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PREFACE

The thirty-fourth Southeastern Archaeological Conference was held at the College Inn at Lafayette, Louisiana, October 26-29, 1977. Host of the Conference was the Center for Archaeological Studies, University of Southwestern Louisiana, with Jon L. Gibson serving as Program Chairman. Forty-four papers were scheduled, seven of which were submitted for publication after the conference. The official program carries the following dedication:

> The Southeastern Archaeological Conference and the University of Southwestern Louisiana Center for Archaeological Studies dedicates this, the 34th Annual Meeting of the Conference, to three of its staunchest members and supporters, the Western Triumvirate:
>
> Dr. William G. Haag, the Great Teacher
>
> Robert S. Neitzel, the Great Sun
>
> Dr. Clarence H. Webb, the Great Healer.

The seven papers published herein were transmitted to me at the Asheville SEAC meetings in 1981, and were copy-edited in 1982. On behalf of the Southeastern Archaeological Conference, I express gratitude to Janet E. Levy, University of North Carolina-Charlotte, for editorial assistance, and to Susan Fabrick and Cindy Cart, Florida State Museum, for a fine job of typing. The Florida State Museum absorbed typing and postage costs. Publication was made possible by grants from the Louisiana Research Foundation; the Lower Mississippi Survey, Peabody Museum, Harvard University; the Wentworth Foundation, founded by the late A. Fillmore Wentworth (William M. Goza, President); and the Coca-Cola Bottling Company.

William H. Marquardt

Gainesville, Florida
November 15, 1983

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HISTORIC ABORIGINAL POTTERY FROM THE YAZOO BLUFFS REGION, MISSISSIPPI

Ian W. Brown
Harvard University

For the past four years archaeological investigations have been conducted in the Yazoo Bluffs region of Mississippi. Research was performed by the Lower Mississippi Survey of Peabody Museum, Harvard University, and the Mississippi Department of Archives and History. A sizeable number of historic French and Indian sites were excavated during this period and we are now beginning to understand the early 18th century ceramics of the local aboriginal populations. In this paper, I will discuss the characteristics of these wares, offer new typological information, and in certain cases, present interpreted ethnic identification of the materials.

The Yazoo Bluffs region, as defined in this paper, covers an area stretching from Vicksburg, Mississippi, northeast for about 15 miles (Fig. 1). Four principal Indian groups resided in this area in the early 18th century - the Tunica, Yazoo, Koroa and Ofo. These Indians were, for the most part, remnants of powerful groups once located in the northern portion of the Yazoo Valley whose ancestors observed the activities of the De Soto entrada. At some time in the 150 year period between De Soto and the arrival of the French, these impressive Mississippi period settlements were deserted and the reduced populations dispersed. Several remnant groups settled along the eastern bluffs of the Yazoo Valley. The Tunica definitely made this move in late protohistoric times, but it is probable that the Yazoo Indians' roots in the Yazoo Bluffs are somewhat deeper. The arrival date of the Ofo and Koroa in this area is uncertain. Little is known of the last two groups, largely because the French missionaries wrote so little about these peoples. Father Davion, La Source, and de Montigny arrived in the region in 1698, and subsequently devoted most of their attention to the numerically superior Tunica Indians. Davion established a mission among these Indians and, with the exception of a few uncertain times, maintained their allegiance for his two decades of work in Louisiana. Such was not the case with the Yazoo, Koroa, and Ofo, however. Their loyalty leaned more toward the well-stocked English traders who traveled so often through their territory. The Tunica and their missionary were literally driven out of the Yazoo Bluffs region around 1706 by a coalition of English-allied groups (Crane 1929:90, 103-107; Delanglez 1935:447; Le Moyne de Bienville 1708:39, Penicaut 1698-1722:124-127; Swanton 1911:307-311).

Between 1706 and 1719, the date when construction started on Fort St. Pierre, almost nothing is known of the Yazoo Bluffs groups. Even in the decade when St. Pierre was occupied, very little information concerning the native groups was related. Trade was definitely conducted between the European and aboriginal populations, but apparently only a few Frenchmen felt inclined to mention the activities and culture of their neighbors (Charlevoix 1923:233-234; Diron d'Artaguiette 1722-1723:51; Penicaut 1698-1722:142; Poisson 1727:314-317). Throughout the colonial era, missionaries were generally the best ethnohistorians, but the Indians of the Yazoo Bluffs region did not receive a missionary until very late. Father Souel arrived in 1727. His notes and papers were destroyed two years later when the local Indians rose against the settlers of Fort St. Pierre (Charlevoix 1902:85; Delanglez 1935:252-253,385; Le Petit 1730:172-175; Lusser 1730:99; Swanton 1911:229-231). For their role in the massacre, the Yazoo and Koroa received severe retribution from the Choctaw and Quapaw over the next few years (Lusser 1730:96-102; Swanton 1911:233,331). Like the Natchez, the Yazoo and Koroa were eventually adopted by Chickasaw and other English-allied groups (Swanton 1911:242-243, 332). The Ofo, who seemingly played but a minor role in the massacre, moved south and joined with the Tunica Indians (Swanton 1911:230; 1946:166). After 1730 there was only minor discontinuous aboriginal occupation of the Yazoo Bluffs region.

A total of nine historic French and Indian sites have now been discovered and partially excavated in this area, eight of which are shown in Figure 1. The Russell Site (22-N-19) (Brain 1975; Phillips 1970:434), not depicted, is located about five miles to the northeast of Haynes Bluff (23-M-5). Haynes Bluff was excavated by Jeffrey P. Brain and the Lower Mississippi Survey crew in 1974. Over the years it has produced a large amount of historic and protohistoric pottery (Brain 1975; Ford 1936:110; Phillips 1970:430), and has contributed much to the formation of the various ceramic types and varieties discussed below. My work has largely been at St. Pierre (23-M-5) and Portland (22-M-12), two sites which have yielded large quantities of native pottery (Brown 1975a-b, 1976a-c, 1977, 1979). St. Pierre is the site of the French fort of this name which was occupied between 1719 and 1729. Portland is believed to be a Tunica Indian site dating between 1698 and 1706, the period between when the French entered the region and when the Tunica left. Minor excavations have been conducted at the remaining sites on the map. Lockguard (22-M-17), located just to the north of Portland, is particularly interesting because it has produced materials identical to those found at St. Pierre, but considerably different from the assemblage recovered at Portland. Lockguard is hence believed to have been contemporary with Fort St. Pierre, and, on the basis of native population estimates of this period (Swanton 1911:39-45), would most likely have been a Yazoo Indian hamlet.

The materials collected from these historic sites have provided valuable information on the local wares of the early 18th century Indians. Plain pottery, by far the most common, is primarily Mississippi Plain, Var. Yazoo (Fig. 2). This large vessel was found within the fort's dry moat. It has a double-noded lug, an attribute commonly observed on other Yazoo jars found within features associated with the French occupation. These vessels often have a considerable amount of charcoal staining on their exterior surface, indicative of heavy use in fire.

Shell-tempered pottery with high sand content, so typical of historic sites in the Angola Farm region (Jeffrey P. Brain, personal communication), is quite rare in the Yazoo Bluffs. It does occur, however, and, following Brain, it has been sorted as Mississippi Plain, var. Montfort. Another plain ware common historically in the Yazoo Bluffs region, but rare in protohistoric and late prehistoric times, is Addis Plain, var. Addis (Fig. 3). Addis is characteristic of the Crippen Point and Winterville phases in the Yazoo Valley (see Phillips 1970), but virtually disappears with the advent of shell-tempered pottery (Williams and Brain n.d.). Only in the Natchez region does it remain the most common plain ware throughout the Mississippi period. Its late reappearance in the Yazoo Bluffs may be the result of increased southerly contacts in historic times.

Several decorated wares produced by 18th century Yazoo Bluffs Indians were also made in the protohistoric Wasp Lake phase, Leland Incised, vars. Russell and Williams being two such examples (Brown 1976b:Fig.2a); Williams and Brain n.d.). Fatherland Incised, var. Fatherland, similarly occurs in the Wasp lake phase. Philip Phillips (1970:106) included this pottery as a variety of Leland Incised but, following Vincas Steponaitis' lead (1974:134-138; 1976), the Fatherland Incised type has been revived in this paper. There are just too many technological differences between the "trailed" lines of Leland Incised and the fine-line incision of Fatherland Incised to include them within the same type. In the Natchez region, the Fatherland variety is strongly represented in both protohistoric adn historic phases. Although it does indeed occurin the protohistoric Wasp Lake phase of the Yazoo Bluffs region, not until the historic Russell phase does it become a typical design (Fig. 4). Following Steponaitis, sorting criteria for the Fatherland variety consist of crude multiple incisions, two or three lines, arranged in simple running scrolls and meander patterns. The incisions are less than 1 mm wide and are sometimes mere scratches. Ware is equivalent to all varieties of Addis Plain. Vessel forms represented in the Yazoo BLuffs region are simple and restricted bowls and plates. Steponaitis includes Phillips' two-lined Natchez variety with Phillips' three-lined Fatherland variety, because there is no stratigraphic distinction between the two treatments in sites along the Natchez Bluffs. A similar situation exists in the Yazoo Bluffs region, the sherd depicted in column 1, row 2 of Figure 4 having both treatments represented. By far the majority of Fatherland has been found at St. Pierre (23-M-5). Portland (22-M-12) has a fair sample of the variety, as seen in row 1 of Figure 4, but the sherds are quite distinct. The polished surface of the Portland specimens is hard, and the lines, having been incised when the paste was dry, are deep and rough. The high frequency of Fatherland at the St. Pierre Site may be related to the increased contact between the Natchez and Yazoo Bluffs regions following the establishment of Fort. St. Pierre.

Also suggestive of increased contact between north and south in historic times is the type Cracker Road Incised. The decision for creating this new type was not an easy one. A considerable amount of pottery from Portland (22-M-12) and St. Pierre (23-M-5) has typical Fatherland Incised, var. Fatherland designs, but instead of occurring on Addis Plain paste, the ware is Mississippi Plain, var. Yazoo (Fig. 5). Such a situation is particularly interesting in that the Yazoo Bluffs region appears to have been a frontier in which a southern decoration blended with a northern ware in the late Mississippi period. This material was originally sorted as an unspecified variety of Fatherland Incised. Including major tempering distinctions within the same type, however, is glaringly inconsistent with the Type-Variety system presently being used in the Lower Mississippi Valley (Brain, Brown, and Steponaitis n.d.; Williams and Brain n.d.). I, therefore, decided to set up a new type to account for the shell-tempered specimens bearing typical Fatherland designs. The decorative treatment of Cracker Road Incised, var. Cracker Road similarly consists of multiple parallel lines incised with a pointed instrument, but the incisions on the whole appear cruder than those observed on the Fatherland variety. As depicted in two bowls (Figs. 6 and 7) found in the dry moat at St. Pierre (23-M-5), the "sun-burst" motif of lines radiating out from circular incisions in scroll-like patterns is particularly typical, but rectilinear decoration is also quite common. The curvilinear and rectilinear patterns often appear on the same vessel (Figure 7). The simple bowl is the only vessel form thus far represented. The Cracker Road variety has been observed at the Keno Site along the Ouachita River, Arkansas, and at the Foster Site (26-K-3) in the Natchez region (Vincas Steponaitis, personal communication) but it is generally quite rare outside of the Yazoo Bluffs region.

Narrow multiple incisions often occur at the St. Pierre Site (23-M-5) on a finely-pulverized shell-tempered pottery which has a thick pink paint and a blackish core. The actual substance forming this pink color is not known, but it is unlike that commonly seen on the various varieties of Old Town Red and Nodena Red and White. Steponaitis (personal communication) has suggested that vermilion may have been used to form this pigment, a hypothesis which needs to be tested. Sherds lacking decoration, except for this pink paint, have been classified as Old Town Red, var. St. Pierre. Those which have multiple fine-line incisions have been classified as Cracker Road Incised, var. Souel. Those which bear white paint in addition to pink are sorted as Nodena Red and White, var. Poisson. I am well aware of the possibility that the plain pink sherds may merely be body fragments of incised or pink and white painted vessels. This is a problem one faces in working with potsherds. Until whole vessels of these types have been found, however, the classification presented here is consistent with that set up by Phillips (1970) and in more recent years refined by Brain and Steponaitis (Brain, Brown, and Steponaitis n.d.; Williams and Brain n.d.). An interesting observation is that the various pink painted types and varieties occur only at St. Pierre (23-M-5) and Lockguard (22-M-17), sites which are thought to be contemporary. Portland (22-M-12), believed to be a Tunica settlement occupied at the turn of the 18th century, totally lacks this pink painted pottery. It is hence possible that the material is a product of Yazoo Indian potters.

Old Town Red, var. Ballground, is quite common historically throughout the Yazoo Bluffs region. The variety, set up by Brain on the basis of the Haynes Bluff (22-M-5) excavations, consists of a heavy red slip on coarse sandy shell-tempered pottery equivalent to Mississippi Plain, var. Montfort. The slip is applied to both exterior and interior surfaces, but primarily the former.

Another historic ceramic which occurs on var. Montfort paste is Barton Incised, var. Charlevoix (Fig. 8a). Like Barton Incised, var. Estill, the design consists of rectilinear line-filled triangles. It differs, however, in that the shell-tempered paste has a high sand content and the lines are not confined to the neck region. The sample is not large enough to say for certain what the overall decoration is like, but it is of some significance that the variety is found at most of the historic sites in the Yazoo Bluffs region. To my knowledge, it has not been found outside of the area.

The remainder of the sherds depicted in Figure 8 are Barton Incised, var. Davion. Originally this material was classified as Barton Incised, var. Estill (see Brown 1976b:Fig. 2b). Phillips' criteria for Estill are close-

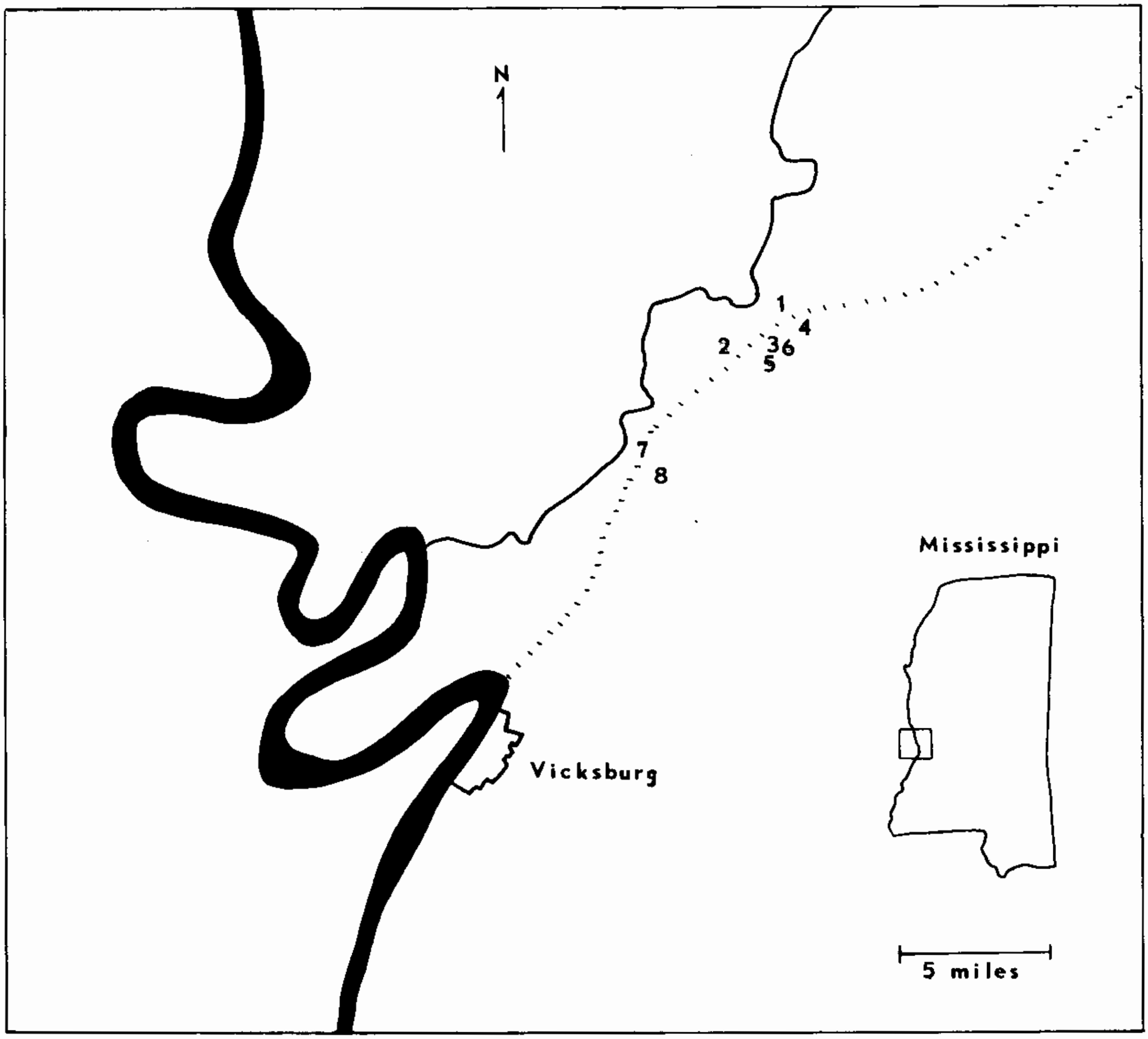


FIGURE 1

HISTORIC SITES
IN THE YAZOO BLUFFS REGION

Figure 1. 1) Haynes Bluffs (22-M-5); 2) Burroughs (22-M-10); 3) Portland (22-M-12); 4) Wrights Bluff (22-M-15); 5) Anglo (22-M-16); 6) Lockguard (22-M-17); 7) St. Pierre (23-M-5); 8) Lonely Frenchman (23-M-11).

spaced, steeply-pitched, line-filled triangles (Phillips 1970:45-46), a description which does not apply to the Yazoo Bluffs sample. Not only is there an absence of alternating line-filled triangles, but triangles themselves are absent. The major pattern is a series of slanted parallel incisions arranged around the vessel neck of Mississippi Plain, *var. Yazoo* jars and bowls. Similar material has been observed at the Pocahontas Site (Rucker 1976:43-46; Fig. 10a, b, d) and at the historic Menard Site (17-K-1) (Ford 1961:pl. 23D), but it appears in general to be quite rare outside of the Yazoo Bluffs region.

The *Portland* variety of Barton Incised is most common at the Portland Site (22-M-12) (Brown 1976b:Fig. 2c), but it also has a considerable representation at St. Pierre (23-M-5) (Fig. 9). *Portland* differs from *Estill* in having line-filled triangles alternating with blank triangles, rather than with other line-filled forms. The triangles with lines all have their base on the shoulder of the vessel. The lines either run parallel or radiate from the apex of each triangle. With few exceptions, the incisions are made with a thin pointed instrument on a fairly wet paste. The standard Mississippian jar is the most common vessel form, but the variety also occurs on bowls. The high incidence of *Portland* at the type site, and its total absence in features associated with Fort St. Pierre, suggests that it may be a Tunica Indian diagnostic. In support of this interpretation, the *Portland* variety has recently been found at the Bloodhound Hill Site (29-J-19) in the Angola Farm region (Jeffrey P. Brain, personal communication), a Tunica site postdating the 1706 migration from the Yazoo Bluffs region.

Another probable diagnostic of this aboriginal group is Winterville Incised, *var. Tunica*, a variety established by Brain on the basis of his work with the Tunica Treasure (Fig. 10). Decoration consists of narrow, rather carelessly executed incisions on a wet or leather-hard surface of ware equivalent to Mississippi Plain, *var. Yazoo*. The design, a simple whorl, is placed on the body and shoulder of small to medium-sized jars (Brain n.d.). The sample from the Yazoo Bluffs region is not particularly large, but the discovery of a partial *Tunica* vessel in a trash pit at the Portland Site (22-M-12) (Brown 1976b:Fig. 1a) contributes to the hypothesis that the pits were the product of Tunica inhabitants (Brown 1976c).

Another variety met infrequently in the Yazoo Bluffs region, but dating to the historic Russell phase, is Owens Punctated, *var. Redwood* (Brown 1976b:Fig. 1b). This variety consists of narrow single incised lines forming triangular zones filled with large shallow circular punctations. These zones occur on the neck of shell-tempered vessels equivalent to Mississippi Plain, *var. Yazoo*. The variety, as yet, has but minor representation in the Yazoo Bluffs region, and it certainly needs further refinement. Its closest relative is Owens Punctated, *var. Menard*, a historic ceramic in the Arkansas River area (Phillips 1970:149-150; Williams and Brain n.d.).

Our knowledge of the material culture of the historic Yazoo Bluffs Indians has increased ten-fold over the last four years, but much still remains to be learned. We now have a fairly good idea of the historic pottery and can even date it within a thirty-year period, but even this refinement offers little satisfaction. Our hope is to assign ethnic labels to these types and varieties and to be able to sort out who was making and using which vessel shapes and designs. Only when a Yazoo Indian ceramic assemblage is differentiated from a Tunica or Koroa assemblage will it be possible to determine relationships between these peoples and trace their respective sociocultural traits both backwards and forwards in time. Fort St. Pierre has been invaluable in this research, because it provides a marker for aboriginal contemporaneity. For example, the Cracker Road Incised, var. Cracker Road vessels depicted in Figures 6 and 7 were found in sealed context within the moat which surrounded the fort. They therefore date no earlier than 1729, the year in which the fort was destroyed. The vessels could not have been Tunica at this time, but were, in all probability, a Yazoo Indian product. Whereas the tight dating of the French component at St. Pierre (23-M-5), and the small single component sites surrounding it, provides fine synchronic control, the archaeology of the multi-component Haynes Bluff Site (22-M-5) provides data on change through time. Jeffrey P. Brain's work in tracing the Tunica as they moved through the valley has provided an alternative, but supplementary, way of observing this change (Brain 1970, 1973, 1975, 1977, n.d.). In this paper I have assigned ethnic labels to a number of ceramic varieties, but as a cautionary note, I want to stress that these assignments are merely interpretations based on the data presently on hand. In determining ethnicity of material culture for the Yazoo Bluffs region, further excavation is obviously required. The information presented here on historic native ceramics provides a framework in which to pursue the above goals.

Provenience of Illustrated Artifacts

Figure 2	St. Pierre (23-M-5)	(Y558-31B, Y558-31D)
Figure 3	St. Pierre (23-M-5)	(Y558-31B)
Figure 4	Portland (22-M-12) St. Pierre (23-M-5)	a(Y500A), b(Y506A), c(Y505C2) d(T11B), e (W97A), f(Y642A), g(W41A), h(Y579A); i(Y601A)
Figure 5	Portland (22-M-12) Wrights Bluff (22-M-15) St. Pierre (23-M-5)	b(Y502F.1), c(Y505A1), d(Y502F.1) e(W330A) a(Y640A), f(Y646A), g(Y604A)
Figure 6	St. Pierre (23-M-5)	(Y558-31F, Y558-31H)
Figure 7	St. Pierre (23-M-5)	(Y558-31B)
Figure 8	Portland (22-M-12) Wrights Bluff (22-M-15) St. Pierre (23-M-5)	c(Y506B), d(Y501B), e(Y506C) a(W325A) b(Y642B)
Figure 9	Portland (22-M-12) St. Pierre (23-M-5)	b(Y503A, Y506C3), c(Y502A), d(Y506C), e(Y500A), f(Y506C) a(Y404)
Figure 10	Portland (22-M-12) St. Pierre (23-M-5) Lonely Frenchman (22-M-11)	a(Y506B), c(Y506C2), f(Y506C), g(Y506C2) d(Y558-31B), e(Y558-31D) b(W301F)

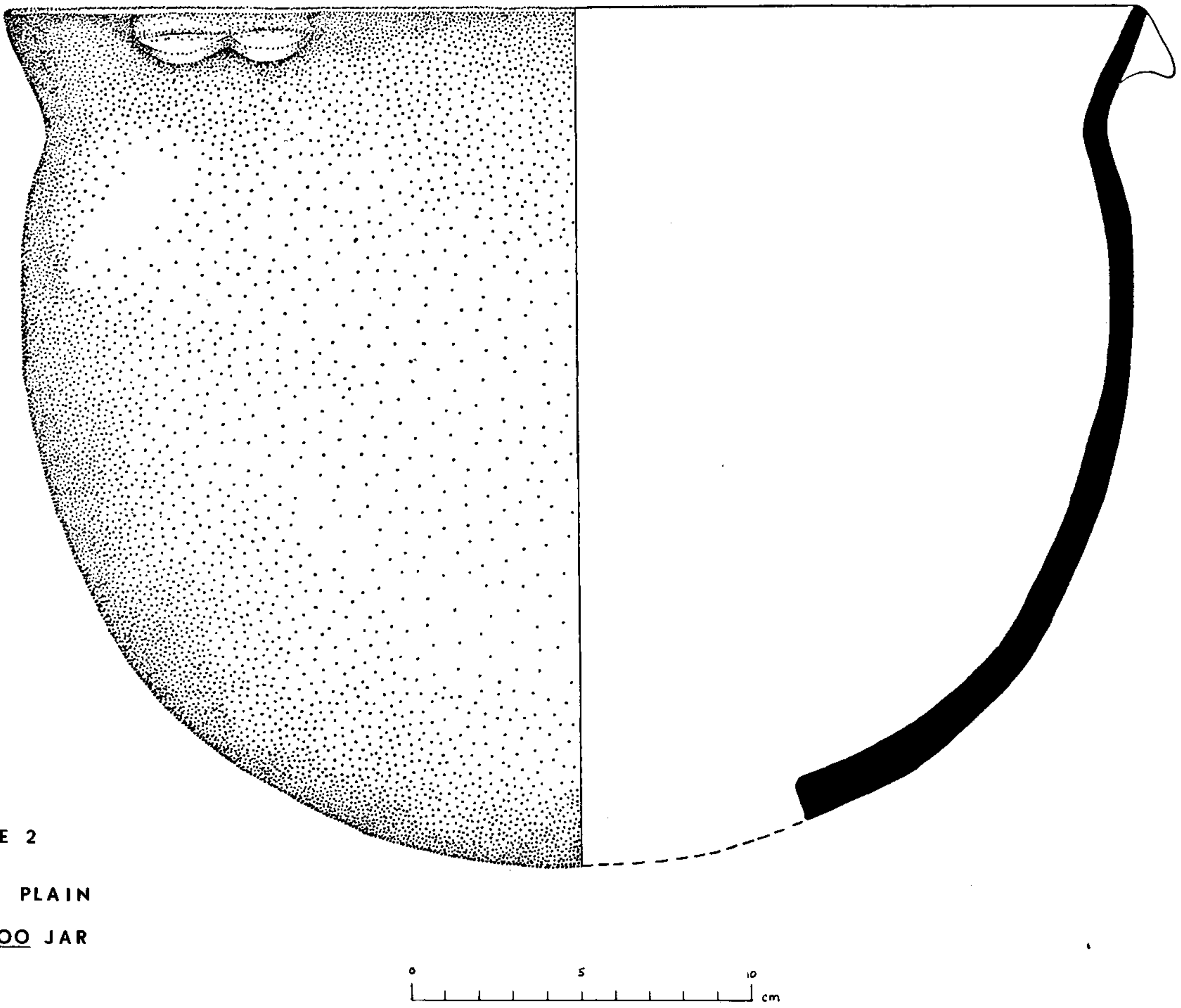


FIGURE 2

MISSISSIPPI PLAIN

VAR. YAZOO JAR

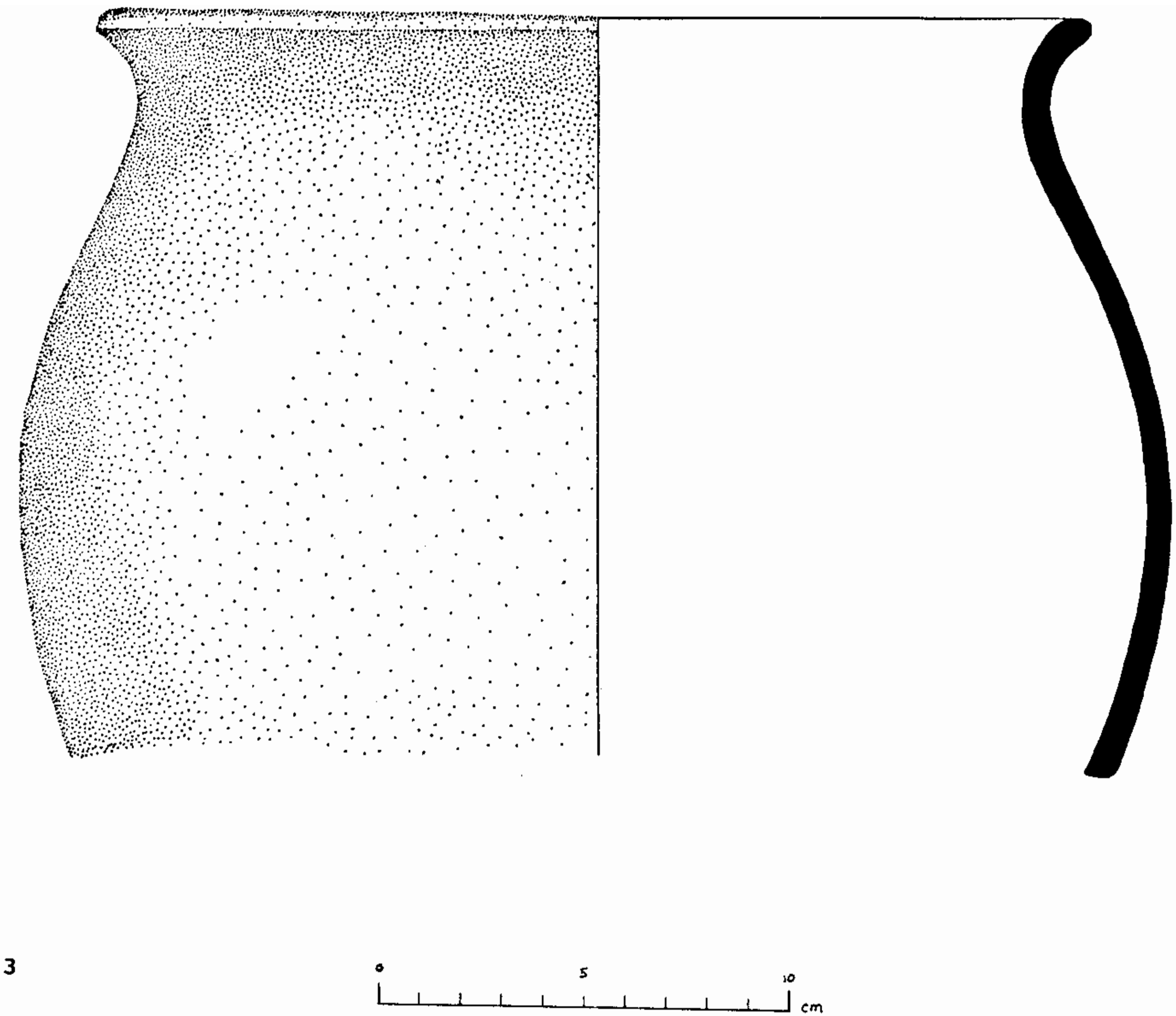


FIGURE 3

ADDIS PLAIN

<u>VAR.</u> <u>ADDIS</u> JAR

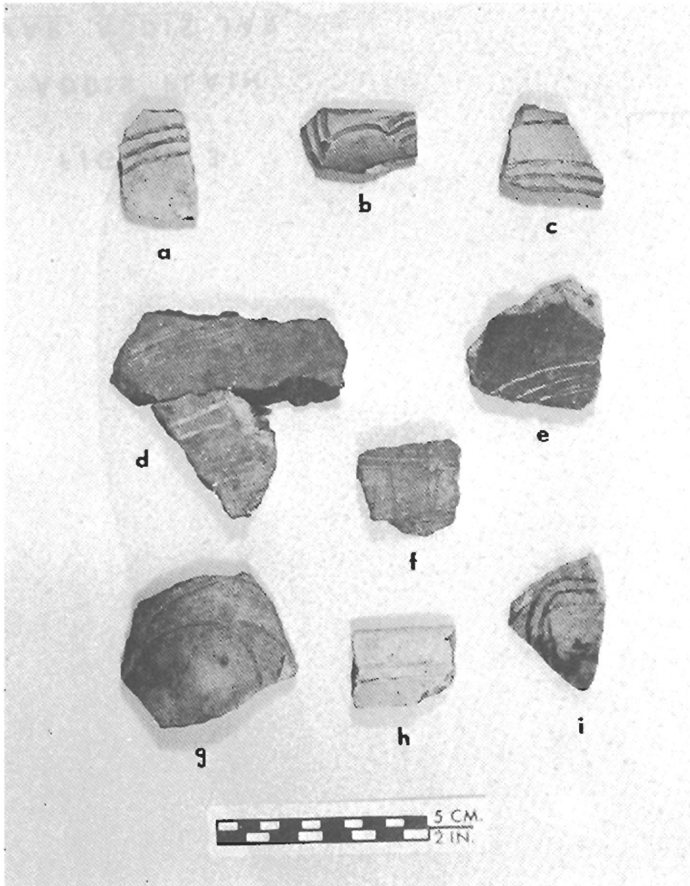


FIGURE 4

FATHERLAND INCISED. a-i, VAR. FATHERLAND

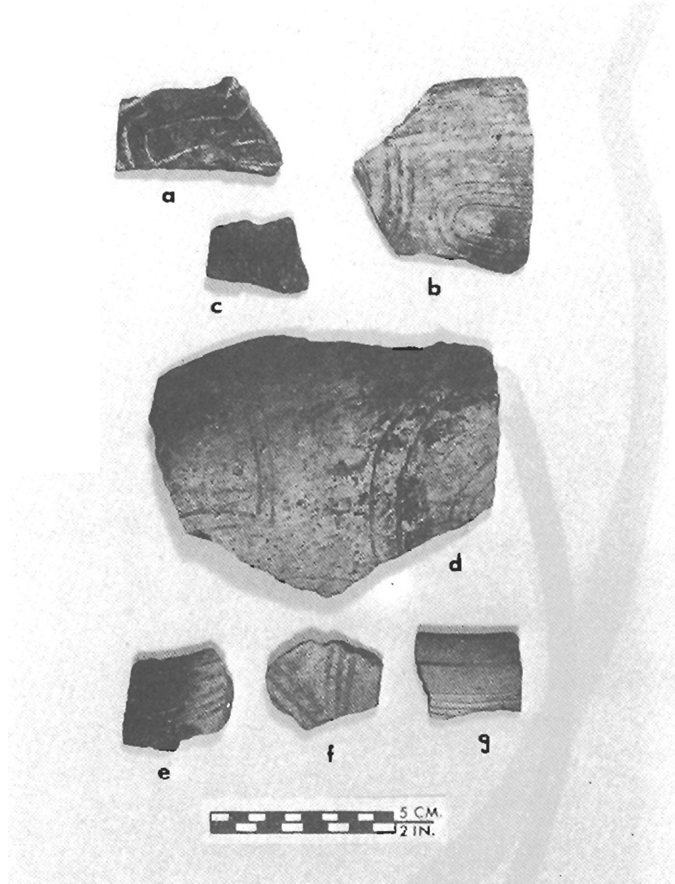
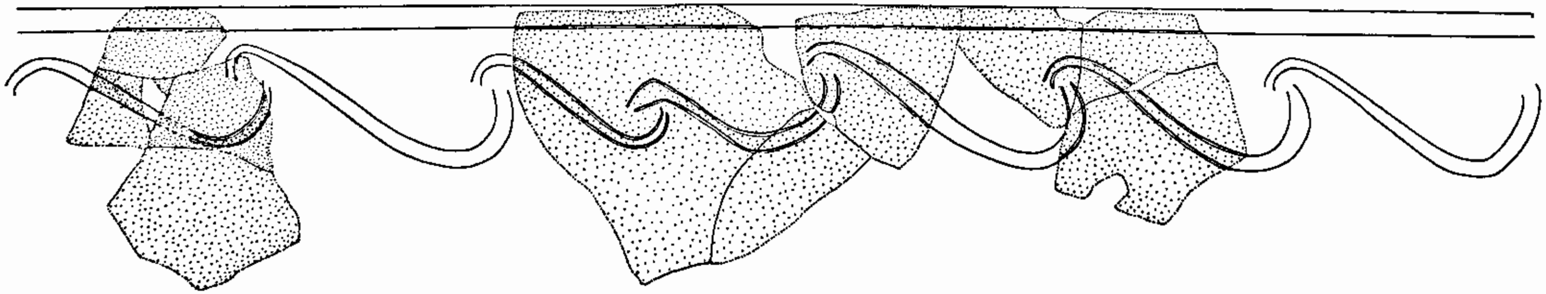


FIGURE 5

CRACKER ROAD INCISED. a-g, VAR. CRACKER ROAD



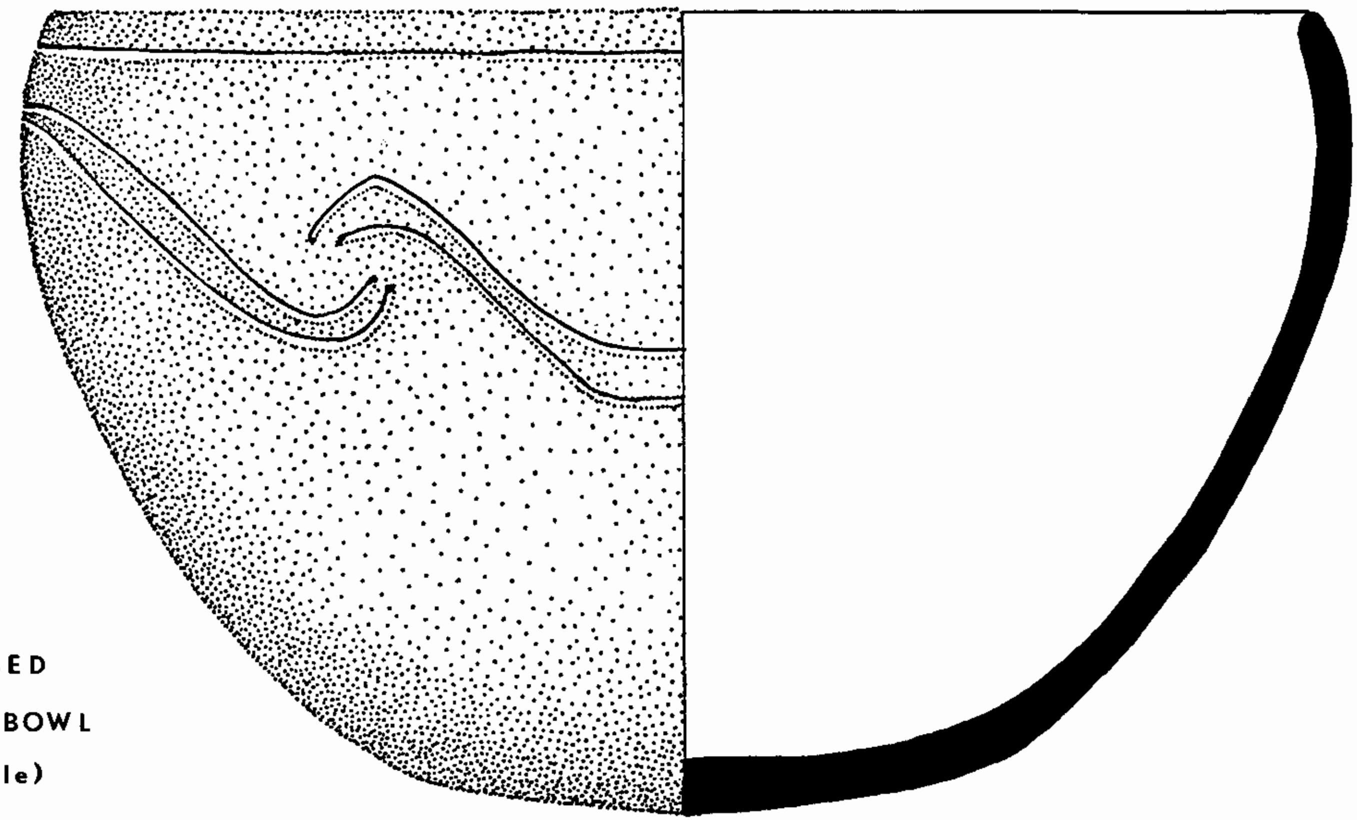
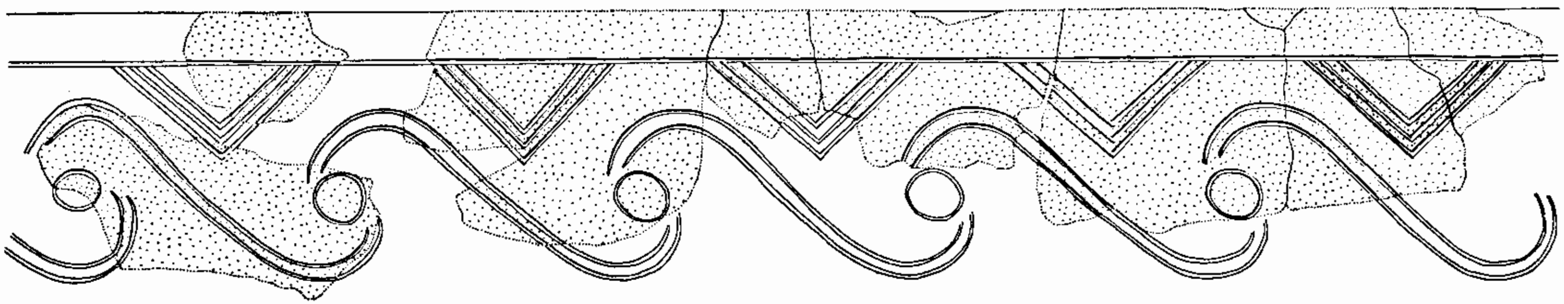


FIGURE 6

CRACKER ROAD INCISED

<u>VAR.</u> <u>CRACKER ROAD</u> BOWL

(to scale)



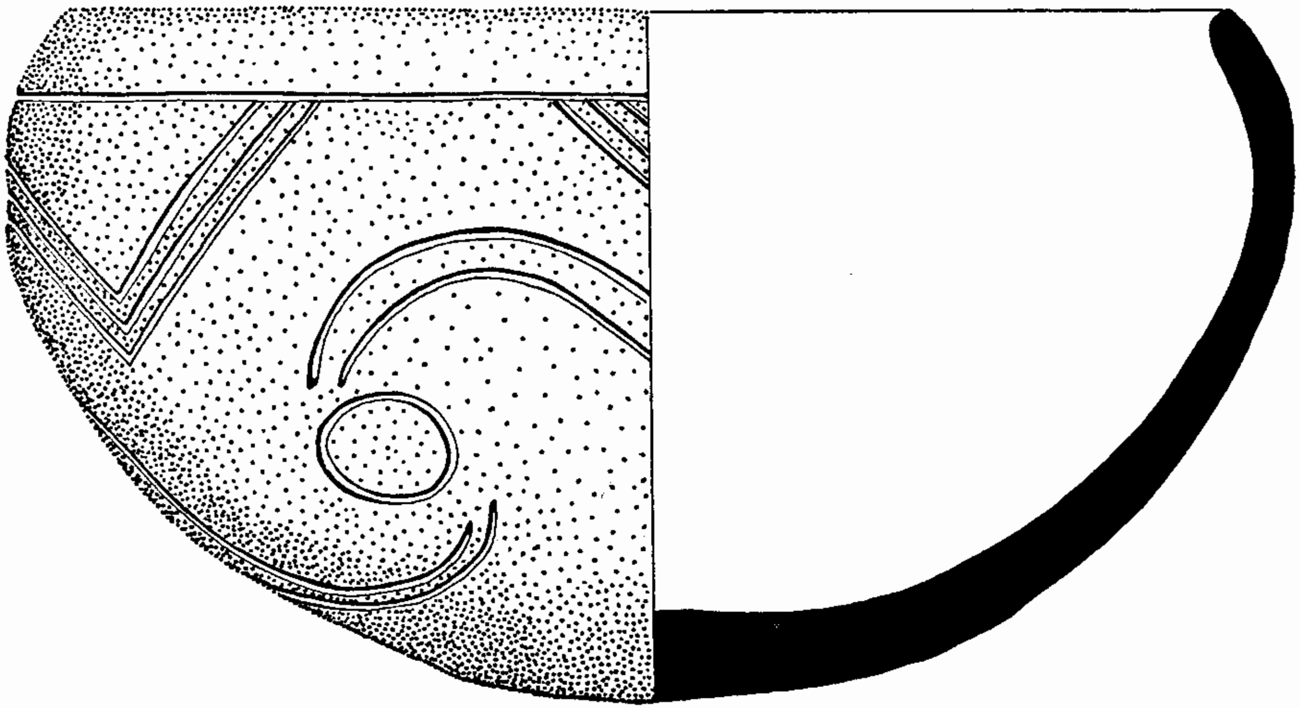


FIGURE 7

CRACKER ROAD INCISED

VAR. CRACKER ROAD BOWL

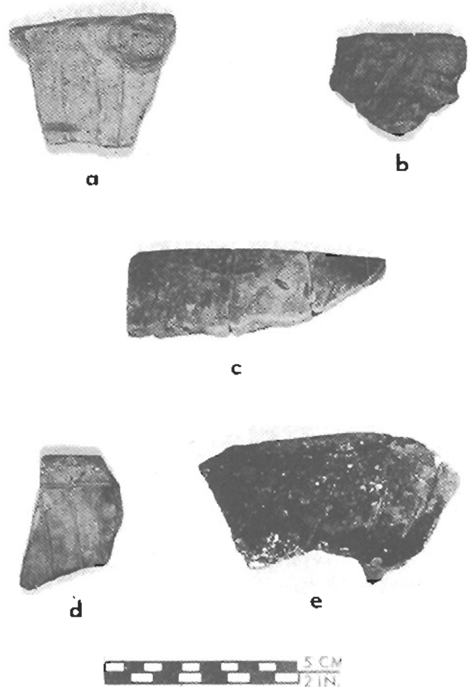


FIGURE 8

BARTON INCISED. a, VAR. CHARLEVOIX

b - e, VAR. DAVION

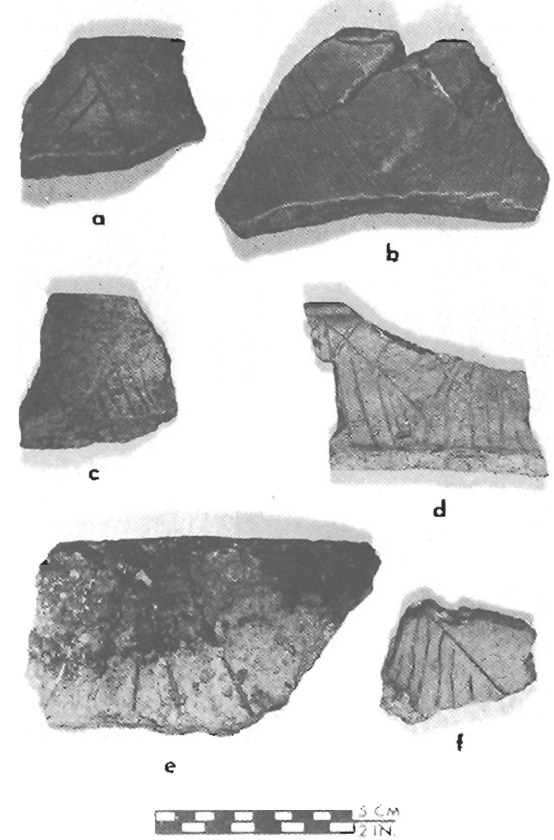


FIGURE 9

BARTON INCISED. a - f, VAR. PORTLAND

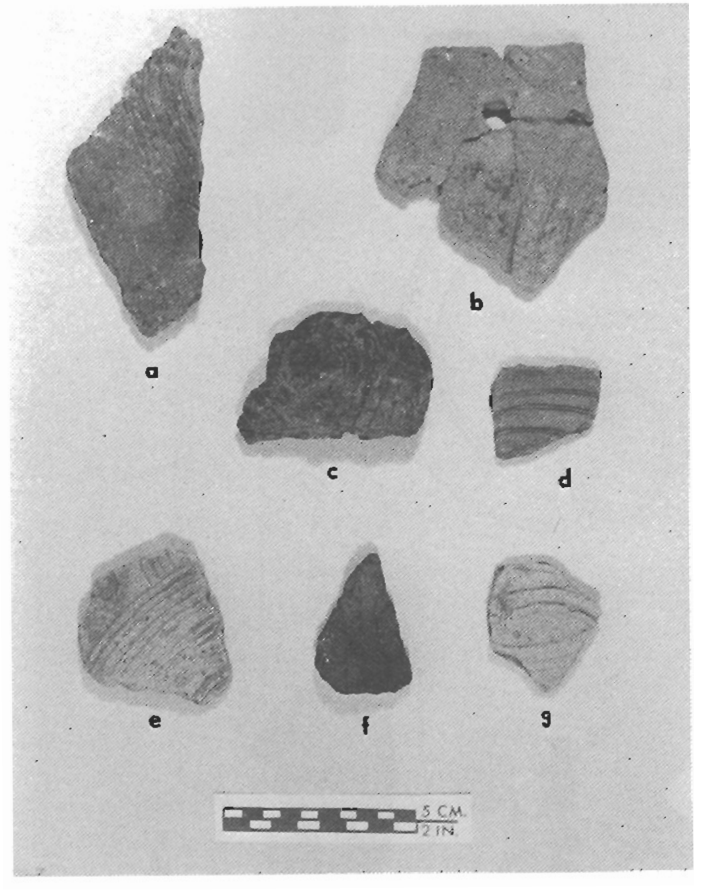


FIGURE 10

WINTERVILLE INCISED. a-g, VAR. TUNICA

Acknowledgments

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THE METROPOLITAN ATLANTA RAPID TRANSIT AUTHORITY ARCHAEOLOGICAL SURVEY: AN INTRODUCTION AND REPORT ON THE 1976-1977 FIELD RESULTS

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Georgia State University

Because of legislation calling for assessment, preservation, and recovery of cultural resources endangered by federally funded construction projects, and the recent enforcement of this legislation, systematic archaeological surveys are now being undertaken in areas once largely unavailable to archaeologists. Urban centers, which have always been the scene of intensive construction activities, represent one such area of heightened concern. This report is an introduction to the archaeological survey currently being conducted by Georgia State University during 1976 and 1977 in the construction alignments of the Metropolitan Atlanta Rapid Transit Authority (MARTA) Rapid Rail System (Bowen and Carnes 1977).

Introduction

MARTA, under the auspices of the Urban Mass Transportation Administration (UMTA), is constructing a rapid rail system in metropolitan Atlanta. This project includes areas of Fulton and DeKalb counties and the cities of Atlanta, Decatur, Doraville, Avondale Estates, Chamblee, and College Park. The main arteries of the system are East-West and North-South rail lines that intersect in downtown Atlanta. The East and West lines roughly bisect that area which is encompassed by Interstate 285. The North and South lines run in a northeast-southwest direction from the community of Doraville, north of Atlanta, to the community of College Park, south of Atlanta. Both of these main lines have several subsidiary lines. When completed, this system will compose a 52-mile rail network.

The MARTA Archaeological Project as reported here concerned only those areas of the North, South, East, and West lines which were scheduled for the initial construction phase. This portion of the MARTA Rail System is termed "Phase A" (Fig. 1) and includes those sections of the line which run from Avondale Station on the east to the Hightower Road Station on the west, and from just north of the North Avenue Station on the north to the Garnett Street Station on the south. Collectively, "Phase A" forms a corridor approximately 14.7 miles long by 60 to 200 feet wide.

The unique layout and dimensions of the MARTA corridor, in relation to the urban environment in which it is set, suggest the pursuit of several research problems. These problems deal with the processes of Atlanta's urban and industrial growth, neighborhood comparisons and relationships, Atlanta's relationship to the earlier community of Decatur, and the treatment of an archaeological site of such spatial magnitude.

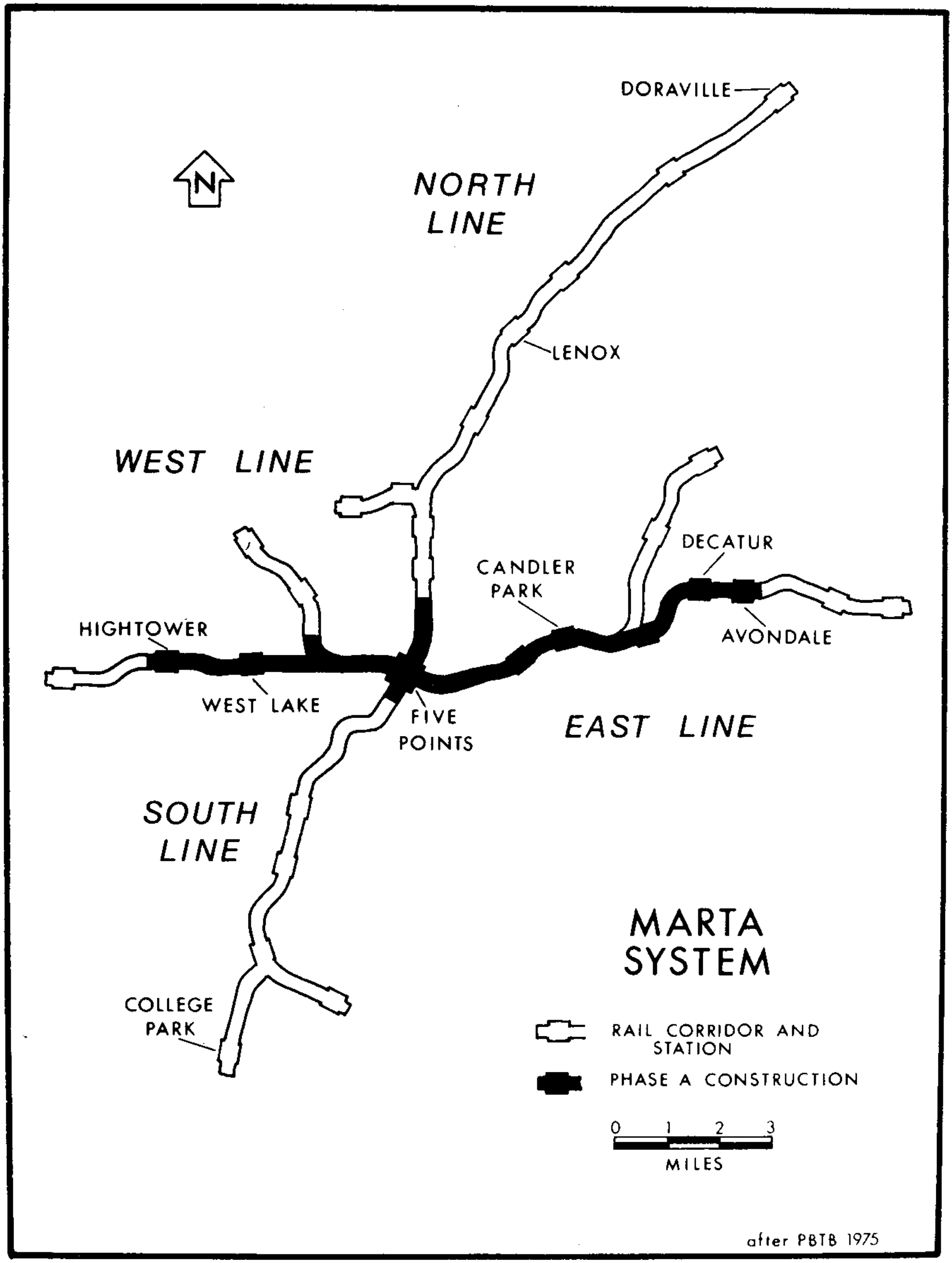

Figure 1. MARTA Systems Map showing "Phase A" in black.

Research Design

The formulation of a research design (Fig. 2) for any particular archaeological program depends upon the nature of that program. In most cases it is possible to review methods that have been successful in the past for a particular type of project and then adapt those methods to the project at hand. At the time the MARTA Survey was conducted, however, very little archaeological research had been undertaken on a large scale in the American urban setting. Therefore, in the MARTA Project, it was necessary to apply traditional methods, and test their applicability to an urban setting, and to develop untested methods that might be suitable for the urban environment.

Survey Units and Rationale

In any archaeological project, whether the concern is the investigation of a single site or a larger unit such as a reservoir, it is necessary to break down the area into manageable units. The well defined and delimited boundaries of the MARTA corridor and the overall layout of the system in relation to the greater Atlanta area made possible the delineation of survey units and prompted the adoption of certain research goals.

In order to facilitate construction procedures, MARTA divided the various rail lines into segments termed Contract Construction Units (CCUs) (Fig. 3). Each CCU in turn was further divided into land parcels. These parcels were small, averaging about 10,000 square feet.

Since the boundaries of the individual CCUs and parcels were previously defined and mapped by MARTA, it was decided to incorporate this system into the archaeological survey. Not only did adoption of these smaller units into the survey strategy allow for a well-controlled surface survey, but the fact that MARTA designations were used made it much easier to convey the scope of our work to MARTA officials. As an example, when survey was reported complete in a particular parcel within a particular CCU, both archaeologist and engineer had a clear understanding of the area under discussion. Often, several parcels were combined to form a single survey area. This was done in order to conserve time and to allow the survey of various geographical features as a single unit.

This method of area breakdown, however, did have its limitations. One problem centered around the inability, at times, of the survey crew to determine precisely where one parcel ended and another began. This was particularly true in areas where MARTA acquired only portions of certain parcels. Another drawback of the CCU-parcel system of survey was the multiplication of individuals with whom the archaeologists had to work. Within the "Phase A" construction area, there were 27 CCUs, each having its own engineer. This meant that instead of keeping up with one engineer's work, it was necessary to visit several engineers in order to ascertain the total scope of the work. Whatever problems this system may have caused, the control and greater manageability of the CCU-parcel system made it worthwhile.

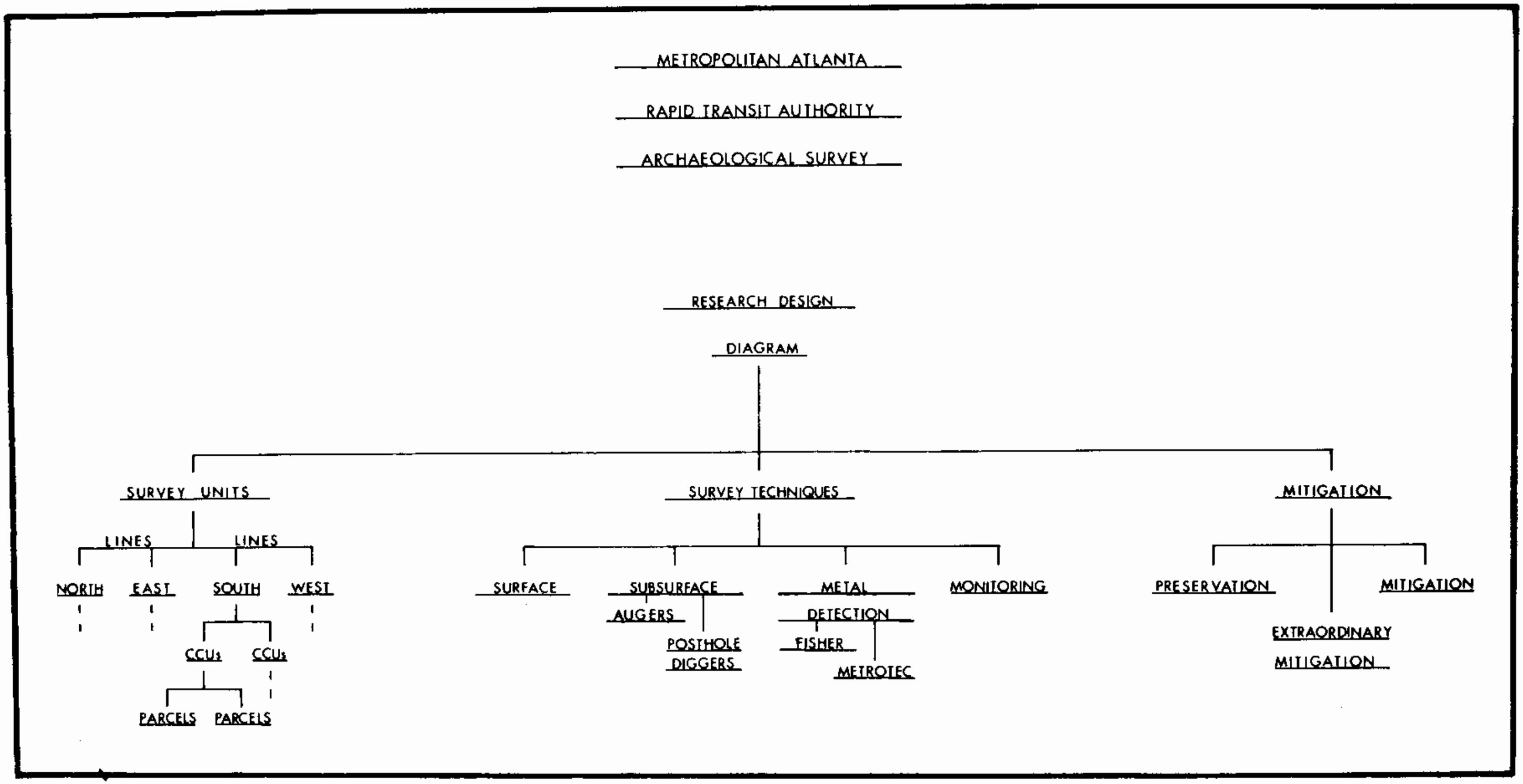

Figure 2. Diagram outlining the research design for the MARTA Project.

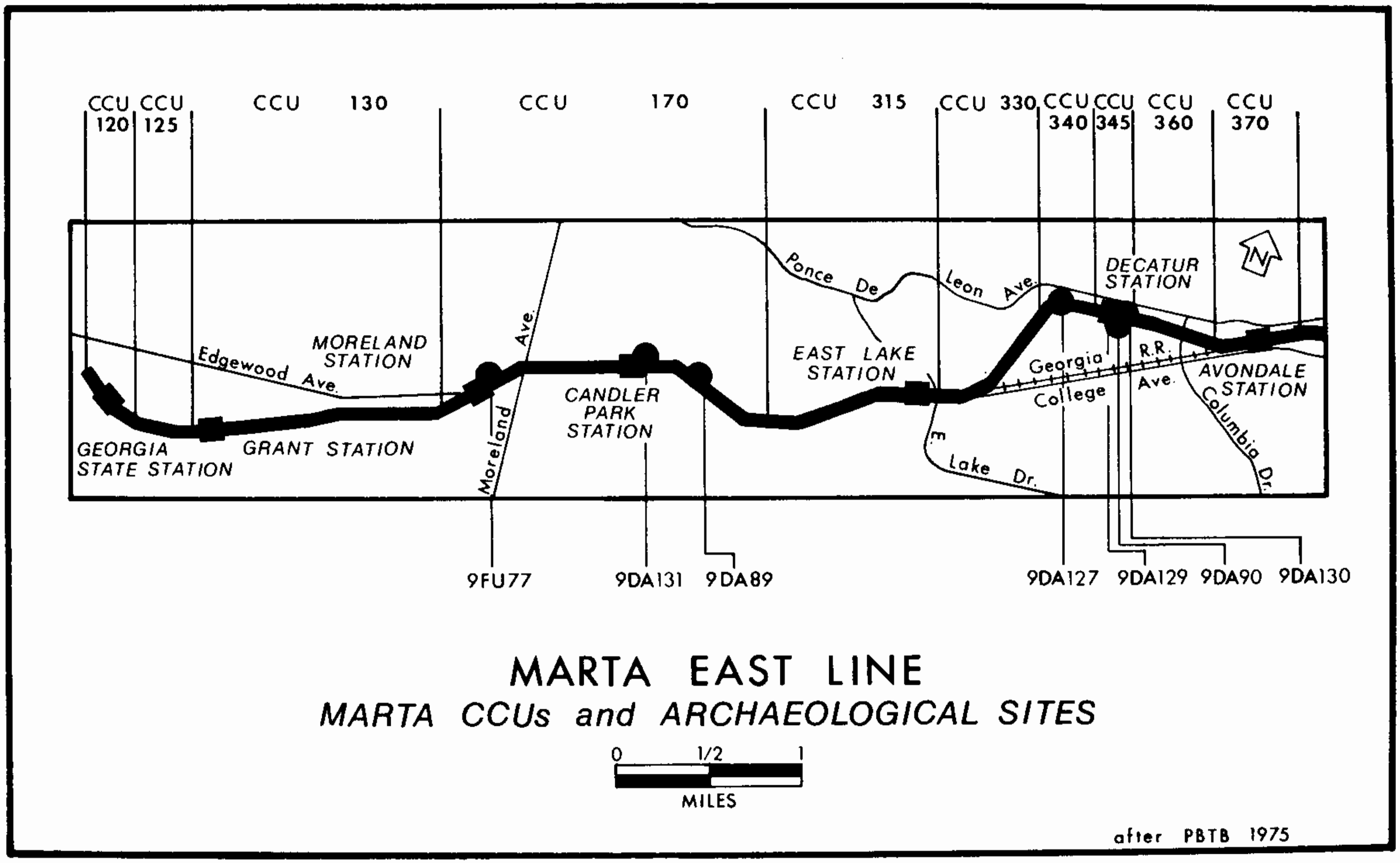

Figure 3. Map of the MARTA East Line showing CCU breakdown and location of archaeological sites.

Another problem, not necessarily related to the CCU-parcel system, concerned the system's overall layout. The linear configuration of the rail system made it very difficult to give proper attention to all areas at a given time. If construction work was occurring at two archaeologically critical areas on opposite ends of the line, it was virtually impossible to carry out the necessary careful observation in both areas. These areas may be separated by as much as ten miles, and when traveling to-and-from such distances in an urban center such as Atlanta, one soon finds himself spending the majority of his time observing urban cultural behavior instead of construction operations.

Survey Techniques and Rationale

The different goals and environments of various archaeological investigations make it necessary to develop and utilize techniques that will yield the most meaningful results in terms of quantity and quality of information. In the MARTA Archaeological Survey, surface inspection, subsurface testing, metal detection, and monitoring of construction excavations were found, when employed in various combinations, to render the best and most thorough results.

Surface Inspection

Except for those areas that had been previously graded during MARTA construction, or were obscured by some form of existing structure, all units within the survey area were subjected to surface inspection. Areas obscured by existing structures, such as buildings, paved streets, and parking areas, were inspected following their demolition and/or grading.

Surface inspection was accomplished by two or more individuals walking side-by-side at approximate five-foot intervals over the entire survey area. This technique yielded a representative sample of cultural materials exposed on the ground surface.

Subsurface Testing

In an attempt to locate cultural features that might lie beneath the surface, subsurface tests were made in all units of the survey area. In the urban setting, such culturally related features are often the remains of historic house cellars, wells, latrines, and garbage dumps. Occasionally, however, prehistoric features were also encountered. As was the case in surface inspection, all areas were subsurface tested except for those that had already been deeply graded or were obscured by existing structures.

Because the survey units were usually well defined and limited in size, attempts were made to test the entire unit rather than to randomly sample a portion of each. Subsurface tests were made at uniform intervals over the entire survey unit, with placement of individual tests governed by the topography and configuration of the survey unit, along with the cultural evidence obtained from surface inspection. Occasionally, additional tests were made based on evidence obtained from the original tests. These subsurface tests were mapped utilizing existing telephone poles, power poles, and MARTA property lines as controls.

Two different implements were utilized in the subsurface testing phase of the survey. In the initial stages of the survey, posthole diggers were employed. These instruments can cut an initial hole six inches wide by two feet deep before expansion of the upper portion of the hole is necessary. Depending on desired depth, a two foot-wide by four foot-deep hole can be excavated while the operator is still on the original ground surface. Ground hardness and the strength and endurance of the field worker are factors in determining the time needed to excavate a posthole test, but in most instances posthole testing is a time consuming and tiring endeavor. Under difficult circumstances, fifteen or twenty minutes are required to excavate a hole six inches wide by two feet deep, while in less difficult situations a similar hole can be excavated in five minutes or less.

After several weeks of subsurface testing using this technique, posthole diggers were abandoned in favor of soil sampling augers. The type of auger that proved to be most suitable for conduction of the subsurface testing phase of the survey consists of three sections: (1) a cross handle for turning; (2) a steel extension tube, which is available in various lengths; and (3) a standard auger head composed of bale, bucket, and bits. For archaeological testing, a three to three and one-half foot steel extension tube, with a three and one-quarter inch or two and three-quarter inch bucket, has been found to be adequate. This brings the total auger length to approximately four and one-half feet, which is, in most cases, enough to penetrate sterile soil yet short enough to be easily managed. The buckets bring up a soil sample that is adequate for archaeological evaluation (Fig. 4). When depths greater than four and one-half feet are needed, extensions are available. Using this testing method, a three to four foot-deep cylindrical shaft can be excavated in a few minutes, with minimal effort. Small rocks and roots pose few problems, but in instances where obstacles prevent complete augering, another shaft can be quickly excavated.

Metal Detection

The MARTA Archaeological Project has helped demonstrate the significant role metal detection can play in archaeological surveys and archaeological research in general (Bowen and Carnes 1976), especially in the urban setting.

While archaeological surveys conducted in rural settings are usually aided by exposed areas such as road cuts, plowed fields, and erosional surfaces, urban surveys often are impaired by human-made structures, lawn grass, and other obstructions. Also, cultural items usually have become deeply imbedded in the topsoil as a result of the large amount of surface disturbance that occurs in an urban environment, e.g., foot traffic, automobile traffic, and construction work. Metal detectors make possible the recovery of metal items obscured in this manner.

Figure 4. Subsurface testing with a soil auger.

Figure 5. Conducting metal detection survey with the Metrotec Model 220.

Two kinds of metal detectors were utilized in the MARTA survey: a Metrotec Model 220, which locates nonferrous metals such as lead, copper, and brass; and a Fisher Model D121, which is sensitized both to ferrous metals, such as iron and steel, and to non-ferrous metals. Because systematic metal detection is usually a time consuming process, a sampling technique was devised for this phase of the survey. Units of various dimensions, such as 50 feet by 50 feet, were established throughout the survey area with the exact location and size of the individual units being determined by surface inspection data, previous ground disturbances (which are abundant in an urban setting), historically documented areas of human activity, and the boundaries of the MARTA corridor. Approximately 80 per cent of the MARTA corridor was conducive to metal detection; that is, surface obstructions were cleared and the area was not overly littered with contemporary metal (pop tops, gum wrappers, etc.). All territory within these units was thoroughly searched with the detector(s) and any significant items located within these units were tagged (Fig. 5). All units were mapped in the same manner as the subsurface tests and all recovered artifacts were, in turn, mapped within the survey unit.

This non-random method of survey was employed in an effort both to sample all areas within the corridor and to focus particular attention on previously determined significant areas. In a more spacious and homogeneous environment, a random sampling technique might be more applicable.

Monitoring

The final, and perhaps most important, phase of the MARTA Survey was monitoring during construction activities. In many areas within the urban setting, monitoring is the only method of survey. Often, paved parking areas and smaller surface structures are not demolished or removed until the area itself is scheduled for grading, or the land is not acquired until just before construction activities are to commence (Fig. 6). Obviously, this leaves no time for conducting formal, systematic survey. Therefore, it is necessary to observe the grading at the time it is in progress to determine if any archaeological features are present.

Monitoring also entails the revisiting of previously surveyed areas and sites, visually observing the construction excavations, and entering and closely examining cuts and profiles (Fig. 7). In this manner the archaeologist has the unique opportunity of evaluating the effectiveness of the survey techniques.

Intensity of monitoring is dependent upon the nature of the area being disturbed. In areas where streets, railroad tracks, paved parking areas, and other such structures preclude surface and subsurface inspection, monitoring is the only method available to evaluate archaeological significance. Therefore, these areas must be monitored regularly as the construction work progresses. Also, areas that have yielded significant archaeological data during the initial surface inspection are monitored especially closely during their destruction. A turn-of-the-century well in downtown Decatur was discovered in this manner.

Figure 6. Monitoring grading of an abandoned street surface. Note the streetcar tracks in the foreground.

Figure 7. Examining profiles of grader cuts for evidence of cultural features.

Extraordinary Mitigation

Most archaeological surveys are concerned with the location and evaluation of archaeological resources with subsequent excavation of selected sites. Because of the unusual situations present in the urban setting, however, such traditional programs are not always possible. Often because of unavoidable construction situations, sites are not located until construction is imminent or already taking place. In such cases it is actually necessary to conduct salvage excavations during the course of the survey. In the MARTA Archaeological Survey, this was referred to as "extraordinary mitigation." Sometimes it was necessary to arrange for MARTA personnel to work around the endangered site until excavations were complete, or to shift their work to another location until the significance of a site could be evaluated (Fig. 8). Usually, with good communication between archaeologist and engineer, this mitigation can be conducted properly with little delay to construction. Stephenson (1976:105) has stressed this need for communication between archaeologist and engineer in evaluating recent developments in contract archaeology.

Results of the 1976-1977 Survey

In a large urban center such as Atlanta, it is often difficult to decide just what is a site and what is not, since cultural debris, both recent and old, will invariably be found over most of the survey area. For the MARTA Project, Atlanta was treated as an archaeological district, with areas of definite artifact concentrations, and areas yielding significant subsurface features, e.g. wells, garbage dumps, and latrines, being designated as archaeological "sites."

Thus far, the MARTA Archaeological Survey has located twenty sites. Despite the large number of prehistoric sites located immediately outside Metropolitan Atlanta, only two of the sites located within the survey area contained prehistoric components. This, along with the fact that eleven of the sites were represented only by subsurface remains, was a clear indication of the effects of urbanization upon archaeological resources. The remaining nine sites represented areas of Civil War military activity, where only surface remains were usually found. These results point up the degree to which constant surface disturbances in the urban setting tend to obliterate or scatter archaeological remains, especially intact features located on or near the surface. Most areas, although they may appear to have undergone little alteration, have been subjected to at least minor grading or filling.

In addition to the prehistoric sites and Civil War military areas, several sites were located that date to early periods in the development of Atlanta and Decatur. These sites included wells, alley ways, earthen basements, and neighborhood and municipal garbage dumps. Data recovered from these sites through extraordinary mitigation should provide valuable data on settlement patterns, class structure, social interaction, and cultural behavior in general.

Figure 8. Supervising bulldozing around a turn-of-the-century garbage dump.

Summary and Conclusions

In closing, it should be reiterated that this paper has been presented only for the purpose of introducing a type of archaeology that is increasing in importance and is likely to become even more important in the future. In reviewing the technical and cultural data that have been generated by this project, several points become evident. Archaeology in the urban setting requires: (1) the formulation of new survey techniques and the reevaluation of traditional techniques; (2) the development of criteria for classifying the diverse cultural contexts within sites of such magnitude and complexity; and (3) the generation of new perspectives for evaluating the cultural remains of an area continually subjected to massive surface disturbances.

Despite these "needs," archaeology in the urban setting can become as important in North America as it has in other parts of the world. For the first time, questions dealing with large scale industrialization and urbanization, which have, in the past, been Old World, South American, and Mesoamerican issues, are available for scientific research. Realistically, if we are to fulfill our professional obligations as archaeologists, sooner or later we must come to grips with the unique situations which urban archaeology presents and devise means by which our research goals can be successfully carried out in this rich, but complex setting.

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PREHISTORIC PATTERNS OF SUBSISTENCE IN THE MIDDLE ST. JOHNS REGION, FLORIDA

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University of Florida

Introduction

Zooarchaeology, the study of animal bones in archaeological context, can greatly contribute to archaeological interpretations, particularly in problems relating to human-ecological interdependence and adaptation. The analysis of faunal remains can provide information on hunting and gathering patterns, habitat utilization, butchering and food preparation techniques, as well as types of occupation - whether sedentary or seasonal - and consequently, such data may help to support certain hypotheses regarding prehistoric subsistence and settlement patterns.

This presentation attempts to illustrate some of the potentialities as well as limitations in the study of particular faunal samples. The bone remains from two sites recently excavated in the middle St. Johns Valley, Florida, are investigated: the Palmer-Taylor, 8-Se-18, and the Alderman, 8-Vo-135, sites. The former is a shell mound located near Geneva in Seminole County, Florida. The mound is situated along the north side of the Econlockhatchee River, a tributary of the St. Johns River. The Alderman site is a ridge-shaped mound located three miles due north on the east shore of Lake Harney, a fairly large body of water that is a widening of the St. Johns River.

The quantity and quality of the faunal data recovered from these two sites differ, thereby yielding answers to certain problems while leaving other questions unsolved. Nevertheless, the zooarchaeological interpretations in both cases are an essential asset to the study of the prehistory of this area.

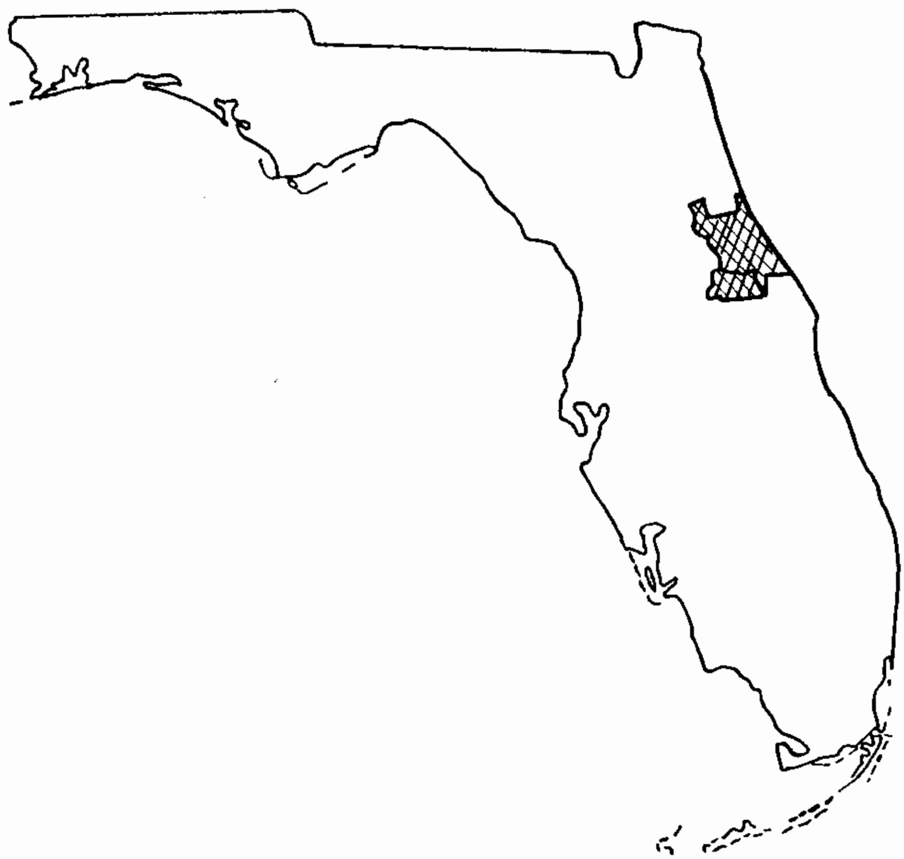
The Natural Habitats

The middle St. Johns valley, the area under investigation, is situated within the eastern portion of the State of Florida (Fig. 1). Several major habitats have been identified for this region. Terrestrial areas include palm and oak forests and pine flatwoods while the freshwater environments consist of lakes, rivers, and ponds.

The Archaeological Cultures

The prehistory of the St. Johns valley has been carefully examined during the past three decades. Due to the survey work of the north St. Johns

Figure 1. Location of sites.



conducted by John Goggin (1952) as well as Irving Rouse's (1951) field research on Indian River and the upper middle St. Johns, most of the sites have been located and their components have been identified. As a result, a cultural sequence has been completely delineated.

Studies of the past ecology of this area also have been done. Major environmental changes have taken place due to the continual rise in sea level that originally began approximately 10,000 years ago. By about the period 5500 to 3000 years ago, the region had already undergone climatic moderation and an increase in precipitation. The Atlantic coast became a more propitious environment in terms of possible human habitation due to the availability of surface waters and the formation of estuarine systems. Such shallow coastal waters resulted in the development of oyster beds as well as in an increasing proximity of many species of fish (Thanz 1977). These ecological modifications, in turn, can be correlated with major cultural changes and population movements, particularly during the St. Johns cultural period.

The two sites investigated, Palmer-Taylor and Alderman, were excavated in the winter of 1976 and 1977, respectively, under the direction of Dr. Marilyn Stewart, a professor of anthropology at Rollins College, Winter Park, Florida. Dr. Stewart's objective was to test several hypotheses including the propositions that:

1) the Late Archaic sites of the middle St. Johns valley represented winter camps, and
2) the later occupations were restricted to summer hunting, fishing, and gathering as groups migrated to the coast in the winter months to exploit oysters.

Palmer-Taylor exhibited a preceramic Archaic or Mt. Taylor cultural occupation which is dated at approximately 4100 B.C. Alderman, on the other hand, was a much later site: the entire cultural occupation was ceramic, sequentially representing both St. Johns I and II. Radiocarbon dates for the major strata ranged from 485 B.C. to A.D. 860. Hence, Palmer-Taylor should be a winter camp while Alderman should represent a seasonal summer base.

The study of the faunal remains excavated at these two sites, in conjunction with the material culture recovered, as well as the use of ethnographic analogy to historic indigenous St. Johns occupants, were employed here in order to test the formulated hypotheses and thus provide further insight into prehistoric adaptation along the St. Johns River.

Faunal Analysis

Method

The identification of the faunal remains recovered from the two sites was undertaken by the author and Ms. Erika Simons at the Florida State Museum under the direction of Dr. Elizabeth Wing. Mollusk remains had been previously separated from the vertebrate bone remains and therefore were not included in this study.

Each faunal sample was recovered from a 2 X 1-meter test pit. At Palmer-Taylor, a total of 506 bone fragments were identified. A large percentage of the osseous remains were in very poor condition which served as a detriment to the identification process. A heavy crust of shell and dirt adhered to the bones and could not be removed without completely shattering the bones.

The Alderman collection, however, was in an excellent state of preservation. Of a total of 8,668 bone fragments, 52 percent, or 4,513 fragments were identified.

The initial step in the faunal analysis was the taxonomic classification of the bone remains. Comparative specimens from the zooarchaeological collection were available for identification purposes.

Next, a list was made of the skeletal fragments represented by each species for each excavation unit. For example, two left humeri of deer appeared in Level 1. Notes were made of the sex or age of the animal as indicated by the size of the fragments, closure of the epiphyses, and/or tooth remains in the latter case, and special morphological differences, such as deer antlers for males, in the former. Furthermore, any evidence of butchering or cut marks or of deliberate modification of a bone fragment into an artifact was recorded.

The tabulation of the number of individuals of each species within each sample was based upon the Minimum-Number-of-Individuals Method (MNI). The latter calculations involve counting the most common skeletal element for each species in each provenience. The total, in turn, corresponds to at least that same number of individuals of that particular animal. Variations in size, age, and sex, also were considered.

Finally, the weight of the bone fragments of each species was measured and recorded. Such data, however, were only used in the analysis of the Alderman site. At Palmer-Taylor, the heavy encrustation upon the bones greatly increased the measured weights and consequently, such quantitative data could not be used.

The preceding methodology provided the basic raw data for an analysis of the subsistence pattern of both the Palmer-Taylor and Alderman inhabitants.

Animal Foods Exploited

Subsistence at both sites was based on the hunting and gathering of the major available resources.

Deer were hunted with atlatls tipped with large Archaic Culbreath and Kirk-like stemmed projectile points. All skeletal parts of the deer were represented, indicating that the whole animal was taken back from the kill site and eaten within the living area. Cut marks indicate that this mammal was skinned prior to butchering while burnt bone remains provide evidence that the animal was roasted over an open fire. Finally, the recovery of antler fragments at Palmer-Taylor was indicative of fall or winter hunting at that site.

Rabbits also were consumed in considerable quantity and were well represented in both locations. Other small terrestrial mammals exploited were raccoon, opossum, and river otter. These animals were probably cut up and roasted as indicated by a large number of burnt fragments.

Birds, particularly those ducks which are permanent residents in the freshwater swamps of the area were hunted for food at Alderman, with no evidence for this practice at Palmer-Taylor.

Reptiles, such as turtles and snakes, also were exploited at both sites. Freshwater species included mud and musk, Florida softshell, pond, snapping, and chicken turtles. Among those collected from the terrestrial areas were box turtle and gopher tortoise. Snakes were consumed at times, particularly water, eastern cottonmouth moccasin, rainbow, indigo, racer, and rattlesnake. Alligators were taken from the local aquatic areas.

Amphibians, such as frogs and salamanders, were exploited occasionally along the margins of the freshwater areas.

Fish were an important food item, particularly at Alderman, where they constituted the largest portion of the aboriginal diet. The majority were freshwater species and were captured within the local lakes, rivers, and ponds. The most utilized fish were catfish, largemouth bass, redear sunfish, bowfin, and gar. Several marine species were also consumed: mullet, croaker, and sea catfish habitually migrate up freshwater rivers. Fish weirs may have been used on the St. Johns according to Laudonnière and Le Moyne (LeMoyne 1875; Swanton 1946:334). Finally, some type of contact with the coast during the St. Johns period, whether trade or migration of people between the two areas, is indicated by a tiger shark tooth recovered at the Alderman site.

Diet Composition and Zones of Exploitation

An in-depth investigation was undertaken in order to determine the relative importance of the various animal foods in the diets of the Palmer-Taylor and Alderman inhabitants. This entailed using both MNI counts and bone weights.

MNI totals and frequencies were calculated at each site according to animal class, that is, mammals, birds, reptiles, amphibians, and fish. Thus, at Palmer-Taylor, reptiles (35.5%) and fish (34.6%) were consumed in equal amounts though mammals (25.2%) were also significant. Amphibians (4.7%) were of minute importance. At Alderman, however, fish were the most abundant (61.5%) while reptiles (23.6%) and mammals (11.8%) were exploited to a lesser extent. It should be noted, however, that the sample at Palmer-Taylor was indeed small, having only 107 individuals, in contrast to 483 individuals at Alderman.

The computation of the approximate amount of edible meat provided by each vertebrate class could be done only for the Alderman sample. Total bone weights were converted to total body weights by the use of linear regression formulas. Once again, fish (64.4%) were the predominant group while birds (1.7%) were of minor significance. Mammals (28.6%), however, demonstrated a substantial increase. Reptiles contributed only 5.2% of the meat, though this proportion is based solely upon turtle remains (Table 2).

Finally, the degree of exploitation of the freshwater and terrestrial zones was investigated. The latter was determined by computing the percentage of the total fauna that were hunted and collected within these two major ecological areas. Such calculations would demonstrate which environmental zone was utilized most. The two sites were comparable. Freshwater habitats were most extensively exploited - approximately 70% of the Palmer-Taylor fauna and 70-80% at Alderman - while terrestrial environments were utilized less - approximately 30% at Palmer-Taylor and 20-30% at Alderman.

Conclusions

The preceding presentation has demonstrated the types of data that can be obtained from the study of faunal remains recovered in archaeological excavations. The two sites examined did provide ample information on certain aspects of the subsistence pattern such as habitat utilization, species' contribution to the diet, and methods of food preparation. Moreover, the particularities of each sample yielded additiional data: the presence of deer antlers at Palmer-Taylor was indicative of at least a fall-winter occupation, while the excellent preservation of the faunal refuse at Alderman permitted the derivation of approximate edible meat weight percentages based

Table 1. MNI Percentages

Fauna Class	Palmer-Taylor	Alderman
Mammals	25.2	11.8
Birds	---	2.3
Reptiles	35.5	23.6
Amphibians	4.7	0.6
Fish	34.6	61.5

Table 2. Alderman Site: MNI % vs. edible meat %

Fauna Class	MNI %	Edible Meat %
Mammals	11.8	28.6
Birds	2.3	1.7
Reptiles	23.6	5.2
Fish	61.5	64.4

upon bone weights.

The hypotheses originally formulated have been partially proven by the resulting analysis. The proposition that Late Archaic sites along the middle St. Johns are winter camps is suggested, though not proven, by the evidence at Palmer-Taylor. The second hypothesis, however, that later St. Johns period occupations were restricted to summer hunting, gathering, and fishing remains unsolved. Such seasonal information was not obtained from the Alderman site.

Nevertheless, these faunal analyses did provide much useful information and thus made an important step toward a fuller understanding of human-ecological adaptation along the middle St. Johns valley in prehistoric times.

Acknowledgments

I would like to thank Dr. Elizabeth Wing for her guidance and support in carrying out this analysis. Also, a word of appreciation to Dr. Marilyn Stewart who funded the project and who read the original manuscript.

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PROJECTILE POINT MORPHOLOGY: STEPS TOWARD A FORMAL ACCOUNT

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Formal accounts consist of units and rules such that when the rules are applied to the units, a reasonable model of the subject phenomenon is produced. In this paper, the units are nominally defined terms and expressions. The rules are the general rules for nominal definition and rules of formation specifying how units in this account may be combined to form additional units.

The terms and expressions used in this study are introduced by nominal definition. The rules for nominal definition have been explained by Hemple (1952). Briefly stated, a nominal definition introduces a term, the definiendum, by stating its synonomy with another term or expression, the definiens, having a previously determined meaning. This previously determined meaning may consist of prior nominally defined terms or primitives. Primitives are the basic starting points for a system of definitions and are introduced at the outset. However, this should not be taken to mean that the meanings assigned to the primitives are arbitrary. They should be stated as explicitly as possible and should contain a maximum of empirical relevance. Since the definiens of a nominally defined term may contain only primitives or prior nominally defined terms, it follows that any nominally defined term must ultimately be reducible to, or replaceable by, a unique expression of primitives. This is Hempel's "Requirement of univocal eliminability of defined expressions" (Hempel 1952:17).

The point may arise: Because all nominally defined terms may be replaced by primitives, why use the nominally defined terms at all? The answers are multiple in nature, the first being purely practical. A single nominally defined term may reduce several lines of primitives to one word, and a definition containing several of these would be virtually unintelligible if expanded to a long passage of primitives. As an example, the fairly simple _basal plane_ expanded to primitives is a formula which requires 97 primitives plus quantifiers grouped in 54 brackets (Marking set addition) nested to the eighth order. Twenty-four operations of subset definition are also needed. It is obvious that "The most proximal transverse plane tangent to the base" is much more understandable. This example implies an additional set of rules which were used in combining the terms, but this will be discussed later.

The second benefit of a system of nominally defined terms is that the meaning of the term becomes precise and consistent. The term _base_ is currently used with three distinct meanings. In a hypothetical discussion of the proximal portion of a broken Clovis point, we may see the artifact referred to as the _base_ of the point. Clovis in general may be described as a ground _base_ point, and one that has an incurvate _base_. Thus the term _base_ may mean respectively:

1. An undetermined proximal portion,
2. The edges of an undetermined proximal portion,
3. A specific edge across the proximal end.

Thus we see that jargon, as an extension of natural language, contains certain ambiguities. These are what Hempel has discussed as determinancy and as uniformity of usage (1952). Determinancy refers to how well determined the application of a term is to a single person. Returning to our above example, this is the consistency with which an individual can decide what should and should not be referred to as base. Uniformity of usage refers to the consistency with which multiple individuals judge the applicability of a term to the same example, i.e. whether or not all people will refer to one specific entity as base. As defined below, the term base will have only one interpretation.

Another benefit of using a system of nominal definitions is that the definitions must be built in an orderly manner without circularity, contradiction, or inconsistency. This forces one to look at the subject material in new ways and often reveals relationships not apparent in other ways. Finally, nominal definitions may be used to define classes, rather than to describe groups. Classes are the necessary and sufficient criteria for class membership and are invariant. The characteristics of a group as a whole are not invariant, as they may change with the addition or deletion of successive members.

Domain Specifier

The first step is to specify the domain, or that area of study, to which the system is to be applied. It is of course preferable for this to be by definition, but in this case it is not. The following characterization will have to suffice for now:

Projectile Point=Any chipped stone artifact presumed to have been used, or usable, as the piercing end of an arrow, spear, dart, or similar composite tool.

Primitives

The more thoroughly a definition system is nested within an extant theoretical system, the greater the likelihood of generality. Thus in a system of definitions dealing with shape, it is not surprising that most of the primitives needed are used in mathematics, particularly geometry. The term tip is included to present one starting place on the projectile point.

Property Terms

Point=A dimensionless geometric object having no property but location.

Straight Line=The shortest distance between two points.

Curve=A line that deviates from straightness in a smooth continuous fashion.

Vertex=A point at the intersection of two lines.

Tip=The most anterior point of a projectile point, considered a vertex.

Plane=Any two-dimensional locus of points.

Boundary=A border or limit.

Distance=The length of a line segment joining two points.

Beginning=The point at which something starts or is originated.

End=The point at which something ceases or is completed.

It is recognized that beginning and end are imprecise terms in that each must be relative to the other or to some other reference point. However, definitions using these terms will contain instructions to the analyst which will remove any ambiguity.

Relation Terms

Perpendicular=Intersecting at or forming right angles.

Parallel=Being at an equal distance at every point.

Tangent=Touching but not intersecting.

Isomorphic=Identical in form.

Maximum=The greatest possible quantity, degree, or number.

Minimum=The least possible quantity, degree or number.

Greater=A larger quantity, degree, or number.

Lesser=A smaller quantity, degree, or number.

Compound=Consisting of two or more parts.

Paired=Consisting of two corresponding parts.

Nominal Definitions

The nominal definitions are produced by combining the prior terms in certain ways. The operations are: set addition; inclusion as a proper subset; being a proper subset of; and exclusion. The quantifiers which may be used have indexical intent or are universal. Quantifiers with indexical intent have a single denotatum such as "a," "one," "the." Universal quantifiers have infinite denotata and may be positive or negative, respective examples being "any," "all" or "no," "none." Real numbers may also be used. These rules, plus the general rules for the formulation of nominal definitions previously summarized, are the basis for the nominal definitions which follow.

The following is a list of nominally defined terms to be used in the analysis of projectile point shape. Where further clarification or interpretation would be helpful it is presented verbally and/or by graphic examples, but such analogies and examples are not by themselves part of the definition. It is interesting to note that most of the terms below are taken from the current jargon, usually with a meaning very similar to the current meaning. This indicates that the jargon does contain a fair amount of empirical meaning but lacks precision and systematization.

The definitions are all in the form:

Definiendum=df. Definiens.

The symbol =df. is read as "equal by definition." Material following the symbol :: is any additional nondefinitional explication. The first set of nominally defined terms deals with reference points on, and the parts of projectile points.

Margin=df. The maximum boundary of a projectile point.

Edge=df. Any portion of the margin.

Coronal=df. The plane which includes the margin.

Longitudinal=df. The plane perpendicular to the coronal which is the boundary of isomorphic parts of the projectile point.

Midline=df. The intersection of coronal and longitudinal planes.

Transverse=df. Any plane perpendicular to the midline at only one point.

Side=df. Either of two portions of the projectile point bounded by the longitudinal plane.

Face=df. Either of the two portions of the projectile point bounded by the coronal plane.

Proximal=df. At a greater distance from the tip along the midline.

Distal=df. At a lesser distance from the tip along the midline.

:: Note that Proximal and Distal are relative to the tip along the midline, not around the margin.

Medial=df. At a lesser distance from the midline.

Lateral=df. At a greater distance from the midline.

Midbase=df. The proximal intersection of midline and margin.

Base=df. Any edge beginning at the midbase and ending at the most lateral paired points on the margin not beyond the first vertex in either direction.

Basal=df. The most proximal transverse plane tangent to the base.

Junctures=df. The paired most distal points on the edge beginning at the most medial paired vertices not on the basal plane and ending at the next vertex on the margin moving initially toward the proximal end of the midline.

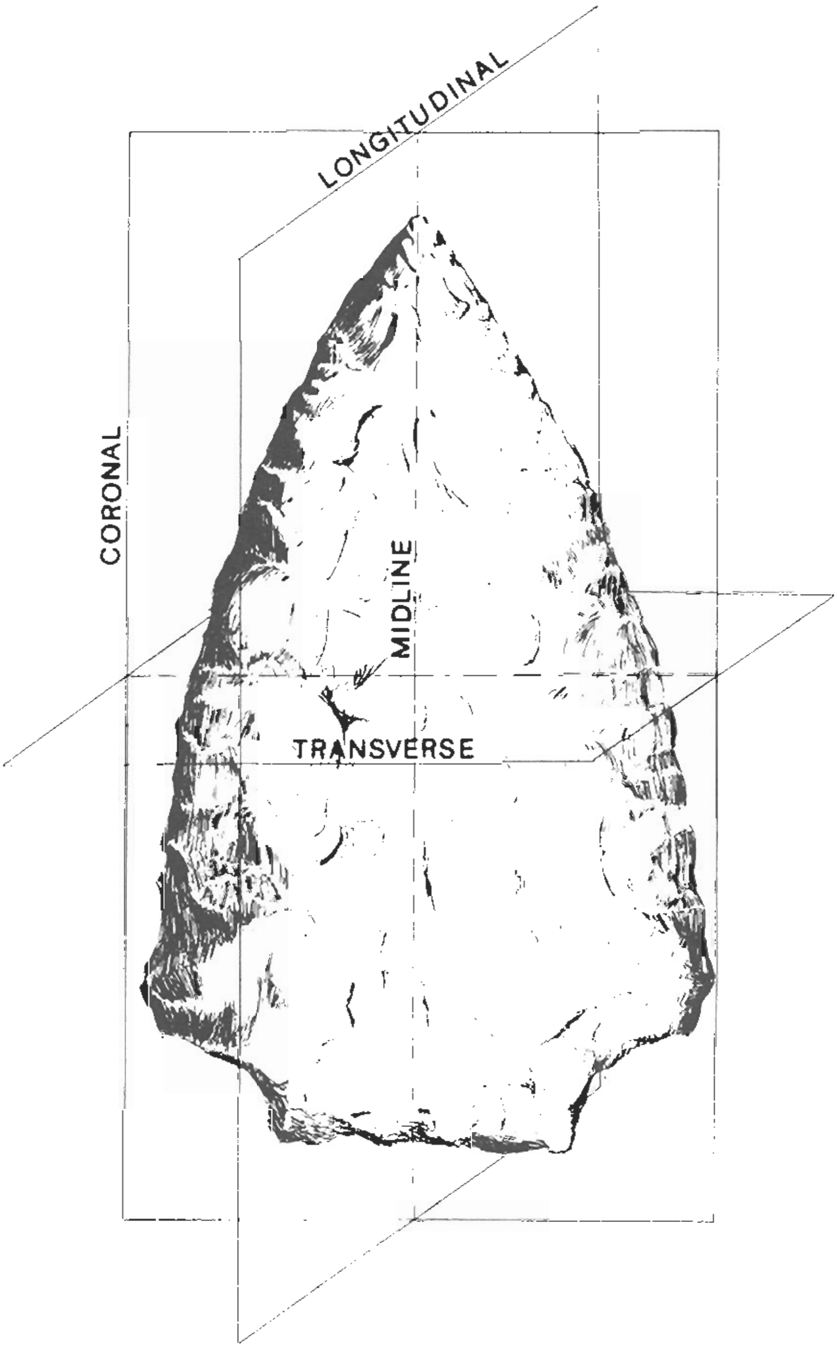

Figure 1. Reference Planes

Haft Element=df. Any portion of the projectile point proximal to a straight line beginning at one juncture and ending at the other.

Blade Element=df. All non-haft portions of the projectile point.

Blade Edge=df. The margin beginning at the tip and ending at the first encountered of: the most proximal and lateral vertex on the blade element other than the juncture; the juncture; or the base.

Shoulder=df. Any non-base margin extending medially from the proximal end of the blade edge and not ending proximally on the basal point.

Lateral Haft Element Edge=df. Any non-base, non-shoulder, margin on the haft element.

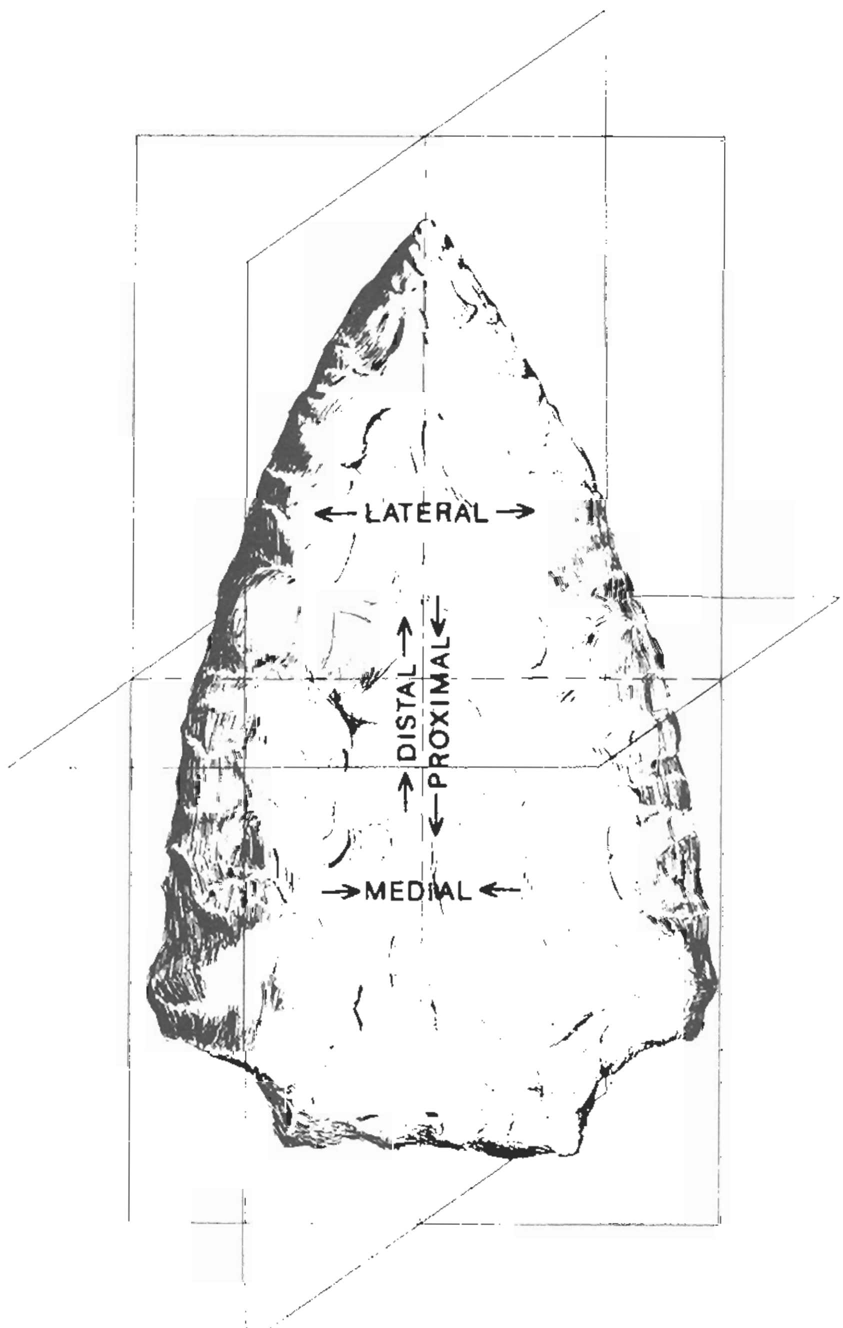

Figure 2. Directional References

The nominal definitions thus far have dealt with various reference points on, and the edges and elements of, a projectile point. The definitions to follow are for terms dealing with shapes and orientation of various edges. These two concepts of shape and orientation are taken here to be separate, though interrelated. Shape is used in reference to the configuration of an edge; orientation is the way one edge is positioned with respect to some other edge or edges. Currently, such things as type of stem and type of shoulder are at times dependent on the shape of the edges involved and at times on the orientation of the edges. Herein these concepts are dealt with separately.

Excurvate=df. Any edge which is boundary of a greater area on the coronal plane than is a straight line between the same two points.

Incurvate=df. Any edge which is the boundary of a lesser area on the coronal plane than is a straight line between the same two points.

Recurvate=df. Any edge which is a compound of at least one excurvate edge and one incurvate edge.

Angular=df. Any compound edge including at least one vertex.

Internal=df. Any angular edge which is the boundary of a lesser area on the coronal plane than is a straight line between the same two points.

External=df. Any angular edge which is the boundary of a greater area on the coronal plane than is a straight line between the same two points.

Horizontal=df. Any shoulder having both ends on the same transverse plane.

Tapered=df. Any shoulder having the lateral end distal to the medial end.

Barbed=df. Any shoulder having the lateral end proximal to the medial end.

Expanding=df. Any lateral haft element edges, the distance between paired points becoming greater proximally.

Contracting=df. Any lateral haft element edges, the distance between paired points becoming lesser proximally.

Concave=df. Any lateral haft element edges, the distance between paired points becoming lesser, then greater, proximally.

Convex=df. Any lateral haft element edges, the distance between paired points becoming greater, then lesser, proximally.

The next set of definitions is for the classification of haft element modifications. That portion of the projectile point dealt with is quite variable as is the nature of the modification. The haft element modification may or may not include the shoulder or all or part of the base, depending on the type of modification involved and the exact form of a given specimen.

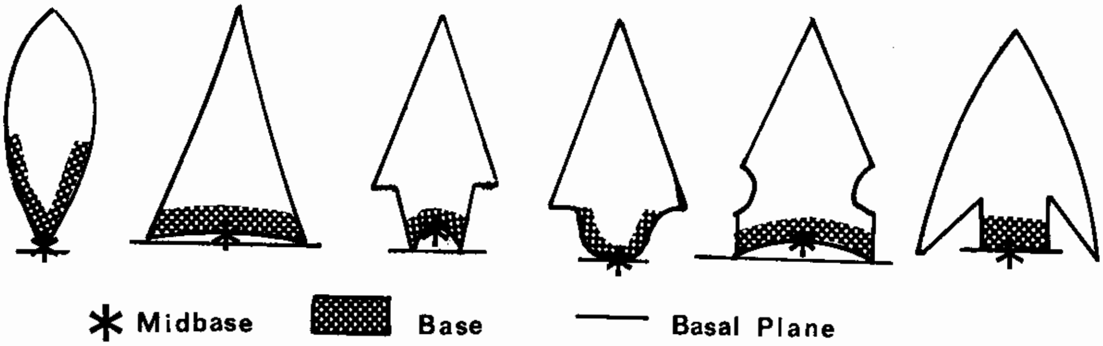

Figure 3. Midbase, Base, and Basal Plane.

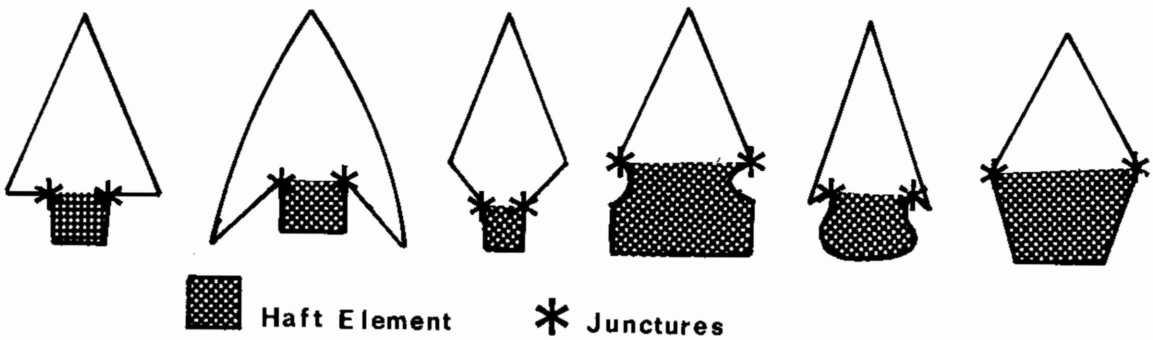

Figure 4. Junctures, Haft Element, and Blade Element.

Haft Modification=df. Any edge between points on the margin lying on a plane perpendicular to the coronal and tangent to the projectile point at the lateral end of one shoulder and the haft element, not including the midbase; or tangent to the projectile point at the lateral end of both shoulders.

Laterally Modified Haft=df. Any projectile point having the ends of the haft modification on two planes either not tangent to the base or tangent to the base but not intersecting proximal to the junctures.

Basally Modified Haft=df. Any projectile point having the ends of the haft modification on a plane tangent to the projectile point at the lateral end of the shoulders.

Diagonally Modified Haft=df. Any shouldered projectile point not laterally or basally modified.

Unmodified Haft=df. Any projectile point having a haft element and no shoulder.

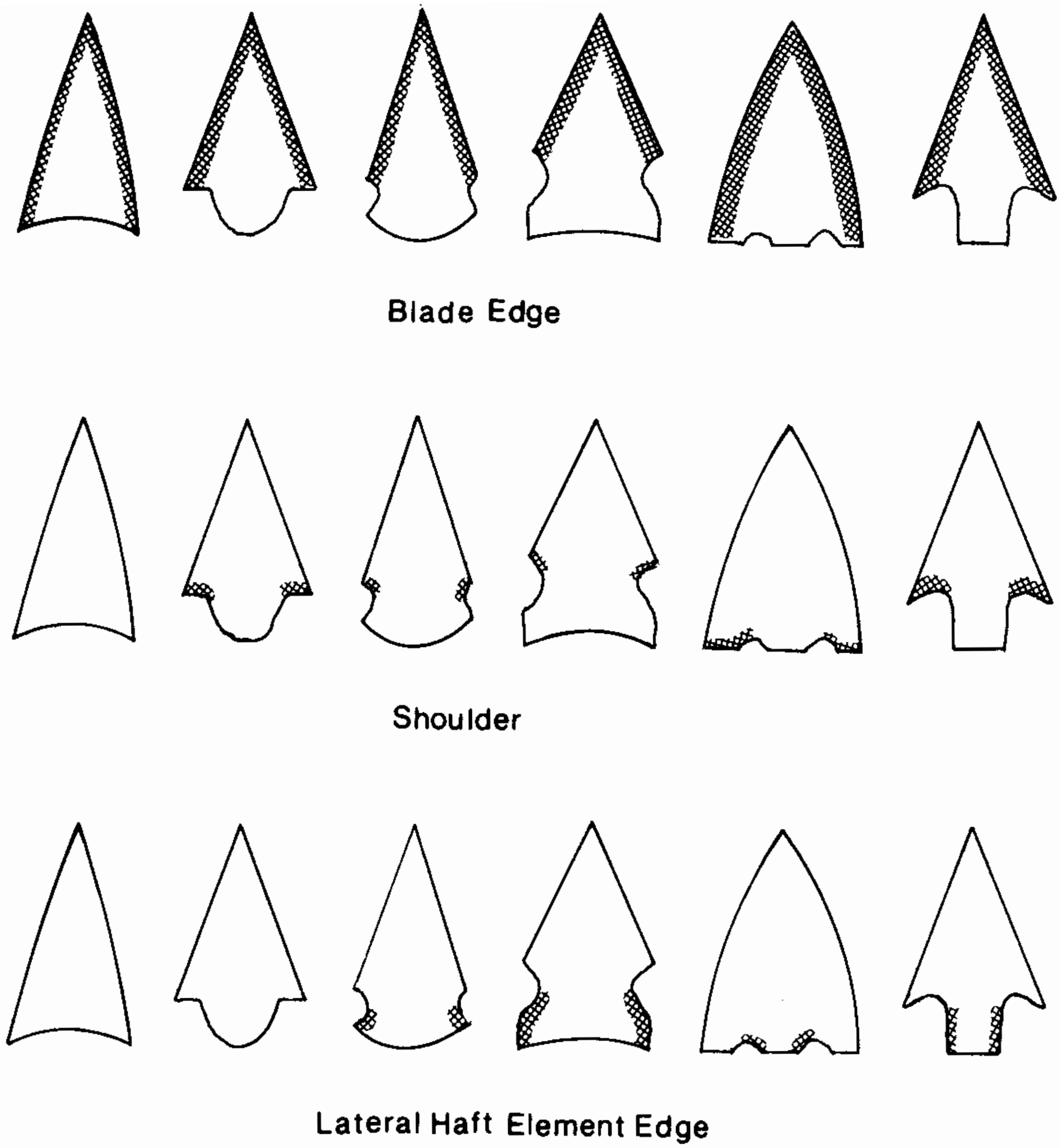

Figure 5. Other Edges.

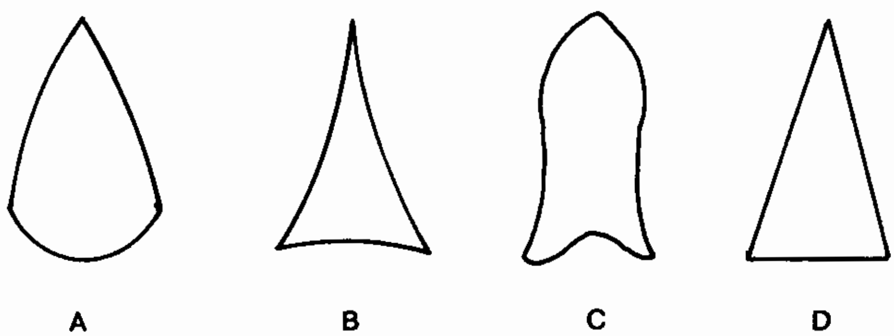

Figure 6. Edges Shapes: A, Three Excurvate Edges; B, Three Incurvate Edges; C, Three Recurvate Edges; D, Three Straight Edges.

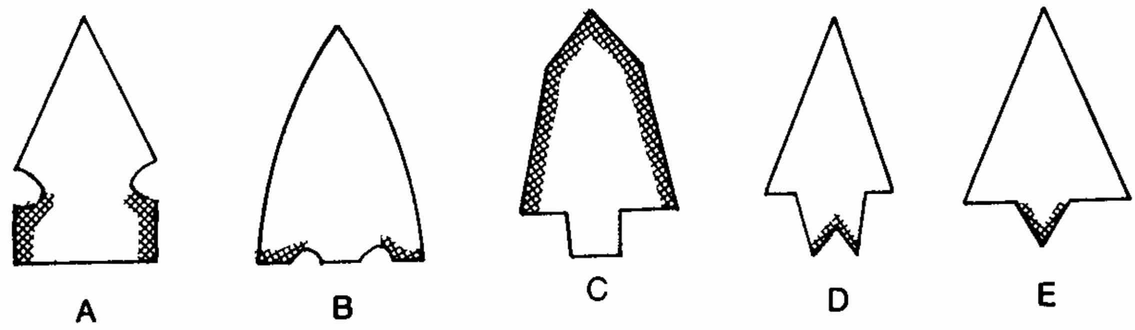

Figure 7. Angular Edges: A, Angular Lateral Haft Element Edge; B, Angular Shoulder; C, Angular Blade Edge; D, Angular Base Internal; E, Angular Base External.

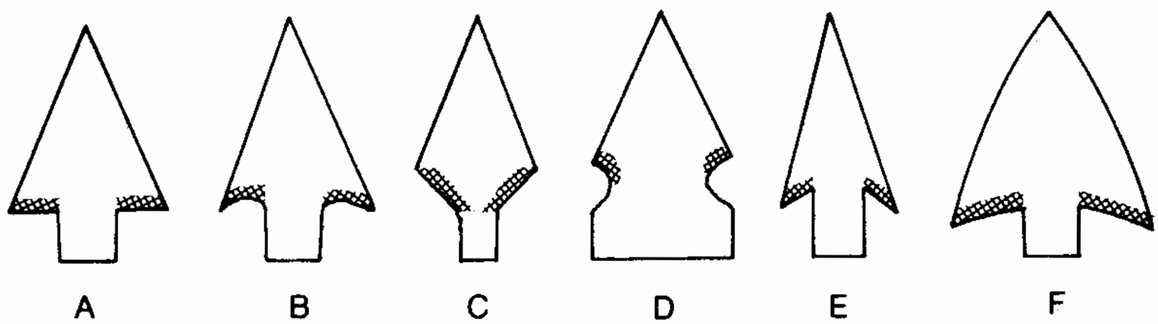

Figure 8. Shoulder Orientation: A-B, Horizontal; C-D, Tapered, E-F, Barbed.

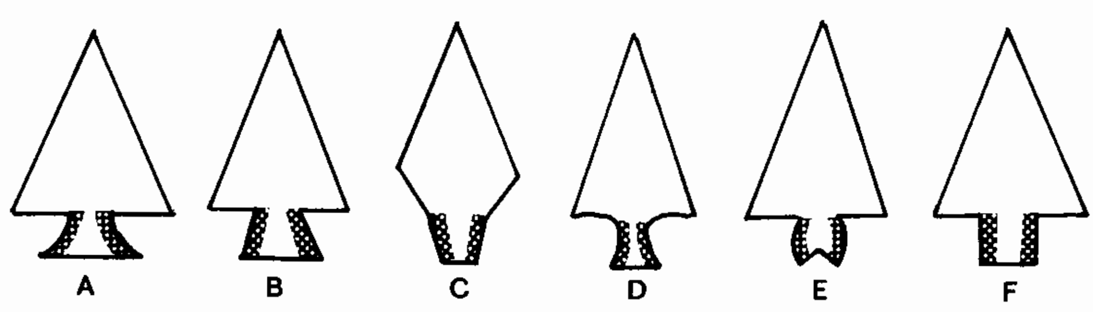

Figure 9. Lateral Haft Element Edge Orientation: A-B, Expanding; C, Contracting; D, Concave; E. Convex; F, Parallel.

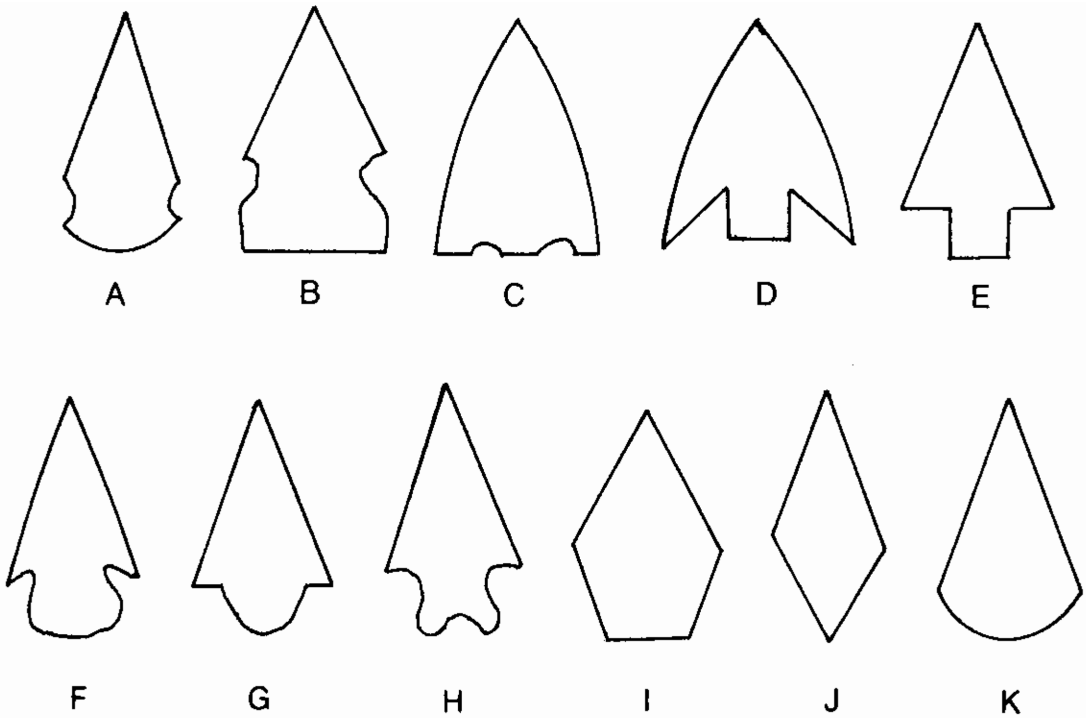

Figure 10. Haft Modifications: A-B, Laterally Modified; C-D, Basally Modified; E-H, Diagonally Modified; I-K, Unmodified.

Rules of Projectile Point Shape

The two rules of projectile point shape below are extensions of geometric rules. The purpose of these is to permit an interpretation of the previously defined terms in order to model the shape of projectile points.

Rule 1. The number of vertices and the number of edge segments on a projectile point must be equal.

This is an interpretation of a theorem of geometry which states that a polygon of N sides will have N angles.

Rule 2. Projectile point shapes are determined by the number and position of vertices and the shape of the edge segments between vertices.

Rule 2 is a logical extension of Rule 1. However, it may be interpreted to mean that the shape of a projectile point is made up of constituent parts and that by defining the number, shape and interrelation of the parts, we may define the shape of the whole.

The final nominal definition dealing with shape may now be introduced.

Vertex Class=df. The number of vertices on the margin excluding any vertex wholly on a single blade edge.

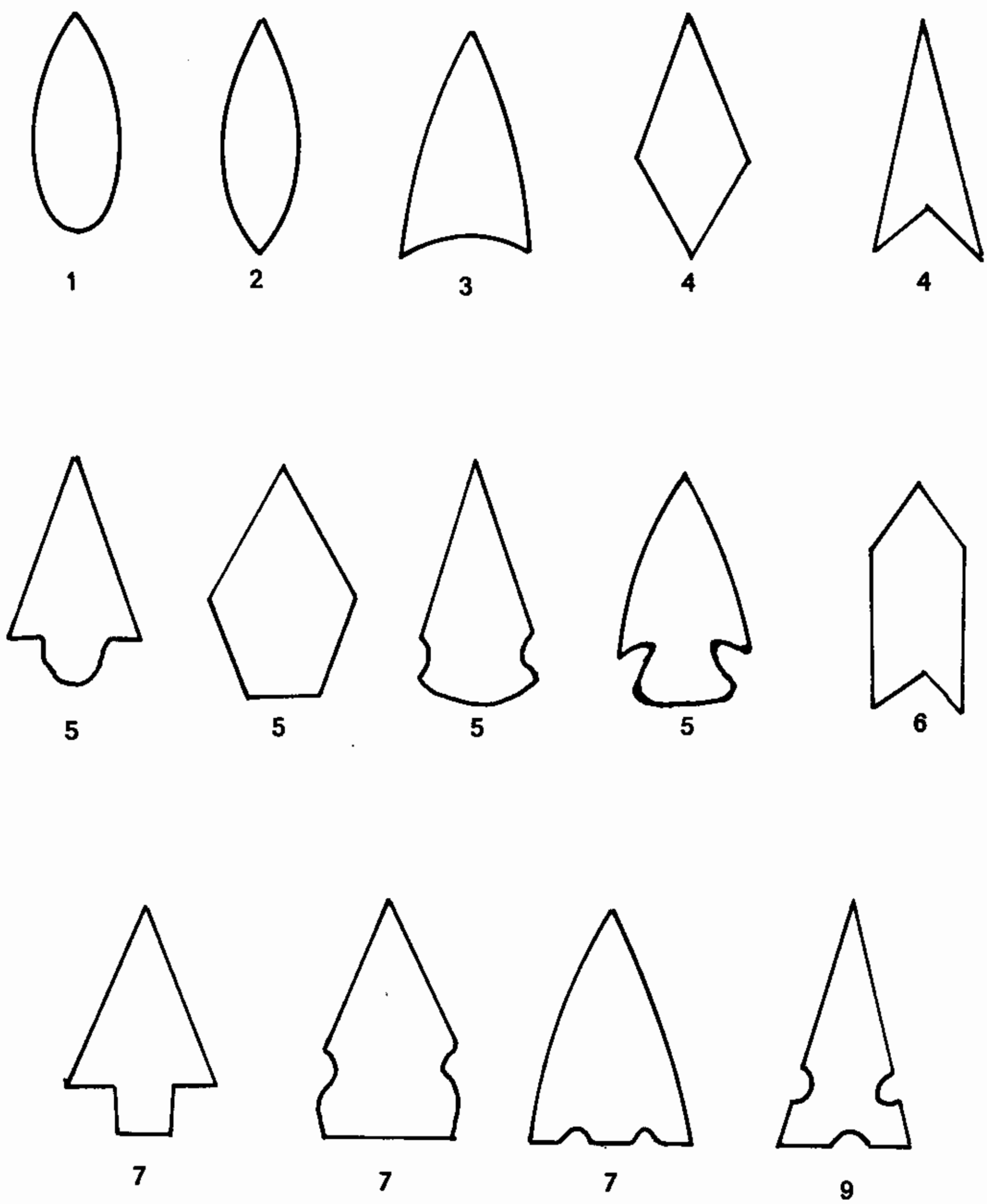

Figure 11. Examples of Vertex Classes.

This is an interpreted vertex count which gives a rough indication of the complexity of shape. An earlier version of this account used a different interpreted vertex count (Futato 1977) that was designed as a more consistent indicator of shape complexity. However, vertex class as defined above is believed to be more useful. Excepting blade modifications, it produces a count of the number of edge segments on the artifact. There are logical and experiential bases for writing a synonomy between one edge segment and one manufacturing operation. Thus the concept of vertex class provides a link between this model and models of manufacturing processes.

Classification of Projectile Point Shapes

The definitions and rules previously presented may be used to define the number, type, shape, and orientation of parts of a projectile point. These definitions may be used in two distinct ways, classificatory or analytical. The first is application to a specific specimen to define the shape of that specimen. This is the assignment of that specimen to a shape class, and is the method used in classifying a group of individual projectile points.

The second use of the definitions is in the creation of a desired class, regardless of whether or not there are any specimens. In the examination of any shape-related projectile point research problem, such as functional or temporal variation, a desired type may be created from the definitions and applied to the study material. For example, if one wanted to make a study of blade shape variability of a group of points, a type or set of types could be created which would define the shape of the artifacts in all variables but one, blade shape. Thus the variance of blade shape would in each case be examined against a background of constants. This is a primary benefit of this analytical classification system. It permits any desired projectile point attribute(s) to be defined as a constant or set of constants against which the variability of other attributes may be measured. How can one examine the variability of blade shape within a point type, if several other attributes are also variable? Then there is no standard of what is a variable, and with respect to what else. The establishment of a constant research universe is fundamental to any study of variability or co-variability of attributes.

The classification of projectile point shape uses nine classes of data with several possible alternate choices under each. The nine classes are the vertex class, haft element, and shape and orientation of various edge segments. All of the terms used are nominally defined terms or primitives. Thus the definition of a particular shape is a list of the attributes of shape which make up the point, an application of Rule 2. If the definition of each type seems excessively long, it should be noted that each can be reduced to an alpha-numeric code. For example: Vertex class - five; Haft element - laterally modified; Blade edge - straight; Base - straight, non-angular; Shoulder - incurvate, tapered; Lateral haft element edge - incurvate, expanding, may be written 5-L-S-S-N-I-T-I-Ep. Figure 12 is a key to the system of classification and also shows a set of abbreviations for the terms. Some examples of classification are shown in Figure 13.

This classification system produces a precise statement of the form of a type and facilitates the comparison of any two forms. The knowledge that some specimen is a Provisional Type 9, while another is a Kirk Corner Notched may be moderately intellectually satisfying and of some historical significance, but it reveals little about the nature of the morphological relationships of the two specimens. Typology by the system presented here, however, would specify the form of each specimen, facilitating any comparison.

VERTEX CLASS
1
2
3
4
5
etc.

HAFT ELEMENT	
None	-X
Unmodified	-U
Laterally Modified	-L
Basally Modified	-Bs
Diagonally Modified	-D

SHAPE BLADE EDGE	
Excurvate	-Ex
Straight	-S
Incurvate	-I
Recurvate	-R
Angular	-A

SHAPE BASE	
Excurvate	-Ex
Straight	-S
Incurvate	-I
Recurvate	-R

ORIENTATION BASE	
Non-Angular	-N
External	-Et
Internal	-It

SHAPE SHOULDER	
None	-X
Excurvate	-Ex
Straight	-S
Incurvate	-I
Recurvate	-R
Angular	-A

ORIENTATION SHOULDER	
None	-X
Tapered	-T
Horizontal	-H
Barbed	-B

SHAPE LATERAL HAFT ELEMENT EDGE	
None	-X
Excurvate	-Ex
Straight	-S
Incurvate	-I
Recurvate	-R
Angular	-A

ORIENTATION LATERAL HAFT ELEMENT EDGE	
None	-X
Parallel	-P
Expanding	-Ep
Contracting	-Ct
Concave	-Cc
Convex	-Cv

Figure 12. Key to Classification.

Metric Attributes

The foregoing definition of projectile point shapes has dealt with the number, form, and orientation of the component parts of a projectile point. It has not considered size and proportion of parts. In the illustration shown as Figure 14 the shape of each example is the same: Vertex class: Seven; Haft element - Diagonally modified; Blade edge - Straight; Base - Straight, Non-angular; Shoulder - Straight, Horizontal; Lateral haft element edge - Straight, Parallel. The difference in shape is the relative size of the parts, and differentiation among these shapes will call for a metric interpretation of some of the terms. This may be done with certain nominally defined terms for measurements which will permit the differentiation of shapes by size and proportion. The given examples are, of course, but a few of an infinite set of possibilities.

Maximum Length=df. Maximum perpendicular distance between transverse planes tangent to the projectile point.

Maximum Width=df. Maximum perpendicular distance between planes parallel to the longitudinal and tangent to paired points on the projectile point.

Maximum Thickness=df. Maximum perpendicular distance between planes parallel to the coronal and tangent to paired points on the projectile point.

Basal Width=df. Distance on the coronal plane between the ends of the base.

Shoulder Width=df. Distance on the coronal plane between lateral ends of the shoulders.

Juncture Width=df. Distance on the coronal plane between the junctures.

Haft Element Length=df. Perpendicular distance between the transverse plane, which includes the junctures, and the basal plane.

Haft Modification Width=df. Distance on the plane defining the haft modification between the two points of tangency.

These terms are for linear measurements, but the capacity for defining specific proportional relationships between measurements is implicit. Ratios may be introduced by nominal definition and exact proportion stated by this. Alternately, proportion classes may be formed by the real number specification of an allowable range. In fact, virtually any defined term in the system can be metricised, largely as a result of the orderly nature of systems of nominal definitions. As another example, the precise angle of the haft modification may be measured between the plane which defines the modification and the basal plane. This may then be used as a metric variable, or specific classes may be defined by specifying a range for each.

The index of incurvature or excurvature of an edge may be defined as the straight line distance between the ends of the edge divided into the maximum perpendicular distance between that straight line and the edge. This ratio may then be subdivided as desired by a statement that each class contains ratios between two specified numbers. To permit a continuum of values from very incurvate to a very excurvate, incurvate values could be negative, being less in enclosed area than a straight line. Excurvate edges would then have

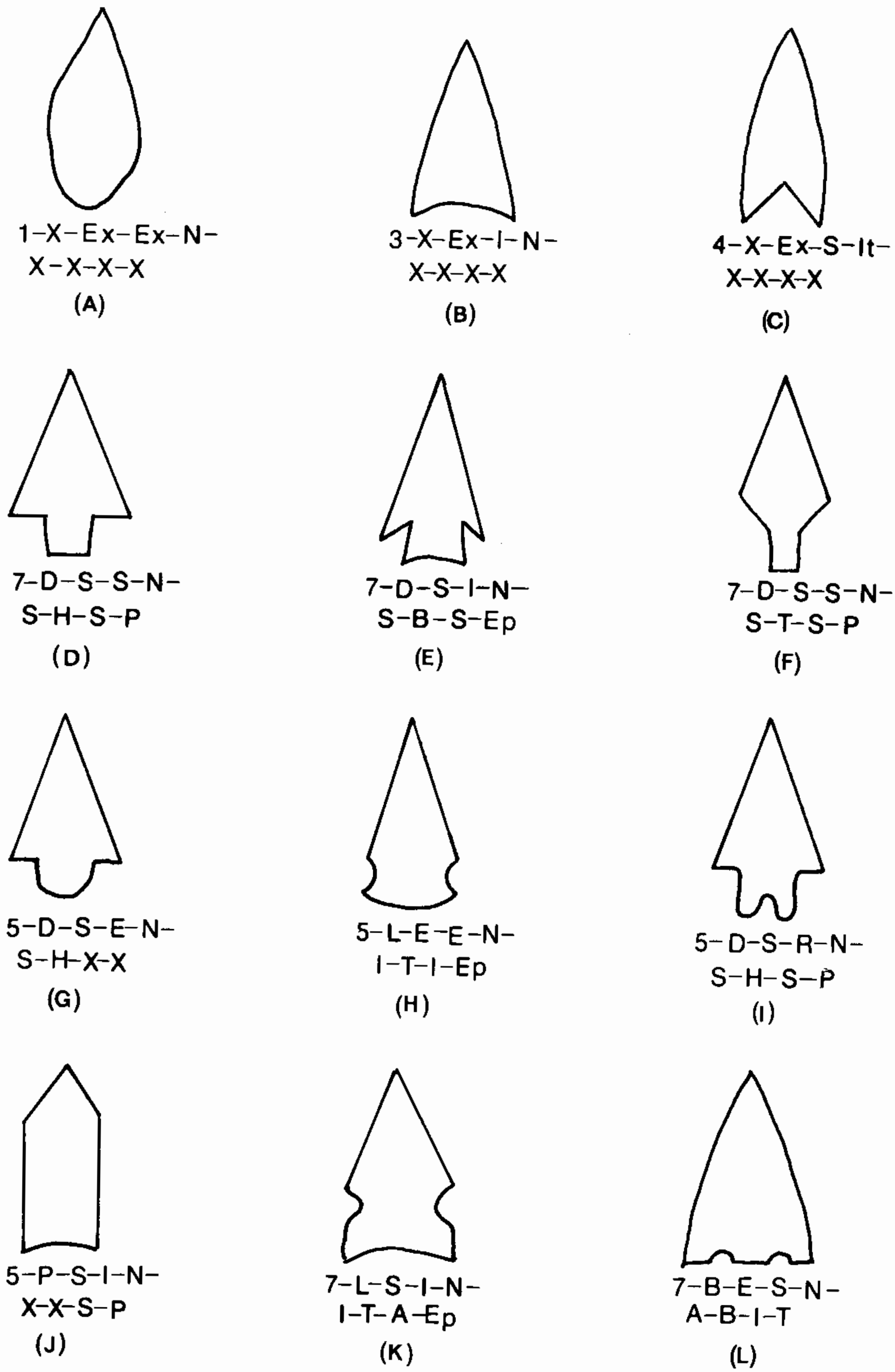

Figure 13. Examples of Shape Classification.

positive values. This would permit the quantification of terms such as "nearly straight." The index value for a straight edge would be 0, and a plus or minus factor could be specified as being considered straight.

Summary

The title of this paper is "Projectile Point Morphology: Steps Toward a Formal Account" because this is by no means intended to be a final word on the subject. In the first place this account has dealt only with certain gross aspects of morphology such as shape and size, and incompletely with these. Certain aspects of shape, such as cross-sections, are not considered, and the metric attributes defined out of infinite choices are only those pertinent to the analysis contained within a typical report. Other important aspects of morphology such as flaking, fluting, or secondary edge modification by serration, beveling or grinding are not considered.

Many unconsidered morphological aspects are ready extensions of the extant system. For instance, serration could be readily defined as multiple vertices on a blade edge. Terms for describing the shape of the serrations are available, and quantification of size, number, position and density of serrations is no trouble. Beveling could be defined in relation to transverse sections. On the other hand, definition of flaking styles probably requires an entire new branch of the system with a largely new set of primitives, and would be a major undertaking.

The problem of asymmetrical specimens also was not considered. As far as the derivation of nominally defined terms is concerned, asymmetry is of no great consequence. Most of the definitions are expressed in unilateral terms, and those which are not could be with wording changes. Asymmetry is more of a problem in classification, a unilateral process as performed herein. Some specification should be made as to side selection if this unilateral mode of classification is followed. If called for by need of the research, the artifact could be divided by the longitudinal plane and each half treated separately. In a detailed morphological analysis this would probably be the best method.

There are certain positive aspects of the study thus far. A basic core of primitives and nominally defined terms is forwarded which, if nothing else, standardizes these terms. It should be re-emphasized at this point that the definitions and the classification are distinct. The set of nominal definitions is a system of specifically defined attributes of projectile point morphology. The classification system in this report represents a single potential use of these definitions. The methodology by which other needed terms of shape or even entire new branches of the system may be generated is introduced, if fleetingly. New primitives may be added if necessary, and the rules for combining terms to form definitions are stated. In fact a completely different set of units and rules could be formulated which would lead to a totally different set of definitions. Thus, this account does present a set of basic building blocks which can be combined, or if needed, increased, in ways tailored to the needs of a particular research problem.

As stated in the first paragraph, a formal account consists of units and rules with a model building capacity. Indeed as a model consists of a representation of parts and their articulation, any formal account is a conceptual model of the studied phenomenon. In those admittedly rather general aspects of projectile point morphology to which this paper is

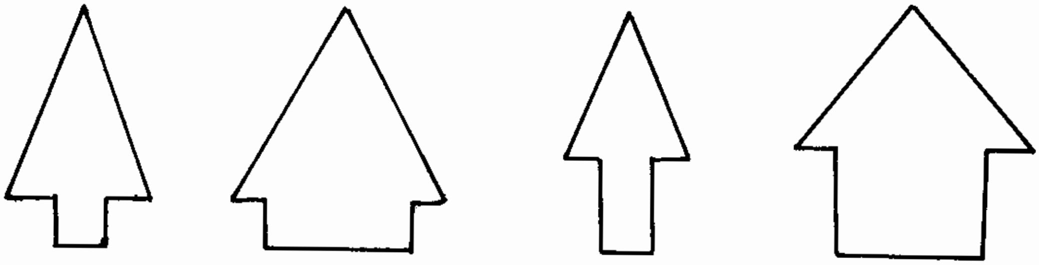

Figure 14. Examples of Shape 7-D-S-S-N-S-H-S-P.

addressed, there is a model building capacity which may claim some modest initial success. Hopefully, continued expansion and refinement will increase the utility of the system as an analytical tool.

Acknowledgments

The author would like to thank Dr. Richard A. Krause, Department of Anthropology, University of Alabama, who provided much of the theoretical and intellectual framework of this paper. The first application of these ideas was in the analysis of materials from the Bellefonte site, 1JA300, under work sponsored by the Tennessee Valley Authority. An earlier version of this paper was published by TVA in the report of that project.

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THE CHRONOLOGICAL AND CULTURAL AFFINITIES AT PHIPPS BEND ON THE HOLSTON RIVER*

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The Phipps Bend Archaeological Project was carried out during the Summer and Fall of 1976 by the Office of Archaeological Research, University of Alabama under Tennessee Valley Authority, contract number TV44953A. The purpose of the project was to mitigate the impact of the construction of a power reactor on archaeological resources. Excavations were carried out on seven sites within the reservation. The ceramic chronology from one of these sites is reported below.

Phipps Bend is located in the Middle Holston Valley of Upper East Tennessee (Fig. 1). The principal comparative material used below comes from excavations carried out in Tennessee to the south at Camp Creek and 40Ck11 (Lewis and Kneberg 1957, and Smith n.d.). Surveys and limited testing have been carried out in Southwestern Virginia in the Holston Basin (Holland 1970). Extensive excavations have been conducted in Western North Carolina mainly in the French Broad and Little Tennessee Valleys (Keel 1976).

Chronologically, the most important site at Phipps Bend is 40Hw45. This site is located at the confluence of Stony Point Creek and the Holston River, and is on the largest creek in the bend. It is located at one of the most ecologically diverse locations in the bend.

The site covers a bit more than a half hectare. It was looted some 15 years previously, which hampered the excavations as much time was spent sorting recent pits from aboriginal ones. Testing showed that there was a midden deposit buried under secondary deposits on the foreslope of the terrace and a 10 cm. thick undisturbed midden on the top of the site. Two primary excavation units were opened on this site. A stratigraphic trench was opened on the slope of the terrace and a large area on the top of the terrace was stripped of the plowzone to expose subsurface features. The following discussion is based on the excavations of the stratigraphic trench on the slope of the terrace.

Both the initial test pits and the controlled surface collection indicated that the midden on the terrace slope was buried under secondary deposits eroding from the top of the site. These were stripped off mechanically, revealing an undisturbed midden deposit. This was excavated in 10-centimeter levels. The first cut at the west end of the trench indicated that the pot hunters had been at work, so work was concentrated closer to the river. The excavations revealed a meter-thick midden which contained pottery, chert, bone, shells, ground stone, fire-cracked rock, and carbon.

*More recent information is contained in The Phipps Bend Archaeological Project, Tennessee Valley Authority, Publications in Anthropology 26, and University of Alabama, Office of Archaeological Research, Research Series 4, 1981.

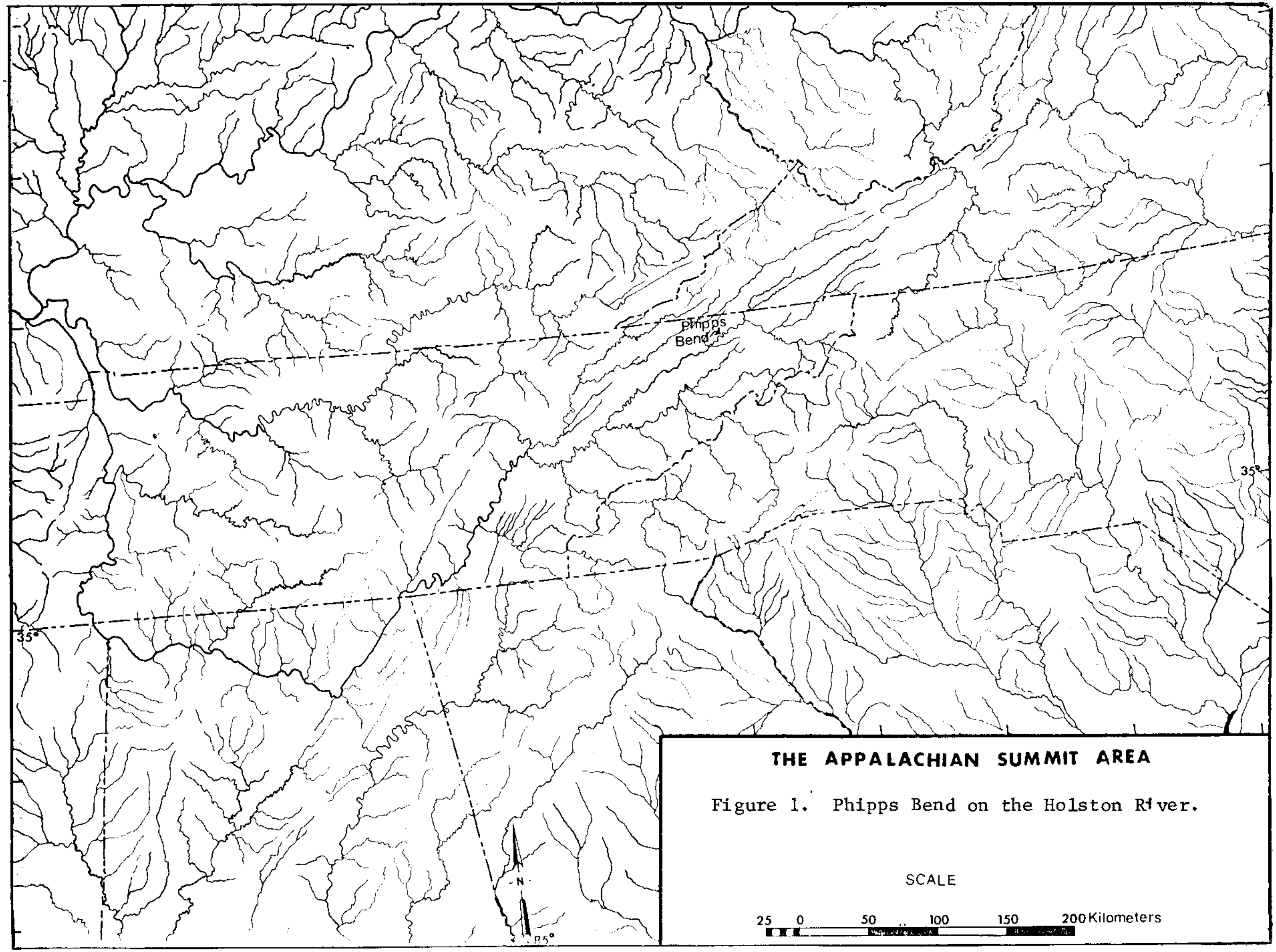

Figure 1. Phipps Bend on the Holston River.

The earliest pottery from the stratigraphic trench was a crushed quartzite-tempered ware which was cordmarked over the whole surface of the vessel, except for the base, which was smooth. Of the rimsherds, 70 percent exhibit cordmarks parallel to the rim. On the remaining rimsherds, the cordmark angle runs from nearly parallel to the rim to perpendicular to the rim. Thicknesses range between 4.1 - 11.6 millimeters with a mean of 6.8 millimeters. The paste contains 10 - 20 percent crushed quartzite and is smooth to the touch. All observed coil fractures are flattened indicating a paddle and anvil technique of welding the coils together.

This ceramic ware is quite different in paste composition, thickness, and surface treatment from the Watts Bar Series (Lewis and Kneberg 1957). The paste is finely made with relatively little tempering material. The sherds are thinner than the Watts Bar Series and cordmarking is exclusive in the earliest levels. The thickness range, for Watts Bar pottery in the French Broad basin, is between 6 - 15 millimeters (Smith n.d.). The Phipps Bend mean thickness is, thus, at the bottom of the range for the Watts Bar Series. Technologically speaking, the Phipps Bend ware is executed with considerable skill suggesting a developed tradition when it arrived in this area of East Tennessee. Technically, the ware is similar to the Swannanoa series of Western North Carolina (Keel 1976 and personal communication), though there are differences. The Phipps Bend ceramics tend to be thinner and have less temper than does the Swannanoa pottery. The axis of the cordmark tends to be parallel to the lip at the Phipps Bend and perpendicular in the Swannanoa series (Keel 1976).

At level 8 of the stratigraphic trench, sand begins to be incorporated in the paste (Fig. 2). From this level, and in several of the succeeding levels, cordmarked pottery continues to predominate with either crushed quartzite tempering or sand/quartzite tempering. Less than one percent of the sherds which contain crushed quartzite are fabric marked; however, over 90 percent of the exclusively sand-tempered sherds, with no crushed quartzite, are fabric marked. The coil breaks on the sand-tempered, fabric-marked ware are rounded, indicating a change in the method of welding the coils, presumably from paddling to smoothing inside of a basket. The quartzite/sand cordmarked ware has flattened coil fractures like the pure quartzite-tempered pottery.

There thus appears to be a change in the early ceramics produced in this area. Sand, or clays incorporating sand, becomes more important in the clay body and was used exclusively in the fabric marked vessels. The differences in the coil fractures indicate that a new method of producing pottery was developed or introduced. This method remains in the minority until late in the sequence.

In level 7, limestone-tempered ceramics become important and increase in importance through the remainder of the sequence. The earliest limestone tempered ceramics also have sand in the paste. This persists for a very brief period and very shortly none of the limestone-tempered pottery has sand included in the paste. Of the limestone-tempered ceramics, 98 percent are fabric marked with a small number of plain bases.

40 Hw 45, Stratigraphic Trench (66N 6 - 10W): percentage weights of ceramics by levels

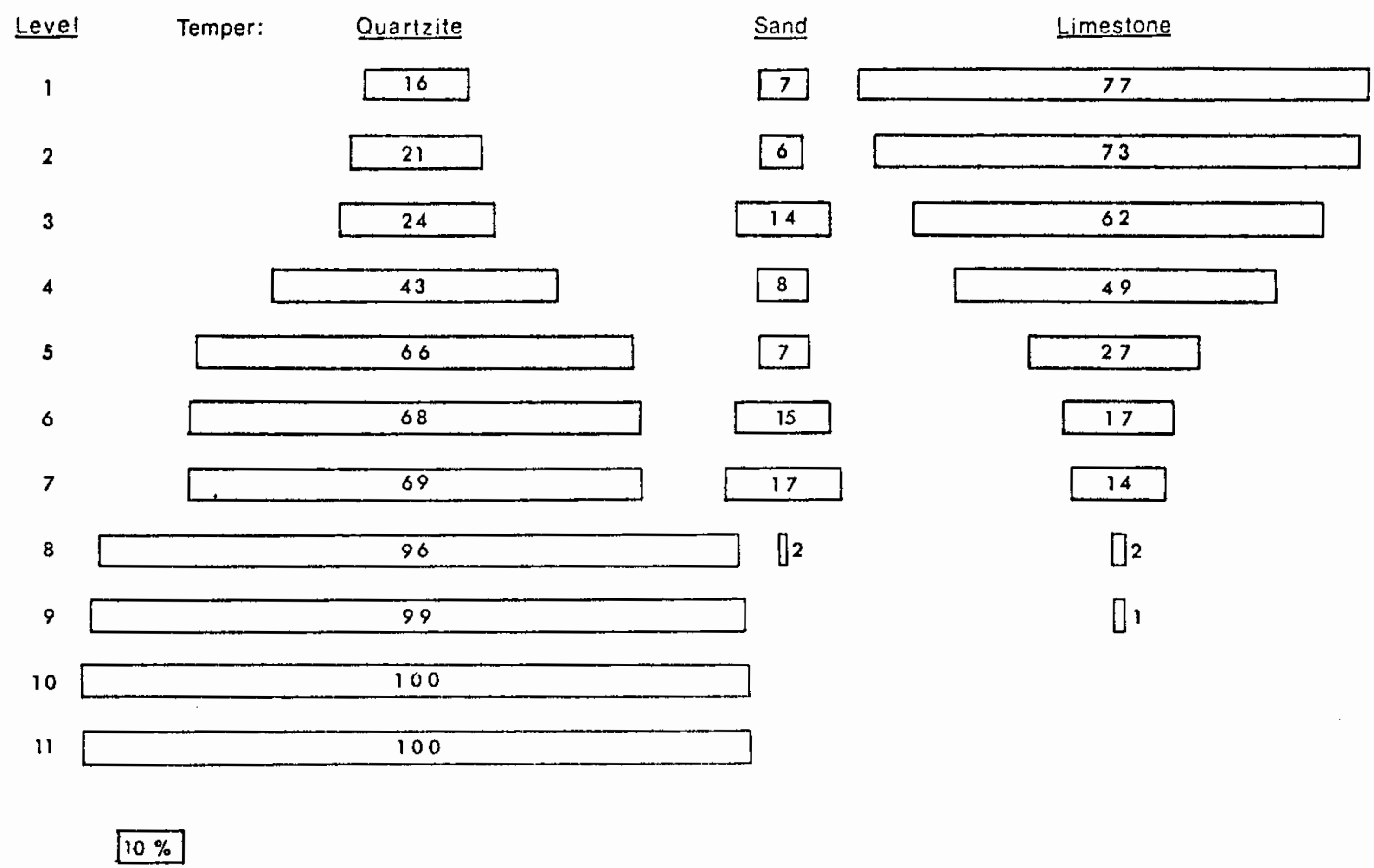

Figure 2. Changes in Ceramic Temper Through Time at Phipps Bend.

The lip forms are of several types; however, all of the different lip treatments are represented in all of the different temper classes. Lips are rounded, flattened, notched, cordmarked and everted. The persistence in these treatments among the different tempering series is an indication of cultural continuity through the sequence rather than population replacement.

Another line of evidence bearing on the problem of continuity is the projectile point morphology. Stemmed and side-notched forms are present throughout most of the stratigraphic record. Toward the upper part of the record, the Ebenezer cluster is more heavily represented. The pentagonal McFarland Cluster occurs only in level 4 and later levels. Again there is indication of continuity, though in a different technology. The biggest change occurs in level 4 when the McFarland Clusters points become common. This change corresponds with a major increase in the total amount of limestone-tempered pottery produced.

The earliest radiocarbon date obtained from the Phipps Bend sites was associated with a pit containing only quartzite tempered cordmarked pottery. Ceramically, this corresponds to level 9-11 of the stratigraphic trench and places the earliest Woodland occupation of this area between 740 B.C. +/- 200 (DIC-807) and 900 B.C. +/- 105 (UGa-2095). The high sigma was due to the small sample size, though it is ceramically consistent with the other dates.

Another date was obtained from the lower portion of level 7 in the stratigraphic trench. In the portion of the trench from which the sample was taken, it immediately preceded the beginning of limestone-tempered pottery. The date was 600 B.C. +/- 90 (DIC-805).

The third consistent date obtained was from Feature 20 on 40 Hw44, a site located on the south side of Stony Point Creek. This sample was associated with limestone-tempered fabric-marked ceramics. The date obtained was 560 B.C. +/- 90.

This series of dates supports the hypothesis by Lewis and Kneberg (1957) that the earliest pottery in the Tennessee area came from the northeast. The lack of preceding Archaic occupation in the immediate area and the highly developed, technically excellent quartzite-tempered pottery both support the contention that the earliest Woodland in the area involved a migration of people into the area from the northeast. It is significant that this pottery is similar to Swannanoa series pottery and the radiocarbon determinations are in line with the time range suggested by Keel (1976) for the Swannanoa phase 7 - 600 to 300 B.C. Superficially they are also similar to the Medowood Phase ceramics of New York State (Ritchie 1969:192).

On the basis of the radiocarbon dates presented above and published dates from other parts of East Tennessee, the following interpretation is made. The earliest ceramic-using people entered upper East Tennessee from the northeast (down the Holston River) in the 8th or 9th century B.C. At this time there were late Archaic populations elsewhere further south in the Tennessee Valley (Higgs and Doughty Late Archaic 700 - 900 B.C., McCollough and Faulkner 1973, Westmoreland-Barber Late Archaic 755 B.C. +/- 155 Gx-572, Faulkner and Graham 1966). From the ceramic-using people the Late Archaic people learned how to make pottery which is manifest in the Watts Bar series (dated at 480 B.C. +/- 180 at Bacon Bend; Salo 1969:179).

Fabric-marking appears to have been transmitted north to the Phipps Bend area about 600 B.C. Pottery was made with sand-tempered ware until the introduction/invention of limestone-tempered pottery sometime in the 5th or 6th century B.C. The early radiocarbon date at Phipps Bend for this ware indicated its invention in or prior diffusion to upper East Tennessee and its subsequent diffusion down the valley. The early dates on this ware include Westmoreland-Barber site, 340 B.C. +/- 150 (Faulkner and Graham 1966); Higgs and Doughty site (McCollough and Faulkner 1973), 405 B.C. +/- 85; Bellefonte site 460 B.C. +/- 85 (Futato 1977).

In summary, the early date of levels containing quartzite pottery technologically similar to ceramic series in western North Carolina (and presumably western Virginia) indicates a movement of ceramic-using people into this area in the 9th century B.C.

From these people the idea of pottery production apparently diffused down the upper valley and manifested itself in the relatively crude pottery of the Watts Bar series. In the process of adapting to the environment the early ceramicists began using limestone to temper their clay body in the 6th century B.C. Limestone is very common in the Tennessee Valley and quartzite relatively rare. This is in contrast to the Appalachian Highland where the reverse is true. From the upper East Tennessee area limestone-tempered pottery diffused down the Tennessee.

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HISTORICAL RECORDS AND FAUNAL REMAINS FROM SPANISH ST. AUGUSTINE, FLORIDA, 1740-1763

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The study presented here began as part of work done with an excavation at the Antonio de Mesa site in St. Augustine, Florida in 1977 conducted by Kathleen Deagan of Florida State University. The research developed out of broader efforts to assess the relative dietary importance of domestic and wild animal foods at St. Augustine.

In studying animal bones recovered from archaeological sites, food supplies can be analyzed in terms of contribution to the total diet and the emphasis placed on particular types of resources. Significant resources utilized at a site might be available locally or they might lie in distant areas, perhaps being obtainable only through trade or privateering.

The extent to which such foreign resources were used is important when assessing the overall subsistence base, but may be difficult to determine when dealing with prehistoric sites unless a species is clearly exotic. Analysis of food remains from historical sites is assisted by the availability of information from written records. Official documents and other papers discuss the economic status of the study group, the foods produced locally, and the extent to which external resources contributed to the diet. Such information, in conjunction with studies of archaeological faunal remains, can reveal much about the over-all food supply and the pattern of animal acquisition.

In order to assess the importance of imported animal foods for St. Augustine in the subsistence strategy of the Spanish residents between 1740 and 1763 both historical documents and archaeological faunal remains have been examined.

St. Augustine was founded in 1565 by Spain in a location selected for its strategic value rather than its favorable agricultural prospect (Fig. 1). Located at the northern end of the Bahama Channel, the garrison at St. Augustine was to maintain the Spanish presence on the Atlantic Coast, protect the vital treasure fleet sailing up the Channel from Havana to Spain, and to aid victims of shipwreck (Arnade 1959). As a consequence the town was occupied by missionaries, military men, government officials, and their dependents throughout the Spanish period. Many of the residents were from urban areas in Spain or New Spain and had neither interest nor skill in agriculture (Corbett 1974). Spain eventually ceded the town to Britain in 1763.

The town of St. Augustine is located in one of the few naturally protected harbors of Florida's Atlantic Coast (Fig. 2). Sheltered from the Atlantic Ocean by a long barrier bar known as Anastasia Island, St. Augustine occupies a low sandy peninsula in an estuarine environment. The town is

Figure 1. Florida in relation to the Caribbean Sea.

bordered on the east and west by saline and brackish waters. Beyond the barrier bar lie coastal and offshore marine areas. To the east the land slowly rises toward a relatively flat interior of pine flatwoods with occasional swamps and bodies of freshwater.

From the beginning St. Augustine relied upon foreign imports for many of its supplies. These came in the form of a royal subsidy from the Spanish Crown, and trade with British merchants. As a Spanish military garrison the town was to receive each year a supply of munitions, food stuffs, and money. This subsidy, known as the situado, arrived irregularly and might not appear at all for years at a time.

In the face of unreliable situado deliveries, the garrison resorted to trade with the British colonies for supplies. Reviewing ship manifests from Charleston, New York, and Virginia, Joyce Harman (1969) found that imported non-animal goods included liquors, vinegar, apples, corn, peas, flour, biscuits, salt, beeswax, and various fabrics. Although animal foods included barrels of beef, pork, cod, and herring as well as cheeses, it is noteworthy that the only livestock reported by Harman was a single horse between 1716 and 1763. Livestock were imported in some quantity, but typically were carried to St. Augustine by small, unregistered smuggling vessels, or were driven overland from the British colonies. As an example, one smuggler shipped 100 young pigs into St. Augustine in 1762 (Harman 1969:61), and 400 head of cattle were driven overland from Charleston in 1757 (Harman 1969:52, 58). In exchange, the Spanish garrison exported oranges, deerskins, fish and, in one case, seventeen sea turtles to their British trading partners (Harman 1969:90).

As these exports indicate, St. Augustine was by no means entirely dependent upon imports. Although legally subsisting upon the _situado_, the presidio personnel successfully exploited domesticated food sources and wild foods found locally. Stephen Cumbaa's (1975) faunal studies for three St. Augustine domestic sites occupied between 1740 and 1763 indicate that wild animals, excluding feral pigs, contributed 86% to 90% of the individuals identified. Many of these were marine fishes and marsh animals. Maps of the period clearly show cultivated fields to the north and west of the town as well as backyard gardens (Chatelain 1941:Map 10). These gardens produced a variety of fruits and vegetables (Dickinson 1975:62). Pigs and chickens were raised in the yards as well and allowed to roam the streets of the town (Boniface 1971:73, 124). The last few years of Spanish occupation witnessed the development of a naval stores industry to complement the orange trade which had existed since the 17th Century (TePaske 1964:106).

It has frequently been assumed that external supplies available to the town in the form of the _situado_ constituted the bulk of the diet (Chatelain 1941). However, it is also acknowledged that the _situado_ was unreliable in both quality and quantity (TePaske 1964); that trade with British colonists was common (Harman 1969); and that local domestic and wild animals contributed to the diet (Cumbaa 1975). Analysis of the total subsistence pattern at St. Augustine needs to consider both foreign and local contributions to the diet. To what extent is trade reflected in the recovered animal remains? Can the relative importance of _situado_, British trade, and local food resources be assessed from the faunal collections? What implications does external resource utilization have for a complete understanding of the nutritional status of the colony? In order to address these questions it is first necessary to know exactly what was contained in the _situado_. The _situado_ information, complemented by what is already known about the British trade, can then be compared with the faunal sample recovered from the Mesa site in St. Augustine.

Methods and Materials

Photostat and microfilm copies of original Spanish colonial records and correspondence dealing with Florida are available at the University of Florida as part of the John B. Stetson Collection of the P. K. Yonge Library of Florida History. Brief summary cards are available for each document in the Collection. These cards were reviewed for the period 1730 to 1763, looking for documents dealing with commerce, _situado_, or food rations. When a document appeared pertinent the complete microfilm text was consulted. Some documents dealing with the _situado_ were probably inadvertently overlooked since the available materials are extremely voluminous and painstaking to review. However, the documents that were consulted presented such a consistent picture that any such oversights would very likely not affect the conclusions drawn from the document review.

The faunal materials studied were excavated from the Antonio de Mesa house (SA 7-6) referred to previously (Fig. 3). The site was excavated in 1977 under the direction of Kathleen Deagan of Florida State University. The details of the excavation and the interpretation of the site may be found in James R. Jones' Master's thesis now in preparation at Florida State University. Only those faunal materials excavated outside the modern structure and dating to a first Spanish Period context were studied in the research reported here. These were recovered using a 1/4 inch mesh screen and identified and analyzed using standard zooarchaeological procedures as

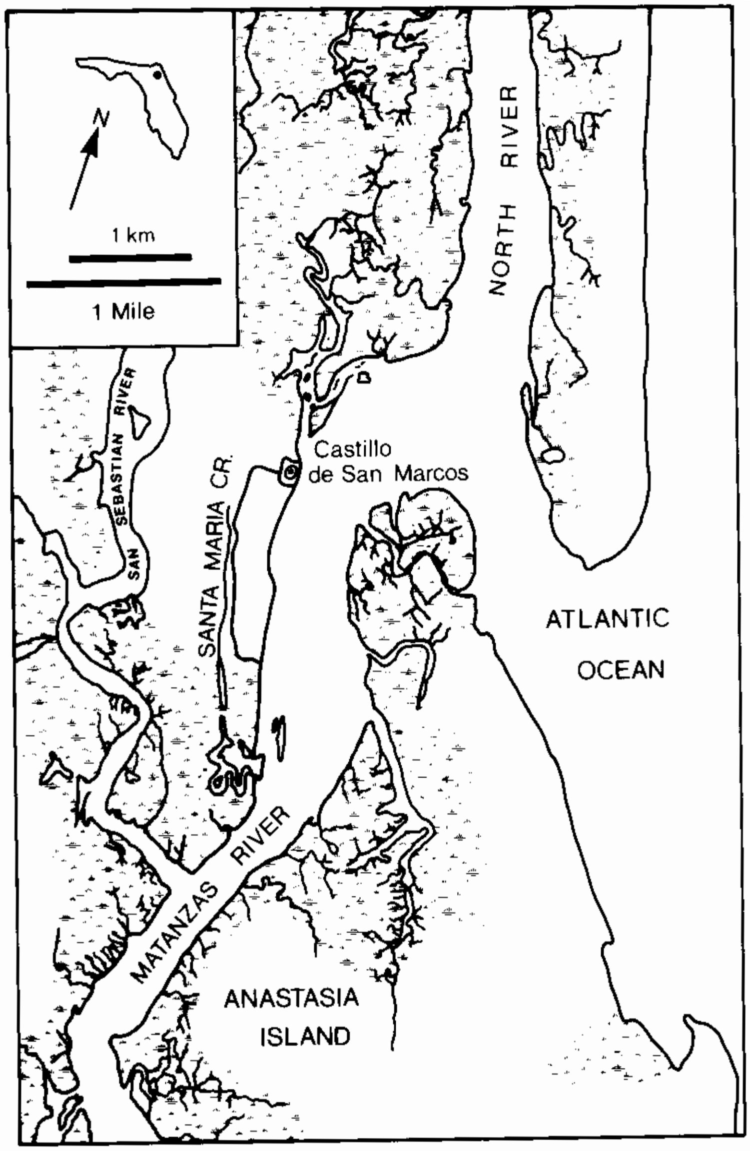

Figure 2. Environs of St. Augustine.

discussed by Raymond Chaplin (1971). The faunal collection is housed at the Zooarchaeology Laboratory, Florida State Museum, University of Florida, where the study was conducted.

Results

The results of the documentary search are of considerable interest. It was already known that the registered British shipments to St. Augustine contained no livestock, if you discount the one British horse. Situado inventories are very similar to the British manifests, and likewise contain no livestock. The situado manifest of December 18, 1758 (AGI 87-3-13) may be taken as a typical example. Goods included beeswax, white wine, oil, pork lard, salt pork, ham, salt beef, salt, rice, corn, flour, and a variety of cloth items. An inventory of the royal stores in St. Augustine for 1740 included the following items: soap, sugar, aguardiente, cinnamon, pepper, textiles, church furniture, tools, cassava, and munitions (AGI 87-3-12, June, 1740). Another inventory, taken in 1751, contains an endless list of items including: axes, fetters, lead weights, bows, tar, cord, tacks, caldrons, pails, oars, spears, machetes, planks, shovels, hammers, drills, planes, brushes, chisels, pulleys, hooks, picks, sulfur, bedding, pipes, cowhides, wooden plates, goatskins, wax, a wide variety of cotton, woolen, and silk items as well as ready-made clothing of these fabrics, oil, paper, aguardiente, incense, rubber, candle wicks, flour, salt, corn, pork, beef, beans, rice, biscuits, ham, wine, two sizes of bells, and finally, one beam (Contraduria 962A). These items may have come directly from Spain (Boniface 1971), from the Yucatan (AGI 54-5-15/89, 1692), or from Havana (TePaske 1964).

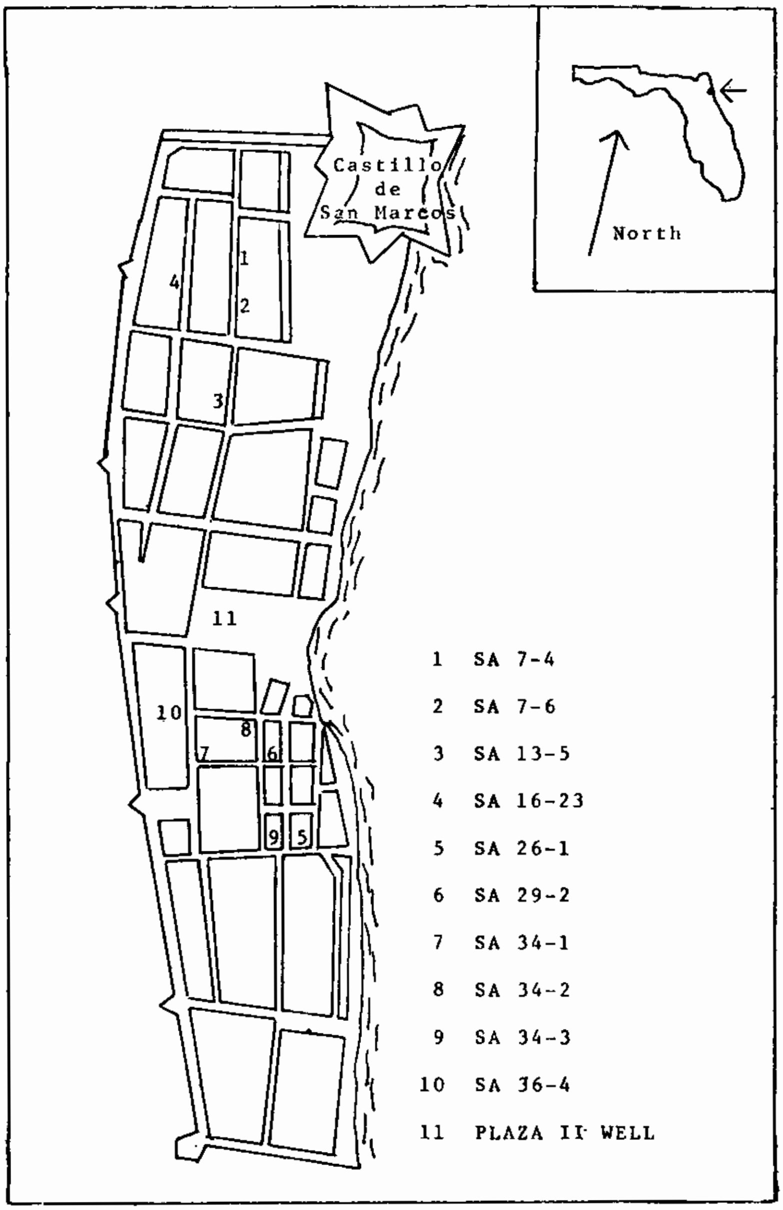

Figure 3. St. Augustine, showing Antonio de Mesa Lot (SA 7-6).

The faunal analysis of the Mesa house materials (Table 1) reflects a reliance upon European domestic, estuarine, and terrestrial wild animals. Domestic animals include cat and dog remains which do not show evidence of butchering, although they may have been eaten. Cow and pig are the most common European animals, followed by chicken and sheep or goat. All of these species are consistently smaller than modern animals. The pigs, considered to be domestic here, might also represent feral or free-ranging terrestrial animals (Sauer 1966). The non-domestic terrestrial animals could be found in the nearby marshes, foraging in the fields, or in the town itself. The gopher tortoise may represent a somewhat more distant excursion from the fort since they prefer very dry sandy soil (Carr 1952:332). Ducks are common in the marshes near town. Of the marine species, all can be found in the estuary adjacent to the town today (Dahlberg 1975). Mullet, drum, and catfish are among the most common species found there today.

Discussion

It can be seen that the recovered faunal materials do not accurately reflect the full dimension of the St. Augustine food base. The situado and the registered British trade contained principally dry goods, staples, and salted meats. Such food may not leave bone as evidence of its consumption (Stephen Cumbaa, personal communication). The herring and cod perhaps retained the vertebral column or the pectoral girdle (Jarvis 1945), but no remains from either of these species have been recovered from first Spanish Period contexts. The ham undoubtedly left evidence, but at this point it is not known precisely what an 18th century ham contained in the way of bones. Much of the physical evidence for the foreign imports is lacking.

These missing data have serious implications for faunal analysis at St. Augustine. It is difficult, if not impossible, to assess definitely the role of foreign food resources in the diet of the Spanish garrison from the recovered faunal remains. It is likewise difficult to assess relative reliance upon the situado, British trade, and local food resources, particularly the comparative importance of domestic and wild foods. The use of domestic animal foods is likely to be consistently underestimated. Our understanding of the pattern of animal use at St. Augustine suffers from this use of salted meats.

Having said this, what can be learned from analysis of the Mesa faunal sample? For one thing, it appears that the importance of the situado as the main source of food for the garrison has been overemphasized. At the Mesa site 31% of the identified individuals were domestic. From the Spanish documents it is now known that these did not come as part of the 1730-1763 situado; they were either grown locally or smuggled in from the north. The pigs, at least, may represent feral animals, hunted on the same basis as the deer. Since cattle require specific fodder, trips away from the town itself had to be made to cut grasses for them, or to pasture the animals. Gopher, deer, and feral pigs may have been hunted on these trips, or captured in the nearby fields. Such terrestrial resources, excluding pig, contributed 8% of the individuals recovered from the site. The inshore area provided 61% of the individuals, including ducks and sharks. Although marine fish in terms of pounds of edible meat were probably less prominent in the diet than were cattle and pigs, they represent a significant nutritional contribution. Emphasis was placed upon locally abundant species, some of which were amenable to netting, trotlines, and night fishing. The coastal and offshore areas evidently were not exploited.

Table I: Faunal Remains from the Mesa House.

Species Name	# Frag.	% Frag.	# MNI	% MNI
DIDELPHIS VIRGINIANA				
Opossum	4	.6	2	1.1
SCALOPUS AQUATICUS				
Eastern Mole	1	.2	1	.6
CANIDAE	1	.2	x	x
CANIS FAMILIARIS				
Domestic Dog	23	3.5	4	2.3
PROCYON LOTOR				
Raccoon	1	.2	1	.6
FELIS DOMESTICUS				
Domestic Cat	1	.2	1	.6
SIGMODON HISPICUS				
Hispid Cotton Rat	3	.5	1	.6
SUS SCROFA				
Domestic Pig	40	6.1	14	8.0
ODOCOILEUS VIRGINIANUS				
White-tailed Deer	15	2.3	7	4.0
OVIS/CAPRA spp.				
Sheep/Goat	8	1.2	3	1.7
BOS TAURUS				
Domestic Cow	117	17.8	20	11.5
GOPHERUS POLYPHEMUS				
Gopher Tortoise	10	1.5	4	2.3
RANA/BUFO spp.				
Frog/Toad	7	1.1	5	2.9
ANATIDAE				
Surface Feeding Ducks	4	.6	x	x
ANAS spp.	4	.6	2	1.1
ANAS DISCORS				
Blue-Winged Teal	4	.6	2	1.1
MERGUS spp.				
Merganser	3	.5	2	1.1
GALLUS GALLUS				
Chicken	28	4.3	10	5.7
GINGLYMOSTOMA CIRRATUM				
Nurse Shark	2	.3	1	.6
CARCHARHINIDAE				
Requiem Sharks	2	.3	x	x
CARCHARHINUS spp.				
Requiem Shark	7	1.1	4	2.3
RAJIFORMES				
Skates and Rays	1	.2	1	.6
ARIIDAE				
Marine Catfishes	27	4.1	x	x
ARIUS FELIS				
Sea Catfish	55	8.4	14	8.0
BAGRE MARINUS				
Gafftopsail Catfish	3	.5	7	4.0
cf. CENTROPOMUS spp.				
Snook	1	.2	1	.6
POMATOMUS SALTATRIX				
Bluefish	1	.2	1	.6
SPARIDAE				
Porgy family	2	.3	x	x
ARCHOSARGUS PROBATACEPHALUS				
Sheepshead	11	1.7	3	1.7

Species Name	# Frag.	% Frag.	# MNI	% MNI
SCIAENIDAE				
Drum family	10	1.5	x	x
CYNOSCION spp.				
Sea Trout	2	.3	2	1.1
MICROPOGON UNDULATUS				
Croaker	1	.2	1	.6
POGONIAS CROMIS				
Black Drum	24	3.7	10	5.7
SCIANOPS OCELLATUS				
Red Drum	28	4.5	12	6.9
MUGIL sp.				
Mullet	204	31.3	37	21.3
PARALICHTHYS spp.				
Flounder	1	.2	1	.6
TOTALS	656	100.8%	174	99.8%

With reference to the *situado* itself, its importance to the settlement should not be underestimated. Although it was not the single source of animal food, its contribution may have been sizable. Through the *situado* the garrison was supplied with many items of hardware, munitions, and staples not available locally or from British traders and it was the source of the garrison's payroll. Additional work is needed in order to refine our understanding of the *situado*'s role in the subsistence strategy of the population.

It should be remembered that the official garrison documents themselves are not always accurate descriptions of the financial and economic conditions of the settlement. The official correspondence with Spain and New Spain was a subsistence strategy in itself--an effort to pry loose greater Crown support. It probably is not a reliable reflection of need, and likely does not suggest the true extent to which the townspeople used local and British resources. Claims to have been forced by *situado* delays to eat horses, cats, dogs, and vermin (AGI 2-1-1/27 Feb. 4, 1573 and AGI Santo Domingo, Legajo 843 Dec. 20, 1715) are not substantiated in the faunal remains. No horse remains have been identified from 18th century St. Augustine, nor is there much evidence that cats, dogs, and small frogs or snakes were consumed. It is also possible that livestock were smuggled aboard the *situado* ships unreported.

Summary and Conclusion

St. Augustinians developed a pattern of subsistence in contradiction to that desired by the Spanish Crown for several reasons. These reasons included official policy discouraging local self-sufficiency, disinclination to farm, an unreliable *situado*, and British eagerness to trade with the garrison. The townspeople developed a multi-level subsistence strategy involving trade with British subjects, exploitation of the inshore and wild terrestrial food resources near the fort, and use of the *situado* for munitions, hardware, and cash. Although the extent of foreign resources' contribution to the diet of the garrison is difficult to assess due to lack of physical remains, the _situado_ and British trade represent two additional resource areas. They must be considered along with the local terrestrial, inshore, coastal, and offshore resource areas when describing the subsistence strategy since they were part of that strategy. The extractive technology for these foreign resources was different than those employed for the local resources, but evaluation of both types of resources is necessary in order to come to an understanding of the Spanish adaptation on the coast of Florida.

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SOME RUMINATIONS ON THE CURRENT STRATEGY OF ARCHAEOLOGY IN THE SOUTHEAST

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Although it might be tempting to go back to the 19th century to begin this review, I will, in view of the time available, merely suggest that the amateurs/scholars of that period, particularly 1870-1890, provided a fine base for later regional studies; for example: Thruston, Putnam, and Joseph Jones in Tennessee, C.C. Jones in Georgia, Potter, Evers, and Conant in Missouri; then a bit later C.B. Moore covering a vast area, with the workers in Washington (B.A.E.) doing more general works, such as Thomas and Holmes.

Turning to this century, and by-passing the first decade which was strangely unproductive in terms of new work with the exception of Moore, one comes to a couple of landmark discussions of the state of American archaeology by, interestingly enough, non-archaeologists: Roland B. Dixon's American Anthropological Association Presidential Address in 1913, and Edward Sapir's classic paper on "Time Perspective" in 1916.

Perhaps it is significant in the intellectual history of our profession that some of the most telling comments and appraisals of archaeology have come from individuals who were not great field workers or excavators: for example, one thinks of Kluckhohn's important critique of the Maya field, and Kroeber's influence on the Peruvian landscape; and more recently Walter W. Taylor, whose 1948 review of American archaeology impacted quite heavily on the whole field. Even Lewis Binford, whose very significant influence none can deny, can be included in this characterization.

But to return to those happier Edwardian days; Roland B. Dixon is not a well-known figure in American archaeology, nor is the paper I refer to often cited as seminal; it was not even included in the extensive bibliography of the recent history of American archaeology by Willey and Sabloff. But the facts are that in the 1920s Dixon chaired, for the National Research Council, the first formal organization, on a national scale, devoted to promotion of research in American archaeology - The Committee on State Archaeological Surveys. Also, with Tozzer at Peabody, he helped train, until his early death in 1934, a number of scholars influential in the field, such as Samuel K. Lothrop, George Vaillant, Philip Phillips, and J.O. Brew.

Dixon's paper was the lead article in the December 1913 issue, and was quite simplistic in its analysis of the field, using very broad characterizations of the eastern and western areas of the continent and finding the east much more complex and hard to understand, but his critique (Dixon 1913:563) is quite to the point:

> The point which I want to make, however, and that to which much of what has been said, trite though it be, directly leads, is that to a large extent the difficulties and perplexities are of our own making. With honorable exceptions in more recent years, the archaeological investigations so far made in this country have been woefully haphazard and uncoordinated, and the recorded data often sadly insufficient; the published reports have too frequently been unsystematic and incomplete; and there has been too little indication of a reasoned formulation of definite problems, with the attempt to solve them by logical and systematic methods. It is no doubt easier and perhaps pleasanter to skip about aimlessly in investigation, taking such opportunities as happen to present themselves; it makes a more attractive report to omit much uninteresting and supposedly unimportant detail, and to describe and illustrate by a few fine plates only the more striking objects, merely alluding to or passing over entirely the more common but often very important things; it requires considerable preliminary time and study to realize and define the real problems - all this is no doubt true, as well as that there are often practical difficulties in the way of carrying out a scheme that has been carefully considered. Nevertheless, these facts do not excuse us for the neglect of saner and more truly scientific methods.

He then goes on to encourage (Dixon 1913:563-565) a specific research topic using the Direct Historical Approach (deLaguna 1960:220). The project is to find a solution to the Quapaw connections between their supposed homeland on the Wabash and Lower Ohio and their historic locations to the South. We shall return to that problem later. Another "modern" aspect of his approach to archaeological methodology can be noted in his affirmation of the interpretive value of ethnology (Dixon 1913:565). There were, in a rather modern format, discussants for the paper: W.H. Holmes, George Grant MacCurdy, and Berthold Laufer. The latter concludes his paper with a clarion cry for chronology. "Chronology is at the root of the matter, being the nerve electrifying the dead body of history" (Laufer 1913:577).

Sapir's paper on Time Perspective is, of course, much better known, but not well enough perhaps, for I will only state for the record my opinion that his discussion and critique of "seriation" is a very notable contribution that preceded Leslie Spier's (Willey and Sabloff 1974:101 to the contrary). Sapir's strong comments on the sorry state of American archaeology and the need for better chronology and stratigraphic excavations are too well known to need quotation in full here - it is sufficient to say that he hoped for improvements in methodology so that archaeology "would throw far more light on the history of American culture than it has in the past" (Sapir 1916:10).

Field work in the East did improve after World War I, and the decade of the Thirties was to be an especially important one for Southeastern archaeology, as all of us are well aware. We might not have had Basketmaker-Pueblos, the Pecos Classification, or even dendrochronology, but we did have the CCC, the TVA, and the WPA (Guthe 1952). In the long run Carbon-14 was going to put those "ceramic retards" of the Southwest in their place: nearly 3000 years behind our Savannah River potters.

But enough local chauvinism. Residing in Santa Fe this fall has perhaps sharpened my viewpoint; what did happen in the Southeast was that regional programs got a substantial boost - more digging was done that ever before in quite a range of sites, albeit with more emphasis on the large deep sites and the more spectacular ones than on the hamlets or limited extraction sites.

These regions were mostly state-oriented with the exception of the Tennessee Valley, which geographically cut a swath through Kentucky, Tennessee, and Alabama, with Major Webb at the helm. Kelly in Georgia and Ford in Louisiana began programs that were to establish at the east and west points pivotal sequences for aligning Southeastern chronology as at Birmingham, 1938 (Williams 1960:2). To the north Joffre Coe began documenting the edge condition for Mississippian influences in North Carolina at Town Creek and also developing some of the finest field techniques in the whole area, while in Florida, where the first Federal program began in 1933 (Setzler and Strong 1936) there was in the last days of the WPA to be inaugurated Willey's Northwest Coast survey, which resulted in a significant addition (Willey 1949) to the chronological supports of Southeastern prehistory.

Beginning just before World War II, a joint program of large regional scope was the lower Mississippi Survey of Phillips, Ford, and Griffin, bringing together Harvard, Louisiana State University (later AMNH) and Michigan to undertake a long-term study of the area. Now in its 37th year and centered at the Harvard Peabody Museum, this research project has geographically encompassed the Lower Valley from Southeast Missouri almost to Baton Rouge, and chronologically from Paleo-Indian times to the 19th century Tunica. We're about to tackle a Gulf Coast locale at Avery Island later this year. An emphasis by the LMS has been placed on establishing regional sequences, while attempting to elucidate both history and process as in Brain's following the meanderings of the sometimes elusive Tunica from the Yazoo Basin to Avoyelles Parish, Louisiana.

In the post-war period the Southeast benefited from a series of events that were to change forever the archaeology of that "backwater" area. First came the advent of Carbon-14 that enabled Southeastern prehistorians to crawl out from under the terrible constraint of the foreshortened chronology forced on them, to no small extent, in my view, by the tyranny of the Southwestern dendrochronology which very early put the Basketmakers at about A.D. 300-400, and made it seem unlikely that Southeastern cultures, especially those with elaborate ceramics, could be earlier. The Carbon-14 dated Tennessee Valley Archaic cultures (circa 4000 B.C.) brought gasps of disbelief in the adobe strongholds of Arizona and New Mexico, but such was the case, and the Eastern time-scale finally had enough room to accommodate interesting developments and even declines, instead of cramming everything into a pressure-packed two to three thousand years.

The second significant development was the growth of the Southeastern field itself, by way of expanding Departments of Anthropology which budded off from joint Sociology structures and the establishment of new positions and departments ranging from state-wide programs in Parks and Historical Commissions to new institutions such as we visit today. No longer, as in 1950 in Gainesville, could the Southeastern Conference with John Goggin's hospitality sit down around a large table and discuss Projectile Point terminology. It's a saddening fact to some of the oldsters, but it has been a boon to new data and ideas, not to mention dozens of new careers.

The third development has not, I feel, been given the recognition it deserves. Ever since Sapir's call for more stratigraphy, there had been special attempts to select sites that would provide such excavational opportunities (actually to the detriment of single component sites); WPA site-selection certainly made that a significant criterion. However, it was not until Joffre Coe's work (1948-58) at Doerschuk and Hardaway in the North Carolina Piedmont that we got the kind of stratigraphic breakthrough that helped sort out the five or six thousand years of Archaic culture sequence that had been compressed in so many surface collections or thin mixed deposits (compare Coe 1952 with Coe 1964:6-7).

Coe's classic work was quickly followed up by John Griffin's work at Russell Cave (Griffin 1974), the Stanfield-Worley excavations in Alabama (DeJarnette et al. 1962), the NPS work in the Macon Plateau flood plain (Ingmanson 1964), and especially Bettye Broyles' (1966) work at St. Albans, all of which brought significant ordering of projectile point types and gave them absolute dates, while telling us something about cultural process, in the process. Never again would we look at a melange of Archaic projectile points, be they from New Hampshire or even the Modoc Rock shelter, and see them as a mixed bag of specialized tools, all of about the same age.

Turning at last to the present - and skipping unfortunately any detailed comments on the effects of W.W. Taylor's review of American archaeology except to say that his own (Taylor's, that is) recent appraisal (Taylor 1972) of the general impact is acceptable. I've not resorted to counting his citations in Southeastern archaeology in the last twenty years to achieve a statistical approach to intellectual history; but it is apparent that, as Willey and Sabloff (1974: Chapter 5) indicate, there was a growing concern for context and function between 1940 and 1960, and some of this change can be laid to Taylor's work. However, one can be chastened in historical research on the field if one considers, for example, the great number of times that Kroeber's Cultural and Natural Areas was cited in site reports and articles in the decades after its publication, given "landmark" status by Eggan (1952:36, fn 6), and then try to appraise the actual intellectual results. I believe that its effect was rather slight on a methodological level and who but Caldwell (1962:306) ever bothered to look at some of the culture- historical questions that Kroeber raised about the Southeast - "the incessant warfare hypothesis" (Kroeber 1939:148). So much for some presumed causal relationships.

But Binfordian impact is not to be denied in the 1960s and 1970s. Hempel and hypothesis - "logico-deductive," processual vs. cultural-historical, and all the rest. It has been a busy time of conceptual ferment and revision of priorities as evidenced by a number of recent volumes: New Perspectives (Binford and Binford 1968), An Archaeological Perspective (Binford 1972), and Contemporary Archaeology (Leone 1972).

I shall not attempt a review of some of the major works in the Southeast that have come out recently that are a part of this "new archaeology," but someone should. The Cache River Archeological Project report assembled by Schiffer and House (1975) is certainly one that leaps to mind, but some comments on it from an LMS perspective are already in print in that volume (Brain 1975).

Instead let me turn briefly to two recent papers: William H. Sears' "Seaborne Contacts between Early Cultures in Lower Southeastern United States and Middle through South America" (Sears 1974) and Berle Clay's "Tactics, Strategy, and Operations: The Mississippian System responds to its environment" (Clay 1976). Both are aimed at doing more with data than discussing pure culture history. Process, hypothesis testing, and systemic analysis are essential parts of their aims - understanding, of course, that the two papers are quite different in their approaches. I feel that both fail to make their special case for the same reason: they do not have a proper chronological framework to help the authors watch the cultural events unfold in an orderly sequence.

Sears has more of a problem since by his own admission the evidence is "most incomplete and inadequate" (Sears 1974:2). In suggesting these long range connections from the Southeast across the Caribbean, Sears attempts to forestall debate by saying that none of the cases are more than a strong possibility (Sears 1974:1) but by the end of the paper they are moved toward probabilities and "finally we see the appearance [in the Southeastern U.S.] of some of those ceramic traits [three decorative complexes] which somewhere to the south, probably in a mystical way, become involved with the development of effective economic systems based on corn agriculture" (Sears 1974:11-12).

Clay, on the other hand, makes use of old data in a new framework. He proposes a general model of Mississippian settlement patterns which is of some interest, but the internal chronology of the system is terribly weak, as he acknowledges (Clay 1976:151). None of the seven sites that he uses in his model are adequately dated either by comparative stratigraphy or carbon 14; none are assuredly single component sites, and none have been excavated in sufficient detail to ascertain with any assurance the actual chronological context for most of the settlement pattern attributes (palisades, varying house patterns, village layouts) that make up the guts of the proposed model.

It seems to me that the logical way to achieve the information needed by both Sears and Clay is through intense regional research programs of the sort that Binford (1964) has called for. Such regional programs have not been too characteristic of Southeastern archaeology in the post-war period. I would exclude most of the current state-wide programs as being too large in scale to qualify, as they cut across many geographic and cultural boundaries through time. Arkansas' multi-based program has achieved much more of a regional focus by its partition of the state. Struever's Illinois Valley project, our own Lower Valley Survey, when it has taken areas such as the Lower Yazoo or Tensas Basins, and Jim Price's Southeast Missouri Research project are three such regional operations that come to mind for obvious reasons, but probably do not exhaust the field.

With the impact of contract archaeology there should be more, rather than less, opportunity for the expansion of such regionally oriented programs, despite short-term diversions to other areas and topics. One thinks for example of modern-day Tennessee Valley projects such as the Tellico Reservoir where recently Jeff Chapman has been following Coe's pioneering efforts on the Archaic and has established context in site distribution and even site layout for some of the early cultures of that area, despite the deeply buried nature of many of the components, and with excellent chronological control as well (Chapman 1975).

Why am I continuing to stress the building of regional chronologies when Willey and Sabloff have declared that concern to be characteristic of a period of archaeological history now long gone? Don't I care what my colleagues think and say? The answer is yes and no. Yes, I do recognize the values of asking questions that have some other import than "When did it happen," questions such as how and why; but no, I don't think that it is old fashioned to care deeply about chronological ordering so as not to be led astray to consider questions to which answers are not attainable until we clear up the chronology (vide supra).

Let me propose a hypothesis. Jim Price (Price et al. 1976:50) in an assessment of the cultural resources of the Fourche Creek watershed in N.E. Arkansas stated: "During the Mississippian Climax substage (his dates: AD 1400-1500) the Fourche Creek area, and for that matter most of Southeast Missouri and large areas of northeast Arkansas, was abandoned by aboriginal peoples. The exact reasons for this apparent abandonment are not fully understood at the present time." This area has been looked at for historic archaeology in great detail - only Shawnee and Delaware of the late 18th and 19th century ever show up in the documents, and no sites of even that period have yet been positively identified. There is, I believe, a real gap in the Indian occupation.

Starting with Price's statement, it is an easy step to expand it and suggest the hypothesis that there was, between A.D. 1450 and 1650, a "Vacant Quarter" devoid of major Indian occupations at the mouth of the Ohio; extending possibly as far north along the Mississippi as Cahokia, and possibly even into the lower Illinois Valley (Asch 1976:1), south along the Mississippi to about the New Madrid bend, west to the Ozark escarpment, and south into part of northeast Arkansas. Going up the Ohio, I include the Kincaid lowlands and quite a distance up the Tennessee, and up the Cumberland to at least Nashville; then up the Ohio proper to past the mouth of the Wabash and to the Angel site. The recently defined Caborn-Welborn phase of late Mississippian near the mouth of the Wabash is, indeed, an exception that I feel partially goes to prove the strength of the hypothesis, as I will indicate shortly.

Thus as Figure 1 shows, the whole central area of true Mississippian development is empty for several centuries. Recall the "echoing stillness" of the area as Marquette and Joliet went through in the middle of the 17th century, and the difficulty that ethnographers from Wissler to Murdock have had in filling this area with recent tribal entities. The Mississippi hearth area was burned out, and only around the edges in Fort Ancient, and Dallas-Lamar, and Oneota was the flame kept alive. Down river, late Nodena phase sites occur just into Southeast Missouri (Chapman and Anderson 1955) and trade objects have been found there and in some St. Francis River sites such as Parkin. Even further south, DeSoto encounters well-functioning late Mississippian sites like Humber (Brain et al. 1975) and as far south as Menard at the Arkansas River mouth Mississippized Quapaw come down to Historic times.

The Caborn-Welborn phase with its late Mississippian pottery, so like Northeast Arkansas as everyone has said, and with late denominators such as snub-nosed scrapers and catlinite pipes, may well be part of that Quapaw-Ohio River connection that Dixon asked for in 1913, although the movement might well be south to north rather than the other way. Indeed, it looks like something of a site-unit intrusion situation with little continuity of site location (Munson and Green 1973).

But without finer chronological control, which we are developing from the northern Yazoo in looking at the DeSoto problem, and are refining for Southeast Missouri, Kincaid, and western Kentucky (Barkley Basin) - we cannot yet say with any real certainty who was where at A.D. 1500, if the whole truth be told. Dr. Dixon will have to wait a little longer for his answer.

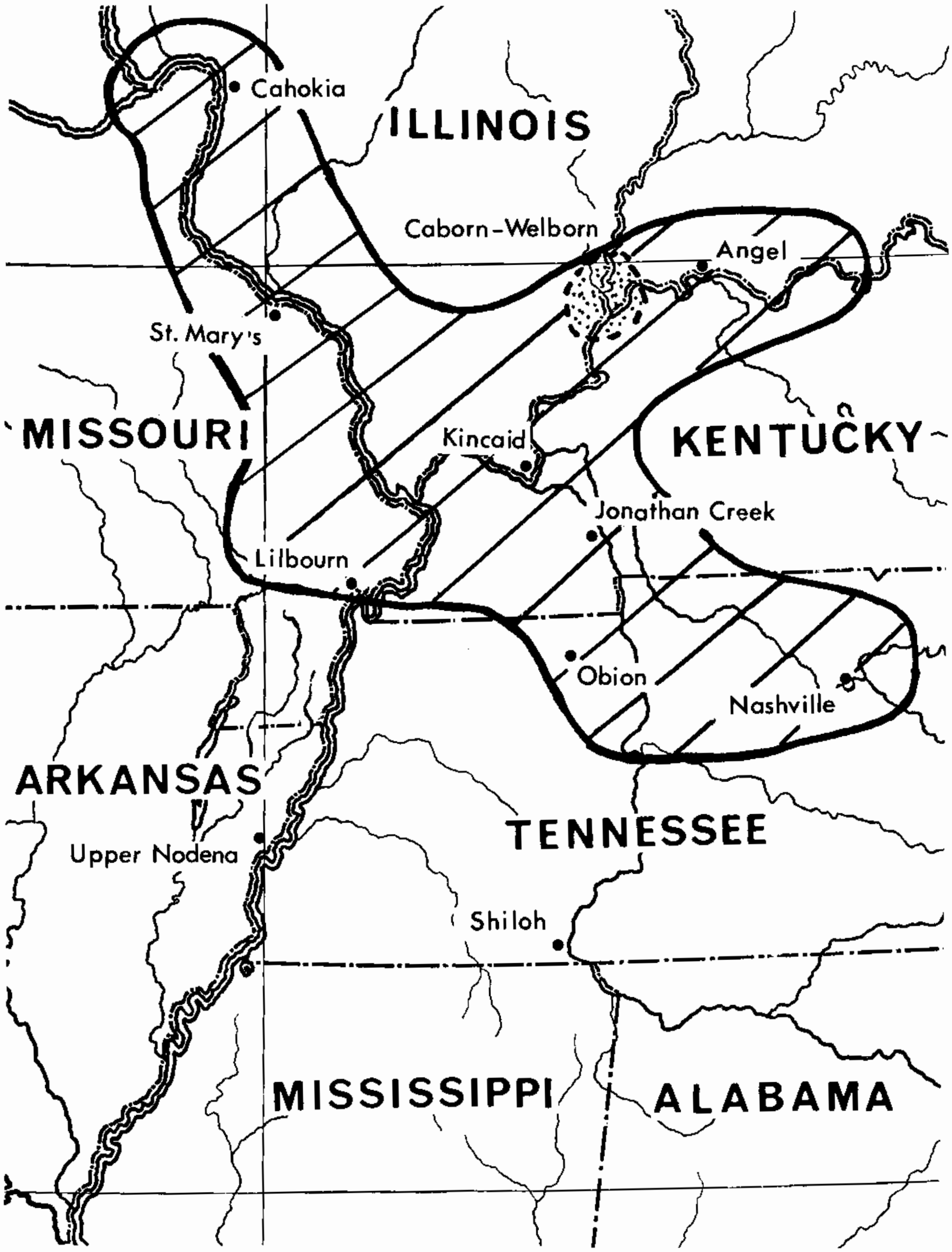

Figure 1. The Vacant Quarter: A.D. 1450-1650.

Therefore, I think that this hypothesis of the Mississippian heartland with its burned out center is an interesting notion; along with a detailed study of the regional sequences in the area should come the hypotheses of why and how. What caused the late Mississippian decline in the central area? Was it drought, soil exhaustion, disease, political upheaval or passenger pigeons? What are the processual answers? -- but first a detailed analysis of the data, please. We are moving in that direction now, I believe.

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