This document contains information on Native American burials. Images considered to be culturally insensitive, including images and drawings of burials, Ancestors, funerary objects, and other NAGPRA material have been redacted.

UNIVERSITY OF GEORGIA
Franklin College of Arts and Sciences
Department of Anthropology
Laboratory of Archaeology

UNIVERSITY OF GEORGIA
LABORATORY OF ARCHAEOLOGY SERIES
REPORT NUMBER 99

A COMPARISON OF NON-FLAKED STONE ARTIFACTS FROM TWO EARLY HISTORIC SITES IN NORTHWEST GEORGIA

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Athens

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by

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B. A., The University of Georgia, 1951

A Thesis Submitted to the Graduate Faculty of the

University of Georgia in Partial Fulfillment

of the

Requirements for the Degree

of

MASTER OF ARTS

ATHENS, GEORGIA

1977

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This thesis is dedicated to my children

Gail, Jeffrey, Stuart

ACKNOWLEDGEMENTS

Many people helped in the production of this thesis, either with professional guidance, or friendship and in some cases both. All gave their time and concern.

The geologists on whom I relied heavily, were Porter Morgan, Bob Carver, Dave Lawton, Charles Cressler and Tom Crawford. Beverly Connor and Gary Adams, University of Georgia graduate students, also identified specimens. Arnie Zisa, geomorphologist, and Jerry McCollum, biologist, both of the Georgia Department of Natural Resources and Marion Hemperley of the Office of the Surveyor General provided material. Gayther Plummer reviewed the tabulation of trees and Gail Pennington, Darlene DePratter and Stuart Pennington helped tabulate the trees from copies of 1832 land surveys. Lewis Larson suggested that forests would differ at the two sites based on his tabulations for the Etowah Site and made this unpublished material available. Edward Farnworth of the Institute of Ecology advised and reviewed, helping particularly in the environmental section. Others who helped in various areas were Linda Adams, Erin Bronk, Sandy Laerm, Jim Crawford, Joci Caldwell, A. R. Kelly, Jim Wilson, Charles Wharton, Mabel O'Connor, Grace and Luther Johnson, Jeffrey Pennington, Adah Toombs and Mrs. Clyde Harper. The excellent photographs were made by Evelyn Barnes. My reading committee, Paul Fish and Michael Olien, get special thanks.

Most of all, however, I thank David Hally my major professor for his time, effort and concern.

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Chapter 1

INTRODUCTION

Non-flaked stone artifacts have received less attention in the eastern woodlands of North America than any of the other kinds of material left by prehistoric people. Two main reasons seem to account for this. Primarily, archaeologists in this region have long focused their attention on chronology and cultural taxonomy. Pottery, and to a lesser extent flaked tools, has been found to be a sensitive indicator of changes through time and space and therefore has received a great deal of attention. Non-flaked tools however do not seem to reflect these changes. Some tool types included in this study can be found in sites dating from the Archaic Period, about 8000 B.C., to the Historic Period, as late as A.D. 1800. Secondarily, archaeologists in the east have not been interested in going beyond taxonomy. Little attention has been given to reconstructing and explaining human activities of the past.

Early in the 1960s archaeology underwent a major shift in interest toward functional studies with a view toward learning what activities occurred, where they occurred and occasionally interpreting why they occurred as they did. With this new emphasis, non-flaked tools can be expected to receive more attention than in the past. This study represents an initial attempt to analyze systematically non-flaked stone material and develop a classification which reflects tool function.

For convenience the material with which this study is concerned is referred to as non-flaked stone artifacts. The major focus is on tools, which are defined as technical aids used to perform a task (Binford 1972:265). The non-flaked stone tools analyzed in this study are composed both of rocks which have been altered to a desired form, mainly by pecking and rubbing, and rocks used in an unaltered state. Occasionally flaking has been an initial part of the manufacturing process but in most cases flaking scars have been ground away. These tools with a few exceptions are made of materials other than chert or flint, which are cryptocrystalline quartz and fracture conchoidally. The submicroscopic crystals of these materials have such structural uniformity that they tend to crack and shatter when struck by even light blows. Therefore some manufacturing processes as pecking and uses involving percussion generally are not compatible with this material (Semenov 1964:66-68). Projectile points, knives and other flaked tools, frequently made of chert or flint, fall outside this study group.

The collection of non-flaked stone artifacts which compose the study group is derived from 2 early historic (A.D. 1550-1700) village sites located in northwest Georgia (Hally 1975, 1976). These sites, the Little Egypt Site in Murray County and the King Site in Floyd County, are located in the Coosa River drainage system about 50 mi apart and are assigned to the same ceramically defined phase (Barnett) by Hally. Although structures at both sites were destroyed by fire, cultural material was abundant on their floor surfaces. A number of these structures at both sites have been excavated in the same exacting manner. Floors were divided into 2 ft squares, the artifacts and features were mapped and a 25% systematic sample of the soil processed by flotation. The resulting data provides an opportunity for both intra- and inter-site comparisons.

A total of 1024 specimens representing almost the entire collection of non-chert rocks from excavated structures was examined and 224 were identified as culturally altered specimens. Tools have been analyzed and on the basis of formal attributes as size, shape and specific wear marks, assigned to 31 different types. An additional 56 non-flaked stone artifacts from burials at the King Site are used to corroborate the tool types from the structure floors.

Although this study began as an attempt to identify tool function or use based on microwear, it became obvious not long after work began that this type of analysis could not be done properly in the time available. The preliminary work however suggested there were differences in the total tool assemblages from the 2 sites. It had been assumed that since the sites belonged to the same ceramic phase and were located fairly close together in the same river system that most aspects of their culture, and in particular their technology, would be similar. Differences seemed to exist in the types of tools present, their frequency at each site and the material from which they were made. So the emphasis of study was shifted from a purely functional analysis to a study of the variation in the tool assemblages from the 2 sites. In order to do this, a typology based on formal characteristics and assumed to at least indicate function had to be established. This paper will describe that work.

In this thesis Chapter II presents the literature supporting the approaches used; Chapter III describes the archaeological sites from which the collection was derived; Chapter IV gives details of the methods used in the analysis and Chapter V describes and classifies the tools. In Chapter VI the findings from the 2 sites are compared with one another and in Chapter VII several hypotheses are presented which may account for the differences noted. The final hypothesis in Chapter VII summarizes the findings. Chapter VIII contains a brief conclusion.

This study, made with these goals in mind, results from the systematic analysis of all non-flaked stone from an archaeological context where stratigraphy was defined precisely and where exceptionally fine controls were maintained, providing an opportunity to reconstruct the associations of artifacts and daily living residue to an exacting degree. As part of the analysis, the non-flaked stone was classified using formal criteria designed to reflect, but not define, tool function.

Chapter II

BACKGROUND OF STUDY

Theory

Typology is a concept basic to both archaeological method and theory. Using this concept, artifacts can be organized so their similarities and variations can provide information to be used in many ways. Little argument exists about the utility of this concept. There has been however considerable disagreement about how to construct a typology and what it means once it is constructed (Rouse 1939, 1960; Kreiger 1943-44; Spaulding 1953; Deetz 1967; Clark 1968). Some archaeologists maintain that a type is nothing more than a convenience category which has no reality outside the mind of the archaeologist. Others, particularly archaeologists who favor statistical approaches, argue that the archaeologist's types may have cultural reality, meaning they may conform to the categories of the aboriginal craftsment. The types which were established for this study were designed subjectively. However their attributes tend to cluster and it is felt that many of these types exist as cultural realities. The types presented here should be considered tentative though, until more artifacts are available for analyses. This point must be made because this thesis is concerned with variability between assemblages of artifacts and with the explanation of that variability. A typology is necessary in order to compare the assemblages and identify the variations.

The literature pertaining to artifact variability is extensive and constitutes the major theoretical subject in archaeological journals for more than the past decade. Three scholars, Binford, Wilmsen and Schiffer, have made contributions which are particularly relevant to this thesis.

Binford has argued effectively that culture is not a phenomenon which differs only through time and space. Instead it is a system composed of subsystems wherein many variables operate either independently or in varying combinations (Binford 1965:199). Other archaeologists conceive of culture as a body of shared ideas, values and beliefs which define the norms for a human group. In this normative view, as Binford calls it, archaeological remains are interpreted in light of these shared concepts. Binford's main criticism is that the normative view does not permit the explanation of differences in artifact populations which reflect various human activities. Artifacts, Binford says, can only be interpreted properly when considered part of the subsystem in which they functioned. He identifies these subsystems as: technomic where artifacts function as objects for coping with the physical environment, the sociotechnic which includes artifacts that function primarily in the social part of the system and the ideotechnic which covers those objects belonging to the ideological component of the system (Binford 1962:23-24).

Most of the artifacts analyzed for this study are technomic and are part of the subsystem that dealt with the environment. This concept will be used in attempting to explain variation that exists between the 2 artifact assemblages. It is also possible that some of these specimens either functioned in the sociotechnic subsystem directly or indirectly through the manufacturing of sociotechnic items. This idea will be considered also.

In discussing what he calls broad cultural alignments, Binford considers style a source of variation. He places stylistic variability within the sphere of tradition. Style is not considered to be an important source of variation in this study. Since the 2 villages belong to the same ceramic phase (Barnett), share architectural characteristics and exist geographically close, it is assumed they belong to the same cultural tradition (Hally 1976).

The importance of variability is further examined by Wilmsen (1974) in analyzing Paleolithic flaked stone material. He describes variation as differences which can be measured on the same scale and argues that the sources of variation are technology, function, style and raw material. In the present study, function and material are considered the main sources of variation among non-flaked stone artifacts. Since it appears that the 2 villages share the same cultural traditions, it is assumed that technology is the same in both components. At this level of analysis it appears the same. As already noted, style is not considered to be a source of variation. Binford also refers to adaptive spheres as geographical areas where environments are similar and the inhabitants use common means for dealing with the environment. This implies that different technomic items will be found in areas characterized by different environments and similar items will be found in areas of uniform environment (Binford 1972:204-205).

Schiffer (1972:157-160) raises the question of how closely the archaeological context of an item compares with its original context when the culture was operating. When an object is performing its intended role in a behavioral system it is in what Schiffer calls its systemic context. Objects not functioning properly in this system are replaced; they may be discarded or recycled into other uses. Sometimes objects reach their archaeological context without being discarded. Catastrophy, for example, can cause objects to be abandoned before their life cycles are completed. This concept is important to the present study, for the artifacts classified here are objects which were in use when fire destroyed their context. They were not intentionally discarded and the classification, therefore, is not one composed of discards. Furthermore, variation between the 2 assemblages cannot be attributed to the amount of discarded implements present in each assemblage.

Approaches Used

Functional Analysis of Microwear

Function is considered 1 of the 2 major sources of tool variation in this study. Microwear, a product of function, is a major criteria used in the recognition of tools and tool variation. Semenov's pioneer work (1964) in this field has served as the basic source of reference in the analysis of microwear for this study, which is of a preliminary nature.

Semenov elevated lithic studies from the level of simple description to an analytical one. He found that a tool is affected by use just as is the object it touches. The marks which result from use indicate the direction of the tool's movement and its position on the object being worked. The size and placement of the marks relate directly to the form of the working part of the tool and together these elements suggest how the tool was used. Semenov feels that eventually traces of work will become "characteristic signs for the definition of categories of tools" and these signs can be used to identify tool function for all time periods over the entire world.

> "Then implements would not be distinguished one from another by form or material but whether they had the same function...They will have uniform signs of wear which cannot be confused with traces of wear on other tools (Semenov 1964:6)."

Semenov's book contains what amounts to the only descriptions and definitions of wear pertaining to non-flaked stone artifacts in the literature. Therefore they are quite important.

Semenov says wear affects tools in 2 ways. It alters the shape of the tool and reduces it in volume. He divides wear into 2 types:

1. the obvious rough deformations as the breaking of large pieces, discoloration, shattering, cracking and scraping which are caused by pressure or percussion.

2. the microwear which results from friction as polishing and grinding.

In his discussion of tools Semenov does not distinguish grinding as a manufacturing process from the grinding which results from use, consequently this causes confusion.

Semenov defines polishing as small specific pressures which disperse minute particles and cause micro-plastic surface alteration. Grinding results from higher specific pressures which displace larger particles and rasping causes visible surface destruction. Semenov (1964:14) considers polishing, grinding and rasping all degrees of wear by friction.

Semenov qualifies his definition of polishing, which he also calls rubbing, saying "Although polishing falls into the category of abrasive work it differs significantly from grinding for the two operations imply different objectives (Semenov 1964:70)." This definition of polishing seems to incorporate Wittholf's findings that polish can be caused by substances being added to a tool (Witthoif 1967). For the flaked Paleolithic tools which he analyzed, Semenov found polishing to be the most common and most easily recognized wear mark.

Semenov's descriptions of wear/manufacturing processes are interspersed throughout his book. His description of grinding marks is given in comparison to those of sharpening: striation from sharpening with a whetstone are more numerous, smaller and shorter, while grinding leaves rougher scratches which are farther apart and fairly long (Semenov 1964:69). Grinding can be done in various ways such as rubbing the stone tool against hard rocks or in sandy soil but the more efficient method uses sandstone blocks which have to be washed to keep from clogging the surface. Pecking removes excess, such as flake scar ridges. It is done by striking the stone vertically with light, even blows. Pecking leaves what Semenov calls a "hole and bump" appearance on a surface and he says that certain rocks, because they fracture conchoidally, are not processed this way. In his experience flint and jasper are not modified by pecking and quartzite and chert rarely are. Pecking is more suited to granular rocks made of mineral particles with a high degree of jointing. In addition to these definitions, Semenov discusses several basic tools and their associated wear marks.

Catchment Area Concept

The concept of a catchment area has been essential for comparing the environments of the 2 sites and explaining why differences exist in the non-flaked stone. A catchment area is an arbitrary area established around a site so the resources within the area can be evaluated. This process was used first by Jarman, Vita-Finzi and Higgs (1972) for a farming village in the Near East. They felt that the traditional method of listing biotic types present in the area did not give adequate information about the village's economic potential. In addition they felt that the catchment area would provide a way to compare sites. It is this potential which makes the idea useful here. Based on ethnographic reports Jarman, Vita-Finzi and Higgs use 5 km as the limit to a reasonable walking distance from a farming village. The catchment area is established on a map by drawing concentric circles with radii of 1 through 5 km around the site. Each kilometer zone is then divided into land forms (arable , marsh, dune and other features) and the amount each occupies is calculated and its percentage within the zone is determined. They rate the potential exploitation of each zone according to its distance from the site: the first mile is rated as 100% exploited by the villagers and the 5th mile, 20%. Flannery (1976) points out weaknesses in the rating method and uses the catchment area in reverse. Taking the known resources used at a village, Flannery shows how far the occupants would have to go to obtain these resources. He defines a catchment area as the zone of resources within reasonable access of a village.

Other Literature

In American archaeological literature, the term lithic generally is synonymous with flaked stone. The Bibliography of Lithic Technology (Hester and Heizer 1973:18) specifies that it deliberately omits references to the manufacture and use of ground and polished stone. The Newsletter of Lithic Technology (Washington State U., 1972-1976) lists 1 microwear study which includes both non-flaked and flaked stone (1973:1-2). Most site reports illustrate and comment briefly on a limited variety of non-flaked tools; some of the best of these are published in the southwest by Rinaldo (Rinaldo 1959; Martin and Rinaldo 1949-1968). The extensive Casas Grandes report (Di Peso, Rinaldo and Fenner 1974) is by far the most comprehensive analysis but the sheer volume of material prohibits the use of clear, helpful illustrations and renders the subject unwieldly. In this extensive study, some non-flaked specimens were recorded and then discarded in the field.

The publication of Semenov's Prehistoric Technology in English in 1964 coincided with the shift of archeaological interest to functional studies. The result has been a rapid increase in microwear analyses of stone tools, with an emphasis on flaked stone. Several major innovative papers containing information which can be applied to non-flaked studies have appeared in American Antiquity and World Archeology. In 1 of these Witthoif showed that polish on flint sickles was not a series of fine cuts but the result of an accumulation of an opaline substance which grain left on the sickles (Witthoif 1967:383-388).

Frison after analyzing kill-site tools concluded that hunters 9000 years ago recognized the stage at which a tool needed resharpening and that one "very stylized" sharpening method was used in the interest of efficiency during the processes of butchering and preserving meat. The state when a tool needed to be discarded was accepted commonly also. Frison comments also on the amount of time spent hypothesizing the function of tools which were in a nonfunctional condition when recovered from their archaeological context. He cautioned that the same tool might look different at different stages of its life (Frison 1968:149-155).

In 1968 Wilmsen began publishing papers which resulted from his systematic analysis of variables of Paleolithic points and flaked tools. In one of these (1968) he suggests that flaked stone tools differ in edge angle sizes because they were used for different functions. Hester, Gilbow and Albee in a later paper (1973:95) suggest that specimens commonly called gouge-scrapers, which have edge nibbling, are wood-working tools.

Keeley, a microwear specialist, reviewed (1974) all major reports on studies of use marks on stone which had been published in the decade following Semenov's book. He assumed that reconstruction of economic activities of prehistoric groups is the goal of microwear studies. To accomplish this goal these studies must attempt to obtain precise designations of function as well as complete pictures of the total uses of the tools. Keeley criticizes most microwear studies. They have produced relatively poor results because they were not conducted with the high technical standards which Semenov uses (Keeley 1974:324). He mentions Wilmsen, Frison and Wittholf as having produced worthy studies.

One final paper should be included here. Briuer (1976:78-83) suggests that residues found on stone tools can be identified either as plant or animal remains and this information can help in determining the function of a tool. A number of the non-flaked stone specimens from the Little Egypt and King Sites have burned residue on them, but this is not investigated here.

Chapter III

THE SITES

Most of Georgia lies in 2 physiographic Provinces, the Atlantic coastal plain and the Piedmont uplands. In the northwest corner of the state west of the Piedmont, small sections of 2 other areas are located. These are the Cumberland Plateau and the Ridge and Valley (Fig. 1). Both have shale/limestone valleys and sandstone and chert capped ridges oriented northeast to southwest.

The Cumberland plateau, the western most physiographic feature, is represented by 2 flat-topped mountains which are separated by a small valley. These mountains, 2000 ft in elevation, are marked by steep escarpments that drop 1000 ft to the valleys below. Drainage is to the north into the Tennessee River.

East of the plateau is the Ridge and Valley Province which is composed of 3 districts: the Chickamauga Valley, the Armuchee Ridges and the Great Valley. The Chickamauga Valley district is a series of discontinuous gently rolling valleys and low parallel chert ridges which rise 200-300 ft above the valleys. Adjacent to this is the Armuchee Ridges section. These sandstone and chert ridges stand at elevations of 1400-1600 ft. The Great Valley is a broad open valley about 25 mi wide and is the major feature of this district. Its elevations range from 700-800 ft and a few scattered ridges rise 50-100 ft above this. Bedrock is predominantly shale, limestone and

Fig. 1. Physiographic features around Little Egypt and King Sites. Adapted from LANDSAT photo at 560 mi altitude.

dolomite. The eastern border of the Great Valley is marked by the Great Smoky Fault. East of the fault to the north is the Blue Ridge Mountains and to the south, the Piedmont uplands.

Within the Ridge and Valley, the Coosa River and its tributaries form the major drainage system. The Coosawattee River enters the Ridge and Valley from the east, out of the Piedmont, and runs westward to join the Conasauga River. They run south, merge with the Oostanala River and within 20 mi are joined by the Etowah River to form the Coosa which eventually empties into the Gulf of Mexico.

The Ridge and Valley Province has a mean of 200 frost free days. Freezing temperatures usually occur between November 4 and April 14. Precipitation averages 52 in with the lowest rainfall occurring in May and June, then September through November. Kuchler (1964) lists the Ridge and Valley Province as potentially having an oak-hickory-pine forest. Braun (1950) calls it an oak-pine region.

The adjacent Piedmont has a rough hilly surface with elevations ranging from 1300-1500 ft in the north to 1000-1100 ft in the southwest. Streams as the Etowah and the Coosawattee drain westward. Kuchler calls the north part of this province a potential Appalachian oak forest and the southern part he lists as becoming an oak-hickory-pine forest. Braun calls it an area of oak-pine. In the northern part of the Piedmont, freezing weather begins about November 2 and lasts until April 7 with 191 frost free days in between (Carter 1969:6). Precipitation ranges from 53-50 in from north to southwest and rainfall is lower in May, June and September-November.

Little Egypt (Fig. 2) is located in a basin formed by an

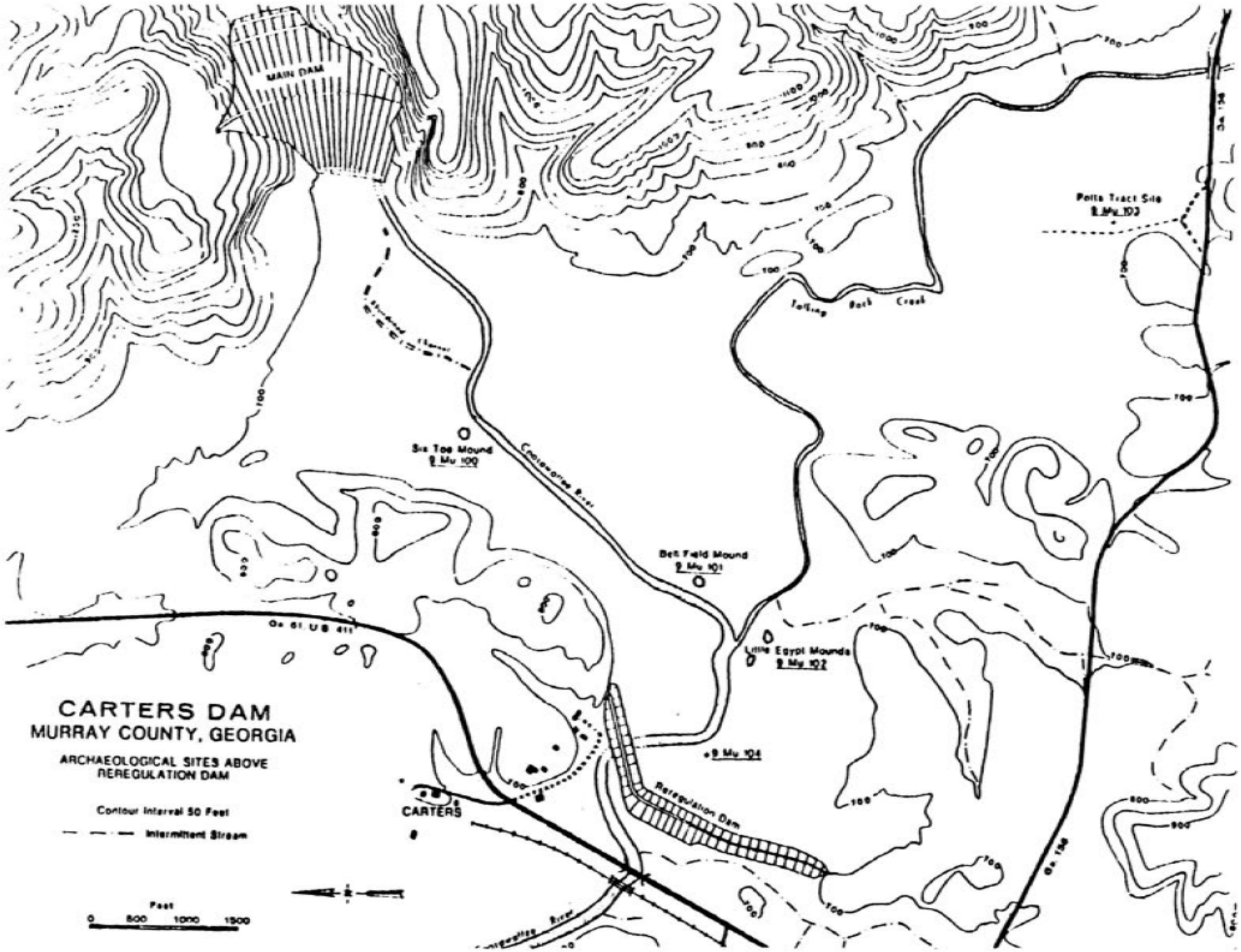

Fig. 2. Little Egypt Site and Carters Dam vicinity (from Hally 1976).

irregularity in the Great Smoky Fault. The Piedmont hills, which rise to elevations of 1400 ft lie immediately east and the Ridge and Valley is to the west. The Coosawattee River flows from the Piedmont through this basin where it is joined by Talking Rock Creek. Little Egypt is located on the southwest side of this junction. Within the basin aboriginal occupation spanning the Archaic through the Historic Periods have been found at 6 sites in addition to Little Egypt.

Alluvial soils, classified as Toccoa-Sequatchie-Whitfield are 25 ft deep here. They are moderately well drained and vary from fine sandy loam to loam. They are considered among the most fertile in a three-county area, although they range in natural fertility between low and moderately high. Little Egypt was covered with 1-2 ft of silt, probably deposited within the past 40 years (Hally 1976).

The site was excavated as a salvage project Fig. 3 prior to the construction of Carters Dam on the Coosawattee. A small auxilliary dam has flooded the basin. The site covers at least 7 acres and included 2 platform mounds which are located close to the river. Mound A measures 200 x 130 x 9 ft and Mound B, 130 x 80 x 6 ft. Three complete structures have been excavated. Structure 1 is located on a terrace on the south edge of Mound A. It measures 30 ft square and has straight walls and round corners. Its location suggests political/religious functions; floor material from the structure suggests it had residential functions also (Hally, personal communication). Structures 4 and 5 are found south of the mounds within the village area. These are square structures with rounded corners, centrally located clay hearths,

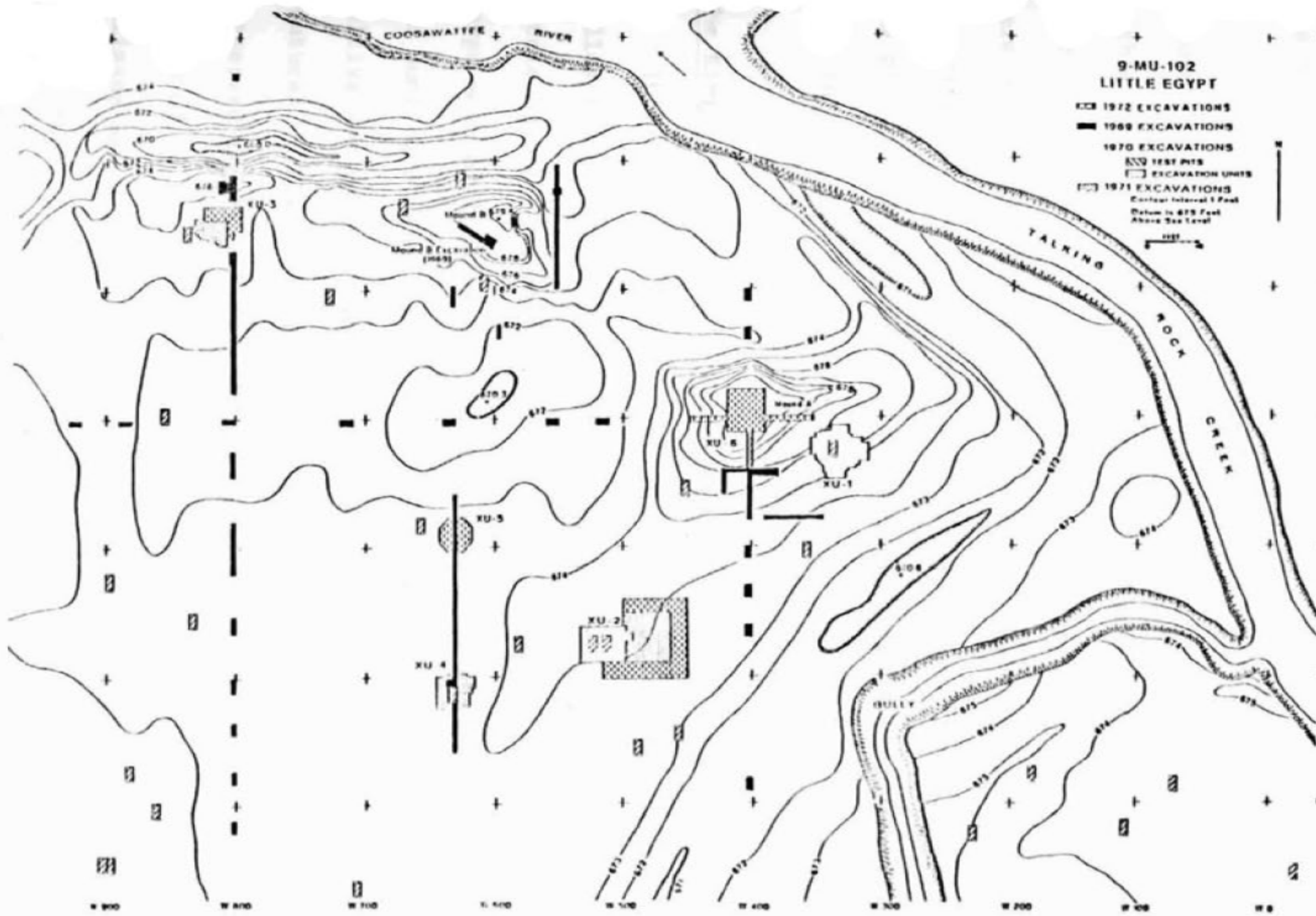

Fig. 3. Little Egypt Site excavation plan (prepared by Hally in 1977).

4 interior support posts and floors depressed 1-2 ft. These structures measure 22 ft square and 24-26 ft square, respectively. Architecturally, structures 4 and 5 are similar to the structures at the King Site.

One of Hally's goals in the Little Egypt site excavation was to recover material that would reflect the activities that occurred within these structures (Hally 1976). These structures, therefore, were excavated with considerable care and precision. Larger artifacts were mapped in place and floor areas were divided into 2 ft excavation units. A portion of soil recovered from each of these units was processed by flotation and the remaining soil was screened. The soil in Structure 1 was not screened.

The King Site (9-FL-5)

This village is located in the Ridge and Valley, within the Great Valley and close to the Armuchee Ridges. Fig. 4. It is 50 mi southwest, Little Egypt. The site is situated in broad bottom land inside a large meander loop of the Coosa River. Soil associations are Holston and Huntington fine sandy loams (Long 1921). Although erosion and cultivation have destroyed the aboriginal occupation surface, features such as burials, postholes and depressed house floors are preserved in the subsoil. The site covers 4.5 acres and about two-thirds of it has been excavated (Fig.). It is enclosed by a palisade and a ditch, the latter measuring 4-5 ft deep and 8-11 ft wide at the bottom.

Inside the palisade domestic structures encircle a plaza measuring

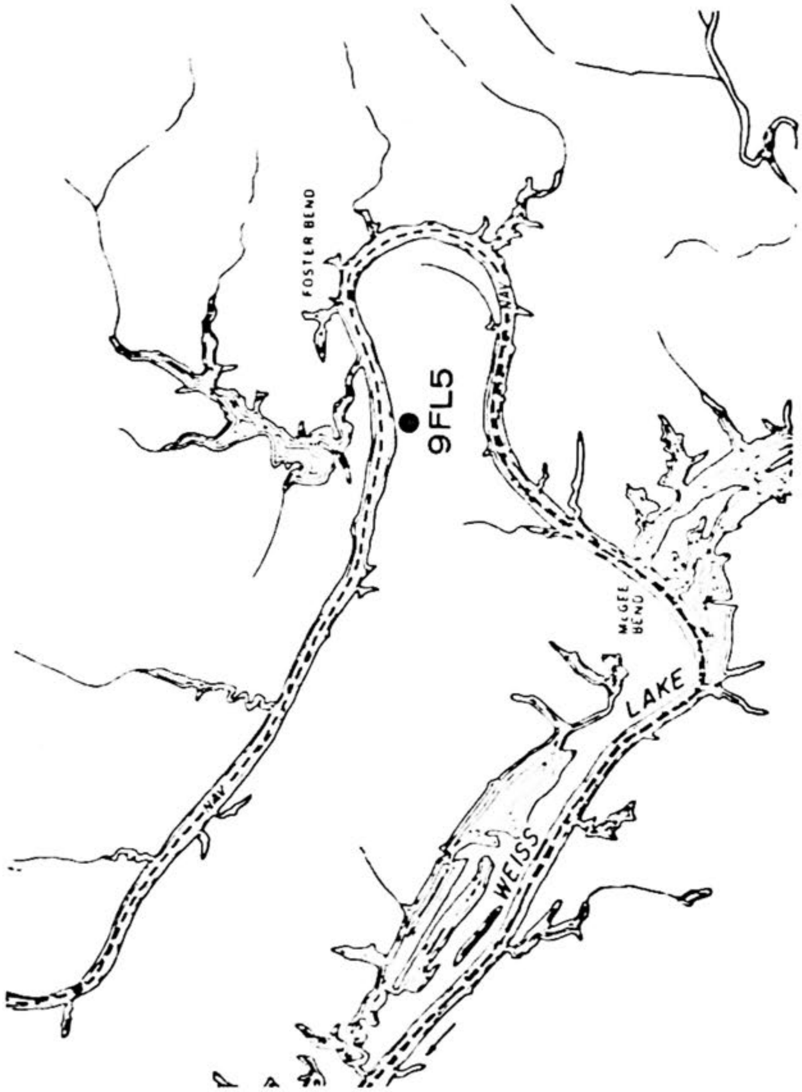

Fig. 4. King Site and Foster Bend vicinity (from Hally 1975).

Fig. 5. King Site excavation plan (from Hally 1975).

150 x 300 ft. Structure 17, which is 48 ft square and probably ceremonial in nature, is located in the northeast section of the plaza. A second structure similar to those which surround the plaza is adjacent to Structure 17 on the west. South of these structures in the exact center of both the plaza and the site itself is a large posthole measuring 3.5 ft in diameter and 5 ft deep.

Twenty-seven structures have been recognized at the King Site and at least 22-25 of them identified as domestic structures used the year round. They have straight walls, rounded corners, central clay hearths, 4 interior roof supports and floors depressed 1-2 ft. Wall trench entrance passages are located near the southwest corners. Remnants of wattle and daub walls in 2 structures suggest that the houses werepartitioned into several rooms. Seven structures with intact floors were excavated by Hally and Garrow in 1974-75. One of these, designated structure 5/10, was partially destroyed by pot hunters. Structures used in the present analysis are 4, 7, 8, 9, 14, 23 and in some instances 5/10.

Based on an estimate of 47 as the total number of residential structures at the site, Hally considers the village population to be about 250 people (Hally and Trotti 1975). Two hundred skeletons are located in the excavated portion (roughly 50%) of the village. They occurred within structures and between them.

Structure 4 was excavated by Pat Garrow in 1972. Cultural material was mapped in place but flotation samples were not taken systematically from the structure. Hally directed the excavation of the other structures. Structures 8, 9 and 14 were divided into 1 ft squares and soil from every other square was processed by flotation resulting in a 25% systematic sample of the house floors. The floors also were divided into 9 equal sections and the remaining floor material was troweled and sifted through quarter-inch screen. Obvious features and artifacts were mapped in place. Time limitations did not permit structures 7 and 23 to be excavated in this same manner. In these structures individual artifacts were mapped and all the floor soil was sifted by sections (Hally and Trotti 1975).

As at Little Egypt, excavation methods were designed to yield quantifiable information on the occurrance and distribution of a wide range of cultural materials. This material was intended for use in the investigation of household activities, functional variation between structures and diet of the inhabitants.

Preliminary analysis of the King Site material indicates that the northern third of structures were used for sleeping and burying the dead. Other activities such as food preparation and flint knapping occurred in the southern two-thirds of the structures.

Radio-carbon dates and historic material associated with the site place them between A.D. 1550-1700. Both sites belong to a late Lamar ceramic phase which Hally (1970) terms Barnett. This phase is characterized by a large percentage of plain wear and a smaller occurrance of decorated ceramics: Dallas Filleted, Dallas Incised, Dallas Plain, Lamar Bold Incised, Lamar Complicated Stamped, Lamar Coarse Plain and Lamar Plain.

Chapter IV

MATERIALS AND METHODS

The outstanding characteristic of tools from Little Egypt and the King Site is their lack of preparation or modification prior to use. In most cases, rocks seem to have been selected for natural sizes and shapes which were appropriate for specific functions. In some cases only minor alteration, as removing a projecting section, has been made on a rock. Major modification when it occurs is accomplished by pecking and grinding. Because they had received so little purposeful alteration, tool recognition was difficult and depended to a large extent on the existence of microwear. Semenov's book (1964) served as the guide in recognizing microwear and thereby distinguishing tools from the total collection of non-flaked stone from Little Egypt and the King Site. Although focusing on Upper Paleolithic flaked material, the book describes and illustrates Mesolithic and Neolithic tools, some of which are non-flaked stone specimens. The detailed photographs in this book as much as the text indicate the kinds of wear and modification which may exist on an artifact and where these traces may be found on tools.

Another set of guidelines were used for this study. These were established by Keeley (1974:332) after he reviewed a decade of major microwear studies.

Keeley's recommendations are:

1. use large samples of the material being studied or the entire collection.

2. establish better controls to help distinguish use marks from natural, technological or casual wear.

3. experiments and ethnographic records should be used to help interpret function.

4. experiments should be made in light of the natural conditions which probably existed at the original site.

5. more work should be done to quantify microwear information.

6. supplementary information as tool distribution and association should be included in microwear reports.

In an attempt to follow these recommendations, all of the non-flaked stone was examined, ethnographic literature was reviewed, natural stone from the vicinity of one site was collected for comparative purposes and some effort was given to analyzing tool distribution and associations within structures. Keeley's influence may not be obvious in the discussion of tool types but his guidelines were followed to the extent that available time and resources allowed.

Discussion of Types

For this project, the comparison of the 2 assemblages, it was necessary to divide the artifacts into types. An artifact type is composed of artifacts with somewhat variable attributes which occur together in most cases (Deetz 1967:51). For a comparative study, artifacts are organized either by using an existing typology or by establishing a new one. Unlike pottery, no thorough typology exists for non-flaked stone which covers the range of specimens from these 2 sites. It would have been desirable to quantify specimen attributes to establish the tool types. But even though the non-flaked stone from Little Egypt and the King Site was combined to provide a larger sample, the sample still was not large enough to quantify and get definitive results. Some attributes (certain use marks) occur often enough that they could be quantified and while the results would have served as an additional aid, they would not have satisfied the needs of the study. For this study, the tentative types were established on the basis of artifact size, shape, raw material and use marks. Based on these attributes, the types were to contain minimal internal variation, yet still be represented by several specimens. Some room for variation within a type is essential for only occasionally do artifacts with several co-occurring attributes come close to being identical in form.

Sorting Procedures

To sort culturally modified stone from the amorphous mass of material, all items were examined first with the naked eye and then with a microscope. Obvious artifacts as celts, milling stones and pitted stones were set aside for further analysis and the remaining material was looked at for overall form and marks which would indicate use. Specimens were sorted and resorted. Edges were inspected to see if they were shaped, worn, sharpened or modified in any fashion. Flat surfaces were checked for depressions, individual scratches, grooves or parallel lines which indicated grinding. In this early state cultural marks had to be distinguished from natural ones. It was necessary to learn what the natural cortex of a rock looked like and to distinguish a ground surface from the natural cortex. Sometimes artifacts have been ground so carefully that, with the aid of weathering, their surfaces look natural. There were no guides for problems such as these. It was a period of looking and relooking as a variety of use marks became evident. The identification of one kind of use mark usually led to the recognition of another. Many tools had multiple types of use marks. A celt, for example, has distinct anvil marks in the center of 1 face. It was realized that the only way to make sense of a hopeless jumble of attributes was to ignore those which could be called secondary and concentrate on what seemed to be primary features. As it turned out, some of the multi-use marks occurred together repeatedly, indicating regular multi-functions for some specimens.

Tools first were sorted into broad categories which were subdivided then to reduce overlapping and internal variation. Some specimens with multiple attributes were shifted back and forth from one type to another. During this sorting period, the specimens were reexamined repeatedly with and without the microscope and with different lighting. During this process, 620 specimens were measured with winged calipers and sketched, 2 views generally. Semenov emphasizes the importance of drawing specimens because details are recorded and the reoccurrance of these details which becomes evident in drawing leads to the recognition of wear patterns. Drawing is as crucial to the identification process as any other form of examination and recordation, including the use of the stereoscopic microscope. Of the combined assemblages of non-flaked stone--a total of 1024 specimens --224 were identified as worked specimens. The discarded stone included 370 pebbles and 55 pieces of limestone (or mudstone) from

Little Egypt. Gravel (under 2 cm) was not inspected. For the magnification, a Bausch and Lomb Stereoscopic Zoom Microscope was used. Most tools were viewed 4 or 5 times, with power ranging from 10-70x and occasionally to 280x. The 10-40x range proved the most useful, generally. In trying to identify and describe the non-flaked artifacts, another factor caused some problems. The specimens had to be described in three-dimentional form and this proved difficult. There are no commonly accepted terms to cover non-flaked artifacts. This is a common problem, even in other fields. In discussing the texture of sediments, Pettijohn (1975:52) comments "At best pebble shapes only approximate the regular solids of the geometrician." And Wauchope (1965) candidly wrote "I find celts hard to describe." Therefore, the descriptions of overall shapes of specimens are approximations here.

Identification of Rocks

All the material in the study group was identified at the beginning of the analysis by Porter Morgan, a graduate student in geology at the University of Georgia, who had served as project geologist for the Corps of Engineers at Carters Dam. Later when specific questions arose, further identifications were made by Charles Cressler of the United States Geological Survey, Tom Crawford, professor of geology at West Georgia College and Dave Lawton, head of the Department of Natural Resource's north Georgia geology unit.

Opinions varied occasionally in the identification of specimens. This is understandable. Rocks are classified using several factors which include percentages of minerals present and their grain sizes. Geologists prefer to work with polished thin sections which reveal both the minerals present and the manner of formation. Hand specimens used in the field can be broken and examined. With archaeological specimens, however, geologists are restricted to inspecting a weathered, stained outer surface which, if unbroken, is hard to interpret. In general the various consultants agreed. Their work was essential to this study.

Chapter V

TOOL CLASSIFICATION

The non-flaked stone artifacts from the two assemblages are classified here into 33 types. This classification is based on shape, size, material and wear marks. Specimens from structure floors comprise the first 31 types; Types 32 and 33 are found only in burials. Following the descriptions of these tool types, the additional burial material which is all from the King Site (9-FL-5) is listed.

In the following description of tools, the number of specimens found in each structure is always 1 unless designated by a number in parentheses after the structure number. In tables, the number which follows the structure designation is the lot (field catalogue) number for the specific specimen.

Type 1: Grooved Abraders

(Plate 1, Table 1)

Provenience:	9-MU-102	Structures 1, 4, 5 (2)
	9-FL-5	Structures 4 (3), 9
Specimens:	8	
Material:	5 sandstone	
	2 gneiss	
	1 amphibolite	
Texture:	7 medium to coarse grained, 1 fine grained	
Shape:	round-oval or tabular	
Size:	tool -	largest 9.1 x 6.1 x 2.9 cm
		smallest 6.9 x 6.2 x 2.9 cm
	grooves -	largest .1 -.4 cm in width
		smallest 5.3 - 1.1 cm in length

General Description: Palm-size river cobbles which generally are used on both faces. Two kinds of wear patterns, fine striation and individual grooves, are present. The sandstone specimens, which predominate, have both the multiple fine lines and the individual heavier grooves. These specimens have rough surfaces where they are worn smooth in the center.

The tools with fine lines --these specimens are not sandstone-- are smooth on their faces, particularly in the center, and are rougher around their sides where use marks are wider and deeper. Most Type 1 tools have smooth depressions worn on at least one face.

Use Area: Major use occurs on the face. The lines on 2 of the finely striated variety run predominantly in 1 direction and extend around the edge of the tool. The third specimen has been ground concave and contains marks cut in all directions; a wide band of fine lines crosses the center of this face, overlaying all other marks.

The line and groove specimens have been used so heavily that individual marks have been worn smooth in the center of their faces, leaving a central depression with lines radiating out from it.

Distinguishing Characteristics: These small river cobbles are crossed by individual grooves/multiple fine lines and have smooth central depressions, which seem to be the result of heavy use. Type 2 specimens, in contrast, are made on broken pieces of rocks and have distinct hollows but lines are barely distinguishable without microscopic aid.

Comment: The exact part that raw materials play in these tools has not been defined. More than half the specimens are sandstone, but at 9-FL-5, Structure 4 contained 3 of these tools: 2 of sandstone and 1 of gneiss which is not a local stone. At 9-MU-102, 2 structures each had a sandstone specimen; the third structure had 2, 1 of gneiss and 1 of amphibolite.

These abraders are related to Type 2 abraders and some specimens from both types are visually if not functionally similar to Type 8 pitted cobbles because of broad grooves or pits. The use marks, fine lines and wide grooves, help establish the dividing line; they are not present on Type 8 specimens. These use marks indicate that these tools were used to modify thin, hard objects such as edges on flint or chert. Whether a sharpening or dulling process is involved is not known. The short v-shaped grooves suggest a tapering object such as a tip of a bone awl.

Type 1 tools are not found in 9-FL-5 burials.

Table 1

Type 1. Grooved abraders.

	MATERIAL			SHAPE					STRIATION			GROOVES			TEXTURE			DIMENSIONS (IN CM)			
	sandstone	gneiss	amphibolite	flattened sphere	round	irregular tablet	whole rock	fragment	parallel to axis	perpendicular	diagonal to axis	parallel to axis	perpendicular	diagonal to axis	fine-grained	medium	coarse	tool	use area	striae	grooves
9 MU 102																					
St1 732	x					x	x					x	x				x	7.9x6.1x3.4	7.6x4.7		1.3x.5
St4 170A	x					x	x					x					x	6.9x6.6x2.9	6.6x4.4 1x.9		2.7x.4
St5 F28			x	x				x	x						x			7.7x7.2x3.2	all over	7.4x.2	
F186		x		x			x			x						x		8.3x7.4x4.2	all over	.05 wide	
9 FL 5																					
St4 3176		x		x			x		x	x	x					x		9.1x6.1x2.9	all over	.04-.09 wide 3.9-7.5 long	
3182	x					x	x					x	x	x			x	7.5x6x2.7	6.8x5.6 6.1x5.4		1 x.4 5.1x.4
3188	x			x			x							x			x	6x6.6x3.8	all over		2.6x1.1
St9 1297B	x				x			x									x	5x4.7x5.4			.04-.09 2.6-3.4

Type 2: Abraders with Ground Hollows

(Plate 2, Table 2)

Provenience: 9-FL-5 Structures 2, 4, 5, 7 (2), 8 (2), 9, 14, 23 (2)
(Structure 2 is not used in the complete analysis)

Specimens: 14

Material: 11 sandstone, 2 quartzite

Texture: medium grained

Shape: oval, rectangular, irregular

Size: largest 14.9 x 10 x 4.2 cm
smallest 3.9 x 2.9 x 2.1 cm

General Description: Small sandstone pieces which have hollows ground into them. Several are reworked pieces of larger broken tools. Some have very fine lines, a few have grooves. They can be separated into 4 categories.

Use Area: A. Seven specimens are small and each contains a ground area, usually a hollow, which covers most of an entire face. Some specimens have fine lines, barely visible, cutting across the depressions from all directions. The reworked pieces have, on the face opposite the hollow, a portion of a level, well ground surface, possibly a remnant of a former tool-use stage.

B. These are the 2 largest specimens and they are ground. One contains an elongated wide groove, the other a pit which resembles a pit found on a Type 8 cobble. The specimen with the groove does not appear to have been used. The groove measures 3.1 x 2.6 x .5 cm. Lines are visible with magnification and may be part of the manufacturing process.

The pitted specimen is covered with long lines and slightly wider grooves that are quite obvious. The pit (3 x 2.1 x .5 cm) is circular and slightly rough. It resembles a pit on a Type 8 cobble and may represent a secondary use.

C. This tool, rectangular and blocky, has a face ground smooth and level and is glossy from use. The adjacent side contains 2 parallel working areas: a long hollow ground smooth next to an irregular surface. A short v-shaped groove is worn into the edge.

D. This oval specimen has a depression on both sides. On 1 face the hollow appears to be carefully ground; it is aligned at an angle to the short axis, where the tool is broken. The broken side has been ground about half way across. The opposite face has an irregular surface with a slight depression ground into it also. The lines on this face are wider than the microscopic lines found on the opposite side.

Distinguishing Characteristics: These specimens differ from Type 1 by having prominent hollows and less noticable lines. Most are broken, at least across 1 edge.

Comments: These tools, particularly variety A, have been used to grind a surface comparatively wider and softer than the edge of a piece of flint. Even so, the area available for grinding is small and consequently a depression results.

Counterparts to these tools are found in burials. Variety B from house floors and 2 similar specimens from 9-FL-5 burials could be placed with Type 8 pitted cobbles. The main difference would be that Type 2 specimens lack the 2 level faces ground on both sides which Type 8 cobbles have and Type 2 specimens contain lines and grooves. Type 2 seem to be multipurpose tools.

Three specimens which are possible Type 2 tools are included in this group.

Table 2

Type 2. Abraders with ground hollows.

	MATERIAL					SHAPE					DIMENSIONS (IN CM)			
	sandstone	quartzite	gneiss	whole rock	fragment	shaped	unshaped	oval	rectangular	irregular	tools	hollows	grooves	ground area
9-FL-5														
St.2*														
1732	x				x					x	14.9x10x4.2	3x2x.5	5.8x.1	
St.4												4.6x4.x.3		
3176	x				x		x			x	8.6x7.9x3.9	4.6x4.4x.4		
St.5														
2064	x						x			x	10.3x6.9x2.9	3.1x2.6x.4		7.8x5.5
St.7														
2635		x			x		x			x	8.4x7.5x2.8	3.8x2.5x.2		
2655	x				x	x					5.4x5.1x2.7	3.8x4.7x.3		
St.8														8.3x4.8
2576	x				x	x			x		8.6x4.9x3.2	4.8x2.6x.6		8.3x1.4
St.9													5.8x.1	
1298B	x				x	x		x			5.2x5.3x1.6	3.6x3.3x.3	8.1x.2	4x3.4
St.14														
1245	x				x	x					6.1x5.8x3.2	5.1x4.2x.2		
St.23														
2026	x				x		x			x	7.1x5.6x3.2	5.5x4.8x.2		5.6x4.6
2047	x				x		x	x			7.4x6 x3.2	5.6x4.6		
9-FL-5**														
St.4												5.7x4		
3210	x			x					x		7.8x4.3x2.8	ground		
9-M[illegible]-102**														
St.4														
F98J			x		x	x		x			5.6x5.2x2.9	5.8x4.3		
1430A		x		x							10.6x6.8x3.8	7.7x4.6x2.8		

*St.2 not used in analysis

**Possibly type 2

Type 3: Sandstone Tablets

(Plate 3, Table 3)

Provenience: 9-FL-5 Structures 4, 8, 9, 14 (2), 23

9-MU-102 Structure 4

Specimens: 9

Material: sandstone

Texture: moderately fine grained

Tactile Element: smooth

Shape: rectangular

Size: largest 17.3 x 4.9 x 3.4 cm

smallest 3.6 x 2.9 x 1.3 cm

General Description: Fairly thin red-brown sandstone tablets with at least one smooth, level face. These tablets are palm size pieces of larger rocks.

Use Area: On most specimens, the smooth face contains a smaller finely ground level working area. One, however, is different. It is longer and wider than most of the specimens and so thin it does not look utilitarian. Striation along its edges, running toward the center, can be seen under 10x magnification.

Distinguishing Characteristics: In contrast with Types 1 and 2, these specimens are all flat sandstone tablets which do not have depressions;

striation is either absent or visible only with magnification.

Comment: The fine texture of these stones and the absence of depressions in the worked areas suggests these tools were used for light grinding of soft material. Sand, which would have left scars, seems to have been absent.

Table 3

Type 3. Sandstone tablets.

	FORM						DIMENSIONS (IN CM)	
	Sandstone	Rectangular	Triangular	Irregular	Two Smooth Faces	One Smooth Face	Overall	Use areas
9-MU-102								
ST4 F98h	x					x	7 x 4.4 x 2.7	3.4 x 2.6
9-FL-5								
ST8 1701	x			x	x		12.8 x 9.9 x .4	6.9 x 5.8 6.5 x 5.6
ST8 1707	x					x	9.4 x 5.7 x 1.2	7.9 x 3.1 5.5 x 2.8
ST8 1722	x	x			x		7.5 x 6.3 x 1.2	3.6 x 3.4
ST8 2473	x					x	4.9 x 4.4 x 1.2	3.4 x 3.2
ST9 1996	x	x				x	17.3 x 4.9 x 3.4	Broken
ST14 1105A	x			x		x	4.5 x 3.8 x 2.1	2.5 x 2.1 2.5 x 1.5
ST14 1288	x				x		3.6 x 2.9 x 1.3	2.3 x 1.8
ST23 2066	x	x			x		8.7 x 4.4 x 2.2	3.8 x 2.8 7.3 x 2.4

Type 4: Non-Sandstone Tablet

(Plate 4)

Provenience: 9-FL-5 Structure 8

Specimens: 1

Material: quartzite

Tactile Element: smooth

Shape: triangular

Size: 7.9 x 6.9 x 3 cm

General Description: A palm size tabular rock with 2 smooth surfaces with slight depressions. This specimen is much harder than the sandstone tablets and has lines which show on both sides under 10x magnification.

Use Area: One side has almost a channel running across it. This depression is darker in color and has a slight sheen. With magnification, lines are visible on this side. On the other face the lines are not oriented in 1 direction but are randomly placed and this face is not as smooth as the one with the channel. These lines are fairly blunt and tend to obliterate underlying lines.

Distinguishing Characteristics: This specimen is closest to a Type 1 tool but the channel, the blunt lines and the hardness of the material set it apart from Types 1, 2 and 3.

Comment: Because of the material and the amount of wear on this stone, it seems to be more of a heavy-duty abrading tool than any of the specimens in Types 1-3. In size, there is little difference.

Type 5: Stones with Ground Channels

(Plates 5a, b; Table 4)

Provenience:	9-MU-102 Structure 4 (2)		
	9-FL-5 Structure 8		
Specimens:	3		
Material:	schist, metagreywacke, sandstone		
Texture:	medium to coarse-grained		
Tactile Element:	smooth channel, rough borders		
Shape:	trapezoid		
Size:	largest	17.6 cm x 14.7 x 2.1 cm	
	smallest	10 x 8.8 x 2.9 cm	
	channel	maximum	11.5 cm x 8.3 cm
		minimum	8.2 x 4.2 x .7 cm

General Characteristics: Three tablets, longer than wide, have a working area ground across one face. This area varies from a well-defined concave channel which probably was made before the tool was used to a crushed surface which evolved through use on another specimen. One of the 3 tools is ground on the underside. The other 2 are unfinished and irregular on the underside.

Use Area: The sandstone specimen has a well defined channel which is quite smooth: The metagreywacke specimen (Plate 5 a, b) has a shallower but broader channel and its surface is somewhat rougher because of the nature of the material. The schist specimen does not have a channel, instead it has a wide ground band which extends across one face and only the higher surface irregularities within that band have been ground.

Comment: These channels obviously are the result of grinding. Whether this is the result of intentional shaping or a product of use cannot be determined. Symmetry of the channels in 2 of the specimens is so perfect that it is difficult to imagine how they were produced or their function.

Table 4

Type 5. Stones with ground channels.

	MATERIAL			CHANNEL		SHOULDER		DIMENSIONS (IN CM)	
	Metagreywacke	Schist	Sandstone	Pre-prepared	Ground by Use	Naturally Smooth	Naturally Rough	Tool	Channel
9-MU-102									
St4 1432B	x			?		x		12.2x8.8x1.3	8.8x6.1x.6
St4 1664		x			x		x	17.6x14.7x2.1	11.5x8.3
9-FL-5									
St8 2488			x	x			x	10x8.8x2.9	8.2 long 1.7-4.2 wide .7 deep

Type 6A: Basin Milling Stones

(Plates 6 a, b, Table 5)

Provenience: 9-MU-102 Structures 1, 4 (1 outside of structures)

9-FL-4 Structures 4, 14

Specimens: 6

Material: 1 sandstone, 2 schist, 1 gneiss, 1 gneiss or metagreywacke, 1 fine grained quartzite of grit (fine grained sandstone)

Tactile Element: smooth to scaly

Shape: rectangular, ovoid, oblong

Size: tool - largest 34.3 x 23.2 x 8.2 cm

smallest 24.5 x 18 x 6 cm

use area - largest 29.6 x 19.2 x 1.9 cm

smallest 18 x 13 cm

General Description: Stone blocks which have been spalled/ground roughly to a uniform size and shape. Four from 9-MU-102 have a rough, scaly appearance and while weathering has produced some of this, it may have been induced when the tools were in use. All have some form of a depression ranging from a slight one near the center of the working face to a deep basin covering the entire face. With 1 exception, the rims around the pits are either ground or are naturally smoother than the basins which have been hit with a sharp stone to roughen them.

Use Areas: Five of the 7 specimens show evidence of smoothing or grinding around the rim of the basin and the depressions are pitted.

9-MU-102: Three from the Little Egypt site have definite basins surrounded by a fairly broad rim and at least 1 of these has been ground on the rim.

The opposite sides of these milling stones have been intentionally flattened. The remaining 2 specimens from 9-MU-102 have sloping faces with barely discernable depressions and show evidence of some grinding on the opposite sides.

9-FL-5: The 2 Type 6 milling stones from here are both ground smooth but they differ in form and on each stone the 2 grinding faces vary. The larger specimen, the largest of the Type 6 tools, is rectangular and made of grit, a fine grained sandstone. It has a well defined trough on 1 side and a basin on the other. The stone was ground before use and both sides contain peck marks (mostly around the periphery) where the work area was roughened. The centers are worn smooth.

The smaller sandstone tool is oblong and may be a portion of a larger tool that has been reworked. It was used after being broken. One surface is fairly level and striation shows, under 10x magnification, aligned with the long axis. A few peck marks are evident. The opposite side, not quite level, contains a shallow depression which has been pecked into the surface along the center of the broken edge. Because this depression is roughly half a circle it appears that the stone has been reworked from a larger piece. This entire face, although basically smooth, has a lot of peck marks.

Distinguishing Characteristics: These milling stones have depressions and are intermediate in size between Types 6B and 7, factors which set them (6A) apart.

Comment: In terms of size and shape, these tools have their closest parallel to food processing stones, metates, from the western United States. Four specimens with trough/basins appear to have been sharpened by having been pecked. It is possible they have been used for food grinding however most historical accounts of Southeastern Indians refer to the use of wooden mortar and pestles for preparation of corn. Occasional reports mention the grinding of foods between 2 stones but few details are given.

Table 5

Type 6A. Basin milling stones.

	MATERIAL					FORM			USE MARKS			TACTILE AFFECT		DIMENSIONS (IN CM)
	Schist	Gneiss	Metagreywacke	Sandstone	Sandstone Grit	Basin	Trough	Sloping Face Slight Depression	Striation	Sharpening Pecks	Grinding Pattern	Smooth (Pecks)	Both Faces Rough, Flaky	
9-MU-102														
448 F18	x					x				x	x		x	30 x 25 x 6.6
N350-W450		x						x		x	x		x	34.3 x 23.2 x 8.2
St1 1129 F78	x							x			x		x	24.5 x 18 x 6
St4 1680			x			x				x			x	30 x 25 x 5.8
9-FL-5														
St4					x	x	x		x	x		x		31.9 x 24.2 x 11.1
St4 1239				x					x	x		x		30.9 x 10.9 x 5.3

Type 6B: Oversize Milling Stones

(Plate 7)

Provenience: 9-MU-102 Structure 5

Specimens: 3

Material: quartzite

Shape: rectangular, flattened oval, oval

Size: largest 51 x 49 x 8 cm

smallest 24 x 17.5 x 13 cm (broken)

General Description: Large milling stones, about twice the diameter of Type 6A specimens, which were used in a relatively unmodified state and which developed slight depressions through use. All are damaged by fire.

Use Area: These stones have enough original surface containing ground, crushed crystals to show they were used for grinding. The 2 larger stones have faint depressions near their centers. The smaller specimen, which was broken across its width, has a ground area which is .4 cm lower than the surrounding surface. This ground area apparently ran the length of the stone. The surfaces of the other specimens have been layered or scaled by heat.

Distinctive Characteristics: These stones are about twice the size of Type 6A specimens and even larger than the Type 7 variety. Type

6B have slight depressions, but not the rims and basins typical of 6A, features which seem to have been fashioned before the stones were used. Type 7 are thinner tablets or flattened spheres with level faces.

Comment: All of these large milling stones are metagreywacke and from the same structure. No Type 6A or 7 specimens were present in this structure. Both were present in Structures 1 and 4. The difference in the milling stones at Structure 5 and the other 2 structures at 9-MU-102 could reflect a difference in time, status or material being ground.

Three or in some cases 4 metates have been used for different purposes in a single Indian household in northern Mexico. The Tepehuan Indians who lived in canyons in northern Mexico used a metate for grinding chile, another for grinding corn and a third for mashing corn sprouts for a specific dish. Another metate sometimes was used exclusively for grinding clay in the manufacturing of pottery (Pennington 1969:219).

Type 7: Flat Milling Stones

(Plate 8, Table 6)

Provenience: 9-MU-102 Structures 1 (2), 4 (4)

9-FL-5 Structure 7

Specimens: 11

Material: schist, gneiss, sandstone

Texture: medium to coarse grained

Tactile Element: fairly smooth rocks, use areas ground smoother

Shape: oblong, oval, tabular

Size: largest 23.9 x 9.9 x 6.6 cm

smallest 13.5 x 7 x 3.1 cm

General Description: Unshaped flat rocks with 2 parallel faces of which 1 or both have been used for grinding, leaving an obvious smooth area slightly smaller than the entire face. Generally these rocks are about half to two-thirds the size of Type 6A basin stones.

Use Areas: On most, grinding follows the long axis. While these specimens are not shaped, they apparently were chosen for their size and parallel faces. One specimen has a depression on both faces --1 side is smooth, the other rough-- but these depressions are irregular and would not have resulted from a steady back and forth grinding motion. Some specimens have traces of peck marks and on 1 they are similar to anvil marks.

Distinguishing Characteristics: Type 7 specimens can be easily distinguished by their flat surfaces, small size and natural shape. Type 6A and B specimens are larger and have depressions, either deliberately made or from use.

Comment: Two Type 7 specimens were found in 9-MU-102 Structure 4, 1 stacked on the other, with the Type 29 tool on top of them.

Table 6

Type 7. Flat milling stones.

	MATERIAL			SHAPE			USE AREA		USE MARKS			DIMENSIONS (IN CM)	
9-MU-102	Gneiss	Schist	Sandstone	Rectangular	Round	Triangular	One Face	Both Faces	Grinding	Pecks	Anvil-like	Tool	Use Area
St1 726		x				x		x	x			23.9x9.9x6.6	17x9; 23x9.5
1100		x		x				x	x			21x12.5x3.8	19x10; 10x7x1.4
St4 423	x				x			x	x			20.2x16.1x4.1	16x11; 15x12
423		x			x			x	x			17.5x14.3x2.8	15x13; 15x11
1460X	x					x		x	x		x	20.7x16.9x5.5	10x10; 11x8
1700B	x							x	x	x		18.5x11.8x4.6	18x10; 16x8.5
9-FL-5													
St7 2680			x			x		x	x			13.5x7x3.1	9.4x5.7
9-MU-102*													
St1 689	x				x		x	x	x			20.6x15.8x5.3	14x12; 12x12
741		x										16.9x7.5x3.5	(broken)
741		x										16.8x9.9x4.3	14.5x7.5; 6x6

*Possible Type 7

Type 8: Pitted Cobbles

(Plate 9, Table 7)

Provenience: 9-MU-102 Structures 1 (2), 4 (2)

9-FL-5 Structure 4, 8 (2), 14

Specimens: 8

Material: sandstone, vein quartz, metagreywacke

Texture: medium to coarse grained

Tactile Element: flat ground faces --smooth to moderately rough

pits --some smooth, others rough

Shape: flattened spheres with parallel faces ground level

Size: tool - largest 11.1 x 11 x 4.7 cm

smallest 9.9 x 7.9 x 6 cm

ground faces - largest 11.2 x 8.9 cm

smallest 5. x 3 cm

pit - largest 2.9 x 2.4 x .6 cm

smallest 1.1 x 1.6 x .1 cm

General Description: These are river cobbles, fairly uniform in size, which are ground level generally on both faces. A pit is centered in the ground face. Frequently battering is evident on a side.

Use Area: The faces of these cobbles have been modified considerably, probably by pecking, then grinding. The grinding is evident, the pecking less so. Grinding, when it occurs, covers most of the face which is ground to a flat surface. The pits range from a ragged faint trace to a well ground symmetrical area. All pits are centered in the ground face. Some of the crystalline rocks have jagged cracks instead of smooth pits. Portions of sides on some specimens have been used and are either rough, as for battering, or smooth, as for grinding; these marks are contained within a definite area and are not scattered.

Two specimens have distinctive elements. One, the largest Type 8 cobble has a portion of one end broken off; the opposite end has been used for grinding, leaving a flattened oval pattern, a characteristic of Type 26A tools.

The second cobble is half of a broken pitted cobble which has been refashioned. The broken edge has been ground until it is smooth, although not level. A trace of the original central pit is evident on that ground edge and a new pit has been made in the new center of one face.

Distinguishing Characteristics: This type has 3 characteristics which sets it apart from other tools with pits: these are hand-size oval river cobbles, they have been ground level on both faces, generally and they have a pit centered in both faces. Other pitted tools have noticable differences:

Pitted rollers, Type 9, are long narrow rocks with pits which are not ground and which are located between the center and an end of the rock.

Type 10 specimens are smaller than Type 8 and are finely ground all over. Type 10 specimens have pits in 1 side only, the opposite side is slightly convex.

The random anvils, Type 11, are not of a consistent size, are not ground and the use marks range from being individual marks scattered across a face to irregular pits placed in the center of a face.

The specimens which bear the closest resemblance to the pitted cobbles are found in Type 2; 1 group of these sandstone abraders are ground over 1 face and have smooth pits which are centrally located. These specimens are not cobbles, do not have level faces and may have a completely different type of working area on the opposite face. They also have a type of use marks, grooves, not found on Type 8 tools.

Comment: In some parts of the world today--Panama (Ranere 1975:205-6) Australia (McCarthy 1967:71; Gould, Koster and Sontz 1971)--people use small stones as a base for cracking nuts. Pits develop as a result of this use.

In writing about contemporary Australian aboriginies, McCarthy photographed an Arnhem Land man breaking hard woody seeds on a hand size stone and commented "After he had broken open several hundred seeds a percussion pit was worn in the mortar (McCarthy 1967:71)." Mortars, found all over Australia, are usually round and vary from thick rounded pebbles to stone blocks. In size they vary from 3-9 inches in length and weigh up to 15 pounds. The "mortar depression" may be worn into 1 or both surfaces of the flatter specimens and thick blocks may have multiple depressions. These mortars are used for pounding seeds and nuts and grinding them into flour (McCarthy 1967:59). The small mortars are not illustrated, however under the healing of percussion stones a "Kulki-type hammer anvil stone" is pictured and it resembles the Type 8 pitted cobbles but is smaller and closer in size to the Type 10 stones (McCarthy 1967:59-71).

Experimental work with stone tools suggests that pits also result from bipolar flaking.

The cobbles with smooth pits may be tools for a different purpose than those with jagged depressions.

Table 7

Type 8. Pitted cobbles.

	MATERIAL			FORM							USE MARKS			DIMENSIONS (IN CM)				
	Sandstone	Vein Quartz	Metagreywacke	1 Ground Face	2 Ground Faces	No Ground Face	1 Smooth Pit	2 Smooth Pits	Faint Depression(s)	Irregular	Peck Marks on Side	Broken, Side Ground Smooth	End(s) Broken	Tool	Faces	Depression	Pecked Area	Other Ground Area
9-MU-102																		
St1	x			x						x	x			10.8x9.4x4.6	9.7x8.4	2.7x2.6x.4 2.3x2.2x.2	6.5x1.5	
St1 689			x		x		x			x	x			10.3x8.7x4.3	9.8x7.5 7x6.6	2.1x1.9x.3 2.6x2. x.3	4.9x1.6	
St4 1442A			x		x				x	x	x			12.2x9 x4.4	9.6x6.8 9.9x5.2	.9x8. x.2 1.6x1.1x.1	6.2x2.2	
St4 1812		x			x					x	x			9 x8.4x5.2	8 x7.1 4.6x2.2	3.6x3.2	2.7x1.3	3.3x1.6
9-FL-5																		
St4 3210	x					x	x						x	10.3x7.5x5.4		2.6x2.4x.4		
St4 1231	x			x					x	x			x	13.2x9.4x6	7.2x7.6	4.4x3.9 3.9x2		4x2.9
St8 1722	x				x				x			x		10.4x6.2x4.5	9 x4.8 8.4x4.7	1.2x.8		7.2x3.3
St8 1696	x				x			x					x	10.9x12.2x4.8	2.	3.4x2.3x.8 2.3x2 x.4		8.2x1.6 side

Type 9: Pitted Rollers

(Plates 11*a*, *b*; Table 8)

Provenience: 9-MU-102 Structures 1 (4), 4 (6), 5 (2)

Specimens: 13

Material: metagreywacke, gneiss, schist

Texture: coarse grained

Tactile Element: moderately smooth to rough

Shape: oblong stones; a few flattened ovals and rectangular stones

Size: tool - largest 29.5 x 9.1 x 6.4 cm

smallest 11.6 x 5.9 x 4.3 cm

pit - largest 3.3 x 2.2 x 0.6 cm

smallest 1.9 x 1.4 x 0.1 cm

General Description: Long, relatively narrow water tumbled rocks which have circular depressions pecked on a convex face between the center and the end. The rocks vary in length but are relatively narrow. Three specimens are exceptions: 2 are flattened ovals and have small craters in the center of a flat or sloping face; the third is a rectangular slab which has a deliberately fashioned pit in the center.

Use Area: The pits were made by a series of blows confined within 1.5 cm. On the rollers the pits were placed forward of center intentionally. The longest roller on 1 face has 4 pits near an end. The other face is broken but a pit can be recognized near an end and several irregular smaller depressions are present. This roller is broken and burned.

Pits on the rollers are not ground and are not always deep, but marks are concentrated in a single place and are not individually distinguishable.

Five rollers have a broken end, indicating they were used for percussion. Two have been ground smooth on an end, leaving an oval pattern, as Type 26A.

Distinguishing Characteristics: The long shape is a consciously selected characteristic of these tools. They are mostly of relatively soft material. The peck marks are concentrated in a small area and individual marks cannot be distinguished, as with Type 11 specimens.

Comment: These appear to be anvils which were used secondarily for percussion or grinding, as reflected by other use marks on about half of the specimens.

Table 8

Type 9. Pitted rollers.

	MATERIAL						FORM												DIMENSIONS (IN CM)		
	Quartzite	Metagreywacke	Schist	Gneiss	Oblong	Flattened Oval	Rectangular	1 Depression	2 Depressions	Multi-Depressions	Unshaped Stone	Shaped Stone	1 End Battered	Both Ends Battered	Side Ground	End Ground	Depression Centered	Depression Not Centered	Tool	Pit	Ground Area
9-MU-102																					
St 1 631			x			x				x		x					x		15.1x14.6x3.9	1.5x1.4x.1 2.4x2 x.3 2 x1.3x.1	12.4x9.7
1011		x					x	x				x					x		16.8x10 x4.7	3.3x2.2x.6	
1011		x					x	x			x							x	11.6x5.9x4.3	2.1x1.8x.1	
1022				x		x			x		x			x					19 x12.4x5.7	2.3x1.2x.2 3.6x1.4	
St 4 532		x			x										x	x			16,9x6.4x4.4	1.9x1.4x.1	2.8x2.1 4.3x1.3 6.1x .7
1437A				x	x				x		x			x				x	18.7x7.5x3.9	1.4x2 1.6x1.6x.2	
1441B		x	x		x			x			x			x				x	13.7x4 x3.7	2x1.6x.16	
1450B				x	x			x			x		x			x		x	17.3x5.9x5.2	3x1.8x.1	2x1.4 end
1460A			x		x			x			x		x					x	16.4x6 x4.5	2.1x2x.1	
1718B			x		x				x		x		x					x	20.3x4.6x4	2.5x2.5x.1 2.8x1.4x.1	
St 5 1803	x				x					x	x		x					x	29.5x9.1x6.4	2.4x1.8x.5 .9x.6	
1984A	x				x				x		x		x				x	x	20 x7.4x5.1	1.6x1.3x-.1 5.1x1.6 (scattered on center)	

Type 10: Ground Stones with Depressions

(Plate 10)

Provenience:	9-MU-102	Structure 4 (2)
	9-FL-5	Structure 9
Specimens:	3	
Material:	gneiss, vein quartz, sandstone	
Texture:	coarse grained	
Tactile Element:	smooth	
Shape:	flattened spheres with a depression on one face	
Size:	5.9 x 5.8 x 3.9 cm (2 whole specimens)	
	depressions: 3.4 x 2.1 x .4 cm	
	2.7 x 3.4 x 1.1 cm	

The specimen from 9-FL-5 is broken; less than half the tool remains and it is a portion of the face with a depression. Only the whole tools will be discussed.

General Description: Palm-size cylindrical stones, ground to the same size and shape, from rounded cobbles. Each has a face which is slightly convex and the other contains a depression. On 1 specimen the depression is barely formed and on the other it is a well defined pit.

Use Area: The depressions vary in the kinds of marks they bear, which may be a result of a difference in materials used. Small holes, part of the manufacturing process, are visible on the gneiss specimen under 10x magnification and so are thin lines which cross the depression from all directions. Most of these lines start at the rim and go into the center of the depression, although some are confined to the center itself. On the quartz specimen, the lines exist but are harder to discern; crushed quartz crystals are visible in the pit when 10x magnification is used.

Distinguishing Characteristics: Small cylindrical ground objects, with one parallel face convex, the other concave.

Comment: At first glance, these tools look like pitted cobbles, but it is simply the pit which links them together. They differ in size, they differ in form. These specimens do not have broad flat ground faces with pits in the center; the pit occupies most of the face. The Type 10 specimens are ground all over, also. They may have served a completely different function from that of the pitted cobbles.

These unbroken artifacts are so similar that before they were scrubbed with soap and water they appeared to have been made from the same stone. They were found within a few feet of one another, on the periphery of Structure 4, 9-MU-5.

The curvature of the broken piece from 9-FL-5 indicates it was similar in size.

Type 11: Random Anvils

(Plates 12, 13; Table 9)

Provenience:	9-MU-102	Structures 1(5), 3, 4(3), 5(2)
	9-FL-5	Structures 4(3), 5(2), 7(6), 8(7), 23(1)
	Structure 3 (9-MU-102) was not used for complete analysis	
Specimens:	30	
Material:	sandstone, vein quartz, quartzite, chert concretions, amphibolite, metagreywacke and siltstone	
Texture:	fine grained to medium coarse	
Shape:	round (cobbles), rectangular (tablets), oblong (rollers), flattened spheres (concretions) and ovoid	
Size:	tool - largest 19 x 12 x 8 cm	
	smallest 4.2 x 3.9 x 3.9 cm	
	use area - largest 8.8 x 2.5 cm	
	smallest 1.4 x .9 cm	

General Description: Whole cobbles, tablets and fragments of both which have been used as anvils without any preparation of the rocks. The use marks vary from short marks scattered over a face to a well-defined central crater. Forty percent (13) were cobbles which ranged from a perfect oval (Plate 13) to flattened spheres. Nine others were rectangular with flat faces. The rest were fragments.

Eight, mostly broken pieces, had been used previously for some other function.

Use Area: On most specimens only a small portion of the rock's surface is used. The marks themselves range from individual pecks or short cuts, both less than .1 cm wide, to irregular pit or, in the case of the single exception, a ground depression. The pits are centered on whole rocks or pieces. When multiple marks exist, they are either centered or scattered across a face. The use surface is either flat or convex.

Distinguishing Characteristics: The variation in use marks and anvil size is typical of this tool type. They are shallow linear marks, frequently, and are either scattered or clustered. When a pit is present it is centered on the rock but is narrow and irregular and is not similar to the smooth depressions typical of Type 8 cobbles which are often called nutting stones. Pitted cobbles, Type 8, are relatively uniform in size; Type 10 (ground stones with depressions) are exactly the same size and have smooth depressions. The pitted rollers, Type 9, have small irregular pits but their placement and the form of the rock used follows a definite pattern. Type 11 rocks are hard but the size and shape varies considerably---for example, the length varies from 4 to 19 cm.

Comment: For whatever purpose these anvils served, a level or convex surface was appropriate, but not a concave one. Given the shape of the use marks, it appears they were made by a thin hard edge. Possibly this could be the result of bipolar flaking. This is a predominant tool; a total of 11 were found in 4 structures at 9-MU-10s and 19 in 5 structures at 9-FL-5.

Table 9

Type 11. Random anvils.

	MATERIAL							SHAPE							USE AREA								OTHER FUNCTIONS	
9-FL-5	Quartz	Sandstone	Quartzite	Amphibolite	Chert Concretion	Metagreywacke	Siltstone	Whole	Fragment	Round	Rectangular	Oblong	Flattened Sphere	Other	Pit	Near Circle	Scattered in Circle	Scattered Linearly	Scattered Randomly	Not Centered	Centered	More Than One Face Used	Hammerstone	Hoe-like Tool
St 4 3173	x							x		x				x			x				x			
3185		x							x					x	x						x			
3201							x	x			x						x		x	x				
3210	x							x		x							x				x			
St 5 2018					x								x				x				x			
St 7 2466					x			x					x				x				x			
2658		x						x		x									x		x		x	
2668	x?		x?						x								x				x			
2672	x?		x?						x					x		x					x	x		
2676		x						x			x						x				x	x		
2693		x						x		x						x					x		x	
3122		x							x		x						x				x			
St 8 1504A		x							x					x	x					x				
1505A					x				x					x		x	x			x				
1507A	x							x					x									x		
2467						x		x						x			x			x		x		
2468									x					x	x						x			
2474		x							x		x								x	x				
St 23 2041		x							x			x				x					x			
St 4 3173*					x			x						x			x							x

*Type 21 Tool.

Type 12: Hammerstones

(Plate 14, Table 10)

Provenience: 9-MU-102 Structures 1 (3), 4 (4), 5 (3)

9-FL-5 Structures 8, 9, 23

Specimens: 13

Material: quartz, quartzite, sandstone, metagreywacke

Texture: fine grained, coarse

Tactile Element: use areas rough, otherwise surfaces vary

Shape: elongated ovals or round

Size: largest 14.9 x 9.2 x 6.1 cm

smallest 2.8 x 2.6 x 2.2 cm

General Description: River cobbles of 3 fairly uniform sizes which show rough or broken ends and sides caused by percussion. While additional wear exists on some specimens, it is not obvious and is only visible in several cases with magnifications. The larger and medium size rocks are elongated and apparently were chosen because they have broad projecting edges and ends. The smaller 3 are round. Forty-six small cobbles and pebbles were not included in this type because there was no way to be sure that the breaks were not natural.

Use Area: The visible use marks on these specimens are either obvious --broken or battered ends-- or so subtle that marks could have resulted from either light percussion or heavy abrasion. Only

1 specimen, round and of a fairly soft material, is covered with the small percussion pits which generally are associated with hammerstones. However, this specimen also has striae which show with magnification; it looks as if it were also used for grinding.

Generally these specimens have 1 or both ends made rough and irregular by battering. With magnification, these areas contain shallow pits/valleys where the surface has been broken by percussion.

Two of the elongated specimens--both are quartz--have cuts predominantly parallel to the long axis on their surfaces which are almost level faces. Another has been spalled or flaked, leaving a crude edge which could be used for chopping.

A broken cobble has been used on a section of its broken edge until the edge has been ground smooth and rounded and appears darker and glossier than the surrounding surface.

Another specimen has a few Type 11 anvil marks near one end.

Distinguishing Characteristics: These hammerstones are distinguished by their size, shape and the location of wear marks. Most specimens are long and battered or broken on the ends; 4 are smaller and round and battered all over. In contrast, Type 13 percussion tools are flattened ovals which have been used on their circumferences; Type 14 are small ovals, generally, which have been used on one end.

Comment: One would think that hammerstones would be numerous at village sites. However, it is easier to assume a stone has been used as a hammer than to prove it. While some may exist as broken stones excluded from the study group, there just was not a large number of possible hammerstones. An analysis of flint tools may show that soft hammers--as wood and antlers--were used at these sites.

Forty-six small cobbles and pebbles were not included in this group because of the uncertainty as to what caused their breaks and battering. Thirty were from 9-FL-5 and 16 from 9-MU-102; of these, 17 had broken ends and 18 had either cortex missing or peck-like marks. They ranged in length from 1-13 cm; there was a strong tendency for them to be smaller at 9-FL-5.

One of the elongated hammerstones which has striae on its face was found with a Type 7 milling stone and a pottery vessel in Structure 4, 9-MU-102.

Occasionally sites in the southeast have produced quantities of hammerstones. At the Hardaway Site, Coe found 536 specimens, mostly surface finds, which he separated into 7 types; not all were found in excavated levels. Most were round or oval. One type, with 13 specimens, was oval. He included pitted stones as 1 of the 7 types.

One large hammerstone was found at 9-FL-5, either included with a burial or as part of the fill. This ovoid stone is larger and heavier than most hammerstones from structures but it has extensive use marks on both faces. With magnification these show as individual and overlapping pits.

Table 10

Type 12. Hammerstones.

	Quartz	Quartzite	Sandstone	Metagreywacke	Round	Ovoid	Elongated	Whole	Fragment	One End Broken	Both Ends Broken	Edge Battered	Peck-Pitted All Over	Edge Ground After Broken	Random Pits	One, Both Ends Battered	DIMENSIONS (IN CM) Tool	Use Area
9-MU-102																		
St 1 719	x					x		x									14.9x9.2x6.1	4.2x3.6
1069	x					x		x		x							14.8x8.8x5.8	3.4x2.1
1100	x					x		x							x	x	13 x8.3x7.9	3.2x3 (lightly marked)
St 4 1430A	x						x	x								x	15.5x7.5x6.3	4.3x3.8 (lightly marked)
																		5.2x2.5 (lightly marked)
1452A	x				x			x		x						x	6.4x6.9x3.2	3.8x4.2
1702B			x			x		x				x				x	9.3x7.4x6.1	3.2x1.6
																		3 x2.4
1704B	x				x			x			x						5.5x5.5x4.8	4.9x3.8
																		3.4x3.4
St 5 1804				x	x			x					x				6.6x6 x5.6	
1981B		x				x					x				x		13.5x9.2x5.5	4.3x4.6
																		5.2x4
F28	x					x		x			x						14 x10 x6.2	4 x3
																		8.9x2.9
																		6.3x3.1
9-FL-5																		
St 8 1691	x						x	x								x	12.3x6.1x5.2	2.4x .4
																		2.1x1.2 (anvil area)
St 9 1485		x			x				x			x		x			9.6x6.7x4	4.9x .3
St 23 2074		x				x		x		x		x					5.5x5.3x5.3	4.6x3.4 (break)

Type 13: Edge Percussion Tools

(Plates 16 a, b; Table 11)

Provenience:	9-MU-102	Structures 4 (1), 5
	9-FL-5	Structures 4, 7, 8 (3), 14, 23 (2)
Specimens:	11	
Material:	metagreywacke, quartzite, chert concretions, sandstone	
Texture:	fine to coarse grained	
Tactile Element:	generally smooth rocks with edges rough from use	
Shape:	flattened ovals	
Size:	largest 11.3 x 8.6 x 2.5 cm	
	smallest 3.4 x 3 x 1.3 cm	

General Description: Chert concretions and other small flattened ovals which have been used around their sides for percussion. Nine are whole and in their natural shape. Three have been modified, 2 flaked and 1 ground.

Use Areas: The sides of these tools are worn irregular by small percussion pits. One specimen, with about a third of its body sheared away, has been battered on almost all of its side until the cortex has been removed uniformly. Two specimens have striated areas with Type 16 patterns so faint they can be seen only under 10x or higher magnification. A third has lines on the side.

Distinguishing Characteristics: These are flat, oval concretions and other stones of similar shape used mainly on their side for hammering. They differ from other percussion tools in size and the location of use marks. Type 12 hammerstones are larger, thicker rocks. Most are elongated, a few are round. The use on the elongated variety is restricted to ends; the rounder specimens have been used over a broader area. Type 14 specimens are smaller than Type 13 and show wear only on the side near the end.

Comment: These specimens although small are hard rocks. They would make efficient percussion tools for specialized jobs. The 2 specimens which are flaked are similar, although 1 is worked all over and the other is flaked only on a part of one face. Both are from the same structure.

Table 11

Type 13. Edge percussion tools.

	MATERIAL					SHAPE			USED				DIMENSIONS (IN CM)	
	Quartzite	Chert Concretion	Metagreywacke	Sandstone	Siltstone	Flattened Sphere	Modified by Use	Natural Shape	Ground	Flaked	Reworked Tool	Striated Area	Tool	Use Area
9-MU-102														
St 4 1574B	x					x	x						7.5x7.4x4.2	7.2x2.6 2.9x2.6 (edge broken)
1586B	x					x		x					7.3x6.4x3.5	all of circumference
St 5 1976			x			x			x				6.6x6.1x2.3	most of circumference
9-FL-5														
St 4 3210					x	x		x						app. 8.5x7.2 all of edge
St 7 2640	x					x		x					4.8x4.4x3.4	3.4x .6 edge 2.4x1.8
St 8 1502B				x		x		x					3.4x3 x1.3	all of circumference
1507A		x				x		x					7.2x6.6x3.3	3.5x1 4.6x1
1733		x				x		x					9.7x5 x5.6	5.1x .9 7.2x1.1
St 14 1287					x	x		x			x	x	11.1x7.9x3.5	11 x1 3.5x3.7
St 23 2088					x	x				x			8.9x7.9x3.4	all of edge
2104	x					x				x			6.1x5.9x2.4	all of edge

Type 14: Convex Edge Percussion Tools
(Plate 15, Table 12)

Provenience: 9-MU-102 Structures 1, 4(2)
9-FL-5 Structures 7, 23

Specimens: 7

Material: chert concretions, vein quartz, quartzite.

Tactile Element: smooth, except where worked on edges

Shape: ovoid, oblong

Size: largest 8.9 x 5.8 x 3.4 cm
smallest 3.7 x 3.1 x 2.5 cm

General Characteristics: Palm-size stones which have been used on their side, near ends for percussion. They show little wear elsewhere. These rocks have a hardness of about 7 on the Mohs scale. Two, from Structure 4, 9-MU-102, are perfect ovals and look like large hen eggs.

Use Area: Individual short scratches and pits are found on the side. Two of the concretions have been flaked, probably accidentally during use, rather than intentionally.

Distinguishing Characteristics: These small oval rocks show signs of wear on their side only near the ends. Types 12, 13 and 26 also are percussion tools which differ in form or use areas from Type 14.

Type 12 hammerstones are either large elongated rocks or smaller round ones; the elongated specimens have been used on their ends, the round variety have been used over a broader area. Type 13 are flattened ovals used around their entire side. Type 26 are long, thin rollers with ends broken by battering.

Comment: These small long rocks with rounded ends apparently were specialized hammerstones for a specific type of use. Two occur in 9-FL-5 burials, along with another type of percussion tools. They are round concretions which have battering marks encircling them.

Larger, more typical hammerstones have been recorded as being used for a wide variety of functions. In 1895, W. J. McGee observed a Seri woman who, during a period of several days, used a hammerstone for 13 different functions, including skinning the leg of an animal, grinding beans and cutting trees (McGee 1895-6:238-9).

Table 12

Type 14. Convex edge percussion tools.

	MATERIAL										DIMENSIONS (IN CM)	
	Chert Concretion	Vein Quartz	Quartzite	Ovoid	Oblong	1 Segment of Edge Used	2 Segments of Edge Used	3 Segments of Edge Used	4 Segments of Edge Used	End Battered	Tool	Use Areas
9-MU-102												
St 1 724	x			x			x				7.3x4.3x1.1	2.5x .5 2.8x .4
St 4 1178		x									6.1x4.9x3.4	2.8x1.9 2.8x1.1
1452A 1460A		x		x			x			x	6.6x4.3x3.5	4 x1.1 (edge) 2.1x1.1 (edge) 1.5x .5 (end)
9-FL-5												
St 8 2487		x			x		x				9.5x3.5x3.5	2.2x .6 2 x1
2591			x					x			5.7x3.1x2.5	2.8x .9 1.2x .8 1 x .2 outside structure
St 23 2112			x	x					x	x	8.9x5.8x3.4	3.8x .6 4.4x1.5 2.7x .8 3.2x .6

Type 15: Beveled Edge Abraders

(Plate 17)

Provenience: 9-MU-102 Structure 4

Specimens: 2

Material: vein quartz

Tactile Element: smooth rocks, generally, except for use edge

Shape: rectangular

Size: tool - largest 15.7 x 9.5 x 5.5 cm

smallest 7 x 6.8 x 3.8 cm

use areas - largest 7.7 x 1 cm

smallest 3.8 x 0.9 cm

General Description: Two river cobbles, 1 palm-size and the other about twice as large, which have been used for rubbing or abrading on until the edge has become beveled. With one exception, the cobbles are unmodified except for the edges. Both specimens have some minute pits suggesting they were used as anvils, similar to Type 11 tools.

Use Area: Long straight edges have been used for abrading or grinding and have become beveled and smoothed by use. The larger cobble has 2 of these edges, located on opposite sides of the flat face.

Distinguishing Characteristics: These rocks have a beveled, blunted edge, ground through use which other tools do not have. These rocks show few other signs of use.

Comment: These tools are made of vein quartz. They are quite hard. Only material of equal hardness would leave such well defined traces of wear, but the material could be in various forms.

Type 16: Striated Concretions

(Plate 18, Table 13)

Provenience:	9-MU-102	Structure 4
	9-FL-5	Structures 7, 8(3), 14(3), 23
Specimens:	8	
Material:	chert and siltstone concretions	
Texture:	fine grained	
Tactile Element:	smooth except where the surface is broken by use	
Shape:	rectangular, ovoid, elongated, dumbbell	
Size:	tool - largest 13.9 x 12.9 x 3.8 cm	
	smallest 6.3 x 5.5 x 3.1 cm	
	stria - largest appx. 6 cm x .05 cm	
	smallest appx. 3 cm x .02 cm	

General Description: Thin, flat ovoid concretions with 2 parallel faces which have been used without modification. They have been struck by thin, sharp objects and the resulting marks fall into 2 distinct categories: multiple, wispy shallow lines and long deeper individual incisions. Generally, the positioning of the 2 is different.

Use Area: This varies from just the center of a face being used to the entire surface on both faces. A correlation exists between the type of lines and their location on the face. The deeper, incised lines are located in the center of the specimen. These lines are angular in cross section, tending to have a vertical side joined by a sloping side; they form an acute angle. These incisions run in the same direction but frequently cross or overlap; they do not seem to be the result of a single process as a group of the finer lines do.

The fine, wispy lines are shallow, just breaking the hard surface of the concretions. These lines generally are rounded in cross section, although some are v-shaped. They occur in groups and run from a point on the face toward the edge, or from the edge toward the center or an opposite edge. A group about 2.5 cm wide will extend about 3 cm long and contain as many as 40 lines. Their maximum width is .04 cm with many measuring .02 cm. (These were measured with calipers, and are, therefore, approximations.) They appear to have been made with a continuous brushing motion. Some of the specimens have been used so much they have fine lines all over both faces, but on those that are less used, a use pattern is suggested: the concretion was held level in 1 hand and brushed rapidly with a sharp, hard object held in the other hand, the direction of the motion was not necessarily away from the body.

One specimen, a dumbbell shaped concretion which has a few flaking scars on it, is a worn multipurpose tool. While numerous tiny depressions have been pecked on its surface and a 3.7 cm wide chunk has been knocked off of a convex end, fine lines predominate on this specimen. The cortex has been worn off of about a third of it through use. A similar dumbbell-shaped concretion was excavated at 9-FL-5 but was stolen from the site.

Two other specimens show slight traces of wear, in addition to striations. One has a few short linear percussion marks on its edge and the other has on its edge a flaked place which is rounded on the high points.

Distinguishing Characteristics: These concretions are unmodified generally and contain either groups of wispy lines or a few individual incised lines. Other concretions in the assemblage are used either for percussion on their edges, Type 13, or polishing, Type 17.

The six Type 13 concretions have peck marks around their edges and 4 have some lines on their faces. None are the wispy curved lines of Type 16. One has long straight faint lines running down the center of a face and these lines tend to be uniform, like grinding lines. The other 3 specimens have a few small groups of lines, oriented in the same direction, which are barely visible without magnification. They do not represent an additional major function for this type.

The concretion polishing disks differ in size and use marks. The disks are smaller, roughly a fourth to two-thirds, then the striated concretions and most have been ground to shape. The disks have edge facets or smooth faces. The lines which are present are faint and they vary in their orientation on various disks. Some are grouped diagonally along the edge, most are laid randomly across a face and in 1 case are found parallel covering an entire face. Most of these lines are fairly straight.

Comment: The wispy lines and the incised lines on Type 16 concretions may represent completely different functions and therefore different tool types. The specimens which most closely resemble Type 16 are found in burials at the 9-FL-5. This is Type 34 which have wispy lines and clustered peck marks which tend to be angular. The incised lines are not a common feature of the burial tools.

Table 13

Type 16. Striated concretions.

	Chert Concretion	Siltstone Concretion	Ovoid	Oblong	Rectangular	Dumbbell	Multiple Thin Shallow Lines	Deeper Wider Lines in Center	Run From Edge to Center	Short Random Lines, Scattered	Edge Battered	Flaked	Specimen Flaked/Spalled	Pecked	Edge Ground After Broken	DIMENSIONS (IN CM) Tool	Use Area
9-MU-102																	
St 4 1565		x	x				x		x	x		x				10 x5.7x2.3	3.6x3.2 striation
9-FL-5																	
St 7 2657	x		x				x				x	x				7 x6.6x4.2	6.9x6.6 one face 3.2x .8 edge
St 8 2464		x	x				x									8.9x6.2x1.7	5.9x3.4
2483	x					x	x			x	x			x		12.7x6.7x5.9	all over
St 14 1234	x				x			x								13.9x12.9x3.8	8.5x4
1238		x		x			x	x	x	x						13.9x5.5x2	10.8x5.6 10.7x5.2
1249	x		x				x		x							8.8x6.3x1.6	5.9x5 5.2x6
St 23 1246	x		x					x		x					x	6.4x5.5x3.1	6.4x3.2 6.3x5.2
2061*		x	x							x						7.5x5.6x1.5	5.2x5

Type 17: Polishing Disks

(Plates 19a, b; Table 14)

Provenience: 9-MU-102 Structures 1(2), 4(2)

9-FL-4 Structures 8(3), 9, 23(2)

Specimens: 11

Material: chert and siltstone concretions, sandstone, quartzite, gneiss, and metagreywacke

Texture: fine-coarse grained

Tactile Element: smooth in use area; in non-use areas, half of the specimens are smooth, others slightly-moderately coarse.

Shape: flattened spheres

Size: tool - largest 9.5 x 8.6 x 3.8 cm

smallest 3.7 x 3.7 x 1.4 cm

facet - largest 3.8 x 1 cm

smallest 2.2 x 1.5 cm

smooth face - largest 3.8 x 3.4 cm

smallest 3 x 3.5 cm

General Description: Palm-size stones which have acquired either a smooth face or a faceted edge through polishing. Six are concretions. Most (7) are approximately 4 cm in diameter but 2 non-concretions are 3-4 times as large. The smaller stones are generally smooth and either have worked edges or faces; the 2 large specimens are rough textured with a smoothed edge facet. Of the 11, 6 are disks, 2 have a face opposite a convex surface and 2 are flattened spheres. Four are natural in shape, the others have been modified by grinding on their edges before use. Several probably were chosen for their natural form which required only a little shaping prior to use.

Use Area: Three of the specimens have facets worn on their edges and 6 have flat smoothed faces. Two others have both edge and face wear. The facets cover only a small portion of the circumference while the face wear covers the entire flat surface, except on those specimens where edge facets are present. When both edge and face wear is present, the center of 1 or both faces is smooth from use.

A few concretions have marks visible without magnification, but these are incidental to function--random incisions on 1, and on another, scars where grains have been dislodged from the surface.

On several of the concretions the use area, either facet or face, is so smooth that marks are hard to see even with magnification. In some cases this contrasts with the rest of the disk where marks are visible (under magnification). Most of the use marks are random, straight and relatively short; about 3 specimens have areas of striation. On 1, faint striation covers most of a smooth face and may be part of the initial manufacturing of the tool. On 2 other disks, the area of striation covers about a fourth of the face. The lines are straight on 1 and slightly curving on the other.

Most edges on the concretions show grinding lines, a part of the initial shaping, around their circumferences. One however has short diagonal lines around its entire circumference. These lines, even though they are visible only with magnification, are short, narrow incisions and seem to represent a different kind of use. (On this specimen, the face is extremely smooth and marks are not visible in the smooth center.)

Distinguishing Characteristics: These tools are small disks with smooth faces or facets and display few obvious use marks; most are concretions and have been shaped by grinding. In contrast, Type 13 concretions are larger, unmodified and have peck marks on their edges. Type 16 concretions are larger flattened ovals with striation/incised lines. The Type 18 disk lacks facets or smoothed faces and the Type 24 specimen is a larger lenticular rock flaked to give it a rough edge.

Comment: These probably are pottery polishing disks. They resemble what commonly are called gaming stones, however, Type 17 specimens are tools with patterned wear.

Table 14

Type 17. Polishing disks.

	MATERIAL							USE AREAS											DIMENSIONS (IN CM)		
	Gneiss	Quartzite	Metagreywacke	Chert	Siltstone	Sandstone	Mudstone	1 Smooth Face	2 Smooth Faces	1 Rough Face	2 Rough Faces	Lines in Many Directions	Lines in Same Direction	1 Edge Facet	2 (or more) Facets	Working Surface Very Smooth	Tool Ground	Natural Shape	Tool	Face Used	Edge Facet
9-MU-102																					
St 1 736		x						x									x	x	3.7x3.9x2.5	2.4x2.3	3.8x1
824			x								x						x				2.3x .9 2.4x .4
St 4 N204																					
W626							x		x	x		x				x			3.8x3.4x1.7		
F98(h)	x									x			x		x		x		9.5x8.6x3.8		3.1x1.2
1766						x		x						x			x		4.1x4.1x3.8	3.5x3	
9-FL-5																					
St 8 2526					x				x			x	x	x			x		4.2x4.1x1.5		2.4x1 1.4x .9
2564					x							x			x		x		5.3x5.1x1.6		2.5x .8 3.5x1.1
2589						x			x									x	3.8x3.4x1.8		3.8x3.2
St 9 1296A				x				x							x			x	4.4x3.6x3.3		1.3x .8 1.3x .7
St 10 2340				x								x	x			x	x		3.7x3.7x1.4		.9x .6
St 23 2045					x													x	3,9x3.6x2.2		2.5x .9

Type 18: Ground Pebble

(Plate 20)

Provenience:	9-MU-102 Structure 5	
Specimens:	1	
Material:	shale	
Shape:	oval	
Size:	tool -	5.5 x 3.3 x .7 cm
	ground area -	3 x 1 cm one side
		2.6 x .9 cm other side
	grinding on sides -	2 x .3 cm
		1.8 x .2 cm

General Description: A thin, flat river-worn pebble, oval in outline, has been ground on one end giving it a sharp edge. Each side of the edge adjacent to the opposite end has been ground flat and a small piece has been spalled off the end between the 2 ground areas.

Use Area: The cutting edge is nibbled from wear. Grinding on this edge seems to be the result of a deliberate act while grinding next to the opposite end is the by-product of use.

Distinguishing Characteristics: There is no other tool like this one in the entire assemblage.

Comment: This tool provides a thin curved edge which is neither exceedingly strong nor sharp. It must have been used on a fairly soft material as bark, leather or shell. The marks on the sides indicate it was used for rubbing and the ground end for light duty scraping or cutting.

Type 19: Celts

(Plate 21, Table 15)

Provenience:	9-MU-102	Structures 4(3), 5
	9-FL-5	Structures 4, 5, 23
Specimens:	7	
Material:	amphibolite, quartzite, slate and an ultramafic material	
Shape:	subrectangular	
Texture:	fine to medium fine grained	
Size:	largest 13.5 x 6.3 x 3.8 cm	
	smallest 9.6 x 3.1 x 2.5 cm	

General Description: Ground stones, artifacts, subrectangular in outline, which have a cutting edge at one end and a poll at the opposite end of the body. Specimens range from those ground only on the tapering edge to those ground all over. Celts vary considerably in size and shape, even in the small number in this assemblage. Edges are convex. Sides can be parallel, convex, v-shaped or may flare outward then become parallel. Polls are either about the same width as edges or are about half the width. One exception also has other variations in form. It is the smallest whole celt (9.6 x 3.1 x 2.5 cm) and it is wider at the poll than at the cutting edge. In addition, instead of being oval in cross section, it has ground face. It may be a different tool. Semenov (1964) calls celts chopping tools, rather than cutting ones.

Use Area: Not all the celts have been used. Two, possibly a third, appear unused. On those which have been used, polls usually are battered and both the bodies and edges are spalled or battered. Edges can have a somewhat serrated appearance. Wear lines can be separated into two categories: those which run parallel to the edge and those which strike it obliquely to perpendicular. One specimen which has a battered poll and a worn, serrated edge has marks suggesting it may have been used as an anvil also. One face has a concentration of linear cuts located in the center. Superficially this resembles Type 16 marks, but the Type 16 marks are either angular or rounded depressions.

Distinguishing Characteristics: Celts generally have a subrectangular body with a sharp ground edge on an end and a poll on the opposite end. In most cases they are designed and manufactured, with considerable effort, as multipurpose tools capable of piercing and pounding a surface. The tool which most closely resembles a celt is Type 22, which may be a broken piece of a celt reworked for further use, possibly as a chisel. The edge, rounded and burnished from use and spalled in places, is present but the poll is missing, the result of a second break. The original broken side, parallel to the long axis, has been ground to a burnish.

Two tool types --20 and 21-- are chopping tools but they differ considerably from celts. Type 20 specimens are thin hoe-like implements flaked so they have rounded blades; of those represented here, 2 have broad stems and 1 is stemless. These specimens are made of fairly soft materials and are not cutting or hammering implements. They were not crafted with much effort.

Type 21 is a fairly large concretion which has been pecked all over a face and flaked around the naturally curved end to form a chopping edge. The manufacturing ended at this stage and the edge remained unfinished beyond flaking. While the edge shows wear traces, there is no indication that this specimen was used for percussion.

Comment: The poll, the slightly curved blade and the dimensions of each are designed for functional reasons. The specimen with the poll wider than the edge has more battering marks on the poll than any of the other specimens. The lines at the edge of this tool differ also; they run from the edge toward the body, diagonally, right to left on both the face and the convex side of the tool. They may be grinding marks rather than traces of use.

Five celts were found in burials at 9-FL-5 and the 2 smaller ones contained typical use marks. The 3 larger which were almost twice as long did not appear to have been used.

Table 15

Type 19. Celts.

	MATERIAL				FORM																
	Slate	Quartzite	Ultra Mafic	Amphibolite	Poll Narrower Than Blade	Sides Flaking Out	Poll Wider Than Blade	Sides Slightly Convex	Poll, Blade Width =	Poll Battered	Blade Battered	Blade Marks 1 to Sides	Blade Marks / to Blade	Blade Marks Opposite, Each Side	Marks Same Direction on Each Side	Whole Tool	Tool Broken	Tool	Blade Width	Poll Width	Blade Marks
9-MU-102																					
St 4 423	x				x	x				x	x			x		x		10.4x6.3x2.5	6.3	3.5x1.2	3.6x2.4 3.6x5
1137				x			x	x		x	x	x				x		12.2x6.5x3.8	4.9	5.8x2.7	4.4x2.6
1450A		x										x					x	5.2x3.2x1.3	3.2		3.2x1.1
St 5 1889B				x			x	x		x	x				x	x		9.6x3.1x2.5	1.5	2.9x1.2	1.5x1.2
9-FL-5																					
St 4 3228		x							x	x	x		x					14.8x6.2x2.1	5.2	5.1x1	5.2x2
St 5 181		x												x			x				
St 23 2021			x		x	x				x			x	x				13.5x6.3x3.8	6.6	3.9x1.5	6.6x1.6

Type 20: Hoe-like Tools

(Plate 22, Table 16)

Provenience: 9-MU-102 Structure 1 (3)

Specimens: 3

Material: phyllite, schist

Shape: rounded blades with rectangularish stems;
specimen with both ends rounded, in outline a figure 8.

Size: largest 15 x 9.6 x 1.2 cm
smallest 9.2 x 7.3 x .9 cm

General Description: Thin tools with broad parallel faces flaked to make a blunt roundish edge. Two specimens---both of a soft rock---have broad stems for hafting. The third does not have a stem, instead it is rounded on both ends and is flaked so it is slightly narrower in the center. The larger of the stemmed specimens is about twice the size of the smaller. The unstemmed tool is intermediate in length but its 2 edges are approximately the size of the edge on the smaller stemmed specimen. The blades on the stemmed tools are asymmetrical and bulge to 1 side. The small stemmed tool is ground all over. The other 2 are flaked only --they are fairly crude-- and any grinding traces which are found on them are a product of use.

Use Area: Edges are rounded and polished on the stemmed specimens, particularly the larger. On it, the edge adjacent to the stem is quite smooth and shows polish from hafting. The small tool also has straight lines running perpendicular to the edge. Areas of heavy wear are found on the edge of the stemmed specimens just below the curve where the tool expands from stem to blade.

Wear marks are faint on the unstemmed tool but the edge on 1 end seems slightly more used than the other where more small flake scars are present.

Distinctive Characteristics: Thin tools, made of soft rocks, which have been flaked to form at least 1 broad circular edge. Type 21, a flaked and pecked chert concretion, is somewhat similar in outline to the stemmed variety of Type 20 tools, but it is thicker, wider and most importantly a much harder stone. It has been flaked to give it an edge with a steep angle which seems to be capable of cutting. Type 20 tools have blunt edges. Celts differ in having ground sharp edges which are less rounded and frequently celts have a poll for percussion. Celts generally are made of a harder material.

Comment: While these look similar to what commonly is called a hoe, they may not be. A geologist questioned whether a stone as soft as phyllite could be used as a hoe. The ground at both sites is soft alluvium and a digging stick would be sufficient for planting. If these tools are agricultural tools, perhaps they are for chopping weeds. Yellow ochre is caught in crevices on the small stemmed specimen. The unstemmed specimen may have been used on 1 edge only.

Table 16

Type 20. Hoe-like tools.

	MATERIAL		FORM			WEAR			DIMENSIONS (IN CM)	
	Phyllite	Schist	Stemmed	2 Rounded Ends	Ground	Wear Marks at Stem-Blade Juncture	Wear Grinding on Blade Sides	Wear Grinding on Blade Bottom	Tool	Ground Areas
9-MU-102										
St 1 731	x		x		x		x	x	9.2x7.3x .8	2.9x .2 2.9x .2 4.2
735		x		x				x	12.7x6.9x1.5	3.6x2.8
763	x		x			x	x	x	15 x9.6x1.2	2.7x .2 3.1x .2 4.6x .9

Type 21: Pecked & Flaked Concretion

(Plate 23)

Provenience: 9-FL-5 Structure 4

Specimens: 1

Material: chert concretion

Texture: fine grained

Shape: pear shaped outline (natural formation)

Size: 14.4 x 11.6 x 3.3 cm

General Description: This concretion, probably selected for its natural shape, is pear-shaped in outline and has a level face and a slightly convex face. Much of the convex face has been pecked in an even and regular manner in what must have been an effort to modify the natural shape of the specimen. The broad curving end is flaked on the convex face, producing a steeply sloping edge. The level face has been modified by use in the center where there is a cluster of linear percussion marks and a polished area.

Use Areas: The convex face is covered with small peck marks which are pinpoint size and appear circular to the eye; they develop into more elaborate forms --crescent, cloverleaf, bisecting circles-- when magnified. These pecks are spaced closely together. They are the result of controlled blows.

The flaked edge on this face shows signs of wear. Ridges on the flake scars are smoothed, rounded and burnished. The opposite end, unflaked, is pecked also.

The center of the flat flake is polished and marked with long, slender striae visible only with magnification and oblique lighting. Overlying this and visible to the eye is a concentration of short, linear marks, in the manner of Type 11 specimens. They are confined to an area about 4.5 x 4.5 cm.

Distinguishing Characteristics: This naturally shaped stone has a broad rounded end, flaked on a side to produce a cutting edge, and an opposite end which is narrower and rounded, somewhat like a stem. Type 20 specimens (hoe-like tools) have rounded blades and some have stems; however, they are thinner, edges are blunt, and material is softer. No great amount of effort has been expended to shape them, either.

Comment: This concretion may be an unfinished spatulate celt. Two specimens are included in the burials at 9-FL-5. They have been shaped and ground to a much greater extent than the concretion has been altered. One specimen from the burials is so well crafted that manufacturing marks do not show except on the top of the stem. These artifacts are similar in size:

14.4 x 11.6 x 3.3 cm

15.5 x 11 x 1.5 cm

13.4 x 10 x 2.3 cm

The burial specimens have not been used and may not have been utilitarian tools at all. They are crafted with considerable skill. It is possible they were status emblems but it would take considerable analysis to prove this. The concretion from the house floor is unfinished. (A celt from a house floor has peck marks on three-fourths of its body; the edge and the adjacent tapering area is ground, however, suggesting that the craftsman either economized on time or that the pecked area provided an efficient hafting surface.) On the concretion the placement of the pecking indicates that a manufacturing stage was begun but not completed. The flaked edge was used probably for chopping, the level face was used for a function which left striae and later as an anvil.

Type 22: Large Ground Disk

(Plate 24)

Provenience: 9-MU-102 Structure 1

Specimens: 1

Material: amphibolite

Texture: medium-coarse

Tactile Element: smooth

Shape: flattened sphere

Size: 9.5 x 9.2 x 3.2 cm

General Description: A naturally dark stone which has been ground. Burning, possibly when the structure was destroyed, has left the stone with a thin coating of a black substance. While this specimen is about the size of a chunky stone, it does not have the typical shape of chunky stones: 1 level face and the other slightly convex. Both faces of this specimen are relatively level, except in 3 small sections where the surface is lower, almost beveled, adjacent to the circumference.

Use Area: The circumference, which appears ground, is battered in several places. Otherwise, it is hard to distinguish use marks because of the rock's color and the effects of burning. About a third of 1 face is uncoated, making this area slightly lighter than the rest of the surface. It is possible this area was protected and did not burn. Under high magnification (140-280x) differences in the surface cannot be distinguished. Striation is present on both faces. Yellow pigment is caught in crevices on the circumference.

Distinguishing Characteristics: This specimen has a diameter similar to the largest of the Type 17 polishing stones and the Type 24 lenticular stone, but this disk lacks the facet of the Type 17 specimen and does not have the flaked edge of the Type 24 stone. This disk also is harder than either of them.

Comment: This stone could be a mano. It was found on the edge of an area of intense activity and about a foot away from a Type 7 milling stone, two Type 11 anvils and a Type 20 hoe-like tool.

On the other hand, it is quite similar in size but not shape to chunky stones from B-FL-5 burials. If the existing battered areas on the circumference were ground smooth, with a motion perpendicular to the circumference, the resulting areas would look beveled.

Type 23: Straight-edge Tools

(Plate 25)

Provenience:	9-MU-102	Structure 4
	9-FL-5	Structure 14
Specimens:	2	
Material:	sandstone (second opinion, quartzite, and metagreywacke	
Shape:	rectangularish	
Size:	tool -	15.7 x 8 x 2 cm
	edge -	12.3 x .6-.9 cm
	tool -	8.9 x 8.6 x 6.9 cm
	edge -	8.6 x .6 cm

General Description: Thin stones, rectangular in outline, which have 2 broad faces. On each specimen 1 long narrow side has been flaked into a blunt edge. The larger tool is triangular in cross section; the smaller, tabular.

The smaller appears to be a broken tool which has been reworked. Both faces have been flaked to remove cortex adjacent to 3 of its sides; the fourth is the broken side.

Use Area: The used edge is blunted rather than fine and sharp. On the larger specimen use lines run both parallel and diagonal to the edge. They are not well defined and are difficult to see, under magnification. The blunted edge itself is covered with cuts aligned in the same direction as the edge.

On the smaller specimen, which is a harder material, lines are faintly visible under 30-40x magnification and they are both parallel and perpendicular to the edge. Not only is the edge blunted on this specimen, but the ridges where the cortex was flaked off are also rounded or worn smooth.

Distinguishing Characteristics: Thin rectangular tools with a long side flaked to produce a blunt, linear edge. Several other tool types ---19, 13, 20, 21, 23 and 24---also have edges but they are convex.

Comment: The larger specimen is a coarser grained material than the smaller tool and on the edge of the larger specimen the bigger grains have been worn away. (This was pointed out by a geologist.)

It is possible that these tools are saws, Semenov describes a saw as:

> "little sandstone or emery plaques with a sharp abrasive edge. These natural plaques have parallel lines of wear along their working edge and similar striations can be detected in the sawn grooves on the stones themselves. There are not teeth on stone saws, for the action of sawing is due to abrasive grains which scratch the rock, and when blunted fall out only to be replaced by the sharp particles behind them (Semenov 1965:71)."

Water was necessary for the sawing process.

The smaller tool may have broken while being prepared as a celt-like tool and afterwards was worked into its present form.

its entire edge.

Comment: The material of which this tool is made is so soft that anything cut or pounded with this tool also would have to be quite soft. However, it was found lying on a Type 26 specimen.

Type 24: Lenticular Stone

(Plate 26)

Provenience: 9-MU-102 Structure 4

Specimens: 1

Material: schist

Texture: coarse grained

Tactile Element: rough, somewhat scaly

Shape: lenticular

Size: 10.9 x 10 x 3 cm

General Description: This is a scaly, palm size stone with parallel sides. Three-fourths of its circumference has been flaked to an edge, while the remainder has been flaked to only a minor degree, leaving that portion blunt.

Use Area: Actual evidence for use on this specimen is faint. In 2 places the flaked edge shows slight signs of having been used; at 1, the ridge is slightly rounded and blunted.

Distinguishing Characteristics: This flattened sphere is flaked in a rough fashion to give it an edge around three-fourths of its perphery. A number of flattened spheres, or circular rocks with parallel faces, are found in this tool assemblage but only 2 have been flaked to an edge around their circumference. The other (Type 13) is smaller than Type 24, made of chert and flaked all over. It has peck marks around its entire edge. (Type 13)

Comment: The material of which this tool is made is so soft that anything cut or pounded with this tool also would have to be quite soft. However, it was found lying on a Type 26 specimen.

Type 25: Abraded Disk

(Plate 27)

Provenience: 9-MU-102 Structure 4

Specimen: 1

Material: gneiss

Texture: coarse grained

Tactile Element: coarse, slightly rough in the area of use

Shape: flattened sphere

Size: 6 x 5.8 x 2.5 cm

General Description: A palm-size ground disk which has been abraded on about a third of 1 face and the adjacent side, leaving the used area slightly lower and lighter in color than the rest of the surface.

Use Area: This specimen is a relatively soft rock and the use area is easily discernable. Wear has created minor ridges and grooves which run from the center toward the side of the disk. This can be seen without magnification; with magnification, random lines are visible. Grinding marks are present on the circumference. The face which is not worn so evenly, contains traces of wear; a section of its surface (across from the grinding area on the opposite face) is irregular from battering.

Distinguishing Characteristics: This disk resembles the disk in Type 22 most closely; they originally were grouped together. But this specimen is considerably softer and smaller than the Type 22 specimen, which also has a lighter area on one-third of one face. The Type 22 specimen has been ground so that battered places near or on its circumference have been smoothed away, giving it a scalloped look.

Comment: This specimen is approximately the size of large Type 17 polishing disks which have an edge facet. If this Type 25 disk were used for the same purpose as the Type 17 specimens either an edge facet would be present or it would seem the wear would be distributed more evenly on the face. It is possible that this specimen was carefully ground to produce an abrading tool which would offer a maximum amount of control for relatively delicate work, as modifying shell or bone. With only 1 specimen, however, function cannot be interpreted.

Type 26: End Battered Rollers

(Plate 28, Table 17)

Provenience: 9-MU-102 Structures 1, 4(2), 5(2)

Specimens: 5

Material: gneiss, metagreywacke

Texture: coarse grained

Tactile Element: smooth-rough, some specimens scaly

Shape: oblong

Size: largest 22.9 x 6.6 x 2 cm

smallest 15.5 x 7 x 5.8 cm

General Description: Long, narrow river-tumbled rocks which have 1 or both ends battered by use. Two also have large pieces broken laterally from a face near an end. Two (1 of which has the lateral break) have been abraded until the softer material has worn away leaving ridges of more durable material running parallel to the long axis. This may be naturally caused deterioration. All are from 9-MU-102.

Use Areas: One or both ends on these rollers are battered and spalled. While other scarring exists, it could be natural.

Distinguishing Characteristics: These rollers are naturally shaped rocks which are broken on at least 1 end. They are identical to Type 9 rollers, except they lack the small pits located close to an end.

Comment: These could be pestles. The lateral breaks may be the result of use, the same thing that produced the broken ends. In Structure 4, 2 of these rollers were located in the south central sector about a foot apart and the Type 24 lenticular stone was lying on top of one.

Type 26A: End Ground Roller

(Plate 29, Table 17)

Provenience: 9-MU-102 Structure 4

Specimen: 1

Material: gneiss or metagreywacke

Tactile Element: smooth, generally, with some long roughened areas

Shape: oblong

Size: 15.4 x 7.2 x 5.8 cm

General Characteristics: A long, narrow river-rolled rock similar to Type 26 specimens except this tool has been ground on the end rather than battered. Two areas, located along a side and 1 face, have been roughened either by natural forces or through use.

Use Area: One end has been flattened by grinding leaving a smooth oval pattern on this end. The battered areas are along a side and running lengthwise on 1 face. This wear is shallower on the side and under magnification (about 40x) small percussion-like pits can be seen. On the face the battering is deeper with higher ridges of harder materials remaining. Under similar magnification this area appears irregular and the depressions are not uniform and do not look like percussion pits.

Distinguishing Characteristics: This is a long, narrow rounded rock ground on one end, leaving a flat smooth oval impression. Had it a pecked depression near an end, it could be placed in Type 9. If it had a broken end, it would not be separated from other Type 26 specimens which all have broken ends.

Comment: What appears to be a separate wear pattern, an end ground flat and oval, may later when specimens are collected from other sites prove to be a stage in the use life of Type 26 tools. Two Type 9 specimens also from Structure 4 have this wear mark on an end. In addition, although the pecked depression located near an end is the identifying characteristic on these rollers, half of the Type 9 specimens have 1 broken end.

The irregular linear depressions found on the Type 26A tool may be a result of use but on this type of material it is difficult to distinguish natural battering which occurred in a stream from cultural wear. The material is composed of large grains which could be dislodged fairly easily, leaving an irregular pattern without many clues as to whether the cause were cultural or natural. If these depressions are not caused by nature, then the rollers from 9-MU-102 show 4 types of use:

1. pecked depressions located between the center and the end of the roller, an anvil type function;

2. broken ends probably resulting from percussion;

3. oval patterns on ends, which seem to be the result of grinding;

4. linear depressions which are the result of some type of battering.

Rollers are not found at 9-FL-5.

Table 17

Type 26, 26A. End battered, end ground rollers.

	MATERIAL									DIMENSIONS (IN CM)
	Gneiss	Metagreywacke	End Broken	Both Ends Broken	End Battered	Both Ends Battered	1 End Ground	Irregular Surface	1 Face Spalled	
St 1 741	x		x						x	16.9x8.2x6
St 4 1179		x	x					x		18.8x6.7x5
1443A	x		x					x		22.9x9 x6.6
St 5 1804		x	x							17.5x7 x2.4
N310 W630		x	x		x			x		18 x6.8x4.6
Type 26A St 4 1179		x					x	x		15.4x7.2x5.8 ground area: 3.8x2.8

Type 27 A, B, C, D: Pigments

(Plates 30, 31; Table 18)

Provenience:	9-MU-102	Structures 1 and 4, hematite and phyllite; Structure 5, phyllite
	9-FL-5	Structure 4, jasper and ochre concretions Structure 5, ochre concretion Structure 8, concretion cups (2), and iron Structure 9, hematite (2) Structure 14, concretion cup Structure 23, ochre concretion
Specimens:	20	

General Description: Raw pigments from Little Egypt and the King Site are found in several forms: as lumps, mixed with other material or contained within a concretion. Ochre most frequently is found within concretion cup-like formations. Hematite and iron occur as lumps, usually mixed with other material. One jasper concretion is faceted. Minor amounts of graphite are found within pieces of soft phyllite. Several of the stones containing pigments have been ground until they have smooth polished facets or have been scratched until smooth grooves developed. They look like tools.

Use Area: A--phyllite with graphite

Three specimens have facets which are the result of grinding, 2 have grooves. Of those with facets, 1 is long and tapers to a point as an awl. This specimen has a ground facet running its full length, the end is ground and in addition, diagonal cuts are found on 3 sides near this ground end. The second faceted specimen is a thin rectangle with rounded ends. One is beveled, the third is a blocky rectangular bar.

One of the grooved specimens is elongated, the other rectangular. The elongated specimen is broad at 1 end and narrow at the other. It has 2 broad, smooth grooves which are parallel to the long axis. These grooves measure 5.2 x .4 x .2 cm and 4.8 x .5 x .2 cm.

The other grooved item is covered with grooves, most of which are parallel to the long axis. The faces have been worn irregular by use.

B--jasper concretion

This concretion is blocky, a little longer than it is wide and its end has a smooth face ground on it and an adjacent faceted edge. Smaller facets are present and are striated.

C--Concretion Cups

The largest concretion has a relatively large depression pecked into it; the others are natural cup-like formations apparently broken open to expose pigment. Although 1 specimen is ground inside, generally few use marks are evident on these cups. Because of the probability of pigment, they were not washed carefully, however.

D--Hematite

The hematite rocks vary in size and coloring content. Several are faceted with grinding striations present, while others are ground so heavily even the marks are almost gone and the surface when magnified is full of holes where particles have been dislodged.

Distinguishing Characteristics: The presence of pigments in these stones is obvious--they will either mark white paper or can be scratched to produce powdery pigment. The exception is the concretion cups, which when whole probably held yellow ochre. They are distinguishable because they are naturally formed concretions broken open. The only tool type which even faintly resembles them are the pitted cobbles, Type 8, and they have ground faces with central ground depressions. Type 8 contain no concretions. Other concretions are used as hammers or anvils.

Comment: All the artifacts in this category probably served as sources of pigment. Although some look as if they were tools, they are either soft or leave color traces when scratched. Therefore, marks on these specimens can be explained as the results of getting pigments.

Phyllite from the Great Smoky Fault can contain graphite. The phyllite specimens from 9-MU-102 leave a mark on white paper but only 1 piece has an appreciable amount of graphite. Hally found graphite which scratched easily and produced a dark powdery pigment from the Barnett phase houses and earlier structures at Potts Tract, located about a mile from 9-MU-102 (Hally 1970:48). Jasper is a cryptocrystalline quartz, similar to chert and flint, which contains minute particles of hematite (Hamblin and Howard 1975:13). Weathered jasper can act as a pigment, as shown by the faceted jasper concretion. When scratched, it produced a red pigment. Most of the hematite pieces leave a red mark on paper, the exceptions are those stones where only a small amount of pigment is caught in crevices.

The concretion cups when scratched produce a yellow or reddish-brown pigment. In addition to enveloping pigment, the concretion cups probably served as pigment mortars. They are common at sites in the southwest. Historical accounts from the southeast, from DeSoto's expedition to the time of Cherokee removal, contain numerous references to the Indians' use of color, both pigments and dyes.

Some burials at 9-FL-5 contained pigments. The total included numerous lumps of red ochre, two concretion cups and 1 piece of ground phyllite. The cups were part of Burial 130. The more symmetrical specimen and a deer metatarsal which was shaped on 1 end were located at the skull. The second concretion cup was placed at the feet along with a flaked flint knife, 2 celt-like tools and a translucent quartz pebble. The deer bone had splotches of dark pigment, possibly hematite, and a waxy substance scattered over its surface.

The phyllite bar is ground.

Table 18

Type 27. Pigments.

	MATERIAL						FORM							DIMENSIONS (IN CM)	
	Chert Covered	Jasper	Phyllite (with graphite)	Hematite	Ochre	Lump-Mixed Material	In Concretion	Ground, Shaped	Contains Grooves	Contains Striation	Side Ground	End Ground	Contains Depression		
9-MU-102															
St 1 740				x		x								9.2x5.6x2.3	
776			x								x	x		4.2x2.9x1.8	
795			x						x	x				9.9x3.8x .8	
1031			x					x				x		6 x3.1x .7	
St 4 1665			x					x			x			10.8x1.7x1.1	
1687				x		x								9.5x6.2x1.5	
St 5 1974			x					x	x					11.1x3.2x2.4	
9-FL-5															
St 4 3201		x						x				x		4 x3.4x3.3	
3210	x				x		x							5.7x4.7x2.5	
St 5 2012	x						x							5.7x5 x1.6	
St 7 2623B				x						x	x	x			
St 8 1694	x				x		x						x	11.1x7.5x2.7	Pit 5.9x3.3x2.5
1734	x				x		x						x	8.3x6.4x2.8	Pit 2.8x2.4x1.9
2466				x		x				x	x	x		13.8x5.9x6.3	
2539				x		x				x	x	x			
St 9 1296A				x		x	x							4.4x3.5x2.7	
1296A				x		x	x							6.1x3.8x2.9	
St 14	x				x		x						x	10.7x8.9x4.7	Pit 4.4x4.4x1.5
St 23 2106	x			x			x							7.4x5.4x5.9	
? 3099				x		x									

Type 28: Cut and Ground Shale

(Plate 32, Table 19)

Provenience: 9-MU-102 Structures 1, 4

Shape: ovoid, round, rectangular

General Description: These are thin pieces of shale which have been ground into geometric shapes or drilled in small areas. One is a disk which broke on a line through 2 drill holes, leaving halves of the holes along the remaining edge of the disk.

Comment: This shale occurs naturally in the vicinity of 9-MU-102. Cressler (1974) describes it. It is glossy naturally and its colors include red, tan and green. Although easily broken, it is an attractive rock. The broken disk apparently was a pendant. The other specimens are less well defined as to purpose. These are socio-technic artifacts, as defined by Binford (1962).

Type 29: Possible Mano

(Plate 33)

Provenience: 9-MU-102 Structure 4

Specimens: 1

Material: quartz

Tactile Element: smooth except for one side; surface greasy prior to washing

Shape: flattened oval

Size: 16 x 8.1 x 3.6 cm

General Description: This rock is a flattened oval with a bumpy looking surface---like an orange---but is smooth to the touch. It was the only specimen in the entire study population which felt greasy all over. Slight battering showed along an edge.

In an effort to determine if the greasy feel was a surface condition, the specimen was washed thoroughly on a third of a face with the irregular side serving as the focus of the scrubbing area. The side and adjacent portion of the face lost the greasy feel and dark brown color. The battered side also became rougher to the touch.

Use Area: The pecked area covers about two-thirds of 1 side. Other than this, it is difficult to discern use patterns. A few striations can be seen under 60x magnification. The 2 faces of the rock have individual pits spread over them, but these may be the result of natural forces.

Comment: This specimen was found stacked on top of two Type 7 milling stones and may have been used in processing food. This rock is coated with a greasy substance which may be animal or vegetable fat. Numerous references exist in southeastern historical accounts of both the quality and use of bear grease and hickory nut oil for cooking. Other fatty foods include racoon, possum, sunflower seeds and numerous nuts such as acorn are listed by Hudson (1976) as common subsistence items for southeastern Indians.

The coating on the rock cannot be detected visually.

Table 19

Type 28. Cut and ground shale.

Non Utilitarian

9-MU-102		Shale	Chert	Soapstone	Siltstone	Ground	Drilled	Flaked	Broken	Notched	SIZE
St 1	742			x	x		x		x		2.1 x 1.3 x 1.3 cm diameter of hole 1.8
	776	x				x			x		6.7 x 6.4 x .5 cm
	1044	x					x		x		5.1 x 3.6 x .3 cm
	1079	x							x		4.9 x 2.2 x .3 cm
St 4	1266B				x						13.7 x 8.9 x 1.1 cm
	1443A		x			x					3.9 x 1.4 x .8 cm
	1578	x					x				9.5 x 4.8 x .3 cm
	1578A	x								x	14.7 x 8.2 x 1 cm
	1663	x					x		x		3.3 x 2 x .2 cm
	1703C	x					x	x			11.6 x 7.9 x .8 cm
	1709	x					x		x		3.9 x 2.1 x .3 cm
	1716B	x				x	x		x		3.9 x 3.6 x .4 cm

Tool Types in 9-FL-5 Burials

Of the following 4 tool types, 30 and 31 are found both in structures at 9-FL-5 and in burials from this site, but are best represented by burial specimens. Types 33 and 34 are found only in 9-FL-5 burials. These types are followed by brief descriptions of burial tools which are found on house floors also.

Type 30-Burial: Possible Wood Working Tool
(Plate 34)

Specimens:	2 in burials
Material:	quartzite
Shape:	sub-cylindrical
Size:	12.2 x 2.8 x 2.7 cm
	9.9 x 2.6 x 1.9 cm (broken on one end)

General Description: These tools are long, narrow and rounded and 1 specimen has been ground flat on 1 side. Polls are damaged, showing signs of heavy force. The opposite end on 1 specimen tapers to a thin, sharp edge but on the tool which is broken the opposite end expands.

Use Area: Polls are battered or broken. On the whole specimen the cutting edge is sharp and relatively undamaged, showing only a small nick on 1 corner. The broken specimen may have had a completely different end opposite its narrow poll. Use marks are most distinctive on the whole specimen where 2 types of marks are found on the body: long thin lines which run generally parallel to the long axis and a series of short, wider marks incised perpendicular to the long axis. These wider marks are about 1 cm apart and are particularly visible on the level face. These marks are 1.5 -.5 cm long and about .1 cm wide and were made after the long thin lines. Similar marks appear faintly on the broken specimen.

Distinguishing Characteristics: While this tool has a poll and a thin sharp edge --on the whole specimen-- as do celts, it differs from them in form and in use marks. Celts are more nearly rectangular and generally have parallel faces. Celts usually have a cutting edge wider than the edge on this tool but this is not always the case. Celts do not have incisions from wear aligned parallel to the edge, extending from edge to poll.

Comment: One similar tool from a structure at 9-FL-5 appears to be a reworked portion from the cutting end of a broken adze. In cross section, the body tends to be rounded except for a level face. Faint lines run parallel to the edge but the more obvious lines are diagonal and perpendicular to it. The poll is broken off of this specimen also and its edge has been battered considerably, especially on the portion adjacent to the level face. Since this specimen is broken, its length cannot be determined; other dimensions are similar to those of the burial specimens: 2.7 x 2.1 cm. Both the specimen from the structure floor and the unbroken burial tool have areas polished by use.

These tools probably are wood working tools, possibly multipurpose tools. The small blade suggests fine or specialized work.

In the Hiwassee Island report, 4 tools are illustrated as chisels. They are long, slender, rounded and at least 2 have a level face. One specimen has 7 widely spaced short marks aligned parallel to the blade. These marks extend almost to the poll and are clearly visible in the photograph (Lewis and Kneberg 1970: Plate 70).

Type 31-Burial: Multi-Purpose Flat Stones
(Plate 35, Table 20, 21)

Specimens:	17
Material:	quartzite, chert, vein quartz
Shape:	thin flattened ovals
Size:	largest 10.7 x 3 x 1.2 cm
	smallest 7.4 x 4.4 x 1.3 cm

General Description: Thin, naturally flattened ovals with broad parallel faces. A specimen may have as many as 5 different uses indicated by modifications or wear traces. These specimens all appear to be concretions, although some have been identified as vein quartz. While these specimens resemble Type 16 striated concretions found on structure floors (both have wispy lines) the burial tools have a wider variety of additional wear features. Ten attributes related to use are present. The burial specimens have been used as anvils, hammers, chopping implements and abraders. One has the ground cutting edge of a celt; 3 have flaked chopping edges. Another specimen has been shaped by grinding on its circumference. Half the specimens have anvil marks, almost all have battered edges. One is unused.

Use Area: Four types of lines and 2 types of anvil marks are present. The lines are: wispy and curving slightly, placed near an end; long straight lines running lengthwise in the center of the concretion; short straight marks running crosswise on an end, and randomly placed short straight lines. Most are fairly shallow and thin. Some are visible only with magnification.

Anvil marks are mostly minute holes usually located near an end; sometimes wispy lines lie over these marks. One specimen has in addition to these anvil marks a cluster of Type 16 marks located close to the center of the specimen.

One stone has no traces of use. Another has only short straight lines near the ends on both faces. All the others have battered edges and either wispy or random lines. Except for the random lines, the use marks usually show a patterning in their placement.

One specimen, which has been shaped by grinding on part of its circumference, has a groove, in addition to wispy and random lines. The use patterns are presented in Table 20.

Distinctive Characteristics: These burial tools combine some of the features of Type 13 (from structures) such as battering on the circumference, and Type 16 (from structures)wispy lines and anvil marks. About half of Type 13 specimens are concretions but they are thicker and rounder than the burial tools. Type 16 concretions do not exhibit the wide range of use traces found in the burial type. Type 16 specimens vary in form and include rounded and dumbbell-shaped specimens.

Comment: One concretion from the house floors (Structure 8) belongs to the burial type. This siltstone concretion measures 7.5 x 4.8 x 1.3 cm (almost identical to the smallest burial specimen). It is ground

Table 20

Use patterns on Type 31-Burial tools.

Use Patterns

Lines:	Short Straight Only	Wispy Only	Short Random Only	Wispy + Random	Long Straight + Random
	1	6	3	4*	2

*one has a groove in addition

Anvil marks:	Minute	Type 16 + minute
	9	1

Side Battering

Worked edges:	Battered	Battering + Flaked Edge	Battering + Celt Edge
	14	3	1

on its circumference and is oval in outline. Its faces contain random short lines and on 1 face it has minute anvil marks. The circumference has been battered.

Burials with these multi-purpose stones always contain hammerstones and chert. Frequently pieces of sandstone and occasionally beaver incisors are included. These seem to be the basic components for specialized tool kits.

Table 21

Type 31-Burials. Multipurpose flat stones.

9-FL-5	Quartzite	Chert	Quartz	Oval	Rectangular	Unused	Groove	1 Face	2 Faces	Edge	Center	Pecked 1 Edge	2 Edges	1 Face	2 Faces	Ground Edge	Ground Blade	Flaked Edge	Random Edge Flaking	Unshaped Stone	Shaped Stone	Size	Use Areas
15				x				x												x		8.2x4.6x1.1	2.7x .5 cm striation
34	x				x				x	x			x		x		x				x	7.5x4.8x1.5	6.6x1.8 cm striation 3.5x1.1 cm striation 1 x .9, 6.6x1, 6.6x1.8 pecking
34	x				x				x	x			x		x						x	7.8x4.5x1.5	3.2x2 cm, 2.9x.9 cm striation 3.2x2, 1.3x2.8, 2.9x.6 pecking
49				x					x	x	x		x	x						x		7.4x4.4x1.3	6.1x3.8 cm opposite 4.2x.4 cm, 3.8x.4 cm edge
81-82		x		x				x						x						x		10.2x4.9x1.2	5 x2.6 striation 3.4x1.6 pecking
81-82	x			x											x					x		9.4x5.3x1.2	2.2x3.2, 4.3x.5, 3.8x2.7 cm, 6.8x.4, 2.2x3.2 cm pecking
81-82		x							x			x								x		11.5x4.5x1.3	8.9x2.4, 7.5x3.9 cm striation 3.1x.2 pecking
81-82		x		x				x												x			
81-82		x				x																8.8x4.9x1.3	
81-82		x		x		x		x				x								x		10.7x3 x1.2	2.3x2.2 striation
92	x								x										x	x		9.2x5 x1.4	3.6x3.2 5.6x2.8
101	x			x					x	x	x									x		8.6x3.5x1.1	all one face 5.6x2.2, 3.8x2.2 striation
103	x			x					x										x	x		9.3x4.9x1.2	4.6x1.5 5 x2.5
117	x			x			x									x						9.1x5.7x1.4	2.8x .5 pecking 6.3x .8 pecking
117			x	x										x						x		7.8x5.8x1.4	2.6x1.8 pecking
124	x								x	x	x				x			x			x	10.7x5.3x2	striation: 8.1x3.1, 6 x3.1 pecking: 3.2x1.9, 2.9x .5, 3.4x .8, 3.5x2.4
135	x			x					x			x						x		x		9.6x6 x1.8	8.5x4.1, 6.9x5.7 striation 3.1x1.2, 2.2x .6 pecked

Type 32-Burials: Round Concretion Hammerstones

(Plate 36)

Specimens: 9

Material: chert, quartzite

Shape: round, some with a projecting knob

Size: tool - largest 5.9 x 5.8 x 4.9 cm

smallest 3.9 x 3.9 x 2.9 cm

use area - entire surface on one specimen

3.3 x .4 cm minimum

General Description: Round concretions, occasionally with a knob, which have been used on their circumferences for hammering. Short lines also may be present, frequently extending beyond the circumference. Most of these specimens are small.

Use Area: Pits and irregular surface breaks are found around the entire circumference on many of these concretions, extending to the top and bottom of the specimens in some cases. A few are hardly used. The knobs contain pits and some have areas where pieces have been spalled off. The lines are randomly placed and only occasionally are parallel. Without magnification the pits look like small circular holes; with 10x or more, they emerge as multiple irregular depressions such as round, crescent and triangular which frequently overlap. Sometimes the circumference on the concretions is naturally irregular and the pits add to the battered look.

Distinguishing Characteristics: From the burials, the only similar tools are oval concretions which have been used on the circumference near the ends, as Type 14 tools from the house floors. From the structures Type 12 hammerstones are either larger/different in form: The only circular specimen in this type is larger, not a concretion and pitted all over. Almost half of Type 13 from structures are concretions which are large flattened ovals. They have battering around their circumferences. Type 14 has 2 concretions from the structures--1 oval, 1 flattened oval—with percussion marks near an end.

Comment: The rounded, sometimes knobby, concretions are restricted to 9-FL-5 burials and do not have a general distribution. Usually they accompany ground sandstone abraders, striated flat concretions, worked and unworked, chert, and sometimes beaver incisors.

These seem to be specialized hammerstones, possibly status/craft related.

Type 33-Burials: Ground Disks - Chunky Stones

(Plate 38)

Specimens: 6

Burials: 9-FL-5 101-(2); 40-(2); 15-(1)

Material: diabase, gneiss, limestone, siltstone, quartzite

Shape: round in outline, one face flat, other slightly convex

Size: largest 9.4 x 9.2 x 3.2 cm

smallest 4.6 x 4.6 x 2 cm

General Description: Finely ground disks, generally uniform in size, with 1 level face and the other slightly convex. Two of the burials each contained 2 chunky stones which were almost identical in size but not material. Two measured 9.4 x 9.3 x 3.9 cm and 9.4 x 9.2 x 3.2 cm (Burial 101). Three of these are made from non-durable material and either flake easily or leave powdery marks to the touch.

Use Area: The 3 specimens of harder stone have been ground so smoothly that grinding marks are barely discernable. Random marks are present, lying over the grinding in random fashion except on the circumference with some oriented across it. These lines are irregular in form and generally are wider than marks on the faces. Pits are found along the circumference also.

Two specimens have broken areas on their level faces adjacent to the sides. On 1 stone these marks have been ground smooth, on the other they have not been retouched.

Distinguishing Characteristics: Chunky stones resemble polishing disks, but generally the chunkys are larger and have both a level and convex face. The polishing disks have either a beveled edge facet or a face ground extremely smooth from wear.

Comment: The chunky game is described in several 17th century accounts. Adair, in his discussion, said that the stones were cared for by generation to generation as a possession of the entire village and that the stones were exempted from being included in burials (Williams 1930).

No chunky stones were found in structures at 9-FL-5. None were present at 9-MU-102. The one possible exception to this is the Type 25 specimen from Structure 1 at 9-MU-102. In size, 9.5 x 9.2 x 3.2 cm, it is almost identical to the 2 specimens from Burial 101 which measure 9.4 x 9.3 x 3.9 cm and 9.4 x 9.2 x 3.2 cm. However, the Type 25 specimen has 2 level faces and is rounded where the side and faces join.

Tools Found in Structures and Burials

The remaining specimens from burials fall into categories established for tools from structure floors. Therefore, the numbering will be the same. Descriptions will not be given unless the burial specimens differ enough to warrant special attention.

Type 2-Burials: Abraders with Ground Hollows

(Plate 37)

Specimens: 10

Material: sandstone

Texture: moderately fine to coarse grained

Shape: rectangular, ovoid, irregular

Size: tool - largest 11.2 x 6.3 x 5 cm

smallest 2.6 x 2.5 x 1.5 cm

grooves - largest 9.9 x 4 x .8 cm

smallest 2.5 x 2.4 x .4 cm

General Descriptions of Variations:

One tool has 5 depressions ground into it. This is an elongated, irregular shaped specimen with 4 sides. Three sides each have a depression; the fourth side is convex and contains a depression above and below the curve. These depressions range from 5.9 x 3.5 x .5 cm - 3.4 x 2.8 x .5 cm.

Another specimen (Plate 38), ground all over, contains a series of grooves which range in size from 9.5 x 4 x .8 cm - 6.1 x .5 x .3 cm.

Type 14 Burials: Edge Percussion Tools

Specimens: 2

Material: chert, quartzite

Texture: fine grained

Shape: oval

Size: tool - largest 7.1 x 4.8 x 3.4 cm

smallest 6.7 x 3.9 x 3.3 cm

use area - largest 3.4 x 1.9 cm

smallest 1.2 x 1.4 cm

Type 17 Burials: Polishing Disks

Specimens: 2

Material: 1 quartzite, 1

Shape: flattened spheres, 1 smooth face

Size: 5.8 x 5.6 x 2.2 cm

4.6 x 4.6 x 2 cm

Neither burial disk had edge facets.

Type 19-Burials: Celts

Specimens: 6

Material: quartzite, diabase

Shape: sub-rectangular

Size: largest 17.1 x 6.6 x 2.1 cm

smallest 9.8 x 4.9 x 1.7 cm

General Description of Variations: Four of the 6 appear to be unused. They are the longer specimens ranging from 12.1 to 17.1 cm in length. One has peck marks over much of its surface and the poll and cutting edge have been roughed in but not finished. Another, with a curving body instead of level parallel faces, also has a poll so narrow that with a cursory glance it appears to have 2 cutting edges.

The specimens which appear to have been used measure 10.4 x 5.5 x 3.1 cm and 9.8 x 4.9 x 1.7 cm.

Type 21-Burials: Spatulate Celts

Specimens: 2

Material: siltstone, sandstone

Texture: very fine to fine grained

Tactile Element: one smoothed and polished, one slightly grainy

Shape: broad rounded blades with long wide stems

Size: 14.5 x 11 x 1.5 cm

13.4 x 10 x 2.3 cm

General Description: These specimens are fairly uniform in size and have a wide rounded blade with a cutting edge and a long stem which is narrower than the blade. They are thin, ground and fairly uniform in size. One is so finely crafted and polished that manufacturing marks show only on top of the stem. The other has a slightly unfinished look although the cutting edge is well ground. The finely crafted specimen has a squared stem, the other a rounded one.

Use Area: These items are unused.

Distinguishing Characteristics: These finely ground implements have a broad convex cutting edge and are stemmed. Celts are the only other ground tools with cutting edges in this study group; the celts however are sub-rectangular and have a poll on the opposite end. In basic features, stem and curved blade, the spatulate celts resemble Type 20 hoe-like implements. These however have blunted edges. The one specimen from the structure floors which may be related to the spatulate celts is the Type 21 pecked and flaked concretion. Although used as a chopping tool and an anvil, it is covered with manufacturing marks and appears to be an unfinished tool with the general shape of a spatulate celt. It is similar in length and width, but thicker. It measures 14.4 x 11.6 x 3.3 cm.

Limestone

One major feature from 9-MU-102 has not been discussed and while it is a resource rather than a tool type, to ignore it would be to distort the picture. Some limestone, 6 unshaped pieces and 2 disks, comes from 9-FL-5 structure floors, but the largest amount is from 9-MU-102. More than 60 pieces, ranging from .5 - 50 cm in length are present; some are shaped but weathering has taken its toll and frequently it is difficult to be sure that a piece has been worked. The material is soft and powdery. Five disks are present at 9-MU-102. One burial at 9-FL-5 contains a weathered object which seems to be a knife. Hally (1976) reports a limestone hoe from 9-MU-102.

The limestone is so fine grained that one geologist referred to it as mudstone.

So much is present in the structures at 9-MU-102 it seems reasonable to assume the inhabitants were using the limestone, which would be available close by.

Miscellaneous

A broken stem of a soapstone pipe was found in Structure 1 at 9-MU-102. It has fine bands of lines encircling the mouth piece and is well ground.

A hollow concretion shaped like an O was found at the same site in Structure 4. The concretion contained a hard crust and a powdery interior before it was broken open and fashioned into a thin oval (Robert Carver, personal communication).

These also are socio-technic artifacts as defined by Binford (1962).

Discards

The discarded rocks fall into these categories:

1. those which may have been tools but for which proof is lacking
2. fragments of larger rocks which probably were used and were broken when the structures burned
3. seemingly random fragments, some fire broken and some not, which were not removed from storage trays; this is a small group
4. river gravel which does not show signs of use.

Some of the possible tools are worth mentioning. Possible milling stones: From 9-MU-102, Structure 2 (which was not used in the analysis), a large rectangular quartzite stone was found. It measured 22.5 x 19 x 8.5 cm, similar to some of the oversize milling stones. This specimen was broken by fire; after it was reassembled some of the thin naturally polished outer layer was intact, but much was missing. No obvious striation or wear path could be detected.

Several smaller fragments of other possible milling stones, from both 9-MU-102 and 9-FL-5, were among the discards: They measure from 10.5 x 4.5 x 5 to 7.5 x 6 x 3 cm. Numerous parts of at least 3 large stones which may also have been milling stones also are among the discards.

Pitted stones, Types 8, 9, 10: Four possible pitted stones are in the discards: Type 8, 1 from 9-FL-5; Type 9, an amphibolite specimen from 9-FL-5 (the stone is not found there) and 1 from 9-MU-102 and 1 Type 11 from 9-MU-102.

Possible Type 12: Fifteen cobbles fall into this category; 3 are large and have 1 or both ends broken, but there is no evidence to indicate how they were broken. They measure between 15 x 10 x 5.8 cm and 11 x 8.4 x 3.9 cm.

Concretions: 10 broken, 6 whole (these are chert) and 1 of siltstone. One chert concretion, broken in half exposing concentric bands of color on the broken end, may have been a rubbing implement.

Possible hoes: 2 thin, flaked specimens from 9-MU-102, may be hoes; the surface of these rocks are scaly and does not show use, partly because of weathering. Flaking is evident.

Possible Type 11: 2 large rounded cobbles which contain a few peck marks in the center of slightly convex faces are in the discards.

Three large quartz cobbles, which look slightly rubbed and faintly battered as well as 2 large chert cobbles with both ends broken off are in the discarded group; also present are 3 narrower rectangular quartz rocks which show no specific use marks.

Two broken rocks similar to Type 26 specimens are present but if these were used similarly the use marks are on the missing parts; 1 of these specimens is from 9-FL-5, the other from 9-MU-102.

The discards also include 2 possible manos, a small round concretion from 9-MU-102, and 1 small thin flat round rock which has a wedge broken out of it and 1 edge of a broken side has been beveled as if it had been used for sharpening.

The rest of the discards are, generally, debris which accumulated through the years; some may have been raw material, intended for use. Fire cracked hearth rocks, typical of Woodland period sites, are not found in Mississippian structures where clay hearths are used.

Chapter VI

COMPARING THE FINDINGS

A total of 280 non-flaked artifacts from Little Egypt and the King Site have been classified into 33 artifact types. Of the total specimens, 56 are from burials at the King Site and were included in the typological analysis to increase the size of the sample. It is evident from the descriptions of the burial artifacts in Chapter V that they fall within the same categories as the artifacts from structures. Thirty-one of the artifact types, accounting for 239 specimens, are tools. The remaining types account for 41 specimens and include pigments, worked shale, chunky stones and a piece of soapstone pipe. While obviously not tools, these are non-flaked stone items and were included in the typological analysis.

The following inter-site comparisons deal primarily with tools from structure floors. Non-tool artifacts and burial artifacts are brought into the analysis at appropriate places to add weight or clarification, and this is done mainly in Chapter VII.

Sample Adequacy

It is assumed that the non-flaked tools analyzed constitute a representative sample from domestic structures at each site. This assumption may not be justified. There is no certainty that a total range of domestic activities is represented in any single structure. The archaeological evidence indicates that identical activities were not conducted in each household. Tables 22 and 23 indicate considerable variation in the kinds of tool types and the numbers of specimens represented in each structure.

If this is the case, the more structures analyzed from a site the more likely that the combined collection of tools will cover the full range of household activities at that site. Tools are derived from 6 structures at the King Site and only 3 at Little Egypt. One of the latter, because of its location and architectural features, may not be a typical domestic structure. It seems therefore that the representativeness of the non-flaked tool assemblage from Little Egypt is questionable.

Summary of Findings

At Little Egypt 27 tool types are represented by 96 specimens. At the King Site, 20 tool types are represented by 88 specimens.

Table 22 lists the tool types and the number of specimens found in each structure at the 2 sites. Percentages that each type represent from the total tool collection at each site are given. The important information can be summarized as follows:

1. Sixteen tool types are shared by each site. They are Types 1, 2, 3, 5, 6A, 7, 8, 10, 11, 12, 13, 14, 16, 17, 19 and 23.

2. No single tool type was found in all structures at both sites. Five were found however in all 3 structures at Little Egypt. One was found in all structures at the King Site. The 5 found in all Little Egypt structures are 1, 9, 11, 12 and 26; Types 9 and 26 are not found at the King Site. Type 2 was found in all structures at the King Site and in one structure at Little Egypt.

Table 22

Tool type frequency by structures at Little Egypt and the King Site.

	Type	Little Egypt Structures 1	4	5	Total	King Site Structures 4	5/10	7	8	9	14	23	Total
grooved abraders	1	1	1	2	4	3				1			4
abraders with ground hollows	2		2		2	2	1	2	1	2	1	2	11
sandstone tablets	3		1		1				4	1	2	1	8
small stone with depression	4								1				1
stones with ground channels	5		2		2				1				1
basin milling stones	6A	1	2		3	1				1			2
oversize milling stones	6B			3	3								
flat milling stones	7	5	5		10			1					1
pitted cobbles	8	2	2		4	1			2		1		4
pitted rollers	9	4	6	2	12								
ground stones with depressions	10		2		2					1			1
random anvils	11	4	3	3	10	4	1	6	7			2	20
hammerstones	12	3	4	3	10				1	1		1	3
edge percussion tools	13		2	1	3	1		1	3		1	2	8
convex edge percussion tools	14	1	2		3			1	2			1	4
beveled edge abraders	15		2		2								
striated concretion	16		1		1				2		3	2	7
polishing disks	17	2	3		5		1		3	1		1	6
ground pebble	18			1	1								
celts	19		3	1	4	1	1					1	3
hoe-like tools	20	3			3								
pecked and flaked concretion	21					1							1
large ground disk	22	1			1								
straight-edge tools	23		1		1					1			1
lenticular stone	24		1		1								
abraded disk	25		1		1								
end battered rollers	26	1	2	2	5								
end ground roller	26A		1		1								
possible mano	29		1		1								
wood working tool	30										1		1
multi-purpose flat stones	31							1					1
Total					96								88

*Type 27 (pigments) and Type 28 (ground shale) are not included here; neither are Types 32 (concretion hammerstones) and Type 33 (chunky stones), found only in 9-FL-5 burials.

Table 23

Tool type frequency by structure.

9-MU-102
27 tool types present at site

St. 1	
#tools	28
#types	12
%types	44%
St. 4	
#tools	50
#types	23
%types	85%
St. 5	
#tools	18
#types	9
%types	33%

9-FL-5
20 tool types present at site

St. 4	
#tools	14
#types	8
%types	40%
St. 5/10 skewed by pot hunters	
#tools	4
#types	4
%types	20%
St. 7	
#tools	12
#types	6
%types	30%
St. 8	
#tools	27
#types	11
%types	55%
St. 9	
#tools	9
#types	8
%types	40%
St. 14	
#tools	9
#types	6
%types	30%
St. 23	
#tools	13
#types	9
%types	45%

3. Eleven tool types are found only at Little Egypt. Six of these are represented by only a single specimen and as such may be associated with activities which were not common. Their absence in the King Site assemblage could therefore be due to sampling error.

4. Four tool types are represented at the King Site and not at Little Egypt. Only 1 specimen of each tool was present. These tools may be associated with uncommon activities and their absence from Little Egypt could be due to sampling error.

5. More tool types were present at Little Egypt than at the King Site, 27 as compared to 20. Yet only half as many structures were excavated at Little Egypt as were excavated at the King Site. If the range of activities varied somewhat from household to household as suggested earlier in this chapter it might be expected that fewer tool types would be represented from Little Egypt than from the King Site. This is not the case. A much wider range of activities is suggested therefore for households at Little Egypt.

To summarize the findings, half of the tool types were shared by both sites. Of the other half, more variety was evident at Little Egypt. Even allowing for probable sampling error, rather striking differences are evident. Tentative hypotheses will be suggested next which could account for some of the differences.

Chapter VII

EXPLAINING THE DIFFERENCES

The previous chapter has shown that the non-flaked tool assemblages from the 2 sites are not the same. Only half the tool types are found at both sites. Although fewer houses were analyzed, the Little Egypt tool assemblage is larger and has more variety in the tool types. In this section, several hypotheses that may account for some or all of this variation will be suggested.

Four hypotheses can reasonably be considered to explain the differences in these assemblages. These hypotheses are:

1. The difference in the 2 non-flaked stone assemblages is caused by the sites having access to different geological raw materials for tools. One village chose certain rocks not readily available to the other site for the technological advantages these rocks offered.

2. The difference in the tool assemblages reflects differences in subsistence activities resulting from distinct environmental differences occurring at the 2 sites.

3. The difference in the non-flaked tool assemblages reflects the different rolls of the 2 sites within the same or similar socio-political system.

4. Differences in available minerals, subsistence activities and the place of the sites within their socio-political system all

affected the tool assemblages to some degree.

In considering these hypotheses 2 assumptions must be made: the tools analyzed from each site are representative of the tools used at their site and the tool types designated in this study do represent functionally different tools.

First Hypothesis: Rock and Mineral Resources

The first hypothesis suggests that the 2 sites had different minerals and rocks available and that 1 village chose materials--which were not readily available to the other--for the technological advantage these rocks offered. If this is accurate these implications should be reflected by these conditions:

1. Different rocks and minerals are available to the 2 sites.

2. For a number of tool types the characteristics of the raw material will not be critical and therefore the tool can be made from a wide variety of materials. In the archaeological record evidence of this will take the form of shared tool types being made of locally available materials.

3. Some material is critical for the proper functioning of certain tools. If this material is not available locally, the inhabitants of each site have 2 potential responses: import the necessary raw material or do without the tool type. In the archaeological record evidence of this situation would take the form of, respectively,

a. shared tool types made out of non-local material and

b. absence of the tool type altogether from the site lacking the necessary material.

Before this hypothesis can be evaluated, it must first be shown that a difference exists in the available lithic resources. To do this the catchment area for each site---the zone of resources available within reasonable walking distance---will be presented. A brief description of geological terminology is presented first as an introduction.

Rocks are composed of minerals which are elements united in nature to form inorganic crystalline solids having specific internal structure. Minerals also have definite chemical composition which varies only within certain limits and therefore each mineral species possesses specific physical properties (Hamlin and Howard 1975). Rocks are classified into 3 major groups: sedimentary, metamorphic and igneous.

Sedimentary Rocks

Sedimentary rocks are made of debris eroded from other rocks and deposited in a basin where it is compacted and cemented into solid rock. Delicate mechanical and chemical sorting of the parent material, referred to as sedimentary differentiation, concentrates materials similar in size, shape and composition into separate deposits which are specific sedimentary environments reflecting the mechanical energy operating at the time of deposition. For example, calcium carbonate generally will be dissolved and precipitated in shallow water free from sand and mud (Hamlin and Howard 1975:35).

Most sedimentary rocks are composed of quartz, calcite, clay and rock fragments, materials which are abundant in other rocks and are stable at surface temperature and pressure. Quartz, one of the most common minerals in the earth's crust, is extremely hard, resistant and chemically stable. It is deposited as sand after less stable material which accompanies it disintegrates. Calcite, a common cementing agent in sands and shales, is the major component of limestone. Calcite, derived as calcium from igneous rocks with a high content of calcium-bearing minerals, is either precipitated in mineral form or is extracted from sea water by organisms and concentrated as shell. Fine grained clay minerals result from the weathering of silicates, particularly feldspars which are abundant and weather easily. Clays tend to concentrate in mud and shale.

The most significant structural feature in identifying sedimentary rocks is layering, which ranges from less than an inch to hundreds of feet thick. Clastic sedimentary rocks, fragments of pre-existing rocks, are conglomerates and breccia, largest in texture; quartz, sandstone, akrose and greywacke, medium texture; siltstone and shale, fine textured.

Crystalline chemical precipitates, grown from chemical solution and oolitic skeletal remains, are (ranging from coarse to fine grained) crystalline limestone, micrite, oolitic limestone, coquina, fossiliferous limestone, chalk, travertine and dolomite, followed by the chalcedonys: chert, flint and jasper.

Metamorphic Rocks

Metamorphic rocks are primarily sedimentary rocks which have been changed fundamentally by heat, pressure and the chemical actions of fluids and gasses. All rocks may be metamorphosed but sedimentary rocks are more susceptible to this process. Metamorphic change produces chemical recombination and growth of new minerals, deformation and movement of the existing mineral grains and recrystallization of minerals into larger grains. The new rocks are harder, have greater crystallinity and contain structural clues to their deformation (Hamlin and Howard 1975). Metamorphic rocks are either foliated or appear structureless. Foliated metamorphic rocks, which contain a plane-type structure, are gneiss (coarsest), schist, phyllite and slate (finest). Non-foliated rocks usually have only one mineral with elongated grains or linear features and these rocks are metaconglomerate, quartzite and marble (Hamlin and Howard 1975:51-57).

Igneous Rocks

Igneous rocks solidified from hot melted material. Dark magmas (rich in iron, magnesium and calcium) produce dark olivine, pyroxene, amphibole and calcium plagioclase. This magma is called mafic. Magmas rich in silica and aluminum are called sialic and produce quartz, potassium feldspar and sodium plagioclase, which generally make lighter rocks.

Regional Geological Formations

The Ridge and Valley Province developed as a sedimentary area between 500-300 million years ago (Cambrian-Pennsylvanian periods) when covered by shallow sea water. The rocks which formed include the chalcedonys, sandstone, siltstone, shale and limestones. Quartzite, a product of quartz sand grains fused by heat and pressure, also is present.

By 500 million years ago, the Piedmont Province had already begun to form. Its rocks are metamorphic and igneous. They include gneiss schist, phyllite, slate, quartzite, amphibolite, mafic and ultramafics.

The King Site is located well within the Ridge and Valley Province surrounded by sedimentary deposits. It is 20 mi south to the Great Smoky Fault and the Piedmont Province. Little Egypt is located where the Ridge and Valley and the Piedmont meet. At this gross level of comparison it is obvious that different rocks and minerals are available at each site. The lithic catchment area for each site will be defined, identifying the rocks and minerals present within a 5 mi radius of each site, affording a more critical view of the differences in resources.

Charles Cressler of the United States Geological Survey has published detailed accounts (1970, 1974) of the geology and ground water of 5 counties in northwest Georgia which include Murray and Floyd Counties, the counties where Little Egypt and the King Site (respectively) are located. The survey which includes Floyd County is somewhat more detailed. The Geologic Map of Georgia will be used for that part of the catchment areas which extends beyond Cressler's work area, primarily to identify resources in the Piedmont. Both the geologic map and Cressler's detailed county survey correlate perfectly.

Modification of Catchment Area

The catchment areas for the 2 sites were drawn on 3 different map series for the purpose of this analysis: United States Geological

Survey topographic quadrants for the vegetation tabulation; for lithics the 1976 Geologic Map of Georgia and Cressler's geologic maps which accompany his reports for Floyd and Murray Counties. The sites are used as the center points and 5 concentric circles, 1 mi apart, were drawn around the site. While Jarman, Vita-Finzi and Higgs (1972) used 5 km, the distance did not seem far enough and therefore has been increased to 5 mi.

Catchment Zone for Lithics: The King Site

The Conasauga Formation (Middle and Late Cambrian) is a long, relatively thin component of the Great Valley. Cressler points out that the formation is complex, and he distinguishes eastern and western belts for Floyd County. The western belt has 3 units and the upper unit, where the King Site is located, abuts the south edge of the Armuchee Ridges.

The site is located about 5 mi south of the ridges (Figure 6). Here the Conasauga is mainly silty shale which contains bands of a clay shale. Both of these shales contain "chert like siliceous nodules up to about 8 in across" that resemble stream gravel and collect on the ground surface (Cressler 1970:12). About a mile and a half northwest of the site the shale contains thin (1-4 in) scattered lower layers of siltstone and fine grained sandstone and discontinuous upper layers of impure limestone.

This is the composition of the Conasauga Formation for all of the first 3 mi surrounding the site and most of the entire 5 mi catchment area. The rocks available within the 3 mi zone are shale, chert concretions, limestone, siltstone and sandstone. North of the

Fig. 6. King Site catchment area. Small circle denotes site, large circle denotes catchment area of 5 mi radius.

site a small section of the 4 and 5 mi zones contains additional lithic resources. At 4.5 mi the shale contains olive green siltstone and impure limestone. Heath Mountain has sandstone and quartzite on its south side adjacent to the river and chert on its north and northwest side. In the 5 mi zone, west and north of Heath Mountain, a limestone formation contains pieces of hard chert which have been mined in recent years (Cressler 1970:13). Whether this chert was exposed during the King Site period is not known. Within the 4 and 5 mi zones, quartzite and chert are added to the list of lithic resources.

One major source for rocks has yet to be considered here the rocks which could have washed down the Coosa River. Cressler's schematic profile of Floyd County's geologic formations (1970 foldout map) shows the river within the Conasauga Formation and does not indicate that it flows adjacent to later formations which contain chert, quartzite and sandstone. The river curves around 2 mountains--Heath and Horseleg--which are 5-10 mi from the site and which contain sandstone, chert and some quartzite. How much these mountains have weathered and contributed to the river's load is not known.

It is also possible that particularly hard rocks, quartz and quartzite, could have washed to the site from the Piedmont. Vein quartz constitutes 17% of the discards at the King Site. Coring the sediments at the river's edge near the King Site or checking a few miles upstream beyond the Weiss eservoir could determine whether quartz could have washed down from the Piedmont (Tom Crawford, West Georgia College, personal communication). There was not enough time for this.

Distances to Specific Resources: King Site

How far did the villagers have to go to get rocks they made into tools? Table 24 lists the rocks which were used at both sites. Chert concretions (14 specimens) probably were available at the site, and sandstone (42 specimens) if it did not wash to the site was available at several locations between 1.5-5 mi. Vein quartz (3 specimens) and quartzite (14 specimens) may have washed to the site via the Coosa River. Cedar Creek south of the site also may have washed sandstone, quartzite and possibly the 1 metagreywacke specimen within 2 mi of the site. Cedar Creek runs through the Rome Formation, which parallels the Coosa Fault about 5.5 miles south of Little Egypt. While metagreywacke is not a common component of the sedimentary region, greywacke is a sandstone-type rock with a large amount of clay in its composition and the conditions which produced the fault could have resulted in the metamorphosing of this material Cressler (1970). does not list any greywacke as being present in this area.

All tools in the structures at the King Site except for 3 specimens and some pigments, can be accounted for within the 5 mi catchment area.

One specimen, a 6A milling stone, could have come from 1 of 2 sources 8-10 mi away. The basin-trough milling stone is light grey and composed of such fine grains that it was identified by several geologists as siltstone or grit, after some hesitation. Cressler identified it as Hartselle sandstone and suggested Judy Mountain as a possible source. The mountain contains Hartselle sandstone which is "very fine to medium grained sandstone" and some

Table 24

Modified rocks and number of specimens of each.

Tools	MU	FL
Amphibolite	5	
Chert concretions	1	14
Gneiss	16	1
Metagreywacke	16	1
Mudstone	1	
Phyllite	2	
Quartz, vein	18	8
Quartzite	14	14
Sandstone	6	42
Schist	14	
Siltstone	1	7
Shale	1	
Slate	1	
Ultra mafic		1
Pigments		
Chert concretions (yellow)		5
Hematite	2	6
Iron		1
Jasper		1
Phyllite	5	
Other Uses		
Limestone	8	
Ornamental shale	6	
Soapstone	1	

quartzite (Cressler 1970:48). Judy Mountain is 6.1 mi overland northeast of the site and about 8-10 mi by the river, which flows south of the mountain about a mile. Rocky Mountain, about 10 mi from the King Site, is encircled by Hartselle sandstone also and was suggested as a source, too.

Iron and hematite are found 10 mi south of the King Site at the northeast end of Indian Mountain where iron has been mined in recent years. A nearby creek is called Hematite Creek and Cressler lists a Hematite Crossing on his map. One large, extensively ground piece of iron comes from Structure 8 at the King Site. Hematite and concretions with yellow pigment are found in structures at the site and some burials also contain these pigments. A gneiss abrader would have come from the Piedmont, 20 mi to the south. A celt from the King Site tentatively has been called an ultramafic rock by Crawford. The closest source of this material would be 8.5 mi south of Cartersville, 36 miles southeast of the King Site by land and about 60-70 mi by the Coosa and Etowah Rivers.

Eight non-local rocks which were either not culturally altered or which did not have recognizable wear marks were found in 9-FL-5 structures. They included 3 pieces of amphibolite, 1 piece of schist, and 5 pieces of gneiss. Amphibolite, an igneous rock, is found southeast of Cartersville, in the location of what is today Lake Allatoona, and this formation extends southwestward to the town of Dallas. This formation is a few miles south of the area where the ultramafic material can be found. Amphibolite also is found 30 mi south of 9-FL-5 in a long, narrow formation in the Piedmont and is available at Little Egypt as well. The schist has been identified as garnet mica schist, possibly from a formation 22.2 mi south of the King Site.

The burials at the King Site contain non-flaked stone items and minerals which are found locally and some which are not found within the catchment area. These are listed in Table 25.

Table 25

Rock and mineral percentages in 9-FL-5 burials.

non-local materials	number	%	local materials	number	%
diabase	4	6%	quartzite	23	36%
gneiss	1	1%	sandstone	14	22%
phyllite	1	1%	chert	10	16%
			siltstone	3	5%
			vein quartz	3	5%
			hematite	3	5%
			limestone	2	3%

Phyllite and gneiss are found in the Piedmont and at the Great Smoky Fault line. The closest diabase dike which is mapped is 66 mi south by southeast of the site. Diabase is located in linear dikes in the Piedmont south of the Brevard Fault and the Chattahoochee River. These deposits are aligned slightly northwest to southeast and are found as far south as the fall line.

Catchment Zones for Lithics: Little Egypt

Little Egypt, 9-MU-102, also is located in the Conasauga formation but it is in a strip that is predominantly limestone; less than a mile to the west the formation changes and becomes predominantly shale. Cressler (1974:12) comments that the formation is complex and varies greatly in composition from one place to another so that within a distance of a few miles it may be "barely recognizable."

To the east, less than a mile, lies the Great Smoky Fault bordering the metamorphic rocks of the Piedmont. If a north-south axis were drawn in the catchment area for this site, it would follow closely the path of the fault. Half of the catchment area for this site lies in the Piedmont-metamorphic rock area (Figure 7). To the east of the site, within the 1 mi zone, the fault itself contains quartzite, phyllite, shale, limestone and some sandstone. East of the fault, within the 5 mi catchment area, these rocks are found: amphibolite, mica schist, gneiss, slate, quartzite, conglomerate, meta-artillite, phyllite and metagreywacke. Most of these rocks as well as quartz could have tumbled down the Coosawattee River to Little Egypt.

The western half of the catchment area is located within the Conasauga limestone and shale units. Little else is present. Cressler

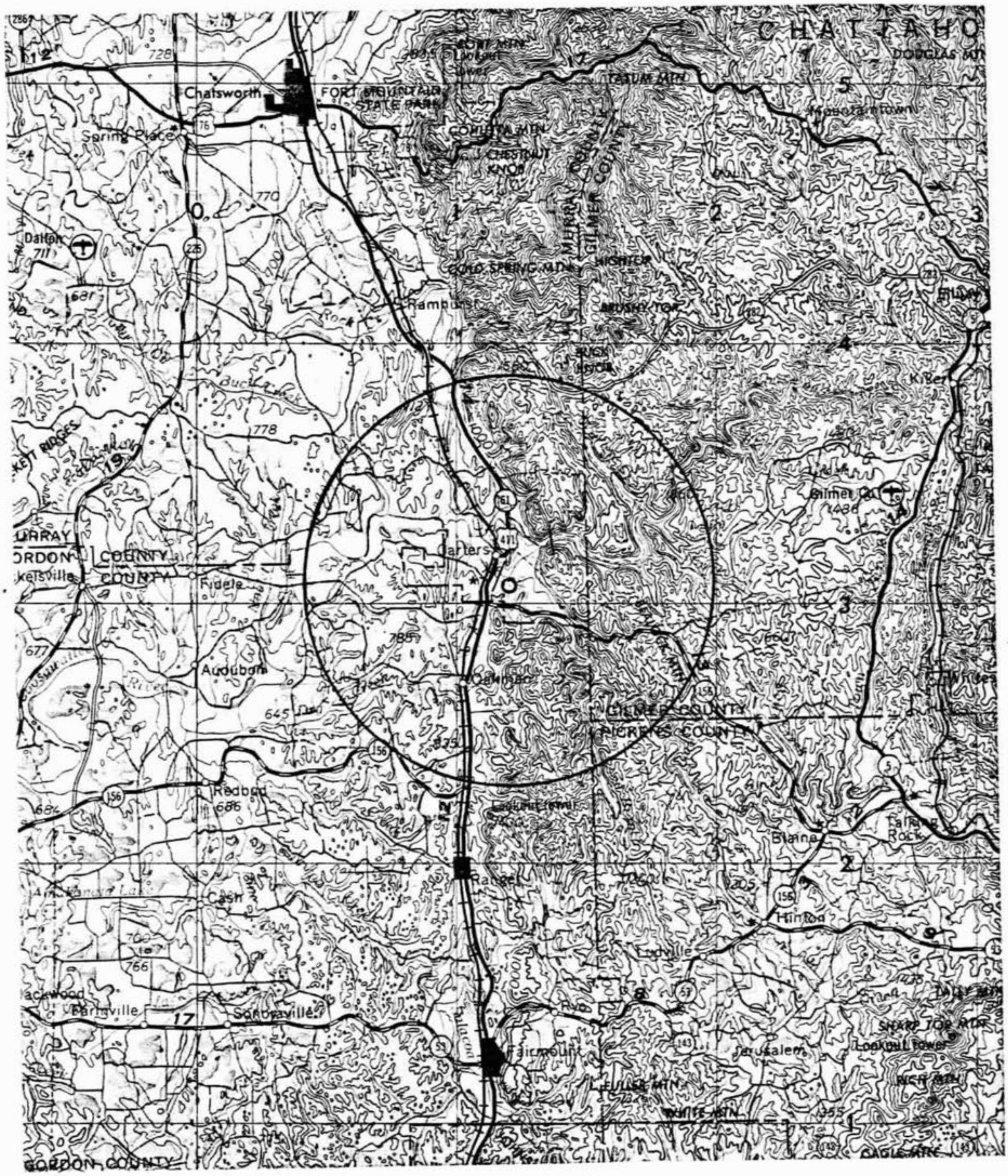

Fig. 7. Little Egypt catchment area. Small circle denotes site, large circle denotes catchment area of 5 mi radius.

says siltstone decreases in abundance in this section and does not mention concretions or sandstone. This report, however, is not as detailed as the one for Floyd County. Mudstone is found at Little Egypt and probably is local. Without a more detailed survey of the geological features it would be a mistake to rule out the possibility that chert concretions may be present within the sedimentary part of the catchment area.

Distances to Specific Resources: Little Egypt

All the materials used in tools at Little Egypt are available locally except three. The local materials are amphibolites, gneiss, limestone, metagreywacke, mudstone, phyllite, vein quartz, quartzite, sandstone, schist, siltstone and shale. The slate used for 1 celt may be a non-local slate. Its source could be further south in the Piedmont, in the vicinity of Cartersville. Soapstone, used for the pipe, is available north of Little Egypt 10-13 mi in the vicinity of Fort Mountain and Chatsworth. Chert concretions may not be found in the limestone and shale found close to Little Egypt; they are at least not abundant there. However, they are sedimentary formations. Only 1 chert concretion is among the tool assemblage and 2 others were among the discards from Little Egypt. Chert is used also for flaked tools. The nearest known source of chert occurs about 11 mi west of the site. Two pieces of hematite are found at 9-MU-102 and may not be local.

Two pieces of unworked diabase are found at Little Egypt. The closest source for diabase is mapped about 50 mi to the southeast.

Discussion

Different lithic resources are available to the 2 sites. The King Site has available within a 5 mi radius: shale, limestone, siltstone, sandstone, chert and probably quartzite. Little Egypt, within the same distance, had limestone, shale, phyllite, quartzite, sandstone, amphibolite, mica schist, gneiss, slate, and metagreywacke.

When material is not critical to the proper functioning of tools a variety of materials may be used in their manufacture. This should be reflected in some shared tool types being made of locally available materials and this is the case. Types 1, 5, 8, 11, 13, 14 and 17 are examples of this.

If material is critical for the proper functioning of some tools and if that material is not locally available, it either will have to be imported or the tool type will not be found at that site. No tool type at either site is made exclusively of imported materials; in fact, the frequency of non-local material is quite low. Several tool types made of local material only are found at only 1 site. Since several of these types are abundant at their site this difference is probably not a result of sampling error. The pitted rollers, Type 9, and the percussion and abrading rollers, Types 26 and 26A, are examples of this at Little Egypt. At the King Site, the multi-purpose flat stones (Type 31) with their numerous wear patterns are an example of tools made from local materials and not found at Little Egypt. Seventeen of these naturally flattened ovals are found in the burials at the King Site and 1 in a structure. These tools have 6 different kinds of use marks. Not only are they not found at Little Egypt, there is no indication of another tool or material taking their place. The same is true for the Type 32 concretion hammerstones. Nine are found in burials at the King Site but no artifact of this type is found at Little Egypt.

Another tool type which is present at the King Site but absent at Little Egypt is Type 21, a flaked and pecked concretion. It may be related typologically to the finely made spatulate celts which are found in burials at 9-FL-5.

Also, 3 hoe-like tools are found at Little Egypt but are not present at the King Site. Two of these are stemmed, phyllite specimens and the third, made of schist, is without a stem. No schist tools were found at the King Site and phyllite is found only as a burial item.

All of the Type 3 tablets, 8 from the King Site and 1 from Little Egypt, are made of a similar type of fine-grained sandstone. Although Cressler does not list any sandstone closer than 10 mi to Little Egypt, Porter Morgan, project geologist for the Corps of Engineers when Carters Dam was constructed, said that a sandstone that is almost glassy in texture is present in the area around the fault (personal communication). When a sandstone of a specific texture was desirable, the inhabitants at Little Egypt may have had to either go after it or do without.

A basic difference does exist in the rocks used by each village. Metamorphic rocks make up 80% of those used at 9-MU-102 and excluding the chert, only 4 non-local materials were found here. Quartz, metagreywacke, gneiss, schist and quartzite are the materials used most and they also comprise 53% of the identified discards at Little Egypt. Sandstone and limestone-mudstone compose 43% of the total discards.

If quartzite is counted as local to the King Site, 87% of the tools are made of local rocks and most, 48%, are made of sandstone. Sandstone, chert and siltstone comprise 65% of the materials used.

While material is not critical to all tool types, as shown by Type 11, some types may be made of different materials to provide a range of textures or different degrees of hardness. Polishing disks at Little Egypt are made of gneiss, metagreywacke, quartzite, sandstone and mudstone. These rocks differ both in texture and hardness. At the King Site they are made of chert and siltstone, which are smooth rocks, and sandstone which is textured. What may be evident at the 2 sites are 3 grades of rubbing materials, varying from quite abrasive to fine grained.

The percussion tools are hammerstones (Type 12), edge percussion (Type 13), end percussion (Type 14) and end battered rollers (Type 26). When these are combined the results are:

	gneiss	metagreywacke	chert concretion	quartz	quartzite	sandstone
MU	3	5	1	9	3	1
FL			3	1	10	1

This indicates a selective use of local materials which have a predominant quartz base. The gneiss and metagreywacke specimens at 9-MU-102 are all end battered rollers. It appears that when such a difference in material and shape is present a different tool is represented.

Second Hypothesis: Forest Resource Differences

The second hypothesis suggests that differences in the tool assemblages at Little Egypt and the King Site reflect differences in the subsistence patterns characteristic of inhabitants at the 2 sites. The inhabitants of both sites relied on agriculture but it is possible that 1 village had greater access to different biotic resources and this difference is reflected to some degree in the non-flaked stone tools.

If this is the case, certain differences should be evident:

1. a difference in the environments of the 2 sites.
2. the archaeological record should show a difference in either the type or frequency of subsistence tools, depending on the degree of difference.
3. a difference in the plant/animal remains found at the 2 sites.

To consider this hypothesis, the environments of the 2 sites will be compared using 5 mi catchment zones.

Gayther Plummer, professor of botany at the University of Georgia, in looking at the catchment zones marked on topographic sheets suggested immediately that subtle differences in temperatures as well as more obvious differences in rainfall would exist between the 2 sites. He suggested that Little Egypt would get more rain because of the hills which rise abruptly to the east and he suggested that, because of its location in the basin adjacent to the hills, Little Egypt would be subject to more severe floods than the King Site. There is a difference in rainfall and temperature. Here are the rainfall averages for Rome, 18 mi east of the King Site, and Ramhurst, 7 miles north of Little Egypt. The Rome figures are based on 29 years and Ramhurst on 23.

	Rome	Ramhurst
December-February	15.83	15.77
March-May	14.19	13.80
June-August	12.70	15.64
September-November	9.66	9.34
Total	52.38	54.55

The average number of frost free days at Rome is 200 and 192 at Ramhurst.

Elevations at Little Egypt and the King Site differ by 100 ft. The second terraces (the first elevations above the flood plains) at both sites are: King Site 570 ft, Little Egypt 680 ft.

When these elevations are viewed in terms of catchment areas, these differences are amplified:

	King Site	Little Egypt Site
Mile 1	570-670 ft (to the SE)	680-1040 ft (S)
Mile 2	570-680 ft (to the SE)	680-1465 ft (NE)
Mile 3	570-725 ft (to the SE)	680-1362 ft (S)
Mile 4	570-740 ft (to the SE)	700-1447 ft (N)
Mile 5	570-1349 ft (to the NE)	640-1461 ft. (NE)

The high elevation northeast of 9-FL-5 lies almost 6 miles away, on the outside edge of the 5 mi zone. This elevation is the south end of Turnip Mountain which just touches the catchment area. At Little Egypt the peaks to the east and north are the hills of the Piedmont and less than 10 mi to the north the Blue Ridge Mountains begin.

The Forests

The deciduous forests of the southeast contributed directly to the subsistence of the aboriginal inhabitants through those trees which provided food, drink and medicine and indirectly by attracting animals which also found their food there. Different forest types offer different items of subsistence because of the composition of the plant species. Forests, therefore, are an important and convenient way to look at environmental differences.

The southeastern vegetation has been analyzed on a broad to narrow slope. As analyses become narrower greater variation in forests appear. Most studies have attempted to determine original or potential forests and therefore encounter problems in the southeast where almost all present-day forests are second or third growth. Opinions vary on how these forests were composed.

Kuchler (1964) in discussing potential forests of the United States suggests that the Piedmont forest east of the Greay Smoky Fault and as far south as Cartersville was an Appalachian oak forest. He calls the rest of the Piedmont and the Ridge and Valley an oak-hickory-pine forest region. Braun (1950) studied the deciduous forests of the eastern United States and along with Harper (1913), an Alabama botanist, placed the Piedmont and the Ridge and Valley in an oak-pine region.

Lewis Lipps, professor of botany at Shorter College, has analyzed the vegetation of a small forest (located about 10 mi east of the King Site) which she considers unaltered by man. She shows that fine distinctions exist in forests caused by differences in soil, slope and aspect. She calls her area a pine-oak community and identifies 3 separate forest types within the community (Lipps 1966).

Plummer (1975) however has used a technique which allows reconstruction of aboriginal forests with some degree of accuracy. This technique involves quantifying witness trees used by early land surveyors. In North Georgia, the Cherokee Territory was surveyed in 1832 for the state of Georgia. In the survey, the corner stake of each land lot, generally 160 acres, was witnessed by 4 trees. Plummer used this and similar surveys to reconstruct the forests of the state. It is assumed that the survey information is a random sample of the trees in the total forest and the percentage of trees in the sample represent the composition of trees in the early North Georgia forest. Plummer included part of the Little Egypt catchment area but did not extend as far south as the King Site. Therefore, for this study, the trees listed in 4 districts each in Floyd and Murray Counties in the 1832 survey were tabulated.

In a critical analysis of environmental potentials multiple factors should be taken into account. Many possibilities are not explored here. While the catchment areas presented here indicate that forests adjacent to each site differ, they do not specify differences that may have characterized the animal and non-woody plant species. The catchment area focuses on trees because this is the only information available.

In trying to define a 5 mi catchment area for each site 2 problems were encountered: 1. the accuracy of the survey, and 2. missing coverage west of the King Site. Most of the land lots are

160 acres in northwest Georgia, however several districts near the King Site were surveyed as 40 acre units.

Surveyors in 2 districts did not follow the standard instructions. Instead of marking or witnessing each corner with 4 trees only 1 witness tree was located on a land lot side, meaning that 1 tree witnessed 2 corner stakes. To overcome this potential inaccuracy, sections of the contiguous districts to the north which were located in the same Conasauga Formation, as well as could be determined from Cressler's maps and USGS topographic quads, were checked against the 40 acre surveys and were shown to be quite accurate. Subsequently, the 40 acre lots were grouped into 160 acres and tallied in the same manner as the rest of the catchment area.

The second problem was missing land survey coverage in the westerly portion of the King Site catchment area in what is now Alabama. The Georgia land survey records do not include this area, therefore vegetation in this small area was analyzed by selecting lots of similar elevation, exposure and drainage patterns from Floyd County and counting the trees in these lots.

<u>Catchment Area Comparisons</u>

Table 26 lists the trees recorded by the surveyors, the number of each within each catchment area and the percentage of the total trees in that area based on the survey records. It is evident from the table that the major differences in trees between sites are in the nut bearing trees.

For the 5 mi zone of Little Egypt, 1517 trees are listed on the survey records and 68% (1029) are nut bearing trees. Little Egypt is

Table 26

Trees in catchment areas based on Georgia land survey of 1832.

Common Name	Little Egypt Site Catchment		King Site Catchment	
	Number of Trees	Percent of Total Trees	Number of Trees	Percent of Total Trees
Black Jack Oak	40	3	41	3
Chestnut Oak	20	1	6	
White Oak	177	12	51	4
Red Oak	198	13	145	13
Spanish Oak	29	2	9	- 1
Post Oak	227	15	292	24
Black Oak	97	6	22	2
Water Oak	4		12	1
Mountain Oak	1			
Chestnut	93	6	8	- 1
Walnut	4		2	
Hickory	136	9	41	3
White Walnut	1			
Poplar	41	3	6	
Sweet Gum	25	2	29	2
Box Alder	22	1	1	
Black Gum	20	1	12	1
Dogwood	17	1	26	2
Sourwood	17	1	13	1
Maple	11	1	7	- 1
Ash	9	- 1	21	2
Beech	8		26	2
Elm	5		15	1
Sycamore	5			
Cherry	4			
Mulberry	4			
Peach	4			
Hazelnut	2			
Holly	2			
Persimmon	2		1	
Red Bud	2		1	
Sassafras	2			
Birch	1		1	
Buckeye	1			
Ironwood	1		4	
Locust	1			
Wahoo	1			
Wild Plum	1			
Pine	257	17	405	34
SA	22	1		
Light	42	3		
Plo	43	3		

in an oak-pine-hickory area and the percentage ratio of these trees is 52:17:9. Chestnuts comprise 6% of the total. At the King Site, 1202 are recorded and 52% (629) are nut trees. The King Site is in an oak-pine community, with hickory ranking quite low and chestnut barely represented. The percentage ratio of oak-pine-hickory is 48:34:3 and chestnuts fall to less than 1%.

A number of trees, primarily hickories, chestnuts and oaks, are referred to in historical accounts as being used by Indians in the southeast. In evaluating the findings of the catchment areas one important point must be kept in mind. From the viewpoint of subsistence not all species of these genera are equally useful. There are striking differences in usefulness of _Quercus_ species. White oaks, in the broad sense bear sweet edible acorns yearly and red oaks produce bitter acorns every second year. The tannin must be leached from red oak acorns before they are edible. The various species also thrive in different habitats and vary in production. Hickories also have similar differences.

A useful way to present the forest potential of the 2 catchment areas is to combine the percentages of white oaks, hickories and chestnuts within each mile zone of the catchment areas:

	Mile 1	Mile 2	Mile 3	Mile 4	Mile 5
Little Egypt Site	28%	29%	28%	23%	26%
King Site	5%	7%	9%	10%	7%

Little Egypt obviously has a higher percentage of trees with readily usable nuts. However, all acorns can be eaten if properly processed so the difference in acorn quality and tree productivity needs to be considered. At least 27 species of oaks grow in Georgia and the land surveyors listed 8 for Murray and Floyd Counties. Three are white oaks and 5 are red oak species. The white oaks are: white oak, post oak, chestnut oak and mountain oak; the red oaks are: southern red oak, northern red oak, black jack oak, black oak and the various water oaks.

Both catchment areas have a high percentage of oak trees and the species percentage at each are:

	Little Egypt	King
Post Oak	15%	24%
Red Oak	13%	13%
White Oak	12%	4%
Black Oak	6%	2%
All Others	6%	4%

Discussion

These oaks vary considerably in the weight of their acorns, yield by species, frequency of abundant crops and the percentage of good crops. Acorn production of Gulf Coast oaks studied over a 5 year period showed production, from high to low, to be: water oak, southern red, white oak, post oak and black jack (Larson 1969: 269-278). However, trees with the heaviest acorns ranked in this order: swamp chestnut oak - 100 nuts a pound; white oak - 138 acorns a pound; black oak - 250 acorns a pound; post oak - 269 acorns a pound; southern red oak - 300 to 700 acorns a pound and Spanish oak - 750 acorns a pound. A mature white oak will yield about 2 pounds of acorns a year and a post oak will produce about one-third of a pound. In this Gulf Coast study some species produced only one good crop in 5 years and the percentages of sound acorns by species varied from

50% to 98% (Larson 1969: 269-278).

While oaks are a good potential resource, it can be seen that their reliability fluctuates from year to year and although red oaks are productive,they are so light it takes many to make a pound. Indian Agent Benjamin Hawkins said it takes 1 bushel of acorns to make a pint of oil (Hawkins 1974). This would make the presence of other nut trees important as supplementary resources. Walnuts are shade intolerant and are not abundant in forests although they sometimes establish groves in open areas (Plummer, personal communication). Hickories and chestnuts therefore may be more important than their percentages indicate. At the King Site, chestnuts comprise 4% of the total trees within the first 2 mi zone around the site but are otherwise rare. At Little Egypt, chestnuts comprise 12% of trees within the 2 mi zone. The percentages of hickories available to the 2 sites are:

	Mile				
	1	2	3	4	5
Little Egypt	11%	10%	9%	9%	8%
King	1%	4%	3%	5%	2%

The surveyors generally did not mention hickories by species. Of the 9 which grow in Georgia only 1 is not palatable, the bitternut hickory. Those with sweet nuts are: mockernut, pignut and shagbark.

The differences in the potential forest resources at the 2 sites can be summarized with percentage ratios. First, the ratio of oak-hickory-chestnut:

Little Egypt	--52:9:6
King Site	--48:3:1

Second, the ratio of white oak-hickory-chestnut:

Little Egypt	--12:9:6
King Site	-- 4:3:1

There are differences in the forest types, mainly in the nut bearing trees, and Little Egypt has a higher percentage and a greater variety of the nut bearing trees. Given these differences in forests, it is possible that differences exist also in the non-woody forest species which were economically useful to the inhabitants of the 2 villages. Unfortunately, what these differences were is not known. There may have been more economically useful non-woody species at one site than the other. Differences in animal species may have existed also.

The catchment area focuses on trees because this is the primary information available.

Historical Accounts

Numerous historical accounts refer to the Indians' preparation of corn, acorns, hickory nuts, walnuts and chestnuts for oil, bread, soups, milk and other foods. These accounts are not always specific about the methods and tools used in the preparation of these foods. Lawson, describing Carolina Indians about 1700, and the ranger who accompanied Oglethorpe to Cusseta in 1734, refer to the preparation of corn in wooden mortars (Lefler 1967:216). Swanton, using mainly early accounts, wrote that "Stone mortars were used in cracking nuts, preparing paint and in prehistoric times grinding corn (Swanton 1952:243)." He does not give any sources for this statement.

Lawson wrote The Natural History of Carolina and said:

> "The hiccory is of the walnut-kind and bears a nut as they do of which there are found three sorts...these 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...
>
> "...There is another sort, which we call red Hiccory, the heart thereof being very red, firm and durable; of which walking-sticks, mortars, pestils, and several other fine turnery-wares are made (Lefler 1967:105)."

It is possible that general references to mortars mean wooden mortars.

Lawson also refers to "acorns sweet as chestnuts and the Indians draw an oil from them as sweet as that from olive..."

DuPratz wrote of bread being made from persimmons, walnuts and, when other food was scanty, chestnuts (Swanton 1952:291)." Thomas Hariot, who was on the North Carolina sound in 1585-7, wrote that acorns were dried on hurdles made of reeds, soaked, then either eaten or "els being also pounded to make louves or lumps of bread." Beans, too, he said were "bruised or pounded in morters" and made into loaves or lumps of "dowish bread." The beans were soaked first (Swanton 1952:269).

Hariot also mentions mulberries, huckleberries, crab apples, chestnuts and two kinds of walnuts and of the latter two, he says:

> "...chestnuts there are in divers places great store, some they use to eat raw, some they stampe and bail to make spoonmeate ...walnuts besides eating them in the ordinary manner...they break them with stones and pound them in morters with water to make milk spoonmeate... (Swanton 1952:272-3)."

LeChalleux wrote of the preparation of food: "the method of using it (corn) is first to rub it and resulve it into flour; afterward they dissolve it (in water)... (Swanton 1922:360)." He also noted:

> "...the head cook now puts the things to be cooked into a great pit; others put water for washing into a hole in the ground; another brings water in a utensil that serves as a bucket; another pounds on a stone the aromatics that are to be used for seasoning... (Swanton 1922:376)."

Several 18th century writers as naturalists William Bartrum, John Lawson and Indian Agent James Adair had a full appreciation of the environment of the southeastern United States and the resources it offered the aboriginal inhabitants. Adair, describing the lands of the southeast, wrote:

> "Trees indicate the goodness or badness of land...On the hills, there are plenty of chesnut-trees, and chesnut-oaks. These yield the largest sort of acorns, but wet weather soon spoils them. In winter the deer and bears fatten themselves on various kinds of nuts, which lie thick over the rich land, if the blossoms have not been blasted by the northeast winds. The wild turkeys live on the small red acorns, and grow so fat in March, that they cannot fly farther than three or four hundred yards; and not being able soon to take the wing again, we speedily run them down with our horses and hunting mastiffs. At many unfrequented places of the Mississippi they are so tame as to be shot with a pistol... (Williams 1930:386-387)."

Differences in Tools

While no tool in the non-flaked assemblage can be identified positively as being used for subsistence it seems possible that the milling stones, Type 6A, 6B and 7 as well as the pitted cobbles, Type 8, could be food processing tools.

There are differences in both the frequency and form of the milling stones at the 2 sites. Eleven milling stones are found in 3 structures at the Little Egypt Site. Combining the 3 types, they comprise 12% of the non-flaked tools from Little Egypt. Three (3%) are found in 6 structures at the King Site. These tools differ in form. At Little Egypt they have basins or sloping faces (Type 6A) or are flat slabs (Types 6B and 7). At the King Site, one milling stone has a basin on one side and a trough on the opposite side. No troughs are found on the milling stones at Little Egypt. Of the other 2 King Site milling stones, one is a slab with a small basin on 1 side and the other is a simple slab. Type 6A milling stones at Little Egypt are rough in texture while those at the King Site are smooth; this probably is a functional feature. The percentages of these tool types from the total non-flaked assemblage at each site are:

	Type 6A	Type 6B	Type 7
Little Egypt	3%	3%	9%
King Site	2%		1%

These are the tools which most probably were food processing tools but there is no way at this point to tell what their specific functions were. However, they vary in form, texture and frequency.

Pitted cobbles, Type 8, are found at both sites in equal numbers. Ethnographic reports from different parts of the world show these stones used for bipolar flaking or cracking nuts (McCarthy 1967:70-71; Ranere 1975:205-206). Type 11 tentatively has been identified as anvils.

They are well represented at both sites. The pitted cobbles have a smooth, ground flat face with a smooth pit in the center. It seems more likely that these would be nut breaking stones than anvils because of these surface features.

Type 7 tools rank fourth in percentage of tools at Little Egypt; there were more pitted rollers, random anvils and hammerstones. Gould (1971:164) describes flat stones used by aborigines in Australia for the grinding of seeds. It is possible, given the high frequency of these stones, that if they are food processing tools they were used for seeds, fruits, nuts or other small food items. Type 29 a possible mano was found stacked on top of 2 Type 7 specimens. The possible mano was the only greasy stone in the assemblage.

Few tools in the combined collection seem related to subsistence and there is not a great amount of variation among those which do seem to be subsistence tools. They tend to be present at both sites. The differences in the milling stones are subtle and may be due to differences in availability of resources and their exploitation. If the pitted cobbles are nutting stones, the fact that they are frequent at both sites indicates that a difference in available nut trees has not affected subsistence and the associated processing tools. The problem in dealing with this hypothesis is that the only data on resources relates to nut trees. There is no direct indication of a difference in availability of other exploited plant species. Also the meaning of the subtle differences in shape, texture and size of the milling stones and what this indicates in terms of function is not known. Also the floral and faunal remains from the 2 sites have not been analyzed. The completion of these analyses should help clarify the functions of at least some of the non-flaked tools.

Third Hypothesis: Social Structure

Several authors (Brown, Larson, Peebles) have argued for the existence of chiefdoms in the southeast during the Mississippian Period. Peebles and Kus (1977) consider the Moundville phase of Alabama a chiefdom and assign the following characteristics to it:

1. ranked social order with the highest levels reflected in the archaeological record by burial location and grave goods

2. a hierarchial arrangement of sites (major centers, local centers and villages) by type, sizes and presumably functions; the position of the settlements in the hierarchy reflecting their position in the regulatory and ritual network of the chiefdom.

3. placement of settlements in an ecotone which provides both arable land and natural resources so settlements are self-sufficient in their subsistence activities

4. the organized production of crafts above the household level and the placement of such activities within specific areas at political-religious centers.

If one assumes that similar socio-political systems also occurred in northwest Georgia it is possible to view Little Egypt as a local ceremonial center and the King Site as a village. Whether these 2 sites are part of a single system or belong to separate but geographically adjacent systems is not important. If they represent different levels in a settlement hierarchy they will have different social and political functions and possibly will yield different artifact classes.

The form and size of the 2 villages, described in Chapter III, indicates that they probably exist at different levels of a hierarchy. Little Egypt covers at least 7 acres, has 2 mounds with buildings on their summits and smaller domestic structures located in a separate area of the site. The structures have considerable variation in the number and types of non-flaked artifacts present.

The King Site is smaller in size, 4.5 acres, and its public structures are a plaza with large post, 2 special buildings (1 the largest on the site) and an encircling ditch and palisade. Burial status is indicated by grave goods/location in the plaza. Domestic structures show uniformity in tool types.

Are the probable socio-political differences between the 2 sites reflected in the non-flaked stone artifacts? Does Little Egypt, the local center, have in its non-flaked stone assemblage objects which indicate its place in the hierarchy? These objects could be either socio-technic-ideographic items or the tools used to produce such items.

Little Egypt has 10 artifact types which do not occur at the King Site. Two non-tool types, worked shale and a soapstone pipestem, may be socio-technic items. The pipestem and a piece of broken shale gorget are from Structure 1; the remaining shale is from Structure 4. While similar shale is found within the catchment area for the King Site, no worked pieces were found there.

Two tool types, Type 20 (hoe-like implement) and Type 22 (large ground disk) are found only in Structure 1 at Little Egypt. Because Type 22 is one of a kind and lacks a distinctive working area, such as a cutting edge, it is difficult to speculate about its function. It is finely ground and is the size of a chunky stone but it is battered on its edge and does not have the characteristic form of a chunky stone. Type 20, the hoe-like specimens, may be ideotechnic objects rather than technomic ones. These specimens are made of soft stone and 1 is ground. Types 20 and 22 may represent some functions reserved for special individuals.

Peebles and Kus (1977) discuss craft specialization only for the Moundville site itself. If they mean crafts will tend to be more centralized the higher the settlement is in the hierarchy, this might explain the variation in tool types between structures at 9-MU-102. If Structure 4 at Little Egypt were the residence of craftsmen, the higher number of tools and tool types in this structure could be accounted for. Three types (15, 25 and 26A) are found only in this structure. The Type 6B milling stones found only in Structure 5 may indicate a specialized function not represented at other structures at either site, also. At the King Site, 4 structures each have 1 specimen of a type not found elsewhere, otherwise there is a tendency toward uniformity in the types in each structure. These 4 single-specimen types are 4, 21, 30 and 31. Both 30 and 31 are found in King Site burials and Type 31, multi-purpose flat stones, are associated with a specialized flint-working kit found in at least 6 burials. Without knowing the functions of the tools in the assemblage, it is not possible to determine which are associated with specialized crafts and those which denote general skills. For example, Semenov (1964) calls celts wood-working tools; celts are found in 2 structures at Little Egypt (Structure 1 does not have any) and 3 at the King Site. This fairly wide distribution seems to indicate they are tools of general skills. It is expected that an analysis of artifact associations within structures will provide some clues as to tool function.

The non-flaked artifact assemblage does not indicate clear differences in ritual or regulatory functions which can be expected to occur at the 2 sites as a result of their different places in the settlement hierarchy.

Fourth Hypothesis: A Combination of Factors

It is possible that each of the three hypotheses discussed in this chapter contribute to the differences in the tool assemblages from the 2 sites.

One hypothesis holds that the differences are caused by the sites having access to different lithic resources. Twelve tool types are shared by both sites and are made of materials which are common locally. These are Types 1, 2, 5, 8, 10, 11, 12, 13, 14, 17, 19 and 23. This indicates that raw material is not critical to proper tool function and substitutes can be made.

Material seems to be critical for the proper functioning of 10 tool types. Type 3 sandstone tablets and Type 16 striated concretions are made of identical materials at both sites. These materials are found locally at the King Site but the chert concretion and possibly the sandstone specimen may be imported at Little Egypt. Eight other types (9, 20, 21, 24, 25, 26, 26A and 31) are found only at 1 site and 3 types (21, 24 and 25) are one-of-a-kind. Types 9, 20, 26, 26A and 31 are made either of similar or the same raw materials. These 5 types are represented by several specimens, except Type 26 A, an edge ground roller; this same use pattern is found on several

Type 9 pitted rollers however, so it is not a unique wear pattern. Material appears to be critical for these tool types and if the material were not imported village inhabitants did without the tool. Celts also fit into this category. Although at both Little Egypt and the King Site celts are made of locally available fine-grained material, 1 celt at each site is made of an imported material. At Little Egypt these tools are made of amphibolite and quartzite, both local materials, and a slate which has been identified as a non-local variety. This is the only tool at Little Egypt which is not made of a local material. At the King Site, celts are made of quartzite and an ultramafic material which is found in the Piedmont Province. This celt is one of the 2 non-local raw materials used in tools found in the structures at the King Site.

Pigments, while not tools, apparently were critical materials. No phyllite is found in structures at the King Site although 1 piece is found in a burial there. Phyllite containing the mineral graphite is found as part of the Great Smoky Fault, which is 20 mi from the King Site. At Little Egypt hematite, which is not mapped as being within the catchment area for this site, is found in Structure 4.

These tool types which can be explained by the first hypothesis comprise 73% of the total tool types. Several types however overlap and also can be covered by an alternate hyposthesis: part of the difference is caused by the different levels of each site in a settlement hierarchy. Four tool types (15, 20, 22 and 28) are found only at Little Egypt and could either be objects used in ritual or by privileged persons or could be tools used to make special objects.

Two of these types, 20 and 22, are found only in Structure 1 which occupies a privileged location on the site.

Another hypothesis states that the sites have different environments resulting in some subsistence differences which may be evident in the non-flaked stone tools. Differences in the biota, specifically the nut bearing trees, exist and this resource potential is higher at Little Egypt than the King Site. Milling stones and pitted cobbles are found at both sites. The milling stones probably are food processing tools and the pitted cobbles may be also. The number of pitted cobbles is about the same for both sites. While 2 of the 3 types of milling stones are shared by both sites, there is a noticeable difference in the frequency of those present. Little Egypt has several times as many Types 6A and 7 as the King Site does and Type 6B is not represented at the King Site. This difference may reflect the higher percentage of white oaks, hickories and chestnuts growing in the vicinity of Little Egypt. At the King Site the percentage of white oaks and hickories drops considerably and chestnuts are almost absent.

Most of the tool types can be explained by these three hypotheses. Three types (4, 18 and 29) are not assigned to any of these hypotheses. Further analyses should add to the understanding of all these tool types.

Chapter VIII

CONCLUSION

Non-flaked stone artifacts have been almost totally ignored by archaeologists throughout the world. With the exception of work by Semenov (1964) and Rinaldo (Di Peso, Rinaldo and Fenner, 1974) the present study represents the first systematic attempt to recognize and classify non-flaked stone tools. It has shown that a large variety of such tools occur in one particular culture (Barnett phase) and that these tools are related to a variety of human activities.

The non-flaked stone artifacts analyzed in this thesis are technological tools for dealing directly with the environment or for making other tools for this purpose. Some of them may be ritual items or symbols of status or the tools used to produce such objects. In order for this type of stone material to become as informative as it should, much basic work needs to be done. Ideally, this study should have included several additional phases of investigation and it is appropriate to review them here.

First, historical accounts for the southeast should be checked more thoroughly to find what stone tools were recorded as being used between A.D. 1550 and 1700. Archaeological site reports from the southeast pertaining to this period should be consulted in more depth to see what non-flaked stone artifacts are mentioned. Ethnographic studies from different parts of the world should be examined further for the descriptions and illustrations of stone tools and their use patterns because these might indicate how prehistoric tools were used.

The non-flaked stone tools from the 2 sites should be reexamined with the stereoscopic microscope and use marks measured, using an internal scale in the microscope. These use marks should be photographed in stereoscopic pairs.

Raw materials should be gathered from the vicinity of each site and experiments conducted to see what can be learned about the manufacture and use of these tools. This would help solve some problems; for example, whether grinding on a particular specimen is the result of manufacture or use. The discarded material should be analyzed also.

Artifact associations within structures should be plotted and the floral and faunal analyses should be correlated with tool types. Also, material from outside structures (found in exploratory trenches during excavation) should be examined for additional tool types or the duplication of types which have only one specimen. This is particularly relevant to Little Egypt. The sample from this site could be enlarged by adding the Barnett phase structures from the nearby Potts Tract Site (Hally 1970).

This thesis cannot do some things. It cannot give the specific functions of identified tools, even the most obvious ones. What it does is point out that from these 2 sites a large number of artifact types can be distinguished and these artifacts are subtle clues to past human activities. If this study did no more than alert archaeologists to treat all non-flaked stone artifacts carefully and give them the same thorough analysis that other remains receive, this would be a contribution to anthropology.

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Plates

Plate 1. Type 1, grooved abrader.

Plate 2. Type 2, abraders with ground hollows.

Plate 3. Type 3, sandstone tablet.

Plate 4. Type 4, non-sandstone tablet.

Plate 5a. Type 5, stone with ground channel.

Plate 5b. This specimen has a wide, shallow channel.

Plate 6a. Type 6A basin milling stone.

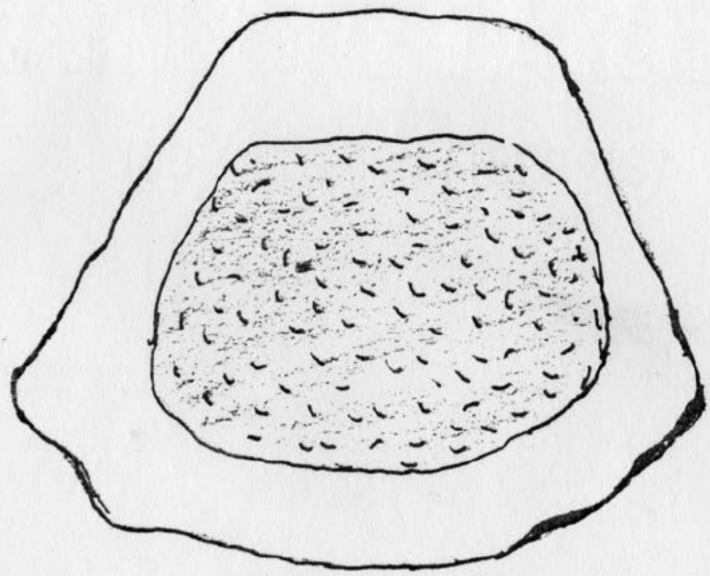

Plate 6b. This specimen has a rough basin, a smooth shoulder.

Plate 7. Type 6B, oversize milling stone.

Plate 8. Type 7, flat milling stone.

Plate 9. Type 8 pitted cobble.

Plate 10. Type 10, ground stone with depression.

Plate 11a. Type 9, pitted roller.

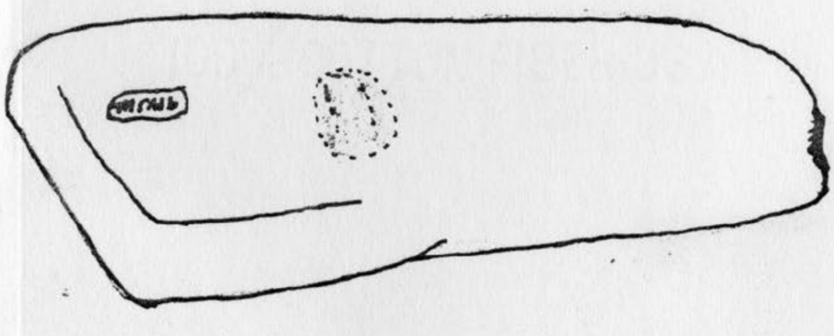

Plate 11b. The pit is not centered in these specimens.

Plate 12. Type 11, random anvil.

Plate 13. Type 11, random anvil.

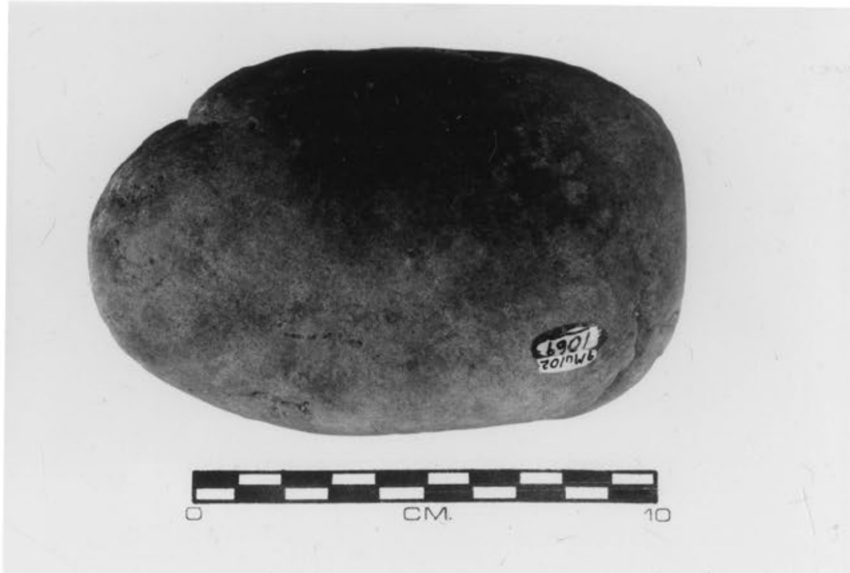

Plate 14. Type 12, hammerstone.

Plate 15. Type 14, convex edge percussion tool.

Plate 16a. Type 13, edge percussion tool.

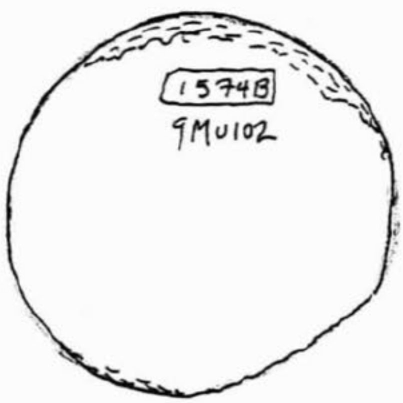

Plate 16b. This specimen is a worn disk.

Plate 17. Type 15, beveled edge abrader.

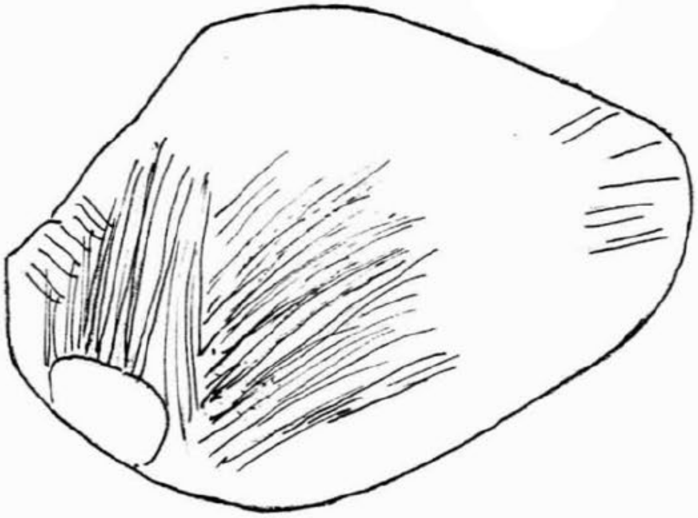

Plate 18. Type 16, striated concretion, (actual size).

Plate 19a. Type 17, polishing disk.

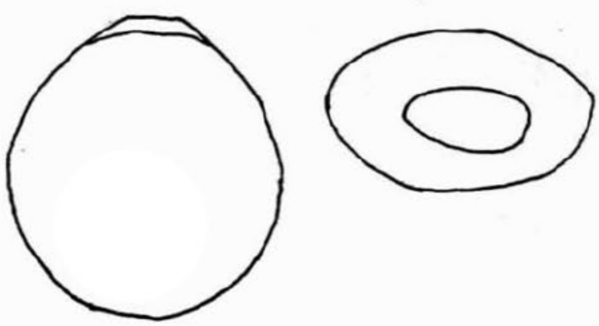

Plate 19b. Type 17, polishing disk.

Plate 20. Type 18, ground pebble. St 5, 9-MU-102.

Plate 21. Type 19, celt made of slate. St 4, 9-MU-102.

Plate 22. Type 20 hoe-like tool, St 1, 9-MU-102.

Plate 23. Pecked and flaked concretion, St 4, Type 21, 9-FL-5.

Plate 24. Type 22, large ground disk, St 1, 9-MU-102.

Plate 25. Type 23, straight-edge tool, St 14, 9-FL-5.

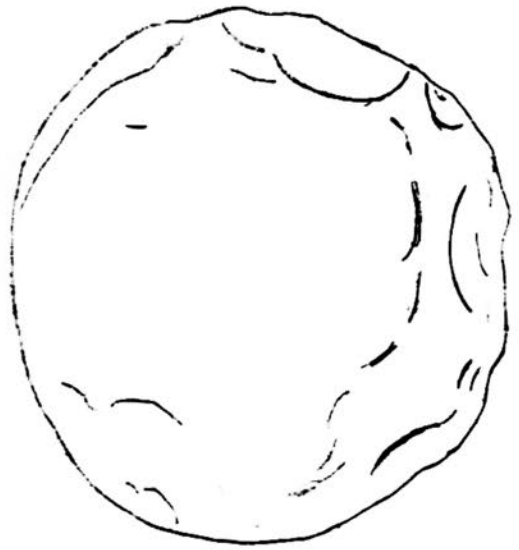

Plate 26. Type 24, lenticular stone. (65% actual size)

Plate 27. Type 25, abraded disk. (actual size)

Plate 28. Type 26, end battered roller, 9-MU-102.

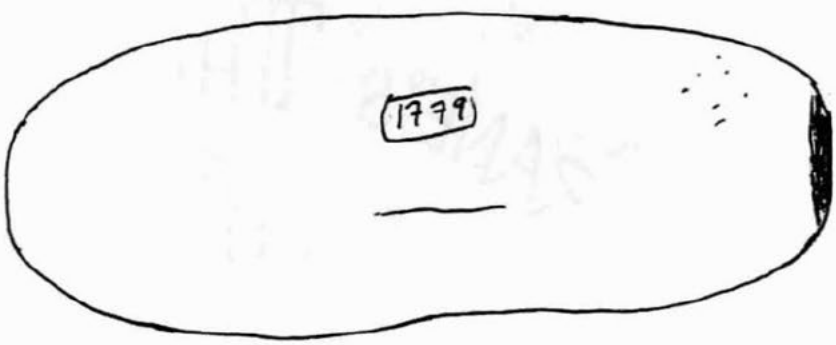

Plate 29. Type 26A, end ground roller, 9-MU-102.

Plate 30. Type 27 (B), pigment. Jasper Concretion.

Plate 31. Type 27 (C), concretion cup.

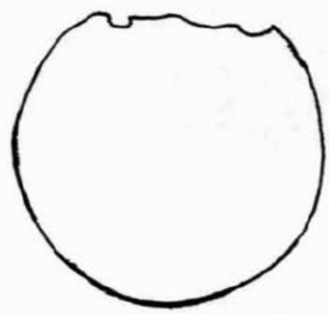

Plate 32. Type 28, cut and ground shale.
9-MU-102.

Plate 33. Type 29, possible mano. 9-MU-102.

Plate 34. Type 30-Burial, possible wood working tool.

Plate 35. Type 31-Burial, multi-purpose flat stone.

Plate 36. Type 32-B, round concretion hammerstone.

Plate 37. Type 2-Burials, abraders with ground hollows.

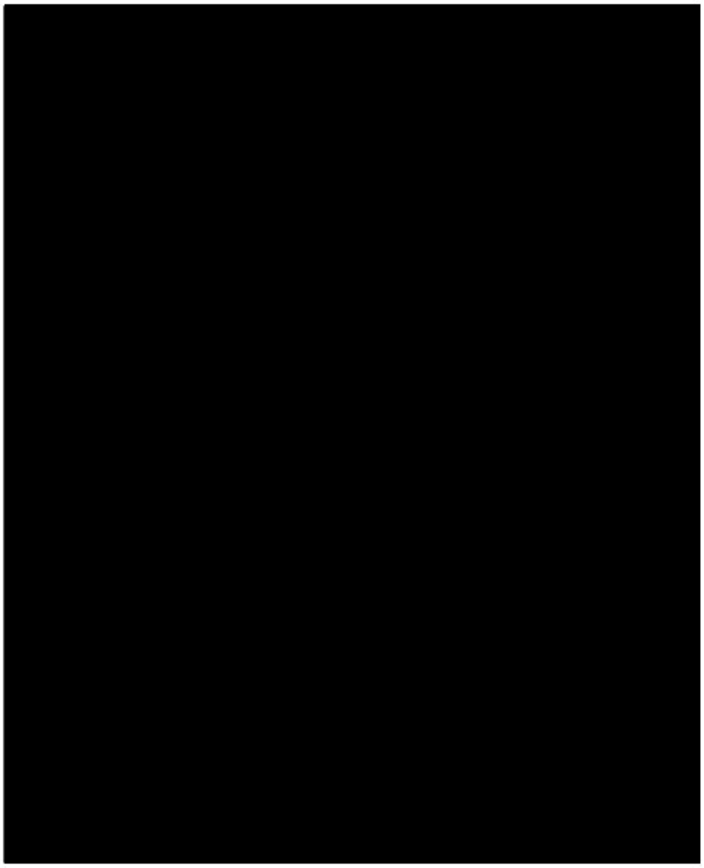

Plate 38. Type 33-B, ground disk.