problem can be alleviated. Phase I's goal should be to find the site and determine its boundaries, including general cultural affiliation. Phase II, the most crucial phase, is to assess the site and determine its worth, i.e., determine what questions can be answered should it become necessary to excavate it. This determination might include such things as whether or not house structures are present; are food and/or plant remains recoverable; are human burials present. It is followed by the generation of specific research hypotheses and an explanation of how those hypotheses can be tested at that specific site. In other words, all the hard work comes at the second phase of the process. The Phase II report should contain a detailed research design for investigation of the site, including procedures to be employed and a statement of what or how much needs to be sampled. Should it become necessary to mitigate the site because it will be negatively impacted by construction or whatever, the contractor can then bid the Phase III job. The problem of contracting agencies or firms accepting low bids that shortchange the archaeology field work disappears. The problem of CRM firms having to scramble to come up with a Phase III report that makes it seem as though they found significant information is also removed. In addition, the public benefits from such a system because the Phase II report documents the significance of our cultural heritage in the form of a written report, a report which can be put in a file for future use should no Phase III work be necessary at the time.

Such a system certainly increases the cost of the Phase II work, but it reduces the cost of Phase III and may actually save money in the long run because the onus is placed on the archaeologists (both the people doing the work and the before, during, and after reviewers) to make sure that a site is indeed significant and capable of providing answers to important research questions prior to Phase III mitigation. The significance of some sites might simply be their presence in time and space. Following the Phase II evaluation and excavations, it may be that no further work is needed, even though the site is to be impacted by construction. I firmly believe that a similar three-phase process should be adhered to not only in the implementation of Crook's model on the Georgia coast, but in all archaeological research. Phase III, full-blown excavations should not be undertaken unless it is known that specific data are present which

will help to answer specific questions.

As I noted above, we can also critique Crook's model on the basis of its content. Has he accurately modeled the available data? Is the model testable in the field? The answer to both is, yes. And he has raised some interesting questions regarding Georgia coastal culture history, including basic questions of time and space distributions of prehistoric cultures. (I would argue that these distribution questions are not allowable as criteria for determining that a high enough level of significance is present to recommend full-scale Phase III excavations; such time-space data easily emerge from a site in the process of answering other questions regarding subsistence, settlement, and social organization. On the other hand, there is no doubt that such chronological and geographical data are necessary to establish the context in which other hypotheses can be generated and tested.)

One possible shortcoming of the model results from a problem present throughout the Southeast (e.g., see M. Smith 1984:13-14). We are not certain how extensive changes in aboriginal cultures were between the time of first European contact and later observations. Population reductions certainly led to changes in settlement and social systems, and application of the direct historical method may not always be valid. For the Guale, some of our best descriptions are from the 1560s (French), 1570s (Spanish Jesuits), and later 1580s into the seventeenth century (Spanish Franciscans and military and governmental officials). But those descriptions come two to three or more generations after the visits by numerous Spanish explorers, visits which probably began with Juan Ponce de Leon in April, 1513, and continued through the 1520s (see Hoffman 1984, for examples) into the 1560s. The question arises: How valid is it to use a Jesuit document describing prehistorical aboriginal horticultural patterns that was written 60 years after Juan Ponce sailed along the coast? <Using the 1527 Chaves espejo and the Herrera account of Juan Ponce's first voyage, I calculate that Juan Ponce's initial landing in La Florida was almost certainly the Georgia coast; see Castaneda et al. 1977:123-124; Davis 1935.>

Because we do not yet have a good answer for this, Crook is certainly correct in using the data that are available, recognizing that "certain elements of the [Guale cultural] system were probably already affected by European influences" (p. 31-32) by the time most of the first descriptions of the Guale were recorded. To solve the problem is not easy. What is needed is more scholarly research into the Spanish documents which may hold additional descriptions and which span the decades between 1513 and the 1560s. Who knows what information may become available to allow us to better model Guale culture? There is no reason (and it would be bad form) not to continue to fine-tune the model as additional documentary-derived (as well as archaeologically-derived) data become available.

One interesting culture history question Crook raises has

perplexed me for some time, and I have debated it with Chester DePratter on several occasions. This is the temporal placement of the Irene culture and Irene ceramics along the southern Georgia coast. Crook's observation (p. 44) that "virtually no Irene Phase occupations" are present on Cumberland Island and the adjacent mainland" is certainly true. I would further argue that Irene villages are not present in any number in Crook's Altamaha Region from St. Simons Island (and the south side of the Altamaha River estuary) southward. Instead, in village sites the Savannah ceramic complex seems to be followed by the complex called San Marcos or Altamaha. Along that bit of coast, the southern end of Guale territory, the Irene ceramic complex is restricted largely to sacred (mound) contexts, not secular (village) ones. Thus, late Savannah period mounds and early Altamaha or Sutherland Bluff period mounds contain some Irene pottery. An excellent example is the Taylor Mound on St. Simons Island (Wallace 1975:39-78) which contained vessels line block stamped on the bottoms and incised with Irene motifs on the tops. The vessels came from a cache which also contained European artifacts.

When the Spanish first reached St. Simons Island in the early sixteenth century (1513 into the 1520s), the Guale living on the north end of the island on Cannon's Point still manufactured Savannah pottery types in their village (as evidenced by a dog burial containing a musket ball in its ribs; Wallace 1975:104, 106; that metal ball may be the earliest non-Norse, European artifact thus far recovered from the mainland United States). If my suggestion that the problem of Irene on the southern coast is not a chronological one but the result of a sacred-secular ceramic dichotomy (as documented by William Sears for other Southeast aboriginal cultures; see Sears 1973), then Chester and I can both be correct, certainly a happy ending.

One of the elegant results of Crook's and other models which focus on questions of process rather than temporal and geographical distributions is that they do not get bogged down in such debates. As I noted above, such spatial/chronological data will emerge as Crook's model is further tested. As Larson (1980:229) has stated: "It is necessary to approach the coastal cultures in a different manner if we are to obtain significant answers to questions of cultural adaptation in the region. The <u>traditional</u> approach will not provide them." Crook's model is such a non-traditional approach and will indeed provide significant answers as well as allow us to manage our dwindling archaeological resources in a wise manner.

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Ray Crook has written, as expected, a thoughtful, even-handed synthesis of archaeological research on the Mississippi Period of the Georgia Coast. What is disturbing, and at the same time exciting, about this document is that it very effectively reveals how little we know about life in this time and place. Despite much archaeological cultivation of the Georgia coast in recent years, the harvest is surprisingly meager.

It is striking that we have studies of the Mississippi period from only a few of the barrier islands and even less information from the mainland. If, as Grant Jones suggests, the bulk of the pre-mission period population was located on the mainland and the shift to island locations occurred in the seventeenth century, then what little we know cannot be considered representative (Jones 1978:178). I am concerned by the absence of any major, detailed excavations capable of revealing aspects of Mississippi period community organization. We are making decisions concerning the adequacy of data recovery at Mississippian components of sites, for example, at the Kings Bay Site, when we have virtually no information on where and how these people lived. This is, in part, a consequence of data collection biases, including an assumption that the only good test pit is a "productive" one and also a failure to recognize non-midden areas as functional parts of a site. Thus we have in some cases collected extensive samples of subsistence debris without any contextual information at the community level.

The most promising new information (over-modestly presented in this document) is Crook's own contribution from work at Kenan Field which, it is to be hoped, will continue. The Kenan Field data is tantalizing for the very scale of the site and the unique form of some of the structures, in particular the 31 x 55 m platforms (which I like to think of as bleachers). But then, in view of how little we know, we should not be surprised by anything.

What is certainly not lacking in this document are ideas for dealing with the archaeological data that does come to light. Crook offers a revised version of a conceptual tool he has been refining for some eight years now (and has finally named): the Guale Annual Model. The discussion contains important additions and revisions, notably an extended and convincing explanation of why oysters aren't good to eat in the summer and fall.

I am, no doubt, one of those who has criticized the Guale Annual Model as static and normative. I really have no problem with the way it is offered in this study -- to be applied as far as it is useful in explaining the data and to be subjected to testing and revision. It powerfully summarizes and organizes a large amount of data. I hope it

will inspire the formulation of supplementary models and alternate models which provide analogs for the dimension of space in the same way the Annual Model provides an analog for seasonality. Another needed model is one which represents developmental change in form (of community organization) through time. It was a desire for some such intuitively satisfying graphic presentation of the settlement/subsistence pattern that led me to include a diagram of hypothetical land use in a recent discussion of the Mississippi period (Smith 1982:124). I am, however, far from satisfied with that particular representation.

A useful and challenging perspective which might supply ideas for operationalizing the Annual Model can be found in Lewis Binford's essay on the archaeology of place (1982). From this perspective the Savannah settlement system would be seen as a system of residential mobility that creates economic zones (cultural) within a resource area (natural). Binford suggests that some systems may combine a number of strategies, employing, for example, a mobility strategy designed for coverage during a phase of population dispersal and employing a positioning strategy based on logistical concerns during an aggregation phase (1982:11). What is most satisfying about this approach is the way in which it integrates activities at locations we recognize and intensively study as sites with activities in the intervening and surrounding resource areas. Further, this approach should lead to interesting questions about how the Annual Model can be tested (or, alternatively, applied in interpretation). For example, if Savannah peoples were, during the fall, employing the coverage tactics of foragers, should we expect these sites to differ at all from the sites of Woodland period coastal foragers?

Binford also makes a series of sobering observations on the depositional consequences of mobile settlement strategies. Multiple occupations of a single location in space are unlikely to be stratigraphically discernable, particularly in a coarse oystershell matrix, and are likely to be excavated as a single assemblage. The result, as Binford emphasizes, may be that "the demonstrably associated things may never have occurred together as an organized body of material during any given occupation" (1982:17-18). Together with other comments on the effects of "assemblage-" vs. "type-based" systems of classifications, this observation should make it clear that operationalizing and applying the Guale Annual Model will not be a simple undertaking. I hope to see at least two conditions fulfilled whenever the model is formally applied: (1) explicit consideration of assumptions and criteria for confirmation, and (2) application to a sample of sites, rather than single sites, so there can be some meaningful comparison and contrast.

The operating plan also contains several tools which will be of immediate use to students of coastal archaeology. The summary of the Coastal Zone Environment is delightfully clear and concise. Having read all and written several of the more tedious environmental discussions appearing in recent research reports, I am in a position

to appreciate a good overview. It is to be expected that individual studies dealing with specific types of ecofacts and localized habitats will require more detailed presentations. However, it is important to maintain a broad perspective in order to avoid the myopic view of the environment which can arise when conducting field work at a particular site over a period of time. It is easy to forget that the current boundaries of the research area, whether administrative or, in our eyes, "natural," probably bear scant similarity to the boundaries of aboriginally important resource areas. Another tool, the table of C-14 dates, distills a great deal of information, which comes, notably, from just six different reports. With the wide and sometimes subtile variability in coastal ceramics now being recognized, it is essential for researchers to tie down their assemblages with chronometric dates whenever possible. I deeply regret yielding to a sponsor's desire for economy-style Phase II testing on a recent project by deferring radiocarbon dating until Phase III. Phase III, of course, has not occurred and is now unlikely to take place. I must differ with Crook, however, on his categorization of C-14 dates as absolute. They are in fact based on a probability assessment of a physical phenomenon that is far from absolutely regular. By the time the numbers are back from the lab, corrected, and worked out in B.P. and A.D. dates, some of us have a tendency to want to believe them. As a consequence, C-14 dates are sometimes published without adequate discussion of contextual problems, associated materials, and the resulting interpretation. For some of these reasons dates included in the recent Phase III report from Kings Bay (Adams 1985) will require study before they can be added to this table.

The one area I feel is inadequately addressed in this study is the dimension of time. The initial document for this planning process discusses one problem associated with division of the past into 36 operating plan units: Crook acknowledges that spatial boundaries which correspond to geological provinces often wind up bisecting aboriginally important habitation areas because of the well-known phenomenon of ecotonal settlement location (1985:17). In a similar way, division of the temporal dimension into cultural periods may tend to obscure the transitions between sequential cultures: transitions which may in the long run prove to be the most interesting aspect of a particular adaptation. To a certain extent, the Mississippi period operating plan gives the impression of minimal temporal change during the five centuries covered. The Guale Annual Model is based on ethnohistoric data, and therefore represents the end product of five centuries of cultural development. It is necessarily a retrospective model; consequently unsuccessful experiments in adaptation to coastal conditions are not part of the variability represented. I would like to see more work in the future on the problem of defining adaptive, as well as ceramic, differences between the Wilmington and Savannah periods. In the present context this problem can best be dealt with by cautioning the user of the plans to read the temporally preceding and following plans, as well as the plans for areas adjacent to the unit of interest.

Crook has loaded this document with many valuable comments and observations: it is worth reading and re-reading. It will provide a solid foundation on which to build future coastal Mississippi period research. I am eager to see it used.

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Morgan Crook presents a clear, concise and well-written synthesis of Mississippi Period archaeology on the Georgia coast. His monograph demonstrates the rather extensive knowledge we have begun to accumulate for this period. Crook's document is intended to serve as a management document which, I assume, will have some sort of "official" status and thus may be used to influence the directions and interpretations of future research. However, there are alternative interpretations to those presented by Crook; these interpretations are emphasized in the comments below.

As Crook notes, a significant amount of archaeological research has been conducted on the Georgia coast since the early 1970's. His discussion of this past research, however, omits several works that contribute to our knowledge of the area and are worthy of note. One of these is the ethnohistorical synthesis of the Guale recently produced by Grant Jones (1978). While Jones' interpretations of Guale life are not significantly different fom those presented by others, his work should be considered, particularly in light of the fact that Crook's reconstruction of Mississippi period life on the coast (his "structure" model) is based largely upon that documented for the Guale. Fred Cook's (1978) thesis on the Kent Mound, an Irene phase and contact period burial mound on St. Simons Island is also not mentioned. The Kent Mound is of interest since, as far as I know, it represents the southernmost mound now known on the Georgia coast exhibiting a "classic" Irene phase ceramics assemblage. Since sites with Irene phase ceramics are rare on St. Simons Island as compared to the coast farther north, one must question the position of the Kent Mound relative to the Irene phase in general and to Irene phase occupation of St. Simons Island specifically. What, for instance, is the exact chronological position of the Kent Mound, especially in light of the circa A.D. 1440 date obtained for a Savannah phase ceramic provenience on St. Simons, a date presumably falling within the Irene phase as it is known on the northern coast. As Crook notes, we are in a muddle concerning the transition from the Savannah to the Irene phase in both time and space. The southern boundary for the Irene phase seems to be in the Altamaha-Satilla Rivers area. I would put forth the idea that the Kent Mound may be viewed as representing the expansion of Irene phase populations (i.e., those people making Irene ceramics) toward the south into this boundary area or at least onto St. Simons Island. This expansion seems to have been very late, possibly just before historic contact and, in fact, it is conceivable that the impact of European contact stopped the Guale expansion to the south. The Kent Mound and other Irene phase sites in the Altamaha-Satilla River area may hold the key to disentangling this boundary problem.

Another omission is a recent paper of Fred Cook and Frankie Snow (1983), which deals with Southeastern Ceremonial Complex (Southern Cult) symbolism on the Georgia coast. Using data from two sites, the previously mentioned Kent Mound and the Pine Harbor site, the authors make an effort to identify Southern Cult iconography and generalize about its occurrence and relationships to wider cult phenomena. While the study is preliminary, important conclusions are that the symbolism is most prevalent in the form of incised ceramic decorations and that, in this medium, it appears extremely late in the prehistoric period on the Georgia coast and seemingly was in use during the earliest period of European contact. The apparent lateness of the use of cult iconography implies that the ethnohistoric record of the Guale may provide useful clues for sorting out aspects of the function and meaning of the symbolism.

The development of a model of subsistence and settlement (the annual model) is a major aspect of Crook's monograph. In general, I have no disagreements with Crook's projected model, however, I do feel that he has arrived at a level of precision and elegance in the model that may not have existed in actual fact and that is not necessarily supported by the available ethnohistories or archaeological record. I would doubt, for instance, that the utilization of shellfish was as strictly confined to the winter and early spring as is implied in the model. Considering the ease of exploitation of shellfish, it seems logical that they would be used when convenient and/or needed. In particular, if Crook is correct in identifying the spring and early summer as a time of subsistence stress, populations would probably turn to the widespread and abundant shellfish resources of the estuary.

Crook also links particular social forms and units with seasonal subsistence activities, but again these are not fully substantiated by the data. For example, it is suggested that in the spring the primary settlement and subsistence unit was composed of one or two nuclear families. Yet the spring is also the time when anadromous fish would have been taken, presumably a more efficient operation when undertaken with large groups. Crook quotes an April 1566 Spanish account concerning a feast given for Pedro Menendez in which "<u>many women</u>" carried foodstuffs to the festivities. The accumulation of many women and presumably others for a feast does not sound compatible with the scattered settlement and small group composition formulated for this period of the year. Crook admits that the model he presents is an hypothetical construct which serves as a framework against which to compare archaeological data. I would suggest, however, that other quite different formulations for this model are possible and feasible dependent upon how one weighs the archaeological data or selects from the historical documents.

A final point concerns the research and management recommendations presented. A phased research design is presented which represents an ideal approach to conducting research. Unfortunately, much of the archaeological work conducted today is not

intended for, nor can it obtain, the level of comprehensiveness that Crook presents. The small-scale survey and/or testing program is likely to constitute much of the archaeological research in the near future. In light of this, the presentation of somewhat more specific research goals and/or approaches that are achievable through the small-scale effort would seem to be appropriate.

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This seems to be a very dynamic time in Georgia archaeology, what with the recent symposium on Savannah River Valley archaeology at the SEAC meetings in Birmingham (November, 1985) organized by Hanson and Anderson and now this discussion of the Georgia Coast. Both need to know each other better. The Savannah River symposium was a bit too much focused on up-river affairs without taking into account the important impact of the Coastal environment through time, and now Crook's paper has not reflected the significant Mississippian developments that Hally and Anderson have wrought both with their own work and especially with the renewed use of old data from important Mississippian period sites like Tugaloo and Hollywood. These latter major sites must have had important ties to the coastal developments. If they didn't, then we should surely investigate that matter too.

Crook has taken a very important and helpful step with the use of an ethnographic model based on the Guale to consider the social-political organization and the economy on the Georgia coast. He suggests (p. 11) that the model will be used "for evaluating archaeological information." Surely that is partly true, but I would also think that the model would be evaluated and tested against the archaeological data as well. Certainly there is no assurance, given the vagaries of ethnohistory, that the elegant annual model (Figure 2) is perfect; the Guale data although adequate, cannot be characterized as very redundantly checkable. Nonetheless, one does feel quite confident about much of the reconstruction, especially on economic aspects, building on the solid base established by Larson earlier.

The archaeological data for the Mississippian period on the coast can best be described as only adequate, although work since the 1970's (p. 34) has added quite a bit of new information, especially on the central portion and the southern end. Despite these advances the coast is still relying on the simplistic Wilmington- Savannah- Irene-San Marcos sequence. Crook (p. 37) throws out the proposed "St. Catherines phase"; I confess not to know or uderstand the nuances of that argument, but I am hard pressed to agree that its acceptance "could serve to blind researchers to important social or cultural issues." In most cases, additional phases or sub-phases tend to sharpen rather than dull such perceptions. I certainly do not agree (p. 38) that TL dating will clear up many of the problems in the Savannah-Irene transition, nor do I feel that C-14 dates will do it either--in those late time ranges, C-14 dates have caused more problems than they've solved.

There is no question that when one talks about Mississippian on the Georgia Coast, one is going to have to lean often on the Irene site data (of ever-honored memory), and Crook has done just that (pp. 40-41). I would be a lot more comfortable with this discussion if there was evidence that the actual materials had been re-analyzed, as

has been done at Tugaloo and Hollywood. As far as I know, the Irene materials are still available and should be subjected to re-investigation before complex hypotheses involving brief intervals of time are set forth. The data may be there, but new questions, never asked in WPA days, are being tested with old sherd counts, or so it seems. A very nit-picking thing, but (p. 43) Macon Plateau ceramics, although decoratively simple, are formally complex, bringing into central Georgia new vessel shapes and modes that have wide-ranging impact through time.

In the conclusions the term "Mature Coastal Tradition" is mentioned (p. 52). Again this may only reflect my current ignorance of the area, but I'm not sure where or how that concept has been defined; no citation is given. In evaluating his structural model, there are some rather self-congratulatory statements about its successful use and predictive results. If one is going to make statements like that, one has got to give appropriate quantification, in tabular format, and outline the nature of the testing; generalities won't do. Don't tell the reader (p. 53) what the model will eventually prove and how accurate it's going to be. That sounds like a car dealer touting a new automobile. Instead, test the model thoroughly and show us the results, then and only then, will we be willing and able to give congratulations on the triumph.

Overall, I think the report is, indeed, a very useful review of the current situation. Its major need is to expand the comparative section so that it interacts with new concepts of development and change that are being suggested for the Mississippian period in nearby parts of interior Georgia, South Carolina and Tennessee. No region, however ecologically distinct, is isolated; especially not during such dynamic times as those from A.D. 1000 when Mississippian cultures are on the move throughout the entire Southeast. Also, there is an abundance of new data in the interior on the protohistoric period; that too must be drawn upon for an adequate understanding of the cultural dynamics of these times on the Coast, as well.

REPLY

The preceeding comments illustrate the value of peer review in their presentation of a variety of alternative perspectives and observations about Mississippi Period archaeology on the Georgia coast. I thank all for their thoughtful comments. Here, I will address what I see as the primary criticisms and observations of the reviewers. Both Milanich and Smith clearly are positive in their reviews of my effort, while Pearson is generally supportive but cautious, and Williams would seem to have preferred that my research had been done very differently.

Milanich promotes a three-phase research plan that argues for intensive Phase II research to accurately and adequately access significance and to provide a detailed, specific research design for data-recovery, should that mitigative option prove necessary. Peer review is seen as critical to assure quality design and performance of the research. I agree with the intent of Milanich's recommendations. Anyone who has attempted data-recovery at a site where Phase II testing has not adequately documented the range of significant existing information would be sympathic to increasing the time and energy put into mid-level research. Phase II is the critical point in the process and specific significant research questions must be identified. Unfortunately, general research questions - such as that "the site contains information important to our understanding of Mississippi Period settlement and subsistence systems" - appear to be the ones most often stated to justify significance. The more explicit we phrase our questions, the more significant will be our answers.

Milanich also offers interesting and testable observations concerning the Irene Phase. He suggests that the Irene ceramic complex may be associated with sacred contexts that are contemporary with secular Savannah contexts in the southern part of the Guale territory, and that true Irene Phase occupation may have been restricted to more northern areas of the coast. In other words, the Savannah Phase continued up to Spanish contact in the southern part of the Altamaha Region. His evidence that the aborigines on St. Simons Island produced Savannah pottery types during the early sixteen century rests in a dog burial found along the edge of a Savannah Phase site. The dog had a musket ball in its ribs. This interpretation is appealing and should be tested in future research in the area. I must confess little confidence in dating the dog burial. I would feel more comfortable with a Savannah Phase provenience if it had been buried with a Savannah Cord-Marked pot.

Smith properly argues in her review for development of supplementary models that extend the Annual Model to consider in a more detailed way the spatial aspects of coastal adaptation and changes in that adaptation over time. I certainly agree with this need and would stress that the Annual Model, while providing for basic

spatial/seasonal patterns, should be refined or new models constructed as new information allows.

Smith also takes issue with my use of the word "absolute" when discussing C-14 dates. Her concern is taken to heart, but my intent was never to argue that C-14 dates are infallible. Rather, my intent was to characterize C-14 as "absolute" in a chronometric, calendrical sense, as opposed to relative dating. The more important difficulty Smith has, and I agree, concerns assessing the validity of C-14 dates. This can be done only with careful documentation and consideration of the archaeological context and associations. C-14 tables that summarize dates and their phases may appear valid until the contexts and associations of particular dates are closely examined.

The final point Smith makes concerns organization of the entire planning strategy (Crook 1985) for archaeology in Georgia. She points out that by dividing Georgia Archaeology into distinct Cultural-Period/Environmental segments, there is a danger of overlooking transitions between the periods. Each transition - the shift between one culture period and the next - is a dynamic time and often may provide the most important evidence concerning the processes involved in changing adaptive strategies. This kind of oversight has not, and hopefully will not, be made. However, the initial set of operation plans in each area are in a weak position to evaluate period transitions. As others are written, evidence of transition should be formally considered. For example, research for the Woodland Period of the Coastal Zone will be in a position to evaluate the transition between it and the Mississippi Period, since the Mississippi Period will be available. In addition, the Woodland Period document will contain information that bears directly on the Mississippi Period. This will require revision of the Mississippi Period document. The process of researching and writing the operating plans is a dynamic one, requiring revision and updating on a periodic basis.

Pearson's review stresses that there are alternative interpretations of the Georgia Coast during the Mississippi Period, and that there are important references omitted in the document that are worthy of note. There are in fact several references that might have been used that were not. The ones used provide the data required to document and understand the general adaptative pattern present on the coast during the Mississippi Period. In his example of an alternative interpretation, Pearson questions exclusive aboriginal use of shellfish during the winter and early spring. He also sees ethnohistoric evidence for large groups of people during the spring as being incompatible with the "one or two nuclear family units" predicted in the Annual Model as the primary social and settlement group. I see nothing incompatible here. The evidence for large groups of people clearly refers to a festive occasion (p. 26) and is predicted by the model. In addition, it is expected (p. 27) that the nuclear family units combined temporarily into larger groups to exploit the spawning fish. As for oysters, I never say that shellfishing was exclusively a winter and early spring activity.

Rather, this would have been the most productive and thus most important time to gather oysters. Oysters occasionally may have been gathered at other times in response to subsistence stress of one kind or another (p. 25).

Pearson points out, as did Smith, that an alternative reconstruction of the Guale has been presented by Grant Jones (1978). This reconstruction relies mainly on late (post-1600) Franciscan accounts and discounts earlier Jesuit accounts as being intentionally exaggerated and unreliable. Jones argues from the later Franciscan accounts that the Guale resided in and immediately around sedentary towns and relied heavily upon maize agriculture. The critical differences between the two reconstructions are my focus upon pre-1600 Jesuit and Franciscan accounts and a consideration of these within their environmental context. It seems clear that the early accounts are significant and meaningful when viewed in an ecological prespective. The alternative model proposed by Jones, however, may prove to be accurate for the Guale who had changed in response to a variety of Spanish pressures. In other words, my model is concerned with the Guale prior to successful acculturation and Jones' model with the acculturated Guale.

By far the most critical comments on the monograph are offered by Stephen Williams. It seems that Williams would be far happier if I had written a culture-history type synthesis of the Georgia coast. I make no apology for my perspective and would urge Williams to develop his.

Williams is correct in pointing out that the Irene Mound materials should be reanalyzed, but this task was beyond the scope and means of the present research effort. He is also justified in criticizing my undefined use of the "Coastal Tradition". This term was created by Milanich (1971:112-115) to refer to a distinctive conservative cultural adaptation on the Atlantic coast that began about 3,000 BC and continued through the Wilmington Phase. It has seen widespread use in the literature and in professional discussions. I use the term "Mature Coastal Tradition" to refer to the Mississippi Period adaptation on the coast; an adaptation which had its conservative economic roots in the Wilmington Phase but which was socially and politically much more complex.

I must conclude that Williams misread the monograph when he questions whether the model will be "tested against archaeological data" and again later when he attacks my evaluation of the model as being self-congratulatory. The need for testing the model with archaeological data, and refining it accordingly, is specifically called for in my discussion (pp. 11, 53). My evaluation of the model is generously qualified and supported, with no intent to be self-congratulatory.

Finally, Williams finds fault with the absence of detailed comparisons of the coast with the interior during the Mississippi

Period. This is not an oversight on my part. An understanding of the Mississippi Period adaptation on the coast requires that aspects of this adaptation first be examined and defined in their context. Premature comparison of isolated aspects of the interior with the coast undoubtedly will provide tenuous results. Both areas require independent understanding; meaningful comparisons only then will be possible. As Larson (1980:229) observed, "It is necessary to reject any consideration of aboriginal cultures on the Coastal Plain that treats them as only marginal expressions of cultural development of the interior. This tendency to view the Coastal Plain cultures as more or less attenuated varieties of 'Mississippi culture' has not only failed to contribute to an understanding of what and why they were, but it has seriously obscured them even more."

REFERENCES CITED

Adams, Richard N.
1975 Energy and Structure: A Theory of Social Power. University of Texas Press, Austin.

Adams, William H. (editor)
1985 Aboriginal Subsistence and Settlement Archaeology of the Kings Bay Locality. Volume 1: The Kings Bay and Devils Walkingstick Sites. Reports of Investigations, No. 1. Department of Anthropology, University of Florida.

Andrews, Evangeline W., and Charles McL. Andrews (editors)
1945 Jonathan Dickinson's Journal. Yale University Press, New Haven.

Barcía, Andrés González de
1951 Chronological History of the Continent of Florida, translated by Anthony Kerrigan. University of Florida Press, Gainesville.

Bennison, Allan B.
1975 Geological Highway Map of the Southeastern Region. United States Geological Highway Map Series, No. 9. The American Association of Petroleum Geologists, Tulsa.

Binford, Lewis R.
1982 The Archaeology of Place. Journal of Anthropological Archaeology 1:5-31.

Bonner, F.T., and L.C. Maisenhelder
1974 Carya Nutt. Hickory. In Seeds of Woody Plants in the United States, pp. 269-272. Agricultural Handbook No. 450. Forest Service and U.S. Department of Agriculture, Washington, D.C.

Bonner, J.C.
1964 A History of Georgia Agriculture. University of Georgia Press, Athens.

Braley, Chad O.
1985 9 McI 41, An Irene Period Homestead on Harris Neck National Wildlife Refuge, Coastal Georgia. Paper presented at the 1985 Southeastern Arcaheological Conference, Birmingham, Alabama.

Breder, Charles M., Jr.
1948 Field Book of Marine Fishes of the Atlantic Coast from Labrador to Texas. G.P. Putnam's Sons, New York.

Caldwell, Joseph R.
1952 The Archaeology of Eastern Georgia and South Carolina. In Archaeology of Eastern United States, edited by James B. Griffin, pp. 312-321. University of Chicago Press, Chicago.

1971 Chronology of the Georgia Coast. Southeastern Archaeological Conference, Bulletin 13:89-91.

Caldwell, Joseph R. and Catherine McCann
nd. The Deptford Site, Chatham County, Georgia. Unpublished manuscript on file at the Ford Library, Florida State Museum, Gainesville.

1941 Irene Mound Site. University of Georgia Press, Athens.

Caldwell, Joseph R. and Antonio J. Waring, Jr.
1939a Some Chatham County Pottery Types and Their Sequence. Southeastern Archaeological Conference Newsletter 1(5):4-9; 1(6):1-12.

1939b The Use of a Ceramic Sequence in the Classification of Aboriginal Sites in Chatham County, Georgia. Southeastern Archaeological Conference Newsletter 2(1):6-7.

Castaneda, P., M. Cuesta, and P. Hernandez
1977 Alonso de Chaves y el Libro IV de su "Espejo de Navegantes". Industrias Graficas Espana, S.L., Madrid.

Chestnut, Alphonse F.
1951 The Oyster and Other Mollusks in North Carolina. In Survey of Marine Fisheries of North Carolina, by Harden F. Taylor, pp. 141-190. University of North Carolina Press, Chapel Hill.

Cook, Fred C.
1978 The Kent Mound: A Study of the Irene Phase on the Lower Georgia Coast. Unpublished M.A. thesis, Department of Anthropology, Florida State University.

Cook, Fred C. and Frankie Snow
1983 Southeastern Ceremonial Complex Symbolism on the Georgia Coast during the Late Irene Phase at Two 16th Century Spanish Contact Sites. Chesapiean 21(3):2-13.

Crawford, James M.
1975 Southeastern Indian Languages. In Studies in Southeastern Indian Languages, edited by James M. Crawford, pp. 1-120. University of Georgia Press, Athens.

Crook, Morgan R., Jr.
1975 An Archaeological Survey of Green Island, Georgia. Unpublished report on file at the Laboratory of Archaeology, West Georgia College.

1978 Mississippian Period Community Organizations on the Georgia Coast. Ph.D. Dissertation, University of Florida. University Microfilms, Ann Arbor.

1984 Evolving Community Organization on the Georgia Coast. Journal of Field Archaeology 11:247-263.

1985 A Strategy for Cultural Resource Planning in Georgia. Office of the State Archaeologist, West Georgia College.

Dahlberg, Michael D.
1972 An Ecological Study of Georgia Coastal Fishes. Fishery Bulletin 70:323-353.

1975 Guide to Coastal Fishes of Georgia and Nearby States. University of Georgia Press, Athens.

Davis, T. Frederick
1935 Juan Ponce de Leon's Voyages to Florida. Florida Historical Quarterly 14:3-70.

DePratter, Chester B.
1973 Archaeological Survey of Black Island. Unpublished Report on file at the Laboratory of Archaeology, University of Georgia.

1978 Prehistoric Settlement and Subsistence Systems, Skidaway Island, Georgia. Early Georgia 6:65-80.

1979 Ceramics. In The Anthropology of St. Catherines Island 2: The Refuge - Deptford Mortuary Complex, edited by David H. Thomas, pp. 109-132. Anthropological Papers of the American Museum of Natural History, Volume 56(1).

Durant, Jeannette E.
1968 Notes of the Fauna Associated with Oyster Beds. In Final Report: Feasibility Study of Methods for Improving Oyster Production in Georgia (Project 2-10-R), edited by Thomas L. Linton, no pagination. Marine Fisheries Division of the Georgia Game and Fish Commission and University of Georgia, Atlanta and Athens.

Ehrenhard, John E.
1976 Cumberland Island National Seashore: Assessment of Archeological and Historical Resources. Southeast Archeological Center, Tallahassee.

Espenshade, Christopher T.
1981 The Lack of a Wilmington/Savannah Distinction in the Cord Marked Pottery from King's Bay, Georgia. Early Georgia 9:25-32.

Fairbanks, Charles H.
1950 A Preliminary Segregation of Etowah, Savannah, and Lamar. American Antiquity 15:142-151.

1956 Archeology of the Funeral Mound, Ocmulgee National Monument. National Park Service Archeological Research Series, No. 3.

Fish, Paul R.
1976 Patterns of Prehistoric Site Distribution in Effingham and Screven Counties, Georgia. University of Georgia Laboratory of Archaeology Series, Report No. 11.

Fried, Morton H.
1967 The Evolution of Political Society: An Essay in Political Anthropology. Random House, New York.

García, Genaro
1902 Dos Antiguas Relaciones de la Florida. J. Aguilar Vera y Comp., Mexico.

Golley, Frank B.
1962 Mammals of Georgia: A Study of Their Distribution and Functional Role in the Ecosystem. University of Georgia Press, Athens.

Gray, Lewis C.
1933 History of Agriculture in the Southern United States to 1860. 2 vol. Carnegie Institution of Washington, Publication No. 430.

Hally, David J., Richard Zurel, and Tom Gresham
1975 An Archaeological Survey of Channel, Dike and Streambank Protection Structures, Big Mortar-Snuffbox Swamp Watershed, Long and McIntosh Counties, Georgia. Unpublished report on file in the Department of Anthropology, University of Georgia.

Harper, Francis (editor)
1958 The Travels of William Bartram. Yale University Press, New Haven.

Hoese, H.D.
1968 Studies on the Parasitic Oyster Fungus Labyrinthomyxa sp. in Georgia Salt Waters. In Final Report: Feasibility Study of Methods for Improving Oyster Production in Georgia (Project 2-10-R), edited by Thomas L. Linton, no pagination. Marine Fisheries Division of the Georgia Game and Fish Division and the University of Georgia, Atlanta and Athens.

Hoffman, Paul E.
1984 The Chicora Legend and Franco-Spanish Rivalry. Florida Historical Quarterly 62:419-438.

Holder, Preston
1938 Excavation on St. Simons Island and Vicinity, Winter of 1936-1937. Society for Georgia Archaeology, Proceedings 1:8-9.

ms. Letters from Preston Holder to A.R. Kelly (December 1936, July 1937). On file in the Ford Library, Florida State Museum, Gainesville, Florida.

Hoyt, John H.
1968 Geology of the Golden Isles and Lower Georgia Coastal Plain. In The Future of the Marshlands and Sea Island of Georgia, edited by D.S. Maney, F.C. Marland, and C.B. West, pp. 18-34. Record of a conference convened by the Georgia Natural Areas Council and the Coastal Area Planning and Development Commission.

Hoyt, John H., and John R. Hails
1967 Pleistocene Shoreline Sediments in Coastal Georgia: Deposition and Modification. Science 155:1541-1543.

Hulse, Frederick S.
1941 The People Who Lived at Irene: Physical Anthropology. In Irene Mound Site by Joseph R. Caldwell and Catherine McCann, pp. 57-68. University of Georgia Press, Athens.

Johnson, A. Sydney, Hilburn O. Hillestad, Sheryl F. Shanholtzer, and G. Frederick Shanholtzer
1974 An Ecological Survey of the Coastal Region of Georgia. National Park Service Scientific Mongraph No. 3. U.S. Government Printing Office, Washington, D.C.

Johnson, Gregory A.
1978 Information Sources and the Development of Decision-Making Organization. In Social Archaeology: Beyond Subsistence and Dating, edited by Charles L. Redman, Mary J. Berman, Edward V. Curtin, William T. Langhorne, Jr., Nina M. Versaggi, and Jeffery C. Wanser, pp. 87-112. Academic Press, New York.

Jones, Grant
1978 The Ethnohistory of the Guale Coast through 1684. In: The Anthropology of St. Catherines Island 1: Natural and Cultural History. Anthropological Papers of the American Museum of Natural History 55(2):178-210.

Juengst, Daniel P. (editor)
1980 Sapelo Papers: Researches in the History and Prehistory of Sapelo Island, Georgia. West Georgia College Studies in the Social Sciences, Vol. 19.

Larsen, Clark S., and David H. Thomas
1982 The Anthropology of St. Catherines Island 4: The St. Catherines Period Mortuary Complex. Anthropological Papers of the American Museum of Natural History, Volume 57(4).

Larson, Lewis H.
1953 Coastal Mission Survey. Unpublished manuscript on file at the Office of the Georgia State Archaeologist, Carrollton.

1957 The Norman Mound, McIntosh County, Georgia. The Florida Anthropologist 10:37-52.

1958 Cultural Relationships Between the Northern St. Johns Area and the Georgia Coast. The Florida Anthropologist 11(1):11-22.

1978 Historic Guale Indians of the Georgia Coast and the Impact of the Spanish Mission Effort. In Tacachale: Essays of the Indians of Florida and Southeastern Georgia during the Historic Period, edited by Jerald Milanich and Samuel Proctor, pp. 120-140. Ripley P. Bullen Monographs in Anthropology and History, No. 1. University of Florida Press, Gainesville.

1980 Aboriginal Subsistence Technology on the Southeastern Coastal Plain during the Late Prehistoric Period. Ripley P. Bullen Monographs in Anthropology and History, No. 2. University of Florida Press, Gainesville.

Laudonnière, René
1975 Three Voyages, translated by Charles E. Bennett. University Presses of Florida, Gainesville.

Lee, Charles F., and Leonard Pepper
1956 Composition of Southern Oysters. Commercial Fisheries Review 18(7):1-6.

Lorant, Stefan (editor)
1946 The New World: The First Pictures of America. Duell, Sloan, and Pearce, New York.

Mahood, Robert K., C. Duane Harris, James L. Music, Jr., and Bobby A. Palmer
1974a Survey of the Fisheries Resources in Georgia's Estuarine and Inshore Waters, Part II, Central Section: Doboy Sound and Sapelo Sound Estuaries. Georgia Department of Natural Resources, Game and Fish Division Contribution No. 23. Atlanta.

1974b Survey of the Fisheries Resources in Georgia's Estuarine and Inshore Waters, Part IV, Southern, Central and Northern Sections. Georgia Department of Natural Resources, Game and Fish Division Contribution No. 25. Atlanta.

Marrinan, Rochelle A.
1975 Ceramics, Molluscs, and Sedentism: The Late Archaic Period on the Georgia Coast. Ph.D. Dissertation, University of Florida. University Microfilms, Ann Arbor.

Martinez, Carlos A.
1975 Culture Sequence on the Central Georgia Coast, 1000 B.C. - 1650 A.D. Unpublished M.A. Thesis on file at the Department of Anthropology, University of Florida.

Merás, Gonzalo Solís de
1964 Pedro Menéndez de Avilés, translated by Jeannette Thurber Conner. University of Florida Press, Gainesville. Original published translation 1923. The Florida State Historic Society, Deland.

Milanich, Jerald T.
1971 The Deptford Phase: An Archaeological Reconstruction. Ph.D. Dissertation, University of Florida. University Microfilms, Ann Arbor.

1977 A Chronology for Aboriginal Cultures of Northern St. Simons Island, Georgia. The Florida Anthropologist 30(3):134-142.

1982 True Confessions of an Archeologist. Contract Abstracts and CRM Archeology 2(3):9-10.

Moore, Clarence B.
1897 Certain Aboriginal Mounds of the Georgia Coast. Journal of the Academy of Natural Sciences of Philadelphia 11(1):1-138.

1898 Certain Aboriginal Mounds of the Coast of South Carolina. Journal of the Academy of Natural Sciences of Philadelphia 11(2):146-166.

Moore, James A.
1983 The Trouble with Know-It-Alls: Information as a Social and Ecological Resource. In Archaeological Hammers and Theories, edited by James A. Moore and Arthur S. Keene, pp. 173-191. Academic Press, New York.

Murdock, George P.
1949 Social Structure. MacMillan, New York.

Olsen, David F., Jr.
1974 Quercus L. Oak. In Seeds of Woody Plants in the United States, pp. 692-703. Agriculture Handbook No. 450. Forest Service and U.S. Department of Agriculture, Washington, D.C.

Oré, Luís Gerónimo
1936 The Martyrs of Florida (1513-1616), translated by Maynard Geiger. Franciscan Studies No. 18. New York.

Pearson, Charles E.
1977 Analysis of Late Prehistoric Settlement on Ossabaw Island, Georgia. University of Georgia Laboratory of Archaeology Series, Report No. 12.

1979 Patterns of Mississippian Period Adaptation in Coastal Georgia. Ph.D. Dissertation, University of Georgia. University Microfilms, Ann Arbor.

Peebles, Christopher S., and Susan M. Kus
1977 Some Archaeological Correlates of Ranked Society. American Antiquity 42:421-448.

Ray, S., J.C. Mackin, and J.L. Boswell
1953 Quantitative Measurement of Effect on Oysters of Disease Caused by "Dermoystidium marinum". Bulletin of Marine Science in the Gulf and Caribbean 3(1):6-33.

Saffer, Marian
1980 Technological Analysis of Some Sapelo Island Pottery: Social and/or Functional Differences. Southeastern Archaeological Conference Bulletin 22:35-38.

Sears, William H.
1958 The Wilbanks Site (9Ck5), Georgia. Bureau of American Ethnology, Bulletin 169:129-194.

1973 The Sacred and the Secular in Prehistoric Ceramics. In: Variations in Anthropology: Essays in Honor of John McGregor, edited by D. Lathrup and J. Douglas, pp. 31-42. Illinois Archaeological Survey, Urbana.

Serrano y Sanz, Manuel (editor)
1912 Documentos Historicos de la Florida y la Luisiana, Siglos XVI al XVII. V. Suarez, Madrid.

Service, Elman R.
1962 Primitive Social Organization: An Evolutionary Perspective. Random House, New York.

Sheldon, Craig T.
1976 An Archaeological Survey of Colonels Island, Glynn County, Georgia. Unpublished manuscript on file in the Laboratory of Archaeology, West Georgia College.

Shelford, Victor E.
1963 The Ecology of North America. University of Illinois Press, Urbana.

Smith, Larry D.
1968 Notes on the Distribution, Relative Abundance and Growth of Juvenile Anadromous Fish in the Altamaha River System, Georgia, with Specific Reference to Striped Bass, Roccus saxatilis (Walbaum). Georgia Game and Fish Commission Contribution Series, No. 1.

Smith, Marvin D.
1984 Depopulation and Culture Change in the Early Historic Period Interior Southeast. Ph.D. Dissertation, University of Florida. University Microfilms, Ann Arbor.

Smith, Robin L.
1978 An Archaeological Survey of Kings Bay, Camden County, Georgia. Unpublished report on file in the Laboratory of Archaeology, West Georgia College.

1982 Coastal Mississippian Period Sites at Kings Bay, Georgia: A Model-Based Archeological Analysis. Ph.D. Dissertation, University of Florida. University Microfilms, Ann Arbor.

Smith, Robin L., Chad O. Braley, Nina T. Borremans, and Elizabeth Reitz
1981 Coastal Adaptations in Southeast Georgia: Ten Archeological Sites at Kings Bay. Unpublished Report on file in the Laboratory of Archaeology, West Georgia College.

South, Stanley
1976 An Archaeological Survey of Southeastern Coastal North Carolina. Institute of Archeology and Anthropology Notebook 8:1-55. University of South Carolina, Columbia.

Speck, Frank G.
1907 The Creek Indians of Taskigi Town. American Anthropological Association Memoir 2(2)99-164.

Steed, William
1972 The St. Catherines Period: A Newly Recognized Segment in the Cultural Sequence of the Georgia Coast. Unpublished manuscript on file at the Laboratory of Archaeology, University of Georgia.

Steinen, Karl T. (editor)
1978 The Cultural Evolution and Environment of Colonel's Island, Georgia. Report submitted to the Georgia Ports Authority, Savannah. Unpublished report on file at the Laboratory of Archaeology, West Georgia College.

1984 Cultural Occupation of the Georgia Coastal Marsh. Southeastern Archaeology 3(2):164-172.

Sturtevant, William C.
1964 Document 42: A Jesuit Missionary in South Carolina, 1569-70. In The Indian and the White Man, edited by Wilcomb E. Washburn, pp. 167-175. Anchor Books, New York.

Swanton, John R.
1922 Early History of the Creek Indians and Their Neighbors. Bureau of American Ethnology Bulletin 73. Washington, D.C.

1928 Social Organization and Social Usages of the Indians of the Creek Confederacy. Forty-Second Annual Report of the Bureau of American Ethnology, pp. 23-472. Washington, D.C.

1946 The Indians of the Southeastern United States. Bureau of American Ethnology Bulletin 137. Washington, D.C.

Thomas, David H. and Grant Jones, Rodger Durham, and Clark S. Larsen
1978 The Anthropology of St. Catherines Island: I. The Natural and Cultural History. Anthropological Papers of the American Museum of Natural History 55(2).

U.S. Department of Commerce
1960 Georgia. Climatological Data Vol. 64.

1965 Georgia. Climatological Data Vol. 69.

1970 Georgia. Climatological Data Vol. 74.

1972 Georgia. Climatological Data Vol. 76.

Wallace, Ronald L.
1975 An Archaeological, Ethnohistoric, and Biochemical Investigation of the Guale Aborigines of the Georgia Coastal Strand. Ph.D. Dissertation, University of Florida. University Microfilms, Ann Arbor.

Waring, Antonio J., Jr.
1968a The Bilbo Site - Chatham County, Georgia. In The Waring Papers, edited by Stephen Williams, pp. 152-197. Peabody Museum of Archaeology and Ethnology Papers, 58.

1968b The Refuge Site, Jasper County, South Carolina. In The Waring Papers, edited by Stephen Williams, pp. 198-208. Peabody Museum of Archaeology and Ethnology Papers, 58.

1968c The Cultural Sequence at the Mouth of the Savannah River. In The Waring Papers, edited by Stephen Williams, pp. 216-221. Peabody Museum of Archaeology and Ethnology Papers, 58.

1968d The Excavation of Mound A, Eulonia, Georgia. In The Waring Papers, edited by Stephen Williams, pp. 256-269. Peabody Museum of Archaeology and Ethnology Papers, 58.

Waring, Antonio J., Jr. and Preston Holder
1968 The Deptford Ceramic Complex. In The Waring papers, edited by Stephen Williams, pp. 135-151. Peabody Museum of Archaeology and Ethnology Papers, 58.

Waring, Antonio J., Jr. and Lewis H. Larson, Jr.
1968 The Shell Ring on Sapelo Island. In The Waring Papers, edited by Stephen Williams, pp. 263-280. Peabody Museum of Archaeology and Ethnology Papers, 58.

Watt, Bernice K., and Annabel L. Merrill
1963 Composition of Foods. Agricultural Handbook No. 9. U.S. Department of Agriculture, Washington, D.C.

Wells, Harry W.
1961 The Fauna of Oyster Beds, with Special Reference to the Salinity Factor. Ecological Monographs 31(3):239-266.

Wharton, Charles H.
1977 The Natural Environments of Georgia. Georgia Department of Natural Resources, Atlanta.

Wilson, Rex
1964 A Radiocarbon Date for the Macon Earth Lodge. American Antiquity 30:202-203.

Wauchope, Robert
1966 Archaeological Survey of Northern Georgia, with a Test of Some Cultural Hypotheses. Society for American Archaeology, Memoir No. 21.

Zimm, Herbert S., and Hurst H. Shoemaker
1955 Fishes: A Guide to Fresh- and Salt-Water Species. Golden Press, New York.

Zubillaga, Felix (editor)
1946 Monumenta Antiquae Florida (1566-1572). Monumenta Historica Societatis Iesu, vol. 69. Monumenta Missionum Societatis Iesu, vol. 3. Rome.