UNIVERSITY OF GEORGIA
LABORATORY OF ARCHAEOLOGY SERIES
REPORT NUMBER 51

AN INTERPRETATION OF A LATE ARCHAIC PERIOD SITE IN PIEDMONT GEORGIA

ANNE ROGERS

Athens
2011

AN INTERPRETATION OF A LATE ARCHAIC PERIOD SITE IN PIEDMONT GEORGIA

By Anne Rogers

Western Carolina University

WALLACE RESERVOIR PROJECT CONTRIBUTION NUMBER 17

DEPARTMENT OF ANTHROPOLOGY

UNIVERSITY OF GEORGIA

1982

PREFACE

This report represents the final report for site 9PM205, the excavation of which was provided for in Appendix 3 of the Archaeological Salvage Agreement between the University of Georgia and the Georgia Power Company.

David J. Hally

Principal Investigator

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

List of Plates

CHAPTER I

INTRODUCTION

Of all the archaeological periods in Southeastern prehistory, the Archaic had a longer temporal span than any other (Figure 1). It is, however, not very well known. This is unfortunate, because it was during this time that changes in subsistence techniques and procurement strategies occurred which presumably effected a transition from the nomadic hunting and gathering technology of the Paleo-Indian period to the development of more sedentary life styles which characterized later periods.

It has been proposed (Caldwell 1958) that this shift from nomadic hunting-gathering to more settled life-ways, especially those which relied on horticulture for subsistence in addition to the exploitation of seasonally available resources, was essential for the development of more complex societies. Evidence for this increased complexity is known from archaeological remains which indicate ceremonial practices and incipient agriculture in later periods of prehistory in eastern North America. Understanding the Archaic period should, then, be of real value in the interpretation of those processes responsible for the transformation of early hunting groups into those present at the

	PROTO-HISTORIC
A.D. 1400	
	MISSISSIPPIAN
A.D. 900	
A.D. 1	WOODLAND
1000 B.C.	
	CERAMIC LATE ARCHAIC
2000 B.C.	
	PRE-CERAMIC LATE ARCHAIC
4000 B.C.	
	MIDDLE ARCHAIC
6000 B.C.	
	EARLY ARCHAIC
8000 B.C.	
	PALEO-INDIAN

Figure 1. Archaeological Periods in the Southeastern United States.

time of initial European contact in the area.

At the present time, knowledge of the ways in which these changes occurred is incomplete. This has been particularly the case for certain areas of the Eastern United States, one of which is the Piedmont region of Georgia. As DePratter (1976a) has shown, most of the information about Archaic sites in the State of Georgia has come from the Coastal region. (Physiographic regions of the state are shown in Figure 2.) Sites in the Piedmont have been poorly represented in archaeological literature related to the Archaic period as a whole as well as in descriptions of specific sites.

This lack of information is detrimental to attempts to develop interpretive models based on behavioral aspects of cultural development during the Archaic. While developmental processes in the Piedmont and Coastal areas may have been similar in some respects, different resource bases could have resulted in different cultural responses and adaptations, especially considering the diverse environments which characterize these geographically distinct regions. Therefore, it seems important to expand our knowledge of the Archaic period in this area in the hope of developing greater understanding of the cultural processes which may be inferred from the archaeological record.

Definitions of the Archaic

According to Byers (1959:229), the use of the term

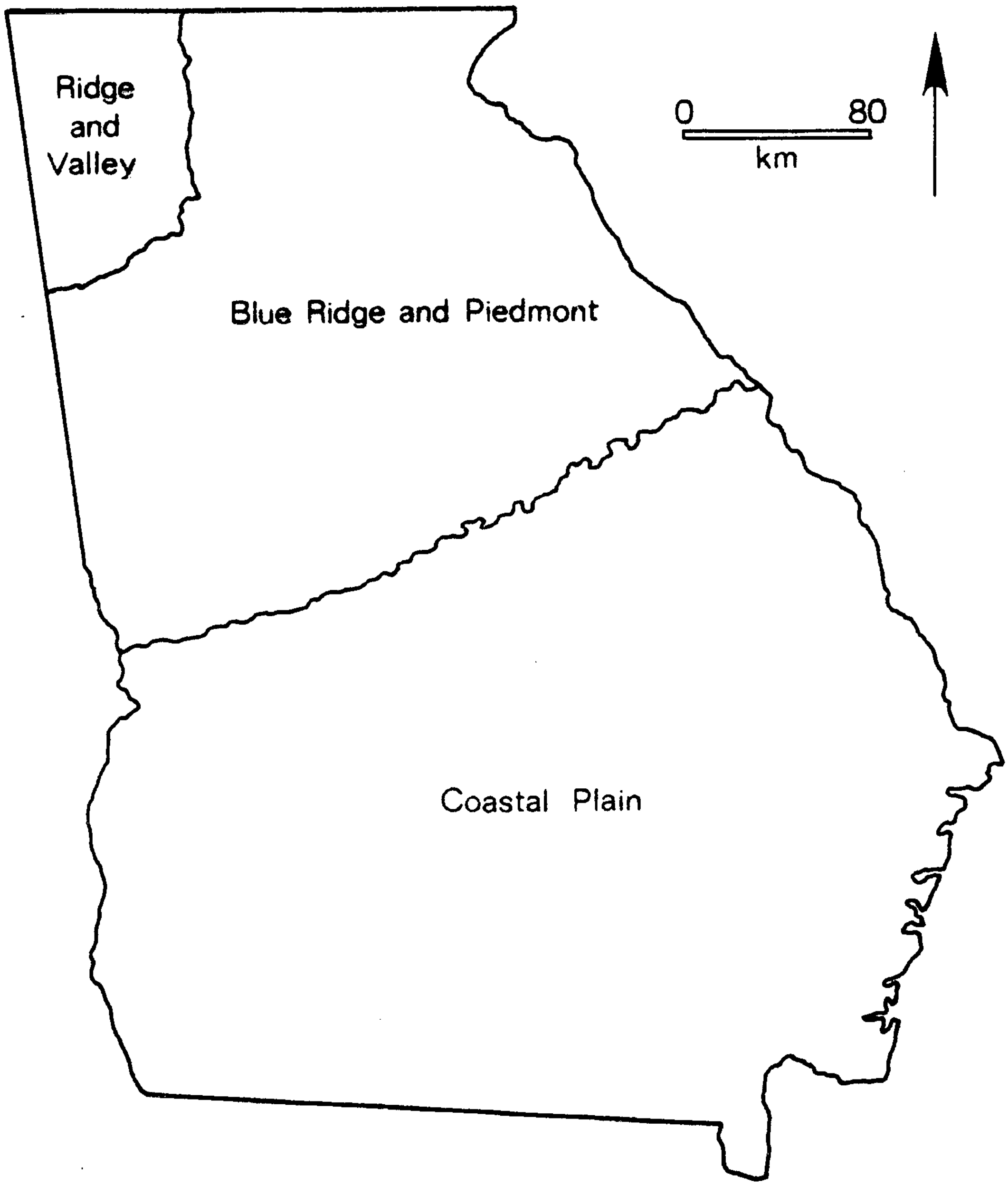


Figure 2. Physiographic regions of the State of Georgia.

"Archaic" to designate an archaeological deposit characterized by specific types of artifacts first appeared in relation to the archaeology of North America when Ritchie (1932) used the term in reference to the Lamoka site in the Northeastern United States. However, the term had been used otherwise by earlier authors. Based on Ritchie's classification, sites which produced no ceramic sherds or evidence or horticulture, and which contained specific types of artifacts, were thereafter referred to as "Archaic" (Byers 1959: 231).

Less than twenty years after Ritchie had established the primary criteria for identifying and classifying Archiac sites, Sears (1948) discussed the extensive regional and temporal variation which can be recognized during this period. His examination of this variability shows the difficulty involved in developing specific archaeological indicators which can be used to define this stage of prehistory. For example, in the Southeastern United States fiber-tempered ceramic vessels are diagnostic artifacts for sites dating from the latter part of the Late Archaic, but in other areas ceramic containers do not appear until the Woodland period.

Byers (1959:34) made clear the fallacy inherent in ascribing general traits to characterize the Archaic in diverse geographic areas when he said, "The Archaic stage is no more a distinct and precise chronological unit with uniform continent-wide limits than is the period of contact with European explorers." This serves to emphasize the necessity for defining and interpreting the various manifestations of the Archaic period in relation to the physiographic areas in which they occur. In this respect, the recognition of similarities is important in developing classificatory models, and the recognition of differences is basic to the establishment of interpretive models which are directed towards understanding various adaptive responses related to diverse situations, both cultural and otherwise.

Characteristics of the Archaic Period

The Archaic period as a whole is usually considered to extend from around 8000 B.C. until around 1000 B.C., although dates often vary according to the area to which they refer. These dates also vary according to the author classifying the period. Stoltman (1978:708-710) has provided examples of the range of dates to be found in the archaeological literature referring to the Archaic period, and the explanation for that variation. He says that,

> "....Eastern archaeologists customarily utilize the term Archaic to designate an increment of time whose precise temporal limits vary with the specific geographic locality being considered.... What most archaeologists are doing is applying a formal concept to their local or regional sequences, designating as Archaic those cultures possessing the requisite formal properties...."

This emphasis on recognizing similarities rather than differences at Archaic sites has made the recognition of diversity during that period the exception rather than the rule, and has precluded the identification and interpretation of diverse characteristics which might serve to differentiate subtle responses to varying natural and cultural environments. However, the development of a cultural sequence was an important and necessary contribution which was essential to a complete and acceptable understanding of the prehistory of the United States.

Early interpretations of the Archaic period tended to be based on the classification of items of material culture. For example, in Griffin's (1952) important synthesis developed to describe the cultural periods of the Eastern United States, the Archaic is divided into two periods--Early and Late. The Early Archaic was described by Griffin as a stage in prehistory when small bands of hunters and gatherers ranged over a hunting territory exploiting seasonal resources. He suggested that the Early Archaic differred from the preceding Paleo-Indian period only in the absence of fluted projectile points in tool assemblages, but proposed that otherwise the two were very similar. Shelters during this time were presumed to be temporary, and stone tools were manufactured by flaking exclusively, with none of the ground stone tools prevalent in later deposits occurring during this period.

Griffin (1952:355) defined the Late Archaic as a period

> "....characterized by the appearance of various implements which were produced in polished stone. Among these are the celts which probably preceded the grooved ax, numerous forms which have

> been called bannerstones and boatstones, some of which were almost certainly used along with the atlatl as has been evidenced by numerous instances, particularly in the southeast, and the tubular or subconical form called a pipe. There is also more evidence of the use of shell for beads and other ornaments, for the use of paint on bone implements to provide decoration. We find a considerable development of stone bowls made out of steatite.... Steatite containers were most common in the east along the Appalachians from New England down to Georgia and Northern Alabama."

Later Willey and Phillips (1958:107-109) described the Archaic as a "stage" characterized by

> "....migratory hunting and gathering cultures continuing into environmental conditions approximating those of the persent....there is now a dependence on smaller and perhaps more varied fauna. There is also an apparent increase in gathering; it is in this stage that sites begin to yield large numbers of stone implements and utensils that are assumed to be connected with the preparation of vegetable foods. In most Archaic cultures these are shaped by use rather than design and do not, therefore, fit into the category of ground and polished stone, which is one of the often-referred-to criteria of the Archaic stage.

They continue:

> "Of primary interest....are the heavy ground stone woodworking tools generally regarded as prerequisite to the successful occupation of forest environments--axes, adzes, wedges, gouges, etc. Highly characteristic....are implements and utensils used in the preparation of vegetable foods--milling stones, metates, mortars, manos, pestles, pounders, etc.... Particularly characteristic of the Archaic in some areas are stone vessels, precursors of pottery. Their presence re-

> flects the greater stability of occupation postulated for some of the later cultures of this stage....Other Archaic elements of significance in particular areas are ground slate points and knives; polished atl-atl weights of various forms; plummet-like objects....; stone tubes....; stone beads; and an array of other objects of purely ornamental or problematical function."

Willey and Phillips also mention the variety of projectile point types found at Archaic sites, some made in a variety of lithic materials, and they refer to the artifacts manufactured by grinding of polishing found in these sites. They further mention that, "....extremely characteristic of Archaic sites in the Americas are masses of fire-cracked stones used in pit roasting and stone boiling" (Willey and Phillips 1958:110).

These descriptions of Archaic culture traits are general and refer to characteristics of this period found over large geographic areas. This is the result of the emphasis on developing criteria for the assignment of sites to temporal periods in prehistory as well as devising a conceptual framework for establishing cultural phases which could be separated on the basis of items of material culture. While regional differences were observed and recognized in the archaeological literature, information concerning sites from some areas was so sparse that there was insufficient data available for establishing more specific identifying characteristics.

Archaic Research in the Southeast

While Archaic components have been recognized in surface occurrences throughout the Southeastern Piedmont and adjacent areas, stratified Archaic levels have been relatively infrequent. Those sites which have contained stratified deposits have sometimes been considered of importance primarily for the information they could provide in developing a cultural sequence for the area. While this was important and necessary, the more recent emphasis in archaeology on the understanding of mechanisms by which cultural systems have reacted and responded to external conditions and the processes by which culture change has occurred, has resulted in the development of broader research goals.

Even though historical developments and relationships are still of interest, the aims of anthropological archaeology have expanded to include questions oriented towards reconstructing prehistoric behavior in both synchronic and diachronic perspective. As a result, research questions are directed whenever possible towards the elucidation of nonmaterial aspects of prehistoric behavior as well as towards the explanation of material remains found in archaeological deposits.

Reports of investigations at Archaic sites vary in content and theoretical approach due to differences in research objectives considered important at the time they were prepared. This is reasonable and to be expected. However, it does mean that information contained in those reports can vary significantly according to the time at which the research was conducted.

The earliest recorded stratified Archaic site reported in the Southeast was the Stallings Island site, which was first excavated and recorded in the latter part of the nineteenth century by C. C. Jones, Jr. (1861:13-22). Later excavations were conducted in 1908, 1921, 1925, and 1929. These were reported by Claflin (1931) and contain the first account of a non-ceramic level in stratified context recorded in the Southeast. However, Claflin (1931:13) failed to recognize the importance of this discovery. His main emphasis is on the description of items of material culture, and the absence of pottery in the lower levels is noted in this single statement:

> "As Trench 1 progressed in depth, however, after reaching 3 feet, fewer and fewer sherds were found until none appeared in the final shell layer which rested on the undisturbed clay and silt."

Not only did Claflin fail to recognize the significance of this aspect of the excavation, but he continues (1931: 13-14) to say that

> "Insufficient area was uncovered at this depth to allow the assumption that the people who left the first shell deposit did not possess pottery. In all probability they did, but to a lesser degree than did later generations."

Claflin did, however, recognize the distinctive characteristics of fiber-tempering in some of the sherds. This is now considered to be a trait diagnostic of the latter part of the Late Archaic in the Southeast. Although Claflin did not identify the tempering medium present in the paste used to construct the pots which furnished the sherds, he did differentiate them from the grit-tempered sherds found at the site.

The most outstanding aspect of the Stalling's Island report is the extensive artifact inventory which it includes. Not only were stone tools present in large numbers, but bone and shell artifacts were well represented. Animal bone had been used to manufacture tools, and in some cases these tools were decorated by incising. Shell had been used to manufacture ornamental beads. Ground stone as well as flaked stone tools were found in quantity. Especially frequent were ground and perforated stones called netsinkers. There were over 2500 of these artifacts found at Stalling's Island (Claflin 1931:32). These artifacts, as well as a grooved type of netsinker, were made from steatite.

The Stalling's Island report is not atypical of archaeological reports of that time, and does provide a good account of the artifacts recovered and the excavation procedures used to explore the arechaeological deposit at the site. However, there is no attempt by its author to place the site in any kind of temporal framework, as none existed in the Southeast at that time. References to similarities with other sites are confined to comparisons with particular artifacts recovered from surface collections in the area or from the excavations of C. C. Jones, Jr., executed in the mid-1800s. The eventual impact of the Stalling's Island report was primarily to focus attention on the association between large shell mounds and Late Archaic sites in riverine settings. It also served as the archetypal Late Archaic site for the area in later interpretations.

As excavation of Archaic sites came to be more frequent, reports from such sites as Indian Knoll in Kentucky (Webb 1974), Modoc Rock Shelter in Illinois (Fowler 1959), Eva in Tennessee (Lewis and Lewis 1961), Russell Cave in Alabama (Griffin 1974), and another site in Georgia, the Lake Spring site (Miller 1949), provided additional information concerning this period in Southeastern prehistory.

By the late 1950s, there was increased emphasis on interpreting archaeological data in a comparative manner. In their interpretation of the Archaic in the mid-South, Lewis and Kneberg (1959) took a synthetic approach, using information from 22 sites in Kentucky, Tennessee, Alabama, and Georgia. They felt that an examination of traits from these sites permitted the recognition of two separate traditions--the Midcontinent and the Eastern. These traditions were considered to be contemporaneous, and were derived through statistical analysis of selected traits which occurred in "two or more components" of these sites (Lewis and Kneberg 1959:174). Those traits were used to derive coefficients which were considered to indicate strength of similarity between phases at various sites.

These coefficients, along with evidence for cultural continuity between archaeological phases, were used to support the separation of the Archaic period into the two major traditions. In addition to their statistical interpretation, Lewis and Kneberg (1959:174) point out two further differences which distinguish the Midcontinent from the Eastern tradition:

> "The two conventions which identify the Midcontinent tradition, especially in early phases, are the attitude toward dogs and the emphasis upon notching in projectile points. The careful burial of dogs, either alone or with humans, reflects the attitude of the Midcontinent people toward their dogs. This was not shared by the people of the Eastern tradition until a very late period. Notching of projectile points is a trait that is almost entirely absent in the Eastern tradition."

Considering the diverse geographic locations of the sites used by Lewis and Kneberg in their analysis, it is not surprising that dissimilarities were noted. Nevertheless, their work represented an important contribution to Southeastern archaeological literature concerning the Late Archaic because it emphasized the diversity which existed during this period. In spite of problems such as small sample size, differential preservation at sites used in the analysis, and the fact that all areas were not equally represented (only two sites from Georgia were included, as they were the only ones available at that time), this paper did go beyond description of artifacts to provide some indication of the variability which could be recognized in Archaic sites in the Southeast.

There were still, however, no clearly established criteria for defining stages or phases of the Archaic period which could be used to separate components at individual sites. There had been excavated no sites with well-defined stratigraphy which would provide a basis for recognizing specific stages, although there were sufficient general diagnostic traits to allow assignment of sites to the larger time period.

It was not until Coe (1964) published _The Formative Cultures of the Carolina Piedmont_ that there was available a means for separating the various phases or stages of the Archaic into recognizable subdivisions. This classification was based on diagnostic projectile point types recovered from stratified sites excavated in the North Carolina Piedmont. These sites were discovered by Coe in geomorphological situations which he considered to be promising for the preservation of Archaic materials in stratified context. They were located in areas where alluvial deposition was responsible for covering archaeological sites with sufficient flood-deposited soil to ensure their long-term preservation.

Coe separated the Archaic into Early, Middle, and Late subdivisions based on projectile point variability evident in the stratified sites which he excavated. He felt that changes in projectile point morphology demonstrated ".... that the Archaic, as a period, developed through a series of identifiable cultural units and no longer needs to be thought of as a great heterogenous morass of traits that spread from the mountains to the sea" (Coe 1964:120).

Coe divided the Archaic material he excavated into a series of "complexes," based on comparisons of various cultural components at the Gaston, Lowder's Ferry, Doerschuk, and Hardaway sites. The earliest complex is called Hardaway, followed in time by the Palmer, Kirk, Guilford, and Savannah River complexes. Each of these complexes is distinguished by a distinctive projectile point type, and the sequence is based on temporal change indicated by stratified deposits at those sites. This typological sequence has been found to be sufficiently similar to that which characterizes the Georgia Piedmont to be used there as well. These point types, along with the artifact types listed by Willey and Phillips (1958) as typical of Archaic sites, are the most frequently used diagnostic artifacts used to assign sites or components of sites to specific temporal periods.

Recently, Chapman (1977) has used Coe's strategy for locating and testing Archaic sites in the Little Tennessee River Valley. There he found stratified sites buried in alluvial terraces along the river and in other places where constrictions in the floodplain resulted in the rapid deposition of alluvium.

Chapman's main objective in excavating these sites was to recover levels dating to the Early and Middle Archaic periods (Chapman 1977:17). Radiocarbon dates from Early Archaic levels excavated by Chapman range from 7500+ B.C. to around 6300 B.C. (1977:166). Those from Middle Archaic levels date from around 5800 B.C. to around 5000 B.C. (1977: 167). Those levels with the earlier dates contained Stanly points, and the later dates are from levels containing Morrow Mountain type points.

Chapman (1977:167) concludes his summary of the excavations in the Little Tennessee River Valley by stating,

> "The Archaic period in the lower Little Tennessee River Valley continued for at least another 3500 years after the components discussed above. Late Middle and Late Archaic period sites have been excavated, but a clear cultural chronology has not yet been defined. Only four dates have been obtained on sites of this time period in the area. Unfortunately, these dates cannot be correlated with any diagnostic cultural material, such that time markers similar to the earlier phases can be established. Certainly more research on this time period must be conducted."

Chapman's observation is true not only for the Little Tennessee River Valley, but for the entire Southeastern United States as a whole. The paucity of information from this area concerning the Late Archaic is unfortunately characteristic of the Southeast in general.

Stoltman's (1974) report of his excavations conducted at Groton Plantation in South Carolina provides an extensive discussion and interpretation of Late Archaic deposits from the terminal phase of this period. There were several sites at this location containing levels with fiber-tempered ceramics, but none from the pre-ceramic Late Archaic. In this area, which is near the Savannah River and well within the Atlantic Coastal Plain (Stoltman 1974:1), there were no stratified deposits from the Early or Middle Archaic, although there were occasional surface finds of artifacts attributable to those periods.

Stoltman (1974:17) notes that there are six sites in the Savannah River region with Late Archaic components, but only two of these--Stalling's Island and the Bilbo site--have preceramic levels. All are shell midden sites, and all contain fiber-tempered pottery. Stoltman calls the preceramic phase in this area Stallings I, and divides the ceramic levels into Stallings II and Stallings III phases, based on variations in ceramic traits.

While this terminology is reasonable for the Savannah River region, it is not necessarily valid for areas in the Piedmont. Only further research will show whether the distinctions recognized by Stoltman can be applied elsewhere. This is indicative of the kinds of problems in interpretation which can only be resolved by the investigation of more Late Archaic sites.

One of the few recent reports concerning the Late Archaic period in the Piedmont is that describing 9Mg90, a site which is located on the Oconee River in central Georgia. This site is located on a levee ridge on the west side of the river, and excavation was oriented towards "....exposing a large horizontal expanse...." in order to uncover evidence of a possible living floor (Smith 1981). Artifacts, including flakes, and features were mapped in place so that possible patterning in their distribution could be investigated. Cultural material was sparsely distributed in excavated areas. Smith (1981:20) notes that, "Most lithic activity seems....to have been of the tool maintenance type..." Two occupational episodes dating to the Late Archaic period were represented in the archaeological record at 9Mg90. The earlier of the two seems to have taken place in the late summer, and the later probably occurred in late fall.

The restricted range of activities represented at 9Mg90 indicates that it was a specialized site. Information from sites of this kind can be important in discerning evidence of behavior associated with a seasonal round of subsistence activities. Excavations of sites like 9Mg90 can contribute much to an increased understanding of the behavior of Late Archaic peoples in the Piedmont area of the Southeastern United States.

Interpretations of the Archaic

The usual approach taken in the interpretation of the Archaic has been to emphasize those aspects of the archaeological record which indicate adaptation to the physical environment, especially in relation to subsistence resources. The general orientation of most interpretive accounts is towards understanding the Archaic as a transitional period--an intervening time between the early big-game tradition of the Paleo-Indian period and the trend towards a more sedentary life-style and the beginnings of agriculture which characterize the Woodland period.

The utilization of available resources was the underlying theme in Caldwell's (1958) development of the concept of primary forest efficiency. This exploitation of resources was seen as sufficiently productive to make reliance on horticulture, with its attendant economic risks, unappealing. However, Caldwell (1958:72) also suggested that this abundance of easily obtainable foods might have established necessary preconditions for agriculture, such as "....some degree of residential stability, and interest in and detailed knowledge of plant life...." Primary forest efficiency was seen to be the culmination of long-term familiarty with those subsistence resources associated with a forested environment.

Winters (1974) has approached the question of subsistence procurement during the Late Archaic from a slightly different perspective. He proposed that the Late Archaic period, as exemplified by the Riverton and Indian Knoll sites, was characterized by a subsistence pattern which he calls a harvesting economy. Winters (1974:x) suggests that this type of economy was based on "....a few essential resources, which in this case would have been deer, mussels, and nuts--a triumvirate that has the admirable quality of supplying all known essential nutrients, with the exception of an adequate supply of vitamin C."

The preservation of faunal remains at both Indian Knoll and Riverton was good enough to make it possible for Winters to identify specific components of the prehistoric diet at those sites. Unfortunately, all Late Archaic sites do not contain such well-preserved materials, but the overall environment during that time was presumably such that at least deer and nuts of various types would have been generally available, even though mussels may not have been.

Furthermore, Winters' (1974:x-xi) says that societies which rely on harvesting economies exhibit certain recognizable characteristics. These include a variety of tools and equipment used to obtain and process food, extensive use of a restricted range of floral and faunal resources, the use of baskets and other containers for storage, and the occupation of sites for several months at a time for the purpose of exploiting seasonal resources.

Nether Caldwell's nor Winters' hypotheses have been tested extensively, and some of their arguments may in fact not be amenable to empirical testing. However, both interpretations do provide some basis for inferring factors responsible for the development of a subsistence economy which became increasingly reliant on horticulture during the ensuing Woodland period. Caldwell's explanation is based on the establishment of necessary preconditions through a more settled life style; Winters' interpretation is predicated on the potential for failure inherent in an exclusive dependence on a narrow range of food resources.

However, as they both recognized, the Archaic period has more to offer in terms of archaeological interpretation than exemplifying specific processes operant in culture change, or, at the other extreme, than providing an interesting list of items of material culture. It does offer an opportunity to understand settlement patterns of hunters and gatherers in an environmental setting which presumbaly had the potential for providing at least an adequate supply of food, and more than likely provided much more than that.

In fact, it may be that the development of Caldwell's "primary forest efficiency" was well underway prior to the Late Archaic period, and the beginnings of cultivation may have already have been established by that time. Asch, Ford, and Asch (1972) have found indications of extensive exploitation of plant foods at the Koster site in west-central Illinois as early as 7000 B.C. Kay, King, and Robinson (1981:813) have reported radiocarbon dates of 4257 ± 39 B.P. and 3928 ± 41 B.P. for Late Archaic levels at the Phillips Spring site in western Missouri which contained seeds of squash (*Cucurbita pepo*) and gourd (*Lagenaria siceraria*). Fragments of squash were recovered from Late Archaic sites in the Tellico Reservoir in Tennessee (Chapman and Shea 1981:70). The radio carbon date for these reamins is 2440 ± 155 B.C.

These findings emphasize the importance of obtaining more information about Late Archaic sites throughout the eastern United States. Understanding this period has become crucial for developing an adequate interpretation of the cultural processes which were responsible for the formation of the archaeological record of prehistoric behavior.

Research at 9Pm205

It is apparent that there is much that is poorly understood about the Archaic and its various phases. It is also apparent that future interpretation is contingent upon the excavation of clearly defined and relatively undisturbed sites from this time period. Only in this way can there be adequate recognition of both the diversity and similarity that may exist both within and between sites.

Spaulding (1960:61-62) has stated:

> "....The ideal unit of archaeological study is the assemblage of artifacts produced and used by a single society over a period of time short enough to preclude any marked changes through cultural innovations or shifts in relative popularity of attributes or attributes combinations."

Sites which meet these criteria are unfortunately not often found. It was for that reason that the recent discovery of an Archaic site, designated 9Pm205, in relatively undistrubed circumstances was recognized as having the potential for providing information useful in interpreting various aspects of Archaic period behavior.

This site, located on the Oconee River in central Georgia, was discovered during an archaeological survey of the Wallace Reservoir floodpool. This survey was conducted by the University of Georgia Laboratory of Archaeology under contract with Georgia Power Company. One of the results of this survey was the recommendation that, in order to preserve important cultural resources, the adverse impact which flooding of the reservoir would have on archaeological resources be mitigated by excavation and recovery of cultural materials and other information from a sample of the endangered sites.

9Pm205 was selected for further investigation because preliminary testing had indicated the presence of an Archaic occupation level at the site. Further testing prior to beginning actual excavation showed that one area of the site contained a stratigraphically defined, single-component occupation, undisturbed by later occupants of the area. This site was found to be Late Archaic in temporal assignment, dating to the pre-ceramic phase of that stage.

Because of the discrete nature of the archaeological deposit, it was possible to formulate a research design which could consider questions previously unanswerable with information available from sites dating to the Late Archaic. These questions were directed towards understanding subsistence procurement and utilization of available resources, interpretation of lithic technology, and towards an interpretation of spatial patterning revealed in the distribution of cultural material across the site.

Initial examination of the site indicated that it did indeed provide an opportunity to investigate an "ideal unit of archaeological study," as identified by Spaulding (1960: 61-62). While no one site can be expected to produce artifacts representing the entire range of activities conducted by any prehistoric group, this particular site appeared to contain considerably more than minimal information.

Preliminary observation showed the presence of a dark-stained midden deposit which suggested length of occupation sufficient for the accumulation of organic matter in quantities which would result in such a feature. Fire-cracked rock indicated the presence of hearths, and fragments of charred wood provided further support for the assumption that this site represented more than an ephemeral occupational episode.

It was also apparent that the production of lithic tools had taken place at the site, as there was evidence of the reduction of both quartz and chert raw materials as well as indications of resharpening or rejuvenation of chert tools brought there from elsewhere. It was hoped that sufficient floral and faunal material could be recovered to permit reconstruction of subsistence procurement practices. In short, the interpretive potential of this site appeared to be unusual in view of the undisturbed character of the deposit and the presumed nature of the occupation.

This site appeared to provide a unique opportunity to test hypotheses about Late Archaic technology and resource utilization. The potential for deriving new insight into the behavior of a small group of hunter-gatherers during the pre-ceramic Late Archaic period was exceptional for any area, and was especially important since there was so little previous research done on sites from this period in the Piedmont.

In a sense, this kind of study is similar to reconstructing a social group which existed in the past by the use of ethnohistoric data; some information may be missing, but sufficient evidence is recoverable to support inferences derived from a combination of factual information and ethnographic analogy. It is in this way that archaeology can provide information about past behavior which is unobtainable otherwise and can go beyond description to explanation.

The specific purpose of the archaeological investigation at 9Pm205 was to attempt to reconstruct the kinds of behavior responsible for the formtation of the archaeological record at a discrete, well-defined Late Archaic site. It was hoped that an investigation of a site of this kind could provide information related to utilization of lithic resources, both local and non-local, to subsistence procurement strategies, and to the range of activities conducted by the occupants of the site as those activities were reflected in the distribution of artifacts and features across the site.

CHAPTER II

EXCAVATION AND RESEARCH GOALS

The site which is designated 9Pm205 was initially discovered during a preliminary archaeological survey of the Wallace Reservoir (Figure 3). This survey was conducted for Georgia Power Company by the University of Georgia Laboratory of Archaeology. Sub-surface tests there indicated both Mississippian and Archaic components (DePratter 1976b). As a result of these preliminary tests, several hectares were set aside for inclusion in the mitigation phase of the archaeological investigation of the reservoir.

Site Location

9Pm205 is located on the west bank of the Oconee River in Putnam County, Georgia (Figure 4). Due to geomorphic structural features which affect the placement of the channel of the river at this point, the orientation of the river in the vicinity of the site is such that the direction of downstream flow is actually in a northeasterly direction.

The physiographic area in which 9Pm205 is found has been identified as the Piedmont Province of the Appalachian Highland (Fenneman 1938). The site is located in the outer Piedmont, and is approximately 15 km north of the Fall Line

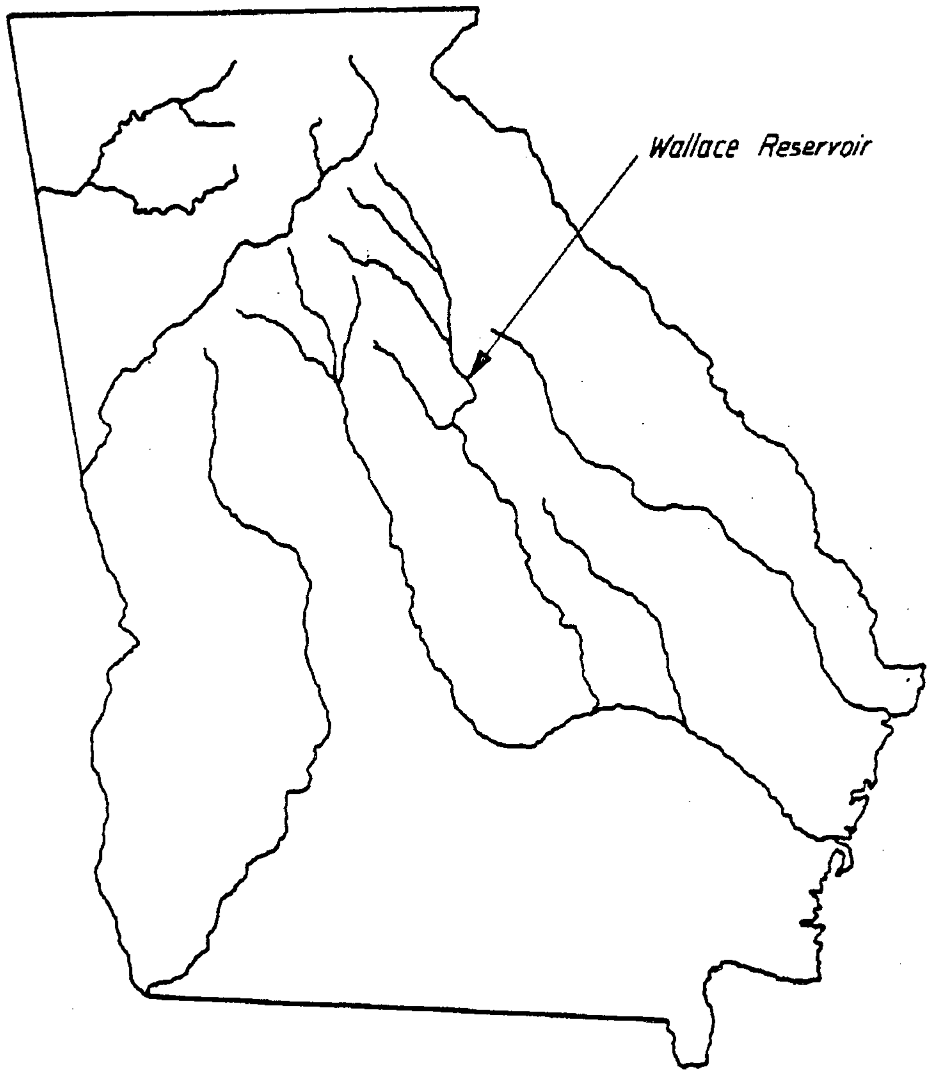


Figure 3. Location of the Wallace Reservoir.

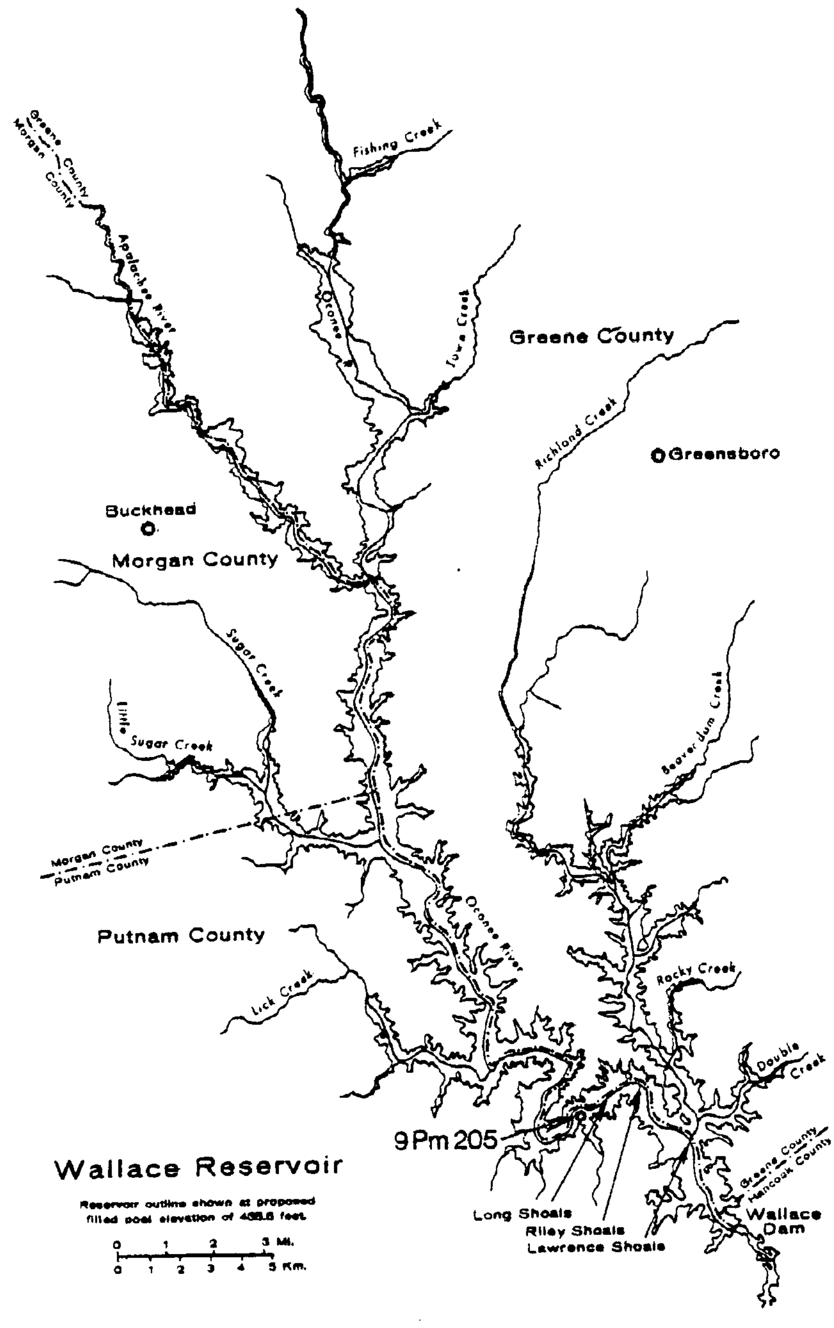


Figure 4. Location of 9Pm205 within the Wallace Reservoir.

by the most direct route. Soils in this area are mostly red and yellow podzolic soils (Hunt 1974), although alluvial deposits of sandy soils are common along floodplains.

The area in which the site is located (Plate 1) developed through the accretional deposition of sand along an old point bar formation (Robert Carver, personal communication). The location of this formation at the upstream end of Long Shoals had resulted in repeated deposits of sandy alluvium along the point bar during high water periods on the Oconee River. When flood waters encountered the obstruction, or knickpoint, created by the granitic outcrop which forms the shoals, heavier particles carried in suspension dropped out as downstream flow slowed at the head of the shoals.

The resultant geomorphological situation is that which Coe (1964) suggested was favorable to the preservation of Archaic sites. In the case of 9Pm205, almost one meter of sandy soil separated the Archaic occupation level from the surface. There is no doubt that this was responsible for the integrity of the deposit, as it was spared contamination from later occupational episodes once it had been covered by alluvial deposits.

The section of the site which is reported in this research was located along an old secondary channel of the river which had become almost completely filled with sandy alluvium. The orientation of the excavated unit in relation to this former channel strongly suggests that the site was situated to take advantage of this proximity, although it is impossible to know with certainty whether the channel was active at the time the site was occupied.

Initial Testing

The area designated for testing and excavation was sufficiently large to allow subsurface examination of several noncontiguous sections of the site. In order to determine the potential for identifying clearly stratified levels of prehistoric occupation, the initial phase of excavation involved profiling the walls of four bulldozer cuts executed by a contractor looking for sand suitable for use in the construction of the dam. Fortunately, this activity was halted before extensive damage was done to the site. In fact, this potentially damaging circumstance was used to good advantage in the preliminary research conducted at the site. Each wall of the four bulldozer trenches was profiled and examined for evidence of prehistoric activity in that area. Each profile indicated the presence of cultural material.

However, with just one exception, there were no clearly defined occupation levels discernible. In this single exception, a faint dark midden deposit was observed at the far southeast edge of Trench IV (Figure 5). As the profile was extended eastward, the midden stain became more distinct and could be seen to contain definite evidence of prehistoric occupation within its limits. It appeared probable that this midden level represented a single occupation, one which was uncontaminated by later inhabitants of the area.

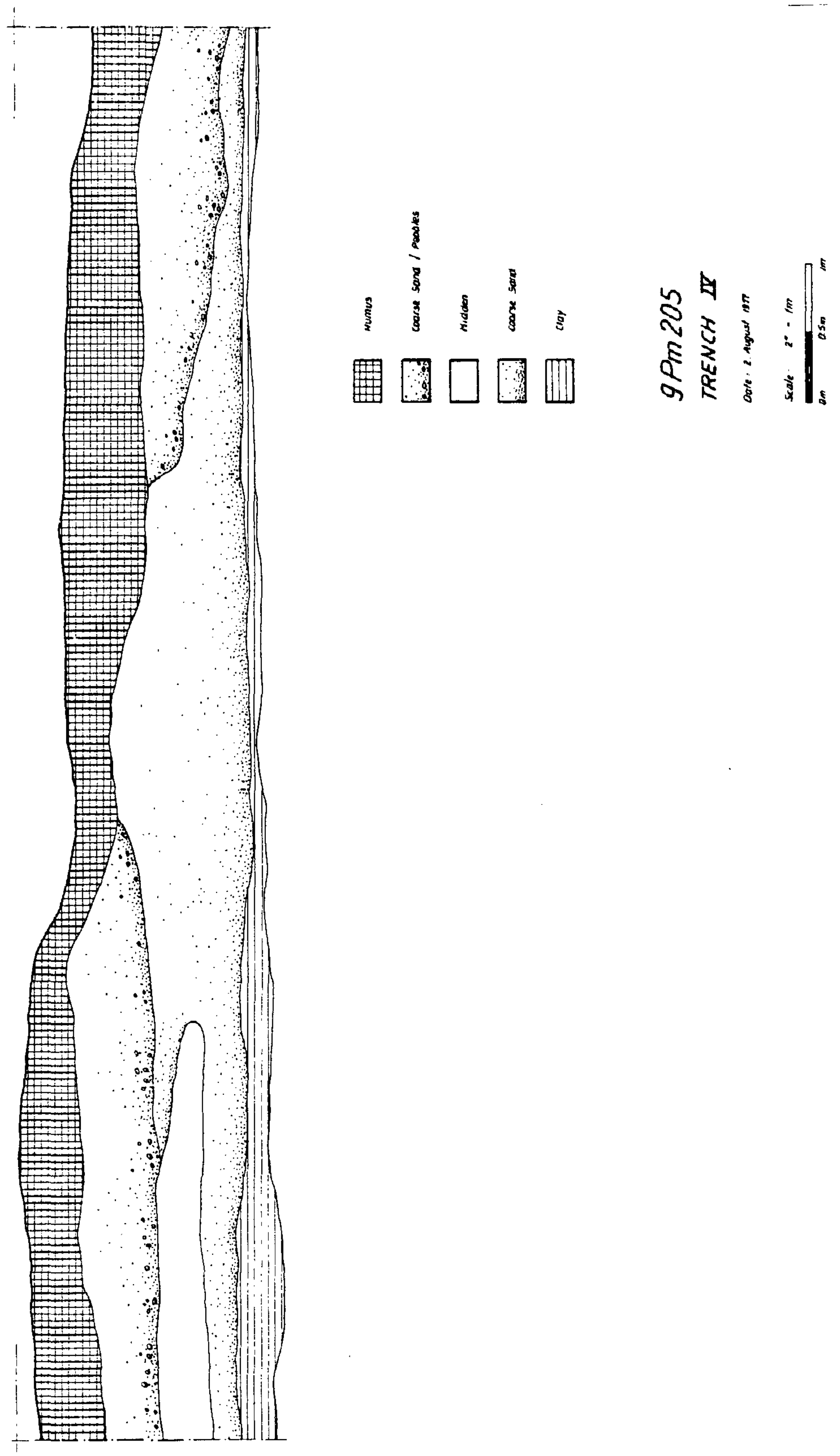


Figure 5. Midden stain in profile of Trench IV.

Further testing suggested that this was indeed the case. A series of post hole tests showed that the dark stain could be identified for approximately 12 meters to the east of its initial point of discovery, and for a similar distance to the north and south. The presence of the old auxillary channel of the river to the west eliminated the possibility of its extending in that direction.

Artifacts were present in each post hole test where the dark stain was apparent. The consistent depth of the midden beneath the surface in all post hole tests and the presence of cultural material in those tests offered strong support for the supposition that this was a single component, well-defined occupation level.

In keeping with the system in use at all sites in the reservoir, this area was designated a "provenience" rather than an excavation unit. The four trenches had been given the designations Provenience I, II, III, and IV, so this excavation unit became Provenience V, indicated as 9Pm205-V in the context of the larger site area. If preliminary survey had disclosed this occupation, it could have received a separate site designator, but its identification as Provenience V was sufficient to insure its recognition as a separate entity within the larger site.

Research Design

The research design which was formulated for the investigation of 9Pm205-V was based on Taylor's (1968:145) dictum that archaeological interpretation whould begin at the site level. As he stated,

> "The cultural materials at one geographic location, usually called a site, pertain to the people who occupied or utilized that location and can be so classified empirically and without recourse to inference....Cultural materials 'undisturbed' and in situ, represent the local group that made, used, or possessed them in the past. Since the local human groups represented by these finds are the only empirical ones with which the archeologist of non-literate and undocumented cultures deals, they are basic and constitute the starting point of all archeological taxonomy."

Later, Taylor (1968:145) restates this point cogently, saying that, "....the primary concern of the archeologist should be directed toward the depiction of the culture of a human group represented at a single site or fraction thereof." Only with secure interpretations of single sites can inferential statements concerning relationships between and among sites be made.

In order to provide as complete an interpretation as possible of the behavior which was responsible for the formation of the archaeological record at 9Pm205-V, hypotheses were developed to be used in considering as many aspects of the cultural material recovered from the site as was feasible.

The null hypothesis which was established was as follows: No observable variability in any aspect of human occupation will be discernible from the archaeological deposit which forms 9Pm205-V.

A series of alternative hypotheses, or test implications, were then developed. They are as follows:

1. Lithic tools will exhibit patterned distribution.

2. Lithic tools of any one type will exhbit morphological consistencies in their attributes.

3. Floral remains will indicate subsistence procurement strategies.

4. Floral remains will indicate seasonality of occupation.

5. Faunal remains will indicate subsistence procurement strategies.

6. Faunal remains will indicate seasonality of occupation.

7. Differential utilization of lithic resources will be indicated by the occurrence of varied lithic materials.

8. Form and distribution of lithic debris, or debitage, resulting from manufacturing processes used to produce stone tools, will indicate reduction techniques utilized to produce those tools.

9. Differential spatial utilization of various areas of the site will be indicated by concentrations of artifacts and other cultural material.

10. Covariation in types of tools distributed across the site will indicate different kinds of activities which took place at various locations within the site.

Excavation of the site was conducted using techniques which would provide information related to these hypotheses.

Excavation Techniques

The Late Archaic level was the only extensive deposit in this area of 9Pm205. The only evidence of later occupation in this area of 9Pm205 was a scattered surface distribution of Mississippian period artifacts. These artifacts were few in number and did not indicate long-term occupation. There was no observable midden in this upper level.

On the basis of this initial testing, a rectangular area extending 11 m east to west, and 10 m north to south was marked off for excavation. Later an area 3 m by 3 m on the northwest corner of the initial excavation unit was also included in the excavation, since the explanatory potential of cultural material in that area seemed to warrant extending the excavation into that vicinity. Of the 119 square meters targeted for excavation, 4.25 meters were not included in the eventual excavation. Of these, one 1 m square in the north central part of the site was not excavated due to the presence of a large tree stump. Another 3.25 m could not be excavated because of their location along the east and north sides of the bulldozer cut where the sand was so unconsolidated that removal in discrete units was impossible. This resulted in the excavation of a total of 115.75 m. A map of the excavation unit is shown in Figure 6 .

Based on the information available from the post hole tests, it initally appeared that the 10 m by 11 m excavation area would be sufficient to ensure the recovery of a major portion of the cultural material which comprised the site.

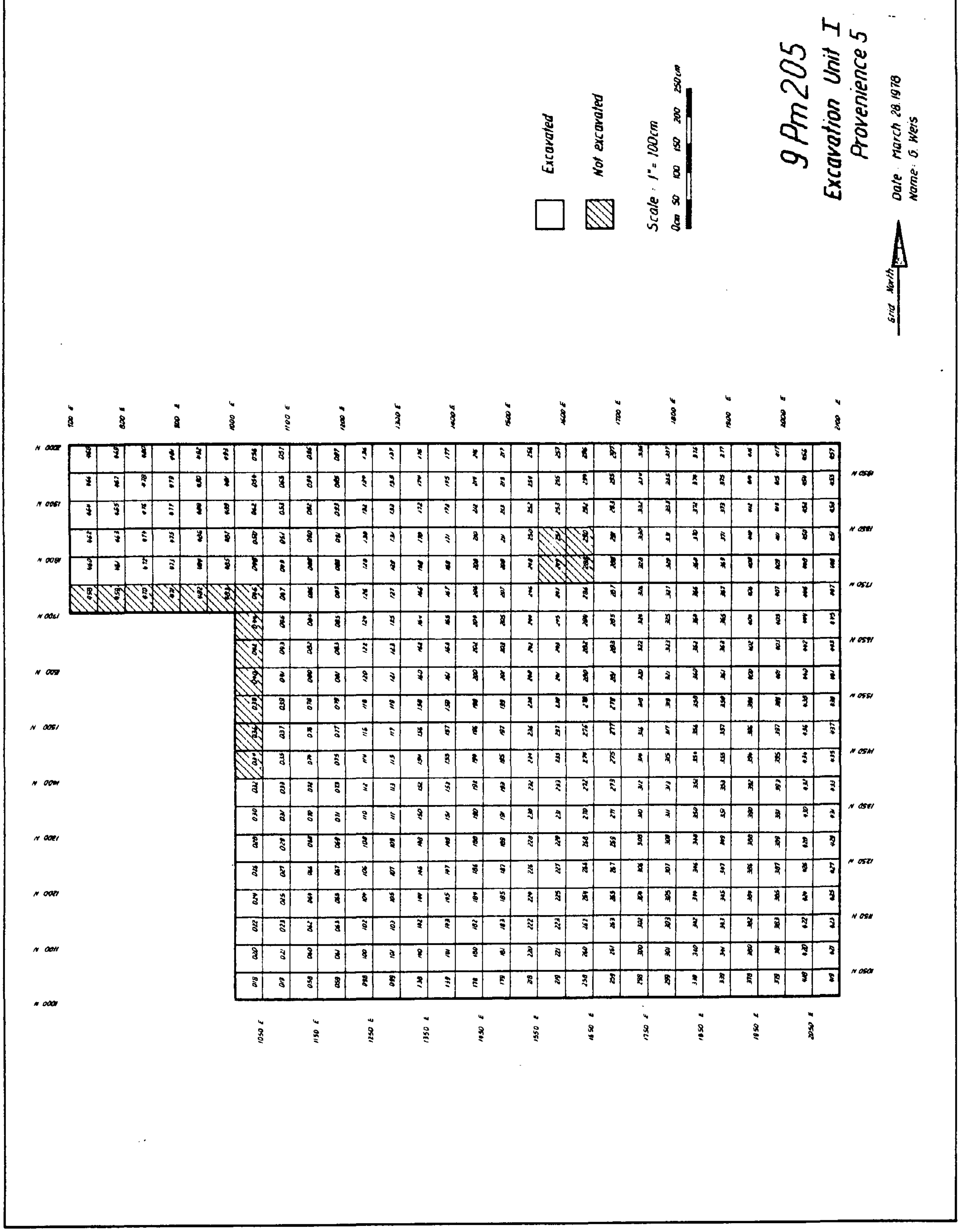


Figure 6. Excavation unit at 9Pm 205-V.

The lower frequency of artifacts found along the north, east, and south boundaries of the excavation unit confirmed that this was the case in those areas. However, excavation in the northwest corner of the unit showed that there were heavier deposits of artifacts in that section than had been suspected, so an additional 3 m by 3 m area was excavated there.

Had time permitted, further exploration in that northwest portion of the site might have proved profitable, but it appeared that sufficient material had been excavated to permit interpretation of the distribution and nature of the archaeological deposit. For that reason, and because the time allocated for excavation of the total site was so short, it was necessary to conclude exploration of the occupation level without excavating the entire cultural deposit. However, based on subsequent interpretation of the material recovered, it appears that at least 50 per cent of the area occupied prehistorically, and most likely 75 per cent of that occupation, was recovered in the excavation of 9Pm205-V.

Following definition of the excavation area, the overlying deposits were removed by hand shoveling to a depth about 10 cm above the dark stained midden level. This deposit was designated "Level A." Artifacts recovered during shoveling were bagged for analysis, but no screening was done. While it would have been preferable to excavate this level using traditional recovery techniques, the amount of time available for excavation of the entire site made it necessary to utilize those methods which were most expedient, as long as they provided acceptable and reliable data. Since several other sites from the Mississippian period were scheduled for extensive exploration the fragmentary material from that period at this site offered little further explanatory potential.

However, the information available from the Late Archaic level seemed to present an unusual opportunity to examine the horizontal distribution of artifacts from a single occupational episode. Since all cultural material appeared to be associated with the dark midden level (Plate 2), it was decided to excavate that level, designated "Level B", as a complete entity.

The site was excavated in 50 cm squares (Plate 3), a size chosen because it was small enough for adequate control of artifact distribution. Since excavation was essentially a salvage project and time was limited, this size unit was considered to be as small as could be excavated efficiently in the time available and as large as could be acceptable if patterned distribution of artifacts was to be a focal point of the interpretation of the site.

The grid was set up with the aid of a transit, so that boundaries were exact. As excavation proceded, linear sections of 50 cm squares were marked and soil was removed in those increments. The presence of the dark stain indicating the midden level with which the Late Archaic artifacts were associated was visible across most of the excavation unit. This made it possible to remove the midden level with some degree of assurance that the occupation level was being excavated in its entirety, as that level was clearly visible and well defined.

The depth of the midden was approximately 20 cm throughout, a figure which is consistent with Gifford's (1980) finding that trampling of artifacts in sand results in a vertical distribtuion of cultural material to that depth. This supports the initial assumption that this site represented a one-time occupation, an assumption which was also supported by the patterned distribution of artifacts across the site.

Although it would have been preferable to have plotted individual artifacts as they were discovered in situ, time constraints imposed by the fact that this was essentially a salvage project made this impossible. Also, the fact that the soil matrix was sandy and unconsolidated made it probable that there had been some shifting of artifacts from their original positions through time, so that exact placement of artifacts at the time of excavation would not necessarily reflect the exact point of deposition prehistorically.

All excavated material was dry screened through quarter-inch mesh. Any item which was retained on the screens was bagged for laboratory analysis, with nothing discarded in the field during excavation. In addition, samples were taken for pollen analysis, radio-carbon testing, and ethnobotanical studies. Individual artifacts which might have been damaged by being bagged with other artifacts were placed in separate bags or in plastic containers. This was done to minimize the possibility of breakage or edge damage during the transportation of artifacts from the field to the laboratory.

Temporal Placement

No material from 9Pm205-V has been submitted for radiocarbon dating. However, its chronological position can be generally established through cross-dating with other sites. Projectile points from the site were almost all of the Savannah River type. These points are found in both preceramic and ceramic levels of the Late Archaic period in the Coastal and Piedmont areas of the Southeast.

In the Georgia Piedmont, as elsewhere in the Southeast, the Savannah River complex is considered to be the terminal phase of the Archaic period as a whole. The diagnostic artifact for this stage is the Savannah River projectile point. These are large, triangular, stemmed points. The stems are straight with parallel sides, with bases which may be either straight or concave. They are made in a variety of materials, with quartz predominant in the Georgia Piedmont. Coe (1964:45) says that this is "....one of the best identified points in the southeast." He notes its occurrence as far north as New Jersey and westward into Tennessee, where it has been called Applachian Stemmed, Benton Stemmed, and Kays Stemmed.

There are also absolute dates available from some sites in the Southeast. Bullen and Greene (1970:11) obtained two radio-carbon dates from Late Archiac levels at the Stalling's Island site. These indicate that the preceramic occupation there dates to around 2750-2500 B.C. Bullen (1961) has also provided radio-carbon dates from the Palmer site in northeast Florida. The preceramic level there is dated at 2140 B.C.

In Stoltman's (1974) synthetic review of the Late Archaic period on the Coastal Plain, dates are provided for ceramic levels at several sites. These include the shell ring at Sapelo Island, dated 1750 B.C. ± 350; the Delaney site in Chatham County, Georgia, dated at 1820 B.C. ± 200; and the lower levels of the shell midden at the Bilbo site, which range from 2175 B.C. ± 115 to 1750 B.C. ± 125, with an aberrant date from the uppermost level of 3550 B.C ±115.

Although these dates are uncorrected, it appears that the preceramic Late Archaic dates between 3000 B.C. and 2000 B.C. The level at 9Pm205-V contained no ceramic artifacts at all, so its date can be presumed to fall somewhere within that range. Advances in radio-carbon dating of very small pieces of charcoal may make it possible to date the fragments which were recovered from the site, so perhaps at some time in the future the site can be assigned to a more specific time period. Hoever, for interpretive purposes, the relative temporal placement of the site is sufficient.

Analytical Techniques

All cultural materials recovered from the site were quantified and recorded by squares to aid in the recognition of patterned distribution. For lithic artifacts, a special form was developed for use in the laboratory. This form was designed to provide information relevant to the questions under consideration. This form is shown in Appendix I.

Categories for this table were developed after examination of all lithic material to determine those characteristics which were considered important in interpreting the variability present in those artifacts, and to ensure that no possible attribute which could assist in the interpretation of variability in patterned distribution of artifacts across the site was neglected.

It was evident from preliminary examination that differences in color were important in analyzing both chert and quartz materials, since it was presumed that it might be possible to identify the areas in which these tools were produced if tools and flaking debris were similar enough to infer that they came from the same source.

While differentiation of artifacts made from chert by their color is not a new procedure, there is no published literature which refers to the separation of quartz tools or other quartz artifacts on the basis of color. Extensive examination of quartz from 9Pm205-V indicated that categories based on color could be used to develop inferences concerning differential lithic resource utilization. For example, vein quartz from the site tended to be white in color more frequently than did quartz from other sources. Cobble quartz was usually either reddish or yellow in color. It was possible to differentiate cobble quartz from vein quartz based on the presence or absence of flakes with indications of an outer "rind" or "skin" on individual flakes. This skin is a characteristic feature of cobble quartz (Charles Schroder, personal communication). It results from cobbles having been tumbled and smoothed by water action.

For purposes of this study, "debitage" was defined as the residual material which resulted from the reduction of siliceous stone for the purpose of making or rejuvenating flaked stone tools. Sometime this debitage took the form of recognizable flakes which had been struck from the parent material, and other times it consisted of formless debris.

Recording the size of chert flakes and other miscellaneous pieces which comprised the debitage made up of that stone was considered important because the presence of large flakes tends to indicate primary reduction of this material to provide flakes suitable for the on-site manufacture of tools. Smaller flakes tend to indicate resharpening or modification of extant tools which were manufactured elsewhere and brought to the site.

Quantifying the size of quartz flakes and other quartz debitage was considered important because it provided some measure of control for determining whether the debitage was produced by preparation of a core prior to producing flakes, or whether reduction was accomplished by some other means. The quantity of quartz debitage recovered indicated that tools had been manufactured at 9Pm205-V, but the means of reduction was unclear.

In fact, research related to the production of quartz tools is nearly non-existent in archaeological literature. The same is true of analysis of quartz tools themselves. This is due in large part to the fact that, as Hayden and Kamminga (1979:8) have noted, "....of all the crypto-crystalline lithic materials, quartz is the most problematical and does not seem to be susceptible to polishing, smoothing, or striating under most conditions."

Baker (1976) conducted experiments directed at determining the frequency of identifiable characteristics observable after detachment of flakes using both hard and soft hammer percussion. The raw material used was obtained from a quarry site in Putman County several kilometers north of 9Pm205, and was similar to quartz from that site. Morphological characteristics used in analyzing chert debitage, such as bulb of force, eraillure scars, and compression rings were infrequent on quartz flakes detached by either method. The major differences in flakes produced by the two methods were that soft hammer flakes were concave while hard hammer flakes exhibited no curvature, and point of percussion was identifiable on hard hammer flakes 70 per cent of the time, while this characteristic was present on soft hammer flakes only 30 per cent of the time. Baker then examined flakes from a surface site near the quarry site from which the experimental material was obtained, and found that the morphological characteristics observed in his experiment were present on aboriginally produced flakes. However, this limited study provides only basic information related to the reduction of quartz material for tool manufacture.

Although there were some whole and broken flakes recovered in the more than 18000 pieces of quartz debris found in the excavation unit, much of this material consisted of "shatter"-type residue rather than flakes exhibiting characteristics attributable to distinct and separate production techniques. This suggests the breakage of large pieces of raw material using an anvil technique, rather than hard or soft hammer percussion. That, combined with the difficulty of recognizing specific attributes which could be assigned to either of those techniques, made further analytical examination unprofitable.

In addition to debitage and formless debris, various tool types were also noted and recorded on the coding sheet. Those types of flaked stone tools which occurred at 9Pm205-V included projectile points, knives, scrapers, perforators and gravers, drills, backed ovate flake tools, unspecialized flake tools, combination scraper/knives.

These types were defined as follows:

Projectile point: A tool used as a spear point. Projectile points may be unifacially or bifacially flaked.

They are generally roughly triangular in shape, with edges which form the sides of the triangle sharpened to form a point (Plate 4). The base may be stemmed. Large projectile points may also have functioned as cutting implements.

Knife: A tool designed for cutting. Knives are usually elongated and roughly triangular in shape, with one or both edges sharpened (Plate 5). They may be unifacially or bifacially flaked, and vary in size.

Scraper: An implement used for scraping. Scrapers tend to be rounded, and sometimes exhibit flaking intended to prepare an edge for use only in a restricted area (Plate 6). Size is variable. Preparation is often unifacial.

Graver: A tool with a spur protruding from one or more edges. These may be manufactured by modification or rejuvenation of existing tools.

Drill: These tools are frequently cruciform in shape, with a long and slender projection forming the drilling portion of the tool (Plate 7).

Backed ovate flake tools: These artifacts have one backed or blunted edge and appear to have been manufactured by retouching a flake unifacially to provide a cutting edge. These are semi-oval in form, and at 9Pm205-V were made only from quartz.

Unspecialized flake tools: These are unifacial tools without distinguishing formal characteristics. These tended to be modified by unifacial flaking only, or were used without retouch.

Combination scraper/knives: These tools have both a cutting and scraping edge, and vary in shape within the constraints imposed by their dual function.

Perforators: Perforators are bifacial tools designed and modified for use in piercing (Plate 8). The sharpened point which characterized these tools is usually shorter than the point of a drill, and is longer than the point which characterized a graver.

Also found at 9Pm205-V were artifacts made from ground stone. Those that were manufactured by intentional grinding were made from steatite and diabase. Also found at the site were pieces of amphibolite which had been modified by use. Categories for classifying these artifacts were included on the analysis sheets. Examples of hammerstones, diabase tools and perforated steatite are illustrated in Plates 9-11.

An additional type of lithic artifact which was recovered from 9Pm205-V was fire-cracked rock and other miscellaneous stone. This material was sorted, weighed, and then discarded in the preliminary sorting of artifacts in the laboratory set up for processing materials recovered from sites excavated in the Wallace Reservoir. Unfortunately, a request that a sample of this type of stone be kept was not honored, so that none of this material was available for subsequent re-analysis by the author.

Since lithic tools, debitage, and other types of stone artifacts comprised the majority of the cultural material recovered from 9Pm205-V, special attention was paid to the explanatory potential of this class of artifacts. It was hoped that evidence of spatial patterning, differential utilization of varied lithic resources, and technological variability would be sufficiently recoverable to allow the recognition of the behavioral processes responsible for the formation of the archaeological deposit at the site. Therefore, research and analytical strategies were directed towards obtaining as much information as possible which might contribute to that recognition.

A further goal of the research related to 9Pm205-V involved the reconstruction, to whatever extent possible, of environmental conditions during the time when the site was occupied. This included using floral and faunal remains for interpretive purposes, and an investigation of any information available which could be used to infer climate. It was hoped that data from various sources could be used to strengthen interpretations based on inference as well as to provide explanations for the empirical data recovered from the site.

Since the environmental conditions in this area at present are such that subsistence resources are generally available without requiring extensive travel to obtain either animal or vegetable foods, it was presumed that site location might reflect the procurement of specific types of resources, perhaps of a type restricted to a particular micro-environment, or a kind of food available only seasonally.

Research Implications

The potential for recovering information from a site of this type made it seem ideal for an examination of the kinds of behavior responsible for the development of the archaeological record at a single component, one-time occupation from the Late Archaic period in the Piedmont area of Georgia. The vertical separation of the site from later deposits and the apparent absence of earlier underlying deposits provided an unusual opportunity to examine a distinct and well-defined living floor.

The horizontal extent of the occupation made it apparent that there was sufficient recoverable information to permit the development of inferential statements concerning the approximate size of the group of people responsible for the cultural deposits at the site. The nature of those cultural remains made it seem likely that it would be feasible to discern activity areas within the site. It also seemed likely that there would be possible indications of subsistence-related behavior as well as of methods used in the manufacture of stone tools.

The underlying assumption which has influenced previous interpretation of Late Archaic sites is that the level of sociocultural organization at that time is best described as that of a hunting and gathering band. Flannery (1974) has defined bands as simple egalitarian groups lacking formal leadership and characterized by weak concepts of territoriality. These groups are usually based on kinship ties or marriage rather than political or other kinds of affiliation.

Service (1979:4-6) has identified several characteristics which he feels distinguish bands from other types of social groups. He says that bands, since they usually rely on foraging for much of their subsistence requirements, are usually nomadic. This has the effect of causing material possessions to be transportable and generally simple. Service also feels that the social organization of bands is affected by their nomadic life-style. He suggests that kinship is the most important organizing factor at this level of social organization, so much so that he states (1979:6) that, "....the band level of society is a familistic order in terms of both social and cultural organization."

Based on ethnographic analogy with modern hunter-gatherers, a band would be composed of a small nomadic group of individuals who exploited available subsistence resources until those resources diminished in availability or appeal. Structures would be impermanent, and items of material culture would be restricted to items which were either immediately available, or could be easily transported.

Lee (1968:35), in a study of the !Kung Bushmen, found that they move their camps five or six times a year, although they seldom move more than "ten or twelve miles from the home water hole," with new campsites sometimes "only a few hundred yards away from the previous one." He also found that they maintained their diets at more than adequate levels by spending twelve to nineteen hours a week in hunting and gathering activities, even though the !Kung live in a relatively harsh environment. Lee (1968:39) calculated that the food brought into the camp during his study period provided an average of 2140 calories per person per day, even though his observations were made during a time of extreme drought. Sixty to 80 per cent of foods consumed were, by weight, vegetable foods gathered by the women in the group. Men provided meat in the form of small game as well as larger animals. The number of Bushmen living in the camps studied by Lee ranged from a low of 8 to 107, with an average population of 42.

Williams (1968), in a study of Bihor bands in India, proposed that the minimum size for a band to function as an exogamous unit within a larger system is between 35 to 75 individuals, and that the maximum size would also be near this figure. These calculations are based on the number of individuals who would be needed to "....provide marriage connections with the average number of territorially contiguous groups," which is calculated as 5 to 6 (Williams 1968: 131).

The occupation level at 9Pm205-V appeared to provide an opportunity to determine whether the kind of behavior responsible for creating the archaeological deposit fit any of the criteria developed through studies of modern hunting and gathering groups. While using this kind of analogous comparison can only be considered inferential, it does seem to provide an acceptable mechanism for interpreting prehistoric behavior.

Another method for interpreting behavior from archaeological data is through the examination of patterning in the distribution of artifacts across a site. Based on the assumption that human behavior tends to be patterned, and that the results of behavior leave evidence of that patterning in the archaeological record, it seems likely that, as Whallon (1974:116) has stated,

> "....at least some human activities will be spatially separated within most places of occupation and that the areal differentiation of activities will result in the differential distribution of tool types over an occupation area as a consequence of their different uses in the various activities carried out at that site."

This can be extended to include other kinds of activities as well. While all activity of a hunting and gathering group would not have been concentrated within the actual living area itself, sufficient activity should have taken place there to make possible at least a restricted interpretation of some aspects of Late Archaic life-styles.

CHAPTER III

PREHISTORIC ENVIRONMENT

Since access to resources related to subsistence strategies is presumed to be an important variable in the selection of locations for sites by prehistoric peoples, and since the mode of subsistence procurement during the Archaic period in southeastern prehistory is thought to have been primarily one of hunting and gathering, factors associated with those activities assume special importance in the interpretation of the behavior responsible for the placement and utilization of any particular site. While it is impossible to know whether specific factors were objectively recognized by the prehistoric occupants of the site, their existence and the possible effects of their role in the selection of a site's location cannot be ignored.

Although all features of the past environment at 9Pm205-V cannot be reconstructed with certainty, physiographic features can be identified, and other aspects of the environment can be inferred from information available from the site and from other sources. The near absence of faunal remains and the scarcity of floral remains from 9Pm205-V makes it necessary to infer general conditions from information available from other sources, since the specific environment eludes reconstruction.

Topography

The immediate area in which 9Pm205-V is located presumably provided an optimal situation for exploitation of a variety of subsistence resources. An extensive outcrop of granitic gneiss immediately downstream from the site forms an obstruction or kinckpoint in the channel of the Oconee River. This abrupt stoppage of the river's flow creates two diverse riverine micro-environments: a deep water channel to the north of the site, and an extensive shallow water shoals, known as Long Shoals, just to the east (Figure 7).

Topographic features in the general area of the site suggest that it is likely that it was situated on the bank of an auxillary channel of the river. This channel was indicated by a longitudinal depression oriented from northeast to southwest. At the time of the site's excavation, this former secondary channel was observable as a shallow sand-filled depression.

Although some changes, such as the filling of this auxillary channel, seem to have occurred in the past, the geomorphology of the area is such that the major structural features are essentially the same as they were when the site was occupied. In fact, Smith (1956:633), in referring to changes which occurred during the Quaternary period in the United States, says that by the Xerothermic Interval, which he suggests took place between 6000 B.P. and 4000 B.P. (or

Figure 7. Location of 9Pm205 in relation to Long Shoals.

4000 B.C. and 2000 B.C.), "....the ice had retreated to the polar region, and the topography and drainage patterns were essentially those of today."

While there have no doubt been minor variations in the positions of auxillary channels and back swamps associated with the Oconee River, the geologic features of the surrounding area are such that no major changes are likely to have occurred.

Climate

Climatic conditions during the Late Archaic are thought by some researchers to have been warmer and drier than those today, while others feel that essentially modern conditions were well established near the end of that period in prehistory.

The warm and dry climatic episode thought to have occurred between 6000 and 4000 years ago is variously referred to as the Altithermal, Megathermal, or Hypsithermal Period, or sometimes as the Xerothermic Interval (Wright 1976). The term used most often in archaeological literature is "Altithermal," although biologists prefer "Hypsithermal."

Evidence for this climatic event is based on pollen cores and dendrochronological records used to interpret climate in the southwestern United States. Since conditions seem to have varied considerably from one area to another, a reliable reconstruction must utilize information from a variety of sources. It must also be recognized that general trends may not represent exact conditions at specific locations, but that micro-environmental differences probably occurred then just as they do today.

Furthermore, the climatic history of the Southeast is not clear even where pollen curves have been obtainable. Wright (1976:586), in discussing this evidence, says that for the southeastern United States,

> "....the climatic sequence is not at all clear, partly because of the problem of differential migration of various major tree types, and partly because of the great expansion of southern pines throughout the area about 6000 years ago. Pollen of the ten species of southern pines cannot be distinguished at present.... Climatic controls on distribution of most of these pines are not obvious. Increased pollen percentages for swamp cypress, black gum, and other swamp trees probably indicate lake filling rather than climatic change."

According to Wright (1976:594), "The Hypsithermal in the southeastern United States seems to have terminated about 6000 years ago." This places the end of this period near the beginning of the Late Archaic archaeological period.

Watts (1980) would place the termination of this climatic episode even earlier. His examination of pollen present in cores from White Pond, South Carolina, on the Inner Coastal Plain, shows a progression of species indicative of a generally warmer climate, and he states that, "....About 7000 yr B.P.....a forest essentially like the modern forest was established" at White Pond (Wright 1980:194). This location is farther north than 9Pm205, but it seems reasonable to assume that modern forest conditions could have been established there at apporximately the same time.

Wharton (1978:12) has proposed that modern environments were established in the Coastal Plain of Georgia by 5000 years ago. If Wharton is correct in his interpretation, it seems likely that 9Pm205, which is fairly close to the Coastal Plain, would also have had an essentially modern environment at the same time.

These interpretations refer, however, to long term climatic trends. It is not improbable that there were fluctuations in temperature in the past just as there are today. There is some evidence which may indicate short term variation in the environment between 4000 and 4500 years ago, or well within the Late Archaic archaeological period. At that time, there appears to have been a lowering of sea level which might have been sufficient to have affected regional climate to some extent.

DePratter (1977:11) found that shell middens of the St. Simons phase, a terminal Late Archaic period on the Georgia coast with sites which were first occupied by 2300 B.C., "....indicate that sea level was approximately 1.5 m to 2 m lower than at the present time."

There is corroboration from the northwest Florida coast for this lowered sea level. Schnable and Goodell (1968), in their investigation of the development of coastal areas in the vicinity of the Apalachicola River, used subsurface sediments to determine that between 4000 and 4500 years B.P., sea level was approximately 15 feet (about 4.5 m) lower than it is at present. They say that sea level there "....approached its present level asymptotically in the last 3000 to 3500 years, after a rather abrupt rise from a slightly lower level (c. 15 feet) 4000 to 4500 years ago" (Schnable and Goodell 1968:60).

Dates from these two sources appear to be contemporaneous, indicating that both the Atlantic and Gulf coasts exhibited lowered sea levels at that time. The effect of change in sea level on climate is not well understood, but it is possible that this lowered sea level could have had some effect on local weather patterns. While this could have been a minor change when viewed in the larger context of long term weather patterns, it is only necessary to consider the effect minor changes in weather patterns, such as unusually dry or cool conditions in the spring of the year, can have on wild foods which presumably formed an important part of the Late Archaic diet. Perhaps in time sufficient archaeological evidence can be recovered to help provide a better understanding of minor climatic variability in the past.

Vegetation

If Watts, Wright, and Wharton are correct in stating that the environment in the Southeastern United States was essentially modern by 7000 to 5000 years ago, then examination of recent vegetation should provide important information concerning edible foods available prehistorically. However, agricultural practices have changed most areas so drastically that modern vegetation may be more the result of cultural practices rather than natural processes.

There are, however, some accounts available from the late eighteenth and early nineteenth centuries which can be used to infer what the vegetative cover of the area was at that time. Observations of William Bartram, a naturalist who traveled throughout the Southeast in the late eighteenth century, include several comments concerning the vegetation of the Georgia Piedmont. Bartram traveled through part of present-day Greene County, which is immediately east of Putnam County, in 1773. There he encountered a forested area which he described as a "sublime forest" (Harper 1958:24); he further stated that many of the black oaks which predominated in the forest were more than 30 feet in circumference.

In 1775, Bartram stopped overnight on the banks of the Oconee River south of present-day Milledgeville, where he describes camping "....in a delightful grove of forest trees, consisting of Oak, Ash, Mulberry, Hickory, Black Walnut, Elm, Sassafras, Gleditisia, &c" (Harper 1958:240). The Gleditisia referred to by Bartram is either honey locust or water locust, according to Harper (1958:517).

DeVorsey (1971) used original survey plats from this same area to determine the accuracy of Bartram's description of a predominantly hardwood forest in Greene County. He quantified individual species recorded on these early maps, and found that, of 197 trees identified as to species, 57 per cent were oaks, 23 per cent were other kinds of hardwood, and 18 per cent were pines (DeVorsey 1971:28). He felt that his findings supported Bartram's description of the nature of the forest at that time.

In an attempt to reconstruct eighteenth forest over the entire State of Georgia, Plummer (1975) used original land survey maps and field notes which accompanied those maps to reconstruct as nearly as possible the various percentages of different kinds of trees represented across the landscape at that time. The area nearest 9Pm205 which is included in Plummer's study is Bibb County, which is to the southwest. Plummer divided this county into two sections: a northern one where soils were characteristic of Piedmont types, and a southern one with typical Coastal Plain soils. In the northern Piedmont section, trees which predominated at the time of the original surveys were post oak, pine, red oak, and white oak, in order of decreasing frequency (Plummer 1975:10, Table 2). These observations came from survey maps prepared in 1807 and 1821.

Based on his analysis of species recorded on these early maps, Plummer (1975:16) found that, "Surveys of the Piedmont covering more than a half million acres showed that the dominant vegetation was oak-pine-hickory, having a ratio of about 53:23:8, respectively, with 32-34 different kinds of trees."

Whether this distribution, or that determined by DeVorsey, can be applied to forests which covered the area 4500 or more years ago is uncertain. It may be that even as early as the late 1700s sufficient agricultural or timbering disturbance had taken place to affect the composition of the forests. As DeVorsey (1975:28) has observed, survey plats are "....only one source of data and represent a somewhat biased sample of what the original forest was really like. They are biased because surveyors probably tended to select a hardwood tree on which to strike a blaze rather than a less durable pine, if the choice was available."

Informal observation of the vegetation in the area before the reservoir was flooded indicated pine plantations in the uplands and mixed hardwood forest in the bottomlands. Wood (1979:7) noted that pine plantations in the area were the result of tree planting by pulpwood companies, but the probablilty is great that they were occupying a niche to which they are naturally well suited rather than representing an exoctic species.

Regarding the modern vegetation of the Piedmont region, Whitehead (1965:418) says that "....largely coinciding with the Piedmont lies the oak-pine forest region. The dominant trees of this association are oaks and hickories (numerous species of both.) Pines are abundant, especially on poorer soils." This description of modern Piedmont arboreal vegetation agrees well with the results of the analysis of carbonized wood recovered from 9Pm205-V, which consisted of ring-pourous hardwood and pine, presumably from wood used for firewood.

Fauna

Faunal preservation was so poor at 9Pm205-V that the only identifiable remain recovered was one drum fish tooth. However, if the environment was essentially the same in the past as it is in the present, it would seem that there would have been abundant resources available in the immediate area.

The site's location at the juncture of deep and shallow water sections of the river would have made riverine resources from both areas readily accessibly. The popularity of the shoals area to the south of the site with local fishermen suggests an abundant modern fish population there. During the excavation of the site, turtles were observed swimming in the deep water upstream from the shoals, and presumably other edible species would have been present there too.

Shapiro (1981) suggests that the shoals areas of the river were particularly important sources of riverine subsistence resources because they provided "....a juxtaposition of microenvironments that were suitable for fish species of both slow and fast-water preference....rapid channels alternate with relatively still pools that lie immediately upstream; bottom characteristics include both rocky and sand bottoms, and the relatively still pools collect detritus, a major food source for bottom feeding fishes."

Wharton (1978) has recorded a number of faunal species associated with floodplain environments in the Georgia Piedmont. Among these are frogs, turtles, otters, minks, raccoons, muskrats, swamp rabbits, beavers, and several types of water fowl. White-tailed deer are common in the area, and were observed in the proximity of the site on several occasions. There may have been other types of mammals in the area prehistorically, but there is no indication of this in the archaeological record.

Inferring prehistoric resources from modern species is of course only speculative. However, if conditions during the Late Archaic were reasonably similar to those today, there would have been sufficient and adequate resources to support a band of hunters and gatherers.

Lithic Resources

Analysis of lithic artifacts recovered from 9Pm205-V indicated utilization of several major types of lithic raw materials. Among these were quartz and quartzite, chert, steatite, diabase, and amphibolite. As far as can be determined, all lithic material with the exception of chert could have come from nearby sources. The lithic sources appear to have been recognized and exploited for their various attributes, with specific materials intentionally selected for special properties.

The general geology of Putnam County has been described by Libby (1971:4) as follows:

> "Putnam County lies in the Charlotte Belt of meta-sediments and meta-volcanics, characterized by extensive amphibolites and mafic intrusives. Metamorphic rocks comprise most of the county, consisting of gneisses, schists, and meta-volcanics. Igneous rocks include granites, pegmatites, mafic and utlramafic rocks, and diabase rock dikes."

These lithic resources are sufficiently diverse to have provided all types of materials except chert found in the archaeological deposit at 9Pm205-V. Furthermore, the proximity of all except chert would have made them readily available to prehistoric populations. It therefore seems reasonable to assume that the lithic materials found archaeologically represent utilization of nearby resources.

The major types of lithic materials utilized prehistorically are amphibolite, chert, diabase, quartz, quartzite, and steatite. These are defined in the Dictionary of Geological Terms as follows:

Amphibolite: "A crystalloblastic rock consisting mainly of amphibole and plagioclase. Quartz is absent, or present in small amounts only." This type of rock exhibits large crystals which can be seen without the aid of a microscope and has a coarse, abrasive texture.

Chert: "A compact siliceous rock of varying color composed of microorganisms or precipitated silica grains. Occurs as nodules, lenses, or layers in limestone and shales." Chert has a smooth texture and exhibits regular and predictable fracturing properties, making it an ideal rock for manufacturing chipped stone tools.

Diabase. "A rock of basaltic composition, consisting essentially of labradorite and pyroxene, and characterized by ophitic texture." Diabase has a characteristic "cross-hatched" appearance when viewed under magnification and has a texture similar to fine-grained sandpaper except when been smoothed by polishing.

Quartz: "A mineral, SiO_2. Hexagonal, trigonal-trapezohedral." This is the term usually applied by archaeologists to refer to the form of quartzite which is generally microcrystalline rather than predominantly granular in appearance.

Quartzite: "A granular metamorphic rock consisting essentially of quartz." This term is frequently used by archaeologists to describe macrocrystalline rocks which are composed mainly of quartz.

Steatite: "Massive, in many cases impure, talc-rich rock." Steatite, which is also referred to as soapstone, has a smooth, somewhat slippery surface when polished. It is often soft enough to be scratched with the fingernails, and can be shaped easily.

While these raw materials may have been available in small quantities in the form of "float" rock or from minor outcrops in the immediate vicinity of the site, there is no information currently available to indicate that this is so. However, there are recorded outcrops of these materials sufficiently nearby to provide evidence that these materials were locally available, and for that reason would not have had to be brought into the area by long-distance trade or by travel to distant locations. While these outcrops may not have been utilized as extensively as minor sources nearer the site, their existence establishes that raw materials were available and accessible in the general proximity of the site.

The occurrence of each of these rocks in the area near 9Pm205-V is as follows:

<u>Diabase</u>: According to Libby (1971:17), "The igneous and meta-igneous rocks of Putnam County have been intruded into Charlotte Belt biotite gneisses and hornblende gneisses in the northwestern and extreme southeastern portions of the county." Included in these intrusive rocks is diabase, which occurs in the form of dikes. The largest of these is less than 15 km to the northeast of 9Pm205. Libby (1971:74) indicates that this large dike is "about 2000 feet long and up to 100 feet wide."

<u>Amphibolite</u>: Libby (1971:18) notes the occurrence of "plutons of a coarse-grained, iron-rich amphibolite" at three locations which are all less than 35 km from 9Pm205. The occurrence of this material in the archaeological remains at the site indicates it was utilized as an abrasive substance. The archaeological specimens show indications of wear which suggest their use in that manner.

<u>Steatite</u>: An extensive study of steatite outcrops and quarry sites in the Wallace Reservoir area has been undertaken by Elliott (1980). This study incorporated geolog-

ically reported occurrences as well as those recorded during the mitigation phase of the archaeological research done in the reservoir area. Examination of sites located near 9Pm205 shows a quarry site less than 3 km distant (Elliott 1980:Map 7). The number of steatite artifacts recovered from 9Pm205-V indicates that this was an important raw material in Late Archaic technology at that site.

Quartz and quartzite: Fractured quartz veins occur near the present town of Rudden, which is approximately 15 km northwest of 9Pm205. Libby (1971:33) says that veins "....up to 25 feet thick...and quartz boulders up to five feet in diameter" can be found in the area. In addition to vein sources, the shallow secondary channels of the Oconee River would have provided an easily accessible source of quartz cobbles. Quartz also occurs as "float" in the uplands near the site. While quartz in these forms might not have exhibited the same fracturing properties as vein quartz, this would nevertheless have provided a potential source of siliceous stone for tool manufacture.

Chert: Chert resources in Georgia are found mainly in the Ridge and Valley Province in the northwest part of the state, and in the Coastal Plain. Chert is not found in Piedmont geologic formations in significant quantities, and must be acquired from other areas.

Goad (1979) investigated some of the chert resources found in both the Ridge and Valley Province and the Coastal Plain, using neutron activation techniques to determine variability in trace minerals found in cherts from these two areas. Unfortunately, her quantitative analysis did not include cherts from those sources which are closest to the Reservoir area, so information concerning the structure of those resources is not available.

Perhaps further research will make it possible to understand better the mechanisms by which chert procurement strategies operated prehistorically, especially if methods for recognizing individual sources can be developed. Although the chert resources nearest to 9Pm205 occur less than 25 km from the site, these may not have been the sources utilized by the site's prehistoric occupants. However, the chert boulders and other types of deposits reported in Washington County by Veatch and Stephenson (1911) would have certainly been close enough to the site to have been exploited without requiring excessive expenditure of energy to obtain this material directly, or for it to have been accessible through local rather than long distance trade.

Other possible sources of chert could have been small deposits which have not been identified by geologists, since their reports are often oriented towards deposits which are of regional significance rather than towards lesser manifestations which may be of interest to archaeologists. It may also be that chert was important as a trade item during the Late Archaic, although sources were near enough to be accessible. Its fracturing properties are more predictable than those of quartz and quartzite, and this could have made it such a desirable raw material that it was traded in an inter-regional exchange network. Clarification of this question could provide important answers concerning economic behavior during the Late Archaic.

Importance of Identifying Resources

The occupation level at 9Pm205-V was located in a sandy deposit formed by repeated flooding over a point bar formation (Robert Carver, personal communication). This resulted in the accretioanl deposition of coarse, heavy sand. No stone larger than river pebble size would have been deposited there through natural processes.

The only immediate sources of raw material suitable for tool manufacture or other cultural use would have been the secondary channels of the river where cobbles would have been obtainable. Some stone would have been available as "float" rock on the nearby upland terraces, but specialized requirements for specific kinds of raw materials for the manufacture of stone tools would have necessitated visiting outcrops or other concentrations where these were obtainable.

It is possible that the desirability of a raw material would have been affected by the amount of energy required to procure it. The absolute weight of unmodified stone nodules or fragments would have required substantial expenditure of energy for the transportation of large quantities for any distance from their sources. Therefore, knowledge of available lithic resources would have been of as much importance to the prehistoric occupants of the site as knowledge of other types of resources. This could have been a factor in areal utilization of territories by hunters and gatherers.

Obtaining food supplies would have been of primary importance, and the technology required to obtain and process food would have been a necessary concomitant of that endeavor. For that reason, any investigation of prehistoric behavior must explore all aspects of resource utilization. While resources described here are not all-inclusive, they do represent at least minimum requirements.

Factors such as traditional hunting and gathering territories or even politically restricted territorial boundaries may have influenced site placement as strongly as availability of particular resources, but definition of these ideational concepts must begin with interpretation of activities at individual sites. Only then will there be a basis for inferring territorial restrictions which may have regulated economic behavior. The interpretation of behavior at individual sites is a prerequisite for defining Late Archaic cultural systems in a larger context, and an understanding of the prehistoric environment is a necessary component of any investigation directed towards the accomplishment of that aim.

CHAPTER IV

FLORAL AND FAUNAL REMAINS

Evidence of plant and animal utilization was scarce and fragmentary at 9Pm205-V, due no doubt in large part to the abrasive action of the coarse sand in which the remains were deposited prehistorically. Flood and rain water percolating through the sand would have had a decidedly detrimental effect on preservation. However, the remains which were recovered do provide some basis for interpretation.

Faunal Remains

The only evidence of fauna at 9Pm205-V comes from the presence of a single tooth of the freshwater drumfish, *Aplodinatus grunniens*. While the absence of other indicators of faunal contributions to the prehistoric diet at the site is unfortunate, it is not surprising. Sand is a poor medium for faunal preservation.

One interesting aspect of the excavation is that no shellfish remains were found in this or in other Archaic levels excavated elsewhere at 9Pm205. According to James Rudolph (personal communication),a similar absence has been noted in all Archaic components of sites excavated in the Wallace Reservoir. This is an interesting situation, since

Late Archaic sites in many other areas of the southeast are frequently associated with large shell middens. In fact, the Stalling's Island site, where preceramic levels were first observed in stratified context, was composed mainly of shell deposits (Claflin 1931), as were the sites of Bilbo (Williams 1977), Eva (Lewis and Lewis 1961), and Indian Knoll (Webb 1974).

The Stalling's Island site is located on the Savannah River approximately 110 km from 9Pm205. This is sufficiently close that the absence of shell middens at Late Archaic sites on the Oconee River would not seem to be attributable to lack of knowledge of the edible nature of fresh water shellfish by prehistoric peoples in the general area, at least not on a regional level.

However, sites of this period without shell middens are not uncommon. Walthall (1980:68), in reporting Late Archaic occupations of the Millbrook phase in Alabama, says that,

> "Futato recognized the close similarity between the Millbrook phase material culture and that of the Stalling's Island culture of Georgia. The two sites reported indicate that the Millbrook phase economy was based upon intensive riverine-oriented hunting and gathering. Unlike some contemporary ethnic groups in other areas, shellfish do not appear to have been among their major resources. The large number of cultural traits held in common between this central Alabama Late Archaic phase and the Stalling's Island culture probably reflect similar adaptations to the riverine habitats of the southeastern Coastal Plain."

Caldwell (1954) was aware of this difference in resource utilization, also. As Caldwell (1954:12) indicates,

> "None of the earliest eastern sites show any evidence of dependence on shellfish. Even many of the later Archaic foci did not use mollusca to any appreciable degree. For the East as a whole it is much more usual to find Archaic sites without associated shell middens. It is evident now that the shellfish exploitation described for the Lauderdale, Indian Knoll, Savannah River, and St. John's foci has been overemphasized in the literature. A fairer picture of the Archaic would regard the shell midden peoples as practicing a specialized economy in the areas where the supplies were abundant."

Whether shellfish were available at 9Pm205-V but were not used for food, or whether they were not available at all is a question for which there presently is no answer. It could be that non-utilization of shellfish as a food source may represent cultural variation characteristic of a particular group occupying a river drainage system and perhaps not in contact with groups on other drainage systems. It could also be that the Oconee River was not a suitable habitat for fresh water molluscs, although this seems unlikely given its proximity to areas where shellfish appear to have been abundant. However, there may have been periods when water temperature and sedimentation made this section of the river unsuitable for molluscs. Since environmental data which would support or negate this interpretation is unavailable, this line of reasoning cannot be pursued further.

Of course, it may be that remains of shellfish were originally present but have not been preserved, although this seems unlikely in view of the preservation of shell at other sites of the same time period, and also because of the preservation of shell from later time periods in the Wallace Reservoir itself.

Finally, it may be that the use of similar material culture traits to provide a basis for contemporaneity may be too broad to account for minor variations in climate which could have affected availability of temperature-sensitive molluscs. Coe (1952) notes a similar absence of shellfish in Late Archaic sites in the North Carolina Piedmont. Perhaps more extensive archaeological investigation of sites in situations similar to 9Pm205-V will help to explain the causal factors responsible for this absence of shellfish remains at these Late Archaic sites.

Plant Remains

While ethnobotanical remains have been recovered and analyzed from Late Archaic sites in other areas of the Southeast, such as the Icehouse Bottom site in Tennessee (Chapman 1977), and the Indian Knoll site in Kentucky (Webb 1974), no analyses have previously been available from Piedmont sites. This report provides the first secure evidence for the utilization of plant materials for food and other purposes from that area.

The carbonized remains of non-edible and edible plants, analyzed along with all ethnobotanical remains recovered during excavation of sites in the Wallace Reservoir by

Elisabeth Sheldon, consisted mainly of wood and hickory shell. There were just two exceptions. One was a fragment of acorn (*Quercus* sp.), and the other was a fragment of an indeterminate fruit.

Carbonized Wood

The carbonized wood remains from 9Pm205-V consisted of pine, resin, and ring-porous hardwoods. In all 148 of the squares excavated contained wood fragments, resin, or a combination of both (Appendix II). Only 13 of these, or 9 per cent of the total squares containing carbonized wood in some form, contained hardwood. One hundred twenty-three, or 84 per cent, contained pine, resin, or both. The wood in 23 of the squares was not identified as to type.

In an analysis of firewood found in Late Archaic levels at the Koster site in west-central Illinois, Asch, Ford, and Asch (1972:6) note that the species used in hearths implied the collection of fallen branches and deadwood to be used for fires. They noted no indication of "....strong cultural selection for a few species, at least for the activities which produced the most charcoal" (Asch, Ford, and Asch 1972:7). According to their findings, expedience rather than intentional selection for specific types of wood was the controlling factor in the choice of wood.

However, there is an ethnograhpic reference from the Southeast which indicates that this may not have been the case in every instance, at least later in time. In John

Lawson's accounts of his travels through North and South Carolina at the beginning of the eighteenth century, he mentions the excellent eyesight of the local Indians, and says,

> "Some alledge, that the Smoke of the Pitch-Pine, which they chiefly burn, does both preserve and strengthen the Eyes: as perhaps, it may do, because that Smoak never offends the Eyes, though you hold your face over a great Fire thereof. This is occasion'd by the volatile Part of the Turpentine, which rises with the Smoke, and is of a friendly, balsamick Nature; for the Ashes of the Pine-Tree afford no fix'd Salt in them." (Leffler (ed.) 1967:176)

Whether the preponderance of pine at 9Pm205-V reflects cultural preference or is related to availability of pine in relation to hardwood at the time of the site's occupation is not clear from the archaeological evidence. There are arguments which can be presented to support either case, but neither can be tested scientifically without additional evidence from contemporaneous sites from the same general environmental setting.

If pine was utilized as the result of some cultural preference, there is no evidence immediately discernible which indicates what might have prompted that choice. Lawson's observation notwithstanding, any interpretation must of necessity be purely speculative. However, two possibilities do present themselves. First, it can be proposed that using resinous pine for cooking would have added flavor to food prepared over a fire in which pine was the major constituent. It can also be argued that pine would have provided intense heat quickly, and this might for some reason have been preferable to the slower burning attributes of hardwood. Although a hardwood fire might need to be replenished less often that one fed by pine, it could be that hearths were used more for short-term cooking than for longer periods for warmth.

It could also be that if pine were readily available, it was used in preference to hardwood because it required less energy to obtain. Pine is less dense than hardwood, and would have been easier to transport, even from nearby sources. If cutting or splitting were necessary, stone tools would be more effective on softwood than on hardwood.

The relatively shallow root system characteristic of pines makes them more susceptible to wind damage than hardwoods, and therefore more reaily available in the form of deadfall wood. Newly felled trees would have been too green to burn, but deadfall wood is ready to use immediately unless it has just recently fallen. The apparent availability of pine in this area during the time period in question indicates that this kind of wood should have been obtainable, if not indeed plentiful.

Of course it is possible that more than one factor was responsible for the apparent preference for pine to be used as firewood. None of the preceding discussion can be considered to be more than speculation. The only fact which can be stated with certainty is that pine occurs more frequently than hardwood in the archaeological remains from this site.

Edible Food Remains

Edible food remains from 9Pm205-V are, with the two exceptions noted earlier, represented by hickory shell and hickory nut fragments (Carya sp.). The distribution of these remains is shown by squares in Table 1 . The two execeptions, one fragment of acorn (Quercus sp.), and one indeterminate fruit fragment, are shown in Table 2.

The near absence of edible remains other than hickory has important implications for defining the time of year at which the site was occupied and also for providing information concerning the diet of its prehistoric occupants. Dispersion of food remains across the site supports the hypothesis that the site was a single component, one-time occupation. Even repeated use which occurred in the same general area at the same time of year over a period of time would have been unlikely to have resulted in such regular patterning in the distribution of botanical remains.

One question which must be considered in interpreting this distribution is how these fragments came to be burned (Hally 1981). One possibility is that shells were discarded in hearths after the nuts were removed from the shells for further processing. Another is that the nuts themselves may have been processed over an open fire, and some nuts accidentally fell into the fire where they were burned. In either case, it would seem that hickory remains and wood

Table 1. Squares containing carbonized hickory nut remains. All weights are shown in grams.

Square	Weight	Square	Weight
31	.20	333	.25
49	.10	334	.01
68	.25	345	.05
71	.10	347	.10
73	.15	351	.05
78	.15	354	.15
80	.15	356	.10
104	.05	357	.05
121	.05	358	.20
126	.20	359	.20
151	.15	382	.10
153	.10	386	.20
159	.10	388	.10
188	.10	395	.25
192	.65	416	.05
193	.35	423	.10
201	.20	430	.15
205	.10	431	.10
206	.15	449	.10
236	.10	450	.05
237	.15	460	.20
238	.19	462	.15
239	.05	463	.30
240	.40	465	.35
241	.30	467	.15
242	.65	473	.40
243	.25	475	.50
252	.05	477	.20
253	.05	478	.10
254	.05	484	.15
257	.10	486	.10
267	.10		
275	.10		
276	.30		
277	.15		
289	.20		
291	.15		
311	.10		
316	.10		
317	.15		
320	.15		
322	.10		
329	.10		
330	.30		
331	.35		
332	.10		

Table 2. Squares containing edible remains other than hickory shell or nut.

Square	Type
68	Acorn
73	Indeterminate Fruit

representing hearths would be strongly associated. That this is so is indicated by the concurrent distribution of carbonized wood and carbonized hickory shell and nuts. In all, of 79 squares containing hickory fragments, 51 also contained carbonized wood. This represents approximately two-thirds of the total number of squares containing hickory.

However, hickory does not occur in strong association with wood in those squares containing the highest proportion of wood. This might indicate that shells tended to be discarded around the periphery of hearths more frequently than in the center, suggesting possible processing of hickory nuts over the edge of the fire. It could also be that hickory shell deposited in the central portion of a hearth area would tend to be consumed completely, while that on the periphery would remain more or less intact.

There is no question concerning the potential nutritional contribution of nuts to the prehistoric diet. Nuts are rich sources of both protein and fat. Woodroof (1979: 74) says that, for an adult male, one pound "....of oily nuts supplies all the calories needed each day, approximately 40% of the protein, 60% of the phosphorous, 30% of the calcium and iron, and 4 times the requirement of fat." This source of dietary fat could have been especially important if animal protein requirements were met solely through the consumption of fish and wild game animals, since neither tends to be high in fat content.

Battle (1922), in an analysis of the relative percentages of oil and protein found in black walnuts (Juglans nigra) and hickory nuts (Hickoria alba), shows that while black walnuts provide a higher percentage of protein per 100 pounds (33.72% for walnuts compared to 11.16% for hickory nuts) hickory nuts produced more oil. Using a solvent to extract the oil, he found that 100 pounds of black walnuts produced 0.625 gallons of oil, while hickory nuts produced 1.20 gallons of oil from the same quantity of nuts. While the extraction of oil by the simpler method used prehistorically would have perhaps been less effective in producing a pure quality oil, there is no reason to think that the relative amounts extracted would have differed significantly. A comparison of the yields of oil and protein from these two types of nuts is shown in Table 3 .

At the present time, 9Pm205-V is within the range of two types of hickory. These are the shagbark hickory (Carya ovata) and the pignut hickory (C. glabra). Since identification as to species was not possible in the analysis of the carbonized remains, it is not known whether one or both of these species is represented. Both are known to be abundant producers, although heavy crops do not occur every year in either species.

The time of year at which the site was occupied can be inferred from the fact that, according to Woodroof (1979: 672-673):

> "Most hickory nuts mature and fall to the ground in October or early November.... generally, the nuts fall about two weeks

Table 3. Yield of oil and protein from black walnuts (*Juglans nigra*) and hickory nuts (*Hickoria alba*). From Battle 1922:;82.

	Black Walnut	Hickory Nut
Weight in grams per 50 nuts	531.00	325.50
Number of nuts per pound	42.00	69.00
Proportion of kernels to whole nuts	10.26	19.50
Percentage of oil in kernels	50.30	67.42
Percentage of protein in kernels	33.72	11.16
Available oil in 100 pounds nuts (in gallons)	0.625	1.20

> ahead of the leaves, and the leaves fall following the first frost....The meats become stale or rancid within one month unless refrigerated."

Since squirrels and other animals would have been competing with humans for the fallen nuts, it is doubtful that thaey would have been plentiful for any length of time after they had fallen. This then tends to fix the time of occupation as late fall, possibly in November, and probably no later than the end of December.

Ethnographic References to Hickory Use

Several ethnographic accounts refer to the use of hickory nuts for food by Native Americans. The recipes mentioned reflect Woodroof's (1979:76) comment that, "Digestibility of nuts is high if the nuts are finely ground."

One of the early accounts of the use of hickory nuts by the historic Creek Indians is provided by William Bartram. Traveling in the late 1700s through an area of Piedmont Georgia west of the town of Wrightsborough, Bartram noted the occurrence of several types of nut trees, which he says were

> "....cultivated by the ancients, on account of their fruit as being wholesome and nourishing food. Tho' these are natives of the forest, yet they thrive better, and are more fruitful, in cultivated plantations, and the fruit is in great estimation with the present generation of Indains, particularly Juglans exalta commonly called shellbark hiccory; the Creeks store up the latter in their towns. I have seen above an hundred bushels of these nuts

> belonging to one family. They pound them to pieces, and then cast them into boiling water, which, after passing through fine strainers, preserves the most oily part of the liquid: this they call by a name which signifies hiccory milk; it is as sweet and rich as fresh cream, and is an ingredient in most of their cooking, especially homony and corn cake," (Harper (ed.) 1958:25).

John Lawson, who traveled through the Coastal and Piedmont areas of North and South Carolina in late 1700 and early 1701, commented in his book A New Voyage to Carolina concerning the vegetation of that area that

> "The Hiccory is of the Walnut-kind, and bears a Nut as they do, of which there are three sorts. The first is that which we call the common white Hiccory. It is not a durable Wood; for if cut down, and exposed to the Weather, it will be quite rotten, and spoil'd in three Years; as will likewise the Beech of this Country. Hiccory Nuts have very hard Shells, but excellent sweet Kernels, with which, in a plentiful Year, the old Hogs, that can crack them fatten themselves, and make excellent Pork. The Nuts are gotten, in great Quantities, by the Savages, and laid up for Stores, of which they make several Dishes and Banquets. One of these I cannot forbear mentioning; it is this: They take these Nuts, and break them very small betwixt two Stones, till the Shells and Kernels are indifferent small; And this powder you are presented withal in their Cabins, in little wooden Dishes; the Kernel dissolves in your Mouth, and the Shell is spit out. This tastes as well as any Almond. Another Dish is the Soup which they make of these Nuts, beaten, and put into Venison-Broth, which dissolves the Nut, and thickens, whilst the Shell precipitates, and remains at the bottom. This Broth tastes very rich." (Leffler (ed.) 1967:104-105)

Lawson also mentions a visit to a small village of the Congaree Indians on the Santee River, where he states,

> "We found here good stores of Chinkapin Nuts, which they gather in Winter great Quantities of, drying the,; so keep these Nuts in great Baskets for their Use; likewise Hickerie-Nuts, which they beat betwixt two great Stones, then sift them, so thicken their Venison-Broath therewith; the small Shells precipitating to the Bottom of the Pots, whilst the Kernel in Form of Flower, mixes it with the Liquor. Both these Nuts made into Meal, makes a curious Soop, either with clear Water, or in any Meat Broth." (Leffler (ed.) 1967:34-35)

Battle (1922:173-174), in a discussion of the aboriginal uses of oil in the Southeast, says that vegetable oils were obtained

> "....almost exclusively from native trees, such as the black walnut (_Juglans nigra_), and the hickory nut (_Hickoria alba_), known now in some localities as 'mocker nut.' Also the shell-bark hickory nuts (_Juglans exultata_) were sometimes used."

Battle mentions passages from the writings of those who accompanied De Soto in his travels through the south in 1539-41 which describe the uses of nuts. Both Ranjel and the Gentleman of Elvas described the oil extracted from walnuts, which was offered along with other foods at the villages which they visited.

It may be that the term "walnut" was used in a generic sense and could have included hickory nuts, also. In fact, according to Jones (1983:316), "Under the term walnut, the historians probably included not only the nut which we designated by that name, but also the varieties of the hickory nut with which the country abounded."

Battle says the only method of preparation of vegetable oils known to the native inhabitants of the Southeast is to crack and then boil the nuts. He notes (1922:176),

> "This caused the separation of the oil, and owing to its lower specific gravity and insolubility in water it rose rapidly to the top and was skimmed off and stored in pots of suitable size provided with cover."

He says further (1922:178) that oil became an important item of trade "soon after the arrival of European traders, and was regularly exported." He says also that oils could have formed the base with which pigments were combined to make paints for use in personal adornment or for other decorative purposes. He suggests that oils might also have been rubbed into leather goods to keep them soft. While we have no evidence that these uses for oil were known or practiced as early as the Late Archiac period, they do add another dimension to the desirability of oil during the early historic period, if not the prehistoric.

The use of hickory nuts has continued into more recent times among Native Americans, as is indicated by a recipe for preparing hickory nut soup collected by Ulmer and Beck (1951) from Aggie Ross Losiah, who was born in 1880 and was a member of the Eastern Band of the Cherokees. This food, known as <u>ga-nu-ge</u> in the Cherokee language, utilized traditional methods for preparing these nuts. Directions are as follows:

> "Gather hickory nuts or scalybarks, dry on a rack before the fire. When nuts are dry crack them by using a large flat rock placed in a flat basket lined temporarily with a cloth, use a smaller rock to pound the nuts when placed on a larger rock. When the nuts are all cracked sieve them through a sieve basket. Place the kernels and small hulls that passed through the sieve in the corn beater and pound until the substance can be made into balls. Roll this into balls until ready for use. These balls will keep fresh for several days if the weather is not too warm.
>
> "When ready for Hickory Nut Soup place a ball or more in a vessel that will hold water, pour boiling water over the balls while stirring constantly. If this is made into a thick soup it may be served with any type bread or dumpling. If it is made into a thin soup it may be used as a drink. As soon as enough soup has been poured off to leave a very thick mixture more water may be added. Do not drink the very last of the mixture because that is where the little bits of hull are." (Ulmer and Beck 1959:48)

Whether hickory nuts were used in these or other ways during the Late Archaic period, it appears certain that they were being used for food at that time. Any other explanation for the presence of hickory shells in the occupation level at 9Pm205-V seems unacceptable. The patterned distribution argues against incidental introduction into the site by random factors such as flood water or rodent activity. If the burned shells were present because a hickory tree burned on the spot, there should be associated hardwood charcoal in abundance.

Ethnographic references suggest methods of preparation. Since hickory nuts of all varieties are difficult to separate from their shells, crushing and then boiling the nuts would have been the most efficient means of preparing them. However, the absence of pottery at the site and for the time period under consideration makes it necessary to consider other types of containers which might have been used if this method of preparation was utilized.

One method which could have been used is stone boiling, where hot stones are placed in water-tight woven containers to heat the water or other liquid which has been placed in them. These would of course have been perishable, and would leave no evidence of their existence in the archaeological record. Another possibility is that steatite containers were used in the same way, or that they were placed in or near a fire to heat their contents.

One factor which may assist in the interpretation of the possible activity at the site is the presence of several artifacts known as "net-sinkers." These are made from steatite and perforated in or near their centers. It has been suggested that these may have served as boiling stones for the preparation of cooked foods. Further examination of the distribution of lithic artifacts from 9Pm205-V is necessary before this can be considered more extensively.

Interpretation

While the absence of extensive remains of flora and fauna from 9Pm205-V makes interpretation of specific subsistence activities difficult, there are other ways of approaching this problem. The large number of projectile points recovered from the sites implies that hunting was an important activity. The proximity of the site to the river suggests possible utilization of riverine resources, and the presence of hickory shell in the archaeological record indicates the importance of those nuts in the diet.

These are rather slim clues, but they do seem reliable enough to provide a reasonable basis for developing inferences about the past activities at the site. Even though the application of analogous ethnographic examples must be somewhat restrained due to the length of time which intervenes between the Late Archaic and Historic periods in the Southeastern United States, it is still possible to infer a long-term reliance on the abundant natural resources of the area.

CHAPTER V

LITHIC ARTIFACTS

Lithic artifacts found in archaeological context are important in an interpretive sense because they represent several dimensions of cultural behavior. They are also the most durable of all artifacts, and often form the bulk of cultural material recovered from a site. Analysis of lithic artifacts can be directed towards individual attributes, combinations of attributes, spatial distribution of artifacts at a site, raw materials used to manufacture tools, or the functions of the tools themselves. These dimensions of variability can be interpreted singly or in combination with other categories.

Interpretive Aspects of Lithic Artifacts

Among the questions which can be applied to the analysis of lithic material is that of the initial source of the raw materials from which artifacts were manufactured. A corollary to that question is the interpretation of the method of procurement of lithic resources, whether directly through actual visits to the source, or through trade of some kind.

It is also possible to examine ways in which raw materials were being used for particular purposes. This stage of analysis involves the investigation of various reduction techniques and manufacturing processes. This investigative process presupposes recognition of differing physical properties of raw materials related to the ultimate function of tools made from those materials.

It is also possible to infer possible functions of individual tools or classes of tools through examination of formal attributes, inspection of edge damage or other use-related patterns, or through ethnographic analogy.

Finally, it is important to examine the distribution of artifacts across the site itself, since this spatial distribution may indicate patterning which is indicative of specialized work areas, or may provide information which can be used to reconstruct prehistoric tool kits.

These analyses are complementary and are all essential, where possible, for the fullest interpretation of past behavior. They are particularly important at sites such as 9Pm205-V, where lithic remains are the most numerous and best preserved of all cultural materials, and represent the best evidence available for developing inferential statements concerning the occupation and utilization of the site.

Procurement of Lithic Materials

Examination of lithic material indicated several factors concerning lithic procurement strategies employed by the prehistoric occupants of 9Pm205-V. A variety of raw materials were utilized at the site. Among these were quartz, chert, diabase, amphibolite, and steatite, all of which have been discussed in an earlier chapter in terms of their relative availability to prehistoric occupants of the site.

Each of these raw materials appears to have been selected for particular characteristics which made it suitable for specific purposes. Amphibolite seems to have been chosen for its abrasive qualities. Diabase is extremely durable and was used for ground stone tools. Steatite artifacts at 9Pm205-V consist mainly of perforated pieces with smoothed edges, usually identified as "netsinkers," although that term may not be an accurate description of their function. Chert was used for the manufacture of flaked stone tools. The crystalline structure of this material is such that sharp cutting edges can be obtained with ease, and its predictable fracturing characteristics make it possible to modify or rejuvenate tools which have become dulled through use. The most ubiquitous of all lithic materials at the site was quartz, which provided the raw material for several different purposes. River cobble quartz was used for lining hearths, for hammerstones, and occasionally for tool manufacture. Vein quartz, which can also provide a sharp cutting edge when fractured, was used for making both unifacial and bifacial tools, and flakes were sometimes used without further modification.

All these types of raw material were available in outcrops or deposits sufficiently near 9Pm205-V to have made direct methods of procurement possible. Even though chert does not occur in the Piedmont region and would most likely have been obtained from the Coastal Plain, the distance is not such that long distance trade would have been necessary for its acquisition.

The fact that raw materials were available in nearby areas should not be considered de facto evidence that long distance trade was not a source of raw materials or possibly even of finished artifacts on occasion. However, there is no empirical evidence to support assumptions concerning long distance trade at 9Pm205-V. Therefore, it seems important to recognize that raw materials found there could have been obtained directly from their sources by the occupants of the site. This finding is consistent with the supposition that knowledge of all types of resources would have been important in successful hunting and gathering. Expertise in recognizing those qualities which contributed to successful tool making would have been as important as knowledge of sources of various types of food, as those tools were necessary to procure and process many of those foods.

Differential Use of Lithic Materials

The types of raw materials used and the methods employed to utilized them are components in the conceptual identification of the value of those resources. Although it is impossible to impute specific ideational concepts which the prehistoric occupants of the site may have attributed to the acquisition and utilization of specific materials, the archaeological evidence clearly indicates at least the recognition of the variable characteristics of those materials. Their selection and use comprised part of the behavior which was responsible for the formation of the archaeological record at 9Pm205-V, and indicates familiarity with not only the immediate area but with resources several kilometers distant. While it is not possible to attribute specific raw materials to securely identifiable sources with the information now available, it is possible to infer that 9Pm205-V presents just one occupational episode in a series distributed over a larger area, and that various lithic resources within that larger area were utilized differentially.

There is little doubt that the source of quartz used for tool manufacture at the site was nearby local deposits. The quantity of white vein quartz, preferred for tool making over other types of quartz because of its homogeneous structure and relatively predictable fracturing properties, provides good evidence for its extensive utilization. This vein quartz is represented in the debitage from the site in disproportionately large quantity.

Examination of flake size and fracturing attributes exhibited by white vein quartz debris from the site indicates on-site reduction of this material in a form other than that of blanks quarried and prepared elsewhere and subjected to final manufacturing processes only after being brought to 9Pm205-V. Since the expenditure of energy required to transport sizeable quantities of even partially reduced vein quartz chunks would have been substantial, it seems unlikely that large quantities would have been transported for long distances. This makes it possible to infer that local quartz resources were both sufficient and adequate for providing raw material for tool manufacture.

Chert, on the other hand, was not as easily obtainable, and this too is reflected in the archaeological deposit. While chert tools comprise 40 per cent of all those recovered during the excavation of the site, only one-fourth of the flakes which compose the debitage from the site are chert (Appendix III). More important than this ratio is that chert flakes found at 9Pm205-V are generally small ones representing bifacial retouch or thinning, while quartz flakes are both larger in size and heavier in actual weight than chert flakes. There are occasional chert cores found in the debitage from the site, but their scarcity indicates that chert was most often brought to the site in the form of finished tools rather than as unmodified raw material.

Other lithic materials, such as diabase and steatite, were brought to the site in either finished or partially finished condition, or were modified in such a way that no observable residual material was generated as a result of the modification process. Amphibolite was used in an essentially unmodified form, at least after having been brought to the site. Quartz cobbles used as lining for hearths, as hammerstones, and possibly as boiling stones, do not appear to have been intentionally modified prior to use.

The ratio of chert to quartz at the site is in accordance with Gould's (1977) ethnographic observations of lithic resource utilization among the Australian aborigines. He found that locally abundant non-quarried material was used and then discarded shortly thereafter, but that stone quarried from distant or ritually important sources was conserved and reworked (Gould 1977:163). While it is impossible to infer that chert used at 9Pm205-V was brought from areas with special cultural significance, the distance over which it had to be transported relative to quartz could have had some effect on its value. This status as an "exotic" item might have served to enhance its value, although it is probable that its main appeal as a raw material for tool manufacture was the fact that its more predictable fracturing characteristics made it preferable to quartz for that purpose.

It is also possible that reworking quartz was so much more difficult than resharpening or reshaping chert tools that quartz tools were not often altered from their original configurations, and were discarded rather than rejuvenated when they were broken or dulled. Since quartz was so readily available, it was also readily expendable. That difficulties involved in reducing quartz raw material to provide a finished product are not insurmountable is apparent in the regularity of patterning exhibited in Late Archaic projectile points made from that material.

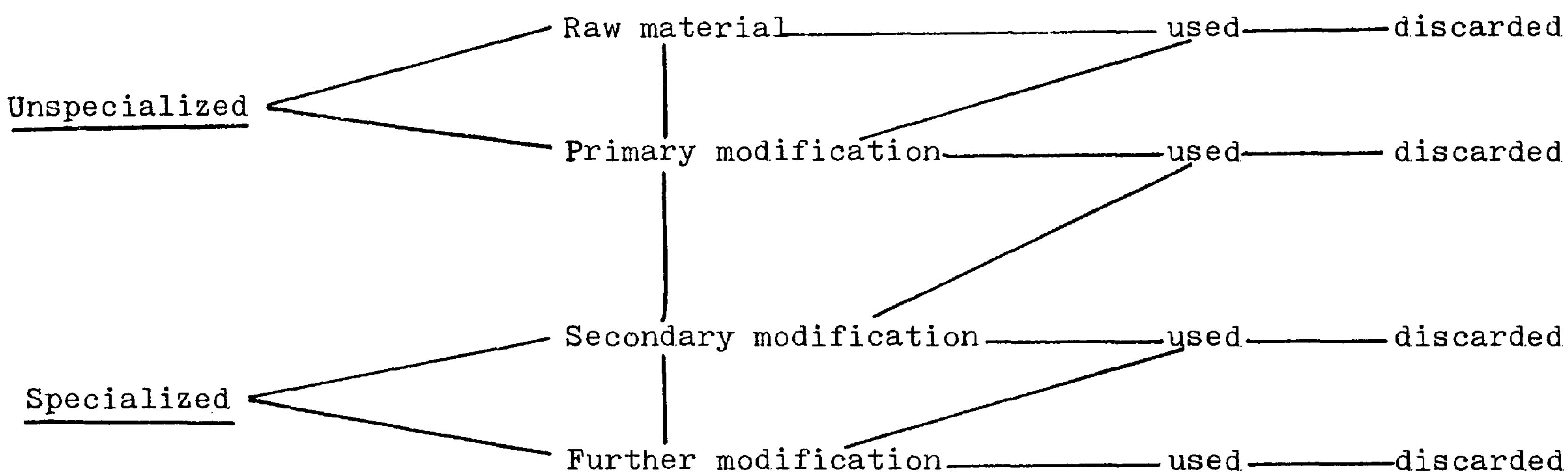
Specific Lithic Resource Utilization

Because of the factors responsible for the deposition of the sand matrix in which 9Pm205-V was located, it was considered unlikely that any stones larger than river pebbles would have been deposited there due to natural processes. Therefore, all lithic materials found at the site were presumed to have been brought there intentionally. While this might have involved nothing more than removing stones from a nearby channel of the river, it would still represent an expenditure of energy that was intentional rather than incidental to some other endeavor.

This fact, in combination with the recognition of the presence of several types of raw materials mentioned earlier as being utilized in different ways at the site, suggested that the most effective means for interpreting specific resource utilization was through the development of an explanatory model.

The development of this model, shown in Figure 8, was predicated on the assumption that the cultural material found in any archaeological deposit accumulated there in definable and explicable ways. One reason for the presence of certain artifacts is the intentional discard of items at the site by its prehistoric occupants. Another is through intentional abandonment of artifacts or other cul-

USE OF LITHIC MATERIALS



Examples of unspecialized use: hearthstones, hammerstones, anvils, utilized flakes, grinding stones, abraders

Examples of specialized use: unifacially or bifacially flaked tools, ground or pecked stone, perforated stone, grooved stone

Figure 8 . Sequence of utilization of lithic materials.

tural remains. A third is through accidental or unintentional loss. A fourth way by which artifacts may be introduced into an archaeological deposit is through external factors not related to the original occupants. This can happen through plant, animal, or human disturbance subsequent to the initial formation of the site, or through geologic or hydrologic activity.

Since the deposit at 9Pm205-V did not indicate more than minimal disturbance from external circumstances, it was assumed that cultural materials found at the site were there as a result of one of the other three factors. Further consideration indicated that it might be possible to identify, at least on a general level, which of these was responsible for the occurrence of certain classes of artifacts at the site.

Since lithic artifacts and debris resulting from their manufacture were the most numerous kinds of cultural remains found at 9Pm205-V, efforts were directed at developing explanatory interpretations which would account for their presence. Preliminary examination had indicated that there were two major categories of artifacts which could be defined at 9Pm205-V, and that the majority of artifacts could be readily assigned to one or the other of these. One of these categories consisted of artifacts representing specialized utilization of lithic resources, and the other contained those artifacts which represented unspecialized utilization of lithic resources.

Specialized artifacts are defined as those which required modification more elaborate than simple reduction of raw material through fracturing to produce flakes, or those which required substantial modification in the form of grinding or drilling prior to use. Specialized artifacts of the first type were those produced through intentional reduction of siliceous rocks such as quartz or chert to flakes or other fractions suitable for the manufacture of unifacial or bifacial tools. An example of the second type is an artifact manufactured by grinding, pecking or smoothing to create a usable tool. These artifacts at 9Pm205-V were manufactured from steatite or diabase.

Included in this specialized category are those tools which are usually classified as "functional," such as projectile points, scrapers, knives, perforators, axes, and similar tools. It seems preferable to refer to these tools as "specialized" father than "functional," since use of the term functional implies that uses of other tools are non-functional. This is, of course, not the case.

Unspecialized artifacts are defined as those which were usable immediately, without extensive modification. Among these are stones used to line hearths, those used as hammerstones, anvils, grinding stones, abraders, and any other tools which required minimal modification, if any, prior to use. Included in this category are those artifacts which required only gross modification. For example, flakes produced during initial reduction of chunks, blanks, or nodules of raw material could be used without further modification for immediate tasks. While these flake tools may exhibit use-wear, they have not been intentionally transformed or modified by manufacturing processes other than primary reduction. Another example of this type of unspecialized artifact is an expended core used for pounding or hammering. Although the core represents the end product of reduction, no specific modification was necessary to prepare it for use as a hammerstone. Figure 9 shows examples.

It is proposed that these two categories of artifacts can be recognized not only by their morphological characteristics, but by their differential representation in the archaeological record. Unspecialized artifacts are likely to have been manufactured from raw materials which were easily obtainable, or to have been made from by-products resulting from the reduction of materials which were not so easily obtainable. These artifacts would have required little energy to manufacture or modify. Since there was little investment in procurement (except in the case of the use of by-products of specialized production of artifacts) or in manufacture, unspecialized artifacts would be more likely to be left in place when a site was abandoned than would specialized artifacts. Furthermore, it is proposed that these unspecialized artifacts are likely to comprise a larger proportion of the archaeological remains in actual quantity than are specialized artifacts found at the same site.

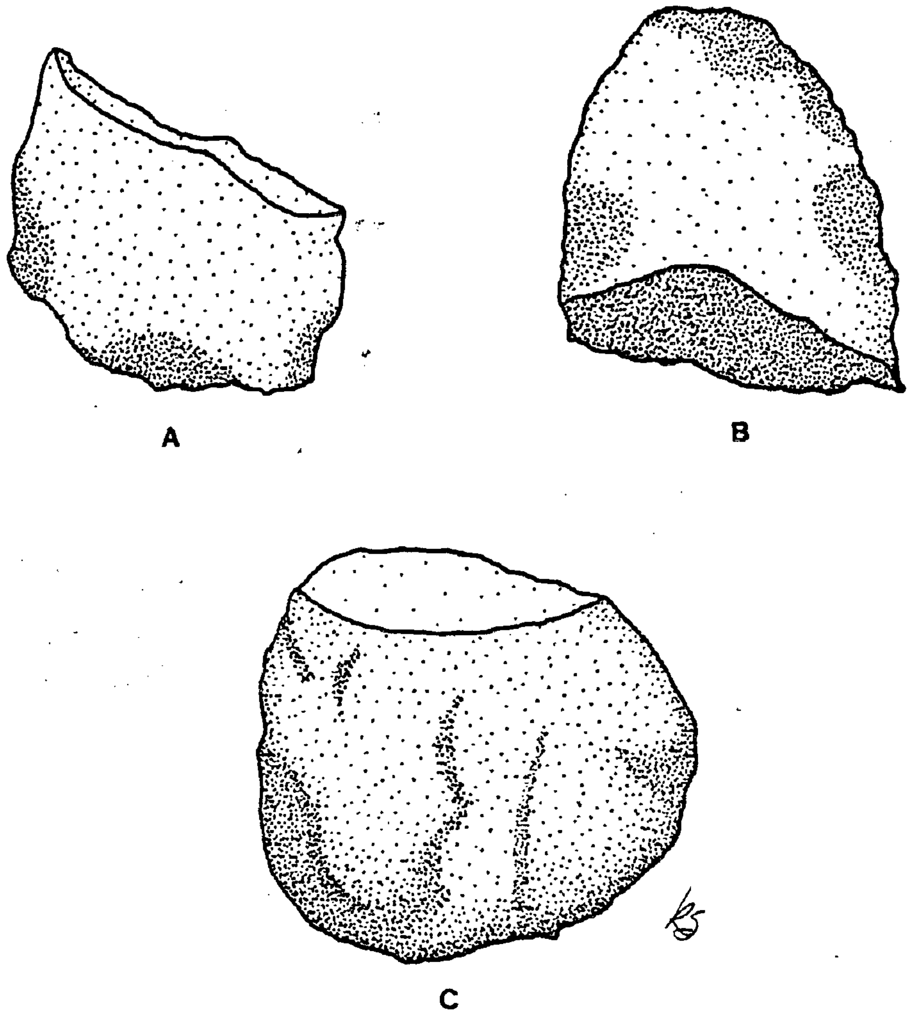


Figure 9. Unspecialized tools. A is a broken hammerstone. B and C are utilized flakes. All are quartz.

Specialized artifacts, on the other hand, are considered to belong to the general classification which Binford (1973) has referred to as "curated" artifacts. This category includes those artifacts which were prepared by specialized reduction and manufacturing techniques. These artifacts presumably represent greater expenditure of energy than those in the unspecialized category. Examples are shown in Figures 10, 11, and 12.

It is proposed that these artifacts were more likely to have been intended for long term use than were unspecialized artifacts. Because of the greater relative investment in time and energy, they would also be more likely to be removed from the site when it was vacated. Because of this, specialized artifacts would be represented in lesser absolute quantity at a site than would unspecialized ones. Furthermore, it is suggested that representatives of this specialized class are likely to be those which were totally expended and therefore discarded because they had no further utilitarian value, or were discarded during the manufacturing process because it was apparent that completion was unlikely to result in a usable tool.

According to this model, then, deposition of lithic artifacts through circumstances other than unintentional loss or introduction through external agencies could occur in any of several ways. Raw materials could be used without modification, as would be the case with stones used to line hearths. Primary modification could produce flakes which

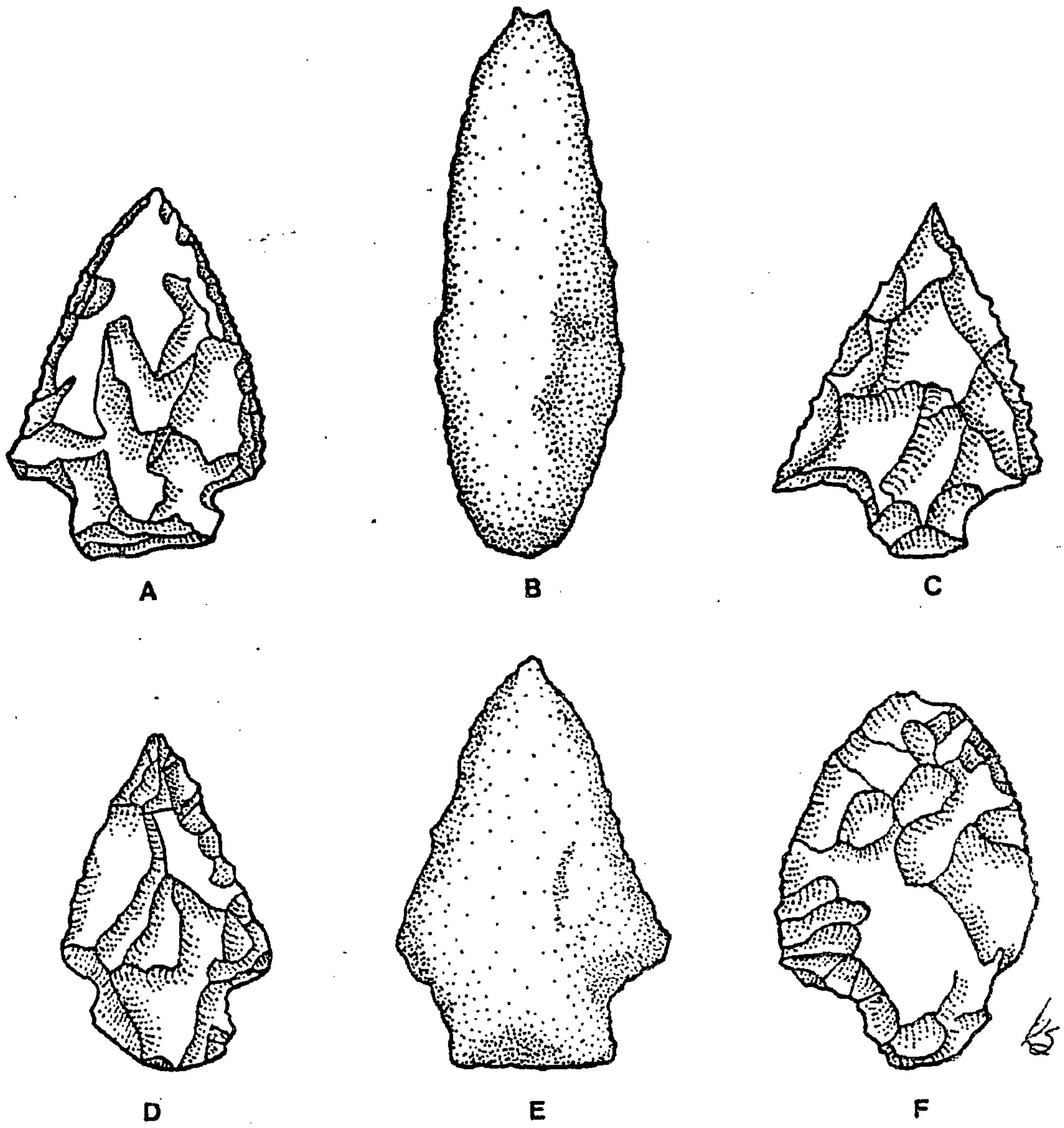


Figure 10. Specialized tools: projectile points.
A, C, D, F are chert; B and E are quartz.

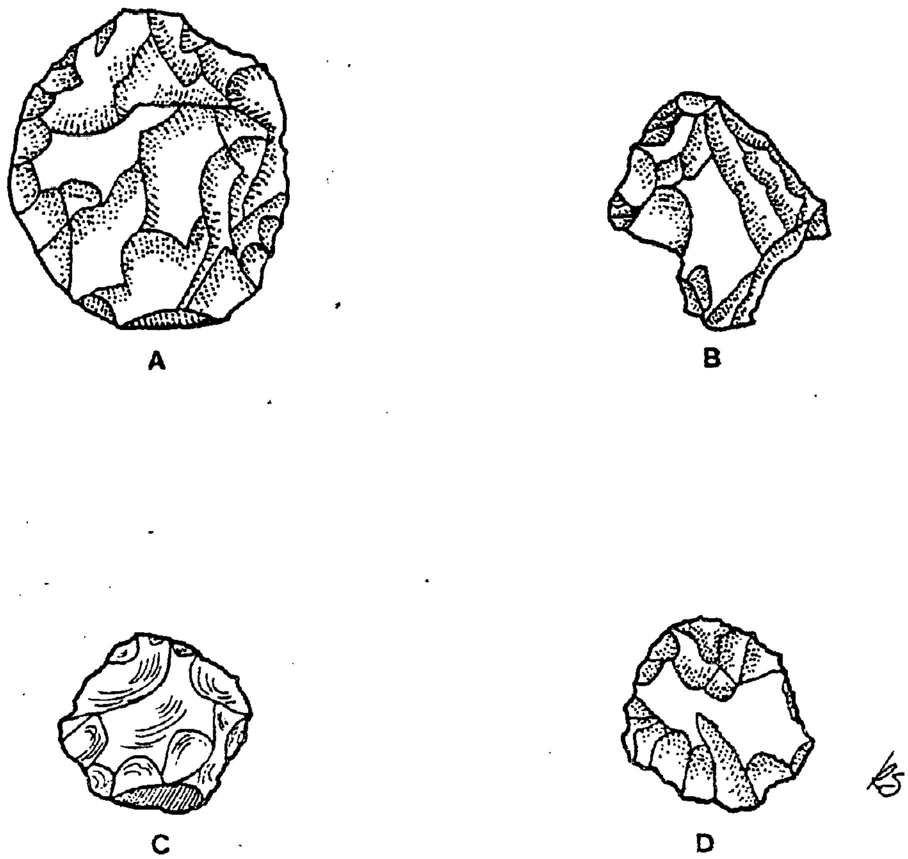


Figure 11. Specialized tools: scrapers. All are manufactured from chert.

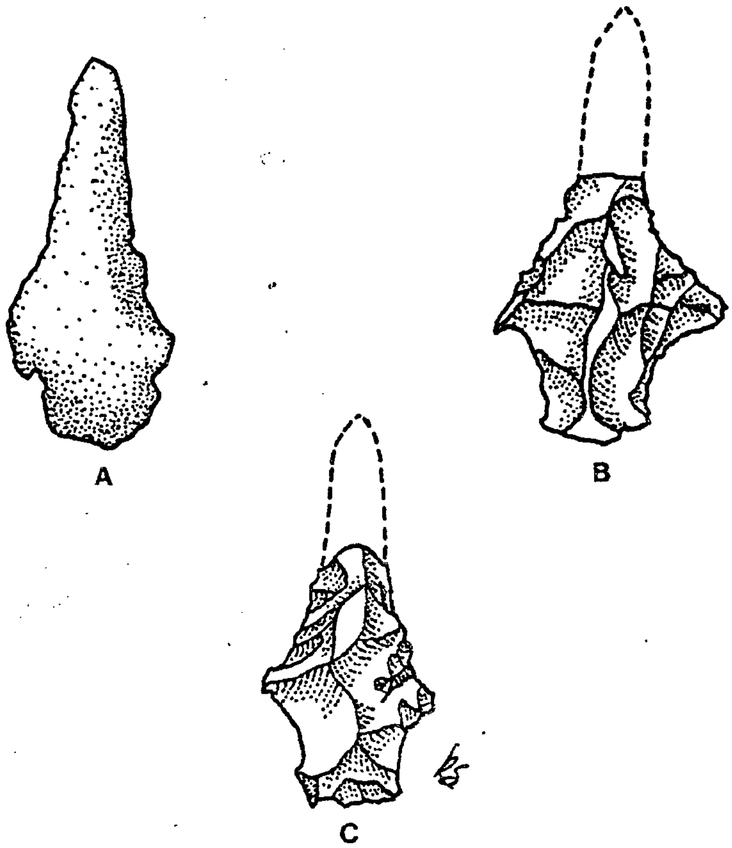


Figure 12. Specialized tools: drills. A is made from crystalline quartz; B and C are chert.

were used on an *ad hoc* basis. Further modification in the form of flaking, grinding, or pecking could continue until the tool could no longer be resharpened or rejuvenated for further use. Discard could follow any of these steps, and presumably did when the tool under consideration had no further utilitarian value, or when the energy required for replacement was less than that required for its transport to another location.

Test of the Model at 9Pm205-V

Examination of cultural material from 9Pm205-V has substantiated these assumptions about the formation of the archaeological deposit, at least in relation to lithic artifacts. Unspecialized artifacts appear to have been left at the site not because they were no longer suitable for use, but because they did not represent items which warranted curation or conservation, a term which seems to be a better descriptor of that process than curation. These artifacts were also represented at the site in greater absolute quantity than were artifacts assigned to the specialized category.

On the other hand, nearly all of the artifacts assigned to the specialized category showed indications of breakage during the manufacturing process, either subsequent to completion or during resharpening or rejuvenation. Sometimes breakage or flaws were confined to a small area of the artifact, but apparently were sufficiently disruptive of the manufacturing process to result in discard of the tool. Some had clearly been broken during attempts at rejuvenation.

In order to test the validity of the model developed to interpret lithic resource utilization in relation to specialized artifacts, one type of artifact--projectile points--was selected for examination. This tool type was chosen because there was little chance that any projectile point would escape identification through misinterpretation of its formal characteristics, and because there was a sufficient number of these artifacts to provide an adequate sample. Also, it was presumed that their usefulness and potential for rejuvenation was such that they would be conserved for future use if possible.

A total of 44 projectile points recovered from the site was selected for analysis, and their metric attributes recorded. These are described in Table 4. All were essentially whole artifacts, with both tips and bases intact except for small breaks or flaws. Of the 44 points, only two exhibited no identifiable morphological indications that the reduction process had ceased before they were completed. It may be that these two points are actually completed specimens which were lost in the loose sand at the site, or it may be that they have minor flaws which are not readily apparent to someone other than their manufacturer. The remaining points are clearly flawed to the point that their completion was impossible. Since continuation of the reduction process would have been unprofitable, it appears

Table 4. Measurements taken on whole projectile points. All measurements are given in centimeters.

Quartz Points

Artifact Number	Length	Width	Thickness
25.1	2.28	1.84	.50
25.3	5.70	3.06	.87
28.1	5.60	2.50	1.32
76.2	4.57	3.63	1.05
79.1	5.86	3.65	1.10
80.1	4.13	2.82	1.07
85.1	5.70	3.18	1.32
111.1	6.27	3.83	1.10
165.1	4.23	3.35	1.12
166.1	5.60	3.04	1.08
223.1	4.42	3.75	1.11
252.1	5.06	2.88	.82
266.1	2.88	1.78	1.40
268.1	4.64	4.00	1.16
271.1	5.20	4.55	1.28
279.1	5.07	3.13	.86
297.1	4.51	2.46	1.64
301.1	6.80	5.56	1.22
310.1	4.55	3.80	1.22
311.1	4.55	2.87	1.00
313.1	4.50	2.54	1.26
320.2	4.37	3.20	1.04

Artifact Number	Length	Width	Thickness
351.2	5.28	4.19	1.48
359.1	5.14	4.55	1.14
359.2	5.45	3.28	1.35
372.1	2.94	2.18	.76
377.2	3.57	2.20	.94
386.1	5.45	3.75	1.25
402.1	4.68	3.98	1.17
446.1	4.66	3.14	1.37
449.1	4.32	3.10	.96
456.1	5.06	3.37	1.12
474.1	4.06	3.28	1.42
476.1	3.11	2.15	.90
480.1	5.05	3.00	1.50

Chert Points

138.1	4.78	3.38	.76
164.2	3.18	2.10	,65
169.1	4.60	3.30	.91
196.1	5.32	3.09	1.05
222.1	3.90	2.69	.83
276.1	4.38	3.48	.79
394.1	4.90	2.47	.79
478.1	4.30	2.90	.69
479.1	4.24	3.14	.94

that they were intentionally discarded prior to completion.

Nine of the 44 points are made from raw materials other than quartz. Of those nine, eight are chert and another is made from a material that appears to be badly weathered chert, but might be a form of rhyolite. Six of these points exhibit sufficient irregularity in the basal portions to indicate that the asymmetry which resulted from breakage was the probable cause for their discard. One is quite small--only 3.18 cm in overall length--and may have been too small to complete or to rework. One is apparently a finished artifact, the single chert point to be so.

Many of the quartz points are broken at the tip or are flawed so that thinning of the edges could not continue. Some are decidedly asymmetrical, in such a way that it appears that they would have not been functional. It seems that limitations inherent in the raw material may have been a major determinant of success or failure in projectile point manufacture when using quartz. Also, the relative abundance of quartz compared to chert may have made further expenditure of energy seem less compelling than would have been the case if quartz had been more difficult to obtain.

While no specific test was devised to investigate the model in relation to any individual artifact type represented in the unspecialized artifact category, calculations involving the total weight of unmodified stone recovered from 9Pm205-V indicated that 745916.55 grams (1644.44 pounds) of lithic material assigned to that category during laboratory analysis came from the site (Table 5). The mean weight per square was 1670.34 grams (3.68 pounds). This does not include weights for flakes, shatter and other debitage resulting from specialized reduction processes. Even without further examination of any particular category of unspecialized artifacts, it is apparent that the quantity of unmodified stone alone lends strong support to the explanatory model presented. Stone of this type was readily available, so it was left behind when the site was vacated.

Variability in Specialized Artifacts

Another aspect of lithic analysis which is important in understanding the behavior responsible for the manufacture of artifacts found at any site is variability in particular classes or types of artifacts. Recognition of patterned variability can be helpful in determining the effects of differential characteristics of raw materials in relation to artifact manufacture, as well as in providing an idea of the idealized cognitive type which guided manufacture of specific tool types.

Clegg (1977), in discussing factors which are responsible for variation in artifacts, recognized four potential causes of variability. These are identified as: the persoanlity of the artisan; the medium, which includes both materials and techniques utilized; the intended function of the artifact; and differences in cultural context.

Clegg used this model to examine the relationship be-

Table 5. Distribution of miscellaneous stone. Weights are given in grams.

Number of squares excavated	459
Total weight of all miscellaneous stone	741632.75 g
Mean weight per square	1670.34 g
Standard deviation	1022.86 g

Number of squares with weight equal to or greater than 2693.20 g (mean + 1 standard deviation)	70
Number of squares with weight equal to or less than 647.48 g (mean - 1 standard deviation)	68
Number of squares with weight between 647.48 and 2693.20 g	307
Number of squares with missing data	14
	459

tween artifacts which he identifies as "mainly cultural" and those which he feels are "mainly functional" in character. He applies this model to all types of artifacts, and uses it to examine changes in cultural and functional aspects at one site through time.

This concept of separating cultural factors from functional ones is initially appealing, but further consideration suggests that cultural and functional factors may in fact be mutually reinforcing. Functional categories are at least partially dictated by cultural concepts, and cultural concepts are not an immediately quantifiable aspect of tool manufacture. Also, while the personality of the manufacturer of a stone artifact may indeed affect the appearance of the finished product, so will such factors as the motor skills of that particular individual as well as the specific characteristics of the raw material being used.

Nevertheless, analyses of lithic tools must necessarily be predicated on the assumption that the manufacture of any artifact involving specialized modification is preceded by an ideational construct which is responsible for the particular shape or form expressed in the finished product. This regularity is indicative of a cultural concept which, within the limitations imposed by external factors, expresses an internalized recognition of the ultimate form which is "correct" for the end-product of the manufacturing process. It is this repetitive conservatism which makes possible the archaeological recognition of types in artifacts, and the resulting utilization of these types as cultural and temporal markers.

In the case of lithic tools, the expression of an ideational concept is of necessity limited not only by the motor skills of the individual who manufactures the tools, but by the raw material used in their manufacture. Furthermore, the implement must be suitable for the function for which it is intended, and must be designed so that it will withstand stresses which may be encountered during its use.

These may be considered limiting factors. Any one tool therefore reflects the ideational concept and the motor skills of its maker, the quality of the raw material used in its manufacture, and the intended function of the tool. Each is mutally interactive with every other limiting factor, and difficulty with any one may result in failure to produce a tool which is acceptable to its maker. However, variation in those which were successfully completed, or nearly successfully completed, may indicate which of these factors was most important in the derivation of its final form.

It is impossible to operationalize each of these limiting factors so that an interpretation of the manufacturing process can be developed through empirical observation of any one factor taken separately. It is possible, however, to use metric observations taken from a population of similar tools to determine how well the end product seems to conform to the concept of an "ideal tool."

An "ideal" tool can be approximated by taking an average or mean of all measurements of certain attributes which are considered relevant to the question or questions being considered. Then, using the standard deviation about the mean of each characteristic to identify conformity to that mean, it is possible to determine how closely any individual tool resembles or differs from the "ideal" tool. In circumstances where, as was the case at 9Pm205-V, similar tools are made from different types of raw materials, it may be possible to determine whether differences in raw materials were responsible for differences in finished products.

Since projectile points are especially amenable to this type of study, the 44 whole projectile points recovered from 9Pm205-V were measured and their lengths, widths, and thicknesses were recorded. Measurements were taken using a metric caliper with a Vernier scale and were recorede to the nearest millimeter. Mean and standard deviations were calculated for three categories: all points combined, quartz points only, and chert points only. The one point made from what appeared to be badly weathered chert or possibly rhyolite was included with the chert points, not only because it increased the small sample size but because the question of major interest was the determination of differences and similarities which could be ascribed to quartz and non-quartz points. Calculations for those statistics are shown in Table 6.

Examination of these figures shows that quartz points

Table 6. Projectile point variability. Measurements are given in centimeters.

	Mean Length	Mean Width	Mean Thickness
ALL POINTS	4.65 ±.91	3.19 ±.75	1.07 ±.25
QUARTZ POINTS	4.72 ±.96	3.25 ±.81	1.14 ±.23
CHERT POINTS	4.40 ±.62	2.95 ±.46	.82 ±.13

tended to exceed chert points in average length, thickness, and width. Width may be a factor related to the more homogeneous structure of chert in comparison to quartz, as this is a characteristic which would allow thinner flakes to be struck from a core or nodule. However, length and thickness are not likely to be related to this feature of the raw material. Instead, it appears that chert tools were being resharpened and there by reduced in size, and difficulties in completing the rejuvenation of these tools resulted in their discard.

Quartz projectile points, on the other hand, are longer and wider than chert points. They appear to have been manufactured at the site and to have been discarded at some point during the initial manufacturing process. This assumption is further supported by the large quantity of quartz flaking debris present at the site in comparison to the number of chert flakes. This tends to support the model developed to explain lithic utilization at the site, and, by extension, the concomitant effect that readily available resources had on the formation of the archaeological deposit. This demonstrates that readily available resources tend to be discarded in greater relative quantities than scarce resources while those scarce resources are conserved for further use.

An examination of the correlations between length/ width, length/thickness, and width/thickness for points made from both materials (Table 7) further confirms this

Table 7. Correlations between projectile point attributes.

	Length/ Width	Length/ Thickness	Width/ Thickness
All points	.684	.659	.614
Quartz points	.693	.696	.642
Chert points	.555	.624	.451

\

There is no text and no page 124 in this document representative one.

Recently, there have been attempts to examine modern hunter-gatherers to obtain information concerning factors involved in site formation processes. Binford (1980) has suggested that there are two basic variants of hunter-gather subsistence systems: those which rely mainly on collecting, and those which rely on foraging to obtain food. These differ essentially in procurement and storage strategies.

Collectors maintain residential camps from which they travel to field camps where organized hunting or other specialized food procurement activities take place. This food is then frequently returned to the residential camp, where it may be stored. While foragers also maintain residential camps, they collect food nearby on a daily basis. Food resources in this case are varied and can be obtained from a relatively restricted area. This is particularly true in areas with temperate climates, where resources are fairly equally distributed and where temperature extremes are the exception rather than the rule, providing an extended growing season.

Binford suggests that specialized camps are found less often among foragers and that residential camps will exhibit this type of adaptation. While Binford's interpretation is directed towards explaining intersite variability in terms of available resources and their procurement, implicit in his argument is the assumption of intrasite variability as well. If subsistence activities tend to be centralized rather than dispersed, components of the archaeological record should reflect this.

While there is not sufficient information available to determine whether the prehistoric occupants of 9Pm205-V were foragers rather than collectors, the environmental setting is such that this could well be the case, with resources evenly dispersed throughout the area. This makes it seem likely that 9Pm205-V was the site of more than one type of subsistence-related activity, and that information concerning these kinds of behavior should be discernible in the archaeological record.

In order to determine whether various types of activities could be reconstructed, distributions of several classes of artifacts were examined. Although Whallon (1978:28) has shown that attempts to derive meaningful groupings of tools through the analysis of spatial patterning may frequently be misleading or even deceptive, there are circumstances in which this can be a reasonable pursuit. Whallon's (1978:32-33) objections are based on the fact that statistical procedures used to define activity areas are often unsuitable for analyzing archaeological data. He also says that attempting to define the functions of tools based on morphological characteristics fails to take into account the problem of multiple function tools, so that the identification of tool kits is difficult if not impossible. He suggests (1978:34) that one approach which is suitable is the examination of "....the broken remains of tools."

After consideration of the nature of the material recovered from 9Pm205-V, it appeared that not only could broken tool remains be used for interpretation, but that the association of these with unspecialized classes of artifacts and with debitage might provide information important in the interpretation of the behavior responsible for the site' site's formation. Included in this analysis were miscellaneous stone, debitage, ground stone tools, and flaked stone tools. The distribution of each of these groups was plotted on a site map.

The analysis of miscellaneous stone used data recorded during the preliminary laboratory analysis conducted immediately subsequent to the field work. In this initial analysis of material from the site, miscellaneous stone was sorted, weighed, and then discarded. While it would have been preferable to have saved this material, space limitations were such that this was considered to be impossible. Unfortunately, no sample of this material was retained for re-analysis. Also, the material was weighed in pounds rather than in grams, so some accuracy was sacrificed in the process.

In order to determine the distribution of this miscellaneous rock, all weights were converted to grams by multiplying the total number of ounces recorded per square by a conversion factor of 28.35. Fifteen of the excavated squares did not have weights recorded in the miscellaneous stone category, and analysis sheets did not indicate whether this was due to absence of stone in this category or to absence of information. Therefore, these squares were excluded from the succeeding computations, as this was considered the best way to eliminate false indications of absence as a source of bias.

Since all except those 15 squares contained rock in var various amounts, it seemed most reasonable to calculate the mean and standard deviation for this material, and to use these figures in determining where concentrations occurred and where there was little stone present in comparison with the remainder of the site. Weights per square of this material are shown in Appendix IV. Mean weight per square was determined to be 1670.34 grams, with a standard deviation of 1022.86 grams.

Using the figure derived by calculating the mean plus one standard deviation to determine which excavated squares had significantly more of this stone than others, and using the mean minus one standard deviation to determine which squares had significantly less, the distribution of these diverse lithic deposits was mapped (Figure 13). This figure shows that the heaviest concentrations of miscellaneous stone are in the northwest section, the southwest corner, the southeast section, and in two areas in the center of the excavation unit. The lightest concentration is in the northeast corner.

Because there was no specific information available concerning the character of the miscellaneous stone, it was

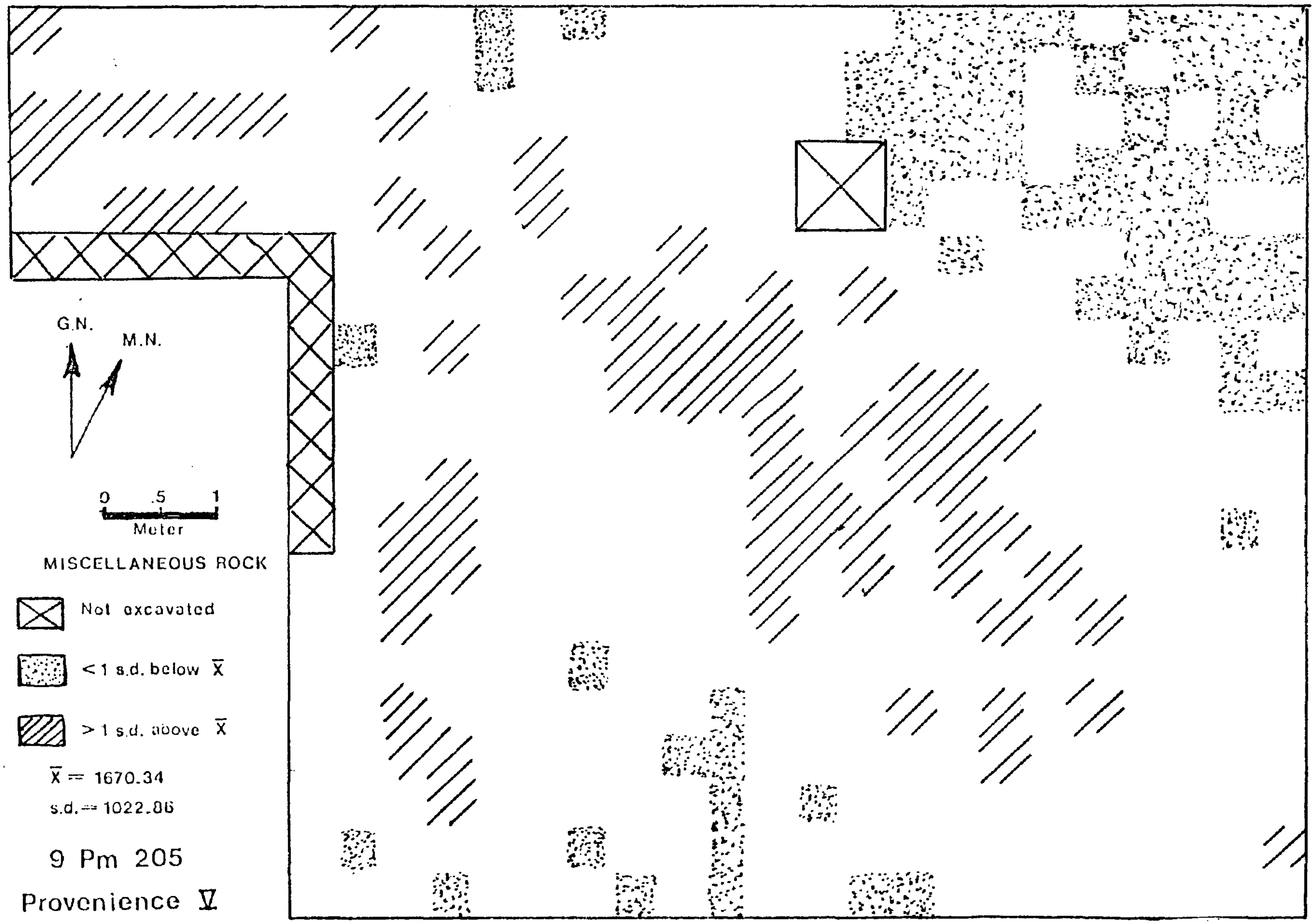


Figure 13. Distribution of miscellaneous stone.

decided to derive additional quantitative information to assist in the interpretation of this distribution. Towards that end, the mean number of flakes per square was calculated. This was done in order to examine the associated distribution of these two kinds of artifacts. It was presumed that if the miscellaneous stone represented the locations of hearths, flakes would be more likely to occur around the perimeters of the miscellaneous stone concentrations than towards their centers. Hoever, if the stone concentrations represented raw materials used in tool manufacturing, it was assumed that the two would co-occur in the same location.

The mean of the distribution of flakes was the sole statistic used for this portion of the interpretation. The extensive range observed in the numbers of flakes per square would have affected the variance in such a way that use of the standard deviation in conjunction with the mean would have been less valid than would be the case when the mean alone was used.

All squares having a greater number of flakes--quartz and chert combined--than the mean derived for these flakes in combination, which was calculated to be 57, were mapped and their distribution compared with that of the distribution of miscellaneous stone (Figure). There was a strong correspondence between these two kinds of lithic materials, with the same areas defined by the patterned distribution of miscellaneous stone discernible in the distribution when

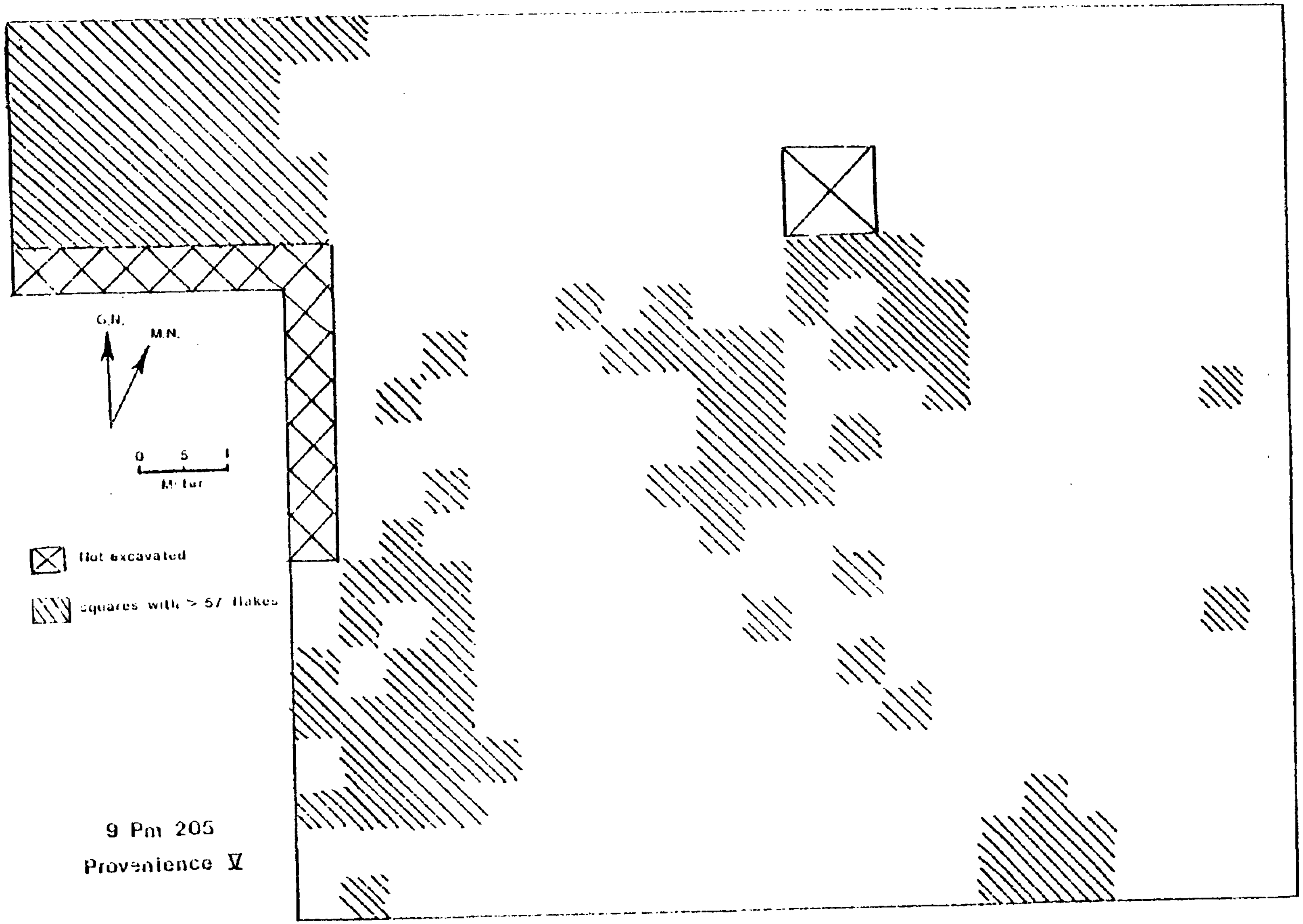


Figure 14. Distribution of flakes.

the two were viewed concurrently. It was also apparent that in most areas flakes and miscellaneous stone were strongly associated.

In the northwest area of the site, the distribution of flakes was much more extensive than was that of miscellaneous stone, suggesting that this was an area where tools were being manufactured. The same is true in the southwest corner. However, observation during excavation indicated that the concentrations of stone in this area represented hearths since there were flecks of charcoal concentrated in association with the miscellaneous stone. It is unfortunate that it is impossible to compare the composition of stone from these two areas. There are areas of the site in the central and southeast portions where concentrations of flakes occur without associated miscellaneous stone. These do appear to represent lithic manufacturing areas. It must be emphasized, however, that these observations are of necessity only speculative.

One striking aspect of the distribution of both miscellaneous stone and flakes is that the northeast corner has few of either. This does not appear to be an area where stone tools were being manufactured, although further examination will show that they were being used there.

To carry this investigation further, the occurrence of flaked stone tools was mapped (Figure 15), and this distribution was observed in association with both miscellaneous stone and flakes. At this point, the areas with high con-

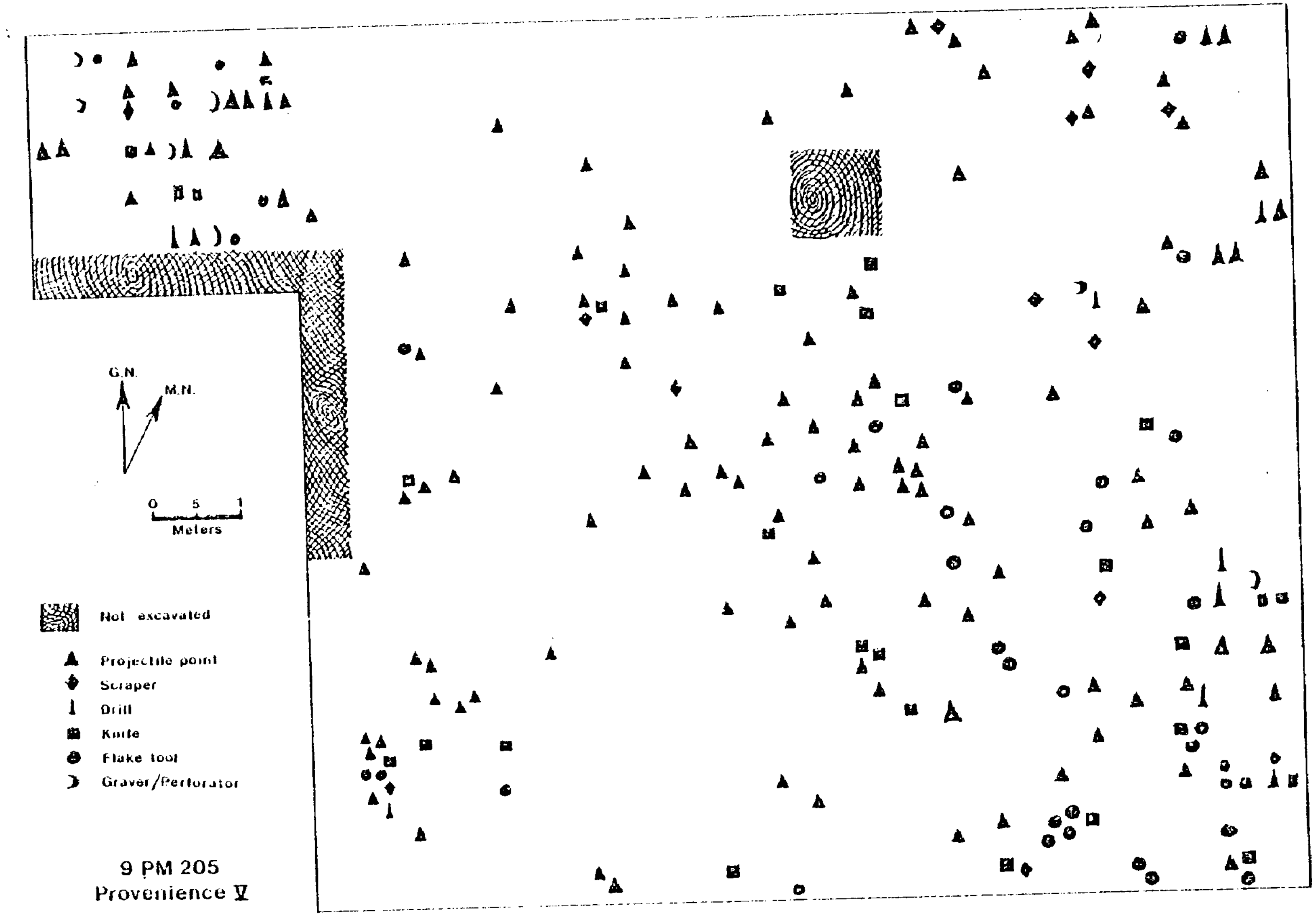


Figure 15. Flaked stone artifacts.

centrations of both these categories were observed to exhibit strong associations with the distribution of flaked stone tools except in the northeast corner.

Next the distribution of ground and other non-flaked stone tools such as quartzite hammerstones was plotted, and the distribution compared with that of other artifact categories (Figure 16). Once more there was a strong correspondence between these tools and the other categories of artifacts, particularly in the northwest corner of the excavation unit, and in the central portion. However, there were comparatively few of these artifacts in the southwest and northeast corners, although there were flaked stone tools, miscellaneous stone, and flakes in the southwest corner just as in the northwest corner of the excavation unit.

There is no clear patterning observable in the association between steatite and diabase or between amphibolite and any other artifacts. The abrasive qualities of amphibolite would be sufficient for smoothing and polishing other types of stone, and it is possible that it was used for that purpose but was not discarded in quantity sufficient to allow recognition of that fact. It is found with both of these types of stone across the site so it may have been used in the manufacture or rejuvenation of both these materials.

Since all ground stone tools recovered from the site are fragmentary rather than whole, it is presumed that they were specialized tools which were discarded after they were

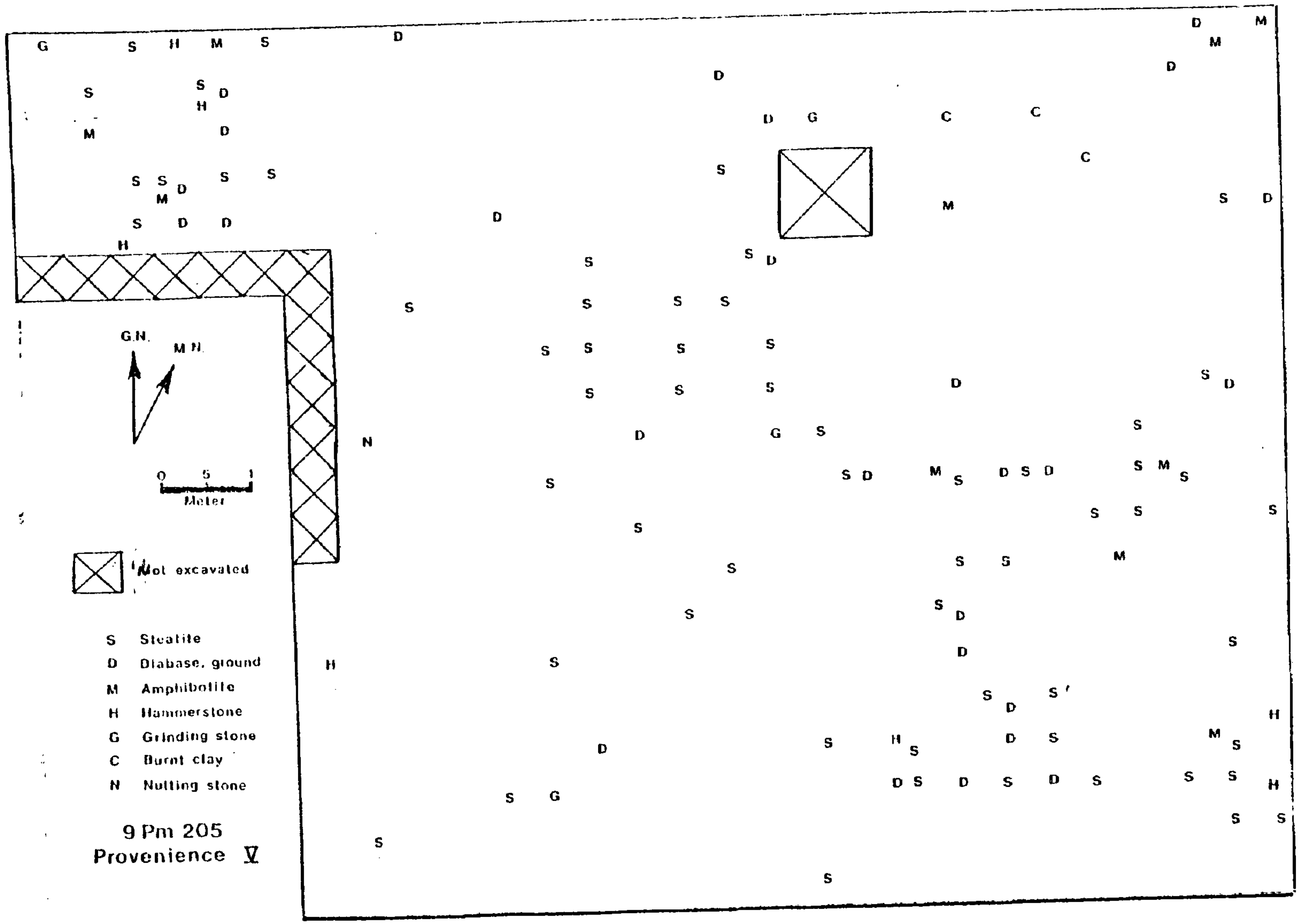


Figure 16. Distribution of ground stone artifacts.

broken during use, or after they were worn so extensively that they could not be re-used. The only exception is amphibolite, and as this would have required little or no modification prior to use, this is considered to represent the discard of unspecialized tools.

It is possible that the steatite fragments recovered from the site are in some cases remnants of raw material brought to the site for modification, but many pieces show evidence of grinding on their edges and other surfaces and have been perforated in the center. It has been suggested (Roy S. Dickens, Jr., personal communication) that these so-called "netsinkers" might actually have been used as cooking stones for heating foods prepared in baskets woven tightly enough to prevent loss of their liquid contents.

This may have been the case at 9Pm205-V, but there are other possibilities, also. One is that these artifacts were being manufactured in the same places and at the same time as were flaked stone tools. A second possibility is that they may have been involved in some kind of activity in which flaked stone tools were used as well. This could be so if they were used as weights for bow drills which were used to perforate wood, hide, or other material which would be difficult to penetrate without use of a specialized tool.

It could also be that their association with other tools at the site is merely fortuitous and indicative of no significant relationship at all. Further excavation of sites where distributional variability is recognizable is necessary if testable hypotheses are to be developed concerning the function of these artifacts.

The diabase pieces from the site appear to be fragments of stone axes, but most are so amorphous in shape that it is difficult to infer their original form. This is in keeping with the assumption that these are artifacts which were extensively conserved since their preparation was sufficiently difficult to ensure that they would be conserved and used until totally expended.

Several small pieces of burned clay were among the artifacts recovered from the site. These fragments were mapped along with the ground stone artifacts, and occurred only in the northeast corner of the site. This is in the same area where there was little miscellaneous stone or debitage. If these clay fragments had been found in an area with large quantities of miscellaneous stone which could be identified as fire-cracked rock, it might be proposed that these pieces represented clay which had been brought to the site adhering to rocks or firewood from the upland terraces nearby. However, the relative scarcity of this type of stone in this area makes it seem unlikely that this was the source of its introduction into the archaeological deposit.

It is possible to speculate that this clay indicates that some type of shelter made of wattle and daub might have been located in this area. Otinger and Lafferty (1980:104) have found evidence that cane was used for house construction at a Late Archaic site in Louisiana, so this type of structure could have been known at 9Pm205-V. However, a few fragments of burned clay are such tenuous evidence for the existence of any type of shelter that it is impossible to do more than speculate.

Interpretation

All in all, lithic artifacts from 9Pm205-V have provided the best evidence available thus far from a Piedmont site which can be used to infer at least some aspects of the life-ways of the Late Archaic occupants of the area. The site is sufficiently extensive in area to provide interpretable indications of distributional patterning of artifacts. Perhaps even more important, it has produced a discrete and well-defined deposit which is uncontaminated by earlier or later occupations. The control permitted by the use of small excavation units has made possible the testing of hypotheses not previously considered for any Late Archaic site in the southeastern United States.

There seems to be little doubt that 9Pm205-V was the setting for more than one type of activity related to the use and manufacture of lithic artifacts. The diversity in types of tools and kinds of raw materials indicates that this was a multi-purpose site rather than a hunting site which was occupied for only a brief period of time. The presence of artifacts made from lithic materials which were not immediately available to the occupants of the site indicates that these materials were being brought there for specific purposes rather than being acquired casually and utilized on an ad hoc basis.

The use and re-use of certain types of materials and artifacts rpovided information about lithic utilization which made possible the development of an explanatory model to account for differential exploitation of lithic resources. The separation of artifacts into specialized and unspecialized categories goes beyond description of archaeological remains to attempt to explain the behavior which was responsible for the creation of the archaeological record.

CHAPTER VI

CONCLUSIONS

The research presented here has served two purposes. It has permitted the development of an interpretation of the activities of a group of people who occupied a wooded site by the side of a swift-flowing river some 4500 years ago, and it has made possible the development and testing of certain hypotheses concerning the activities responsible for the cultural remains which form the archaeological deposit designated as 9Pm205-V.

Interpretation of Late Archaic Life-Ways

Evidence from 9Pm205-V has provided at least some basic information concerning prehsitoric diet, activities, and resource utilization. While the following interpretation is admittedly specualtive, it is drawn from empirical evidence of various activities at the site. This inferrential interpretation is based on data recovered from the site, with ethnographic analogy used for explanatory purposes where appropriate.

Using the above resources, it is possible to infer that 9Pm205-V was probably occupied by a relatively small band of hunters and gatherers, possibly members of an extended family, if modern examples of groups of this kind can be projected backwards into time. The site may have been just one stop in a semi-nomadic existence, occupied for a few weeks in the fall, or perhaps it may have provided a more permanent habitation for several months during the winter.

There would have been several types of food available. Riverine resources of diverse kinds would have been easily obtainable. There might have been migratory birds following the path of the river in the late fall, which is the time of year that ethnobotanical evidence indicates the site was occupied. Game in the form of deer, fish, turtles, birds, and small mammals probably all provided animal protein for the inhabitants of the site. Hickory nuts were consumed also and no doubt were important because of the vegetable oil which they added to a diet low in animal fat. Other nuts such as acorns, and seeds of various plants could have been used for food, too, but there is little supporting evidence to indicate that this was so.

It is likely that this group of people was familiar with numerous sources of food, both animal and vegetable. They may have hunted and gathered throughout a territory recognized and defined by neighboring groups as well as by themselves. If so, it would have included many kilometers of hunting and gathering grounds, and would have contained non-food resources important to their survival and well-being as well.

That these people were familar with non-food resources is apparent in their use of various kinds of stone for tool making. The extensive use of quartz for tool production at 9Pm205-V indicates the importance of this type of stone and its regular utilization. In addition, the number of chert tools found at the site and the attributes of the chert debitage recovered suggest knowledge of resources available in the nearby Coastal Plain area. It is not clear whether this material was obtained directly, or whether it was acquired through trade. Its relative scarcity in relation to quartz does tend to indicate its importance, however.

Since this chert is the only type of exotic material found at the site, and since its occurrence is not outside the distance which could have been covered on foot in one or two days, it is presumed that this material was obtained directly and not through long distance trade. If trade of some kind, either short or long distance, was an important component of the economic system of the people who occupied 9Pm205-V, it is not apparent in the archaeological record.

While it is possible that there were exotic goods present at the site which were removed when it was vacated, it appears probable that this was a self-sufficient group, knowledgeable about local resources of all kinds and expert at exploiting them effectively and efficiently.

It is likely that procurement of subsistence resources was conducted by techniques which Binford (1980) refers to as foraging; that is, they traveled out from a base camp on a daily basis to procure food as needed, rather than organizing hunting parties which were absent for periods of several days at a time. This is consistent with Jochim's (1976:27) observation that, "Searchers tend to be generalists, while pursuers tend to be specialists."

Based on evidence from other Late Archaic sites excavated in the Wallace Reservoir area, it appears likely that 9Pm205-V can be considered to represent a base camp location which was occupied for a period of several weeks or longer. Excavations at 9Pm201 conducted by the author, and at 9Mg90 (Smith 1980) have disclosed eivdence of short-term, sporadic occupational episodes rather than more permanent camp sites where tools were manufactured for use at some later time.

If ethnographic evidence is correct for defining the division of labor in a hunting and gathering economy for a time so far distant in the past, it is probable that males were responsible for the manufacture of stone tools and other implements for hunting animals. Females were probably responsible for gathering vegetable foods from nearby forested areas and may have prepared skins for making clothing. They most likely manufactured baskets and other types of containers for gathering, storing, and preparing food.

The distribution and form of lithic artifacts of both specialized and unspecialized types provides a tentative basis for defining activity areas across the excavation unit. The abundant deposits of quartz debris and other debitage in the northwest, southwest, and central portions of the site could indicate locations where males sat together and manufactured tools. The discarded tools support this supposition.

The only area with possible indications of a work area occupied by females, if ethnographic analogy serves, is in the northeast corner of the site. Tools in that area consisted mainly of projectile points and scrapers. If it can be assumed that projectile points can function as cutting implements and well as hunting weapons, this may represent an area where an activity not previously inferred for a Late Archaic site was taking place.

Recent communication with Edmund Youngbird, a Cherokee basketmaker who uses traditional methods learned from his grandmother in making river cane baskets, indicates that there are only two steps involved in the weaving of river cane which require tools. These occur in the initial preparation of the cane for weaving. First the cane is split into four sections, using a knife, and then the outer covering of the cane is peeled away, again using a knife. Next the peeled cane is scraped to insure uniform thickness and to reduce the material so that it is flexible enough for weaving.

While there is no empirical evidence for the use of river cane or other types of baskets during the Late Archaic period in this area, the absence of ceramic containers suggests that some type of non-durable container was in use.

While steatite containers are known from sites of this time period, their size and weight would limit their portability for use in gathering vegetable foods.

The use of cane for house construction has been noted by Otinger and Lafferty (1980:104) at a Late Archaic site in another area of the southeast, so the utilitarian aspects of this material were not unknown at that time. Furthermore, river cane did grow in the reservoir area at the time 9Pm205-V was being excavated, and if the climate and environment were similar in the past, it should have been available in that area then.

In addition to being suitable for the construction of baskets, river cane is also used for making fish traps and mats. According to Youngbird (personal communication), the best time for gathering cane to be used for basket making is in the fall, and the ethnobotanical evidence from 9Pm205-V indicates that this was precisely the time at which the site was occupied.

While this interpretation of possible activity is extremely speculative, the occurrence in this one area of the site of numerous projectile points and scrapers and the absence of flaking debris indicating that this was a lithic manufacturing area, makes this interpretation an appealing one. The use of basketry throughout the prehistoric period has been proposed, but little or not attempt has been made to identify the technological aspects of basket manufacture as they would be reflected in the archaeological record.

This interpretation at least suggests that further research is worthwhile.

It is probable that some of the miscellaneous stone found at the site represents hearths or ovens used for cooking and also for warmth. Although there is no recorded indication in the laboratory analysis of material from the site that stone recovered from any of the squares showed the characteristic breakage and discoloration that occurs when many types of stone are heated, observation in the field indicated that this was so. It is therefore considered probable that at least some of the concentrations of rock, particularly those without large numbers of associated flakes present, were indeed hearths. If so, sleeping areas were likely located around these concentrations os stone, most likely in the areas which do not have heavy concentrations of flakes, miscellaneous stone, or artifacts.

Even though the excavated material certainly does not represent the entire range of prehistoric activity at the site, it does provide the most extensive horizontal exposure of a Late Archaic occupational episode known from the Piedmont area. As such, it has provided an unparalleled amount of information concerning that archaeological period.

Methodological Implications

The question of the ways by which artifacts and other cultural materials are deposited at an archaeological site has been of interest to archaeologists for some time (Binford 1979, Gifford and Behrensmeyer 1977), but the problem has not been previously approached using the interpretive model presented here. Interpretation of artifacts has been oriented towards definition of activity areas, technological practices, cultural affiliation or temporal placement of sites rather than towards separation of these arti= facts into categories which might be useful in predicting which would be most likely to remain at a site when it was vacated by its inhabitants.

There has been some attention given to the mechanisms by which artifacts are left at sites through discard and breakage (Whallon 1978:33), but there has been no attempt made to define those categories which are here referred to as specialized and unspecialized. The analysis of lithic artifacts at 9Pm205-V has shown that unspecialized artifacts tend to be left at sites in greater quantity than specialized artifacts because their replacement cost is low. Specialized artifacts, however, are found at sites due to discard practices. The discard of expended or broken tools at points of manufacture or use provides the main vehicle by which lithic tools become part of the archaeological record. This has important implications for the interpretation of activities which may have been conducted at any site, since an activity which results in extensive breakage of tools will tend to be over-represented, while an activity which does not result in frequent breakage will tend to be under-represented. This could be a serious source of interpretive bias, if unrecognized.

The ideal remedy for this situation would be experimentation to determine what activities result in different breakage patterns and relative frequencies of breakage. This, followed by examination of cultural material from discrete occupation levels such as the one at 9Pm205-V, would make possible the development of predictive models for the explanation of prehistoric behavior. Only with a more extensive understanding of various activities at individual sites can a framework for comparative studies be established.

The model presented for the separation of tools into specialized and unspecialized categories is an important step in deriving an understanding of factors which influence conservation or discard of various kinds of tools. Archaeological interpretation has been biased towards interpretation of specialized tools, although as has been shown in this study, there are those artifacts which are unlikely to be found in archaeological deposits in still usble form. This kind of interpretation also ignores activities involving unspecialized tools, which not only are likely to be found in greater quantity than specialized tools, but which may have been as important to the prehistoric occupants of a site as were specialized ones.

The research at 9Pm205-V is only a beginning towards interpreting the Late Archaic period in the prehistory of the southeastern United States. However, it is hoped that it has provided a better understanding of the behavior which was responsible for the formation of the archaeological record at the site, and that it willl someday form part of a larger reserach universe which can be used to further knowledge about this important period in prehistory.

REFERENCES CITED

Asch, Nancy B., R. I. Ford, and D. L. Asch
1972 Paleoethnobotany of the Koster site. Illinois State Museum Reports of Investigations No. 24.

Baker, Charles M.
1976 Some technological considerations of quartz as a raw material for chipped stone implements: experiments and applications. Paper presented at the 33rd Annual Meeting of the Southeastern Archaeological Conference, Tuscaloosa, Alabama.

Battle, H. B.
1922 The domestic use of oil among the southern aborigines. American Anthropologist 24:171-182.

Binford, L. R.
1980 Willow smoke and dog's tails: hunter-gatherer settlement systems and archaeological site formation. American Antiquity 45:4-20.

1979 Organization and formation processes: looking at curated technologies. Journal of Anthropological Research 35:255-273.

Byers, Douglas
1959 An introduction to five papers on the Archaic stage. American Antiquity 24:229-256.

Bullen, Ripley
1961 Radiocarbon dates for Southeastern fiber tempered pottery. American Antiquity 27:104-106.

Bullen, Ripley, and H. B. Greene
1970 Stratigraphic tests at Stalling's Island, Georgia. The Florida Anthropologist 23:8-28.

Caldwell, Joseph R.
1958 Trend and tradition in the prehsitory of the Eastern United States. American Anthropological Association Memoir 88.

Carver, Robert
1977 Personal communication.

Chapman, Jefferson
1977 Archaic period research in the Lower Little Tennessee River valley. University of Tennessee Depart-

ment of Anthropology Report of Investigations no. 18.

Chapman, J. and A. B. Shea
1981 The archaeolobotanical record: Early Archaic Period to Contact in the Lower Little Tennessee River Valley. Tennessee Anthropologist VI(1): 61-84.

Chaflin, W. H., Jr.
1931 The Stalling's Island mound. Papers of the Peabody Museum of American Archaeology and Ethnology, Harvard University, XIV (1).

Clegg, J. K.
1977 The four dimensions of artifactual variation. In Stone Tools as Cultural Markers, edited by R.S.V. Wright. Australian Institute of Aborigine Studies, Canberra.

Coe, Joffre
1964 The formative cultures of the Carolina Piedmont. Transactions of the American Philosophical Society 54(5).

DePratter, Chester
1977 Environmental change on the Georgia coast during the prehistoric period. Early Georgia 5:1-14.

1976a The Archaic in Georgia. Early Georgia 3:1-16.

1976b The 1974-75 archaeological survey in the Wallace Reservoir. Manuscript on file, University of Georgia, Department of Anthropology, Athens.

DeVorsey, L.
1971 Early maps as a source in the reconstruction of southern Indian landscapes. In Red, White and Black: Symposium on Indians in the Old South, edited by Charles M. Hudson. Southern Anthropological Society Proceedings 5:12-30.

Dickens, Roy S., Jr.
1979 Personal communication.

Dictionary of Geological Terms
1976 Anchor Press, New York.

Elliott, Daniel
1981 Soapstone use in the Wallace Reservoir. _Wallace Reservoir Project Contribution_ No. 5, University of Georgia Department of Anthropology, Athens, Georgia.

Fenneman, N. M.
1938 _Physiography of the Eastern United States_. McGraw-Hill, New York.

Flannery, Kent
1974 The cultural evolution of civilizations. _Annual Review of Ecology and Systematics_ 3:399-426.

Fowler, Melvin
1959 Summary report of Modoc Rock Shelter. _Illinois State Museum Report of Investigations_ No. 8, Springfield, Illinois.

Gifford, Diane
1979 The third dimension in site structure. Paper presented at the 44th meeting of the Society for American Archaeology, Vancouver, Canada.

Gifford, Diane and Kay Behrensmeyer
1977 Observed formation and burial of a recent human occupation site in Kenya. _Quarternary Research_ 8:245-266.

Goad, Sharon
1979 Chert resources in Georgia. _University of Georgia Laboratory of Archaeology Series, Report_ No. 21, Athens, Georgia.

Gould, Richard
1977 The anthropology of human residues. _American Anthropologist_ 80:815-835.

Griffin, James B.
1952 _The Archaeology of the Eastern United States_.
9 University of Chicago Press.

Griffin, John
1974 Investigations in Russell Cave. U. S. Department of the InteriorNational Park Service _Publications in Archaeology_ 13.

Hayden, Brian, and J. Kamminga
1979 An introduction to use-wear: the first CLUW. In Lithic Use-Wear Analysis, edited by B. Hayden. Academic Press, New York.

Hally, David J.
1981 Plant preservation and the content of paleobotanical samples: a case study. American Antiquity 46:723-742.

Jochim, M. A.
1976 Hunter-Gatherer Subsistence and Settlement. Academic Press, New York.

Jones, C. C., Jr.
1873 Antiquities of the Southern Indians, Particularly of the Southern Tribes. D. Appleton & Company, New York.

Kay, M., F. B. King and C. K. Robinson
1980 Curcubits from Phillips Spring: new evidence and interpretations. American Antiquity 45:806-822.

Lee, Richard B.
1968 What hunters do for a living, or, how to make out on scarce resources. In Man the Hunter, edited by Richard B. Lee and Irven DeVore. Aldine, Chicago.

Leffler, Hugh, editor
1967 A New Voyage to Carolina. University of North Carolina Press, Chapel Hill.

Lewis, T.M.N. and M. Lewis
1961 Eva: An Archaic Site. Univeristy of Tennessee Press, Knoxville.

Lewis, T.M.N., and M. Kneberg
1959 The Archaic culture in the Middle South. American Antiquity 25:161-183.

Libby, Steven
1971 The petrology of the igneous rocks of Putnam County, Georgia. Unpublished M.A. thesis, University of Georgia, Athens.

Miller, Carl
1948 The Lake Spring site, Columbis Count, Georgia. American Antiquity 15:38-51.

Otinger, J. and R. Lafferty III
1980 The depositional implications of Archaic structures at the Brinkley midden, Tishomingo County, Mississippi. Southeastern Archaeological Conference Bulletin 22.

Plummer, Gayther
1975 18th Century Forests in Georgia. Bulletin of the Georgia Academy of Science 33(1):1-19.

Ritchie, W. A.
1932 The Lamoka Lake site. Researches and Transactions of the New York State Archaeological Association 7(4), Rochester.

Rudolph, James
1980 Personal communication.

Schnable, J. E. and H. G. Goodell
1968 Pleistocene-Recent stratigraphy, evolution, and development of the Apalachicola coast, Florida. Geological Society of America Special Paper No. 112.

Schroder, Charles H. III
1979 Personal communication.

Sears, William
1948 What is the Archaic? American Antiquity 14:122-124.

Service, Elman
1979 The Hunters. Prentice-Hall, Englewood Cliffs, New Jersey.

Shapiro, Gary
1981 Report of excavations: 9Ge175. Manuscript on file, University of Georgia Laboratory of Archaeology, Athens.

Smith, Marvin
1981 Archaeological investigations at Site 9Mg90. Wallace Reservoir Project Contribution No. 8, University of Georgia Department of Anthropology, Athens.

Spaulding, Albert
1968 Explanation in archaeology. In New Perspectives in Archeology, edited by S. Binford and L. Bin-

ford. Aldine, Chicago.

Stoltman, James
1978 Temporal models in prehistory: an example from Eastern North America. Current Anthropology 19:703-746.

1974 Groton Plantation. Monographs of the Peabody Museum, Harvard University, No. 1.

Taylor, Walter W.
1968 A Study of Archaeology. Southern Illinois University Press, Carbondale.

Ulmer, Mary and S. E. Beck
1951 Cherokee Cooklore. Mary and Goingback Chiltoskey, Cherokee, North Carolina.

Veatch, O. and L. W. Stephenson
1911 Preliminary report on the geology of the coastal plain of Georgia. Georgia Department of Mines, Mining, and Geology Bulletin No. 26.

Walthall, John A.
1980 Prehistoric Indians of the Southeast. University of Alabama Press.

Watts, W. A.
1980 Late-Quarternary vegetation history at White Pond on the inner Coastal Plain of South Carolina. Quarternary Research 13:187-199.

Webb, William S.
1974 Indian Knoll. University of Tennessee Press, Knoxville.

Whallon, ROBert, Jr.
1978 The spatial analysis of Mesolithic occupation floors: a reappraisal. In The Early Postglacial Settlement of Northern Europe, edited by P. Mellars. University of Pittsburgh Press.

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

Whitehead, Donald R.
1965 Palynology and Pleistocene phytogeography of unglaciated Eastern North America. In The Quarternary of the United States, edited by H. E. Wright and D. G. Frey. Princeton University Press.

Willey, Gordon R. and P. Phillips
1958 Method and Theory in American Archaeology. University of Chicago Press.

Williams, B.J.
1968 The Birhor of India and some comments on band organization. In _Man the Hunter_, edited by R. Lee. Aldine, Chicago.

Williams, Stephen, editor
1977 The Waring papers. Papers of the Peabody Museum of Archaeology and Ethnology, Harvard University Vol. 58.

Winters, Howard
1974 Introduction to the new edition. In _Indian Knoll_, by W. S. Webb. University of Tennessee Press.

Wood, W. Dean
1979 An analysis of two Early Woodland households from the Cane Island site, 9Pm209. Unpublished M.A. thesis, University of Georgia.

Woodroof, Jasper G.
1974 _Tree Nuts_. Avi Publishing Company, Westport, Connecticut.

Wright, H. E., Jr.
1976 The dynamic nature of Holocene vegetation. _Quaternary Research_ 6:581-596.

Youngbird, Edmund
1981 Personal communication.

APPENDIX I

FORM FOR RECORDING LITHIC ARTIFACTS

Form for recording lithic artifacts.

I. Quartz/quartzite debitage

A. Flakes and formless debris

1. white
   - 1 cm ___
   - 2 cm ___
   - 3 cm ___
   - 4 cm ___
   - 5 cm ___
   - 5 cm ___

2. clear
   - 1 cm ___
   - 2 cm ___
   - 3 cm ___
   - 4 cm ___
   - 5 cm ___
   - 5 cm ___

3. reddish
   - 1 cm ___
   - 2 cm ___
   - 3 cm ___
   - 4 cm ___
   - 5 cm ___
   - 5 cm ___

4. gray
   - 1 cm ___
   - 2 cm ___
   - 3 cm ___
   - 4 cm ___
   - 5 cm ___
   - 5 cm ___

5. green
   - 1 cm ___
   - 2 cm ___
   - 3 cm ___
   - 4 cm ___
   - 5 cm ___
   - 5 cm ___

6. yellow
   - 1 cm ___
   - 2 cm ___
   - 3 cm ___
   - 4 cm ___
   - 5 cm ___
   - 5 cm ___

B. Cores and chunks

1. white ___
2. clear ___
3. reddish ___
4. gray ___
5. green ___
6. yellow ___

II. Chert debitage

A. Flakes and formless debris

1. white
   - 1 cm ___
   - 2 cm ___
   - 3 cm ___
   - 4 cm ___
   - 5 cm ___
   - 5 cm ___

2. red
   - 1 cm ___
   - 2 cm ___
   - 3 cm ___
   - 4 cm ___
   - 5 cm ___
   - 5 cm ___

3. yellow
   - 1 cm ___
   - 2 cm ___
   - 3 cm ___
   - 4 cm ___
   - 5 cm ___
   - 5 cm ___

4. black
   - 1 cm ___
   - 2 cm ___
   - 3 cm ___
   - 4 cm ___
   - 5 cm ___
   - 5 cm ___

(II)

5. brown
   - 1 cm ___
   - 2 cm ___
   - 3 cm ___
   - 4 cm ___
   - 5 cm ___
   - 5 cm ___

6. green
   - 1 cm___
   - 2 cm___
   - 3 cm___
   - 4 cm___
   - 5 cm___
   - 5 cm___

7. orange
   - 1 cm ___
   - 2 cm ___
   - 3 cm ___
   - 4 cm ___
   - 5 cm ___
   - 5 cm ___

8. gray
   - 1 cm___
   - 2 cm___
   - 3 cm___
   - 4 cm___
   - 5 cm___
   - 5 cm___

9. other___________
   - 1 cm ___
   - 2 cm ___
   - 3 cm ___
   - 4 cm ___
   - 5 cm ___
   - 5 cm ___

B. Cores and chunks
   1. white ___
   2. red ___
   3. yellow ___
   4. black ___
   5. brown ___
   6. green ___
   7. orange ___
   8. gray___
   9. other_____

III. Flaked stone tools

A. Material
   0. unidentifiable
   I. chert
      - a. white
      - b. red
      - c. yellow
      - d. black
      - e. brown
      - f. green
      - g. orange
      - h. gray
      - i. other _____
   2. quartz/quartzite
      - a. white
      - b. clear
      - c. reddish
      - d. gray
      - e. green
      - f. yellow
   3. "rhyolite"
   4. other___________

B. Preparation
   0. unidentifiable
   1. unifacial
   2. bifacial
   3. use modified

(III) C. Tool type
- 0. unidentifiable
- 1. projectile point
- 2. knife
- 3. scraper
- 4. graver
- 5. drill
- 6. backed ovate flake tool
- 7. unspecialized flake tool
- 8. scraper/knife
- 9. perforator
- 10. other ______________

D. Condition
- 1. whole
  - a. finished
  - b. unfinished
    - (1) on tip
    - (2) on side(s)
    - (3) on base
    - (4) other________
- 2. fragmentary
  - a. unidentifiable
  - b. tip only
  - c. center only
  - d. base only
  - e. base and central portion
  - f. tip and central portion
  - g. one side only
  - h. other ______________

E. Formal attributes
- 0. not applicable
- 1. backed
- 2. shouldered
- 3. stemmed
  - a. parallel sides
  - b. expanding sides
  - c. contracting sides
- 4. lateral edge(s)
  - a. incurvate
  - b. excurbate
  - c. straight
- 5. transverse edge(s)
  - a. incurvate
  - b. excurvate
  - c. straight
- 6. base
  - a. straight
  - b. convex
  - c. concave
  - d. ground

(III) 7. special edge preparation
- a. none
- b. serrated
- c. beveled
- d. notched
- d. other________________

8. other features________________________________

F. Metric attributes

maximum length	______	mm
maximum width	______	mm
maximum thickness	______	mm
length of stem	______	mm
width of stem	______	mm
shoulder angle	______	degrees
other	______	

G. Projectile point type
- 0. unidentifiable
- 1. Savannah River
- 2. Morrow Mountain
- 3. Kirk
- 4. other____________

IV. Ground or pecked stone artifacts

A. Steatite
- 0. unidentifiable fragment
- 1. perforated "netsinker"
  - a. unbroken
  - b. broken
    - (1) at perforation
    - (2) on side
    - (3) other________
  - c. approximate angle at corner
    - (1) right
    - (2) acute
    - (3) obtuse
  - d. size ______________mm x __________mm
  - e. thickness ______________mm x __________mm
- 2. sherd
  - a. size ______________mm x __________mm
  - b. thickness ______________mm x __________mm
- 3. plummet
  - a. length ________mm
  - b. maximum thickness ________mm

B. Diabase
- 1. unidentifiable fragment
- 2. grooved ax
- 3. hammerstone
- 4. other

C. Amphibolite ______________mm x __________mm

APPENDIX II

LIST OF SQUARES CONTAINING CARBONIZED WOOD

Squares containing carbonized wood.

Square	Pine/Resin	Hardwood	Unspecified
19	x		
21			x
27	x		
28		x	
29	x		
37	x	x	
41	x		
43	x		
47	x		
48	x		
49	x	x	
58	x	x	
62	x		
63	x		
65	x		
66	x		
67	x		
68	x		
71	x		
72	x		
73	x		
74	x		
75	x		
76	x		
77	x		
79	x		
80	x		
86	x		
88	x		
103	x		
104	x		

Square	Pine/Resin	Hardwood	Unspecified
106	x		
107	x		
109	x		
111	x		
112	x		
113	x		
114	x		
115	x		
116	x		
117	x		
118	x		
120	x		
121	x		
127			x
139	x		
152	x		
155	x		
160	x		
161			x
164	x		
165		x	
197	x		
201	x		
203	x	x	
204	x	x	
205	x		
206		x	
207	x		
218	x		
222	x		
223	x		
224	x		
225	x		

Square	Pine/Resin	Hardwood	Unspecified
234			x
236	x		
238	x		
240	x		
241	x		
242			x
243	x		
244			x
245	x	x	
254	x		
256	x		
259	x		
265	x		
267	x		
269	x		
270	x		
271	x		
272	x		
273			x
274	x		
275	x		
276	x	x	
277	x		
289	x		
313	x		
316	x		
317	x		
319	x		
320			x
322			x
327	x		
330	x		
333			x
339	x		
344	x		

Square	Pine/Resin	Hardwood	Unspecified
345	x		
346	x		
347			x
348			x
349			x
350	x		
352	x		
354	x		
356			x
357		x	
358	x		
361			x
363	x		
366	x		
382			x
383			x
386			x
388			x
391	x		
419	x		
420			x
423			x
427			x
430	x		
434	x		
435	x		
436	x		
438	x		
448		x	
449	x		
450	x		
460	x		
462	x		
463	x	x	

Square	Pine/Resin	Hardwood	Unspecified
465	x	x	
473	x		
475	x		
476	x		
477	x		
478	x		
479	x		
486	x		
488	x		

APPENDIX III

FREQUENCY OF CHERT AND QUARTZ FLAKES PER SQUARE

Quartz and chert flakes per square. An asterisk indicates that the square was not excavated.

Square	Quartz	Chert	Square	Quartz	Chert
18	16	27	64	109	32
19	48	42	65	94	20
20	3	2	66	151	20
21	40	13	67	695	20
22	48	29	68	78	11
23	158	20	69	283	20
24	0	21	70	43	13
25	1227	39	71	59	19
26	68	24	72	71	32
27	150	22	73	64	21
28	107	11	74	92	22
29	0	22	75	35	20
30	39	7	76	46	8
31	59	12	77	53	31
32	9	4	78	30	12
33	45	13	79	35	20
34	*	*	80	44	15
35	3	2	81	23	16
36	*	*	82	32	11
37	16	7	83	51	25
38	*	*	84	22	14
39	15	8	85	24	9
40	*	*	86	30	10
41	4	4	87	25	30
42	*	*	88	28	22
43	8	3	89	16	5
44	*	*	90	6	2
45	8	2	91	2	0
46	*	*	92	2	1
47	29	11	93	0	1
48	73	18	94	18	10
49	34	20	95	7	3
50	53	14	96	22	3
51	29	12	97	4	0
52	38	10	98	3	2
53	12	6	99	14	4
54	29	1	100	25	7
55	31	8	101	11	5
56	120	18	102	21	6
57	93	22	103	18	7
58	10	5	104	52	7
59	4	5	105	19	6
60	8	4	106	33	8
61	22	10	107	19	6
62	108	45	108	41	8
63	43	26	109	11	0

Square	Quartz	Chert	Square	Quartz	Chert
110	30	11	161	16	4
111	13	7	162	20	8
112	36	12	163	38	21
113	23	6	164	45	24
114	32	7	165	36	24
115	23	4	166	33	7
116	31	10	167	33	15
117	37	6	168	11	3
118	18	7	169	6	3
119	18	11	170	17	10
120	32	10	171	18	4
121	31	13	172	5	0
122	26	16	173	1	0
123	21	8	174	4	0
124	12	11	175	0	4
125	19	8	176	5	5
126	26	13	177	6	3
127	19	9	178	5	3
128	21	18	179	9	1
129	5	15	180	4	4
130	16	4	181	8	8
131	4	1	182	22	4
132	2	1	183	0	3
133	0	3	184	10	3
134	6	2	185	10	8
135	3	1	186	8	2
136	6	5	187	20	12
137	1	3	188	16	6
138	10	11	189	17	14
139	8	2	190	13	3
140	5	5	191	28	10
141	12	0	192	25	6
142	21	4	193	36	5
143	15	8	194	28	7
144	18	7	195	61	11
145	9	2	196	56	15
146	26	9	197	68	21
417	10	4	198	23	17
148	15	8	199	63	9
149	23	2	200	39	6
150	28	15	201	58	16
151	9	7	202	54	11
152	11	2	203	61	14
153	29	8	204	63	20
154	28	4	205	14	6
155	17	6	206	22	11
156	24	5	207	13	2
157	14	7	208	7	3
158	23	7	209	18	7
159	21	14	210	6	0
160	18	11	211	14	2

Square	Quartz	Chert	Square	Quartz	Chert
212	9	3	262	1	1
213	4	4	263	20	6
214	7	5	264	18	0
215	18	7	265	15	12
216	16	5	266	11	4
217	16	6	267	51	11
218	16	6	268	81	5
219	12	6	269	22	7
220	10	4	270	34	6
221	10	7	271	43	5
222	12	2	272	60	5
223	0	0	273	16	4
224	14	12	274	14	1
225	21	9	275	25	6
226	0	6	276	28	6
227	11	11	277	33	3
228	18	7	278	56	8
229	41	12	279	26	0
230	57	8	280	15	3
231	20	6	281	43	12
232	44	10	282	70	8
233	30	2	283	57	8
234	42	12	284	25	6
235	39	12	285	55	7
236	46	12	286	137	5
237	54	17	287	64	3
238	76	13	288	*	*
239	27	12	289	12	5
240	53	22	290	*	*
241	36	20	291	12	2
242	70	28	292	11	6
243	35	15	293	11	4
244	42	9	294	18	3
245	54	7	295	12	4
246	43	2	296	24	3
247	80	4	297	10	9
248	37	8	298	17	6
249	*	*	299	125	7
250	20	16	300	43	7
251	*	*	301	173	6
252	8	4	302	19	8
253	19	3	303	39	12
254	13	3	304	18	9
255	17	4	305	24	4
256	27	8	306	12	4
257	31	2	307	7	16
258	16	4	308	30	14
259	10	6	309	38	11
260	2	1	310	31	14
261	15	7	311	36	6

Square	Quartz	Chert	Square	Quartz	Chert
312	32	4	362	0	0
313	29	13	363	27	6
314	36	12	364	25	5
315	25	12	365	16	2
316	38	9	366	18	10
317	25	14	367	11	4
318	42	8	368	20	1
319	35	6	369	8	3
320	52	9	370	46	5
321	23	9	371	34	6
322	54	5	372	15	5
323	34	12	373	23	9
324	53	11	374	12	5
325	38	6	375	14	5
326	18	6	376	14	13
327	0	0	377	21	24
328	34	4	378	33	8
329	24	2	379	22	12
330	13	3	380	42	7
331	20	4	381	33	15
332	18	4	382	32	13
333	12	5	383	32	7
334	5	8	384	26	11
335	14	4	385	22	8
336	15	4	386	18	11
337	18	7	387	40	13
338	159	13	388	34	3
339	48	13	389	29	11
340	332	3	390	24	4
341	109	9	391	;5	4
342	84	2	392	34	4
343	39	14	393	32	7
344	6	6	394	31	16
345	15	9	395	33	15
346	14	6	396	34	9
347	19	13	397	17	3
348	41	6	398	8	5
349	21	10	399	23	4
350	33	4	400	6	1
351	48	4	401	16	6
352	14	9	402	13	2
353	21	2	403	15	5
354	41	10	404	8	0
355	34	1	405	11	3
356	27	5	406	9	4
357	15	7	407	12	2
358	26	5	408	26	8
359	15	6	409	13	2
360	29	8	410	14	2
361	12	5	411	19	9

Square	Quartz	Chert	Square	Quartz	Chert
412	19	7	461	96	23
413	12	2	462	726	52
414	8	6	463	358	54
415	18	4	464	101	20
416	21	11	465	241	55
417	27	8	466	112	19
418	11	6	467	288	51
419	18	9	468	154	24
420	27	9	469	636	67
421	16	6	470	*	*
422	14	8	471	*	*
423	19	9	472	94	25
424	11	0	473	144	28
425	22	6	474	131	26
426	38	11	475	205	30
427	21	5	476	154	55
428	29	3	477	263	49
429	34	6	478	214	153
430	34	29	479	289	72
431	40	9	480	402	139
432	14	14	481	726	50
433	19	5	482	*	*
434	25	6	483	*	*
435	18	7	484	166	29
436	17	8	485	259	29
437	10	7	486	158	19
438	5	1	487	90	33
439	7	1	488	320	32
440	434	24	489	109	13
441	2	0	490	400	23
442	9	2	491	157	24
443	0	2	492	187	21
444	5	3	493	126	27
445	5	3	Totals	22164	4835
446	7	2		$\bar{x}$ =49.47	$\bar{x}$ =10.96
447	6	2			
448	26	3			
449	25	1			
450	19	7			
451	19	5			
452	11	2			
453	8	6			
454	22	7			
455	11	2			
456	23	1			
457	9	0			
458	*	*			
459	*	*			
460	187	30			

APPENDIX IV

WEIGHT OF MISCELLANEOUS STONE BY SQUARE

Weight of miscellaneous stone by squares.
An asterisk (*) indicates that the square
was not excavated.

Square	Weight (grams)	Square	Weight
18	907.20	49	2608.20
19	935.55	50	2069.55
20	907.20	51	1360.80
21	170.10	52	2041.20
22	708.75	53	2494.80
23	1134.00	54	1077.30
24	1814.40	55	1020.60
25	1672.65	56	2154.60
26	1842.75	57	3203.55
27	2154.60	58	1729.35
28	2268.00	59	255.15
29	2579.85	60	1247.40
30	1644.30	61	2069.55
31	2268.00	62	2608.20
32	935.55	63	3175.20
33	1814.40	64	3175.20
34	*	65	2948.40
35	963.90	66	3543.75
36	*	67	2182.95
37	1048.95	68	2268.00
38	*	69	2012.85
39	1134.00	70	3033.45
40	*	71	2523.15
41	680.40	72	2920.05
42	*	73	3430.35
43	198.45	74	3402.00
44	*	75	2806.65
45	2381.40	76	2353.05
46	*	77	3373.65
47	2268.00	78	1899.45
48	1417.50	79	1587.60

Square	Weight	Square	Weight
80	1786.05	113	1729.35
81	2268.00	114	1360.80
82	1786.05	115	1105.65
83	3061.80	116	1360.80
84	1814.40	117	935.55
85	2353.05	118	1247.40
86	1190.70	119	2587.60
87	4791.15	120	822.15
88	4025.70	121	1502.55
89	2041.20	122	1757.70
90	2347.40	123	1672.65
91	2360.80	124	1899.45
92	2920.05	125	1219.05
93	1020.60	126	1275.75
94	850.50	127	2353.05
95	680.40	128	1417.50
96	1417.50	129	3628.80
97	680.40	130	1219.05
98	850.50	131	5244.75
99	737.10	132	1360.80
100	1134.00	133	737.10
101	737.10	134	481,95
102	1530.90	135	963.90
103	1048.95	136	538.65
104	2012.85	137	1247.40
105	missing	138	1190.70
106	2409.75	139	340.20
107	1502.55	140	481.95
108	missing	141	963.90
109	missing	142	765.45
110	missing	143	595.35
111	1729.35	144	992.25
112	1701.00	145	368.55

Square	Weight	Square	Weight
146	1559.25	181	1701.00
147	907.20	182	283.50
148	935.55	183	765.45
149	992.25	184	595.35
150	1502.55	185	850.50
151	1134.00	186	510.30
152	1587.60	187	963.90
153	1105.65	188	1105.65
154	1417.50	189	1644.30
155	1474.20	190	1587.60
156	992.25	191	2296.35
157	1247.40	192	1757.70
158	992.25	193	1786.05
159	765.45	194	2409.75
160	2466.45	195	2211.30
161	2721.60	196	2126.25
162	2324.70	197	1417.50
163	3883.95	198	680.40
164	4054.05	199	2012.85
165	3572.10	200	3231.90
166	1984.50	201	4536.00
167	1474.20	202	5783.40
168	2268.00	203	3940.65
169	1247.40	204	2296.35
170	1020.60	205	2268.00
171	1587.60	206	3061.80
172	1559.25	207	2494.80
173	1332.45	208	1927.80
174	1701.00	209	1814.40
175	1190.70	210	992.25
176	595.35	211	1445.85
178	1275.75	212	1247.40
179	992.25	213	2211.30
180	481.95	214	680.40

Square	Weight	Square	Weight
215	1587.60	249	*
216	missing	250	1927.80
217	1814.40	251	*
218	878.85	252	1445.85
219	1502.55	253	1587.60
220	1927.80	254	680.40
221	907.20	255	1190.70
222	538.65	256	2154.60
223	935.55	257	1701.00
224	1020.60	258	567.00
225	1672.65	259	255.15
226	1871.10	260	1048.95
227	1814.40	261	935.55
228	1445.85	262	1304.1 0
229	2041.20	263	1701.00
230	2608.20	264	680.40
231	1871.10	265	1020.60
232	3572.10	266	1587.60
233	1757.70	267	5698.35
234	3827.25	268	1814.40
235	3685.50	269	2664.90
236	3657.15	270	2154.60
237	3373.65	271	2154.60
238	3543.75	272	2891.70
239	2041.20	273	1020.60
240	3572.10	274	2835.00
241	2636.55	275	2608.20
242	3969.00	276	2445.85
243	2268.00	277	3912.30
244	2721.60	278	3912.30
245	1984.50	279	4365.90
246	2041.20	280	2154.60
247	2069.55	281	3458.70
248	1587.60	282	2012.85

Square	Weight	Square	Weight
283	2268.00	317	1842.75
284	2778.30	318	3175.20
285	2097.90	319	2806.65
286	1190.70	320	2920.05
287	1247.40	321	2296.35
288	*	322	2342.70
289	510.30	323	2608.20
290	*	324	1871.10
291	538.65	325	1729.35
292	481.95	326	510.30
293	113.40	327	737.10
294	623.70	328	1105.65
295	226.80	329	1020.60
296	1247.40	330	141.75
297	340.20	331	567.00
298	822.15	332	226.80
299	1134.00	333	368.55
300	1105.65	334	141.75
301	missing	335	368.55
302	708.75	336	198.45
303	1417.50	337	311.85
304	1701.00	338	680.40
305	3090.15	339	822.15
306	1786.05	340	2012.85
307	2976.75	341	1304.10
308	2409.75	342	2182.95
309	missing	343	907.20
310	2154.60	344	1190.70
311	3090.15	345	1672.65
312	3402.00	346	1871.10
313	1445.85	347	2891.70
314	3231.90	348	1587.60
315	3090.15	349	2523.15
316	4819.50	350	2239.65

Square	Weight	Square	Weight
351	3033.45	385	1814.40
352	2721.60	386	1701.00
353	1899.45	387	1814.40
354	2636.55	388	1984.50
355	2608.20	389	1134.00
356	1474.20	390	1701.00
357	1020.60	391	1502.55
358	2097.90	392	2381.40
359	1984.50	393	1304.10
360	1134.00	394	1701.00
361	missing	395	1729.35
362	missing	396	2608.20
363	2494.80	397	1332.45
364	680.40	398	1247.40
365	567.00	399	878.85
366	1389.15	400	1474.20
367	missing	401	680.40
368	141.75	402	393.90
369	340.20	403	793.80
370	missing	404	198.45
371	198.45	405	538.65
372	85.05	406	56.70
373	missing	407	453.60
374	708.75	408	198.45
375	113.40	409	567.00
376	255.15	410	141.75
377	1077.30	411	226.80
378	1048.95	412	311.85
379	1701.00	413	765.45
380	missing	414	680.40
381	1360.80	415	453.60
382	missing	416	255.15
383	1587.60	417	453.60
384	1701.00	418	1587.60

Square	Weight	Square	Weight
419	1842.75	452	538.65
420	2551.50	453	708.75
421	2948.40	454	255.15
422	2154.60	455	255.15
423	2409.75	456	453.60
424	1729.35	457	481.95
425	2154.60	458	*
426	2268.00	459	*
427	1927.80	460	1474.20
428	2445.85	461	2523.15
429	2012.85	462	2778.30
430	935.55	463	2381.40
431	1105.65	464	3005.10
432	2268.00	465	2721.60
433	1048.95	466	1814.40
434	595.35	467	1956.15
435	737.10	468	2778.30
436	1020.60	469	2126.25
437	680.40	470	*
438	1020.60	471	*
439	680.40	472	286.65
440	595.35	473	2749.95
441	340.20	474	2466.45
442	141.75	475	2494.80
443	737.10	476	3912.30
444	141.75	477	3288.60
445	595.35	478	2381.40
446	340.20	479	3657.15
447	340.20	480	1389.15
448	708.75	481	missing
449	1020.60	482	*
450	396.90	483	*
451	481.95	484	3203.55

Square	Weight
485	1587.60
486	1729.35
487	2182.95
488	3542.75
489	2976.75
490	1899.45
491	2494.80
492	2608.20
492	1077.30

Total Weight	741632.75 g
Mean weight	1670.34 g
Standard deviation	±1022.86 g

205

Plate 1. Looking northeast across floodplain toward PM260. Site location is marked by backdirt piles.

Plate 2. Profile in Provenience V showing dark midden stain.

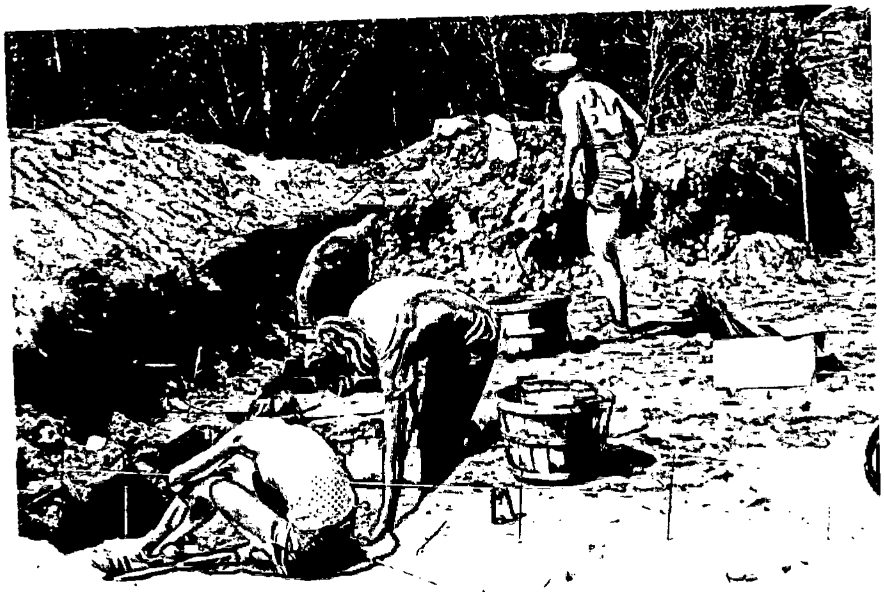


Plate 3. Excavation of 50 cm squares in Provenience V, PM260.

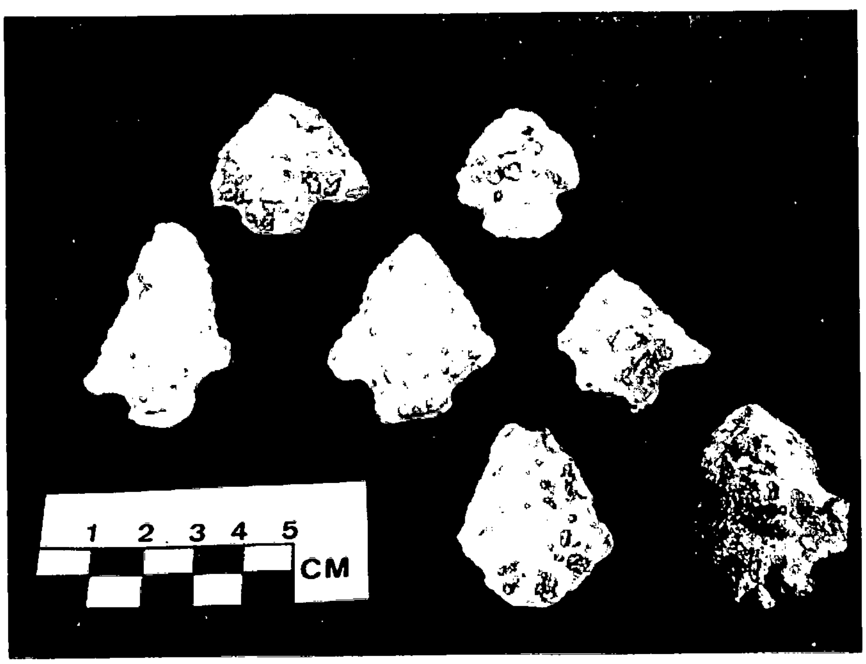


Plate 4. Quartz projectile points typical of the Late Archaic component at PM260.

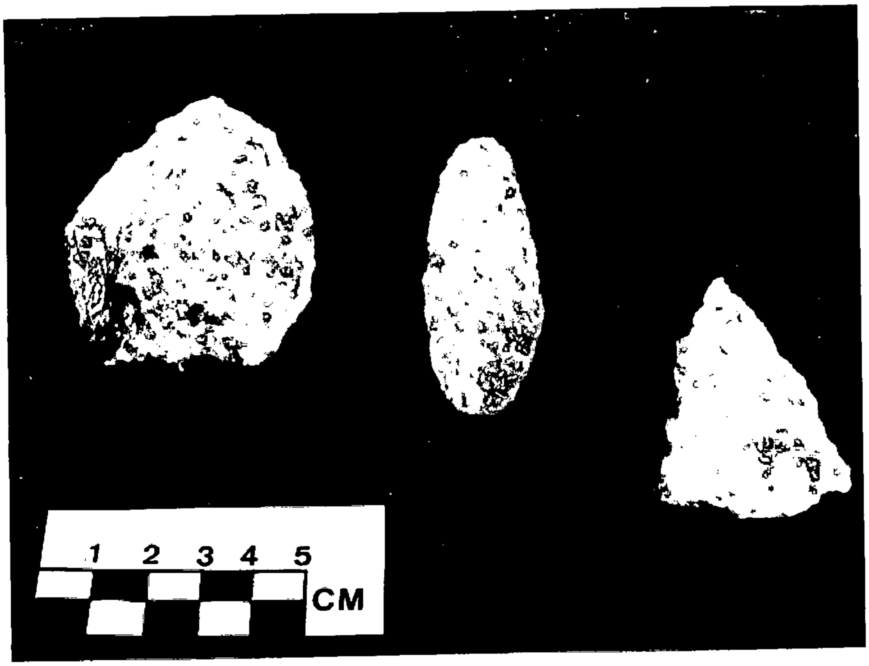


Plate 5. Quartz bifacial knives typical of the Late Archaic component at PM260.

Plate 6. Quartz bifacial scrapers typical of the Late Archaic component at PM260.

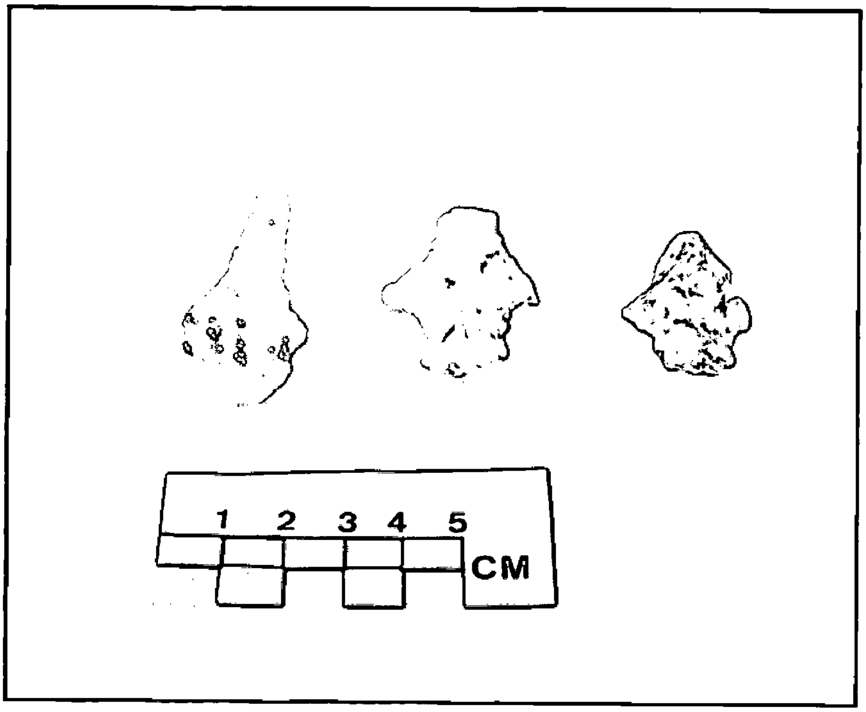


Plate 7. Bifacial drills typical of the Late Archaic component at PM260.

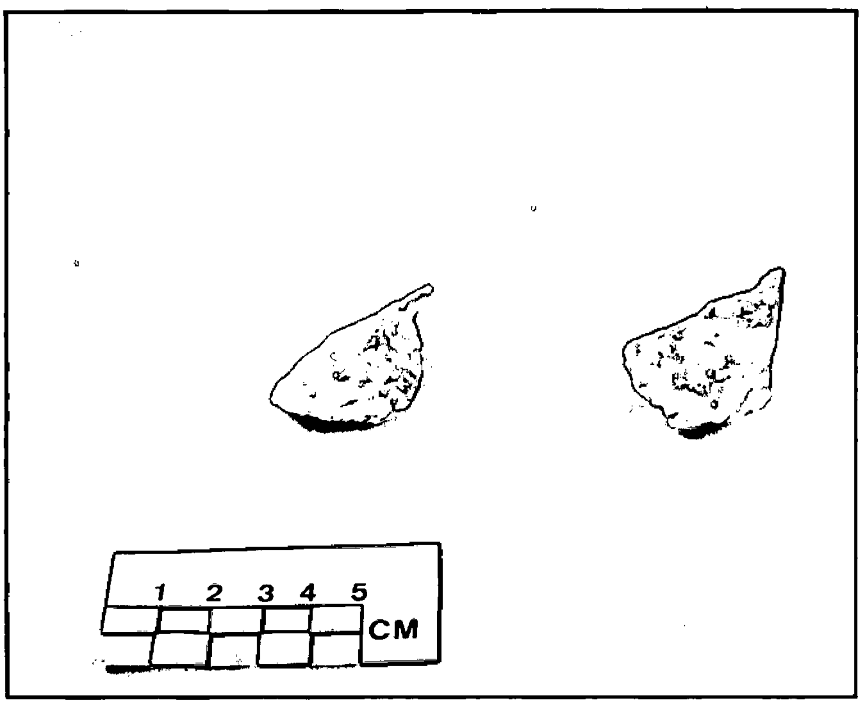


Plate 8. Unifacial perforators typical of the Late Archaic component at PM260.

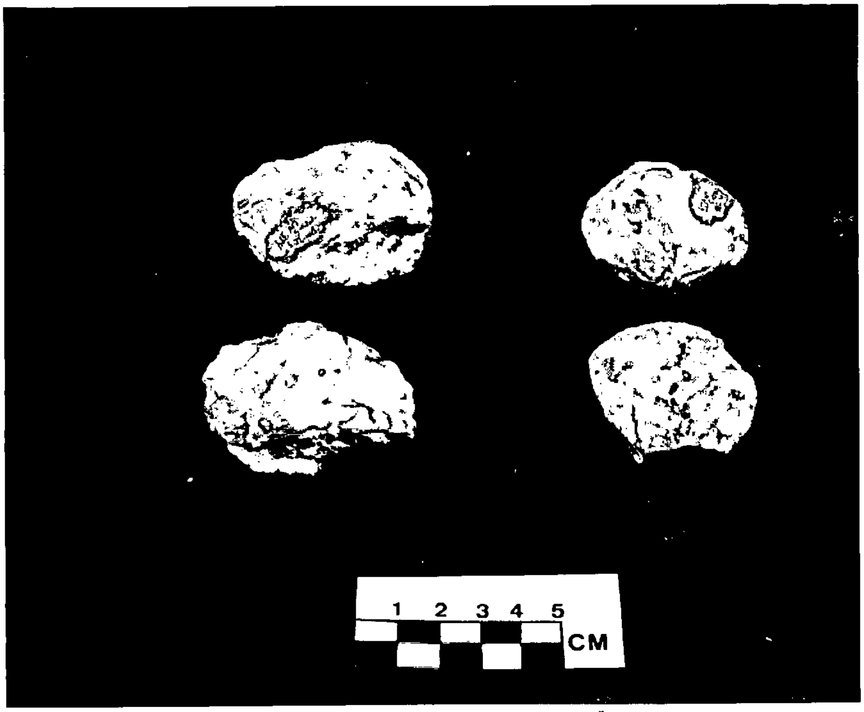


Plate 9. Hammerstones typical of the Late Archaic component at PM260.

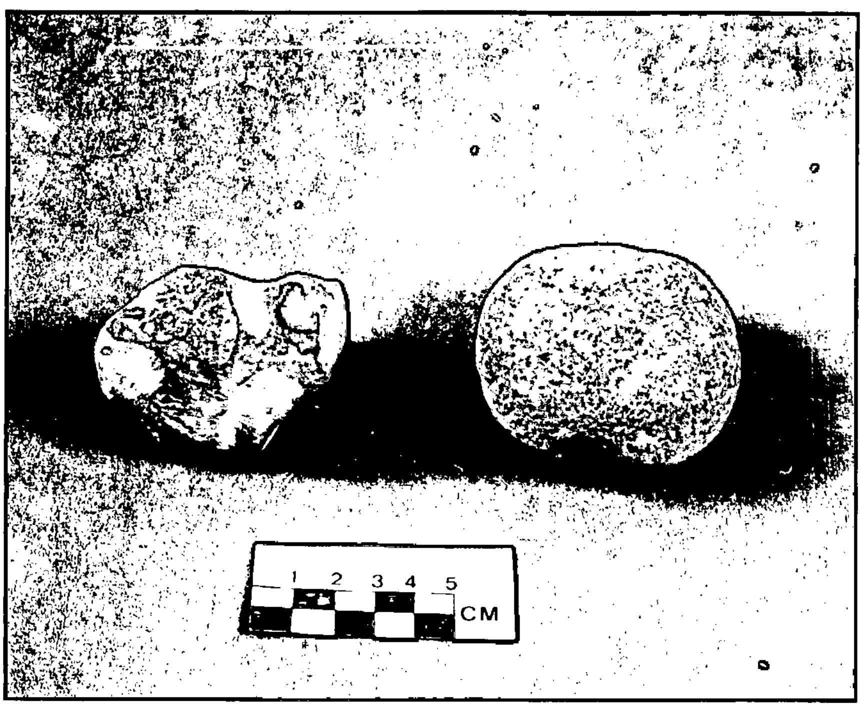


Plate 10. Diabase tool and grinding stone from Late Archaic component at PM260.

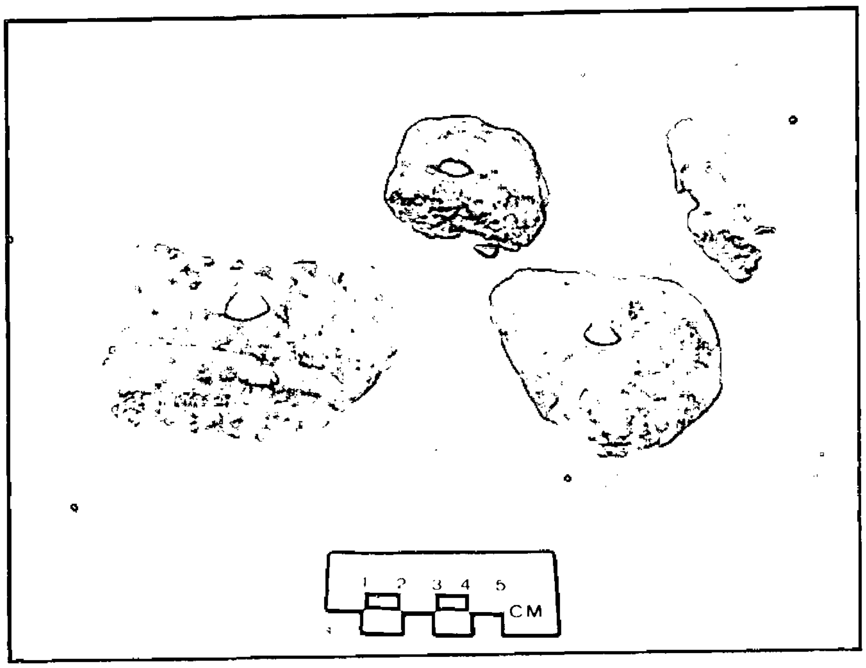


Plate 11. Perforated steatite typical of the Late Archaic component at PM260.