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Edited by
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PREFACE

The Thirty-Sixth Southeastern Archaeological Conference was held in Atlanta, Georgia, on November 8-10, 1979. Roy S. Dickens served as local arrangements chairperson and Robert L. Blakely and Anne F. Rogers were program co-chairpersons. For the first time ever a student paper competition was held, and a committee chaired by Stephen Williams selected Julie Stein as the winner. Ms. Stein's paper was entitled "Geologic Analysis of the Green River Shell Middens."

The conference was the largest for the SEAC to date. One hundred fourteen papers were presented in fifteen sessions. And for the first time three sessions ran concurrently each morning and afternoon. This complexity necessitated the printing of a floor plan of the meeting rooms which also showed the locations of both men's and women's rooms. A once small conference has clearly become big time.

I am grateful to Vernon J. Knight and Diane Coupe for their help in preparing this Bulletin for publication. Jim handled most of the correspondance with authors, all of whom graciously provided us with excellently prepared copy and graphics.

J.T. Milanich
Florida State Museum

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TREND SURFACES AND THE DELINEATION OF DISTURBED AND IN SITU SITE STRUCTURE: TWO EXAMPLES FROM NORTH CAROLINA

Trawick Ward

The purpose of this paper is to discuss some preliminary findings concerning the correlation between the structure of undisturbed, in situ features and architecture and the patterns of various classes of artifacts contained in the plow zone. The study of the interrelationships between disturbed and undisturbed site structures is certainly neither novel nor revolutionary.

Recently several researchers (Binford et al. 1970; Redman and Watson 1970; Schiffer and Rathje 1973; Flannery 1976; and Faulkner and McCollough 1978) have dealt explicity with the problem of the degree of coincidence between disturbed site structure and the undisturbed matrix. These studies have, however, been primarily concerned with surface-subsurface correlations. Few have attempted to investigate on a large scale the degree of correspondence between the patterns of artifact densities within the plow zone and the buried in situ spatial structure represented by features, houses, and other architectural forms.

My interest in this area grew out of a concern over a growing number of reports dealing with the excavation of small, plow-disturbed sites where a high degree of horizontal spatial integrity has been simply assumed. It was felt that many of the spatial relationships among various artifact types and classes were not reflecting the activity structure and adaptive poses of past cultural systems as much as they were indicating agricultural practices as well as fortituous and capricious natural forces. This skepticism eventually led to a series of spatial studies involving a somewhat unique body of data from two sites that the Research Laboratories have been excavating for several years. The most well known of these is the Warren Wilson site, Bn29, the subject of a recent book by Roy Dickens (1976). As most of you know, this site represents a late prehistoric Cherokee village located on the floodplain of the Swannanoa River in Buncombe County, North Carolina. In many ways, Warren Wilson is typical of the medium sized villages occupied during the Pisgah phase in western North Carolina. The other site, not so well known as yet, is located on the Dan River in the northern piedmont section of Stokes County. This site, Skla, comprises a historic Souian village that has been putatively identified as a component of Upper Saurtown. It too is "typical" of many of the Dan River Phase occupations along the Dan and its tributaries in North Carolina and Virginia. Jack Wilson (1977) has recently detailed a segment of the subsistence cycle at Skla and is currently carrying out an extensive study of the Dan River phase.

My interest in these sites results from the fact that large portions of their respective village areas have been totally excavated, bringing to light considerable information concerning the spatial arrangements of features, burials, houses, palisades as well as other architectural forms. Over 24,000 ft^2 have been opened at Bn29, while well over 10,000 ft^2 have been exposed at Skla, and the work is continuing today. The scale of the excavations alone certainly does not make them unique, but the fact that they have been consistently excavated utilizing exacting field techniques resulting in the near total recovery of plow zone materials does set them apart. This plow zone data, in conjunction with the in situ village plans have permitted the evaluation of several assumptions concerning the relationships between disturbed and undisturbed site structures. Concomitantly, new insights into the spatial analysis of plow zone sites have also surfaced.

The scope of this paper is too limited to allow a detailed discussion of the research objectives currently being investitated. As a consequence, only a broad, general overview will be presented.

As mentioned previously, the first objective has been to explore the degree of correlation between undisturbed feature artifact output and the disturbed artifact distributions contained in the plow zone. Based on studies of surface-subsurface correspondences, the picture is unclear, and it appears that a myriad complex of factors are at play (Flannery 1976). However, by comparing the plow zone artifact densities with the known in situ structure, the best possible conditions for patterned correspondence between the two contexts exist. Patterned correspondence simply refers to the fact that if undisturbed areas of the site have high artifact output, it is expected that this trend would be discernable within the plow zone and vice versa.

If some form of predictative relationship between the two contexts could be established, it was felt that the different classes of artifacts would display differential degrees of predictative acuity and further that certain kinds of specimens would readily indicate specific types of subsurface facilities. For example, it was hypothesized that the presence of concentrations of bone in the plow zone would indicate subsurface trash pits. This relationship is based on several assumptions. First, it was somewhat ethnocentrically assumed that bone, because of its unattractive and noxious nature would very likely be cleaned up and deposited in a secondary context (see South 1977). It was also assumed that bone elements would be broken up into smaller and smaller fragments with each successive plowing and that these smaller, dispersed fragments would lose their survival potential. Consequently, only those pieces kicked up by the most recent plowings would be present in the plow zone, and these should be concentrated in close proximity to their points of entry.

Because of its small size and unobnoxious presence, lithic debris was considered to have most likely entered the record in a primary or de facto context (see Schiffer 1972; Binford 1978; South 1979). A similar disposal pattern was suggested for the small triangular arrow points common at both sites. As a result of the way in which it was assumed these specimens entered the record - or were "transformed" from systemic to archaeological context to use Schiffer's (1976) terminology - it was hypothesized that plow zone densities of debitage and arrow points would have little predictive value in locating subsurface features.

A third objective was to define the intra-site structure contained in both the plow zone and the undisturbed context. Recent studies, by and large, have either relied totally on in situ deposits when both disturbed and undisturbed materials were present (Smith 1978) or assumed a degree of spatial association for plow zone or surface artifact distributions when intact remains were lacking (House and Wogaman 1978). Few, if any, spatial or activity analyses have utilized both contexts in interpreting spatial patterns and those cultural, systemic processes encoded in such patterns. Specifically, it is felt that most specimens in primary or de facto context are contained in the plow zone at sites similar to Warren Wilson and Skla, while secondary refuse deposition primarily comprises the in situ artifact patterns. By using data from both contexts, it is hoped that a complimentary relationship can be established that will allow for a more complete understanding of the site formation processes as well as spatial dynamics.

The artifact classes used in the study have been ceramics, animal bone, debitage and projectile points. The choice of these categories was dictated, for the most part, by factors of preservation and sheer numbers. Only a few kinds of specimens are represented at both of the sites in sufficient quantities for valid inter- and intra-comparisons. This handicap is particularily acute when dealing with materials from the plow zone not only at Bn29 and Sk1a but at most sites in the Southeast. The more fragile materials, including ethnobotanical specimens, shell, and other organic remains are simply not able to withstand the disturbance and exposure.

Plow zone counts were calculated for each of the different classes of artifacts per 10 ft grid unit. There were 242 such units at Bn29 and 102 at Sk1a. Since a midden was lacking in both instances, the undisturbed context consisted of various post holes, pits, and depressions that had been truncated by the plow. To compare their output with the plow zone, artifacts counts per feature square were calculated. If more than one feature occurred in a given square, the contents were totaled so that there was only one count per artifact class per square. A summary of these data are presented in Tables 1 and 2.

To determine the degree of correspondence and coincidence between the disturbed and undisturbed contexts, these data were quantified and simplified by using the computer graphics SYMAP program to create contour, trend surface and residual maps of each class of artifact from both contexts at each site. This computer mapping technique has had widespread use in archaeology (Redman and Watson 1970; House and Wogaman 1978) and provides an easy means of constructing distributional or density maps than can be studied descriptively as well as quantitatively. Most archaeological SYMAPs, however, have only used the contour capability of the package. The mapping of trend surfaces and the residuals from these surfaces has not been extensively tested on either an inter-site or intra-site level (Hodder and Orton 1976) nor has it been used to explicate the variability between disturbed and undisturbed site structures.

Table 1. Sk 1 Plow Zone and Feature Variables

Feature Variables Denoted By F.

Variable	N	Mean	Standard Deviation	Sum
Ceramics	102	658.1	405.6	67130
Lithics	102	75.1	70.8	7658
Bone	102	13.9	25.1	1419
CSPP	102	8.3	8.3	842
Ceramic (F)	60	244.2	237.1	14654
Lithics (F)	61	46.3	56.7	2824
Bone (F)	61	158.2	217.9	9651
CSPP (F)	60	4.7	6.7	282

For a detailed discussion of the statistical foundations and limitations of trend surface analysis, the reader is referred to Davis (1973). Here I will only cover in a very superficial way some of the general statistical principles involved. Basically trend surface is one of several regression techniques, and as such it separates data into two components--a general regional trend and localized deviations or residuals from this trend. Archaeologists often consider a geographical area such as a river basin as a region and intuitively look for broad trends in site size, content, temporal range, and function. On the other hand, we are also interested in localized deviations from the trend such as the large ceremonial center or the small activity specific loci. On the intra-site level we look for general trends in the distribution of artifacts and features while at the same time, fluctuations in the overall distribution are also noted with interest. These "blank" areas and "hot spots" provide the foundation for structural studies and activity analyses.

Table 2. Bn 29 Plow Zone and Feature Variables

Feature Variables Denoted By F.

Variable	N	Mean	Standard Deviation	Sum
Ceramics	242	1673.7	687.8	405035
Lithics	242	32.9	17.1	7970
Bone	242	29.9	49.3	7230
CSPP	242	4.0	2.9	974
Daub	242	4.0	22.7	970
Ceramic (F)	47	242.6	412.0	11400
Lithics (F)	46	15.9	21.5	731
Bone (F)	47	210.3	509.0	9883
CSPP (F)	46	1.4	2.5	64

Trend surface and residual, as well as contour maps, were calculated for each category of artifact from each context at both sites. Second, third, and fifth order surfaces were fitted and these were compared with each other as the known excavated surfaces to determine if the added resolution was significant.

Since one of the main goals was the investigation of the relationship between the plow zone distribution of artifacts and the distribution of features and structures, the maps of residuals from the trend surfaces were of primary importance. However, by comparing the various trends of different artifact classes within the two structural contexts, hopefully patterns can be identified and correlated with in situ structural components. These patterns may then be used to develop spatial models that will facilitate activity analyses of disturbed context data. This segment of the research is only beginning and will require similar data from a variety of sites.

Comparing the large number of maps with one another and the excavation plans has not been an easy task. The simple, yet time consuming, visual inspection using overlays has proven most productive. Some fairly simple quantitative techniques have also been used to not only aid in comparing the maps but to add another dimension to the overall analysis. The Statistical Analysis System or SAS has provided a flexible program to create data sets from the artifact classes which were used to calculate an array of correlation coefficients (Tables 3, 4). This procedure complimented the SYMAP comparisons and aided in isolating corre-

Table 3. Correlation Coefficients between Sk 1 Plow Zone and Feature Variables
Feature Variables Denoted By F .

	Ceramics	Lithics	Bone	CSPP	Ceramic (F)	Lithics (F)	Bone (F)	CSPP (F)
Ceramics	1.00	0.44	0.49	0.61	0.03	0.08	0.39	0.18
Lithics	0.44	1.00	0.35	0.52	0.11	0.27	0.34	0.36
Bone	0.49	0.35	1.00	0.40	0.23	0.31	0.43	0.53
CSPP	0.61	0.52	0.40	1.00	0.22	0.24	0.44	0.44
Ceramic (F)	0.03	0.11	0.23	0.22	1.00	0.72	0.58	0.73
Lithics (F)	0.08	0.27	0.31	0.24	0.72	1.00	0.58	0.70
Bone (F)	0.39	0.34	0.43	0.44	0.58	0.58	1.00	0.65
CSPP (F)	0.18	0.36	0.53	0.44	0.73	0.70	0.65	1.00

Table 4. Correlation Coefficients between Bn 29 Plow Zone and Feature Variables
Feature Variables Denoted By F.

	Ceramics	Lithics	Bone	CSPP	Ceramic (F)	Lithics (F)	Bone (F)	CSPP (F)
Ceramics	1.00	0.42	0.24	0.46	-0.10	0.00	-0.06	-0.13
Lithics	0.42	1.00	0.12	0.24	-0.24	-0.04	-0.22	-0.18
Bone	0.24	0.12	1.00	0.17	0.29	0.35	0.47	0.13
CSPP	0.46	0.24	0.17	1.00	0.04	0.06	-0.07	0.00
Ceramic (F)	-0.10	-0.24	0.29	0.04	1.00	0.55	0.75	0.85
Lithics (F)	0.00	-0.04	0.35	0.06	0.55	1.00	0.31	0.62
Bone (F)	-0.06	-0.22	0.47	-0.07	0.75	0.31	1.00	0.48
CSPP (F)	-0.13	-0.18	0.13	0.00	0.85	0.62	0.48	1.00

spondence between different artifact variables. Of course the correlation coefficients only measure general correspondence between two variables, and since sample locations are not taken into consideration, it is possible to have a high _r_ value and very little spatial overlap and vice versa. In this regard, the SYMAPs have been extremely helpful in evaluating the correlation coefficients.

Much of the data analysis has yet to be completed. A few general comments can, however, be offered in light of the stated research objectives. The first objective was to determine the degree of coincidence between the patterns of artifact distributions within the plow zone and the patterns of artifact output from undisturbed features and other structural components. It now appears that artifact distributions within the plow zone may or may not have a significant degree of structural overlap with major concentrations of such undisturbed facilities as trash pits, houses, or storage units. The degree of overlap is dependent on many variables, but one of the major factors, at least at Bn29 and Sk1a, is the storage and refuse disposal patterns.

A distinct and different form of storage and garbage disposal was practiced at each site. At Sk1a most of the gargage was disposed of in specially prepared trash pits or large abondoned storage facilities normally associated with house structures. In contrast, the Warren Wilson data suggest that the overwhelming bulk of refuse was collected and dumped along the palisades. This pattern is not unlike that described by Binford for the Mask site where the disposal mode defines a distribution that is inversely related to patterns of use intensity (Binford 1978:356). At both sites high density zones, for the most part, reflect disposal and not activity areas. At Warren Wilson very few trash or storage receptacles were dug, indirectly indicating not only an above ground refuse disposal mode but also the presence of above ground storage facilities. As a consequence, there is very little correlation and overlap between the patterns of artifact output in the plow zone and the in situ site structure (see Figures 1-4). On the other hand, the Sk1a data show a fairly strong predictive relationship between the two contexts. These different patterns are reflected in the various SYMAPs as well as the array of correlation coefficients.

Although the degree of correspondence between the plow zone and what lies beneath it will vary considerably from site to site, on sites where refuse was disposed of in subsurface pits bone in the plow zone appears to be a fairly strong indicator of the locations of such facilities. This relationship was detected by the residual maps and reinforced by the correlation coefficients from both sites. Although at Sk1a there were several high correlations (_r_ .4) between plow zone and feature content, the only correlation above .4 at Bn29 was derived when feature bone content was compared with plow zone bone output. Also as expected, lithic debris and projectile points were not as frequently found in secondary context

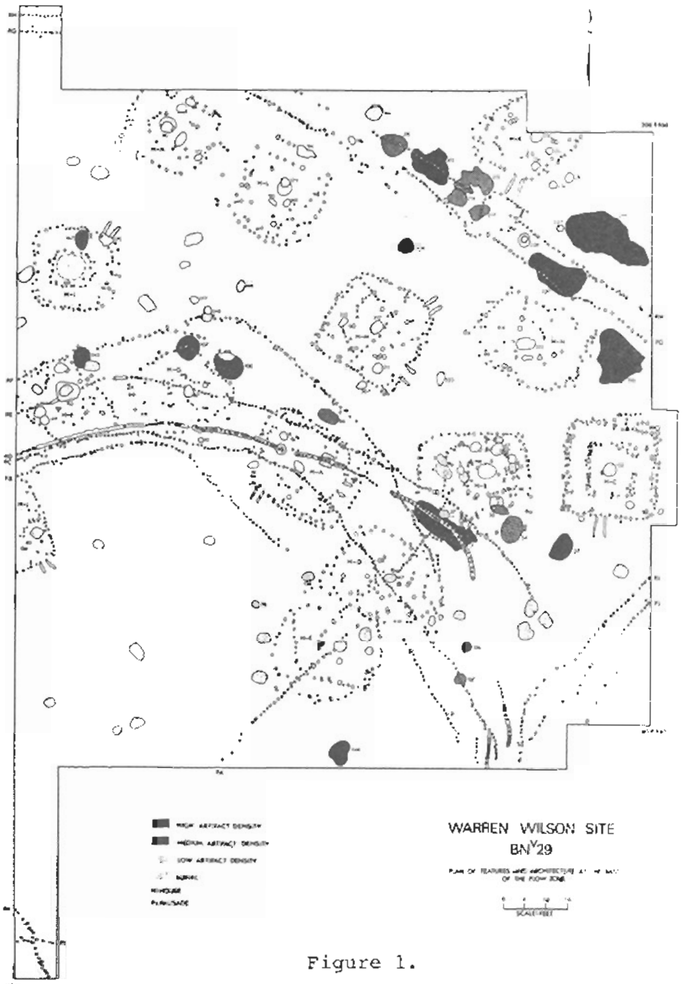

Figure 1.

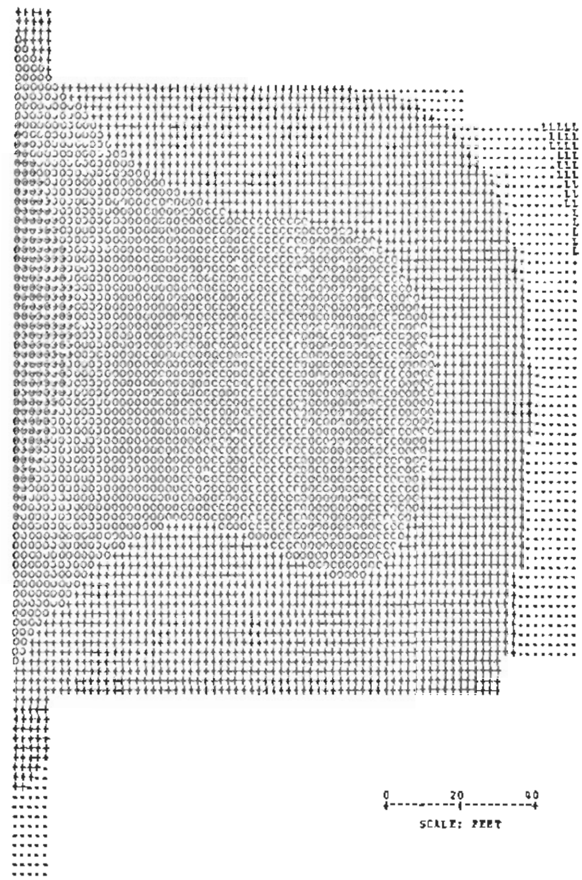

Figure 2. Ceramic distribution, plow zone, third order trend surface.

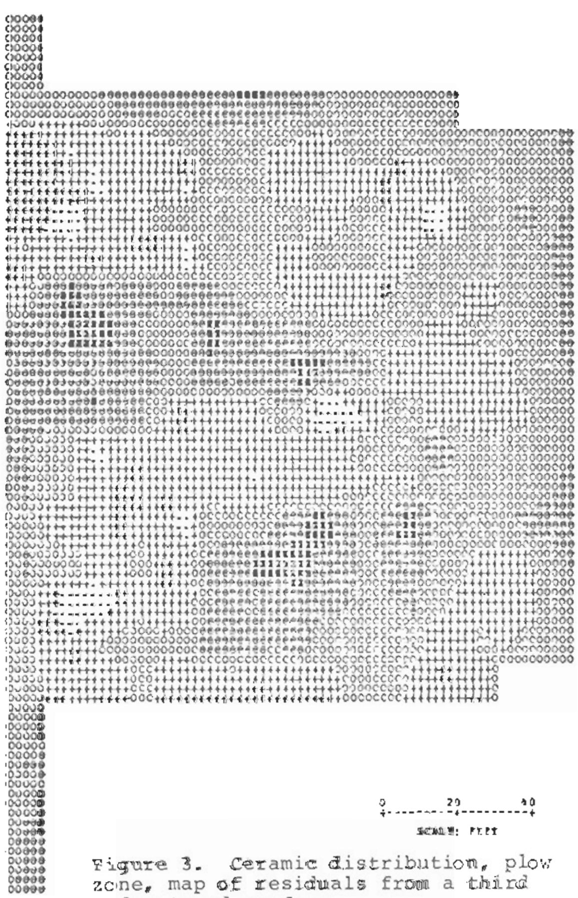

Figure 3. Ceramic distribution, plow zone, map of residuals from a third order trend surface.

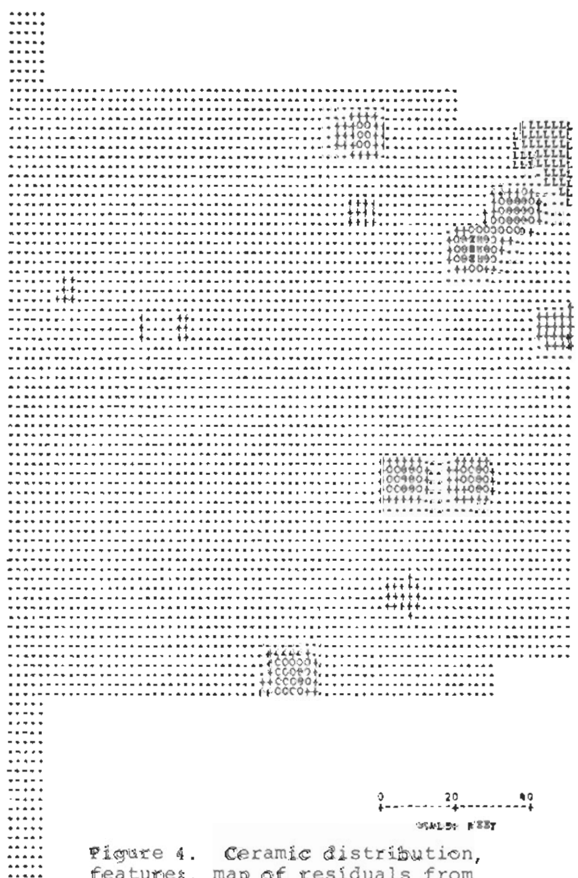

Figure 4. Ceramic distribution, features, map of residuals from a third order trend surface.

as bone or pottery. This pattern appears to be particularly relevant at Bn29 where the plow zone distribution reflects a general coincidence between lithic debris and house structures, while ceramics and bone are found mainly along the palisade alignments. At Skla, there is also some indications of a spatial relationship between lithic materials and structures, but here there is also a fairly strong correlation between the plow zone output and feature output. The picture is somewhat confused by the fact that many of the large storage-trash pits are associated with houses. Most of the ceramics at Skla appear in secondary context and are concentrated in the plow zone in areas containing trash pits or other refuse disposal facilities.

It is felt that the spatial patterns isolated at Warren Wilson and Skla necessitate a re-assessment of the two most prevalent assumptions concerning plow-disturbed deposits. They cannot simply be bulldozed or shoveled away as many have suggested (Binford 1964; Smith 1978; Faulkner and McCullough 1978) nor can the plow zone alone - and this certainly applies to surface materials also - be expected to encapusulate data sufficient to allow for an accurate analysis of intra-site activity structure as others have implied (House and Wogaman 1978; Talmage and Chesler 1977).

The complexities and subleties of site formation processes require that disturbed context data to be studied as a part of an overall spatial analysis that also relies on in situ structural data. The evidence from Bn29 and Skla underlines the need for more extensive excavations on sites where both types of data can be carefully controlled before realistic predictive trends and spatial models can be formulated. This effort needs to be directed toward the small homesteads and campsites, as well as the large villages where disturbed and undisturbed site structures are present. Once sufficient quantities and varieties of sites have been studied and the structural components compared, hopefully predictive patterns of disturbed context data can be isolated that will aid in the spatial analyses of sites whose total content is contained in the plow zone. Based on the results outlined here, plow zone data should be used to compliment in situ observations but not as a substitute. Without undisturbed deposits, spatial analyses of plow zone sites can provide only descriptive distributional information that lacks functional, behavioral correlates within systemic context. At the same time, structural studies based solely on non-plow disturbed deposits can be very misleading in the search for spatially relevant behavioral inferences.

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THE BRUNK SITE - AN UPLAND PISGAH SITE

David G. Moore

Pisgah settlement systems are described as generalized Mississippian systems (Dickens 1976, 1978). However, information from the Brunk Site, 31Bn151, in Buncombe County, North Carolina, suggests that the scope of the current model of Pisgah settlement be expanded with additional emphasis placed on upland environments.

Robert Brunk contacted me in August, 1978, with information about Pisgah ceramics he had collected. His description of an upland spring and nearby field seemed an unlikely location for such a find, but a visit confirmed it as a non-riverine Pisgah site.

The Brunk Site is located at the head of a small intermittant stream valley, which runs south from Big Ivy Creek about 25 km east of the confluence of the French Broad River and the Big Ivy. The elevation of the Big Ivy floodplain is approximately 640 m above sea level, while the elevation of the Brunk Site, just over 3 km to the south, is nearly 945 m above sea level.

The site is situated on the edge of a toe slope on the north margins of Frosty Knob Peak, which rises to a height of about 1280 m less than 1 km south of the site. Around the neighboring slopes, rock terraces were constructed in the late nineteenth century to create additional fields for cultivation. Thus the site is found on the highest, relatively flat land in the valley. The intermittant stream, Sugar Creek, runs within 100 m of the site, and though it is often dry at the upper elevations, two nearby springs are active today. The first is less than 50 m from the site, but the second, 100 m north, is the more significant as it is here that the original discovery of the Pisgah ceramics was made. Mr. Brunk has recovered more than 2000 sherds from the spring. Unfortunately, the area around the spring has been subject to large earth-moving projects and no aboriginal material has been recovered immediately adjacent to it. It is assumed that the pottery found here is related to the site above, though the nature of this relationship is presently unknown.

With the cooperation of the Brunk family and the support of the Research Laboratories of Anthropology, we began excavation of the upper field with the hope of revealing subsurface features which would contribute to the understanding of this atypical site. Work has proceded on a part-time basis during the past 12 months. Presently, 85 m^2 have been excavated to the top of the subsoil.

A plowzone, usually about 30 cm deep, contains ceramic and lithic artifacts. Beneath the plowzone lies a dark, compact soil zone which represents earlier slopewash from the upper elevations. No features or postholes have been observed in this zone, but it does contain additional artifacts. The compact soil is 3 to 12 cm thick and is underlain by a lighter colored, clayey subsoil. Postholes are visible at the surface of the subsoil though they are often obscured by recent rodent activity. By removing 1 to 3 cm of the subsoil, we are able to clear most of the rodent disturbances. The excavation unit is then trowelled and photographed and all postholes and features are recorded.

The resulting plan map shows postholes and small features. Though several posthole patterns may be suggested by the map (not reproduced here), the exposed area is too small to conclusively predict patterns. With that cautionary note in mind, I do believe that one pattern of postholes represents part of a structure, perhaps a house structure. This pattern is similar, though not identical, to Dickens' description of Pisgah house patterns at the Warren Wilson site, 31Bn29 (Dickens 1976:31). Regardless of potential patterns, it is clear that considerable activity occurred on the site, evidenced by the sheer numbers of postholes present. Whether they represent one occupation or a series of occupations is not so clear.

Unfortunately, postholes provide the bulk of information about the structure and possible function of the Brunk Site. Other classes of features are represented only by several small shallow pits. Preliminary analysis of the fill from one of these features revealed carbonized hickory nut shell, acorn meats, and two aboriginal corn kernels. This appears to be the highest elevation recorded in the southern Appalachians for corn from a prehistoric, archaeological context. Corn was grown on the site as recently as ten years ago; whether or not it was grown at this high elevation during the Pisgah phase or instead brought to the site is uncertain. Finally, no faunal remains have yet been recovered.

Many classes of artifacts occur, with ceramics being the most prolific. While Pisgah sherds make up more than 85% of the nearly 2000 sherds from the excavation, ceramics from two earlier Woodland phases, Connestee and Pigeon, are also present. Other ceramic artifacts include pipe fragments and ground disks which usually exhibit typical Pisgah surface finishes.

Lithic material is varied, though relatively rare; the excavated sample consists of only 20 tools - utilized flakes, scrapers, gravers, bifaces, and projectile points - along with 89 flakes. The raw material is usually flint or chert. The diagnostic lithic artifacts reflect a variety of occupation episodes as do the ceramic types. Of five projectile points recovered, one is an early Archaic Kirk point, two are late Archaic Savannah River points, one is an "earred" Middle Woodland point, and the last is a Pisgah type.

It should be clear from this brief artifact inventory that small upland sites are prey to the same problems encountered at large sites. Contexts disturbed through erosion, plowing, and other factors must be thoroughly examined to determine if artifact association is meaningful or merely fortuitous.

At this point the reader may be expecting the author's synthesis of a new model integrating the Brunk site with earlier models of Pisgah settlement. Instead, I shall disappoint you and express the usual plea for more time and data. I do not know what the Brunk site represents nor how it articulates with overall Pisgah settlement systems as they are presently understood. However, the consideration of the Brunk site requires a reconsideration of the present model of Pisgah settlement which emphasizes village locations in alluvial floodplains.

The site does not fit the usual locational model for the Pisgah phase. It is found at a high elevation more than 3 km away from the nearest alluvial valley, and though located on marginal agricultural soils, corn may have been cultivated there. Previously, sites on this order, less than 1/2 acre in extent, have been seen as temporary campsites, yet the artifact assemblage recovered is nearly identical to those of larger excavated Pisgah villages, though smaller in quantity. The site does not resemble previously reported Pisgah hunting stations where large lithic scatters without associated ceramics have been located.

While the observations above illustrate why the Brunk site does not fit the current model, they do not explain the lack of fit. One may construct numerous explanatory hypotheses, most of which fall into two categories.

In hypotheses under the first category, it served as a special purpose site, an outpost or extension of a larger village located on the flood plain of the Big Ivy Creek. Some examples of this type are hunting stations, seasonal locations for gathering and or preparing plant foods, a source of local creek and spring clays for the production of pottery, or finally, the site of a particular ceremonial haven.

The second category subsumes explanations relying on the interrelationships of chronology, environment, and culture. For instance, the site may have served as a refuge, that is, a more easily defended position, during periods of conflict. Or, population pressures and competition for arable land may have forced small groups of the lower valley population to exploit marginal agricultural land of the uplands.

It is premature to embrace any particular hypothesis. In fact, one may do an injustice to prehistoric cultural systems by seeking a quick solution to the questions posed by the discovery of this site. It may be more productive to examine the current model to determine if it may be effectively altered to accept the new data.

Dickens (1976:210) suggests that Pisgah subsistence was based on approximately equal parts of hunting, gathering, and agriculture. Each of these activities can be pursued within close proximity of the alluvial valley, but it is reasonable to assume that hunting and gathering strategies fully exploited upland areas as well. Thus, models of Pisgah subsistence necessarily consider all environments. In contrast the locational model of Pisgah settlement emphasizes alluvial valley village settlement while acknowledging temporary upland campsites for which there are little data at the present time.

Dickens (1978:115) also states that a combination of the two sets of data enables reconstruction of a settlement-subsistence system. This is easily accomplished by positing a model of primary occupation in the alluvial valley locations with additional or secondary settlement in the nearby upland regions. Future work at the Brunk site and additional survey in similar environments should contribute to a fuller understanding of the articulation of the secondary upland settlement with the primary lowland settlement.

The altered model is also useful since it need not be limited to the Mississippian Pisgah phase. The Pisgah occupation was apparently the latest at a location found useful by earlier Woodland peoples. Since the subsistence strategies of the Pisgah phase probably differed from those of the Woodland periods only by the increased emphasis on maize, is it not reasonable to expect that some continuity of settlement systems also occurred? Indeed, a brief survey of the Sugar Creek valley has revealed numerous Woodland sites and the possibility of additional Pisgah sites. The combination model proposed above can thus form a framework for temporal study of cultural continuity and change as well as for the study of Pisgah settlement.

Carole Crumley (1979:143) has recently underscored the importance of the concept of "scale" in regional studies, and emphasis on regional analysis will be particularly useful for future Pisgah studies. However, the present scale of lowland emphasis should be enlarged; the model boundaries should be consciously expanded to make use of complementary geographic areas. A regional study of Pisgah settlement should examine equally alluvial sites and their adjacent mountain coves and valleys. If this course is taken I do not expect that the Brunk site will remain an anomoly for long.

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VARIATION IN MISSISSIPPIAN STRUCTURES AT LUBBUB CREEK

John H. Blitz

Recent archaeological excavations in the central Tombigbee River Valley near Lubbub Creek in western Alabama have produced a wealth of data on architectural remains of a single continuously occupied Mississippian community. The location of this settlement gave access to the easily tilled, productive soils (Ward 1965) and the varied ecosystems of the Fall Line Hills to the north and the Black Belt Prairie to the south and west.

Lubbub Creek Mississippian architectural remains can be loosely grouped into two sets: dwellings or buildings, and architectural efforts requiring mass "public" labor, such as the substructure mound and palisades. This paper will address the variation in those structures identified as dwellings or buildings. Three distinct types of structures are differentiated by the physical evidence: the rectangular wall trench construction, the circular single set post construction, and the rectangular single set post construction.

An example of the rectangular wall trench structure is illustrated in Figure 1. Four wall trenches, each approximately 5 m long, defined the limits of a structure encountered on the original ground surface

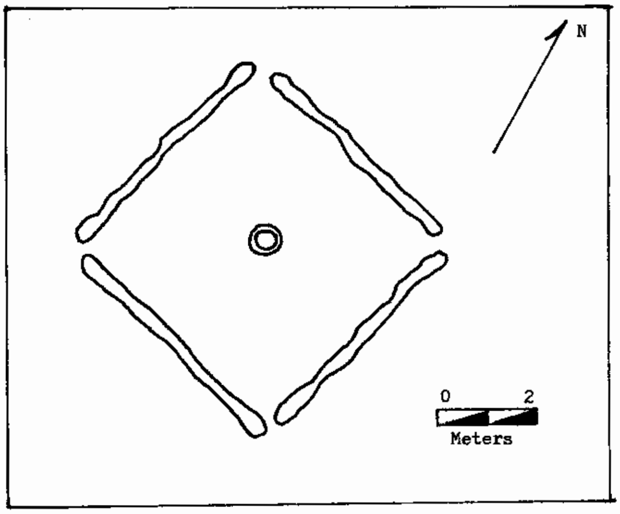

Figure 1.

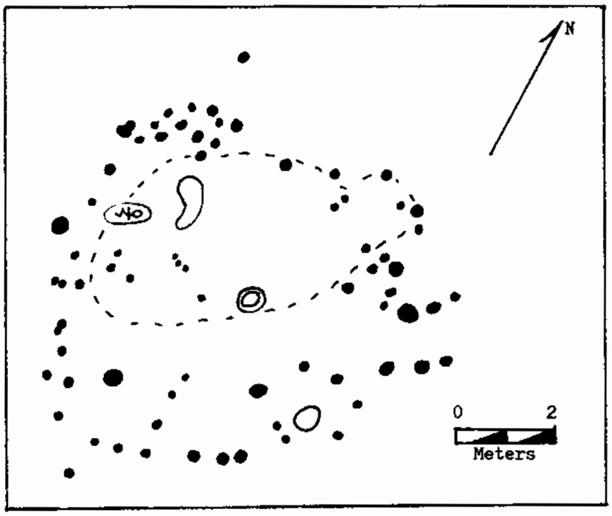

Figure 2.

below the substructure mound. These wall trenches were dug through a sandy loam subsoil to a maximum depth of 50 cm. Defining individual post molds within the trench fill was not always possible. The trenches were non-convergent, suggesting corner entrances. There were no interior post molds. A clay-lined hearth formed a shallow basin in the structure's center. Almost no cultural debris was recovered from the floor, but the wall trenches and hearth yielded a small amount of shell-tempered sherds. A total of three rectangular wall trench structures were discovered.

Another type of structure excavated at Lubbub Creek were those that had a circular pattern of single set post molds (Figure 2). This example was 7 m in diameter, with a central, clay-lined hearth forming a shallow basin with a rim raised slightly above the floor. Lines of small post molds in the structure's interior might indicate screen partitions, racks for storage, or other furniture. The dotted line represents a heavy clay layer partially overlaying the floor. This was probably daub, deposited when the building collapsed. This layer preserved faunal remains on the floor. There was no evidence of burning. Two pits were located in the interior. One contained an infant burial, and both contained deer, turtle, and fish bones as well as mussel shells. The two lines of parallel post molds running perpendicular to the wall probably indicates an entrance way with an eastern orientation. Diagnostic ceramic sherds associated with the floor and pits are identified with the Moundville II subphase between A.D. 1250 - 1400. Approximately eight structures of this type were excavated.

A third type of structure encountered during the excavation was a rectangular pattern of single set post molds (Figure 3). There was a central clay hearth and, as in the second example, lines of smaller post molds on the interior floor may indicate spatial partitioning. Perhaps some of the larger interior post molds were roof supports. Two small shallow pits were located in the floor. Two parallel wall trenches, each 2 m long, perpendicular to the structure, form a very narrow eastern entrance. As many as seven structures of this type were uncovered.

Several Lubbub Creek structures showed evidence of burning. Fire hardened daub covered portions of floor areas, preserving ceramics, food remains, lithic debris, and charred posts. Ground stone discoidals were often found on these floors or within post mold fill.

The rectangular structure with tightly spaced posts in wall trenches is apparently associated with the transition from the Woodland cultural tradition into the increasingly intensive agricultural economy of the Mississippians. Examples of this structure type have been found throughout a wide area in the eastern United States. In general, the wall trench type represents a technological departure from the large circular single post Woodland structures like those utilized in central Tennessee (Faulkner and McCollough 1974), and by the Miller people of the Tombigbee region (Cotter and Corbett 1951). A small semisubterranean rectangular structure has been associated with a terminal Miller III subphase in the central Tombigbee area (Jenkins 1979:270).

Soon after A.D. 1000, an economy based on an increasing reliance on agriculture emerges in the west Alabama region with a full array of Mississippian traits. Evidence from the Bessemer and Moundville sites indicate architecture became quite complex, with a distinction between residential dwellings and more specialized buildings of community or religous significance. At Bessemer, a wall trench structure has been radiocarbon dated at A.D. 1070 ± 55 (Walthall and Wimberly 1978; DeJarnette and Wimberly 1941).

The wall trench structure predominates at these two sites and is the basic architectural form for both residential dwellings and the "public" buildings. At Moundville, the wall trench structure appears to have been in use for quite a long time. Judging from associated ceramics, it persists into the Moundville III subphase, A.D. 1400 - 1550, and evolved examples of complex, multiroom buildings (Peebles 1979). Single set post mold patterns, both circular and rectangular in shape, are minority types at Bessemer and Moundville.

Returning to the central Tombigbee Lubbub Creek area, wall trench construction has only been found beneath the earliest building stages of the large truncated pyramidal mound. Although these structures have not been radiocarbon dated at this time, associated ceramics suggest a Moundville I, A.D. 1100 - 1250 context. The restricted location of these structures on the site implies a special rather than a general function.

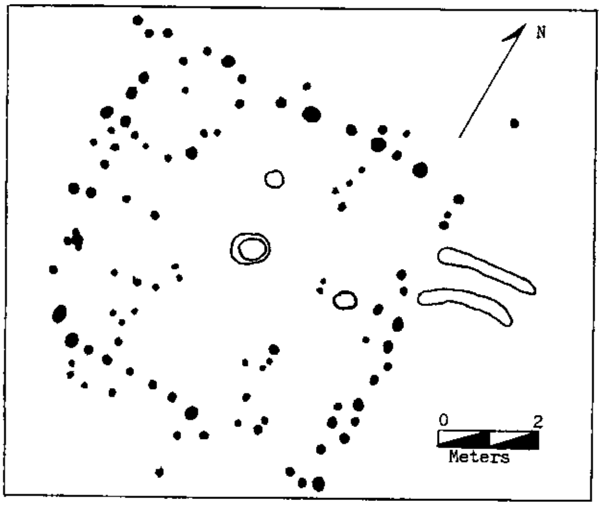

Figure 3.

The majority of Lubbub Creek structures are single set, wide spaced post mold patterns with wall trenches appearing only in associated entrances. Some of the circular and rectangular single post structure patterns appear to be contemporaneous with each other and the ceramic evidence indicates contemporaneity with Moundville as well. At the Lubbub Creek premound surface, single post structures superimposed over earlier wall trench structures indicate that the wall trench form did not exist here for very long. Apparently certain factors influenced the Lubbub Creek people to abandon the use of wall trench structures after a relatively short period of time. This change from a predominance of the wall trench to a single set post construction is documented at Tennessee mature Mississippian sites where superimposed structures revealed a long occupation contributing to the formation of "residence mounds" (Lewis and Kneburg 1946; Nash 1968).

Wall trench structures are differentiated from single set post houses by the sparcity of cultural debris found on the floors of the former. The occupants of the earlier structures either carefully removed or did not accumulate the type of debris found in abundance on single post house floors. On the premound surface, where both wall trench and single set post construction occurred, no garbage or midden spreads were found anywhere in the immediate building area. Perhaps this material had been removed to some unknown location on the site. The fill within wall trenches, post molds, and hearths contained most of the recovered artifacts.

In west Alabama, single set post construction has a long cultural continuum. It is present in the archaeological record from the Woodland period, but is then eclipsed by the wall trench form after 1000 A.D. The single post technology does not disappear, but evolves into a slightly different form in late Mississippian times. Wall trench structures persist at the major center of Moundville, but appear only breifly at Lubbub Creek in the ceremonial context of the premound surface. Apparently the majority of Lubbub Creek people lived in single set post houses. In reviewing the record provided by these sites, it is apparent that variation in building form increases with the size and complexity of the site and perhaps mirrors the developing social differentiation in Mississippian society. At Moundville this emergence of ascriptive, hierarchical ranking of people can be seen in mortuary ceremonialism (Peebles 1971, 1974). This is not meant to suggest that wall trench construction is only used in a ceremonial context, but that some of the variation in Mississippian structures at Lubbub Creek can be explained in part as a phenomenon of local provincial enculturation, with construction techniques reflecting an earlier Woodland architectural heritage.

Through much of this discussion I have emphasized chronology, which is a necessary perspective for an overview; but now, with the volume of field work in Alabama increasing, we will be able to approach architectural studies from a behavioral point of view. Some behavior, such as social, psychological, and physical, can be linked to architecture because this form is a physical embodiment of these behavior patterns and, conversely, the built structure affects behavior and the way of life (Rapoport 1969).

For example, the Choctaws and Chickasaws used two different types of dwellings, the winter house and the summer house. The winter house was a circular structure and the summer house was a rectangular form. This is a description of an eighteenth century Choctaw winter house as seen by a French traveler in Mississippi:

> This house is nearly of a circular figure and built of clay mixed with haulm [straw or grass]. The top is conical and covered with a kind of thatch [the nature of] which I could not make out. The inside roof is divided into four parts and there are cane seats raised about two feet from the ground which go round the building (I mean on the inside), broad enough to lie upon, making the wall serve the prupose of a pillow. Underneath these seats or beds they keep their potatoes and pumpions, cover'd with earth, but their corn is in a building by itself raised at least eight feet from the ground. The fire place is in the middle of the floor, just as in some parts of the Highlands of Scotland only they have aperture at top to evacuate the smoke. The door is opposite one side (for the house is round without, yet on the inside it approaches near to the figure of an octagon) and is exceedingly small both in height and breadth (Swanton 1931:39).

The traveler mentions food storage in pits beneath the floors of the house under cane seats. Both are objects that could be expected to leave some physical disturbance in the soil. It therefore seems possible that the small pits and post molds discovered along interior walls of structures at Lubbub represent this kind of activity.

A possible explanation of the parallel wall trench and single set post mold patterns associated with entrance ways might be found in this description from a Chickasaw winter house by Adair:

> The door of the winter palace is commonly about four feet high, and so narrow as not to admit two to enter it abreast, with a winding passage for the space of six or seven feet, to secure themselves both from the power of the bleak winds, and of an invading enemy (Adair 1775:419-420).

Most archaeological evidence is the physical remains of a culture's technology. The assumption is made that, if we examine ethnographic records of a people with a similar material culture, living in a similar environment or even the same geographical area, and see which types of material culture influenced or were with which kinds of social behavior, then we may say that the excavated data will infer similar types of social behavior and activities as described in the ethnographic or historic record. Does the acceptance of this assumption in archaeology always have to remain in the realm of a subjective judgement on the part of each investigator?

There is much disagreement on this point. K. C. Chang presents one point of view: "As to analogy, archaeology as a whole is analogy, for to claim any knowledge other than the objects themselves is to assume knowledge of patterns in culture and history and to apply these patterns to the facts" (Chang 1967: 109).

Other archaeologists feel that using analogy in a specific historical explanation is not applicable to a positivistic approach that seeks to define cultural laws by testing hypotheses through deductive reasoning. Thus analogy should not be used to explain any behavior directly, but it can suggest hypotheses to be tested.

One advocate of this approach states:

> In short, I do not view interpretations or synthesis of interpretations as an end product of our investigations; on the contrary, we should be seeking generalizations regarding the operation of cultural systems and their evolution - something which has not been described ethnographically nor thus far achieved through the observation and analysis of contemporary events (Binford 1971:289).

However, it would seem that most archaeologists working in the Southeastern United States do not hesitate to compare archaeological data with ethnographically or historically known behavior. Furthermore, most investigators would deny that the interpretation of cultural remains at a specific site in an attempt to reconstruct past patterns of behavior is not without value in and of itself. If the goal is an interpretation of prehistory as a process, all information or analogies must be considered in forming meaningful hypotheses. The limitations of the systemic model to interpret all that one may wish to understand in archaeology is real.

Consider this astute observation: "Logical analysis of form depends as much on perception of the object, which is conditioned by cultural background, as by any universal principles" (Anderson 1969).

In the absence of any evidence for seasonal variation, the winter/summer house phenomenon may not have occurred at Lubbub Creek. The purpose of the analogy has been to show how seasonal changes in life style and daily activities influenced change in house form as a way to explore the question of the relationship between changes in culture, expressed by behavior, and change in environment, as expressed in physical form. Archaeologists can only record the physical form of the houses that are excavated; but, aware of the relationships of form and behavior, with enough data they might be able to determine which of the forces working on house form are primary and which are secondary. Then perhaps they can make the move to not just describing or classifying differences in form and construction, but can attempt to determine what social, cultural, or environmental factors are associated with these differences. With all of man's complexities and impulses, a viewpoint attempting to explain house form through any single causal factor is too limited.

It is necessary to understand the character and values of a culture to gain an insight as to its choices among the possible dwelling responses to both the physical and cultural variables. The physical setting provides the possibilities from which choices are made through sociocultural values. In a rich environment, where the physical possibilities for house form are great, the actual choices for a society may be limited by its cultural values (Rapoport 1969).

So house form is not just the result of physical forces involving climate, materials available, and technology. Form is an expression of a society's cultural values, modified by the physical environment and materials available. A structure is a container for people in which they are protected from the physical environment. It can also be a symbol of social ordering that represents a way in which people socially separate themselves. The different activities within this circumscribed space can determine the design of the structure, giving it a purpose beyond mere shelter.

The cultural organization of space and the relationship between social order and the spatial patterning of the archaeological data is being subjected to new analytical approaches (Clarke 1977). The spacial patterning of artifacts, individual activities, and architectural design as a symbolic expression of a society's values has been demonstrated with an ethnographic study of a Berber household (Bourdieu 1973). In the more pretentious realm of public architecture, which in Mississippian societies includes mounds, palisades, and ceremonial buildings, the representation of cultural values should be easier to detect than in the remains of individual household dwellings. Therefore, sociocultural factors are of primary importance in determining house form and basic to an understanding of man's response to the natural environment.

Acknowledgements:

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A TRANSITIONAL WOODLAND-MISSISSIPPIAN PERIOD SHAFT-AND-CHAMBER BURIAL FROM CENTRAL ALABAMA

Bascom McDonald Brooms

During the Phase III and Phase IV investigations at the site of Fort Toulouse (1Ee8) at the confluence of the Coosa and Tallapoosa Rivers in Central Alabama, six Transitional Woodland-Mississippian and Early Mississippian period burials were encountered. Four of the six burials were excavated while the remaining two were mapped and recorded, but left intact. Two of the excavated graves were semi-flexed Early Mississippian period burials while the other two were shaft-and chamber burials. One of the shaft-and-chamber burials was quite unique and is the major topic of this paper. This burial, FtT 4V, was assigned a Transitional Woodland-Mississippian period cultural affiliation based upon the associated artifacts and a radiocarbon date of 1090 ± 55 B.P. or A.D. 860 (UGa - 2665).

The Burial:

When encountered, burial FtT 4V first appeared to be a double feature, one intrusive into the other, as can be seen in the orifice drawing on Figure 1. Upon excavation, however, it was evident that the west half of the feature was a relatively round shaft with straight sides and a narrow basin shaped bottom which may have served as an aid in lowering the body into position in the actual grave. The fill associated with this shaft was the same brown sandy soil as found immediately above the skeletal remains.

The skeletal remains were in very poor conditon with only fragments of the skull, humeri, and femora remaining (Figure 2). This fragmentary skeleton was that of an adult male at least 35 years old at the time of death. There was no indication of pathology on any portion of the skeletal remains present (Turner, personal communication 1979).

The skeleton was situated in the east half of the pit in a flexed position, with the cranium to the north and facing west. The body was placed along the east profile of the burial pit and covered with approximately 85 cm of brown sandy soil which was probably a mixture of excavated subsoil and topsoil. This portion of the pit was then capped with seven large mica schist slabs weighing between four and eight pounds each. The next phase of the burial process apparently consisted of tossing whole ceramic vessels atop the slabs (Figure 3). At least 17 vessels containing the charred remains of animal and vegetable matter were thrown into the pit. Several of these vessels were stacked one inside the other. Mottled brown sandy soil was then thrown in to fill the void around the broken vessels. This zone of broken vessels and earth fill was approximately 50 cm deep. The ritual was concluded with a small fire built atop the burial indicated by a thin zone of charred wood in a matrix of brown loam. The entire pit attained a depth of 1.5 m, a maximum width of 1.8 m at the point of the mica schist slabs, a width of 98 cm at the base of the burial pit, and a width of 1.3 m at the surface. A profile of the burial is shown in Figure 1.

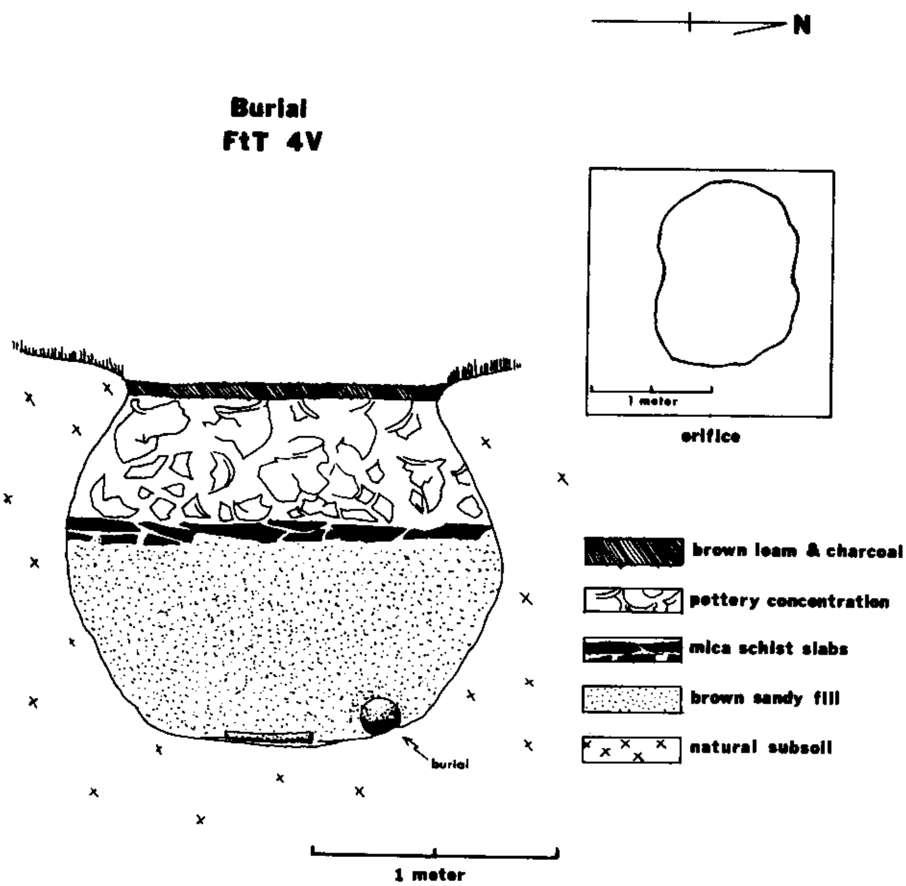

Figure 1.

The Cultural Material:

The Transitional Woodland-Mississippian ceramics from 1Ee8 have tentatively been assigned the type names Taskigi Plain, Taskigi Incised, and Taskigi Complicated Stamped. These three ceramic types were named for the mound at 1Ee8 which was called the "Taskigi Mound" by the Alabama Anthropological Society in the first quarter of this century. Taskigi Plain and Taskigi Incised sherds have been found along the base of this mound, but it is not known what association exists between the people who produced the Taskigi ceramics and the people responsible for construction of the mound since formal investigations have never been conducted there.

The Taskigi ceramic types were previously unknown in Central Alabama until their identification at 1Ee8. Little could be said concerning vessel size and forms during the Phase III excavations until burial FtT 4V was discovered and excavated. This single burial produced 17 vessels. An analysis of these vessels resulted in the determination of eight whole and two partial vessel forms.

Taskigi Plain ware can be subdivided into three varieties based upon temper. One variety is tempered with sand and/or grit and pulverized shell, a second variety is tempered with flake shell, and the third variety is tempered with sand and/or grit and flake shell.

Twenty-nine sherds of Taskigi Complicated Stamped ware were recovered from the burial. These were the only complicated stamped sherds found during the Phase III investigations. The sherds mended to create a large rim fragment which had been tempered with fine sand and large flake shell. It is possible that this rim was a trade item and may not belong with the Taskigi wares at all.

The determination to place the Taskigi wares in the Transitional Woodland-Mississippian period was based upon similarities with both Woodland and Mississippian period ceramics. A radiocarbon date of A.D. 860 ± 55 years (UGa-2665) confirmed this suspicion. Ceramics tempered with sand and/or grit and small amounts of pulverized shell resemble the Late Woodland Autauga phase wares from Central Alabama in surface finish and paste texture while they have the orange-grey colors and common fire clouds of the Late Woodland Hope Hull phase ceramics. Taskigi wares tempered with pulverized shell and small flakes of shell closely resemble the Early Mississippian Shine phase ceramics identified by Chase (1967) in Central Alabama while the larger flake shell tempered ceramics are similar in temper and paste to the Mississippian period Moundville phase ceramics. Jenkins (personal communication 1979) has identified Vessel c on Figure 2 as being very similar to Moundville Incised, var Carrolton in form, decoration, and temper.

The eight known vessel forms from burial FtT 4V are discussed below in detail. Where more than one vessel per known from was recovered, both measurements will be given where there are notable differences. The available data on the two incomplete forms will also be presented below. All vessels are shown in Figure 4.

Vessel a.

Only one vessel of this form was recovered from the burial. This container suggests a Mississippian influence. The small jar is composed of a short, straight neck with a round lip and wide shoulders tapering to a flat base. It is tempered with coarse grit and flake shell. The paste is soft and is dark grey in color. The interior color is medium grey, and the exterior is buff with light and dark grey fire clouding over most of the vessel. The surface finish is smooth but is somewhat irregular in shape. The four cornered "squash blossom" design draped over the shoulder is the result of the extraction of paste from the body of the vessel or the addition of paste to the neck and shoulders rather than incising.

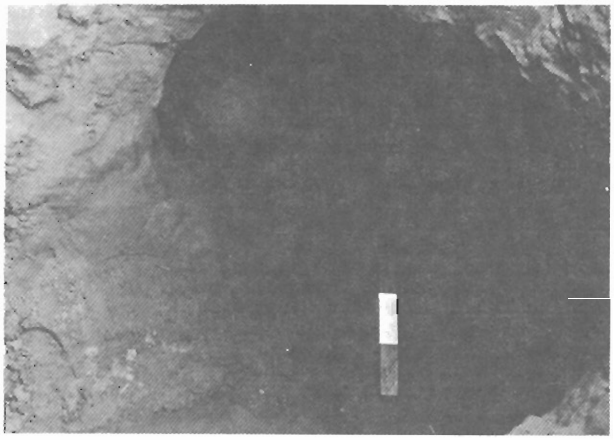

Figure 2. FtT4V burial.

Vessel b:

One vessel of this type was recovered from the burial. This is a small globular jar with a round neck, inverted rim, round lip, and round base. Two holes (0.6 cm diameter) were drilled in the neck. Sand was used as the tempering agent. The paste is hard and medium grey with black fire clouds present. The surface finish resembles the salt and pepper appearance of Autauga Plain resulting from sand particles protruding from the paste. The surface is smooth and consistent with no decoration.

Vessel c:

One vessel of this type was found in the burial. This container closely resembles Moundville Incised, var Carrolton (Jenkins, personal communication 1979). This is a medium sized globular container with a round to flat base and a short, straight neck and a round lip. The temper is grit and flake shell with a small amount of sand present. The paste is uneven and grey in color. Both the interior and exterior indicates that the vessel once contained an orange-red slip, but this has flaked off of most of the surface. Design elements consist of two parallel curvilinear incised lines 1.0 cm apart on the shoulder.

Figure 3. FtT4V excavation.

Vessel d:

There was only one vessel retrieved from FtT 4V of this type. It is a basin shaped bowl with an inverted rim, round lip, and round to flat base. The tempering agents are a slight amount of fine sand and a moderate amount of pulverized shell. The vessel was subjected to intense heat at the time it was fired which resulted in the vaporization of elements in the paste which left an abundance of gas leak traces over the upper half of the interior and exterior of the vessel. The bowl was obviously hand molded as fingerprints are still visible on the surface. The paste is grey and very porous. The interior and exterior are grey to black, and the surface finish is rough and uneven. Design elements are not present on the container.

Table 1. Vessel measurements (vessels are shown in Figure 4; letters are keyed to figure in text). All measurements in centimeters.

	a	b	c	d	e	f	g	h
height of vessel	18.2	14.7	27.6	10.1	24.0	40.0	19.4	34.0/38.0
width at shoulder	18.3	16.5	28.6[A]	-	26.4/33.0	35.0	18.0	24.0/27.6
width at neck	9.0	13.0[B]	8.4	-	17.1/25.1	31.5	5.5	16.0/18.2[A]
width at rim	-	9.2	-	23.3[C]	-	-	-	13.4/14.9[D]
width at base	6.5	-	-	-	-	-	7.7	11.0
height of neck	3.4	4.6	3.2	-	5.1	-	4.7	4.3/6.0
thickness of neck	.5	.7	1.1	-	.7	1.1	.8	.6/1.0
thickness of body	.7	.7	.8	1.0	.5	.8	1.0	.5/.6
thickness of base	.9	.7	1.1	-	.7	.9	1.0	.7
thickness of rim	-	-	-	1.3	-	.5[E]	-	-
circumference of rim	-	-	-	73.3	-	-	-	-

[A]width of vessel at widest point; [B]measurement taken at base of neck; [C]maximum width below rim; [D]measurement taken at lip; [E]measurement taken near lip.

Vessel e:

Two vessels of this form were recovered from FtT 4V. These containers are globular with a short, straight neck. The lip is round in places and flat at others. The base is generally round but appears to be slightly flattened. This shape is probably the result of pressure from sitting the vessel down while it was still wet. The neck contains two drilled holes (0.8 cm in diameter). The temper consists of a very slight amount of fine sand and pulverized shell making the vessel appear almost temperless. The paste is smooth, consistent, and grey in color. Coil lines are visible. The interior is grey and smooth while the exterior is also grey but is irregular and lumpy showing finger and hand impressions. Decorations are absent on both vessels.

Vessel f:

FtT 4V contained two of these vessels. They are large conical containers almost as wide as they are tall. The basic shape resembles conical vessels of the Late Woodland period in Central Alabama. The neck is constricted and the base is pointed. The rim is everted and the lip is round. A slight fold is evident along parts of the rim but is smoothed away in places. The rim near the lip is noticeably thinner. The tempering agents consist of a medium amount of fine sand and pulverized shell with a sparse amount of flake shell and mica included. The paste is smooth and consistent and is buff in color. The interior and exterior color is buff with varying shades of light orange patches. Small streaks of grey to black fire clouds are present on both surfaces. The surface is slightly smoothed but is pitted and coil lines are evident. Design elements are absent on both vessels.

Vessel g:

Two vessels of this type were recovered from the burial. They are small jars with narrow necks, rounded shoulders, a tapering body and a small flat base. The neck is straight at the bottom but slightly flaring at the top with a round lip. The manufacturing technique entailed molding the jar by hand. Finger and hand prints are obvious on the interior surface. One jar is tempered with a slight amount of pulverized and flake shell while the other is tempered with a medium amount of medium sized sand and grit with a slight amount of pulverized and flake shell. The paste is dark grey to black and is consistent in texture. The interior is grey and very rough while the exterior is buff and smooth with occasional streaks of grey fire clouds. The surface shows no evidence of pebble polishing or decoration.

Vessel h:

Five vessels were removed from FtT 4V which conform to this shape. These containers are large jars with a slightly tapering neck, round shoulders, a tapering body, and a flat base. The rims of the necks are straight, but taper towards the lip. Four of the five jars indicate a 2 cm difference between the width of the neck at the base and at the lip. The fifth jar has a 4 cm difference. Lips on all five vessels were round, and one has a slight exterior fold. The temper used in the manufacture of four of the five containers consists of medium sized sand grit with a slight amount of pulverized shell. Coarse sand

and grit with pulverized shell was used in the fifth jar. The paste is dark grey in color and consistent in texture. The interior and exterior colors include grey, orange, and buff on the same vessel. Grey and black fire clouds are present on the exterior of all five jars and on the interior of two of these. Four of the five jars have a very smooth interior surface, but one jar has wide brushed lines over a previously smoothed surface. The exterior surface of all five is sandy to the touch and pitted. Coiling lines are easily visible. None of the vessels have any indication of decorations.

One of the two incomplete vessel forms from the burial shares similarities with the three largest vessel forms discussed above (Vessels e, f, and h). This container was apparently thrown into the burial with the base directly impacting upon the stone slabs. This shattered the lower half of the vessel making total reconstruction impossible. This container was probably a globular jar similar to the body shape of Vessel e, Figure 4. The rim is everted with a round lip and a fold is evident all the way around the exterior of the rim. Medium sized sand with a slight amount of flake shell was used as a temper. The paste is light grey in color as is the interior of the vessel. The exterior is a mixture of grey, buff, and orange with dark grey fire clouds present. The interior is smooth, but the exterior feels sandy to the touch and is pitted like that of Vessel h, Figure 4, with no design element noted. These measurements were the only ones attainable (in centimeters): width at shoulder 25.2; width at neck 22.7; thickness of neck .5; thickness of body .7.

The second partially reconstructed vessel form was unlike any other found in the burial. Twenty-nine sherds mended together to form a large complicated stamped rim and shoulder fragment of what appears to be a casuela bowl. The angle of the shoulder is sharp, and the rim from the shoulder to the lip is slightly inverted. The lip is round. The overstamped design covers the entire sherd and is either a circular or figure eight pattern. The lands are .3 cm apart. The temper is large flake shell with a slight amount of fine sand. The paste is light grey and consistently smooth. Both the interior and exterior are light grey, and fire clouds are present on the exterior. The only measurements possible are (in centimeters): height of rim from shoulder to lip 6.6; thickness of neck .6; thickness of body .4.

The only lithic tool found in the burial was the basal portion of a randomly flaked, milky quartz biface knife. The remainder of the lithic material with the exception of one nodule of red orchre and a spherical steatite fragment, were lithic industry byproducts which may have been placed in the burial with the fill unintentionally. This material consisted of 3 black chert flakes; 1 flaked black chert pebble; 2 pink chert cores; 39 clear, rose, or milky quartz flakes; 17 quartz pebble fragments; 4 quartz pebbles; and 1 nodule of white marble.

Associated Burials and Other Features:

The second shaft-and-chamber grave was very much like FtT 4V in pit shape, but lacked the large schist slabs and vessel offerings. The only artifacts found within the pit fill were miscellaneous fragments of Taskigi Plain sherds. No information could be ascertained from the skeleton since only faint traces of bone remained.

The two Early Mississippian burials found near FtT 4V share certain traits with the shaft-and-chamber burials but variances were evident. The later burials contained evidence of a low heat fire atop the pit fill as did FtT 4V, but the large schist slabs sealing the grave and the vessel offerings were not present. The Early Mississippian burials were semi-flexed rather than tightly flexed. The ceramics from the burials show similarities to the Taskigi wares in temper and general appearance. This close ceramic association and a radiocarbon date of A.D. 1195 ± 470 years (UGa - 3012) suggest that the later internments may have been the descendants of the earlier Transitional Woodland-Mississippian people.

The Early Mississippian period ceramics retrieved from the burials have been identified as Shine Plain, a ware associated with the Shine phase in Central Alabama. This phase was named by Chase (1979) after the Jere Shine site on the Tallapoosa River only a few miles up river from 1Ee8. The phase has been assigned a tentative date of A.D. 1050 to 1300 and is associated with hemispherical and platform earth mounds. Excavations at other sites indicated that the culture grew corn and beans, had rectilinear wattle-and-daub houses, and ceremonial activities were a part of their lifestyle (Chase 1979).

Crushed shell tempered ceramics are a diagnostic trait of Shine phase sites. These ceramics are usually buff or tan and are pebble smoothed on the interior and exterior. The vessel forms include bowls and globular jars with a constricted neck. Lip nodes occur as well as noded and plain handles. These nodes and handles, when present, are in multiples of two but most commonly occur as a single pair. Rims are either straight or slightly everted and lips are usually round. Although the most common ceramics found on Shine phase sites are plain, a rectilinear incised variety is also known (Chase 1967:48-49, 1979).

The two probable burials recorded but not excavated have an orifice very similar to that of FtT 4V. These two burials are located very close to FtT 4V. The upper pit fill contains fragments of charred wood and charcoal fragments suggesting that a fire was built atop these two burials also.

Numerous postmolds containing fragments of Taskigi Plain wares were discovered scattered all around the burials. These postmolds were usually shallow, small in diameter, and round. Nor architectural inferences could be drawn from the postmolds, however.

One small, shallow, irregular shaped pit with a basin shaped bottom was also excavated near FtT 4V. This small pit, only about 20 cm deep, contained small fragments of Taskigi Plain wares. The feature was probably a trash pit of some sort, but it contained a very interesting item: the molars of an adult human. The feature is much too small to be any part of an adult burial.

Conclusions:

Shaft-and-chamber graves such as FtT 4V have traditionally been thought of as a Late Mississippian/Historic period burial custom found in the Appalachian Summit and Carolina Piedmont regions of the Southeast. Dickens (1976) discusses this burial custom is association with the Pisgah culture, which he calls prehistoric Cherokee (A.D. 1100-1550), and states that this custom was continued into the Historic period by the 18th century Cherokee. Logs and sometimes stones were used to seal shaft-and-chamber flexed burials at the Warren Wilson site in North Carolina (Dickens 1976). Shaft-and-chamber graves are also known in the Upper Tennessee Valley during the Late Mississippian Dallas phase.

The only shaft-and-chamber grave known by the author other than FtT 4V which predates the Late Mississippian culture is a similar burial at the Jernigan II site in the Normandy Reservoir on the upper Duck River in Tennessee. The Jernigan II site has been assigned to the Late Woodland period Mason phase in Middle Tennessee. A radiocarbon date of A.D. 770 ± 85 years was obtained from the burial which makes it the oldest known shaft-and-chamber burial in the Southeast (McCollough, et al. 1979).

The shaft-and-chamber burial at the Jernigan II site and FtT 4V share many similarities. Burial pit size and shape are similar as well as pit fill, placement of the human remains in the pit, and the presence of charcoal in the pit fill. Major differences include the use of large stones to seal the burial and the ceramic grave offerings in FtT 4V. It is important to note that the Jernigan II site burial has been assigned a Late Woodland period context and FtT 4V has presently been assigned a transitional Late Woodland-Early Mississippian association.

McCollough et al. (1979:185) state that "the origin for the shalf-and-chamber grave type in the Southeast is still unclear at this time". Although the question of the origin of this burial custom may remain unanswered for the present, the identification of shaft-and-chamber burials in Central Alabama associated with the Late Woodland/Early Mississippian culture is a significant discovery and may shed some light on this riddle.

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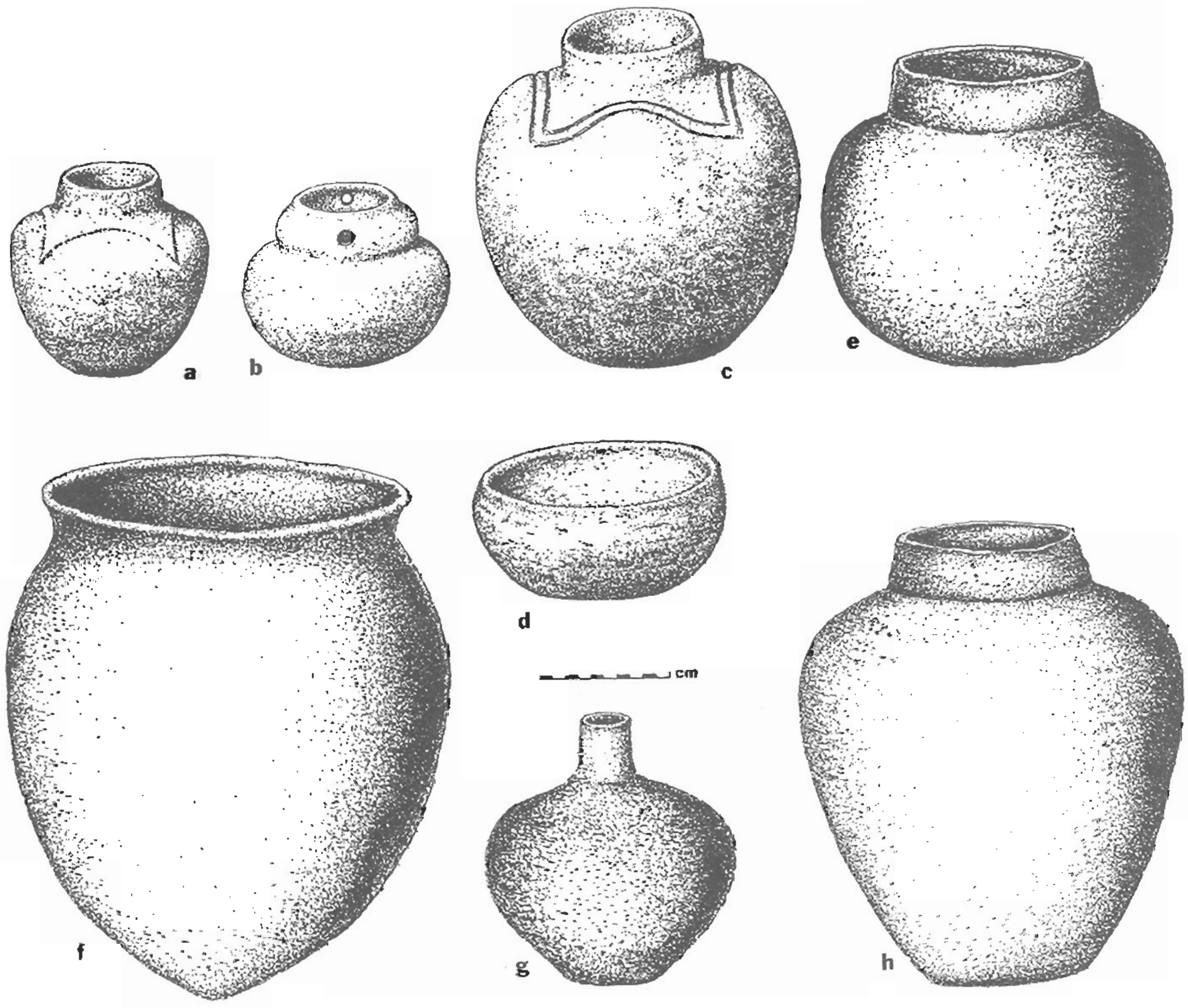

Figure 4. Taskigi vessels.

EXCAVATIONS AT MOUND A, SHILOH NATIONAL MILITARY PARK, TENNESSEE

Lindsay M. Beditz and Randy V. Bellomo

Shiloh National Military Park in Hardin County, Tennessee, includes a large and well preserved prehistoric Indian mound and village site within the park's boundary. The site is located in the eastern portion of the park on a high bluff above the west bank of the Tennessee River. The edge of the bluff forms the eastern boundary of the site. Deep ravines cut by tributary branches of the main stream border the site on the north and south. A long, low embankment marking the line of a former palisade which extended across the neck of the bluff is believed to be the western boundary of the site.

The major features of the site are seven large mounds, ranging from 5 to 15 ft in height, and numerous small low mounds from 1 to 2 ft high. Six of the large mounds are rectangular temple mounds. The seventh is a conical burial mound. The small low mounds are generally thought to be house platforms.

The Tennessee River, which forms the eastern boundary of the park, is eroding the prehistoric complex as well as other portions of the park along the river bluff. The mechanisms for potential slope failure are complex, because they are undoubtedly acting in various combinations. The low-lying areas are largely blanketed with alluvium which is nearly impervious and relatively homogeneous. Consequently, during periods of high water little infiltration occurs and a subsequent relatively rapid drawdown does not cause a critical increase in pore water pressure within the bank.

On the other hand, the higher, steeper slopes which front on the river adjacent to the mounds and the cemetery are composed of Eutaw soils. The materials are quite diverse, having impervious clayey layers sandwiched between more pervious granular beds. The permeability of these soils varies widely, both laterally and vertically. Prolonged high river stages followed by rapid drawdown have historically triggered the major slope failures. It has been suggested that variable, but extensive, infiltration into these soils during prolonged high water stages is not relieved during usually short drawdown intervals. Excessive pore water pressures developed during this time may in effect "blow out" the lower portion of the slope. This is followed by sliding and slumping of the steep overhung slopes above (Department of Interior 1976:70).

While one might expect all these mechanisms to work to varying degrees along an "uncontrolled" reach of river with similar physiographic and geologic settings, the operation of multi-purpose dams upstream and downstream undoubtedly enhances the erosive process.

Further, the orientation of the park on the outside and downstream from a rather sharp bend in the river increases the rate of erosion by undercutting. The current is unusually swift because the park is located just 9 mi downstream from the discharge of the Pickwick Dam and powerhouse. It is obvious from aerial photos that the current is capable of rapidly removing material which slumps into the river so that the cycle of slumping and sliding followed by scouring as just described can be repeated again and again. The area of the Indian mounds and the National Cemetery, a length of approximately 3500 ft, has been degraded moderately to severely. This condition of erosion, sloughing, and slumping is continuous and appears to be accelerating (Department of Interior 1976:70-71).

Because Mound A of the mound group is most immediately threatened by this erosion, a team from the National Park Service Southeast Archeological Center conducted testing at Mound A during the summer of 1979. This report summarizes the preliminary findings of this testing.

Previous Archeological Investigations

The earliest documented archeological investigation of the mound and village site was carried out by Colonel Cornelius Cadle of the War Department in 1899. He trenched Mound C, the burial mound, and located three burials accompanied by a human effigy pipe in a log tomb (Cadle 1902).

Clarence B. Moore visited the site in 1915. He was unable to obtain permission to excavate any of the mounds, however.

The bulk of the archeological work was done during late 1933 to early 1934 under the Civil Works Administration. Frank H. H. Roberts of the Smithsonian directed the project. During this investigation Mound C (the burial mound) was sectioned and 30 burials recovered. A series of trenches were dug in the areas surrounding and between the main mounds. These trenches revealed the remains of 30 houses, a temple, and numerous refuse deposits. Two of the platform mounds-Mounds E and F--were also trenched (Stirling 1934; Roberts 1935; Chambers 1936).

In 1975, under contract to the National Park Service, Gerald Smith of Memphis State University carried out a 3 phase investigation involving the Shiloh mounds and village site. First, he analyzed the work done by Roberts in 1933 and 1934. Roberts' field notes are relatively generalized. He started his survey and excavation crew at the same time, and there are no benchmarks which can be located in the field from this excavation. Smith also conducted limited testing to determine the limits of the site and the culture chronology. He conducted six test excavations involving the bastion and embankment area and the areas near Mounds D, F, and G (Smith 1977).

Methodology

Archeological testing at Mound A was conducted to determine the internal composition of the mound as well as the possible existence of a ramp on the south face. A 1 m square test pit was placed to the west and south on the mound top. However, this first test square yielded historic intrusive material down to a depth of 1 m when the test was abandoned.

A second 1 m square test was then excavated several meters east of the first test. This square yielded only one historic artifact and showed no other evidence of disturbance. It was excavated to a depth of 6.8 m until sterile soil was encountered.

A third test pit 1 by 1/2 m was sunk to a depth of 1.4 m into the south face of the mound in an effort to locate a ramp leading into the central area of the plaza. No evidence for such a ramp was discovered. However, the stratigraphy from this pit corresponded to a section from the second test, suggesting that the mound is essentially undisturbed.

Artifact Analysis

Just over 1,000 artifacts were excavated from Test 2. The majority were ceramic, lithic, and shell; small amounts of bone and daub were recovered. No features of any kind were discovered.

Ceramics - Two ceramic types dominate the ceramic assemblage: Neeley's Ferry Plain (which is Mississippi Plain var Neeley's Ferry in Phillips' taxonomy); and Mulberry Creek Cordmarked. Neeley's Ferry Plain is shell-tempered, while Mulberry Creek Cordmarked is grit-tempered. Minority wares include Baytown Plain, Kimmswick Fabric Impressed, Bell Plain, Moundville Incised, Wheeler Check Stamped, and O'Byam Incised (Phillips 1970). No complete or partial vessels were recovered. The vast majority of the sherds are only thumbnail size, so no reconstructions were possible. Only 11 of 343 sherds were rim sherds.

An interpretation of the ceramics recovered at Mound A is somewhat difficult to make. The 1934 excavations and Smith's 1976 test excavations recovered the same types of ceramics. What has been retained in the 1934 collection probably represents a selective sample of some sort. Gerald Smith's ceramic material has good stratigraphic control, but none of it is from a mound excavation.

In general, the ceramics from the Mound A excavation show no particular trends through time. Mulberry Creek Cordmarked and Neeley's Ferry Plain are certainly indicative of two major ceramic complexes; a Mississippian and Woodland complex. However, the percentages of ceramic types seem to fluctuate randomly through time or at least throughout the levels of the excavation. The ceramic data indicate that rather than being constructed in various stages through time, the mound was probably constructed with a relatively short period of time. The sherds were present in the fill or midden used to construct the mound. No ceramics were excavated in levels 14 through 20 which correspond roughly to the bottom one third of the mound. Other cultural debris was present in these levels, however. Therefore, it appears probable that at least two different areas provided dirt or fill for the mound. The specific source areas for the mound fill are presently unknown, although the river floodplain is a likely source based on the types of shells excavated in the mound.

Sherds were also found to a depth of over 2 m below the base level of the mound. Percentages of the two major ceramic types (Neeley's Ferry Plain and Mulberry Creek Cordmarked) indicate a general decrease of Mulberry Creek Cordmarked through time as Neeley's Ferry Plain increases. Thus, it seems likely that Mound A was constructed over an area which contains evidence of occupation through time at this spot.

Lithics - With the exception of one projectile point, all of the lithic material recovered from Mound A is temporally non-diagnostic. Over half of the lithic material consists of unmodified rocks and pebbles which probably occurred naturally in the fill. Approximately 1/4 of the lithics consists of unworked flakes and debitage. The remaining 1/4 of the lithic material was modified. This 1/4 included worked flakes, a unifacial scraper, a core, a chopper, and a small typical Mississippian projectile point with a broken distal tip.

Bone - Only 42 fragments of bone were found. None were human and none showed evidence of modification or utilization. Only 11 fragments could be identified with any certainty, and these fragments were all deer bone.

Shell - In addition to the bone and ceramics associated with the mound, several species of mussel shell and snail shell were also recovered. Of the shell found, well over 3/4 were unidentifiable. All of the shell recovered from the mound fill was far too deteriorated to enable identification. Of the shell recovered below the base of the mound, four species and three genera were identified. These included the mussel shells Elliptio crassidens, Elliptio dilatatus, Quadrula pustulosa, and Obliquaria reflexa. The genus Pleurobema was also identified (Morrison 1942:337-392; Burch 1973; Heard 1979).

Two genera of snail shells were also identified as Goniobasis and Campeloma, both of which are mud burrowers. All of these organisms are river dwellers and reflect deep water environments--at least water too deep for wading to collect them (Heard 1979).

The heaviest concentration of shells occurred in levels 26 through 31, which extended for a depth of over 1 m below the base level of the mound. These shells are apparently associated with the midden or living surface on which the mound was constructed.

The heavy concentration of shell below the base of the mound may have been gathered as a food source during periods of unusually low water in the river.

The secondary concentration of shell in the upper 1/2 to 2/3 of the mound may indicate that this fill came from the river bed area during a period of low water. It may also have come from an old river channel area of the river floodplain. The fill comprising the bottom 1/3 of the mound contained only three fragments of shell and may, therefore, have been carried in from another area farther away from the river.

Summary and Conclusion

Radiocarbon dates based on charcoal samples collected from 5 different levels of the excavation seem to support these conclusions. The 3 dates obtained for three levels of the mound itself range from 825 to 1090 A.D. (level 11-825 A.D.; level 9-760 A.D.; level 2-1090 A.D.). The dates for the midden on which the mound is constructed ranged from approximately 200 A.D. (level 26) to 735 A.D. (level 23). These dates follow the general trends and conclusions which the artifacts and stratigraphic data suggest. However, because none of the charcoal came from identifiable hearths but was collected throughout the level, it is possible that the burned material dates the midden or fill, which was then brought in to construct the mound.

Based on the 1979 excavation data, it appears that Mound A was constructed during a short period of time rather than over an extended period. It was built on top of an area which had been occupied over a period of time. The fill used to construct the mound was carried in from at least two separate areas, at least one of which was probably located on the river floodplain.

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SPECULATIONS ON THE EARLY WOODLAND THOM'S CREEK PHASE SETTLEMENT PATTERN ALONG THE SOUTH CAROLINA COAST

Michael Trinkley

When invited by Ms. Claassen to present a paper at this symposium I envisioned a broad review of speculations from a variety of phases in the Woodland period. When I began collecting some thoughts, however, I narrowed the topic to only the Early Woodland, or essentially the Thom's Creek phase. Before continuing I should clarify two possible points of confusion. First, I need to define what I mean by "speculations" and second, I need to briefly explain how I interpret "settlement studies." By speculations, I do not mean guesses, without the backing of substantive, empirical data. Nor do I mean what I have called "let's pretend archaeology," wherein supporting data are used and conflicting data are ignored. The state of archaeology is such that speculation should play a significant part in the development of our understanding of prehistory, and can play an important role if it is based on sound reasoning with supporting data.

Although the term "settlement pattern" has been defined in a variety of ways, I will follow Trigger's (1968) early lead and will use the term on three levels: the individual structures (housholds), the community plan (village), and the areal (zonal) patterning of these communities. Trigger (1978:148-150) notes, "(it) is assumed that the quantity, type, and distribution of the material remains of human activities ... constitute reliable evidence concerning the manner in which former inhabitants adjusted to their environment and that all of the factors that influenced this adjustment are reflected, either directly or indirectly, in the settlement pattern." Of course, our study of settlement patterns will be no better than our empirical data regarding the material remains, and the settlement pattern may be interpreted to suggest a variety of adjustments to the environment. Consequently, I am again back to dealing with speculations.

A number of investigators (Miller 1949; Williams 1968; Smith 1974) have found evidence, either stylistic or stratigraphic, for an in situ development of the Stallings phase in the Savannah River region south of Augusta, Georgia. This idea has been given additional credence by Stoltman's (1966) early radiocarbon date of about 2500 B.C. from Rabbit Mount. The temporal and cultural distinction between the Stallings and Thom's Creek wares is far from well defined (Trinkley 1976). The two appear to be roughly contemporaneous, with the Stallings ware perhaps slightly earlier. Smith (1974) has suggested that the intrusion into the Savannah River region of the people exhibiting the Morrow Mountain and Guilford cultural traits, at a time when population densities had approached long-term carrying capacity (cf. Binford 1968), caused a disequilibrium which resulted in selective pressure being directed toward a method of procuring supplemental food sources. A this time, according to Smith, shell middens appeared along the Savannah River. This more effective subsistence base led to a population increase, and then to larger sites such as Fennel Hill on the Savannah River, and the Love Site in the uplands. Smith goes on to suggest that the larger social units and resultant disequilibrium led to further geographical expansion -- into the Atlantic Littoral.

Smith's evidence from along the Savannah River is scanty and the survey work necessary to provide the evidence has not been conducted, in spite of the constant encouragement of the late Clemens de Baillou. Waring (Williams 1968) and others (Crusoe and DePratter 1976) observed a transition from plain to decorated pottery, and from plain or simply engraved bone pins to finely engraved bone pins at coastal sites. The occurrence of baked clay balls is also apparently an early manifestation.

I have previously suggested that as the people of the Thom's Creek phase became more successfully adapted to the coastal ecosystem, there seem to have been three major changes: first, a coalescence in the population; second, an increase in the complexity of social organization; and third, a specialization of technology. The process of establishing sedentary village life along the Atlantic Littoral is essentially the same as the process in Mesoamerica: that of realizing and utilizing the potential resources concentrated close at hand (cf. Coe and Flannery 1964).

The investigation of Thom's Creek phase sites along the coast has been irregular and infrequently published. Edwards (1965) published the preliminary results of testing the Sewee shell ring, Hemmings (1970) published a brief account of his trenching of the Fig Island shell ring, and Calmes (1967) reported on the testing of the Sea Pines and Skull Creek shell rings. Sutherland (1973, 1974) has offered preliminary reports on the Spanish Mount shell midden, and recently I have investigated two sites, the Lighthouse Point shell ring and the Stratton Place shell ring. Excavations at Lighthouse Point total in excess of 2200 ft^2, and at Stratton Place in excess of 1300 ft^2. These two sites, coupled with extensive survey and previous studies, form the basis for my statements regarding Thom's Creek settlement patterns.

An examination of the changing settlement pattern through the Thom's Creek phase, coupled with artifact studies and radiocarbon dating, may provide evidence of the coalescence of population, increased social complexity, and specialization of technology. Two classes of coastal sites apparently provide the earliest radiocarbon dates. First, as a whole, those sites geographically south of the Savannah River have an average date of 1766 B.C., while the sites north of the Savannah River, but south of Charleston have an average date of 1463 B.C. Only two dates, averaging 1582 B.C., are available for those sites north of Charleston. Second, if the sites are divided between irregular heaps of shell and ring-shaped middens, the irregular middens are older, averaging 1921 B.C., while the rings average 1547 B.C. There are still too few dates (the total sample size is 30), and too many potential interpretations of the data, to offer conclusions, although it is tempting to suggest that the Georgia sites are older. That possibility is suggested because of their proximity to the Savannah River and the route that the bearers of the Stallings cultural tradition took to the coastal zone. It is not unreasonable that the irregular middens should have older dates, if their artifact assemblages and topographic positions are studied. Not only do the artifacts from these sites show a great deal of similarity with the Late Archaic and Bilbo I phase (plain pottery, large quantities of lithics, baked clay objects, and plain or simply engraved bone pins), but the sites are frequently inundated by the rising sea level.

In the sparse work conducted at Thom's Creek phase coastal shell middens, no structures have been found, although random postholes are not infrequently mentioned. In an attempt to discern living areas, I have opened fairly large contermineous areas at several shell rings. During this work no posthole patterns were observed, although the occurrence of random post molds was greater than anticipated. This is not, however, to say that no data are available on individual living areas in shell rings. Calmes (1967:11), during his work at Skull Creek, noted "numerous small piles [of shells] about seven or eight feet in diameter," which he interpreted to be individual habitation areas. A similar phenomenon has been observed at both Lighthouse Point and Stratton Place. The profiles seem to indicate that small mounds of shell and other refuse were formed by the Indians. These small mounds were walked on, pits were dug into them, sand was scattered over them, and they were apparently leveled on occasion, perhaps when they accumulated too much height. At this stage of our study little more than this can be said about the basic level of settlement studies.

Slightly more, however, can be said about the community layout during the Early Woodland Thom's Creek phase. I have previously mentioned that there are two basic settlement patterns, and this has recently been stressed by Michie (1979): (1) the irregular midden usually found eroding out of a creek bank; and (2) the shell ring usually found on higher ground. At the present time the only excavated data from irregular middens come from sites in Georgia, and from two South Carolina sites. These sites are similar to the presumably ancestral sites up the Savannah River, and consist of midden debris evidencing occupation. Some sites are fairly small, others are rather large. There are no data at present regarding the permanence of these occupations, although sites such as Daws Island, Venning Creek, and others suggest temporary middens, perhaps used on a seasonal basis. In any event, these irregular middens are distinct from the ring-shaped middens, from which we have most of our data.

Work at Lighthouse Point and Stratton Place suggests that while these shell ring sites are similar, they are not identical. There appear to be four site areas at a shell ring, based on the limited sample -- the ring exterior, the shell midden, the interior edge, and the interior of the ring. Each area is characterized by different remains and different quantities of soil chemicals, suggesting differential usage. From the outside edge of the ring, for a distance of 10 to 15 ft, there is a zone of heavy disposal where a quantity of potsherds and animal bones will be found. Beyond this the artifact density rapidly decreases, and soil chemicals indicative of human occupation become negligible. This zone of debris may be accounted for by disposal off the top of the adjacent midden, and items rolling down the sides. The lack of artifacts, pits, or other evidence of occupation outside the ring is dramatic, indicating that the site occupation was on or within the ring -- not adjacent to it. The ring itself is composed of varying proportions of shell, animal bone, pottery, soil, and other artifacts. It does not appear possible to offer any averages, although it is possible to suggest that the midden ring, when compared to either the interior or exterior, is composed of a higher percentage of silts and clays. The midden is lensed and crushed. Pits have been dug into the midden, and the formation process appears to be one of house middens, deposited in a rough circle, gradually closing together, and forming a continuous ring of varying height and width. Under the midden is found a quantity of large shell pits, several feet in diameter, and several feet in depth, filled with crushed shell and charcoal. These features appear to have been shellfish steaming pits. Their use, with the consequent disposal of the shells, actually formed the midden. The majority of the coprolites found at Lighthouse Point come from the outside edge of the ring, perhaps an area out of public view. Distinct from the ring itself is the interior edge. At this point a large number of distinctive features are found, consisting of pits filled with quantities of hardened ash, burnt shell, and fish bone. These pits suggest hot fires fully oxidizing the wood to produce ash as opposed to charcoal. The purpose of these pits is not clear, although they are different from the shellfish steaming features. This interior edge, perhaps twenty feet in width, shows a great deal of disturbance, but few post holes.

The last site area is the interior of the ring. Thought by most researchers to be devoid of occupational debris, the shell ring interior has developed a certain shroud of mystery. Hemmings trenched the interior of Fig Island, but found very little, perhaps because the tidal inundation prevented investigations deeper than 0.5 ft. Other work, by Calmes (1967) and Ritter (Flannery 1943) suggested that the interior was more complex than Hemmings' work indicated. While only 250 ft^2 of the central portion of Lighthouse Point has been investigated, over 1100 ft^2 (roughly 20%) of the center of Stratton Place has been excavated. These studies, although not complete, do allow some preliminary statements. First, the center is not completely devoid of shell; one pit was found at Stratton Place, a dark humic pit was found at Lighthouse Point, and several others are reported by Calmes and Ritter. Second, the interior is the respository for a quantity of pottery, but no animal bone. Garbage was deposited in the ring interior, but garbage disposal was limited. Third, based on the fragmentation of the pottery, and the depth it was apparently being pushed into the soil by pedestrian traffic, it appears that the interior was utilized. Fourth, the ring interior has, understandably, a low pH, and low amounts of nitrogen, phosphorus, and phosphate. Consequently, while activities were taking place in the ring, those activities were not producing recognizable chemical evidence of occupation. There is some evidence suggesting that different pottery is found in the ring interior than is found within the midden. While some of the mysteries of the interior remain, we are beginning to more fully understand site composition.

The shell rings suggest permanent occupation, based on site density and preliminary examination of subsistence items. Coalescence of population is suggested by the increase in numbers of rings over irregular middens, their large size, and the aspect of their gradual construction. Some sites, such as Fig Island, Cannon's Point, Skull Creek, and Sewee, are suggestive of fission. I have previously suggested that this coalescence of population was possible because of the rich environment of the coast, and increasing adaptation by the Thom's Creek "people." This increase in population, by necessity, brought an increase in the level of social organization.

When we turn to look at the areal settlement patterns we are on less firm ground. Sufficient survey work has been conducted in too few areas to allow any safe speculations. Michie (1979) has argued that the distinction between the irregular middens and shell rings is one of extractive site versus base camp believing that the sites are contemporaneous. I have suggested an alternate explanation in this paper which takes into account differences in artifacts assemblages and radiocarbon dates. Essentially I see patterning changing in response to cultural change and increasing adaptation to the coastal zone.

Turning away from the zonal pattern along the coast, there appears also to be a distinction between those Thom's Creek sites within the coastal zone which evidence shell middens, and those sites in the coastal plain of North and South Carolina which lack shell, although no one has yet firmly established the relationship between them. Pottery is virtually the only artifact available to compare and contrast these sites, although the interior sites give the impression of being more ephemeral, short term occupations. The pottery, unfortunately, is little help without good radiocarbon dating. The only coastal sites that provide stratigraphic pottery data are the Fig Island shell ring and Spanish Mount (Trinkley 1976), but dating is available only for Spanish Mount. At both sites the quantity of Thom's Creek Shell Punctate increases through time, while Thom's Creek Reed Punctate and its variant, Thom's Creek Reed Drag and Jab, decrease through time. At Spanish Mount plain pottery increases, while at Fig Island the plain pottery decreased in quantity through time. At neither site are there sufficient quantities of Awendaw Finger Pinched pottery to determine its place in the seriation. At Lighthouse Point plain pottery accounts for 82% of the recovered material, with Awendaw Finger Pinched being the next most common type at 7.6%, followed by Thom's Creek Reed Punctate and the variant Drag and Jab at 4.8%. Thom's Creek Shell Punctate accounts for about 4.2% of the total (Trinkley 1975). All of these ceramics are found in levels and features dated to roughly 1225 B.C. It is possible, using these sparse data, to suggest that the pottery be seriated such that Thom's Creek Plain is the oldest pottery, followed by Thom's Creek Reed Punctate. At the time reed punctating was losing popularity, Thom's Creek Shell Punctate was gaining popularity. Awendaw Finger Pinched appears to be the most recently made pottery in the Thom's Creek Series. Waring (Williams 1968:217) noted that shell punctate appeared to be late, and Waddell (1966) found the punctated pottery to be generally confined to the south, while finger pinched pottery was found in a more northern range. If this reconstruction is correct the spread of the ware may have begun at the inland Thom's Creek sites, prior to the adaptation to a coastal biome. These inland sites may, then, represent part of a seasonal cycle between the coast the the interior which is not found later in the Thom's Creek phase.

There are two major problems with this reconstruction. First, the inland Thom's Creek Reed Punctate pottery appears better made than the majority of pottery found along the coast. Second, the inland sites are generally multicomponent, evidencing quantities of later pottery mixed with the Thom's Creek material. It is tempting to suggest that these inland sites are therefore later than the coastal sites, perhaps being the result of some environmental stress on the coast which broke up the sedentary settlements. This suggests that, at this time, we can not successfully use pottery as a temporal indicator in trying to understand the relationship between coastal sites with shell middens and a variety of pottery types, and interior sites without shell middens and consisting predominately of Thom's Creek Plain and Thom's Creek Reed Punctate pottery (cf. Widmer 1976:43).

It is ironic that the future of "settlement archaeology" along the South Carolina coast seems to be intimately tied up in a question posed over ten years ago, but never resolved. In Chang's edited work on settlement archaeology Willey (1968:209-210) noted the procedural disagreement between Chang and Rouse over the "question of precedence." While Chang apparently thinks that no one step of archaeological investigation can take precedence over another, Rouse insists that there is a logical progression of archaeological investigation with the recovery and classification of remains preceding their interpretation. We still find ourselves in the position of discussing "settlement archaeology" with little more data than a bag of jumbled potsherds and a ready mind. My paper illustrates this problem. Even for the Early Woodland, for which there have been several moderate scale excavations, we lack the data to convincingly solve most of our "settlement problems." The data for the Middle and Late Woodland, for some reason, have not been forthcoming, despite almost fifteen years of professional archaeology in South Carolina. If we decide settlement studies are worthy endeavors, then much more attention must be placed on the development of sound typologies and chronologies, as well as sound data collection.

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HOLOCENE ENVIRONMENTAL CHANGE AND THE NATURE OF COASTAL SETTLEMENT: AN ASSESSMENT FROM SOUTHEASTERN VIRGINIA

Paul R. Green

This essay examines prehistoric human settlement in the temperate nearshore environment, specifically the estuarine zone of southeastern Virginia. Few controlled excavations and systematic archaeological surveys have been conducted in this area, although the potential cultural resource base in considerable, to judge from the intensity and results of local artifact collecting.

Generally speaking, the study of settlement patterns and systems, as well as the ecological framework into which they fit, remain fruitful areas of inquiry for the archaeologist (cf., Fitzhugh 1972; Parsons 1972; Flannery 1976a). Also relevant to this discussion is the comparative study of coastal or maritime adaptations in prehistoric contexts (cf. Casteel and Quimby 1975; Fitzhugh 1975; Mellars 1978). Within the southeastern United States, other archaeologists have sought to elucidate particular settlement interrelationships found in littoral or riverine environments (cf. McMichael 1977; Brain 1978; Pearson 1978).

Few studies, however, have closely addressed problems of local environmental change which may affect the reconstruction of settlement pattern and systems development and operation; it is to this point that this essay is chiefly directed. But first it is appropriate to comment on the methodology of settlement pattern and system analysis as practiced to date, since these models will undoubtedly be emulated to some extent in future research designs for the coastal mid-Atlantic region.

As several authors have noted (Winters 1969:110f; Parsons 1972; Flannery 1976b:162), the terms "settlement pattern" and "settlement system" are not at all synonymous. Settlement pattern studies treat "the pattern of sites on the regional landscape" (Flannery 1976b:162) or the distribution of the "absolute spatial loci of sites" (Plog and Hill 1971:9). Much of what passes for "spatial archaeology" today attempts to cull from the geometric arrangement of sites such behavioral inferences as are possible, if not probable (cf. Hodder and Orton 1976). Settlement system studies incorporate the inferences from pattern analysis with a consideration of the relationships between contemporaneous sites. These relationships, variously described as functional, dynamic, or systematic, produce what Flannery (1976:162b) called "the set of 'rules' that generated the pattern in the first place."

Before reaching this level of analysis, however, one necessarily deals with basic matters of site definition, determination of site size, and establishment of contemporaneity of site occupation. Usually sites are defined by some arbitrary measure of spatial separation between aggregates of cultural material; site size is often computed from surface dispersions of artifacts and features, with varying degrees of success (cf. Brain 1978:342f.; Pearson 1978:64f.; Price 1978:213ff.). Temporal imprecision is a severe limitation to the development of settlement models, for as Hamond (1978:3) has noted:

> it limits the archaeologist's ability to measure the degree of contemporaneity between sites, the duration and absolute chronology of their occupations, and the duration of the time period which is being analyzed. Thus the grouping and description of sites in context of such time periods may conceal interesting developments within and between these times

or it may result in what Brain (1978:342) aptly termed "the reduction of a complex series of patterns to a single synchronic surreality."

The archaeological distribution map, the grist of most settlement pattern analysis, is subject to numerous biases. There are the familiar problems of survey in forested or growth-covered areas, of producing site distributions which correlate all too well with convenient modern road networks, and of blank areas resulting from the impediments of standing water, constructional activity, or agricultural land use. In addition, non-systematic survey techniques, subsequent settlement, and natural transformational processes (such as deposition and erosion) leave the distribution map (and consequent inferred patterns) incomplete and biased (Hamond 1978).

Settlement pattern studies often encounter difficulty in objectively delimiting the research area. A physiographic marker may be sufficient in some cases, as in island studies (cf. Pearson 1978), but more often one relies upon some strategy of overlapping cultural, physiographic, and biotic boundaries for a research area that intuitively "feels" appropriate. Haggett et al. (1977:457ff.) remind us, however, that such schemes are often incomparable from observer to observer, since the bounding devices may be intercorrelated or of unequal weight.

Site size information has often been applied in models to suggest hierarchical levels of societal organization (cf. Johnson 1972; Pearson 1978; Price 1978). Others caution, though, that such models drawn from the Western intellectual tradition may be inappropriate for prehistoric examples (Bell 1977; Crumley 1976, 1979; Stark and Voorhies 1978). Archaeologist also persistently rely upon correlations (some demonstrated, some assumed) of site size and functional complexity to sustain a hierarchical model of spatial organization (cf. Pearson 1978). This assumed relationship begs for verification and clarification in the ethnographic literature, particularly at sites of the intermediate and smaller sizes, where this relationship may be suspect (Haggett et al. 1977:113ff.; Hodder and Orton 1976:69-73). Crumley (1979), Stark and Voorhies (1978:293f.), and others have suggested alternative forms of spatial organization, which may more properly reflect local cultural and biophysical conditons.

Settlement pattern or system reconstruction inherently requires thorough knowledge of areal distributions of site types, thus necessitating wise use of time and manpower to achieve the most accurate picture possible. Traditionally, the success of a field survey rested on the expertise of the director. The adequacy of such a purposive or judgmental technique, particularly when used exclusively, is open to question. Clearly, what were needed were sampling techniques with demonstrable statistical relationships between the sampled unit and the total research universe. To that end, sampling designs borrowed from biology and geography have been applied in archaeology (cf. Mueller 1975).

Plog's (1976) comparison of probabilistic sampling techniques showed, generally speaking, that there was little significant increase in knowledge gained from use of the more elaborate schemes; Flannery (1976a:159f.) commented that a sensible blend of judgemental and statistical techniques would probably yield the best results. McMichael (1977) examined the efficacy of stratified random sampling relative to judgmental survey and confirmed the usefulness of the approach advocated by Flannery. One of the dangers in sampling techniques, particularly in large surveys, is that the recovered set of sites (or "dots" on the distribution map), however "representative" of the different kinds of sites in the area, may never have actually been related in a settlement system at any given time. The "lines connecting the dots" must be established by careful, intensive site excavation and analysis and not blithely assumed in a hastily concocted settlement model.

Parsons' (1972:135) review included a concise restatement of Struever's view on an "ideal" settlement research program. It is noteworthy that the initial steps advocated there (establishment of local temporal relationships and fine-scale paleoenvironmental reconstruction) are often given the least support and attention, due not only to the complexity of such problems but also to the current archaeological attraction for modeling prehistoric social systems on a regional scale and to the funding attitudes of governmental agencies. The soundness of the regional approach is not being questioned here, rather the manner in which such a program is usually planned and executed.

Southeastern Virginia is relatively unstudied by the professional archaeologist, although there has been considerable amateur excavation and intensive collecting. Prior to developing models of settlement distribution and interaction for this area, careful attention should be paid, as noted above, to the paleoenvironments of various cultural phases. In the past, several archaeologists studying prehistoric coastal cultures recognized this problem and used the work of geologists to help them resolve it (cf. McIntire 1971; Schwartz and Grabert 1973). Conversely, geologists have on occasion resorted to the dating of archaeological middens to elucidate patterns of coastal landform development (cf. Curray et al. 1967).

The most thorough treatment of geomorphic change and human coastal adapatation is found, however, in the work of Kraft and his colleagues (Kraft et al. 1973; Kraft 1976, 1978). Kraft, working primarily in the Delmarva region, relies heavily on the application of Walther's Law, or the Law of Correlation of Facies. According to Middleton (1973:979, cited in Kraft 1978:367), it states that:

> the various depostis of the same facies areas and similarly the sum of the rocks of different facies areas are formed beside each other in space though in cross section we see them lying on top of each other. As with biotopes, it is a basic statement of far-reaching significance that only those facies and facies areas can be superimposed primarily which can be observed beside each other at the present time.

Figure 1 illustrates in a schematic form how such a principle is applied to a section of the Delmarva coast.

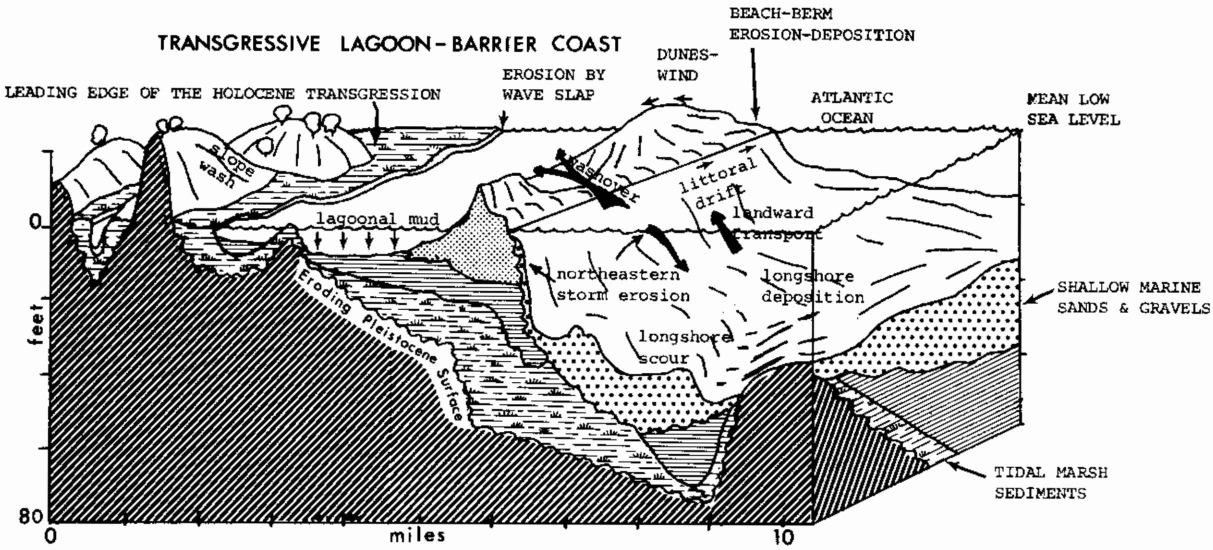


Figure 1. A schematic illustration of Walther's Law as applied to the Delmarva coastal area (redrawn from Kraft 1978: fig. 6).

An extensive program of subsurface sampling in barrier beaches, estuaries, salt marshes, tidal lagoons and creeks, and alluvial valleys enabled Kraft to detail local geomorphic evolution in coastal Delaware throughout the Holocene period (Kraft 1971). This information, when combined with the distribution of known archaeological sites, produced a series of cultural geographic vignettes (Figure 2) altogether more accurate than is normally found for that area.

The geological configuration of southeastern Virginia in post-Miocene times has been reconstructed primarily by Oaks and Coch (Oaks and Coch 1973; Oaks et al. 1974). This area (Figure 3) contains numerous subtle scarps and intervening flats or terraces. Initial workers in this and similar regions incorrectly attributed these topographic features (mostly on non-stratigraphic evidence) to a few dramatic episodes of marine transgression and regression during the Pleistocene (Oaks and Coch 1973:11-14). Oaks and Coch analyzed hundreds of core profiles in terms of the sedimentary morphology of the facies they contained. Eight formations and various members were defined, along with several regressive episodes, all of which showed the Pleistocene sequence to be developmentally and spatially complex.

Following a marine regression and shoreline emergence episode between about 60,000 and 40,000 years ago, the Londonbridge Formation was deposited (Figure 4). It comprises a sand and gravel facies in ridges and clayey silts in intervening logoonal deposits (Oaks and Coch 1974:80). A prominent north-south ridge of oysters (Crassostrea virginica Gmelin) was also identified near the eastern section of the present Dismal Swamp (Figure 4). Sometime in the mid-Wisconsin stage (absolute dates are uncertain here) the Sandbridge Formation was deposited (Figure 5). According to Oaks and Coch (1973:89ff.), it consists of a homogeneous sandy lower member and a heterogeneous upper member, with facies of ridge sands and flatland or alluvial clayey-sands, silty-sands, and silty-clays.

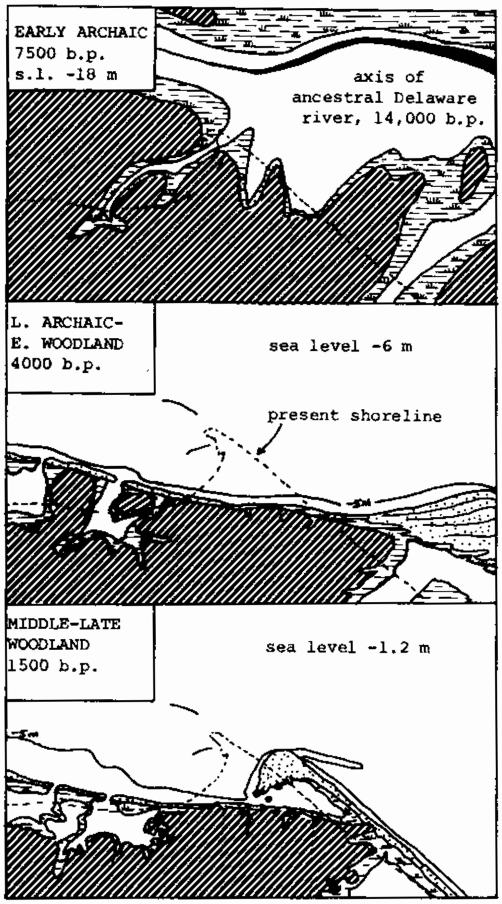


Figure 2. Paleogeographic reconstructions of the Cape Henlopen spit and dune-marsh area from Archaic through Woodland times. Dots show sites of American Indian occupancy for each time period (redrawn from Kraft 1976: fig. 18).

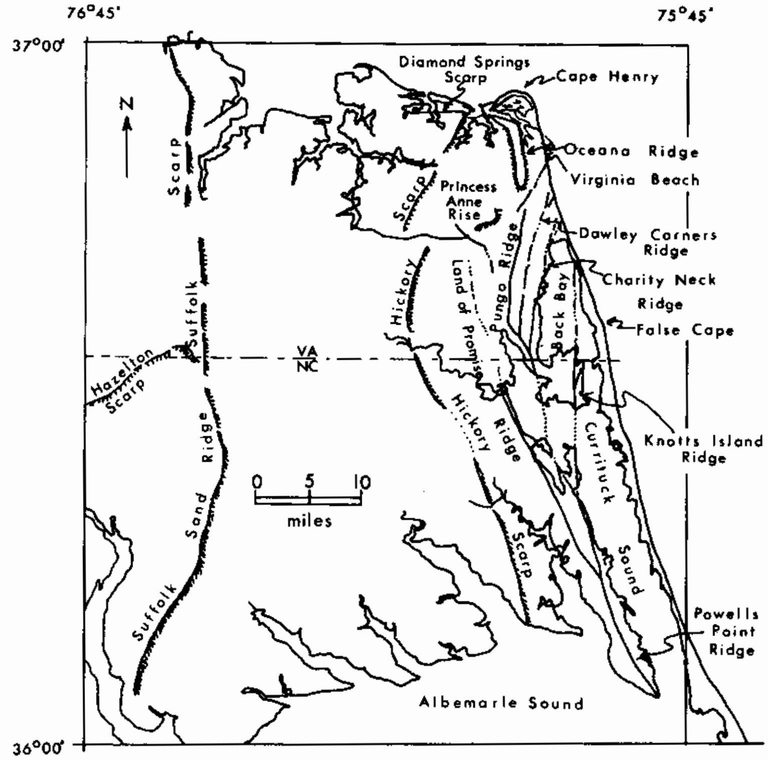


Figure 3. Scarps and ridges in southeastern Virginia and adjacent North Carolina (after Oaks and Coch 1974: fig. 7).

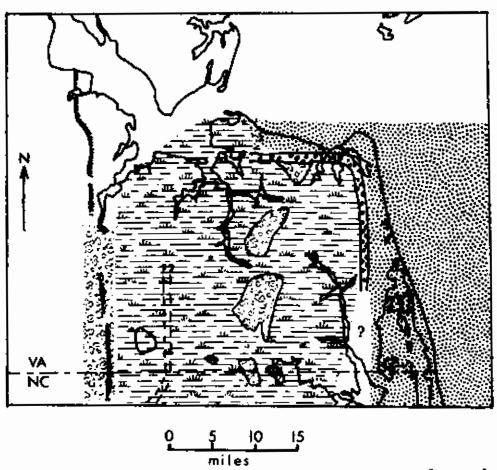
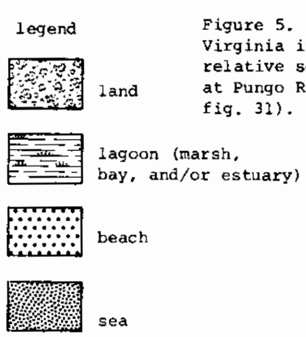


Figure 4. Paleogeography of southeastern Virginia in Londonbridge time; relative sea level near 24 feet; shoreline at Oceana Ridge and Diamond Springs Scarp (after Oaks and Coch 1973: fig. 28).



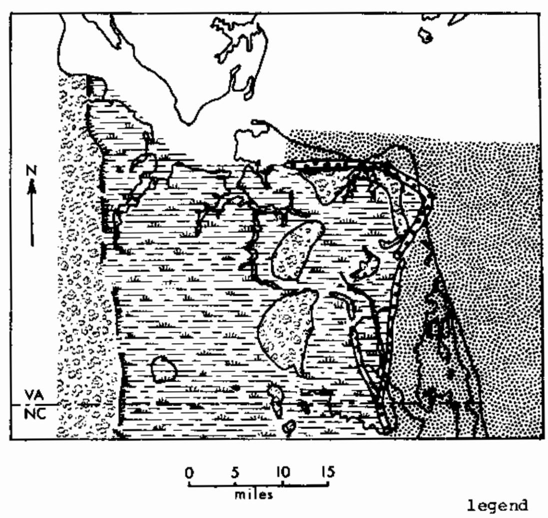
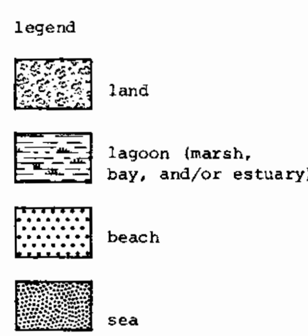


Figure 5. Paleogeography of southeastern Virginia in earliest late Sand Bridge time; relative sea level near 13 feet; shoreline at Pungo Ridge (after Oaks and Coch 1973: fig. 31).



The spatial inter-relationships of these lithofacies suggest a combination of barrier island and backbarrier environments (Figure 5) (Oaks and Coch 1973:95). The relatively low ridges east of Hickory Scarp (Figure 3), such as Pungo Ridge, Dawley's Corner Ridge, and Knotts Island Ridge were all formed during this period. The late Wisconsin glacial maximum saw sea level in this area fall more than 180 feet below the current mean and the concurrent eastward migration of the shoreline (Oaks and Coch 1974:84f.). The land exposed prior to the Holocene submergence was not studied by Oaks and Coch, but submarine geologic studies by Swift et al. (1971) and many others have shed some light on this portion of the sedimentary sequence.

Ridge and swale topography on the seafloor in the vicinity of False Cape, for example, has been interpreted as relict strand plains and beach ridges (Fisher 1968; Sanders 1962; both cited in Swift et al. 1971:239). Less is known farther from the present shoreline, however, and this missing information is essential to resolving the long debate over the origin of barrier islands (see Schwartz 1973 and especially Schwartz 1971). Furthermore, it was during this period, roughly 20,000 to 10,000 years ago, that the first humans began to occupy this region of the continent. While the scattered recovery of megafaunal remains from the continental shelf testifies to the presence there of one common food source of the Paleo-Indians, nothing is known of their coastal sites and associated local environments.

Sea level rose quite rapidly, in geological terms, in this area between about 10,000 and 5,000 years ago (see Oaks and Coch 1974: Figure 12). Paleo-Indian occupation had been supplanted by Archaic cultural groups, whose sites are far more numerous and widespread than the former. Evidence from other areas in North America suggests that Archaic peoples intensively exploited both marine and riverine aquatic resources, and one might easily suppose that Archaic groups were so situated by Holocene shorelines of any given time. As the glaciers retreated in the north and sea level began to rise, Archaic groups were necessarily "forced" westward. Previous Archaic occupations were either buried or, as Kraft (1976) suggests, more likely destroyed by the dynamic "working edge" of the trangressing sea. Thus, Archaic sites found today in the Virginia Beach area, for example, represent a palimpsest of later coastal occupations and inner coastal plain remnants of former Archaic site distribution patterns.

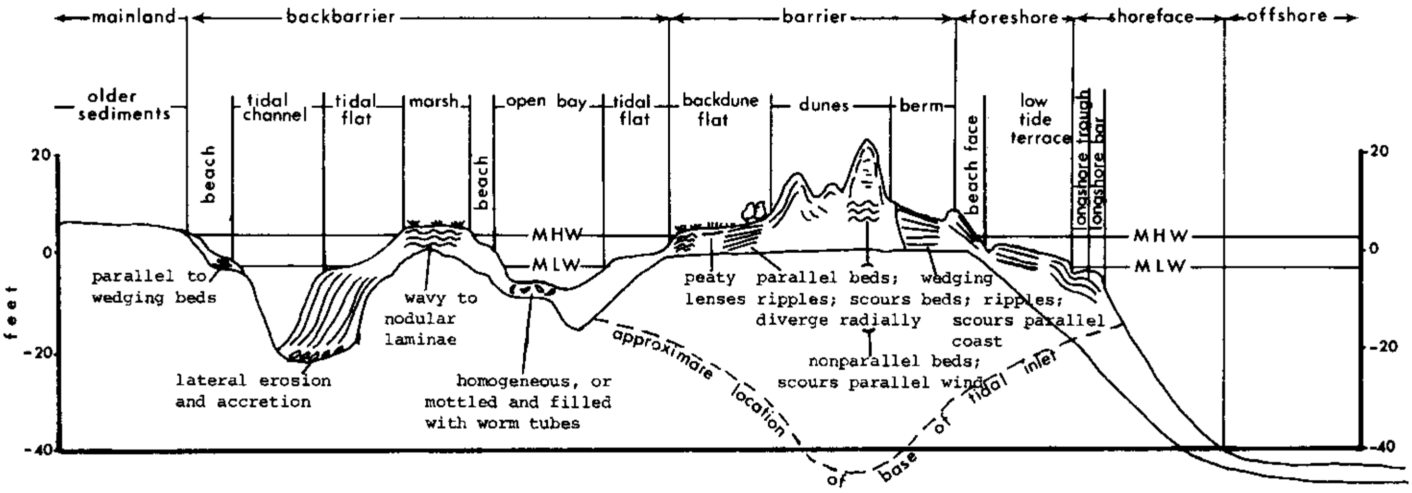


Figure 6. Schematized section through existing barrier and backbarrier environments, Virginia coastal plain; vertical scale greatly exaggerated (after Oaks and Coch 1973: fig. 8).

Models of barrier island formation not only serve to explain the genesis of submarine topography on the continental shelf, but also the most recent landforms found in current shoreline regimes of the region. Oaks and Coch (1973:98) divided southeastern Virginia coastal sediments into those of barrier environments (foreshore, berm, dunes, backdune flat, and inlets) and backbarrier environments (marshes, swamps, small beaches, tidal flats, and open bays) (see Figure 6). Each of these local environments has a characteristic biotic association, knowledge of which is useful to the archaeologist attempting to assess locally available and exploitable resources. In addition, to the west of these barrier/backbarrier environments fluvial sediments were and are being deposited. Much of the Holocene botanical history of this area is known from the work of Whitehead (1972), and is discussed below.

Fisher's (1967) dissertation traced the development of the Cape Henry foreland (Figure 7) by the use of pedogenic analysis and inspection of surface morphology through aerial photography. The numerous relict dune riges on Cape Henry were divided by Fisher into nine temporal sequences (Figure 7, inset). According to Fisher's model, sometime after 4,000 years ago erosion from a Pleistocene headland, combined with longshore drift currents, initiated and distally prograded a spit formation. Subsequent erosion and aggradational episodes after this initial phase eventuated in the present formation (Figure 8). The physical parameters and developmental sequence described for Cape Henry are broadly comparable to that found at Cape Henlopen (Delaware) by Kraft (1971) (Figure 9).

The relatively recent formation of Cape Henry is borne out archaeologically by the absence there of in situ Paleo-Indian and Archaic components, though these both occur on the Pleistocene formations immediately south and west of Broad Bay. Although Oaks and Coch defined the local environments of the present coastal regime, their research was not directly aimed at detailing the Holocene evolutionary sequence, as was Kraft's in Delaware. Thus, while we are aware of the dynamic and recent nature of the littoral zone we are much less certain of the paleogeography and chronology of this period, which is coterminous with the appearance of Archaic and Woodland peoples in the area.

Some of this informational lacuna for the Holocene has been filled, at least for the western part of the outer coastal plain, by Whitehead's (1972) work in the Dismal Swamp. The analysis of hundreds of pollen profiles provided, with careful qualifications, a biotic history for the late Pleistocene and Holocene and, when combined with the geological data of Oaks and Coch, permitted a tentative reconstruction of the development of the swamp itself.

From about 12,000 to 10,000 years ago (this and other information discussed below is summarized from Whitehead 1972) the region was dominated by pine (jack or red)-spruce forest with some fir. This boreal forest of the very late glacial epoch occurred in interfluvial zones, while freshwater marsh vegetation developed on the inorganic clays being deposited in streams. Between 10,000 and 8,200 years ago a hardwood beech-hemlock-birch forest developed, while marsh formation steadily increased along streams and in interfluvial areas (Figure 10a). From about 8,200 to 6,000 years ago a fibrous oak-hickory forest dominates, although other plant types common to the region today were also abundant in the swamp, including gum, sweet gum, ash, red maple, walnut, elm, and cypress (Whitehead 1972:309) (Figure 10b). The percentage of oak-hickory decreased from 6,000 to 3,500 years ago, while cypress-gum vegetation increased and finer-grained peats began to be increasingly deposited in interfluves (Figure 10c). From 3,500 years ago to the present, peat development occurred throughout the swamp. Cypress-gum forest dominated a complex mosaic of vegetational types, whose pattern Whitehead (1972:311) attributes to water-table fluctuations, storm blow-downs, and natural or human induced forest fires.

In summary, Whitehead (1972:313) suggested:

> that the primary factor controlling the beginning of swamp development was ponding due to the rise of sea level. The latter phases of the swamp's development were probably also controlled by an interaction between topography of the Sandbridge surface and the rise of sea level. The postglacial climatic amelioration appears to have controlled the character of the vegetation growing on the interfluves within the swamp, but ultimately edaphic factors related to sea level seem to have superseded. Peat development appears to have been initiated along the streams and to have spread inland toward the Suffolk Scarp and as the peat accumulated, laterally onto the interfluves. The gradual mantling of "mineral soil" highs and interfluves by peat resulted in the replacement of hardwood forest by swamp forest.

Although the geomorphic and vegetational picture summarized in the present paper is but an ititial step, it does provide a framework within which to form more appropriate models of cultural adaptation. It emphasizes the complex and heterogeneous composition and mosaic distribution pattern of biophysical resources. A proper archaeological survey research design for this area should attempt total coverage of a carefully selected transect. This transect would

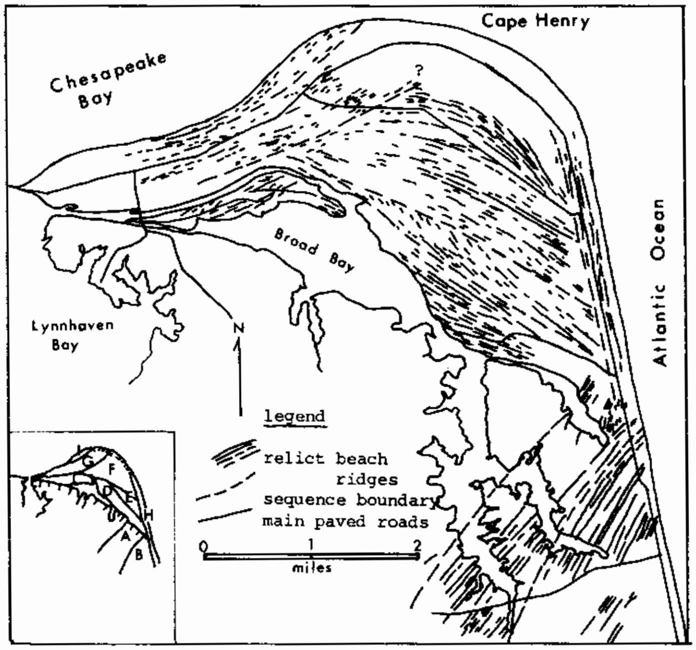


Figure 7. Map of Cape Henry dune ridge complex (after Fisher 1967: fig. 14).

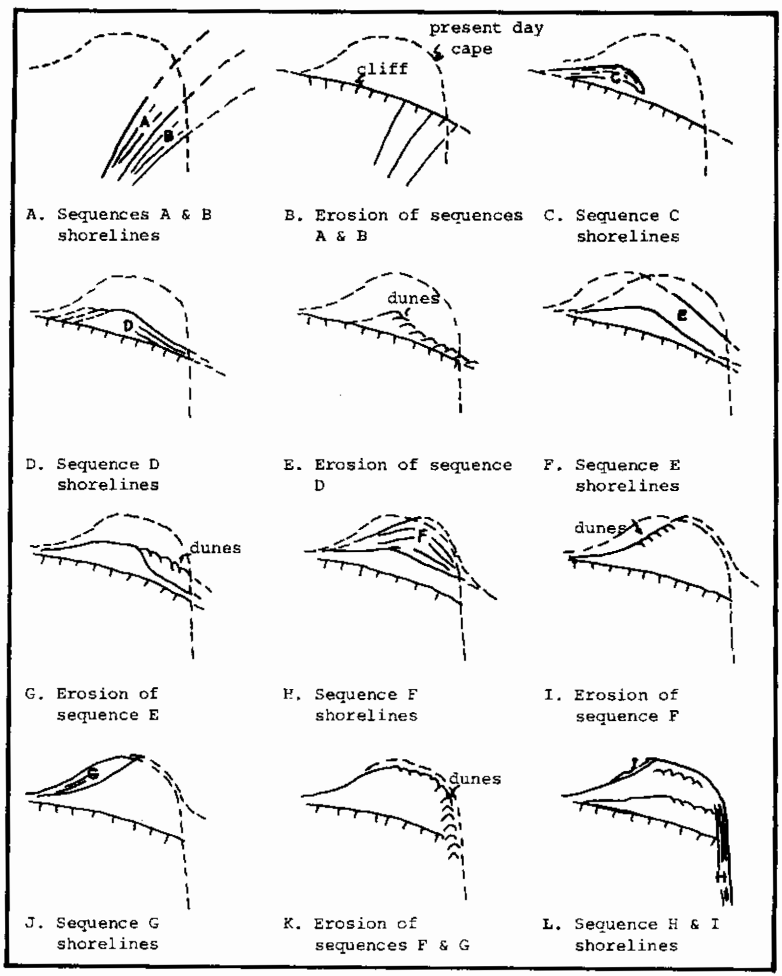


Figure 8. Development of Cape Henry dune ridge complex (after Fisher 1967: fig. 16).

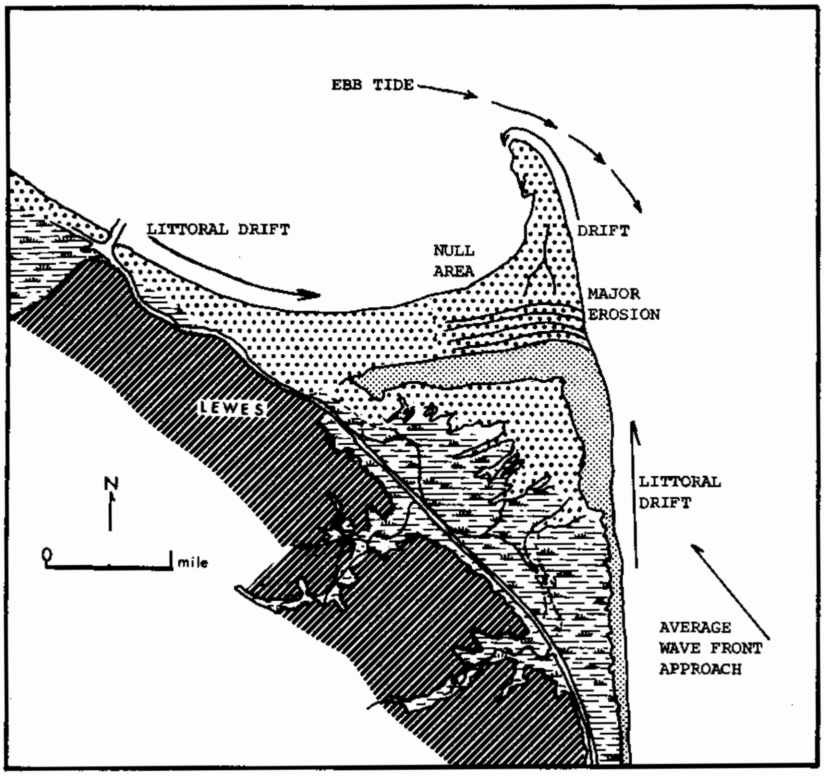


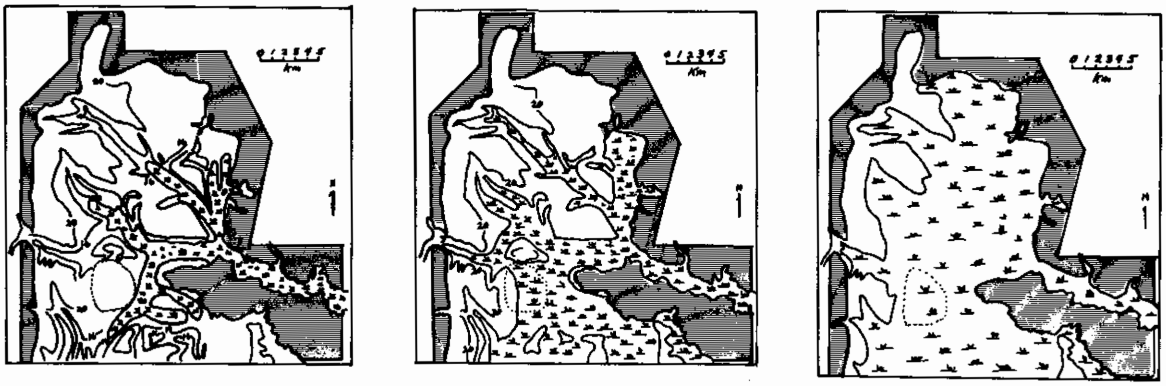
Figure 9. Geomorphic elements of the Cape Henlopen spit-dune-marsh complex (after Kraft 1971: fig. 78).

LEGEND

active dunes
inactive dunes

tidal marsh

pre Holocene-Pleistocene highland



a) ca. 8300 b.p.

b) ca. 6000 b.p.

c) ca. 3500 b.p.

Figure 10. Reconstructions of topography of Dismal Swamp, based on core profiles (after Whitehead 1972: figs. 7-9).

include most or all of the biophysical environments discussed above. Rather than retrieving only a "representative sample" of the different kinds of sites in the cultural system, the archaeologist would locate and excavate sites in locally contiguous environmental zones. The goal, then, is to closely and accurately model the subsistence and settlement systems of the aboriginal inhabitants on a small scale. While itself possibly limited as regards strength of generalization, such a model would be fashioned from a more complete and accurate informational base than is usually the case.

In the future it could be logically integrated with similar-scale models for adjacent regions, such as the inner coastal plain of southeastern Virginia or the sounds and estuaries of North Carolina immediately to the south. Such comparative studies, ultimately drawn from a variety of settings in both the Old and New Worlds, will eventually lead to a better understanding of the structural dynamics which integrated and facilitated the adaptive success of coastal peoples.

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PREHISTORIC CULTURAL ADAPTATION IN THE SALINE RIVER VALLEY OF SOUTHERN ILLINOIS

Richard W. Jefferies

The Center for Archaeological Investigations at Southern Illinois University at Carbondale has recently completed fieldwork in the Carrier Mills Archaeological District, Saline County, Illinois. Fieldwork was conducted for a total of 9 months during the 1978 and 1979 field seasons. The Carrier Mills Archaeological District consists of 57 ha located on a low upland area adjacent to the South Fork of the Saline River (Figure 1). Three major sites, 11Sa86, 11Sa87, and 11Sa88, along with several smaller sites, are contained in the district (Figure 2).

Fieldwork conducted at the three primary sites during this period utilized a multistage research strategy which included a controlled surface collection of all sites, the hand excavation of over 200 systematically selected 3 X 3m test units, the excavation of large blocks of the central portion of the sites, and the use of various types of heavy machinery to remove extensive portions of the plowzone. An estimated 950 m^3 of midden was excavated at the three sites resulting in the location of approximately 750 features and 438 burials. The results of analyses discussed in this paper represent a preliminary interpretation of data recovered from 11Sa87-Area A, a subarea of the Black Earth site (11Sa87).

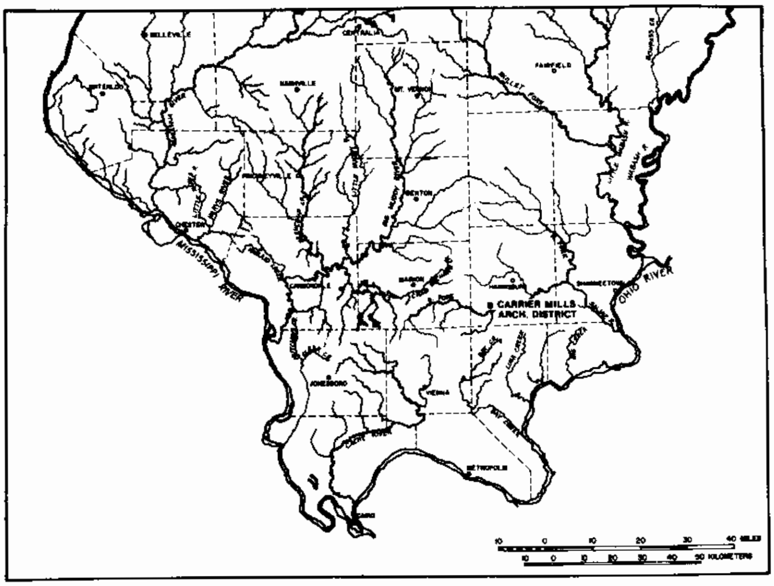

Figure 1. The location of the Carrier Mills Archaeological District in southern Illinois.

Problem Orientation

Until recently, little information existed concerning the nature of prehistoric cultural adaptation in southern Illinois (McNerney 1975; Muller 1978). The extant literature was largely based on data which had been collected during the excavation of widely scattered and disassociated sites or from a few relatively large scale research projects conducted during the 1930s and 1940s, prior to the development of many of the scientific research techniques which are currently available (Maxwell 1951; MacNeish 1948).

Archaeological investigations in the district have been directed toward collecting data which can be utilized to formulate and test hypotheses concerning the nature of the articulation between the prehistoric inhabitants of the research area and the physical and social environment. Current research goals have necessitated the recovery of a wide range of cultural and environmental data and the utilization of expertise from a diverse group of scientific disciplines to interpret these data. The unique nature of the Carrier Mills sites allows the investigation of many of these questions at both the synchronic and diachronic level.

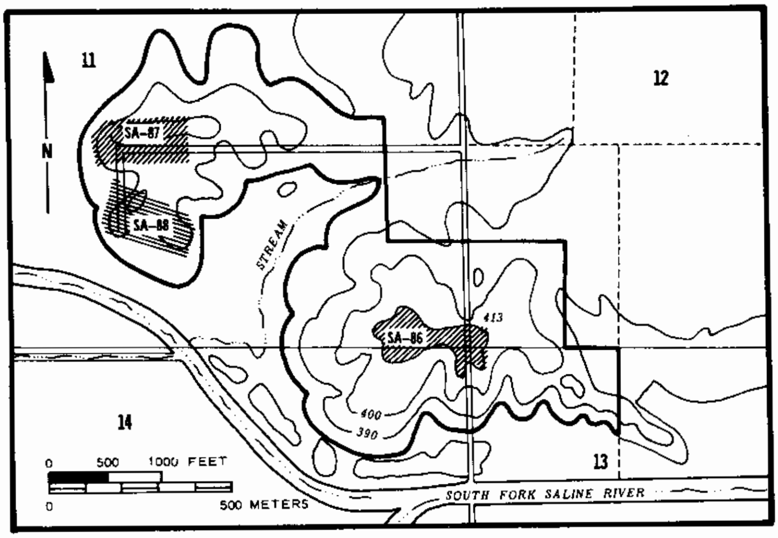

Figure 2. The locations of major sites in the Carrier Mills Archaeological District.

More specifically, a number of interrelated problem areas are currently under investigation:

1. The development of a regional chronological framework to be employed as a basis for the investigation of other more behaviorally oriented questions.

2. Examination of cultural and environmental data to elucidate the nature of, and changes in, the subsistence, technological and social systems operating at the site.

3. Analysis of environmental variables to gain insight into the nature of the paleoenvironment.

4. Analysis of the large burial population to generate data relating to the range of social and biological variability among the various groups which inhabited the site.

Environmental Setting

Contemporary environmental conditions in the Carrier Mills District reflect major geological and climatological events which occurred during the Pleistocene. A major geological event during the Late

Pleistocene was the backflow of the Saline River drainage from meltwater flow in the Wabash, resulting in the formation of a large shallow lake in the vicinity of Carrier Mills. The lake reached its maximum extent around 20,000 B.P., but continued intermittently to exist until 13,000 B.P. (Frye et al. 1972).

Early nineteenth century land records indicate that much of the Pleistocene lake bed was covered by large areas of cypress swamp and shallow lakes and ponds. A large cypress swamp covering an area of about 364 ha was located immediately west of the archaeological district, while a smaller lake covering about 182 ha was situated to the east. It is likely that these ponds and lakes were present on at least a seasonal, if not year-round basis during the prehistoric period. Local informants have reported that these bodies of water contained a diverse range of aquatic flora and fauna until the recent past. Remnants of the Pleistocene lake continued to exist until the early part of the twentieth century when the lowlands were drained to create agricultural fields (Butler and Van Hoy 1978:8-9).

The Carrier Mills Archaeological District is largely situated on a series of low ridges which are located around the edge of the former lake. These ridges range from 8 to 15 m in elevation above the floor of the lake. The Shawnee Hills, located approximately 5 km south of the district, offer much more rugged terrain, rising to a maximum of 215 m above sea level.

It is readily apparent that the prehistoric inhabitants of the Carrier Mills Archaeological District were able to fully exploit both the aquatic resources found in the river and lakes of the lowland areas and the terrestrial resources available in the drier portion of the upland area. Evidence demonstrating the extent to which this micro-ecotone was utilized through time is best exhibited at the Black Earth site (11Sa87-Area A).

Description of the Site

The Black Earth site (11Sa87) is located in the northwestern portion of the Carrier Mills District. The site is the largest in the district, consisting of three midden areas located along the crest of a low ridge (Figure 3). Total area of the site is 64,000 m^2. The largest of the three midden deposits, designated as Area A, is located at the western end of the site and covers 10,000 m^2. Midden deposits in this locality extend to a maximum depth of 160 cm. A low, swampy plain, formerly occupied by remnants of the prehistoric lake, borders the site to the west. Inhabitants of the site would have had immediate access to the resources of the lake.

A multistage research design was utilized in the excavation of Area A. Following the completion of a systematic surface collection, systematically selected 3 X 3m test units were excavated to determine the depth of the midden and the nature of its contents. Depth of the midden deposits in the core area ranged from 90 to 160 cm. A second series of 3 m squares was excavated along north-south and east-west lines connecting three of the original systematically selected squares forming two perpendicular transects across the center of the site. A third phase of data recovery required the excavation of four contiguous 6 X 6m units designed to open a large area at the center of the site.

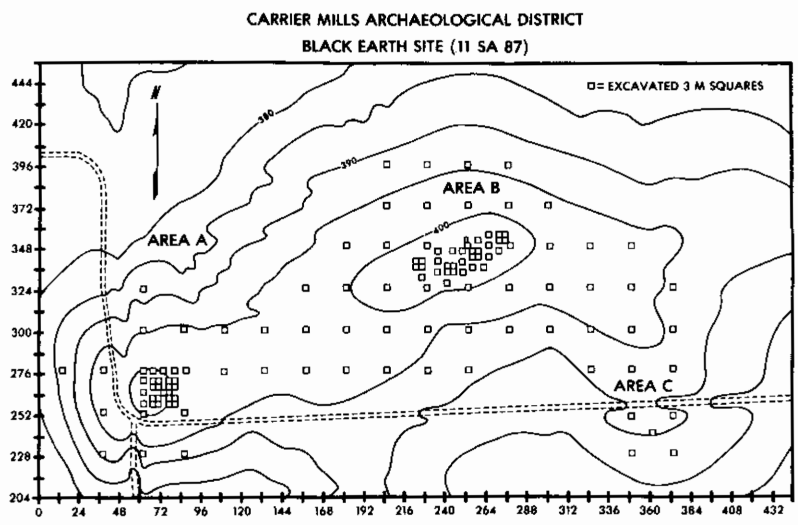

Figure 3. The location of excavation units at the Black Earth site (11Sa87).

Chronological Framework

The establishment of a chronological frame of reference was a necessary prerequisite for the analysis of diacultural and environmental variability. A series of eight charcoal samples representing various levels within the midden were selected for initial analysis. An attempt was made to submit samples representing all excavation levels; however, the presence of reliable samples was not uniformily distributed through the midden, the majority originating in the lower levels.

Radiocarbon determinations indicate that the earliest intensive occupation at the site dates to ca. 5905 ± 85 B.P. or 3955 B.C. (UGa 2706-uncorrected). This date was obtained from charcoal recovered at the contact zone between the base of the midden and the subsoil, 154 cm below surface. Six additional charcoal samples taken from 90 to 140 cm below surface yielded dates ranging between 3105 and 3725 B.C. (uncorrected). A final radiocarbon determination of 4860 ± 85 B.P. or 2910 B.C. (UGa 2703-uncorrected) was obtained from charcoal recovered from a hearth at the 50 cm level. No charcoal samples were recovered from above the 50 cm level. The standard deviations for the eight radiocarbon determinations range between ± 70 and ± 145 radiocarbon years.

Stratigraphy

The examination of wall profiles located in the deeper portions of the midden revealed a relatively homogeneous midden matrix. The absence of any readily discernible natural stratigraphy has posed a major problem for archaeological investigations at the Black Earth site. In lieu of using natural strata as a basis for excavating the midden deposit, arbitrary 10 cm levels served as a means of maintaining vertical control.

An intensive analysis of soil columns taken from each excavated square has been directed toward the goal of discerning the physical and chemical attributes of the midden and elucidating the nature of the cultural and natural processes instrumental in midden formation. No distinct sterile units are evident in the midden, suggesting that long periods of abandonment did not occur. The midden is characterized by a relatively homogeneous texture, a basic soil pH, an extremely high organic content, areas of strong carbonate reaction and high concentrations of calcium, copper, iron, potassium, and zinc. In contrast, the Hosmer series soil on which the site is located is characterized by high soil acidity, low organic content, and low levels of the aforementioned chemicals.

At least two major color zones can be observed in the midden. A dark brown zone was identified in the upper portion of the midden and extended to an average depth of 50 cm below surface. The Woodland and Late Archaic components are largely contained in this zone. A second lighter soil zone lay below the dark zone and extended 50 to 100 cm to the subsoil. The second midden zone can be attributed to a Middle Archaic occupation.

Soils in the midden are neutral to weakly alkaline with samples falling in the 7.0 to 8.0 pH range. Analysis indicates that the culturally created alkalinity of the midden can largely be attributed to increased concentration of calcium, magnesium, potassium, and sodium ions. The probable source of these ions is wood ash. The alkaline condition of the midden is also instrumental in the excellent preservation of bone (Woods 1979:13).

High organic matter content in the midden consists of pyrolitic products, such as charcoal and charred plant remains. Sub-plowzone organic content decreases with depth, but remains extremely high throughout the midden (Woods 1979:11).

Carbonate content is quite high, with the highest concentration present in a zone beginning between 30 and 60 cm below surface and continuing until 30 cm above the subsoil. Strong carbonate reaction is indicative of levels which have experienced intensive burning or bacterial decomposition of plant and animal remains (Woods 1979:14).

Chemical analysis of soil samples reveals that calcium had the highest level of concentration of any element tested. Levels of calcium decrease toward the edge of the midden. Within the midden, high concentrations of calcium exist below 50 cm below surface. The principal source of calcium at the site is believed to be the result of intensive cultural activity. Cultural calcium can be derived from the excreta of humans or other animals, or from other types of organic residues (Woods 1979:15-16). Bone contains high levels of calcium, but osteological material in the midden is in an excellent state of preservation suggesting an alternative source of calcium. While it is probable that a portion of the midden calcium is the result of human waste, evidence suggests the source of calcium may be plant tissue and wood ash, with wood ash being the primary contributor. High levels of potassium and magnesium found in the midden can also be attributed to wood ash.

A rate of net midden accumulation of approximately 1.15 mm per year over a 785-year period has been projected for the central portion of the midden. The accumulation rate is based on radiocarbon determinations obtained from charcoal samples taken from two features having points of origin separated by 90 cm vertical distance. Dates from the two features were 3695 ± 70 B.C. and 2910 ± 85 B.C. respectively. Results of the soil analyses of the two soil columns nearest the features suggest a relatively homogeneous midden fill within the zone defined by the two dates. This fill tends to maintain a vertical extent ranging from 80-90 cm throughout the central portion of the midden area, roughly conforming to the previously described lighter colored Middle Archaic zone.

The rate of 1.15 mm of midden accumulation per year is considered to be an extremely high rate of buildup considering the hilltop location of the site. Based on the results of the radiocarbon determinations, it seems likely that the lower 1 m of midden in the central portion of the site accumulated during a roughly 1000-1500 year period commencing around 4000 B.C. and terminating about 2500 B.C. The remaining 4000 years of prehistoric cultural activity at the site produced approximately 50 cm of midden which is indicative of a much lower rate of accumulation on the order of .13 mm per year. It seems likely, at this point in the analysis, that cultural activity was very intensive during the terminal portion of the Middle Archaic (4000 B.C.-2500 B.C.) at 11Sa87a, and that these activities were associated with the burning of large amounts of organic material. Data suggest that during the post 2500 B.C. period, there was a change in the nature of activities or the intensity of activities performed at the site which may suggest a changing role of the site in the prehistoric settlement/subsistence system.

Analysis of Artifacts

A preliminary assessment of artifacts from the lower 1 m of the midden suggests relatively little stylistic or technological variability within the zone. The 1000-year period, defined by dates from the upper and lower limits of the zone, is generally included in the terminal part of the Middle Archaic. Temporally diagnostic projectile points from levels within the lower zone show very little stylistic diversity, with the great majority being included in one of several side notched types. Projectile points sharing similar stylistic attributes have been identified as Matanzas and Godar points at the Koster site (Cook 1976), Big Sandy II in the Tennessee River Valley (Lewis and Lewis 1961), and by numerous other names in other parts of the Eastern United States. In general, the contents of the Middle Archaic zone at 11Sa87a closely parallel material from Horizon 6 of the Helton Phase at Koster. Radiocarbon determinations from Horizon 6 range between 3770 B.C. and 2930 B.C. (Cook 1976:70), matching the dates defining the Middle Archaic zone at Carrier Mills. The hypothesis of a rapid accumulation of midden during a short period of time, which was formulated on the basis of radiocarbon determinations, tends to be supported by the stylistic homogeneity of artifacts within the zone.

Late Archaic material is concentrated in the upper 50 cm of the deposit, along with most of the Woodland material. Projectile points associated with the Late Archaic occupation are generally stemmed and include examples traditionally assigned to the Karnak and Saratoga point types. Approximately 93% of the Early and Middle Woodland Crab Orchard ceramic material is contained in levels above 50 cm below surface, while 90% of the Late Woodland ceramic material is in the levels above 30 cm below surface.

The density of various nonceramic artifact categories (debitage, flaked stone tools, sandstone, and burned clay) tends to be quite high in the portion of the midden above 50 cm, then decreases with depth in the Middle Archaic zone. This trend is sharply reversed when the per annum rates of artifact accumulation are calculated and the differential rate of midden deposition is considered. Per annum rates of artifact accumulation are two to three times greater in the Middle Archaic zone than in the later occupation levels. Such a trend also tends to support the hypothesis of a very intensive utilization of the site during the Middle Archaic occupation.

Faunal Analysis

The alkaline characteristics of the soil at the Black Earth site provided a favorable environment for the preservation of faunal remains. More than 200,000 elements have been analyzed, representing a minimum of 62 species from the mammalian, reptilian, avian, amphibian, and piscine classes. Identifiable remains suggest a diverse exploitation of animal habitats associated with the lake and its immediate environs was practiced by the occupants of the site. Data suggest that open lake, lake-edge, shoreline, lake bank, and tributary streams, as well as drier upland wooded and grass habitats, were focal points of hunting activity. This pattern seems to have been established quite early in the occupation of the site and continues throughout the site's occupational history. Ongoing analysis is currently utilizing various aquatic and terrestrial species to ascertain the nature of the environs of the lake and to identify change in micro environmental conditions through time.

A second major area of research is directed toward the analysis of bone as a resource for tool manufacture. The several thousand bone artifacts recovered from the midden offer an ideal data base with which to examine technological, functional, and stylistic attributes of these tools.

A final research goal is oriented toward evaluating the food potential represented by faunal remains and to examine patterns of diachronic variability concerning the dietary importance of species or groups of species to the prehistoric inhabitants.

Botanical Analysis

Flotation samples collected from all excavation units and features are providing data relating to prehistoric exploitation of botanical resources and general environmental conditions in the immediate vicinity of the site. Identification of wood charcoal has not been completed; however, weighing and analysis of carbonized seeds is concluded. The predominant plant remains consist of hickory (Carya spp.) nut shell, forming between 81.2% and 99.5% of all carbonized plant remains in the midden levels. A diverse assortment of other types of carbonized nuts and seeds have been identified from the various excavation units. There appears to be little evidence, at this point in the analysis, suggesting major shifts in the patterns of exploitation of botanical resources through time.

Prehistoric exploitation of developed forest, forest-edge, water-edge and old field habitats can be inferred based on the identified botanical remains. Oak-hickory forests located on hilltops and slopes seem to have been heavily utilized throughout the 5500-year occupation of the site. Fruit tree species represented in the midden tend to indicate the presence of open or disturbed forest, forest-edge, or old fields. Hazel nut, wild grape, wild bean, and bed straw imply the same. Bush clover, mustard, giant ragweed, and wild sunflower strongly suggest the presence of open disturbed habitats, while bulrush and pickerel-weed occur in shallow standing water, primarily along lake or pond edges.

Summary and Conclusions

A preliminary analysis of data collected at the Black Earth site indicates that the site was intensively utilized during the terminal portion of the Middle Archaic period, and to a lesser extent during the Late Archaic and Woodland periods. Analysis of soil samples suggest that activities conducted at the site during the Middle Archaic were associated with a high frequency of burning, possibly associated with the processing of plant and/or animal resources. Apparent changes in the rate of midden accumulation during the Late Archaic and Woodland occupations point to a decrease in the intensity of certain activities, a shift in the nature of activities being performed at the site, or variations in the size and composition of the social unit occupying the site. Corresponding changes in feature morphology have also been observed between the Archaic and Woodland occupations. Such trends may reflect the changing role of the site in the settlement/subsistence system during later occupations.

Analysis of faunal and botanical data indicate the exploitation of a very wide range of terrestrial and aquatic resources. It is suggested that as a consequence of the very diverse nature of the environment in the immediate vicinity of the site, subsistence resources were available during all seasons of the year. It does not seem unreasonable to predict that the site was inhabitated during much of the year, if not on a year round basis. Botanical and faunal data tend to support such a hypothesis. The presence of burials and large features from the Middle Archaic period also suggest a more permanent occupation. While a year-round occupation is suggested, the size and composition of the social unit occupying the site may not have remained stable throughout the year, with population fluctuations reflecting the cyclical nature of food availability.

Acknowledgments:

Analysis of botanical material recovered from the Black Earth site is being conducted by Neal H. Lopinot, Southern Illinois University, Carbondale. Emanuel Breitburg, SIU, Carbondale, is conducting the analysis of faunal material from the site.

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A MASON PHASE COLLECTING STATION ON THE ELK RIVER IN TENNESSEE

Brian M. Butler

The purpose of this paper is to examine data from a Late Woodland Mason phase occupation on the Elk River in Tennessee. The site in question is the Yearwood site (40Ln-16) which was excavated by the author in 1975. The Yearwood site yielded an extensive Middle Woodland component which has been described elsewhere (Butler 1977, 1979), but it also revealed a highly selective group of remains attributable to the Mason phase. The latter are suggestive of a particular functional role of the site in the local subsistence-settlement.

The Mason phase is a Late Woodland cultural assemblage presently defined for the upper Elk and Duck river drainages in southeastern Middle Tennessee--the southern edges of the Eastern Highland Rim. The phase was defined on the basis of work at the Mason site (Faulkner 1968) in the Tims-Ford Reservoir on the upper Elk River. The far more extensive work in the Normandy Reservoir on the upper Duck River immediately to the north has provided additional data on the Mason phase, although it appears that the Mason utilization of the upper Duck was relatively minimal (Faulkner and McCollough 1973, 1974, 1977). While the overall character of the cultural assemblage is generally similar to other Late Woodland phases in neighboring areas, the Mason phase is distinctive on a number of points. Most importantly, the Mason phase is characterized by its distinctive chert-tempered ceramics which exhibit not only the ubiquitous cord-marked surfaces but also knot-roughened and net-impressed surfaces. The marked preference for silicious rock, usually chert, is in sharp contrast to the persistent regional tradition of using crushed limestone as tempering material.

The Mason phase was originally accorded dates of A.D. 600-900, but virtually all the presently accepted dates fall after A.D. 750 with several in the range of A.D. 900-1000. In several instances, trade ceramics in the form of shell-tempered pottery have been found in association with Mason materials.

Present data on Mason settlement activity are sketchy. The type site (Mason) was relatively large (up to 30 acres), but it was multicomponent and Late Woodland materials were not distributed uniformly over that large area. The Mason site did evidence a comparatively intense Late Woodland occupation including a variety of subsurface pits, burials, and a moderate amount of artifactual material. Several large bell-shaped storage pits were located, but no architectural remains were identified.

The majority of Mason components examined to date appear to represent short term, non-intensive site usage. This is particularly true in the upper Duck River, which may well be a marginal area for Mason Phase activity. In the Normandy Reservoir, the contrast between Mason components and the numerous and substantial Middle Woodland occupations is particularly striking. Only one intensively occupied Mason phase site is presently known to exist in the Upper Duck area; this is the Powers Bridge site (40Cf-54) which has yet to be investigated. Considering the Mason components reported to date, one is immediately impressed by the rarity of substantial housing and features. The Normandy work has identified several lightly built single-post oval structures as being Mason.

Available subsistence data are equally sketchy. To date, no maize has been documented in Mason contexts. Only squash, gourd rind, and sunflower (thought to be cultivated) have been identified (Crites 1978; Charles Faulkner, personal communication). The <u>apparent</u> paucity of cultigens is in strong contrast to the preceding Late Middle Woodland Owl Hollow phase (Crites 1978, 1979), where maize and various cultigens are present in some quantity. The overall impression of the Mason phase is of an intensive hunting-foraging adaptation involving small groups which are highly mobile and only marginally acquainted with plant cultivation. This statement will receive further comment at the end of this paper.

The Yearwood Site

Yearwood was excavated in 1975 by the Tennessee Division of Archaeology. The excavation was a salvage effort because of the impending construction of a new school. The site occupied a crescent-shaped area of high ground situated on the edge of the narrow valley through which the Elk River flows (see Figure 1). With the exception of subsurface pit features, all cultural materials were contained in the plow disturbed topsoil. After initial hand excavated test pits and shovel probing, heavy machinery was employed to strip the topsoil from the site and expose the features. Unfortunately, there was neither time nor the resources to conduct a controlled surface collection. Virtually the entire site (approximately 2.5 acres) was stripped under controlled conditions. Subsequent stripping by the construction contractor exposed additional large areas adjacent to the site and confirmed the horizontal extent established by the original work. The excavations recovered materials from five different components, although Woodland materials predominated. The Middle Woodland component marked the most intensive use of the site, but Early Woodland (Long Branch phase) and Late Woodland (Mason phase) were also present in quantity.

The archaeological data on the Mason occupation at Yearwood can be summarized as follows:

1. <u>Surface Artifact Density</u>: There is very little surface debris associated with the Mason occupation. Intensive collection of the site prior to excavation revealed only a few small Elk River series sherds and one small triangular Hamilton-like projectile point. Examination of several private collections from the site made over a period of years by knowledgeable amateurs revealed a similar dearth of Mason material.

2. <u>Subsurface Features</u>: A total of 37 pit features can be definitely attributed to the Mason component. All but three of these pits are located in a single large cluster at the geographical center of the site (see Figure 2). This cluster occupies a roughly rectangular area measuring approximately 30 by 15 m. The other three pits constitute a small group about 30 m to the southwest. Twenty-seven of the 37 features were partially or wholly excavated. All were not examined because their content and form proved to highly redundant, and few contained any appreciable amounts of artifactual material. The standard procedure was to profile the pits and excavate one half of the pit fill. Of the 27 excavated pits, 23 of them proved to be large deep pits with flat bottoms and vertical or undercut walls. The features are identified as storage pits, a usage which is consistent with their physical characteristics and ethnographic data on similar features described for various North American Indian groups. The four remaining features were large pits with diameters similar in size to the storage pits but much shallower and with fill characteristics which suggest that they were some type of cooking pit, possibly earth ovens. These four pits contained no rock charges and exhibited no direct evidence of severe or prolonged firing, and it is also possible that the features are shallower and less formally executed storage pits. Scattered over the other areas of the site were a series of shallow hearths which could not be definitely attributed to a specific component on the basis of content. Some of these hearths may belong to the Mason component.

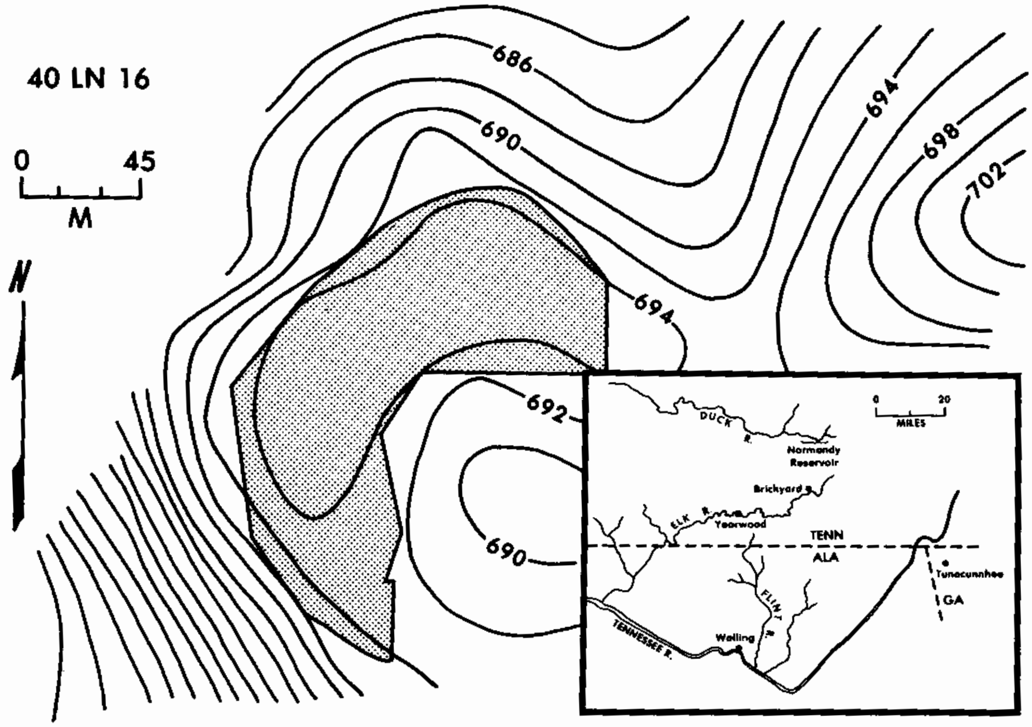

Figure 1. Yearwood site: general location and site map showing stripped area.

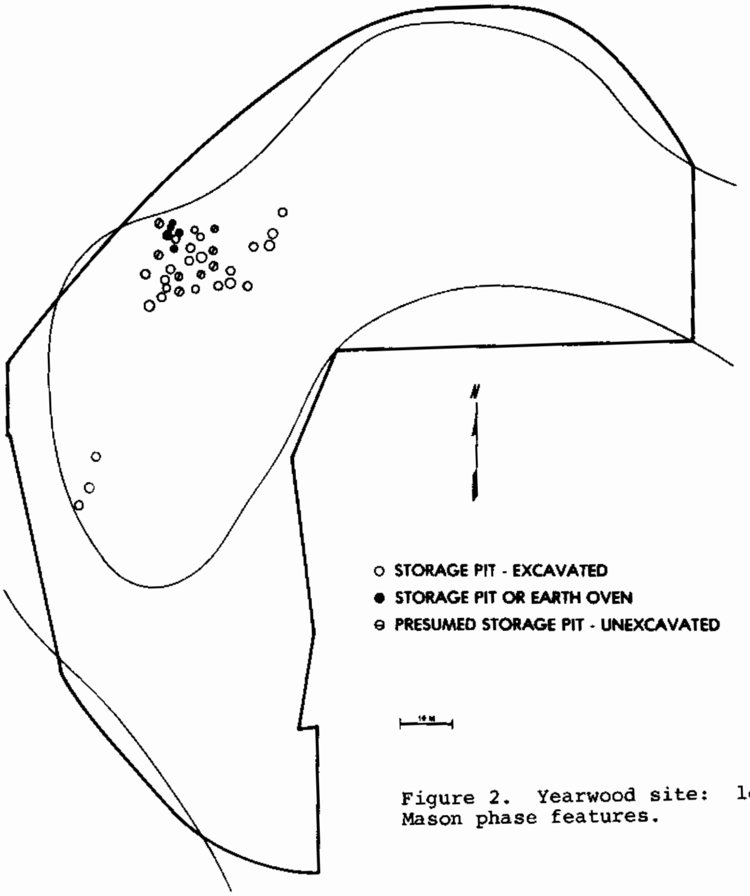

Figure 2. Yearwood site: location of Mason phase features.

The storage pits are generally large. Twenty-two of them were sufficiently excavated to obtain accurate measurements and volume estimations. These data are summarized as: diameter, mean--1.65 m, range--1.05-2.15 m; depth, mean--1.29 m, range--0.7-1.95 m; volume, mean--2.9 m^3, range--0.7-6.75 m^3. The total volume of the 22 excavated storage pits is 64 m3. For all their volume, these pits contained suprisingly little artifactual material. Typically, they contained far more Middle Woodland material than Mason artifacts. Only in six cases were significant amounts of refuse associated with these pits. In each case, the refuse constituted a concentrated load in one portion of the pit; in five instances, the refuse load was in top of the pit fill, representing the last act in closing the pit and leveling the ground surface. The sixth case involved a refuse load about half way down in the pit fill. These six features contributed the vast majority of Mason remains from the entire site (over 82% of all Mason ceramics).

Five burials were recovered from the excavated storage pits. All bone remains were in an advanced stage of decomposition but the burials could be identified as adults.

3. Artifact Assemblage: The artifact assemblage recovered from the pit features does not differ markedly from that documented at other Mason sites. There is no marked bias toward any class of tool types, although there is an obvious difficulty in identifying non-diagnostic chipped stone tools.

4. Subsistence Remains: Virtually no botanical data were recovered. Few of the pits produced a noticeable quantity of charred material, and samples from the refuse loads were suspect due to potential mixing with older materials. A total of 574 elements of faunal material were recovered, of which 390 are molluscan. The faunal material comes chiefly from two of the storage pits with refuse loads. For such a small amount of material, the variety of species and habitats represented is surprising. Deer and turkey predominate as one would expect, but elements of bear, beaver, rabbit, bobcat, and opossum are present. Also represented are four species of terrapin/turtle, three species of fish, four species of molluscs, and four species of snails. The sample size is far too small for any definitive conclusions, but the remains imply a broad spectrum faunal exploitation.

5. Chronology: Two attempts were made to radiocarbon date Mason phase features. In the first instance, a sample of charcoal collected from the general fill of a storage pit yielded a date which coincides with the cluster of Middle Woodland dates from the site. Apparently, this sample represented charcoal introduced into the pit from the Middle Woodland occupation. The second sample, from one of the concentrated refuse loads in a storage pit, yielded a date of 1340 ± 100 B.P. or A.D. 610 (DIC 605). The status of this date is unclear. If accepted, it represents one of the earliest Mason phase dates. Some characteristics of the associated ceramics and projectile points could be viewed as arguing for an early date, but the possibility of some contamination from the Middle Woodland occupation cannot be ruled out.

Discussion

The Mason component at Yearwood presents the investigator with a situation in which the occupational evidence consists almost entirely of storage pits. There are no architectural remains; the hearths, even liberally designating a number of the unclassified hearths as Mason, are scarce. In addition, very little refuse is associated with the occupation. Several important assumptions are involved in the discussion of this material. The first, which has already been indicated, is that these deep cylindrical and bell-shaped features are storage pits. The second is that these pits functioned primarily for the storage of foodstuffs. The third is that the foodstuffs placed in these pits were chiefly plant food products. No one has presented definitive archaeological evidence on the type or types of foodstuffs actually stored in such features, but the problems associated with underground storage and the characteristics of plant food materials suggest the far greater likelihood that plant foods rather than animal products were stored in these structures.

The placement of the majority of the pits in one tightly defined cluster indicates both planning and continuity of use. The pits are placed in the area affording the best drainage conditions on the entire site--the crest of the rise on which the site is centered. This portion of the site is not an area of prime activity during any of the other occupations at the site. Despite the very small area in which these pits are concentrated, there is only one case of one pit significantly intruding another. The lack of pit intrusions indicates continuity of use in that, with each successive occupation, the inhabitants knew or could identify where previously used and refilled pits were located. The site was used with sufficient frequency that a number of on-site deaths eventually occurred (at least five).

The data argue for brief, periodic utilization of the site area by small groups over an extended period of time. I would suggest, further, that a major reason for the group's presence was the accumulation and/or processing of foodstuffs to be placed in storage pits. Presumably the site location was selected because it was conveniently located to whatever resource or resources were being exploited. The mere existence of such features indicates the capability of amassing amounts of foodstuffs in excess of the group's ability to feasibly transport them elsewhere. The data clearly rule out any periods of prolonged site usage, a situation which suggests that multiple visits were made to the site during the annual round--once, when foodstuffs were procured and placed in storage and again, when the stored materials were to be retrieved.

The interpretation offered here is that Yearwood represents a Mason phase collecting station, that is, a site characterized by short-term usage where collecting and processing for storage were significant segments of the total spectrum of activities carried out at the site. The materials being collected are assumed to be chiefly plant foods. Identification of the Mason component as a collecting station does not mean, however, that a broad spectrum of basic activities did not take place at the site. During any but the most transient visits to the site, immediate food needs and basic maintenance requirements must be met. The refuse found at the site can relate largely to these activities rather than the collecting and processing activities. This is especially true if the collecting and processing activities do not require any specialized and durable tool forms. If, for example, digging sticks and baskets comprised the required technology for these activities, the artifact assemblage at the site would provide little evidence for any special emphasis on those activities. This consideration is a sobering thought in light of attempts by archaeologists at determining site function on the basis of artifact assemblages found at given sites, especially ones that were not intensively occupied. The storage pits, of course, are very tangible evidence of the importance of a certain set of activities.

It may well be that Yearwood represents a fortuitous circumstance in which a relatively simple pattern of use has not been confounded and confused by longer lasting and functionally more diverse habitation activities. The pattern of site use suggested by Yearwood represents one particular solution to a major logistical dilemma encountered in exploiting various kinds of forest products. Many of the forest products thought to be exploited by Woodland groups are widely distributed in the local environment. Individual productive areas may be relatively small and their specific locations from year to year are difficult to predict (Asch and Asch 1978:317-318). Because of the dispersion of such resources, exploitation of them by large groups is not feasible. A small group strategy is far more efficient from the standpoint of labor input, but with it there is less capacity for transporting the harvest. Thus, some form of storage at or near the resource area is required. An effective collection strategy would involve a series of such camps, each of which serves as a base of operation and collection point for the harvest within a certain operating radius. The total residence time on these sites in any one usage would be small, but other basic subsistence and maintenance activities would take place. Such a pattern of use, projected over an extended period of time, would produce precisely what we find in the archaeological record at Yearwood.

The forgoing interpretation of the Mason occupation at Yearwood fits the current picture of Mason subsistence/settlement activity, that is, one of small, mobile groups involved in an intensive hunting-foraging strategy. At this juncture, however, a certain caveat is in order. There is a growing uneasiness among investigators who work in this region that the present view of Mason culture may be seriously biased by the circumstances of where intensive investigations have taken place in the area. Of all the cultural units defined in this area, the Mason phase is probably the least understood. Understanding has been thwarted by the general paucity of remains on most Mason sites and the inability of archaeologists to locate and investigate more intensively occupied sites. As was noted in the introduction, the upper Duck River is thought to be a marginal area for Mason activity. In the Elk River drainage, where the phase was defined, there are major gaps in the survey coverage along portions of the river. The suspicion is that we may not yet have identified the complete spectrum of Mason phase settlement systems. There are accumulating but unverified reports of large, intensively occupied Mason "villages", both on the Highland Rim in the headwaters of the Elk and along the Elk River near Fayetteville. Verification and investigation of these sites may well reveal the more sedentary side of Mason settlement, along with the heretofore lacking architecture and cultigens. In other words, it is possible that previous work has encountered mostly the short term seasonal sites and missed the more permanent nucleated sites. This could well be the case if Mason groups had rather large operating radii.

In the final analysis, this paper makes two points. The first is the interpretation of the Mason component at Yearwood as a site where certain sets of activities, namely collecting and processing for storage, were emphasized. The second is a caution against assuming that Mason settlement systems consist entirely of ephermeral and short-term sites. While this is possible, there is growing reason to suspect that our present view of Mason phase settlement and subsistence is seriously biased in favor of short term seasonal sites and that substantial, nucleated, and (presumably) more sedentary occupations do exist.

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FLORAL EXPLOITATION AND LOCATION OF WINTER SITES IN THE YOCONA BASIN

Janet Ford

There is an often unstated assumption in some archaeological literature that, given the choice, pre-agricultural groups would not winter in river valleys, but would instead withdraw into the hills. This paper will investigate the distribution of potentially exploitable flora in a representative area of the North Central Hill region of Mississippi and on this basis evaluate the logic of wintering in the hills.

Archaeological research in the area

The central region represents a void in the archaeological knowledge of north Mississippi. To the west, the Delta region has been extensively studied and has yielded a number of proposed components which can be arranged in time and space. To the east, excavation of sites such as Bynum, Miller, and Pharr have produced construction and reconstruction of the Miller sequence. Summary statements on Southeastern archaeology have traditionally tended to merge the central section with one or the other of these better known regions, often relegating it to the status of "cultural backwater" area. Others have suggested that it might contain the center for a separate complex about which little is as yet known.

Inability to define the cultural affinities of the north central section of the state are understandable since archaeological work has been somewhat limited both in extent and focus. Reports of five excavations have been published. Only mounds were excavated at Baker's Creek (Thorne 1968a), Tyson (Thorne 1968b), and the Great White Mound (Connaway 1968). The Clear Creek excavation (Thorne and McGahey 1968) was a salvage operation precipitated by the exposure of skeletal material by the wave action of Sardis Lake. Only at Womack did research include excavation of a "village" area. Even here information yield was limited. The "village site" had been almost totally destroyed by frequent inundation and cultivation; only 57 sherds were recovered (Koehler 1966:36). There has been no large-scale survey of the region.

In sum, all that is known about north central Mississippi is that the Indians lived there (or at least died there) at some point in time; that they built mounds, broke pottery, and left stone tools and fragments thereof. It is known, further, that the artifacts show similarities to those from both the Yazoo and Miller sequences, but are seemingly somewhat distinct from either. These types of data are at best limited in their potential for eliciting information about ecological utilization and/or its effect on settlement decisions.

Description of the region

The majority of the region between the Delta and the Tennessee-Tombigbee drainage is composed of a physiographic region known as the North Central Plateau. While this designation does denote the original land surface, erosion and stream cutting are so advanced south of the Mississippi-Tennessee line that the designation "North Central Hills" is more descriptive. The region is characterized by relatively low, rolling hills, braided by numerous streams and rivers which drain westward into the Yazoo. Each of these river basins is basically similar.

The Yocona River basin

One of the basins typical of the North Central Hills is that of the Yocona River. The Yocona drains 560 m^2 in North Mississippi, carrying water generally southward into the Tallahatchie River. The channel meanders through a valley which extends some 50 mi from the headwaters to a junction with the alluvial plain of the Yazoo River.

The basin system consists of the active river channel, the active floodplain, the first terrace (or "second bottom") and the adjacent ridge systems. The ridges are composed of weathered plateau remnants which consist of rounded clay hills interspersed with more rugged sandy hills. The valley areas have been formed by the rich loams washed down from the hills; twenty-five ft deposits have been recorded in Lafayette County (Attaya 1951:10,23). The valley ranges in width from 1/3 mi to 3 mi.

Approach

The modern floral inventory of the Yocona basin cannot be considered an accurate reflection of the prehistoric picture. The valleys have been stripped of trees in order to facilitate agricultural practices. Logging and other commercial enterprises have similarly altered the floral content of the hills.

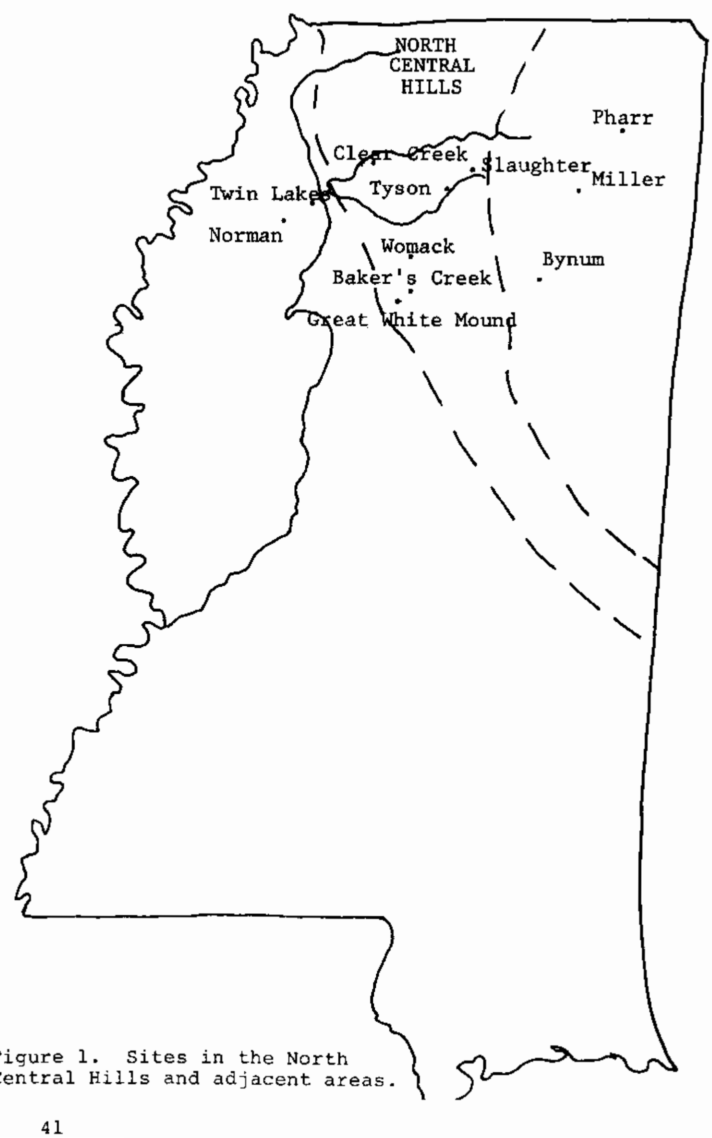

Figure 1. Sites in the North Central Hills and adjacent areas.

While ground cover has changed, the variation of soil content and potential water supply apparently has not been drastically altered. Therefore, the same microniches that existed at the time of preagricultural occupation should still be present and it should be possible to suggest floral distribution on the basis of the microniche habitat preference of individual plant species. For example, flora that showed a preference for rich, wet soil should have been found in greater abundance in the valley than in the hills, even in the preagricultural period.

Procedure

In order to determine the distribution of exploitable potential, a list of species which were native to the area and which had been credited as food sources for either historic or archaeological groups was composed. The simple dual zonal division of hills and valley was chosen for the present purpose. Zonal distribution of microniches was determined and species were assigned to zones on this basis. Plotting of the intersection of zonal preference, plant part exploitable, and season of availability resulted in construction of a paradigm which suggested the distribution of preagricultural food sources in the Yocona River basin.

The distribution of species showed a great overlap between the hills and the valley. In the North Central Hill region there is no pronounced major ecosystem division. Here, a designation of major forest type and representative dominant species does not supply data of proper sensitivity for study of the question in point. It therefore became necessary to look, literally, at the trees instead of at the forest--i.e., qualitative information about each species became important.

One of the by-products of the manipulation of information produced by the paradigm was the sequence of plant part availability. In order to judge winter placement of sites, the late summer to spring portion of the cycle was viewed. The pertinent sequential, but overlapping categories of plant part availability thus studied were those of fruits, seeds, nuts, and roots. Since the point of the investigation was to study the relative advantages of hills and valleys, species which occurred in both zones were removed from consideration. Specific qualitative information was then gathered on species which provided food during the late summer through spring and which showed mutually exclusive zonal distribution (Table 1, page 44).

Results

Although the mutually exclusive distribution of plants producing edible fruit showed a greater profusion of species in the hills, almost all bore small fruits. The larger and apparently more important fruit-bearing species showed non-specific distribution.

All of the differentially distributed species producing edible seeds occurred in the valley zone. Some of these species provide potentially important food sources. Cane periodically produces a large food supply and reed a nutritious one. If wild rice was, indeed, also available, the relative exploitative potential of the valley intensified in the late summer to early fall.

Many sources indicate that the nut crops were regarded as food staples even in the historic agricultural period. Therefore the investigation of this category was considered particularly pertinent.

McCollough and Faulkner (1976:233-234) suggest that there is scheduling operant in harvesting the "nut" crops. Acorns had to be collected and consumed soon after maturation. Hickories and walnuts, on the other hand, could be collected later and consumed much later since they could be stored more efficiently.

An evaluation of acorn species which exhibit zonal preference reveals that the productive potential of the hills was superior. While the valley contains two species whose products are considered edible, even sweet flavored, neither has been firmly documented as being important to Indian groups. The oaks which prefer the microniches found in the hills, white oak, black oak, and red oak, were the more productive and more frequently productive species which, coincidentally, seemed to have been more often documented in archaeological contexts.

Evaluation of the distribution of hickories exhibiting zonal preference was not as simple as that of oaks. The small pignut, which is sweet but not extremely plentiful (Medsger 1940:102), was found in the hill environs as was the pignut, which Zawacki and Hausfater (1969:32) consider important enough to mention. The valley produced some hickory and bitter pecan, but also two of the more important species--pecan and water hickory. The quality of pecan is unquestioned. The nut of the water hickory has been found in archaeological context (Yarnell 1964:9) even though it is apparently rather bitter tasting (Gupton 1977:134).

Other nut bearing trees showing zonal preference were the chestnut, more plentiful in the hills, and possibly the buckeye, flourishing in the valley. The walnuts are not listed as having primary distribution in either zone, although McCollough and Faulkner note that "the black walnut grows best in deep rich soils" (1976:234). In the Yocona basin, as in that of the Elk and Duck rivers, these soils occurred primarily in the alluvial bottoms.

When the category of plants with exploitable roots is considered, the potential of the valley far exceeds that of the hills. All exploitable rootstocks showing zonal preference occurred in the valley. The list is considerable and the food yields great. Arrow arrum, for example, yields a root that is said to weigh three or four pounds (Medsger 1940:196).

Inferential conclusions

Given the qualitative data and the distribution of plants, several alternatives for winter occupation seem to emerge. If the location of winter villages in the hills is assumed, four patterns may be suggested:

1. Withdrawal from the valley might logically take place in the early fall when the hill zone reached the peak of its floral potential. From this base, then, inhabitants could descend on a daily or short period basis to gather hickories, walnuts, and rootstocks in the later fall. Valley-produced supplies could then be brought back in easily carried increments for storage in the winter base camps in the hills.

2. It is possible that the inhabitants could stay in the valley throughout the fall. The valley bases would serve as centers for the accumulation of the acorns, hickories, walnuts, and rootstocks. When these supplies were complete, they could then be carried into the hills and a winter camp begun.

3. The move could occur at some time between early fall acorn maturation and the beginning of winter. Motivation for such timing is not apparent on the basis of present data. The particulars of subsistence scheduling would present a mixture of those described in alternatives 1 and 2.

4. The inhabitants could remain in the hills for the entire period of late summer to early fall. In other words, they would not move to the hills, but remain there.

If, on the other hand, location of winter villages in the hills is not assumed, a fifth alternative is possible.

5. Yocona basin inhabitants could remain on the valley floor during the entire late summer to spring span. Work groups could then go out from this base into the hills in the early fall to exploit the superior acorn potential of the hills and range the immediate area later in the fall to bring in supplies for use and/or storage.

The Slaughter site

The range of possible alternatives can be narrowed somewhat by data recovered from excavation of the Slaughter site (22La513). Slaughter originally consisted of three small rises and one larger mound located near the southern edge of the second bottom on the north side of the channel of the Yocona River. The large mound, apparently a burial mound, was bulldozed and spread over the surrounding areas. A field road cutting into one of the smaller mounds revealed no evidence of aboriginal use. The other two small mounds, however, were marked by concentrations of flakes, sherds, stone tools and tool fragments, and other evidence of aboriginal activity.

One of these rises were chosen for investigation and was excavated during the summers of 1971-1975 by students enrolled in the field course of the University of Mississippi. Although neither stratigraphy nor stratification was discernible, analysis of excavated remains indicated possible use stretching from the Middle, or perhaps Early Archaic through at least the Middle Woodland periods. An archaeomagnetic date taken from a feature appearing immediately below the plowzone yielded a date of A.D. 725 ± 5.

Of primary importance for the point in question is the floral inventory recovered from the site. Remains identified included grape (26 seeds), persimmon (4 seeds, 1 complete fruit), sumac (1 seed), wild potato (1 seed), and numerous fragments of acorns, hickories, and walnuts. The entire matrix of the site fill was thickly littered with charred nuthulls. There were no noticeable increases or decreases in concentrations either horizontally or vertically. It would appear, then, that this site marked an area of nut crop consumption the volume of which changed little during the entire time span of site use--i.e., from the Archaic through the Woodland. Such a continuity is not unique. McCollough and Faulkner (1976:237) report that the subsistence pattern at Owl Hollow showed little change during the same Archaic-Woodland span.

Given the available date and the time sequence represented, the absence of known cultigens is striking. Certainly maize has been located elsewhere in the southeast by this time level; in the eastern Tennessee Valley Hamilton culture it has been dated at A.D. 625 ± 105 (Faulkner and Graham 1966:311). It is equally true, however, that coeval or later sites intensively investigated for floral remains have produced no evidence of maize. Faulkner (1973:42), finding this situation in the upper Elk and Duck river areas, tentatively hypothesizes a continued reliance on hunting and gathering, with any extant horticulture relegated to secondary importance. Such an hypothesis also seems to be suggested by the floral inventory from Slaughter.

The specific contents of the inventory are most pertinent to the point in question. Grapes are a late summer/early fall food source; muscadines are plentiful all through September. Persimmons generally become edible in October in the North Central Hill region. Sumac, while not a major food source, has several technological uses and produces a fruit which can be used for making a drink from midsummer through winter; it is among the species occurring primarily in the hills. Acorns reportedly represent early fall exploitation; hickories and walnuts reflect later fall activities. The seed of the wild potato may suggest use of a plant whose root provides a spring and fall food (Fernald and Kinsey 1943:326).

Evaluation of alternatives

The floral inventory from Slaughter suggests that some inhabitants in the Yocona basin remained on the valley floor from late summer at least through late fall. Although the presence of sumac and acorn may imply exploitation of the hills, the presence of large quantities of acorns in the floral inventory suggest that there was no general withdrawal into the hills at the time of maturation of this crop. Trinkley (1976:64) suggests that the dependability of the acorn crop is inferior to that of the hickories, which may have influenced the decision of the inhabitants. At any rate, data from Slaughter render alternatives 1, 3 and 4 improbable.

Evaluation of alternatives 2 and 5 rests on less concrete data. Speculation about the nature and use of rootstocks, combined with the distribution of plants producing them, provides some basis of conjecture.

Roots, tubers, rhizomes, and other subsurface plant parts are widely cited as foods available in spring and fall. The traditional pattern suggests that the roots were gathered in the fall. Some, but not all, were dried and ground into flour; others were simply dried or stored for winter use. Such procedures, however, besides consuming valuable time at the busiest season of food processing, might reduce the food value of the root as well as its bulk. Potatoes, for example, lose Vitamin A when stored (USDA 1963:176).

On the other hand, Fernald and Kinsey (1943) repeatedly note that the prime time for rootstock food potential is when the root portions are "well filled." In at least one instance they specify: "when well filled with starchy material late in the autumn and through the winter" (Fernald and Kinsey 1943:83). When plant growth ceases and the above-ground portion of the plant dies in the fall, roots cease to expend food and begin to store it to support the rapid growth of shoots in the spring. Therefore, it would seem more appropriate to list rootstocks as potential food sources from late fall through early spring.

Snowfall is rare in the Yocona basin; therefore the remains of the above-ground portions of plants producing edible rootstocks would rarely have been hidden. The ground is rarely frozen. In fact, the soil is usually very moist and softer than at any other time of the year. Since there would have been no problem in either location or retrieval of fresh rootstocks at the time that their bulk and nutritive value peaked, it would seem feasible to suggest that at least some rootstocks would have been exploited by inhabitants of the Yocona basin during the winter. The considerable list of exploitable root plants which exhibit zonal preference indicates that the valley would have been the primary area of production.

In sum, on the basis of present data, alternative 5 seems superior. The floral inventory suggests that Slaughter was occupied from the late summer to late fall. The speculations on use of rootstocks and the proximity of constant source of fresh water further suggest that the site occupied the optimally efficient location for a winter and early spring occupation. From this central position on the second bottom it would have been possible to exploit the superior acorn potential of the hills in the early fall, the hickory and walnut crops of the valley in later fall, and the rootstocks found in abundance in the valley, particularly in the active floodplain region, in the late fall, winter, and early spring. There was no necessity to move base camps and stored supplies to the hills at the onset of winter. From the point of view of total exploitable floral potential, there was no logical reason for wintering in the hills.

	HILLS	VALLEY
FRUITS		
Chokecherry (Prunus virginiana or Padus nana)	X	
Red chokeberry (Aronia arbutifolia)	X	
Smooth sumac (Rhus glabra)	X	
Staghorn sumac (Rhus hirta)	X	
Nannyberry (Virburnum lentago)		X
Hawthorne (Crataegus viridus)		X
SEEDS		
Reed (Phragmites communis)		X
Great bullrush (Scirpus validus)		X
Giant cane (Arundinaria gigantea)		X
Switch cane (Arundinaria tecta)		X
Wild rice (Zizania aquatica)		X
Pale dock (Rumex altissimus)		X
OAKS		
White oak (Quercus alba)	X	
Red oak (Q. rubra)	X	
Black oak (Q. velutina)	X	
Swamp white oak (Q. bicolor)		X
Basket oak (Q. prinus)		X
HICKORIES		
Small pignut (Carya or Hicoria microcarpa)	X	
Pignut (C. or H. glabra)	X	
Water hickory (C. or H. aquatica)		X
Bitter pecan (C. or H. texana)		X
Pecan (C. illinoinsis or H. pecan)		X
Swamp hickory (C. or H. cordiformis)		X
OTHER NUTS		
Chestnut (Castenaea dentata)	X	
Sweet buckeye (Aescules octandra)		X
ROOTS		
King Solomon's Seal (Polygonatum communtatum)		X
Butterfly weed (Asclepias tuberosa)		X
Cat tails (Typha latifolia and T. angustifolia)		X
Skunk cabbage (Spathyema foetida or Symplocarpus foetidus)		X
Reed (Phragmites communis)		X
Common greenbriar (Smilax rotundifolia)		X
Saw greenbriar (S. bona-Nox)		X
Cat greenbrier (S. glauca)		X
Mulefoot lily (Nymphaea advena or Nuphar advena)		X
Golden club (Orontium aquaticum)		X
Arrow arum (Peltandra virginica)		X
Arrowhead (Sagitarria latifolia)		X
Great bullrush (Scirpus validus)		X
Chufa (Cyperus esculentus)		X

Table 1. Distribution of exploitable flora in the Yocona Basin.

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EXCAVATION AT THE LECONTE-WOODMANSTON SITE

Jennifer M. Hamilton and Rochelle Marrinan

The following paper presents the preliminary analysis of the LeConte-Woodmanston site (Figure 1). The Garden Club of Georgia plans to develop this late eighteenth-early nineteenth century rice plantation and botanical garden with an emphasis on interpretation of the plantation era components, the natural setting, and use as a habitat for endangered plant species. Louis LeConte's botanical garden (1812-1838) became internationally known within the scientific community for its early cultivation of Camellia japonica outside the hothouse.

The site has been badly disturbed by lumbering activities over the past 25 years, but there is still potential for retrieving valuable archeological data. The basic research strategy included the use of linear transects to control a program of mechanical auger tests. This procedure provided a satisfactory means of delineating the extent of extreme subsurface distrubance and artifact distribution with a minimum amount of clearing. Results of the auger tests were checked with formal excavation and trenching.

In archaeological sites disturbed by cultural activities subsequent to the period of major interest, either historic or aboriginal, there is still the possibility of retrieving significant cultural information. Evaluations of the potential of a disturbed site must consider habitat uniqueness vis-a-vis resources, physical characteristics, temporal distinctiveness, kind and variety of activities, quality of preservation, significance to the local public, and significance to the regional research design. One must take into account the amount and type of disturbance which has occurred in each specific instance. "As long as the cause and pattern of disturbance can be outlined, the archaeologist can add the disturbance variable into the intepretation of the remaining distribution of artifacts" (Talmadge et al. 1977:7, 11).

Agricultural activities, pot hunting and other destructive forces may move and or remove some materials but they do not completely destroy the integrity of the site. Within badly disturbed sites, several goals may still be approached. The interpretation of the spatial distribution of artifacts and features, techniques in tool manufacture, change through time, chronological placement of artifacts, and the amount of corresponcence between surface and subsurface remains may be explored. The approximate location of structures, site utilization and technological information may also be available (Talmadge et al. 1977:8).

LeConte-Woodmanston may be taken as a case in point. It is located in and around Bulltown Swamp, 40 miles southwest of Savannah near the present community of Riceboro, Georgia. It was the site of an antebellum gravity flow rice plantation and botanical garden during the late eighteenth and early nineteenth centuries. The site has been placed on the National Register of Historic Places because of its association with the LeConte family. Most importantly, the site was the location of a botanical garden initiated by Louis LeConte during the period from 1810 to 1838. Louis LeConte was internationally known as a botanist and Europeans marveled at his extensive garden of bulbous plants and large camellias. In Europe, such plants were relegated to hot houses but at Woodmanston, these plants were grown out of doors, some achieving great size. LeConte's camellias, for example, achieved tree-like proportions. Additionally, Louis LeConte served as host to many naturalists and horticulturalists resulting in the importation of many native plants of the Altamaha drainage to Europe.

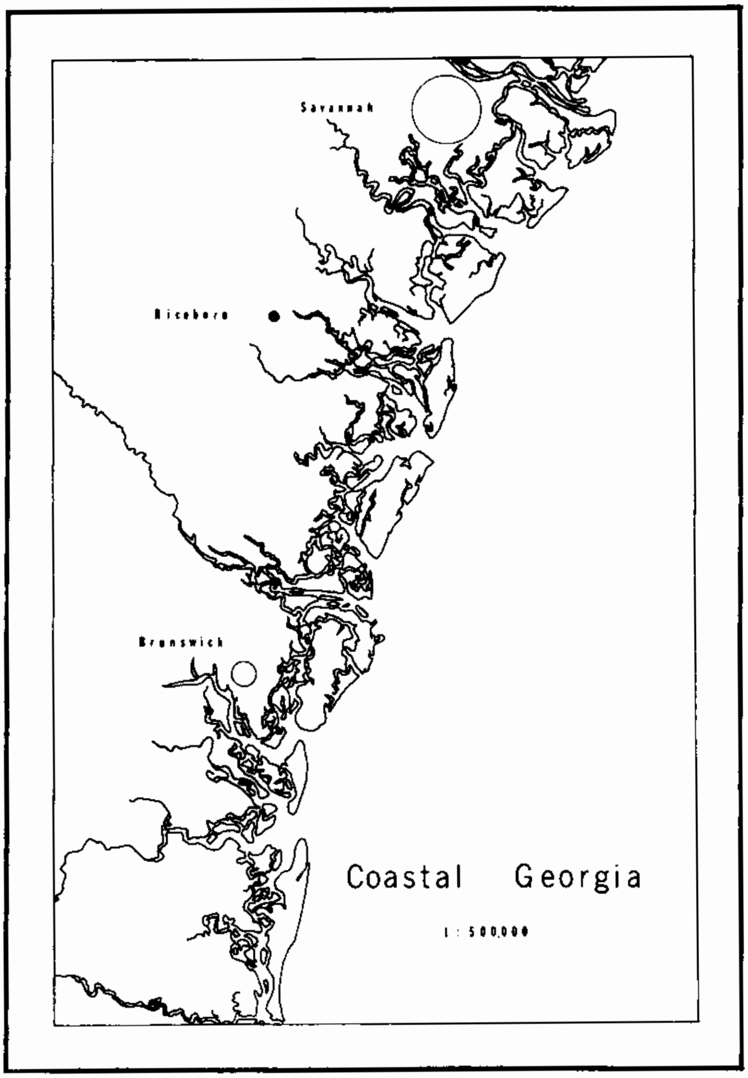

Figure 1. The LeConte-Woodmanston site is located approximately 4 miles south of the present community of Riceboro, Georgia.

Of importance also is the site of Woodmanston, as the boyhood home of Louis' sons John and Joseph LeConte. Both were educators, first in the southeast and later in California at the fledgling University of California at Berkeley. John LeConte served as the first acting president of the University while Joseph held the chair in geology, zoology and botany (LeConte 1903:244).

In 1971, Colonel Claude A. Black of Savannah, a botanical enthusiast, relocated the LeConte property and garden site. Through his efforts and those of the owners, LeConte heirs, Nature Conservancy, Garden Clubs of Georgia, and the Brunswick Paper and Land Company, a portion of the original tract was secured. Of the 3354 acres of the original LeConte holdings, 63.8 acres were deeded to the Garden Clubs (Ray 1977: 12). A seedling camellia, two large cabbage palms, crepe myrtles, numerous brick fragments, and the remnants of an earthen dike system were all that remained in the area believed to be the site of the former house and botanical garden.

From what we can infer from the documents, the main house was probably a two story structure with detached kitchen. The plantation also included a settlement for over 200 slaves and was supported by a tannery, blacksmith shop, carpenter shop, shoemaker shop, and milling/ginning facilities for both rice and corn. The documents indicated that the latter equipment was horse powered (LeConte 1903:22). Unfortunately, we were unable to locate any of these support structures with any certainty.

In 1987, 40 years after the site had been abandoned by the family, Joseph LeConte made the journey from California to the family homesite. Photographs taken during this visit give a startling view of the remains of the Woodmanston Plantation (Figures 2 and 3). Even then a tenant house, row crops, several old camellias, and two cabbage palms were all that were left of the once successful plantation.

Twentieth century land use has been predominantly lumber production, cattle raising, and hunting. The area has been timbered and clear cut and replaced by a pine cash crop. During initial reconnaissance of the area considerable damage from logging and lumbering activities was noted. A portion of the site, just east of the plantation era landmarks, had been completely removed for use as fill dirt in the construction of access roads.

Previous archaeological data consisted of the 1972 archaeological assessment by Gordon Midgette of the Georgia Historical Commission. A brief note states that after a surface walk-over and shovel scraping, his findings indicated that "surface evidence was extensive for bricked pilings, walks, and possibly foundations of floors of the late eighteenth and early nineteenth century" (Midgette 1973). These field notes did not provide substantive information for the present study because they failed to tie in any existing landmarks, for example the ornamentals or the dike system. Because the site has become considerably more overgrown in the past seven years, the only areas easily accessable are the entrance road and a small area around the seedling camellia. Dense vegetation and heavy leaf cover made adequate surface investigation almost impossible. In addition it was difficult to place any degree of confidence on the negative result of such a survey.

Archeological goals during the spring excavations were dictated by the Department of Natural Resources' proposed development plan. This plan emphasized interpretation of the plantation era site components, the natural setting and use as a habitat for endangered plant species (LeConte-Woodmanston Trustees Committee 1978). In order to provide necessary guidance for the Garden Club development of the site, our assessment focused on the impact of proposed structures; the parking lot, visitor interpretation center, and nature walks on the existing cultural resources and the location and identification of the remaining plantation era resources to help supplement documentary evidence. The focus of excavations was the time periods between 1810 and 1838, the time during which Louis LeConte was master of Woodmanston and the botanical garden flourished.

Figure 2. Picture of Joseph LeConte standing under the white camellia tree in the old garden of Louis LeConte, Liberty County, Georgia. Photography taken by Dr. Joseph Nisbet LeConte in 1897.

Figure 3. Photograph of LeConte-Woodmanston in 1897. Note the two sabal palms and the Camellia joponica trees in the background.

The basic research strategy can be characterized as a diagnostic survey with a limited amount of formal excavation. Approximately 5% of the upland was covered by a series of linear transects which were used to control a program of mechanical auger and posthole testing. A gas driven 4 in mechanical auger was used along with standard posthole diggers. Both worked well, each had its advantages and disadvantages. The posthole diggers were more time consuming than the auger, but they resulted in a wider hole and artifacts were broken less frequently. Also it provided a clearer picture of the stratigraphy. The auger, however, is much more efficient in terms of time per test. A great distance can be covered in a day. It, too, has it's disadvantages, such as the noise and gas fumes and the possibility of getting hung up in roots and clay.

Two teams executed approximately 40 tests per day. Each test extended approximately 3 ft or until the drill reached clay. The test interval was 3 m. Test material was caught in a metal tray and screened through 1/4 in hardware cloth. Findings were plotted and areas of culturally positive testing were noted. Surface clearing for positioning auger tests required substantial crew hours but was the most efficient method of sampling a maximum area with the least expenditure of time. This form of testing made it possible to compare surface indications with the distribution of archeological refuse over a large part of the site. For the most part there does not seem to be a 1:1 correlation. Although this may sometime be so in plowed field sites, heavy ground cover presents different problems.

Auger testing has been used successfully as a means of delineating site extent, determination of artifact distribution and site composition, and testing correlation between surface and subsurface materials in both historic and prehistoric sites by Deagan and Bostwick in St. Augustine, Percy at the Torreya site in Liberty County, Florida and by Coblentz and Powell in the Lubbub Creek Project, Alabama, (Deagan et al. 1976; Bostwick and Wise, 1980; Percy 1976; Coblentz and Powell 1979). Price, Hunter, and McMichael used a 200 pound solid core drill for approximately the same purposes but the lightweight two man auger offers a much more practical alternative (Price et al. 1964).

Three areas were tested. The central area included the botanical features and comprised approximately two acres. A total of 93 tests were made in this area. Fifty-eight percent were positive for cultural material including ceramics, bone, glass and metal. The west area, comprising about eight acres, included property indicated by the 1844 plat map to have at least one "settlement" and various fields (Liberty County 1844). A total of 217 tests were made with 14% culturally positive. The east area, also indicated to have been fields, comprised approximately 12 acres. This area received 195 tests with only .5% culturally positive. For all the areas, 504 tests were made with 17% culturally positive.

These results were checked by limited formal excavation and trenching. Areas of high positive concentration and areas with low frequencies were checked. In the central area, two locations were determined to be possible locations for structures. Slight surface elevation, concentrations of brick fragments, and positive test findings motivated excavation. The first group of excavation units were placed approximately 30 m east of the seedling camellia, southeast of the palms (Figure 4). These units exposed a brick structure which was determined to be the base of a double chimney. Evidence of a drip line perpendicular to the long axis of this chimney was recorded. This structure may have been part of an outbuilding from the plantation era.

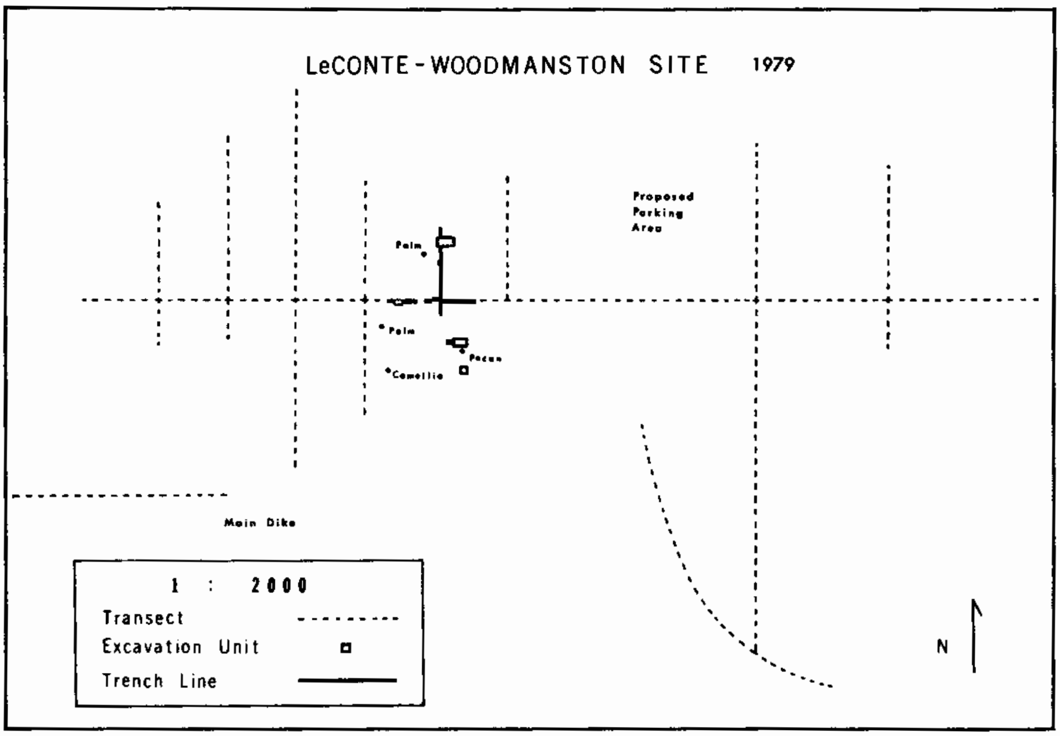

Figure 4. Diagram of the spring, 1979, testing program. Note the existing plantation era landmarks: palms, camellias, pecans, and main rice dam.

Excavated fill was screened through 1/4 in hardware cloth over 3/4 by 3/8 in diamond mesh by mechanical shaker screens. The artifact content of the structure was relatively high and included ceramics, glass, nails, pipestems, household articles, grindstones, toys, gun parts, jewelry and food bone. Transfer-printed pearlware, annular wares, Gaudy Dutch and stoneware were represented in the ceramic assemblage. One piece of transfer-printed pearlware was recovered with a maker's mark. It has been identified as Ridgeway, Morley, Wear and Company of Staffordshire, circa 1836 - 1842 (Godden 1964:565).

The second group of formal excavation units was located north of the crepe myrtle stand and east of the north palm. A linear configuration was observed and from the scattered, fragmentary condition of the bricks indicates a robbed brick wall. The artifact content of this unit was less numerous than the first, but of the same nature. The size and composition of the bricks differed between the two excavation areas. This may indicate different time periods or simply different functions.

The third and final formal excavation unit was located just northeast of the southern palm in an area which showed no cultural evidence on the surface but had had positive subsurface tests. This unit had a much lower content of cultural material.

Two diagnostic trench lines were laid east-west and north-south across the central area, 1 1/2 m wide. The fill from these trenches was not screened but carefully removed in an effort to assess the presence of remaining features within the time frame. These trenches clearly showed that the central area still contains cultural information which is relatively intact. The features are distinct and have not been subject to the leaching or subsurface disturbance which could have occurred. Numerous postholes and other anomalies indicate some sort of activity area but it is not possible to say what type without further intensive excavation in this area.

The entire central area, or a large portion of it, needs to be stripped in order to assess the type of activities represented. Large scale stripping has been used by Honerkamp at the Riverfront site in Savannah (1974). Also an entire symposium at the 1979 Southeastern Archeological Conference in Atlanta was dedicated to the use of such heavy equipment.

LeConte-Woodmanston has the advantage that its access roads have been maintained for use with logging trucks so that the problem of site inaccessibility would be negligible. The central area is also relatively free of large trees and woody shrubs which might prove an impedament to earth moving equipment.

In summary, sites like LeConte-Woodmanston, although they have incurred severe damage, may produce archaeologically significant information. Use of the mechanical two-man auger in a program of controlled testing is felt to be a satisfactory means of applying widescale testing to a highly disturbed site. Such a testing procedure minimized the amount of clearing needed to place and plot the density of cultural materials over a site.

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ARCHEOLOGICAL SURVEY OF BIG CYPRESS NATIONAL PRESERVE

Robert Taylor

The mandate to preserve cultural resources for the benefit, enjoyment, and understanding of this and succeeding generations is contained not only in the National Park Service Organic Act of 1916, but also in five other significant legislative enactments. These laws have significant impact on the policies, programs, activities, and procedures of the service, and taken in total impose a special obligation on the service to locate, identify, evaluate, preserve, manage, and interpret cultural resources in every federal park in such a way that they may be handed on to future generations unimpaired.

Therefore, as by law, the establishment of the Big Cypress National Preserve in South Florida required that the areas cultural resources be located, inventoried, and evaluated. Initial reconnaissance of the preserve began in the spring, 1977. This was the beginning of a 5 year program which is entering its fourth year. The resulting evaluative inventory is providing the substantive data needed to formulate historic preservation and resource management proposals: to guide planning, development, interpretation, maintenance activities, and comply with legal requirements. The cultural resources inventory is an essential part of the Preserve's information base.

The National Preserve is located within the Big Cypress watershed and encompasses approximately 2340 km^2 of sloughs, marshes, pine flatwoods, tropical hardwood tree islands, and prairies (Figure 1). The region is generally less than 4 m above sea level with large areas covered by cypress and secondary pine forests. Most of the soils in the swamp have developed on shallow deposits of recent and Pamlico sands overlying marl or limestone. Natural drainage in the swamp is by slow, overland flow to the south, with well defined streams occurring only along the coast where the swamp merges with the mangrove forest of the Ten Thousand Islands. The natural vegetation is that characteristic of extensive areas in southern Florida. It consists of a great variety of plants that vary locally with differences in the soils and water level. Wildlife in the swamp is aquatic or water tolerant and is adapted to seasonal inundation.

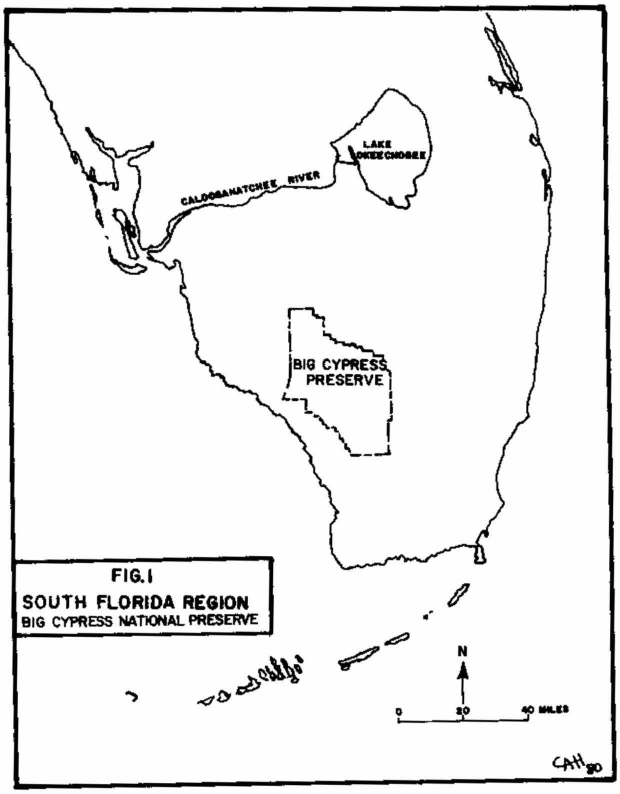

FIG.1
SOUTH FLORIDA REGION
BIG CYPRESS NATIONAL PRESERVE

There is considerable literature concerning the archeological sequence of South Florida around the Big Cypress but the current deficiencies in our understanding of prehistoric cultural sequences within the swamp are primarily a function of the limited professional interest and research conducted there to date. The National Preserve is located well within the boundaries of the Glades archeological area. In this area two traditions are recognized: the Archaic and the Glades. The Archaic tradition is represented only sporadically in the Glades area, and as yet no sites attributable to this tradition have been located within the National Preserve tract. Excavations conducted by Cockrell and Morrell on the southwest Florida coast at Marco Island demonstrated the existence of stratified Archaic sites with fiber tempered ceramics in the Glades area (Cockrell 1970a, Morrell 1969). This tradition may have existed from between 3000 B.C. to 1000 B.C. The subsequent Glades period, subdivided into eight subperiods, was constructed by Goggin (1947:114-27). This time span was characterized by the Glades Tradition subsistence, typified by "the exploitation of the food resources of the tropical coastal waters with secondary dependence on game and some use of wild plant food" (Goggin 1949:28). Undoubtably, this resource exploitation strategy grew from similar patterns during the Archaic. The only amendment to Goggin's definition is that the resource exploitation featured adaptive strategies that reflected the site's local environment. Faunal material from prehistoric Glades period middens located in the interior portions of the preserve reflect this, but tools and items of marine origin are common throughout the tract. Griffin has modified much of Goggin's chronology after doing work in the Everglades National Park and presents the following dates for subsequent subperiods (Griffin 1976:13-14).

Glades I (Late)	ca. A.D. 500-700
Glades IIa	A.D. 700-900
Glades IIb	A.D. 900-1000
Glades IIc	A.D. 1000-1200
Glades IIIa	A.D. 1200-1400
Glades IIIb	A.D. 1400-1513
Glades IIIc	A.D. 1513-ca. 1750

Of 146 Glades tradition sites recorded to date 114 or 78% lack sufficient material to accurately place them in the Glades chronology. Known Glades I - II Period sites make up 11% of the total Glades tradition sites, with the remaining 11% exhibiting traits associated with the Glades II - III Period.

With the demise of native American populations within the Glades area after European contact, the complete extinction of the south Florida tribes occurred by the end of the eighteenth century (Romans:1962). This left a cultural vacuum in the Glades area that may have lasted from between 50 to 75 years. Significant migrations of Creeks into South Florida did not occur until after the First Seminole Indian War. A probable beginning date for Seminole occupation in South Florida may be ca. 1820 (Ehrenhard et al. 1978:10). After this date the Seminole population reached about 3000 by the time of the Second and Third Seminole Wars which led to the removal of all but 300 Seminoles by the year 1860. Throughout the entire period of Seminole occupation, until present, many of the tree islands within the Glades area have been used for settlement and especially agriculture. The Big Cypress survey project had recorded 72 sites with Seminole components. Of these 72, 40 are sites with an underlying Glades tradition component; 32 exist as single Seminole components. Preliminary data indicate that the majority of the Seminole sites date from A.D. 1900 to 1940.

The size and natural environment of the preserve has generated special logistical problems. During the previous three field seasons a variety of reconnaissance techniques have been employed and compared. They are: the use of informants, random sampling of possible site areas, use of maps showing site locations, and aerial photograph analysis. Transportation into the tract has been by helicopter, swamp buggy, Honda all-terrain cycles, and by foot. Each method of reconnaissance and the associated mode of transportation feature advantages and disadvantages relative to ground cover, target to target distance, and personnel and equipment carrying capacity.

The most productive and often used technique involves the use of infrared imagery (Mark Hurd, 1:80,000), and small scale, high resolution black and white imagery (1:2500 or 1:6500). This method targets for the tropical hardwood tree islands and forests in relation to deep ponds and sloughs. This locational model was first employed by Carr and was modified to fit the Big Cypress tract (Carr:1974). Areas of possible site locations are first field checked to determine the nature of the aerial photograph features. All possible site targets are systematically checked as well as some marginal areas. The use of helicopters greatly facilitated this process by allowing the survey workers to rise above the forest canopy and identify the tree islands and tropical hardwood stands that are depicted on the imagery. However, due to the high cost of this service, its use is restricted to the most remote portions of the survey tract. Ground based teams use the aerial imagery as a means of finding not only the targets, but also the way back to their vehicle.

Once a site is located a small test pit is usually placed within the midden area. Seminole sites are primarily surface expressions and do not exhibit the extensive midden components that are typical of Glades tradition sites. The test unit is of a standard size (30 cm^2) and excavated in arbitrary 10 cm levels. The midden matrix is screened in available water with a 1/16 in mesh screen. The small test unit size and complete removal of soil in the field make it possible for two-person crews to retrieve statified samples from remote site locations. These samples contain a variety of material that when analyzed will provide the data needed to form testable hypothesises on settlement patterns, subsistence activities and site chronology for the Preserve.

Our inventory of the preserve is now approximately 65% complete. It has produced site quality and quantity data of sufficient detail to show that the cultural manifestations within the preserve show relationships and interaction between the coastal zone and the interior. However, and more importantly, the majority of the Glades tradition sites of the Big Cypress found to date represent a separate and interior adaptation to the environment: they portray an occupation that is substantial and long term in nature. Continued testing and analysis will provide the necessary data to explain the behavior of the prehistoric population of the Big Cypress and link series of events that account for the patterns that are observed in the archeological record.

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