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ARCHEOLOGICAL INVESTIGATIONS AT SHILOH INDIAN MOUNDS NATIONAL HISTORIC LANDMARK (40HR7) 1999-2004 VOLUME 2 of 2



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AT
SHILOH INDIAN MOUNDS
NATIONAL HISTORIC LANDMARK (40HR7)
1999-2004
SHILOH NATIONAL MILITARY PARK
HARDIN COUNTY, TENNESSEE
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CHAPTER 10

A GEOARCHEOLOGICAL STUDY OF THE MOUND A STRATIGRAPHY

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INTRODUCTION

The archeological study of an earthen mound requires that we conceive of the archeological record as more than post holes and potsherds. We must expand our perception to begin with the sediments as artifact—artifacts as defined by Renfrew and Bahn (2000:565), “any portable object used, modified, or made by humans.” There were cultural principles that guided the choices in the matrix used to build the mound, and engineering principles to consider when selecting materials and combining them to create both stable slopes and surfaces and accomplish visual objectives. From this perspective, the mound sediments and their organization become a series of informative artifacts with the potential to produce significant data to infer behavior related to land use, technology, architecture and ritual.

Mounds have been built by prehistoric cultures in the southeastern U.S. as early as the Middle Archaic (Gibson and Carr 2004; Saunders et al. 2005). Through time we see a general trend from mounds constructed of opportunistic building materials and rare in-depth preparation of the building site to increasingly complex earthen structures of non-local building materials, and complex landscape modifications. Mound building becomes increasingly complicated both in terms of social and physical processes by the Middle Woodland period and into the earliest Late Woodland. Surfaces are prepared and clay platforms are constructed (Kidder 2001, Sherwood 2006), and multiple stages become common. It is impossible to generalize this period when techniques and materials used in mound construction are highly variable depending on their locations. In the Tennessee Valley we see rectangular platform mounds constructed in multiple stages (e.g. Boudreaux and Johnson 1998, Mainfort and Sullivan 1998). In the Lower Mississippi River Valley, Kidder (2001) has also documented variable construction. He does however make the

point that “Early and Middle Woodland mounds were designed to be built, used and abandoned... they were rarely re-used” (Kidder 2001:6).

The Hopewell phenomenon, includes the construction of mounds, embankments and enclosures, and extends farther afield than the southeast throughout the Eastern Woodlands. An important aspect of this phenomenon in the context of mound construction is the repeated choice of transported materials, both in terms of objects and earth, that were selected for visibility and probably symbolic reasons (Charles et al. 2004). This development in mound building suggests that just as we study sourcing among stone tools and exotic minerals, the sourcing of moundfills can hold similar significance. Charles, et al. (2004:62) examine the potential for meaning in Hopewell contexts, not just in the function of the mounds but also in their construction. They propose that surface preparation and the types of materials selected for stage surfaces and ramps, may relate to symbolic representations of cosmological conceptions and could be invested with meaning like that of specific raw material such as obsidian and mica.

Identifying shifts in the nature of moundfills can signal a stage or period of mound stability where the accretional surface is maintained. In the case of Mississippian Period platform mounds, these surfaces are usually intended to support architecture, presumably to house the elite or to be used for ritual space. As a result, stages can be identified by architectural remains (e.g. hearths, wall trenches), and the appearance of prepared floors, but they can also be identified based on soil formation indicating the long-term stability of surfaces.

But attention to the stratigraphy within the mound is only part of the picture. Some of the most recent mound studies have also looked beyond the monument itself to the surrounding landscape and its modification (Knight 2006, Dalan et al 2003). By the Late Woodland and the Mississippian

Periods mound building appears to go hand in hand with modifications to the local landscape. Archeologists have identified this new level of sophistication with a significant shift in function in various areas of the Southeastern U.S. (e.g. Holley et al. 1993; Kidder 2001). Landscape modification, preparation, and remediation begin to appear at a larger scale, beyond just the preparation of the immediate surface beneath a mound. Entire areas are restructured, through cutting and filling, to adjust drainages, alter slopes and generally change the landform to level surfaces and accommodate specific configurations, creating expansive areas to facilitate building. Numerous archeologists (c.f. Brown 2003, Kidder 2004a, Knight 1995, 2010; Lewis and Stout 1989; Pauketat 2007) have suggested the scale of such an extensive labor effort indicates the importance of the requisite layout and its diction of the placement of mounds, plazas and other communal features and ritual spaces.

From this brief introduction it is clear that mound stratigraphy, above and below the mounds of grass covered earth we observe today, must be carefully examined to provide data to enhance traditional interpretations of construction stages and the nature of the buildings set upon them. Revealing the variability in the matrix of the mound, the composition and deposition of these materials, and the landscapes modified to accommodate them, can also contribute to our understanding of symbolism as well as the technological knowledge and engineering skills used to construct these complex earthen structures.

This chapter begins with a general overview of the geomorphic context of Mound A. The geoarcheological methodological approach used in the study of Mound A is presented in detail and organized by macrostratigraphy and microstratigraphy. The methodology is followed by a classification proposed for moundfill that provides for a categorization of the variability observed in the mound. Potential source locales are then discussed for the material used to construct the mound, how they can be identified in the context of the mound and what may have been necessary to extract these soils and sediments. The bulk of this report

is made up of the description and interpretation of the stratigraphy organized by mound stage from bottom to top. Finally, the conclusions of the geoarcheological study of Mound A are presented, with suggestions for future research directions.

LOCAL SOILS AND GEOMORPHOLOGY

The Shiloh Mound Complex lies in the lower Tennessee River Valley, which marks the boundary between the West Tennessee Coastal Plain and the Western Highland Rim (see Chapter 4). The West Tennessee Coastal Plain is part of the larger East Gulf Coastal Plain and is characterized by low relief and west flowing drainages, which are a component of the Mississippi River Embayment (Fenneman 1938). The Western Highland Rim to the east, in the Interior Low Plateau physiographic province which surrounds the Central Basin, is very generally exemplified by rolling terrain dissected by numerous streams in deeply incised valleys (Fenneman 1938). The Western Valley physiographic region includes the channel, floodplain, and terraces of the northward flowing lower Tennessee River. Approximately 318km by river to the north from river Mile Marker 198, the Tennessee joins the Ohio River and flows west to the Mississippi.

The Lower Tennessee Valley proper varies from 5–32km wide with the floodplain narrowing in the vicinity of the site to roughly 5km with an average elevation of 115m above mean sea level. Here the river abuts the western valley wall in a westward meander. East, across the river, the floodplain is made up of sloughs, ridges and swales composed of the fine sandy loams and silt loams mapped as Inceptisols and Mollisols (NRCS 2005; Proffitt et al. 1963). These floodplain soils are underlain chiefly by resistant cherty Devonian-Mississippian Fort Payne limestone and Chattanooga Shale (Hardeman 1966). In the vicinity of the town of Savannah, north of the site on the opposite side of the river, Silurian age Wayne Group Lego Limestone crops out above river level (Russell 1964).

The river valley meanders through the dissected uplands of the West Tennessee Uplands and Western Highland Rim. Composed of remnants

of alluvial terraces and natural levees, these uplands rise over 30m above the floodplain. The uplands are composed of generally well-drained sandy loams overlain by silt loams chiefly composed of loess. These soils on the ridge top, in the vicinity of Mound A, are mapped as various phases of the Paden Series (Proffitt 1963). The Paden Series is taxonomically defined as a fine-silty, mixed semiactive, thermic Glossic Fragiudult composed of an A, E, Bw1, Bw2, Bw3, E/Bx, Btx, 2Bt1, 2Bt2 pedon, over 2m thick (NRCS 2005). The eroded upland slopes surrounding the site are mapped as various silty clay loam or silty clay Ultisols. All these local upland soils form in ancient alluvium that are overlain by silty material that is primarily loess.

The upland soils are underlain by three primary geologic units, Quaternary Terrace Deposits (QT), Cretaceous Coffee Sand (Kc) and the Eutaw Formation (Ke) (detailed in Table 10-01; Figure 10-01) (Russell 1964). Beginning at the bottom, the Eutaw Formation is visible along the base of the steep eroded slopes and tributaries to the Tennessee River near Shiloh. A large expanse of this formation was briefly exposed at the base of the bluff just south of the site when the COE cut the slope back in 2002. This cut was made to prepare the bank for Gabian wall rip-rap in an effort to stabilize the erosion on the west bank. This formation, not often observed in large exposures or studied in the Lower Tennessee River Valley, is composed of a complex series of laterally variable beds that include a few layers of clean quartz sand and fine grained glauconitic highly micaceous clay laminated with sand and mica partings. These beds were observed in the bank profile grading laterally (north) into layers with increasing sand. The Eutaw Formation represents transgressive nearshore paleoenvironments (Mancini and Soens 1994) with carbonaceous plant remains noted along the base of some beds. Though partially visible along seasonal seeps in the steep slopes of Dill Branch (Figure 10-02) there is no evidence

in the mound stratigraphy that this material was used in any detectable quantities in the moundfill.

The Coffee Sand Formation is composed of thin bedded and weakly cross-striated glauconitic quartz sands (Figure 10-03). These deposits can be as thick as 30m on the west side of the river (Russell 1968). The Quaternary Terrace Deposits overlay the Coffee Sand Formation and consist of predominantly rounded, poorly sorted, commonly cross-stratified chert gravel up to 15m thick (Figure 10-04). The sands and gravels of the Quaternary Terrace Deposits and the Coffee Sand relate to a relatively complex paleogeography based on paleo-drainage patterns. Limited sedimentological and lithologic study of the Terrace gravels indicate that they are Pleistocene lag deposits from high competence stream/alluvial fan depositional environments (Self 2000, 2002). Later in the Pleistocene, the deposition of loess occurred in the uplands. This finely ground

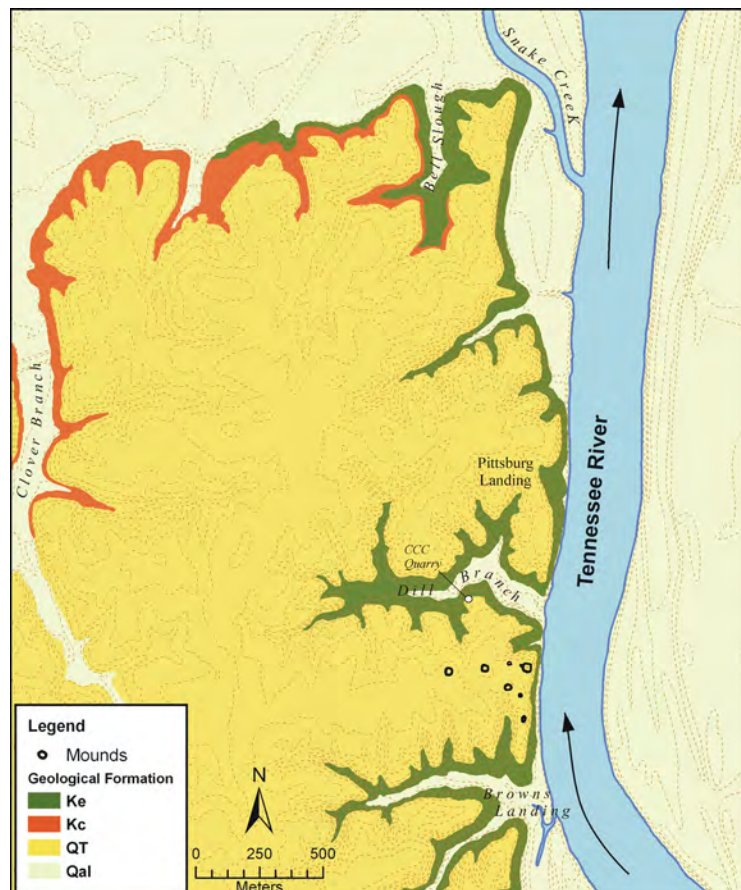


Figure 10-01. Detail of the geologic map for the vicinity of Mound A. Revised from Russell (1964).

Table 10-01. Major geologic and soil unit descriptions. Explanations from Russell 1964 and Proffitt 1963, supplemented with NRCS 2005.

Time	Unit	Description Summary
Pleistocene and Holocene	Paden Series	
Upland surface	Fine-silty, mixed, semiactive, thermic Glossic Fragiudult. Brown silt loams into a yellowish red silt clay loam at ca.15cm, increasing clay, red hue and structure with few lenses of highly weathered pebbles. Diagnostic ochric epipedons (A/E horizons), and glossic horizons containing bleached coatings (albic material) along primary ped faces, indicating fragipan degradation (Lindbo, et al. 2000). Concentrations of Fe-Mn nodules also occur in horizons above the fragipan, Depth >1.5m.	
	Pickwick Series	
Upland surface above Dill Branch	Fine-silty, mixed, semiactive, thermic Typic Paleudult. Brown silt loam into reddish brown at 15cm, with increasing clay (silty clay loam), red hue and structure with few lenses of highly weathered	
	Waynesboro Series	
Upland slopes	Fine, Kaolinitic, thermic Typic Paleudults. Black to brown loam A, E, to BA horizons to 25cm, increasing gravel, clay, red and yellow hues, and structure. Formed in unconsolidated old alluvium.	
Quaternary	Alluvium	Silt, sand and gravel, generally gray to yellowish-orange. Probably more than 12m thick along the Tennessee River, thinning up major tributaries.
Quaternary and Tertiary	Terrace Deposits	Gravel, predominantly chert with some quartzite and quartz, fine to very coarse, plus some bounders as large as 60cm in dia.), rounded, poorly sorted, commonly cross-stratified, stained yellowish-orange to moderate red; iron oxide cementation common in irregular layers as much as 10cm thick, especially near base of older terrace deposits; quartz and chert sand, fine- to coarse-grained, subangular to rounded, poorly sorted; and structureless silt, caps sand and gravel. Terrace deposits as much as 4.5m thick cap uplands in the area
Cretaceous	Coffee Sand	Quartz sand, white to greenish-gray (weathers to dark yellowish-orange), fine grained, well sorted, thin bedded to weakly cross-stratified glauconitic. Basal sand is quartz, medium-grained, with rare fine chert gravel, moderate reddish-brown. Clays, brownish-gray to medium-gray, laminated, commonly contain carbonaceous plant remains, interbedded with very fine glauconitic sand. Formation as much as 30m thick beneath terraces west of Tennessee River, thin outliers east of the Tennessee River.

Time	Unit	Description Summary
	Eutaw Fm	Quartz sand, pale olive (weathers to moderate reddish-brown), fine-grained, well-sorted, glauconitic, highly micaceous, in many places complexly cross-stratified; and clay medium-gray, laminated, with sand and mica partings, lenticular grades laterally over short distances into sands. In many places upper beds commonly contain much carbonized wood. A massive, more marine unit, Tombigbee Sand Member (less than 6m thick), present in the area. Overall formation thickness approximately 45m.
Silurian	Wayne Group	Lego Limestone is light-gray with light-pink specks, fine to medium-grained, medium-bedded, even-bedded. About 3m exposed above river level, at east end of bridge at Savannah >16km to the north..



Figure 10-02. The Eutaw Formation exposed up Dill Branch.

windblown silt-size material is typically derived from retreating northern glaciers. Some of the loess and silt-size fluvial material comes directly from the thicker deposits on the Coastal Plain to the west but some may be blowing up directly from the local Tennessee floodplain during the Pleistocene.

The interface between the terrace sands and gravels and the upper loess derived soils is the focus of several studies (e.g. Carter 1996). This interface represents a pathway for vadose water. In addition to triggering specific chemical changes it may ultimately be responsible for the seepage and the localized slipping causing the rip-rap below the mound to fail.

The chemical changes in the vadose zone result in the precipitation of iron at the base of the Terrace Deposits. The result is the formation of irregular layers of gravel cemented in iron



Figure 10-03. An exposure of the Coffee Sand Formation, upper bank of Dill Branch.

oxide which are common in the area and crop out throughout the eroded tributaries draining the uplands and along steep upland slopes (Figure 10-05). These iron conglomerates were used sporadically historically as a building resource (e.g. Shiloh Church, Figure 10-06) but appear to have been used little prehistorically (no appreciable amounts have been recovered in the Mound A excavations thus far). Historically and presently the sands and gravels of the Coffee Sand Quaternary deposits are commercially mined throughout the area. Within the boundaries of the site, just outside the remnants of the palisade wall, lies a small-scale CCC era gravel quarry that was in operation in the 1930's during Roberts' excavations (Welch 2006)



Figure 10-04. An exposure of the Quaternary Terrace Gravels.



Figure 10-05. Outcrops of the iron conglomerate in stream bed. White lines mark end of exposure.



Figure 10-06. Use of the local iron conglomerate in the construction of the Shiloh United Methodist Church.

METHODS

How we designate and describe the stratigraphy sets creates a framework for the interpretation of an archeological site. The excavation of Mound A has basically two scales of observation that are applied in order to construct a comprehensive stratigraphic database and ultimately an interpretation of the mound's depositional history. Each scale incorporates a similar interpretive framework within the "human scale" (*sensu* Stein 1993), also called the site-scale, and focuses on a different interpretive spatial resolution.

Site-scale observations, incorporating macroscopic and microscopic scales, were made of the Mound A lithostratigraphic units and their attributes. A lithostratigraphic unit is a concept borrowed from the geosciences and refers to a sedimentary unit that is distinguished and delimited on the basis of lithologic characteristics (Stein 1987:342). The macroscopic observations were made in the field primarily based on vertical profiles and later supplemented by digital images of the excavation process. These microscopic observations were based on the analysis of sediments in thin-section. Each scale of observation was relied upon to produce a comprehensive stratigraphic interpretation.

Off-Mound Geoarcheology Methods

Off-mound comparative work was conducted at both scales in order to determine the potential

sources of the moundfill. As noted above, the choice of moundfill can be significant, both in terms of its engineering properties, as well as the symbolic meaning that specific colors or textures may possess. So our ability to identify the local raw material provides insights into the acquisition and transportation costs necessary to obtain the sediments used to construct the mound. We can also use this characterization of local raw materials, relative to the moundfill stratigraphic units, to begin to trace the processing involved as local materials are combined or extracted to create the desired medium.

The identification of potential source areas began with a careful overview of the regional geologic maps and soil survey to assess the variability and distribution of the local soils and sediments. During the winter, at the time of site visits in 2002, 2004, and 2005, when the absence of vegetation allowed the best ground visibility, the area off the mound was carefully covered on foot looking for exposures to sample and describe and fine-scale topographic variability that might suggest prehistoric mining areas. Exposures were photographed, sampled and briefly described using the same standardized descriptions as the mound stratigraphy. The methods used to collect representative soils and sediments samples are the same as those described below. Sample locations, descriptions, results and implications follow this methodological section.

Mound Geoarcheology Methods

This section explains the methodology used to record and describe the lithostratigraphic units at Mound A, both macroscopically and microscopically. The nomenclature employed is clearly defined and whenever possible consists of standardized terminology.

MACROSTRATIGRAPHY

The initial recording and subsequent reporting of thorough field descriptions based on standardized criteria and terminology are requisite tools of archeological investigation. Lithostratigraphic designations should not imply interpretation (e.g., house floor, kitchen midden) but should consist

of standardized descriptive terms that can be reproduced by others, incorporated into sampling routines and easily communicated.

The excavation strategy of Mound A evolved through the four field seasons as the stratigraphy became clear and depending on whether the team was excavating test units or opening large areas. The initial excavation units were maintained at 1m squares and excavated in 10cm levels that later shifted to lithostratigraphic units. Levels recorded on Excavation Unit forms have unique stratigraphic designations that are not always correlated between units or levels. Stratigraphic correlations were limited to profile drawings per vertical exposure that were not designated uniformly between profiles. In the field, stratigraphic descriptions for the profile drawings by SEAC consisted of Munsell colors and textures. Each “zone” was indicated using a number and defined by clear stratigraphic breaks, color and texture. These zones are considered three-dimensional lithostratigraphic units though they were not always correlated in three dimensions. In some cases the zone descriptions were expanded during the geoarcheological field data collection. The field zone numbers on the profiles, used as essentially color codes, were not incorporated into the excavation documents, so correlating stratigraphic units with artifact distributions is a careful matter of determining unit and level elevation data with zone.

Please note there may be occasional discrepancies with the color or textural designations used here relative to the legends on the profiles. The designations that appear in this discussion are not incorporated into the field documents, as these assessments are based on a combination of field and lab analysis that the field technicians did not have access to. The “color legend” textures on the profile figures in particular should be considered field estimates.

For the purposes of the geoarcheological study the field excavation unit and strata numbering system had to be replaced with one that incorporates the stages of mound construction. These stage and zone/subzone designations (see below) were subsequently adopted throughout the analyses in this volume to describe the excavation results

and present summary data by major provenience. The large E179 profile combined with the E185 profile and the identification of stage surfaces as unconformable boundaries containing prepared surfaces and/or architectural features, served as a guide to designate the overall stages. Though geologically and temporally a bit confusing, for ease in the process of excavating from the top down, Stages are designated in this manner, using roman numerals with Stage I representing the current ground surface to Stage VII, the deepest cultural deposits associated with Mound A. The radiocarbon and thermoluminescence results provide the data that define the stages as chronostratigraphic units (see Chapters 12, 21). Chronostratigraphic units are groups of zones (or strata) that accumulated during a specific time interval (Stein 1987, 1990).

From the onset it is safe to say that with the small fraction (≤ 5 percent) of the mound that has been excavated thus far, that these stage designations most likely represent only a portion of the construction phases actually present. This, and the need to be able to distinguish various types of zones composing the stages, are the basis for the further divisions of the stratigraphic units.

Zone groups designated within the stages are given lower-case alphanumeric designations (e.g. IIIa, IVb) from bottom to top. These represent major “packages” of zones that could be distinguished in profile as directly associated, typically chronostratigraphically. These are further broken down by individual zones that follow the stage with a hyphen and are designated numerically (e.g., IIIa-2, IVb-4). The smallest zone division is a subzone and is designated as an alphabetic lower-case character that represents the smallest variability within a zone that could still be delineated and separated from the surrounding sediment during this analysis (e.g., IIIA-2b, IVB-4c). This smallest division usually includes conformable boundaries that could be observed in the field.

There are two sources of logic for this “zone” system. The first is purely practical. If and when new stages are discovered, only the stage will need to be adjusted, but the remainder of the zone designations can stay intact. The second source of logic is

paradigmatic. As stated in the introduction, in reality a mound is a series of deposits or zones which are technically artifacts. The zones, in many cases are laid down in a systematic way using specific material that suggests dictation by cultural laws in order to create a final product. So the designation of zones within a stage will facilitate a discussion of both how and perhaps why the mound was constructed.

From a strict geoarcheological perspective, the numerous “features” consisting of post holes, wall trenches, and hearths are all fundamentally deposits or zones (*sensu* Stein 1987). The term feature is in and of itself a relic, produced from conceptualizing the archeological record as a series of artifacts and significant human intrusions (e.g., hearths, storage pits, structures) into a sediment or soil that generally represented only the medium holding the artifacts in place (Stein 2000). Archeology has become more concerned with the formation of the archeological record and in environmental reconstruction we realize that the “matrix”, and not just the artifacts, is a significant data source (Macphail and Goldberg 1995). In the case of mounds and earthworks almost all stratigraphic units within a mound can be considered significant data sources. So although zones and features are paradigmatically the same in this context, they are treated and discussed separately.

MICROSTRATIGRAPHY

The microscale observation and analyses were carried out using soil/sediment micromorphology studied from thin-sections. Micromorphology is the study of undisturbed soils, sediments and other archeological materials (e.g., ceramics, bricks, mortars) in thin-section at a microscopic scale. The technique employs undisturbed, oriented samples in which the original components and their geometric relationships are conserved (Courty et al. 1989). Micromorphological analysis allows the observation of composition (mineral and organic), texture (size, sorting), and fabric (the geometric relationships among the constituents). Within an individual thin-section it is possible to observe micro-stratigraphic sequences that reflect temporal changes in depositional and post-depositional processes.

Sampling Protocol

The field protocol used to collect intact block samples for micromorphological analysis is quite simple, especially in the context of Mound A where the sediments are compact and cohesive. Standardized large format thin-sections in North America are 7.5x5cm (2x3in) so the blocks that are typically collected to fit generally measure approximately 15x8x8cm. In a few cases where potential source material was being sampled, smaller blocks were removed for standard geological thin section slides measuring only 2.5x5cm (1x2in). Regardless of the block size the protocol always includes the vertical orientation of a sample, its exact location (three-dimensional coordinates) within the site, and observations as to the lithostratigraphic unit(s), which the sample represents. Block samples were cut from profiles (Figure 10-07) (typically vertical but occasionally horizontal at boundaries between zones, from within zones and from specific structures within zones. The list of samples from the mound and their provenience information and the zones they represent are presented in Table 10-02.

Each sample was wrapped in tissue, secured with packaging tape and labeled in the field. Samples were temporarily curated at Middle Tennessee State University, Department of Sociology and Anthropology (2001–2002) and later at the UTK, ARL (2003–2005) until they could be selected for thin sectioning. Once selected, samples were packed and double boxed and sent to Spectrum Petrographics, Inc., in Winston, Oregon. At Spectrum, under the direction of owner Dr. Michael DePanger, samples were unwrapped, set in frames, dried and impregnated with epoxy or polyester resin under a low vacuum. The hardening process can vary depending on the proportion of catalyst and the ambient temperature and humidity in the lab.

When samples were completely hardened, they were trimmed with an oil- or water-cooled geologic trim saw to a 7.5x5cm, with variable thicknesses of 2–4cm. These blocks were then ground and polished, affixed to a glass slide and then cut and ground to approximately 30 microns (μm) thick to create the final thin section. When the thin sections are received



Figure 10-07. Collection of micromorphology soil/sediment samples in the field.

from SPI they are rinsed and lightly sanded with 800 grit sand paper to remove any remaining debris.

Thin-section Analysis

Thin-sections were systematically described using a combination of terminologies. Descriptive criteria were based primarily on Bullock et al. (1985), which have been updated by Stoops (2003) and includes a comprehensive morphological descriptive system that focuses on soils, and Courty et al. (1989), which targets archeological sediments. There is no universal descriptive system or format for soil thin-sections, especially archeological sediments. While Bullock et al. (1985) have suggested a worksheet format most descriptive formats in use today are geared towards the specific soil type or specific research questions and consist of tables or narratives. Some of the terms traditionally used in archeological micromorphology have tended toward interpretive language; these were avoided in this study. For universal communication and critical assessment it is important to use standardized terminologies. Anthropogenic sediments in general, however, offer some unique circumstances that require a variation

Table 10-02. Thin sections from Mound A excavations at the Shiloh Mound Complex.

Sample	NPS Field Specimen	N	E	Depth	Profile	Zones Represented	Date Collected	Comments
01SM001	867	50.00	181.00	11 cmbs	W	I-1	9/392001	A horizon material
01SM002	868	50.00	181.00	83 cmbs	W	II-2a	9/392001	thin red zone extending into weathered fill
01SM003	869	50.00	181.00	98 cmbs	W	II-b	9/392001	red veneer on grey md (Stage IIb)
01SM004	870	50.00	181.00	107 cmbs	W	II-b	9/392001	interior of grey md (Stage IIb)
01SM005	871	55.00	181.00	55 cmbs	W	II-b	9/392001	red veneer on grey platform sloping up to the west
01SM006	872	51.00	181.00	62 cmbs	W	II-b	9/392001	top of grey mound with tin, less consistent red sand veneer top
01SM007	874	48.00	181.00	210 cmbs	W	Ib-1a, IIc-2a	9/392001	prepared surface, archeomag
01SM008	875	36.00	180.00	140 cmbs	S	W1	9/392001	
01SM009	876	35.00	180.00	142 cmbs	S	IIIg-7a, IIIg-6b	9/392001	cuts through possible slack water deposits above red
01SM010	878	35.00	180.00	152 cmbs	W	IIIb-7a (top)	9/392001	cuts through possible light slack water deposits above red, includes underlying reds, not wash?
01SM011	879	35.00	180.00	160 cmbs	W	IIIg-6a	9/392001	thin red lenses
01SM012	880	35.00	180.00	168 cmbs	W	IIIg-6a	9/392001	base of red wash over more massive sand
01SM013	902	35.00	180.00	176 cmbs	W	IIIg-6a, IIIe-5, IIIc-6a	9/392001	more massive deposit over top of grey banding
01SM014	903	35.00	180.00	184 cmbs	W	IIIe-5, IIIc-6a, IIIc-6	9/392001	surface and contact, grey banding, same time as use of 3e
01SM015	916	36.00	180.00	165 cmbs	S	W1, W2	9/392001	contact of yellow mottled with pebbles and red band
01SM016	917	33.00	180.00		N	W3, W4	9/392001	rocky fill over sharp band of ?. Note: TS is upside down
01SM017	918	37.00	180.00	114 cmbs	W	W1a, W1	9/392001	grey veneer on 3b - yellow mixed fill, nature of the grey?
01SM018	919	70.00	181.00	0	F	n/a	9/392001	burned surface, prepared? Stage unknown, base of N md.
01SM 019	920	63.00	181.00					
03SM053	3226	39.00	181.85	543 cmbd	N	IIIe-1a, IIIe-1b	9/15/2003	inverted sod block
03SM057	3230	38.00	183.13	610 cmbd	N	W6	9/15/2003	floors

Sample	NPS Field Specimen	N	E	Depth	Profile	Zones Represented	Date Collected	Comments
03SM058	3231	39.00	180.50	508 cmbd	N	/	9/15/2003	grey veneer, slope of the md, see dia in field notes
03SM059	3232	39.00	180.50	512 cmbd	N	/	9/15/2003	grey veneer, slope of the md, see dia in field notes
03SM062	4562	51.00	180.00	250 cmbd	n/a	IIb-1	9/16/2003	variable shades of grey silt loads, feels like ash in the field when moist
03SM066	4566	39.00	179.00	438 cmbd	N	IIIf-1a, IIIf-2a	9/16/2003	"tiger stripe" md, yellow over red, see dia in field notes
03SM069	4569	40.00	180.69	410 cmbd	N	IIIf-3, IIIf-5	9/16/2005	lens on top of IIIf (red loamy sand) - surface or wash?
03SM070	4570	40.00	179.00	475 cmbd	N	IIIf-7a,b	9/17/2003	interior contact red and yellow
03SM071	4571	40.00	181.70	520 cmbd	N	IIIf-6a,	9/17/2003	inverted sod block inside over sep red load, could be part of 3g, see desc
03SM073	4574	40.00	183.80	533 cmbd	N	IIIf-2a, W5	9/17/2003	inverted sod block on the slope of the "rocky md" Stage IIIf, overlying wedge deposit of W5 yellow weathered chert sand and mixed soil aggregates
03SM074	4575	40.00	183.20	567.5 cmbd	N	IIIf-2b	9/18/2003	mixed gravel lenses, sloping downward to the west
03SM076	4577	40.00	183.00	558 cmbd	N	W7, IIIf-1b, IIIf-1c	9/17/2003	red surface in IIIf, loading or a surface?, not the clast md, further to the W; W7 wedges in from the east -source?
03SM080	4581	39.90	184.00	616 cmbd	W(185)	IIIf-7	10/29/2003	zone at the top of E184 profile, roots
03SM081	4582	39.90	184.00	626 cmbd	W(185)	IVc-1; IVc-1a; IVd-1	10/29/2003	clayey sand of fine sand a laminae or prepared surface?, over IVc-1, mixed clasts of red clayey sand, silt loam and mixed dark brown loam clasts.
03SM082	4583	39.90	184.00	644 cmbd	W(185)	IVc-1, Vc-4, Vc-3, Vc-1	10/29/2003	at the base of Vb-4 are tan and med brn silt laminae
03SM084	4585	39.90	184.00	683 cmbd	W(185)	Vc-1, Vb-4	10/29/2005	medium brown, massive mixed "midden" (?)
03SM085	4586	39.90	184.00	705 cmbd	W(185)	Va	10/29/2005	hard (fired) prepared surface over intrusive mottled red sic filled basin
03SM086	4587	39.90	184.00	726 cmbd	W(185)	IV	10/29/2003	

Sample	NPS Field Specimen	N	E	Depth	Profile	Zones Represented	Date Collected	Comments
03SM087	4588	39.90	184.00	734 cmbd	W(185)	V1c-3	10/29/2003	2 zones visible in the field under prepared surface Vic-4, mottled red silt
03SM089	4590	40.05	184.00	741 cmbd	W(185)	V1c-3, V1c-1	10/29/2003	sediment below red prepared surface and mottled red soft sediment below that
03SM091	4592	39.90	184.00	774 cmbd	W(185)	V1a-1,	10/29/2003	Possible A horizon over light brown deposit or horizon?
03SM092	4593	39.90	184.00	798 cmbd	W(185)	VII	10/29/2005	sic
03SM093	4594	39.90	184.00	824 cmbd	W(185)	Subsoil	10/29/2005	sc w/ highly weathered chert
03SM097	4598	45.59	184.00	832 cmbd	W(185)	Subsoil	10/29/2005	cs with fragic properties
03SM099	4599	42.00	187.30	0 cmbd	N	historic, IVc	10/29/2005	historic slump, truncated, what is the red lense that marks the content
03SM101b	4601	49.65	180.48	382 cmbd	F	Struct 3	10/30/2005	fallen daub wall
03SM105a&b	4604	48.04	180.85	398 cmbd	N	105a = W8; 105b = IIIg-1	10/30/2005	below St. 5, top of tiger St. Md, detailed field notes
03SM106	4605	48.04	180.95	417 cmbd	N	III f-7, III f-7b	10/30/2005	is the red a floor remnant or loading?
03SM107	4606	48.04	180.95	437 cmbd	N	III f-7, III e-4	10/30/2005	same yellow as "tiger stripe"? Top of 3f, part of brn md? Same material? Note Mn nodules, what source
03SM108	4607	48.04	180.60	458 cmbd	N	III e-4, III e-3	10/30/2005	is lower zone a surface? Between subzones yellow micro-laminations could be wash from higher place
03SM110	4609	45.03	181.87	523 cmbd	N	III b-7a	10/30/2005	across inverted sod block
03SM112	4611	45.03	181.80	565 cmbd	N	III b-6b, III b-5e	10/30/2005	inverted sod block
03SM114	4613	45.03	181.35	613 cmbd	N	III b-5c, III b-3b	10/30/2005	rocky md over mixed grey silt (looks like "ash") and "nugget" with burned lens inbetween. 116 and 114 should be different if rocky md was there first and a separate entity
03SM115	4614	45.03	182.13	609 cmbd	N	III b-3e, IV b-1a	10/30/2005	base of III b? (rocky md) with burned lens? Over mottled red? 116 and 114 should be different if rocky md was there first and a separate entity
03SM116	4615	45.03	180.32	610 cmbd	N	III d-1, III d-1a, III b-5c	10/30/2005	base of III d, where does the grey lens between III d and III b come from?

Sample	NPS Field Specimen	N	E	Depth	Profile	Zones Represented	Date Collected	Comments
03SM117	4616	45.03	180.32	618 cmbd	N	IIIb-5c, IIIb-3c	10/30/2005	where base of IIIId, edge of IIIb, and top of IV come together.
03SM118	4618	45.03	180.00	639 cmbd	N	IVa-1, Vc-3	10/30/2005	intersects base of red zone that marks top of Stage IV(?) and dark possible midden below
03SM154 a&b	4623	37.55	179.00	544 cmbd	W	IIIg-2a	11/17/2005	lens on slope over Stage IIIf (tiger stripes), fascade or veneer? Clasts of red clay and clean white sand
03SM157	4626	37.55	179.00	580 cmbd	W	IIIIf-3a	11/17/2005	yellow "tiger stripe"
03SM161	4630	39.25	179.00	502 cmbd	W	IIIIf-3, IIIe-5b, IIIe-5a	11/17/2005	tiger stripe over stacked lenses of IIIe. Not describing upper IIIf (see 157), underlying
03SM165	4634	39.45	179.00	573	W	IIIc-2a	11/17/2005	inverted sod block, red silt loam, marks the outer "surface" or building phase of IIIc-2
03SM171	4637	41.65	179.00	363 cmbd	W	IIIh-2, IIIg-4	11/17/2005	mottled grey over (irreg. contact) mottled red over a red surface
03SM173	4640	41.75	179.00	405 cmbd	W	IIIg-3, IIIg-2	11/17/2005	mottled red of IIIg-3 over black thin lens (soot floor?), IIIg-2 over "tiger stripe md" of IIIf
03SM174	4641	41.65	179.00	428 cmbd	W	IIIg-1a, IIIf-6	11/17/2005	contact, a dark red sic clasts with clean white sand over mixed yellow, slopes up to the south
03SM175	4642	42.10	179.00	547 cmbd	W	IIIIf-6, IIIe-3, IIIe-3b	11/17/2005	IIIIf-6 mottled yellow / IIIe-3 yellow sand / IIIe-3b lens sloping upward toward the south off of IIIf-5?, what is this coming off of? Or is it cutting into IIIf-5?
03SM180	4646	37.55	179.00	605 cmbd	W	IIIe-7b	11/17/2005	laminated grey deposits coming down from Stage IIIe, under IIIf
03SM182	4648	42.25	179.00	348 cmbd	W	IIc-1, IIa-8	11/18/2005	mottled grey and red mound fill from center "depression" between two mds over variable xbedded sands (concentrated at the top of IIa-8), washing from the S. side of basin?, over wash zones
03SM183	4649	42.25	179.00	366 cmbd	W	IIa-7	11/18/2005	base of wash zone, over grey mottled , cover of XLIII wash over III?

Sample	NPS Field Specimen	N	E	Depth	Profile	Zones Represented	Date Collected	Comments
03SM184	4650	46.24	179.00	373 cmbd	W	Ila-7, IIh-2c, IIIh-2b	11/19/2003	complex series of zones at the intersection of IIa and the top of Stage IIIh
03SM187	4653	46.24	179.00	408 cmbd	W	IIIg-4, IIIg-2	11/18/2005	last floor of Stage III, red slipped or possible soot, ceramic for TL and ceramic recovered from this surface, under last floor in Stage III
03SM188	4654	46.24	179.00	417 cmbd	W	IIIg-2, IIIg-1	11/18/2003	contact between IIIf-6 & IIIe-3 to the north, correlate across 2d profile - how does this compare with SM175 on opposite side?
03SM190	4656	46.75	179.00	470 cmbd	W	IIIe-3	11/18/2005	complex xbedded lenses with red laminae or veneer.
03SM193	4658	49.50	179.00	364 cmbd	W	IIb-5	11/18/2003	S side of the IIb, shaped like steps, is there compression here? Eroded?, capped with red veneer?
03SM194	4659	50.85	179.00	280 cmbd	W	IIc-1, IIb-1	11/18/2005	grey silt platform md
03SM198	4662	52.35	179.00	116 cmbs	W	IIb-1	11/18/2003	red lens, wash? Surface?
03SM200	4663	52.35	179.00	64 cmbs	W	II-	11/8/2003	contact of red zone, floor?, beneath grey platform md
03SM203	4666	52.35	179.00	173 cmbs	W	IIb-2, IIb-2b	11/8/2003	contact, massive LVII and extent of grey md? LV
03SM207	4669	54.50	180.00	75 cmbs	W	IIb - north	11/8/2003	lev 23, EU 53, St 5 wall fall, daub material?
03SM400	4254	53.85	181.50	385 cmbd	F	III?		lev 12, EU 122, floor, St. 3
03SM401	4111	52.11	179.15	375 cmbd	F	III?		

on some of the existing terminology. A combination of terms, defined below, was employed in order to systematically describe each thin section.

Each thin section was first examined macroscopically. These initial steps allowed comparison with field notes and zone descriptions with observations of the macroscopic structural features. In very rare cases mistakes can be made in the lab and are identified at this point, such as an incorrect orientation. Thin sections then underwent detailed examination using a Nikon E600 petrographic microscope equipped with transmitted polarized light to view thin sections in cross-polarized light (XPL) and plane polarized light (PPL). Oblique Incident Light (OIL) is also used when describing the thin sections. Magnification ranged from 20x–400x. Most observations were made at a magnification of 20–40x. Whenever photomicrographs are shown in the report, plain polarized light is always on the left and to the right the same view is shown in cross-polarized light unless otherwise noted.

The detailed thin section descriptions and associated images are presented in the electronic appendices as Geoarcheological Thin Sections (GTS), Appendix A. The images were created by scanning the thin section using a transparency adapter on a Microtek ScanMaker5 flatbed scanner. This image serves as a record of the thin section and provides a basic image for mapping and labeling the zones represented in each thin section. A microstratigraphic description accompanies each thin section image. This description is derived from a relational database for archeological thin section description, originally created in Microsoft Access by the author with subsequent updates by UTK graduate student Stephen Yerka. The basic zone descriptions are recorded in this database as well allowing all subsequent sample data and descriptions to be linked back to the zone. The database consists of a normalized set of tables that rely on the zone designations to organize data into a comprehensive record. The database emphasizes the importance of zones via the zone table, an entity that describes detailed geoarcheological

data at a range of scales anchoring different data tables within the depositional history of the mound.

The primary keys are the Stage and Zone (e.g., IIIc-2, IIa-7) and the sample (e.g., “03SM112”). These primary keys link all the data tables and a graphic user interface, designed with drop-down menus, was used to maintain systematic descriptions during data entry. The presentation of the data, recorded for each thin section, was produced by querying the micromorphology database and creating an Access report that was then translated into MS Word format.

Each thin section was organized into zones. The zones (as noted above) are lithostratigraphic units observed in the field, while the microzones are microstratigraphic divisions too small to isolate in the field for excavation, and observed and described using micromorphology. The structure of each lithostratigraphic unit visible in each thin section was described first by microstructure, followed by more detailed observations on the fine fraction, coarse fraction (silt, sand and gravel), aggregates, voids, and finally post-depositional features. Two final categories in the database are designated *Interpretation* and *Images*. *Interpretation* is divided into five text fields that include a summary of the depositional history—source, transport, environment of deposition, post-depositional alteration, and notes. These are meant to be a “working draft” of each thin section and are not incorporated into the electronic appendices.

The *Images* section designates the file name of the photomicrographs and provides a description and the magnification at which it was recorded. This has been converted into a separate Geoarcheological Images (GI), Appendix B. These digital images were recorded with a Polaroid Digital Microscope Camera using Polaroid DMC V2.0 software. Each image includes a view with plane polarized light (PPL) and cross polarized light (XPL) representing standard features as well as unique features or attributes within specific zones. Throughout the discussion of the zones digital photomicrographs are used to illustrate aspects of the narrative descriptions. These are given figure numbers and are in the text but the

same image is also listed among the images by thin section in GTS Appendix A, and can be viewed in GI Appendix B, in the electronic appendices.

Thin-section Description

Presented below are the definitions of the attributes and their descriptors (e.g., size, shape) in the order in which they appear in the database. The majority of the parameters observed are standardized micromorphological features and can be found in either Bullock et al. (1985) or Courty et al. (1989). Also in this section terms are defined that require clarification because of their inconsistent usage in the literature. Micromorphological observations are made qualitatively (presence or absence) and semi-quantitatively. The majority of the semi-quantitative estimates are made using charts of visual field percentages within various particles sizes available in Bullock et al. (1985) and FitzPatrick (1980) and then operationalized using standardized adjectives for expressing either abundance or frequency (Bullock et al. 1985; Stoops 2003) (Tables 10-03 and 10-04). These have been altered slightly to fit the Mound A distributions observed in the initial thin section screening. Point-counting in soil/sediment thin sections can be an onerous task, and often produces quantitative data that are not necessary to address micromorphological questions. The use of percentage charts is a widely accepted, expedient, reproducible and reliable technique to estimate abundance in thin section (Courty et al. 1989; FitzPatrick 1980, 1984).

Most formats typically used for micromorphological description assume that the thin section and most certainly the individual zones within the thin section are relatively consistent. The thin sections from Mound A presented a descriptive

challenge in that it was not unusual to have several materials from different sources in one zone. For example, describing the frequency of sand grains could vary significantly depending on the clast under observation; the clast that might be adjacent could be without any sand. So the descriptive section provides a best attempt to distinguish unique aggregates or clasts under the aggregate section, however if the zone is composed with relatively equal parts from different sources, these do not appear in the aggregate description and are summarized as a whole in the general description.

Microstructure

The initial entries for each zone, in each thin section in the database, are based on microstructure. The arrangement of the solid components, their size and shape, and the voids between them generally define microstructure or the geometry of the material. There are several ways to describe microstructure. The terminology applied here distinguishes the microstructure from several different viewpoints including boundary (lower contact is applicable), structure, related distribution, and sorting.

Boundary

The contact between microstratigraphic zones is an important observation but one that is not assigned specific nomenclature in the literature. This attribute is typically relegated to the microstratigraphic scale of observation in soils and sediments. The nature of a transition between two units can inform as to the presence or absence of a conformable or unconformable boundary signifying the nature of the processes that created that boundary. In the context of Mound A, for example, unconformable

Table 10-03. Frequency of constituents in thin section (based on Bullock et al 1985:23).

Frequency	Area (Percent)
Dominant to Very Dominant	>50
Common	30–50
Frequent	15–30
Few	5–15
Very Few	<5
Trace	<1

Table 10-04. Abundance expressed for fabric units in thin section (based on Stoops 2003:49).

Abundance	Area (Percent)
Very Abundant	>20
Abundant	10–20
Many	5–10
Occasional	2–5
Rare	1–2
Trace	<1

boundaries are critical in the distinction of types of moundfill.

In an effort to describe the microstratigraphic boundaries, criteria were borrowed from soil science to define the distinctness of a boundary, here characterized by the thickness of the transition, although in field descriptions of soils the boundary limits are clearly thicker. The boundary was only described if the lower contact was visible in the thin section. If a boundary was not present in thin section then “n/a” was recorded. If a boundary was present it was described as *sharp* (<0.5mm), *clear* (0.5–3.0mm), *diffuse* (>3.0mm), or *wavy* (an inconsistent or irregular contact).

Related Distribution

The spatial arrangement of the coarse and fine fraction is referred to as the related distribution (Bullock et al. 1985). The limit between the coarse and fine fraction is designated here as 2 μ m (the division between silt and clay). The related distribution is described based on five established types of geometric patterns that relate the coarse and fine constituents (Bullock et al. 1985; Courty et al. 1989:73–74; Stoops and Jongerius 1975). The standard terms used to describe the distributions are monic, gefuric, chitonic, enaulic, close porphyric and loose porphyric (Courty et al. 1989:73–74). The majority of the zones in Mound A are described as either close or loose porphyric where the coarse particles are embedded in a matrix of finer material (typically silt loam), either concentrated (close) or scattered far apart (loose). Occasionally a combination of patterns is present and both are listed.

Fine Fraction

The fine fraction is the clay size portion of the matrix (< 2 μ m). This material cannot be clearly defined in thin section using petrographic microscopy due to the thickness of the sample. Therefore, description was restricted to the general descriptions of color (in PPL), b-fabric (see below), presence or absence of organic matter and ash, and general comments. The color designations traditionally suggest specific conditions. For example, the color red-

brown generally indicated oxidized clay (typically burned) or residual clay. Black indicated charcoal and/or organic matter. Since Munsell colors had already been recorded in the field, colors were distinguished in thin section intuitively since only one observer was involved—the author—and as the thickness of the thin section can influence color, the designation has limited meaning in this context.

The b-fabric (or birefringence fabric) is an expression of the internal geometry of the fine materials represented in interference colors and birefringence observed under XPL (Bullock et al. 1985:66; Courty et al. 1989:74; also see FitzPatrick 1989 for a discussion of the term birefringence). This attribute reflects the nature of the mineral material in the fine fraction and possible post-depositional processes affecting the geometry. Four types of b-fabric are used to describe the fine fraction at Mound A: undifferentiated, crystallitic, speckled and striated. In the absence of interference colors suggesting either the presence of isotropic or opaque minerals or the masking by humus or sesquioxides, the fine fraction is identified as undifferentiated (Courty et al. 1989:74). Crystallitic b-fabric refers to the presence of fine birefringent materials resulting in an overall birefringent appearance. Speckled b-fabric refers to the random appearance of birefringent materials. A striated b-fabric was designated when elongated zones of birefringence were clearly present. The striated fabrics identified in the Mound A sediments are rare but, when present, suggest wetting and drying conditions as well as intense compaction resulting in pressure, sometimes visible around coarse grains from deep in a soil profile (FitzPatrick 1993).

Ash and organic matter were noted as present or absent. Ash is generally silt size when the crystals are articulated, but the crystals may be dispersed, resulting in gray colored clay or fine silt size material. Ash is commonly subject to post-depositional dissolution or reprecipitation, making it difficult to recognize individual ash particles. Both of these materials, when present among the coarse materials, were recorded in that portion of the database. Ash was rarely observed in the main mound (higher than 620cmbd), but is

more common in the lower reaches of the profiles where preservation in general is better. Organic matter here refers to the presence of organic matter in the clay size fraction. In this fraction organic matter is typically present as opaque, dark coloration. There is little else that can be observed at this scale. The fine fraction observations were completed with general comments that typically noted the general character of the matrix.

Voids

Another important characteristic of the microstructure is the voids, here defined as spaces within aggregated and non-aggregated materials. These features are described in the database in their own table, so they are presented apart from the microstructure section above. Different types of voids describe the morphology and imply the origin of the cavities. The void types are packing, channel, vesicular, vugh, chamber, plane, and sponge, following the usage of Bullock et al. (1985) and Courty et al. (1989). The void frequency is determined as a visual frequency estimate using the charts for percentages in visual fields with various particle sizes (Bullock et al. 1985:24–25). These estimates were made based on the representation of each void type and their distribution across the thin section. In the notation field, pertinent observations such as the size of chambers, type of packing voids, and other features directly related to the voids were recorded.

Aggregates

Different kinds of aggregates are identified in pedology and include peds, generally described as structure, and less permanent fragments of material generated by cultivation or frost action (Bullock et al. 1985). Here “aggregate” is used to refer to rounded compound grains made up of a combination of reworked soil, mineral and/or non-mineral grains. Due to the nature of the variable sources of material used to make the mound it was not possible to come up with a systematic list of aggregate types that appeared consistently in the Mound A thin sections. Therefore a more free style description was provided, describing aggregates

as they are observed, trying to remain consistent in terminology when similar types of aggregates were observed between thin sections or zones. Aggregates in the mound had to be distinguished from the coarse and fine fractions as they can contain combinations of one or both size fractions but represent different origins and processes. They are only designated and described if they were unique, i.e. if they varied relative to the dominant sediments making up the matrix. In many cases the overall structure was composed of consistent aggregates but these were described as the general matrix and not segregated as aggregates.

Coarse Fraction

The coarse fraction described for the Mound A thin sections consists of silt ($50\mu\text{m}$ – $2\mu\text{m}$), sand (2mm – $50\mu\text{m}$), and gravel ($>2\text{mm}$) size materials. These materials include rocks, minerals, organic matter and artifacts. The frequency of each size range is estimated using the same visual percentage charts used for voids (Bullock et al. 1985:24–25) (see Table 10-03). Gravel is recorded with frequency and the type is noted. Gravel from Mound A is typically limited to weathered chert from the Pleistocene Terrace deposits, or occasionally artifacts. Gravel size clasts are usually avoided in block sampling techniques in order to remove an intact sample and to reserve the limited number of artifacts in the mound for archeological analysis. So if gravel is present in thin section they are typically well represented in the zone.

Overall frequency, sorting and composition are recorded for both the silt and sand fractions. Sorting is expressed for both sand and silt and is generally considered a consequence of the source and transport medium. This attribute can be determined in part by the frequency estimates for sizes, but this type of observation provides a straightforward way to compare among zones and between particle types within the database. Sorting has been successfully estimated from thin sections using a simplified version of a chart proposed by Courty et al. (1989:68). This chart distinguishes eight degrees of sorting that were reduced to

Table 10-05. Sand and silt particle types and descriptions identified in thin sections from Mound A. Listed alphabetically.

Name	Definition
Ash	Ash crystals, rare in the mound, appear as single white, yellow and predominantly gray highly birefringent calcium carbonate crystals in various shapes (lozenge, rhomboid, spherulitic). Due to the single crystal size ash is recorded in the silt size fraction only. Among the sand-sized particles the crystals can be aggregated and are recorded among the aggregates.
Bone	Bone (calcium phosphate) fragments and whole fish and microfauna elements appear both burned and unburned. Bone is identified by its unique shape, low birefringence and “ropy” pattern, going from yellow to brown in color (PPL) (Courty et al. 1989:109)
Charcoal	Charcoal fragments are black or opaque, typically angular in shape with distinct internal structures (including both wood and nut). The degree of combustion and size varies. Whenever possible charcoal is broken down into wood charcoal, cane charcoal or seeds but typically there are not enough of the morphology present to make such a distinction and it is recorded as unknown charcoal. Whenever possible the presence of clear plant structure is noted in the hopes that the data set can be easily searched in the future for thin sections appropriate for botanical study.
Chert	In this context chert specifically refers to the microcrystalline chert derived from the local Quaternary Terrace Deposits. It is clearly distinguished in thin section, based on texture and high degree of weathering compared to the finer grained chert types used in lithic manufacture. Shape is also a distinguishing factor as non artifact chert is either rounded or weathered relative to fresh fine grained material that is angular. When “weathered chert” is noted it pertains to the presence of neoformed clay adhering to irregular surfaces and voids inside the chert.
Concretion	Concretions are opaque nodules of iron or manganese that appear in various forms and sizes. The typical concretions are rounded fine sand size clasts that sometimes incorporate grains of quartz sand. The concretions are derived from local soils in the area. Noted alternatives include various forms of manganese dioxide segregations that are typically related to wet conditions. Several of the concretions observed have distinct morphologies.
Coprolite	Coprolite fragments are rare in Mound contexts and are typically very small and composed of fine pale-yellow ground-mass with possible bone fragments and sediment. Under UV light the material is highly fluorescent.
Diatoms	Microscopic algae with cell walls made of silicon that have two separating halves and distinct morphologies usually measuring ca. 5–400µ. The presence of these silicon bodies can indicate paleoenvironmental conditions.
Feldspar	Though in far lower frequencies, like quartz, various feldspar minerals are ubiquitous throughout the local soil materials and appear to be at their highest frequency (as much as 5%) in Tennessee River alluvium.
Glauconite	Glauconite is an antigenic mineral identified in the local Coffee Sand Formation and consists of (typically sand size) green, earthy rounded peloids devoid of internal structure (visible under the polarizing microscope).
Heavy Mineral	Heavy minerals accounts for all the other (not mentioned in this list) minerals that are present. Typically these include pyroxene, garnet, rutile and others, but rarely account for more than 1% of the coarse fraction.
Limestone	Limestone is carbonate rock that is locally rare in the immediate vicinity of the mound.
Mica	Mica includes both muscovite and biotite mica as rod-shaped, pleochroic, highly birefringent laminar grains with high interference colors, some more weathered than others. >5% sand-sized mica is typically associated with Tennessee River alluvium (see Sherwood et al. 2004).
Microdebitage	In accordance with the macro-lithic distribution in the site the majority of the material appears to be fine grained Chert. Microdebitage is identified by its fine microcrystalline texture, angularity, and absence of weathering (compared to the more coarse-grained Tusculumbia chert weathering from bedrock).

Name	Definition
Papule	Papules are defined as deep red, noncalcareous, often layered, dense high-relief clay appearing as round aggregates or angular fragments. The clay can be derived from insoluble clay residues from weathering rock but typically comes from clay coatings deep in a soil weathering profile (e.g. Bt horizon) that have been disturbed and fragmented. (Courty et al. 1989:89). The absence of silt or sand distinguished papules from “aggregates”.
Phytoliths	Phytoliths are microscopic particles of silicon minerals that form in plants. While they can be identified using light microscopy (thin sections) it is difficult without extensive training in the regional phytoliths to identify species. All the identifications here are very basic and usually consist of presence absence and if concentrations are present.
Quartz	This common anisotropic mineral is observed based on its optical properties. It is common both in the upper geologic formations and in the loess soils covering the local terraces. Quartz (Qz) is typically moderately to poorly sorted in the sand fraction with variable shapes and sizes. As a dominant component of loess it is typically very well sorted in the silt fractions in the Mound.
Quartzite	Quartzite is identified based on the compressed shapes of the metamorphosed quartz grains and is common in the Quaternary Terrace Gravels.
Sandstone	Sandstone is identified as cemented quartz grains. Only a few fragments of sandstone were identified in thin section and are most likely related to use of a wet stone or other sandstone artifacts imported into the area.
Shell	Shell fragments are composed of fibrous calcium carbonate crystals in elongated thin shapes. If the fragment is large enough to reveal elements of overall morphology, this material can typically be distinguished as mussel, fresh water gastropod or terrestrial snail as well as burned (darker, duller aspect) and unburned.

five, including perfectly sorted, well sorted, moderately sorted, poorly sorted and unsorted.

Distribution describes the relationship of the sand or silt particles with respect to the other grains within that textural category (also referred to as basic distribution pattern; Bullock et al. 1985:34). Four distributions are used based on Bullock et al. (1985:35). These types are: *random*—individuals are distributed randomly throughout; *clustered*—individuals are concentrated in clusters; *linear*—individuals have a linear arrangement; and *banded*—individuals are concentrated in bands, with the distance between the individuals smaller than the distance between the bands, which can be discontinuous. More than one type of distribution could be present but the majority of the material is random at this scale of observation.

Within each database table several possible particle types were listed. These particles are listed and defined in Table 10-05. Characterizations are included since some of these types are specific to the Mound A descriptions. Recorded in the database are particle types present in the

silt and sand fractions. General notes on the predominant grain types and other observations, such as shape (referring to the basic sphericity) are listed in the note section for each fraction. Quartz predominates throughout the mound.

Post-Depositional Features

Post-Depositional Features include several pedofeatures and processes that occur in the sediment following deposition. In thin section, the presence of these features and their juxtaposition can indicate the order in which these processes occurred. The features selected for the micromorphology database were based on general pedofeatures that are often observed in thin section. In order to describe the intensity of the process in the database the distribution of each feature is listed based on abundance (see Table 10-04).

In considering soil animals, the assumption in pedology is that these features occur post-depositionally; however mound sediments and soil materials are human transported and purposefully deposited. For example, most of the microfabrics

Table 10-06. Thin sections from potential source areas.

Sample	Location (UTM)	Depth (cmbs)	Context	Description	Date Collected
04SM450	16 379800E 3889587N	n/a	Locale 1, slope	xbedded well sorted 10R 5/6 sand	3/18/2004
04SM451	16 379800E 3889587N	n/a	Locale 1, slope	black carbonaceous silty clays over xbedded sands with Fe pan forming	3/18/2004
04SM452	16 379800E 3889587N	n/a	Locale 1, slope	Red (10R 4/8) sand over increasingly “clean” sand, abrupt boundaries	3/18/2004
04SM601	16 379610E 3889907N	50	Coffee Sand above Dill Branch	Reddish gray (10R 6/1) irregular clay lenses.	3/17/2004
04SM602	16 379210E 3889912N	n/a	South side of Dill Branch	clay	3/17/2004
05SM502	16 379768E 3889502N	100	Coffee Sand, mid-way down slope of north edge of quarry depression.	Red sandy clay to sand	1/25/2005
05SM503	16 378931E 3889825N	100	Tributary to Dill Branch	Massive well sorted gray fine sand to silt with oxidized irregular mottles and few rounded unsorted highly weathered gravels	1/26/2005
05SM508	16 3279628E 3889N	0	Eutaw Fm?, ~20m from the top of the bluff	inconsistent lenses of grey clay in variable sand lenses	1/26/2005
05SM510	16 379510E 3889335N	6	Profile 2, Ultisol, A/E horizon	silt loam	1/27/2005
05SM511	16 379510E 3889335N	9	Profile 2, Ultisol, Bw Horizon	silt loam	1/27/2005
05SM512	16 379510E 3889335N	9	Profile 2, Ultisol, Bw Horizon	silt loam	1/27/2005
05SM514	16 379510E 3889335N	35	Profile 2, Ultisol, Bw/Bt Horizon	silty clay loam	1/27/2005
05SM515	16 379366E 3889775N	60	Profile 1, Ultisol, Bt Horizon	clay loam	1/28/2005
05SM517	16 379366E 3889775N	90	Profile 1, Ultisol, B/C horizon	sandy clay loam	1/28/2005

observed are the result of post-depositional bioturbation by soil animals at the source, not within the mound. These microfabrics, typically excreta of earthworms, maintain their granular structure, complete with packing or spongy voids, and are transported intact. So if bioturbation is identified under “Post-Depositional Features” then it should be understood that it was evident, based on other aspects, that the material was turbated *in situ*. This distinction between what has occurred *in situ* and what pedofeatures are originally derived from the source area is a difficult one. Experience and careful observation of the nature of these features and their juxtaposition allow for confident determinations.

Where the timing of these features in the depositional history was not clear it is communicated under *notes*.

MOUNDFILL SOURCES

Based on the color and texture variability observed in the mound stratigraphy, specific materials were sought out, mined and in many cases processed and then brought to the mound and deposited in a specific manner. As noted above, our ability to identify the local raw material available for mound construction, relative to what the mound is actually composed of, can provide data to determine the acquisition and transportation costs necessary to obtain the material as well as modifications to the material. This section reviews what types of

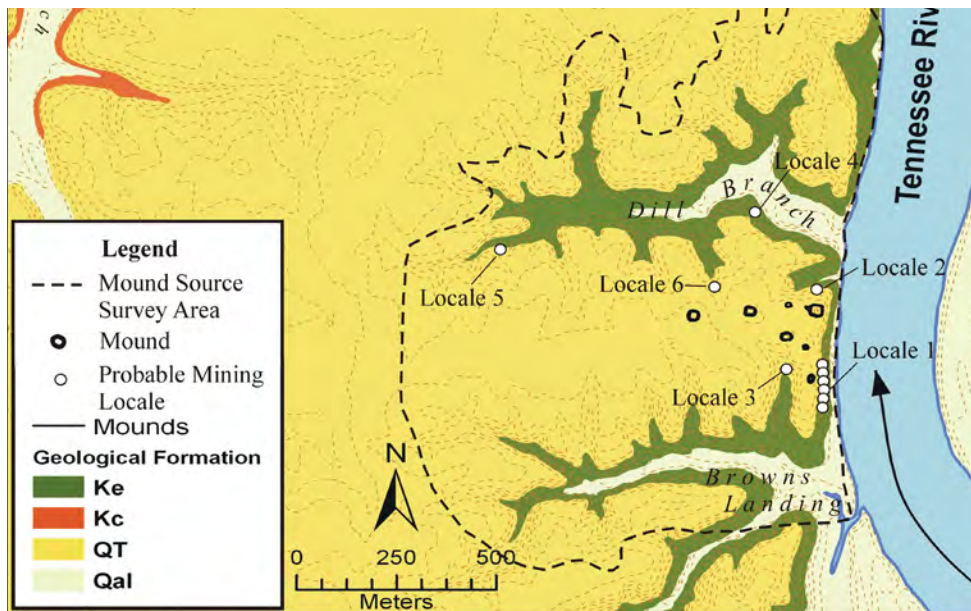


Figure 10-08. Limits of the area covered in the off-mound and off-site geoarcheological survey. Key areas in the discussion are indicated.

sources were locally available and how they would have been extracted.

The identification of potential source areas began with a careful overview of the regional geologic maps and soil survey to assess the variability and distribution of the local soils and sediments (Proffitt et al. 1963; Russell 1964, 1968). As noted above, during the winter when visibility was highest, the area off Mound A was comprehensively covered on foot looking for exposures to sample and describe. In addition, localized topographic variation was carefully noted in the hopes of identifying possible prehistoric mining areas. Here the challenge lay not in identifying these local anomalies but in distinguishing them from historic features relating to the Civil War battle and encampments, and nineteenth and early twentieth century farming and river commerce activity. Careful examination of the park's historic maps and field checking was facilitated with the assistance of NPS Shiloh historians Allen and Smith, allowing most of the features to be sorted out as prehistoric or historic. Natural anomalies such as tree falls and drainage formation were also carefully examined to compare to possible prehistoric features.

Figure 10-08 outlines the limits of the area covered during numerous walkovers. Exposures

examined are too numerous to mention but those locales where samples were analyzed and described are positioned on the figure. Exposures were described using the same standardized descriptions as the mound stratigraphy. The methods used to collect representative soils and sediments samples are also the same as those described above. Geoarcheological Control Samples (GCS), Appendix C contains the micromorphology samples analyzed as

control samples to help associate signature parent material, sedimentary structures, or pedofeatures from known sources with those from the mound.

There were numerous probable materials making up the mound that are derived from five general sources. These sources are summarized here with a descriptive designation and described below in the order they appear in the regional stratigraphic record. Possible engineering properties of these materials are noted, however the bulk of this discussion is incorporated into the Mound A stratigraphy discussion at the end of this chapter.

Loess Based Soil Material

The top of the bluff is covered in upland soils composed of silt loams chiefly composed of loess. The soils are generally mapped as various phases of the Paden Series (Proffitt et al. 1963) and described above. In the early days of the Park development erosion control was recognized as a priority. Forest clearance and early agricultural practices had left the silt loam soils vulnerable to erosion resulting in much of the park being stripped of its rich top soils. As a result, during this study it was difficult to identify an exposure of the Paden Series that had not been impacted by erosion and would be

comparable to the soils available prehistorically. The limits of the Shiloh Mound Complex, and the protection it has been afforded since the Civil War, offered the best potential for intact soils and protection from agricultural activity. The next challenge became identifying an exposure with no obvious archeological impact without disturbing the site.

Two profiles were selected, described and sampled (Figures 10-09, 10-10, and 10-11) and are described in Table 10-06. Profile 1 comes from a bank exposure in a tributary to Dill Branch near Mound G. Profile 2 was located along the southwestern margins of the site in an exposed profile of a partially collapsed rodent burrow. These local soils were used in the construction of Mound A and typically appear as clasts from specific substages. This material is generally light

brown in the upper horizons and reddish brown in the deeper horizons (see Figure 10-10). These soils would have provided the localized sod blocks (see below) as well as deeper silty clay loam from the subsoil that would have offered a relatively stable building material due to the increase in clay. Coarse materials could have provided the variability in the grain size needed to discourage shrink/swell and crack propagation to maintain the slope gradient. What would not have been terribly desirable about these local soils would have been the erodability of the less clayey material from higher in the profile, the loess silt. Once disturbed and spread out, this soil material would have been highly unstable. In addition, the strong and vivid colors are absent in this upper soil material.



Figure 10-09. Photograph of location of the Loess Soil Profile 1 (UTM 16N 379491E 3889757N).



Figure 10-10. Photograph of Loess Soil Profile 2 (UTM 16N 379510E 3889335N).



Figure 10-11. Photograph of Quaternary Terrace red sandy clay exposed midway down the bank above the Tennessee River. Note the rock hammer for scale = 33 cm.

Quaternary Terrace Clayey Sand or Sandy Clays (Red and Yellow)

Sandy clay is a textural designation recognized by the NRCS to describe a soil with 50–65 percent sand and 35–55 percent clay (Soil Survey Staff 1993). If a soil is as much as 45 percent sand and > 55 percent clay then it is simply called a clay. These soil characterization terms offered a bit of a dilemma in the case of this source material in Mound A. First, it is a judgment call to designate these either soil materials or sediments in the mound fill. Based on the presence of birefringent (though very dense) clay the author felt obligated to call them soils, however to call them clay, though technically correct, is misleading from an archeological and engineering perspective. Therefore Clayey Sand

or Sandy Clay is used to designate material that describes the primary constituents, with the first term modifying the second, which represents the bulk of the material.

Clayey Sand or Sandy Clay appeared in exposures along the west bank of the Tennessee River, above the cross-bedded pink and tan sands and in bucket auger tests placed along the eastern-most ridge extending south towards Browns Landing. In the auger tests it appeared approximately 100cm below the surface. Sand and clay contents are high but vary in these cores suggesting that concentrated clay could vary by lenses. The colors appear as localized concentrations of red and yellow sandy clay, in some cases the yellow was closer to a gray yellow (see Figure 10-11). This is due most likely to iron oxidation and depletion (redoximorphic features).

The issue of redoximorphic processes and their effect on color offers interesting consideration for the material as colored mound fill. In the case of grey clays, depending on the exact nature of the iron, these materials could be changed to red with limited heating, oxidizing the iron.

Depleted Gray Silty Clays or Silts

Gray depleted silty clays and silts are distinct in the mound. These deposits were generally well sorted silt (loess) with some clay but other signature grains/minerals, such as mica and glauconite, are absent. A single gray silt source area was located in the off-mound survey, in a tributary up Dill Branch (Locale 5 on Figure 10-08)

Coffee Sand

As noted in Table 10-01, the Coffee Sand Formation has a signature component of glauconite, though it is not abundant (only <3–5 percent), it is distinct and is not present in the other local formations or soils (Figure 10-12). Exposures are located south of the mound, midway up the bluff face and in Dill Branch (see Figure 10-03).

Tennessee River Alluvium

Tennessee River alluvium consists of a silt loam to sandy loam texture with distinct minerals including abundant mica and sparse pyroxene. This material is

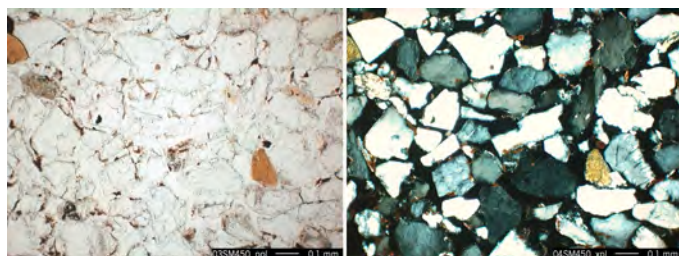


Figure 10-12. Photomicrograph from a thin section collected in a Coffee Sand exposure (Locale 1) that shows the relatively well-sorted sand, some of which are glauconite.

distinct both in hand specimens and in thin section and has been identified as a signature of Tennessee River alluvium (see Collins et al. 1994; Sherwood et al. 2004). These sediments rarely appear in the mound but when they do, they are typically limited to isolated subzones and easily identified in thin section (see Figure 10-12). It would have been available at the surface at the base of the bluff on the floodplain prior to inundation.

MATERIAL ACQUISITION

Since the regional geology is composed of horizontal sedimentary deposits, as long as there are erosional features that create vertical exposures or slopes where limited digging can expose the sediments beneath the loess soil, then access to the materials can exist almost anywhere, especially in the deeply cut drainages. Only the loess-based soils are accessible on top of the bluff near the mound and only in the case of sod and soil blocks (see below) was the surface material used. There is very little Tennessee River Alluvium present among the zones beyond occasional aggregates and isolated subzones. This indicates that this material, though readily accessible, requiring minimal digging, was not desirable and only appears to have been incorporated occasionally and typically as aggregates. Such sporadic aggregates were probably introduced through trampling, or clinging to materials or foodstuff that would have come from the floodplain below the mound.

Several of the ponds within the site boundaries (see Chapter 7) are likely borrow areas for this sediment but others (most likely the Mound G Pond) are natural seeps or springs that may have been initiated by tree tips. Figure 10-13 shows

a modern tree tip on the site and the person standing in the resulting hole shows the type of depth these features can reach. Within the mound fill is soil material that was used from the top of the bluff, derived from deep within the profile (> 50cm). The majority of the material observed, however, is not derived from the surface soils but was specifically sought and mined from nearby slopes in the steep drainages of Dill Branch and Browns Landing and along the Tennessee River terrace (see Figure 10-08 and Figure 10-14).

Digging deep into a borrow pit for desired materials in most cases would have been impossible due to the presence of the iron conglomerate or iron pan. These conglomerates could have occurred through a number of processes; however, it most likely precipitated in this zone due to aerobic conditions in the gravels. The immobile Fe^{3+} and Mn^{4+} were reduced (and are probably still reducing) as water infiltrates through the loess soils and the upper terrace deposits where decaying organic matter helps create anaerobic conditions. When it reaches the gravels and the aerobic areas it precipitates, forming strongly cemented and highly variable iron pans and conglomerates. These would have formed a barrier to accessing the deeply weathered sandy clays and variably colored sands of the lower Terrace Deposits and Coffee Sands. The most direct access to these materials would have been mining from the bank, finding the iron-cemented zones and digging beneath them. Where this is the most clearly expressed at Shiloh is in Locale 1 (see Figure 10-08 and Figure 10-15). Though difficult to map the steep wooded bank, much less photograph it, these bowl shaped notches into the steep slope begin below the conglomerate and continue to what might have been the top of the Eutaw Formation. Other east facing slopes are available in the area, along the ridge fingers to the west, but none had large scale bowl features such as these. Variably colored materials and textures would be readily available with this approach to mining with the only costly aspect of the acquisition being the actual transport of the material up steep slopes. This area is, however, easily accessible from the southern ridge (where Mound C is located). This



Figure 10-13. Modern tree fall on the site. The person on the left is standing in the pit that resulted from the root ball removal.



Figure 10-14. Steep banks in the drainages surrounding the sites would have afforded relatively easy access to deeply buried strata. View to the north from the interior drainage of Browns Landing.



Figure 10-15. Locale 1, a proposed mining area on the steep bank below Mound C. The white arrows point to the edges of the excavated (probable mined) area.

ridge slopes down to Browns Landing where remnants of a nineteenth century road are still visible. Gaining access from the base of the bluff or mid bluff, to the top using a “switch-back” approach would have made the trek longer but far less steep and therefore more energy efficient.

Other possible mining areas are Locales 2, 3 and 4 (see Figure 10-08). Locales 2 and 3 were observed but not sampled due the absence of fresh exposures. The drainages are highly eroded, especially along the upper terrace edge overlooking Dill Branch. In the case of Locale 4 (see Figure 10-08) the area is undercut suggesting it has been extensively disturbed, presumably by prehistoric mining (Figure 10-16). Locales 2, 3 and 6 would have been convenient to Mounds A, B, C, D and E and the built surface platforms associated with Mound E and other areas in the vicinity. Locale 4 and 5 are slightly more remote, but still easily accessible (Figure 10-17).

While all of the base materials were readily available, and in many situations probably contiguous, great effort was invested to segregate materials and to apply them to the mound stages in a planned, organized way. In some cases the analysis indicates that materials also underwent additional preparation (this will be discussed in the section on Stage Stratigraphy below). A proposed classification of moundfill follows in an effort to categorize one aspect of the moundfill variability.

THE CLASSIFICATION OF MOUNDFILL

In order to begin to understand the variability among the moundfills typical of a Mississippian mound a systematic classification of these deposits was constructed. This classification is an extension of one originally developed by Van Nest et al. (2001) where they partitioned major moundfills into types based on fills observed in Hopewell mounds in the Illinois Valley. Both classification schemes are centered on the basic characteristics of a deposit, focusing on how they appear in a mound sequence in the field. By summarizing the variability identified in a particular stage; we can begin to determine what the difference is between stages and within stages, if these differences might indicate shifts in source

areas, engineering strategies and differences in the appearance of the mound over time. One variable not consistently accounted for in this classification is source material, except in the case of soil blocks where their compositions have direct properties that are discussed below.

Features are excluded from this classification for simplicity sake. Features refer to non-portable artifacts such as hearths and postholes and, as noted previously, the term is antiquated, and needs to be integrated into a geoarcheological perspective that encompasses the matrix in which they are found. For better or worse, the term feature is deeply embedded in archeology and in a context such as a mound can be very confusing considering the mound as a whole is technically a feature, or more precisely, a series of features reflected in substages and zones within stages.

Following the classification created by Van Nest et al. (2001) the top partition of moundfill is broken down into loaded fills, massive fills and stratiform fills (Figure 10-18). Subsequent categories in the classification diverge from the Hopewell classification, for instance the introduction of thematic vs. unthematic, and are explained below.

Loaded Fills

Loaded fills can be defined as single dumping events that when amassed and observed in profile can result in a variegated appearance due to the distinction of individual deposits. Traditionally, in southeastern archeology these are referred to as “basket loading” with the implication that each volume of sediment was transported to the mound by basket or other containers and added to the accretional surface. The key attribute of these loaded fills is that the loads are definable by abrupt boundaries as individual deposits. Loaded fills are further divided into *compositional loads* and *soil blocks*.

Compositional Loads

Van Nest et al. (2001:636), following Squire and Davis (1848), review early recorded observations concerning loading, highlighting two distinct features for compositional loading including



Figure 10-16. Impacted area north of Mounds F and G where mining may have taken place. View to the north.



Figure 10-17. Eroded possible mining area, locale 4, beyond the palisade on the northern boundary of the site above Dill Branch.

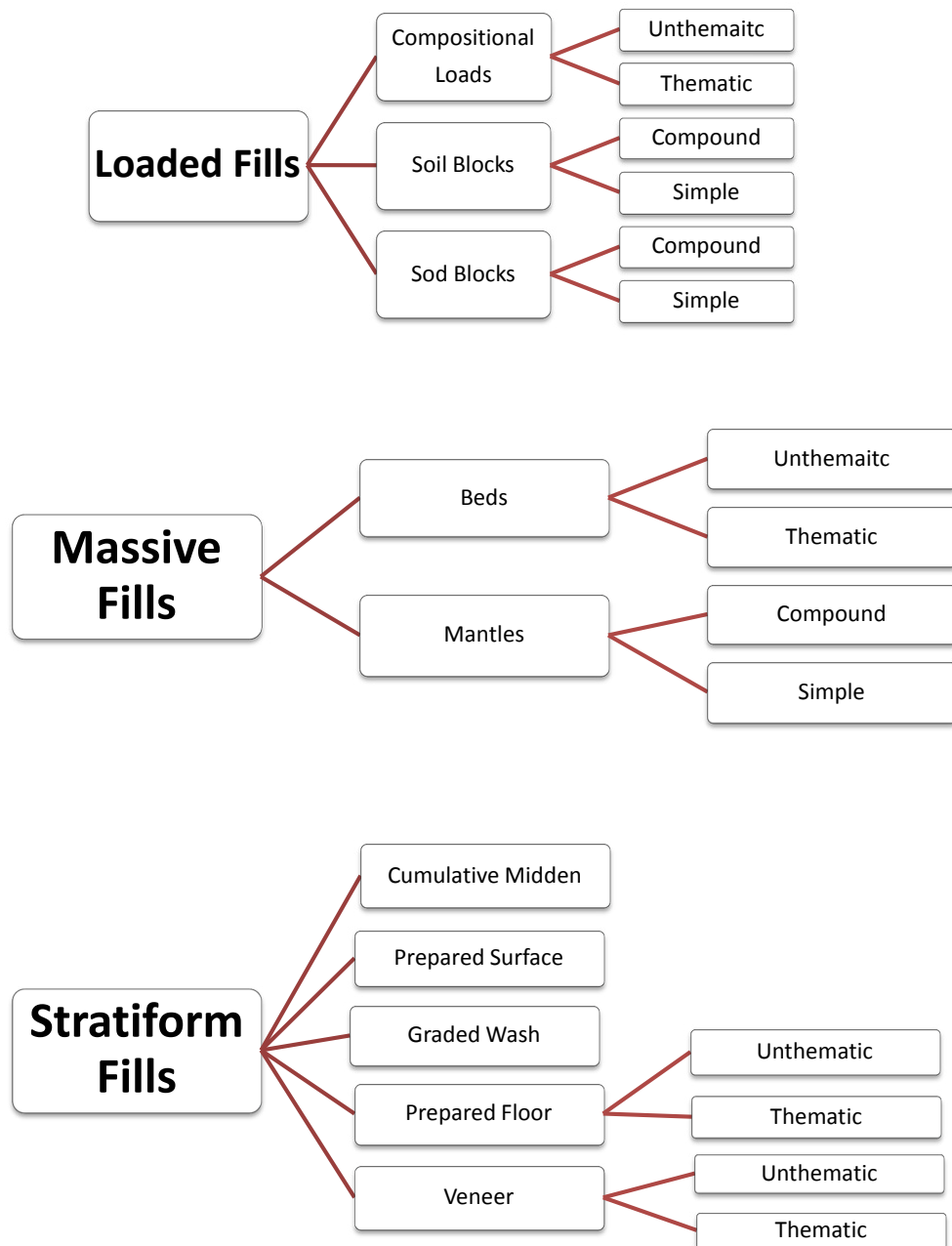


Figure 10-18. Proposed Mississippian Period Moundfill Classification (based on Van Nest et al. 2001).

varying composition and texture of individual loads and the abrupt boundaries between these individual deposits. These types of loading fills have been divided into thematic and unthematic (see below). Thematic refers to compositional loads that are clearly selected or created for specific attributes, usually color, texture or both, based on the fact that they are alike. The result is a series of like deposits accumulating as one relatively homogeneous stratum. These are distinguished from massive fills (see below) simply in that the individual loads are distinguishable, even though we must consider that they may have had the same end effect as the massive fills. If the separate thematic loads are only occasionally visible in a broader massive fill then the few thematic loads are noted but the unit is classified as a massive fill.

Unthematic compositional loads are simply individual deposits that do not share compositional attributes with those adjacent, but were part of a larger deposit with well-defined boundaries. The result is a more chaotic appearance. Such mound fills are relatively rare at Mound A as it appears that like colors and textures were selected for different stages of the mound or combined to produce a specific appearance or engineering property.

Soil Blocks & Sod Blocks

Soil and sod blocks can be defined as intact soils that are removed as an intact mass from specific horizons (or positions in the soil profile), and transported and used to build earthen structures. This terminology is used to broaden the classification of blocks and incorporate those observed at Shiloh. Soil vs. sod blocks can be distinguished depending on what part of the natural soil profile they were originally derived from; sod being from the top, primarily composed of A horizon material and soil blocks being from lower down the profile, primarily from B horizon material.

According to Van Nest et al. (2001), sod blocks are held together by dense rootlets typical of A horizons and usually include a portion or all of the surface A horizon and the natural transition into the underlying horizon, whether it be a B or E horizon. This transition was closely studied by Van Nest et

al. (2001:640–641) with a tight sampling interval identifying a shift in organic carbon and particle size as gradational along natural boundaries. It is the presence or absence of the actual sod that distinguishes the three types in the classification.

A sod block appears in profile as a distinct dark surface, transitioning up into either a tan or red lower unit. As also noted by Van Nest et al. (2001), these are rarely placed in the mound in their natural “up” position but are more typically inverted with the surface horizon or dark color facing down. In the case of Mound A they are usually either stacked (e.g. Figure 10-19) which is how they are frequently found in mounds elsewhere but they are also placed singly between stages or substages and on steep slopes (e.g. Figures 10-20 and 10-21). Both types vary in size but average approximately 20cm at their thickest point and 25–35cm across an oval or ellipsoid cross section. When they are stacked, a distinct bicolor variegated pattern appears in profile, also noted by Van Nest et al. (2001:636).

Blocks of soil are not uncommon in Woodland to Mississippian mounds but are reportedly often overlooked or are mentioned in passing in the mound explorations of the last century (Van Nest et al. 2001:636–7). Detailed study of sod blocks from three different mound contexts in the Illinois River Valley convinced Van Nest et al. (2001) that use of the process of obtaining sod blocks was more involved than might be immediately apparent. Studies of the soil type and the pollen and phytolith components indicated that the sod blocks were mined from a grassy environment in soils that had been essentially created for the purpose. The soils were very young and formed from anthropogenic sediments in an open habitat where there would have been a dense tree canopy. Van Nest et al. (2001:643) suggest therefore that sod-mining areas must have been maintained, most likely by burning. In addition, the composition appears to consist of two parent materials suggesting management of sod block harvesting areas. They distinguish these as compound vs. simple – which contain only one parent material.

The inverted sod blocks in Mound A primarily consist of intact dark gray A horizon silt loam over



Figure 10-19. Example of Soil Blocks in Profile, N42-43 E179 west profile, Mound A.



Figure 10-20. Detailed view of single sod block in profile (N40).

a tan E horizon of silt loam that would fall into the simple category (Van Nest et al. 2001) (see Figure 10-18). These sod blocks differ in significant ways from those in the Illinois River Valley study. The Mound A soil blocks do not have evidence for dense root mats that would technically define them as sod or turf. In addition there is no evidence of grass in the form of significant remnant organic matter or phytolith concentrations. What is present in the majority of the Shiloh Mound A sod blocks is a unique microstructure that is probably indicative of bioturbated soil.

The soil blocks have not been identified elsewhere and are first defined here. These are composed of a truncated E horizon, possibly with some A horizon material present, over a developed B horizon with a distinct reddish color (see Figure 10-21). These blocks appear to be the result of either A horizon material accumulating and added to a truncated surface, perhaps where sod blocks or upper soil blocks have previously been removed. This sequence can be seen in Figure 10-10 under the local soil discussion. Van Nest et al. (2001) defined similar sod blocks at Mound House which they designated as “compound sod blocks”. These were composed of two different parent materials resulting from the addition of alluvial mud that enriched the A horizon (Van Nest et al. 2001:641). The circumstances at Shiloh differ in that the “red soil blocks” typically



Figure 10-21. Examples of 2 types Soil Blocks in profile. Black circles indicate “red” compound Soil Blocks and white circles indicate “brown” simple Soil Blocks.

do not have a disconformity between the upper horizon and sub A horizon where related A and E horizon materials are present and the sub A horizon consists of B horizon material. If indeed the lighter “top” of the red soil blocks are A or E horizon materials they are not suggestive of an introduced parent material beyond the local loess based soil material, therefore it is probably inappropriate to use the term compound in this context.

Some of the most prominent differences in the Illinois River sod blocks studied and the Mound A counterpart is the lack of evidence for an allogenic source area. The source of the Mound A soil blocks consists of a local silt loam (loess based), with no evidence for additions of other materials as described by Van Nest et al. (2001). The alluvial soil, as noted above, is significantly different from the terrace soils and would be easy to distinguish, especially in thin section. The absence of evidence for grass suggests that sod areas were not necessarily maintained, however land clearance, removing trees and opening up the canopy, would have allowed for grasses and weeds to colonize these areas. Even to stick a shovel into the ground in the woods today

and retrieve an intact block is a challenge as the many roots and humus cause the soil to break apart.

The most plausible scenario postulated is that the soil blocks are derived from areas near the mound, on the terrace, that are maintained as open areas but are active enough to discourage dense grass growth. This would also go with the fact that the surface soils in the soil blocks are relatively compact with few voids as one might expect in the granular structure of an A horizon. One aspect to tie into this discussion is the absence of dense microartifact concentrations. Typically the only microartifact in the soil block A horizon material observed so far is charcoal, and even this is sparse. This may further link the soil blocks to the plaza areas that were maintained and kept clear of debris.

Thematic vs. Unthematic

Thematic is defined as relating to or constituting a topic of discourse. Thematic in the context of moundfill refers to a color and/or color and texture that, based on its consistence (repeatedly expressed in loaded fills or homogenized beds or mantles), was deposited in order to communicate or convey

a specific theme. Themes could have varied from the announcement of war, death of a new political or religious figure, represent a kin group, or any other number of events or shifts in the society. The primary assumption is that attention to color in particular represents a theme. Juxtaposition of dichotomous light and dark sediments has been observed in numerous mound contexts throughout southeastern prehistory (Buikstra et al. 1998). This combination is observed in several stages in Mound A.

Anyone applying this classification to the fact that color can also be indicative of specific particle sizes and engineering properties must be cautioned. While loaded fills may be selected from a specific area providing continuity in their appearance, the reason(s) do not have to be symbolic, they could be purely practical from the perspective of creating a stable monument, or they may be both. In this case, this level of classification should be assigned carefully and cautiously.

Unthematic refers to an absence of consistence or a randomness to the types of loaded fills deposited together. The composition of each adjacent fill contains different colors or colors and textures. The implication is an absence of symbolism in the loading. Instead there was a purely construction emphasis that focused on adding to the mound without concern for a specific color but material selection could have been for other reasons.

Massive Fills

Massive fills are traditionally referred to as Mantles (although this terminology has never been well defined). These layers are distinguished from the compositional loads by the homogeneity of their composition and texture, and their vertical and horizontal extent. There are little to no internal boundaries visible suggestive of loading. These massive fills often appear as extensive mound building episodes, often to cover the previous floor or surface.

Two types of homogeneous layers are proposed here that are distinguished based on engineering intent, thickness and placement; only the last two attributes can be empirically documented.

The term mantles is borrowed from early mound exploration such as at Cahokia where massive, homogeneous zones were recorded extending over earlier stage summits and mound flanks. Mantles are more extensive than beds and measure >10cm thick and extend across horizontal space typically >100cm. In the case of Mound A, a mantle only occasionally contains evidence of the actual loading used to create the mantle. The compositions are surprisingly homogeneous, especially when one considers that the mantles making up Mound A are clearly compositional, consisting of a mixture of materials that do not occur immediately together but are mixed consistently (see below). Such mixing could have been to express a theme or to create desirable physical properties to enhance stability as a new phase of mound building or landscape modification began, covering up the old, and starting anew. Zone Vc-1 was used as an example, although it is from the submound strata, it represents such an extensive effort and is composed of a uniform, yet composite material; another example is Zone IIIe-3 (Figure 10-22).

Beds

Beds, in keeping with geologic terminology, refer to layering that is sheet-like. When referring to sedimentary rocks, beds are the smallest distinguishable division among the stratified layers (Allaby and Allaby 1990). In some ways it can be considered a catch-all class for zones too localized to be considered mantles, that contain too much volume to be considered loads, and internal boundaries identifying loaded fills. In this classification beds are less extensive relative to mantles, averaging <10cm vertically and <100cm horizontally (Figure 10-23).

Stratiform Fills

A Stratiform is a term borrowed from stratigraphy in geology and is technically defined as a mineral deposit that is concordant with bedding; usually in sheets but it may be ribbon-like” (Allaby and Allaby 1990:357). Van Nest et al. (2001:636) used this term to refer to tabular or sheet like units however here the term is restricted, again



Figure 10-22. Example of a massive fill classified as a mantle. Arrows bracket yellow mantle, Zone IIIe-3.



Figure 10-23. Example of a massive fill classified as a bed (in this case zoned fill). Arrows point to 2 of many examples of thematic beds visible in the lower three quarters of the profile.

based on size, to units <10cm that in some circles might be referred to as a “stringer”. These differ from beds in that they are not massive deposits and typically not laid down as fill but are often related to specific processes — be they anthropogenic or geogenic. Their unique compositions and extent result in further subdivisions. The Stratiform Fills were divided into five categories: Cumulative Midden, Prepared Surface, Prepared floor, Veneer and Graded Wash. Each subtype is a product of different processes.

Cumulative Midden

Middens are composed of cumulative organic waste and various artifactual debris. The assumption is that a midden does not represent an activity area but a discard area within a site. They are usually described as black in color and “greasy” to the touch, which generally is a reference to the high organic composition and their ability to retain moisture. My use of cumulative in this classification may appear to be repetitive since the middens are typically defined as an accumulation that forms over time. The use of the term here is to distinguish this type of accrued fill from midden material that is acquired from a midden deposit (source) and used in the construction of the mound (midden becomes a parent material). Such a distinction is obviously important in order to correctly analyze the artifact assemblage from a mound. Cumulative Midden in this classification is referring to material formed in place based on macroscopic and microscopic observations. Macroscopically a cumulative midden is based on a relatively homogeneous and continuous layer, dark in color, typically with a relatively high frequency of microartifacts.

Prepared Surfaces and Floors

Prepared surfaces and floors can be composed of the same or similar material. Their difference lies in their extent and ultimately function. Prepared

surfaces, explored in a paper by Sherwood and Chapman (2005), are defined as discrete, localized, red clay, cultural deposits that are often intentionally fired to a hard consistency (Figure 10-24). At Mound A these are associated with stage surfaces and always have a unique lithology compared to adjacent strata. Usually they are composed of silty clay. The surfaces are flat to slightly concave, <3cm thick and measure between 50–100cm in diameter. Their hardness is attributed to heating. It is not always clear in the areas exposed at Mound A if these surfaces are inside structures or outside. These surfaces are distinguished from central hearths in that they are not basin shaped and are not composed of puddled clay or coated in a thin veneer of plaster-like sediments as is often the case in Mississippian hearths.

A prepared floor is different from a prepared surface in that it is directly associated with architectural features such as post holes and typically covers a much larger area. Prepared floors can also include associated layers such as the active and passive microzones as defined by Gé et al. (1993). The prepared floors observed in Mound A typically consist of a thin (<1cm) application of silty clay or silty clay loam, usually red in color. At Shiloh these floors were carefully maintained with few artifacts remaining on their surface prior to burial. Prepared floors are distinguished from unprepared floors (post depositional features and not distinct deposits) by their unique lithology relative to the sub floor moundfill and the overlying fills.

Veneer

The term veneer is used to describe a thin layers of sediment (<2cm thick, typically millimeters thick) that have been applied to an external sloping surface of different source material. The effect would be a veneer placed as a thin facing used as finishing material. Veneers are typically identified in the field by their stark color contrast such as red clay and sandy clay, thinly applied to a grey silt platform mound (Figure 10-25). They differ from a prepared surface in that they are on slopes and do not appear to have intended to support a floor and the associated activities (they lack associated



Figure 10-24. Example of Stratiform Fills classified as a prepared surfaces in the submound.

active and passive microzones—see above). They are instead interpreted as functioning in two realms, the aesthetic and the practical. The veneers are usually composed of fairly pure gray or red prepared sediments that would have resulted in a striking presentation. On the practical side, their fine texture and smooth consistent outer surface may have served to direct precipitation down the slope, discouraging infiltration of the moundfill beneath therefore assisting in erosion control and discouraging saturation resulting in slope failure.

Graded Wash

Graded Wash is a descriptive term used for a natural series of deposits that are often observed associated with mounds, especially when they are examined closely. Graded wash zones, a form of mass wasting are typically composed of finely laminated, well-sorted sediments (Figure 10-26). They can appear



Figure 10-25. Example of a Stratiform Fill classified as a veneer. Black arrows point to red veneer on gray platform mound Stage IIb.

as graded bedding, single or multiple, composed of more coarse material on the bottom grading upward into finer sediments (usually clay). These deposits can be very informative if studied from a structural as well as a compositional standpoint as they inform as to the direction and nature of the surface they are washing from. Their presence also indicates the absence of activity (trampling) where they are preserved as these types of structures are fragile and easily disturbed. For the same reason graded wash zones may also indicate their rapid burial with subsequent moundfill providing additional information as to construction periodicity and the regularity of maintenance. For example, it is doubtful such deposits would last through repeated

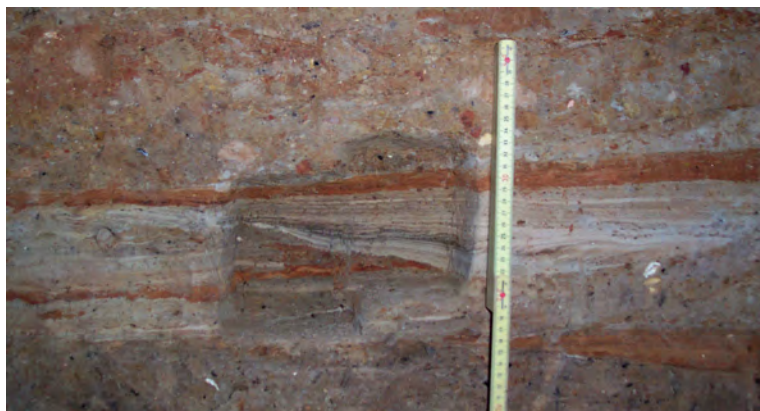


Figure 10-26. Example of a Stratiform Fill classified as a graded wash. These examples are washing off the south slope of Stage IIb and settling on the basin between IIb and IIa.

freezing without being disrupted. Soil fauna and burrowing insects can also quickly disturb these fine laminae if they are exposed long (e.g. up to a year).

The recognition and classification of these deposits can provide insights into highly localized conditions and materials on the mound. The shape and nature of cross-bedding features can be especially informative. The direction and nature of the laminae and cross-beds (if they are present) can indicate the direction of the slopewash. When only a portion of the mound may be revealed, as in the excavations at Mound A, this can provide some insight into the microtopographic variability in unexcavated portions of the mound.

STAGE STRATIGRAPHY

Though the stages of mound construction are numbered from top to bottom, this discussion begins with the stage stratigraphy with the earliest, deepest deposits beginning with subsoil, identified >6m from the current mound summit (see Figure 09-01 for a view of all the construction stages). This discussion is organized with a general description of the stratigraphy composing the stage followed by comments on the classification of those stratigraphic units and how they might have been engineered. A detailed discussion of the chronostratigraphy is not included, beyond a general overview of the timing and observations on the possible longevity of specific surfaces based on the pedogenic nature of the stratigraphy (see Chapters 9, 12, 21 for discussion of absolute dating results). The discussion here is divided into two main sections, Submound and Mound.

The area north of N54 consists of excavation to the surface of IIIg and the northern step trench. Complex stratigraphy is revealed there as in the south and main portion of the excavation. There is not enough exposed, however, to facilitate interpretation north of N54, therefore this discussion centers on those areas south of N54.

Submound Stratigraphy

Though designated as stages, the lower excavation (below the primary Mound A structure, from ~620cmbd to a depth of 860cmbd) was limited to a less than 10m long profile along N36–45, E185 and a shorter profile along N37–40, E184 where four 1x1m excavation units were removed (Figure 10-27 to 10-30; see also Figure 09-71, 10-54 below). The profile was produced in a backhoe trench placed parallel to the bluff edge late in the 2003 field season (see Chapter 3). The vertical extent

of the excavations into that profile were limited to approximately 200cm exposed in the north and west walls of the backhoe trench, and the 1m profile produced in the four 1x1m excavations. These limited (1m) three dimensional views into the submound were insufficient to construct a detailed interpretation, specifically if this was part of an earlier mound, if it represents the basal portions of Mound A, or if these strata indicate landscape modification in order to create a platform for mound construction. However, based on several

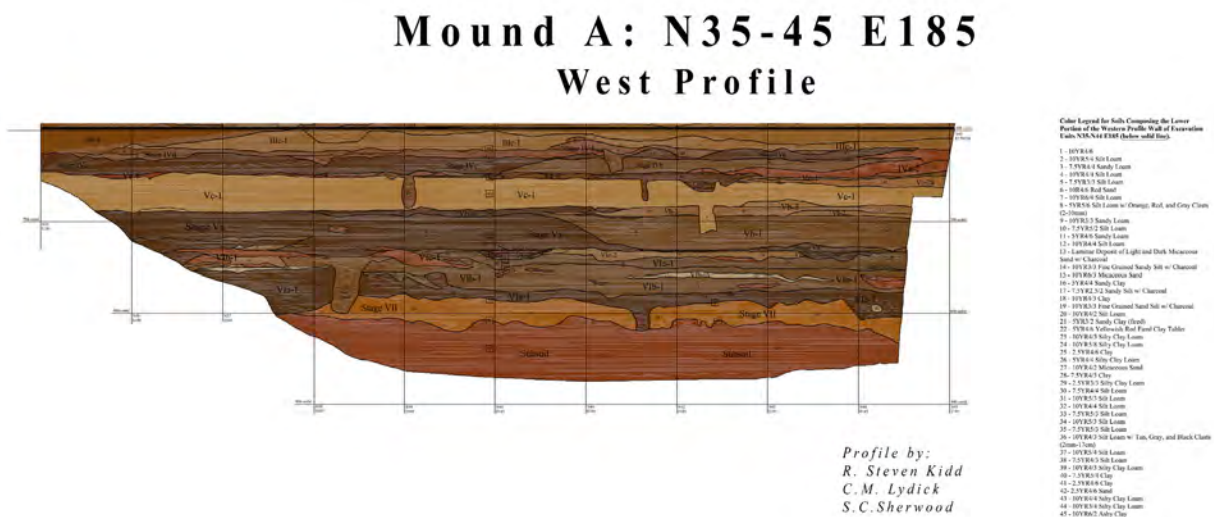


Figure 10-27. Mound A Submound West Profile N36-45 E185, with stages, major zones, and micromorphology sample locations.

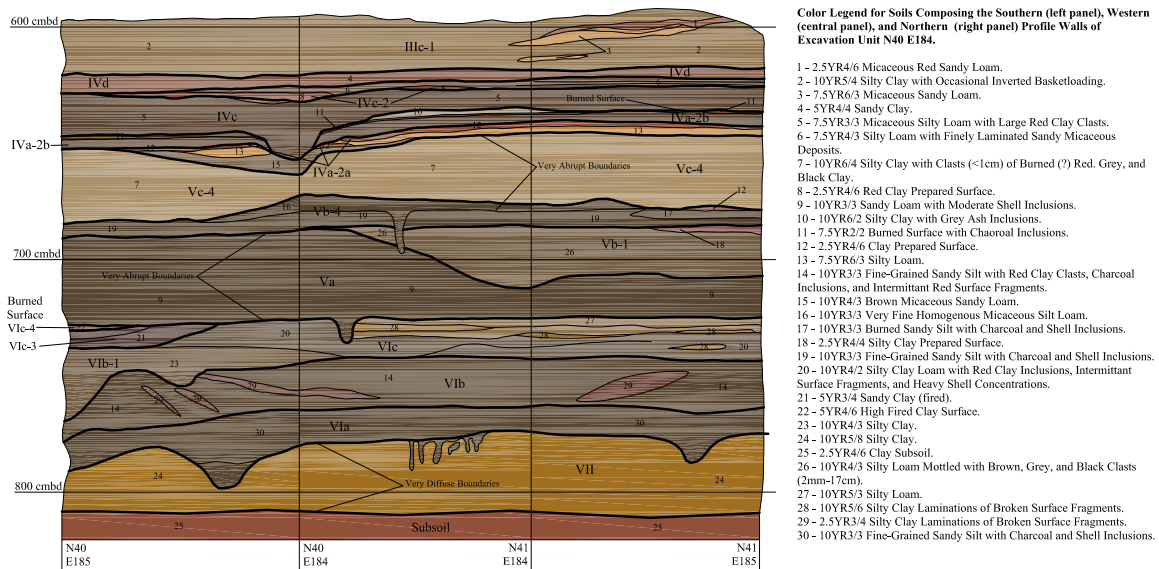


Figure 10-28. Unit N40 E184, contiguous south west, north profiles.



Figure 10-29. Photograph of the Submound West Profile N36-45 E185 Profile. View to the northwest.



Figure 10-30. Photograph of Unit N45 E185, view to the north end of the submound backhoe trench.

factors that will be elaborated on below, we propose that this “submound” section constitutes an early soil material mining area that once abandoned, was leveled for habitation. The area is made up of structures, cumulative midden(s), with repeated filling with mantles and beds until there was a dynamic shift (social, political, economic or some combination thereof) that occurred in the late twelfth or early thirteenth century when the function of the area changed. At that time there was an extensive thematic surface prepared at the same basic elevation as the surrounding terrace, and stages of mound construction commenced.

Subsoil

The deepest stratigraphy observed in what is called the backhoe trench (see Figures 10-27, 10-29, and 10-30) is composed of 2.5YR3/6 sandy clay with interfingered reduced iron clay extending vertically (Figure 10-31, GTS Appendix A, 03SM93, 97). There are few highly weathered chert pebbles in the matrix. Based on the firm, well developed structure this is a deep, *in situ*, highly weathered argillic horizon interpreted as a truncated Pleistocene soil derived from the Quaternary Terrace parent material. The upper boundary is an abrupt unconformable contact that suggests prehistoric excavation to this depth. Based on soil profiles and auger tests observed throughout the area it is estimated that greater than 1m, potentially 2m, of soil was removed from this location, leading me to suggest that the original ground surface sloped upward to the west, following the current landform and was probably mined for sediment in the construction of an earlier earthwork at the site.

Stage VII

Above the unconformable contact with the subsoil is a light brown 7.5YR5/8 silt loam loess soil material composed of 60/40 ratio of undifferentiated fabric and crystallitic fabric from red clay aggregates derived from deeper in the soil profile. Few charcoal and microartifacts (burned bone and shell)

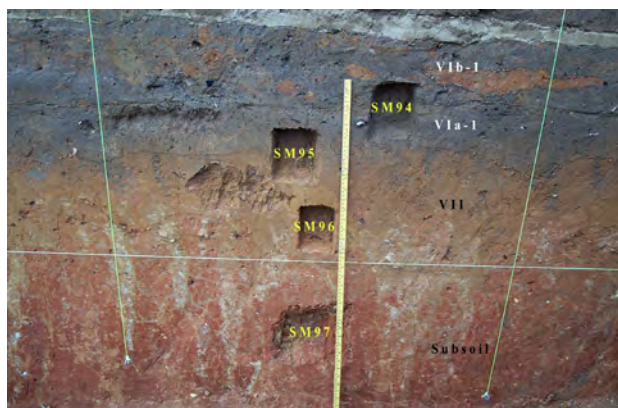


Figure 10-31. Lower submound profile detail. Note the difference between the subsoil and Zone VII above. West Profile E185 micromorphology sample locations labeled in yellow.

were observed in thin section (see Figure 10-27; GTS Appendix A, TS 03SM92) and are randomly oriented in the upper portion of the thin section suggesting bioturbation from a midden (Zone VIIa-1) above. A portion of an aquatic gastropod is revealed in the thin section scan as well. The structure of the chambers from the upper shell appears in section and may be able to be identified as to genus or perhaps species. The profile produced for Unit N40, E184 (Figure 10-28) indicates a wavy and clear to diffuse contact for the upper boundary of Zone VII with intrusive zones from VIIa-1 above.

The nature of the soil material and the stark contrast in the degree of weathering between Stage VII and the subsoil below indicates it was introduced, most likely by people (see Figure 10-31). The absence of well-defined loading, the overall clear boundaries, consistence of the material and the massive nature of the fill could classify this as a thematic bed. Based on the limited exposure it is difficult to speculate as to the purpose, however, the distinct and uniform color may represent a specialized preparation of the surface prior to the new use of the area.

Stage VI

Simply based on the law of superposition and the AMS dating results, Stage VI encompasses the earliest clear occupation deposits exposed during the project (see Chapters 12, 21). This stage is

broken down into three primary units (see Figure 10-27), discussed from bottom to top.

Zone VIa

This primary zone consists of brown 7.5YR4/2 silt loam with organic matter (rarely preserved in the overall mound fill). This zone extends across the entire lower profile and includes intrusive postholes with abrupt boundaries into Zone VII below. There are no obvious intrusive features and the lower boundary is diffuse with frequent bioturbation pedofeatures (aggregates and root channels with micritic hypocoatings) throughout the zone, suggestive of a once active surface horizon that may have been stable briefly and supported vegetation.

This zone contains micritic coatings (void coatings) and micritic hypocoatings (the micritic embedding of the groundmass adjacent to a void) (Figure 10-32). Micrite is an aggregate of CaCO_3 crystals less than 4μ in size. Carbonate, primarily derived from the decomposition of ash, shell, and bone in a midden context, results in carbonate-charged localized ground water. When this water encounters high CO_2 concentrations related to root activity and relatively concentrated organic matter, the carbonate quickly precipitates.

The coarse fraction observed in thin section in Zone VIa-1 includes occasional burned shell <4mm, burned bone, many charcoal fragments, one fragment of shell tempered ceramic (Figure 10-33), and few ~0.5mm red sandy clay aggregates. The shell tempered ceramic contains two types of shell and does not appear to contain mica, a potential signature of ceramics locally manufactured. Localized slaking crusts are composed of well-sorted silts (quartz, charcoal, papules and ash crystals, with clay laminae). These appear to be *in situ* and can attest to a cumulative surface where

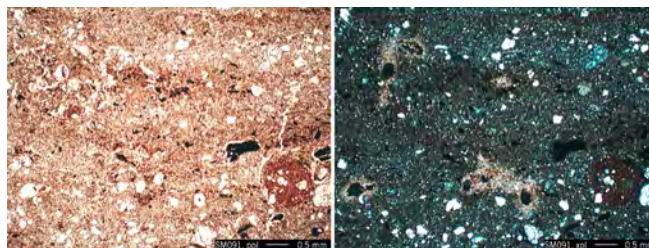


Figure 10-32. Photomicrograph illustrating Zone VIa, micritic coatings.

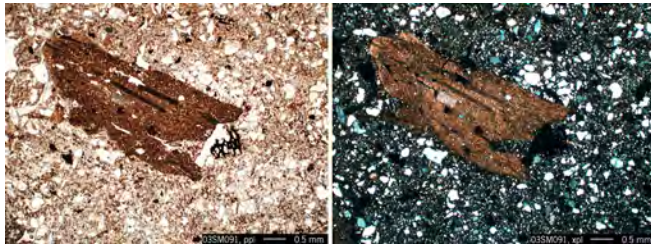


Figure 10-33. Photomicrograph illustrating Zone VIa-1, shell tempered ceramic fragment.

water pooled or localized slope wash accumulation occurred prior to the deposition of Zone VIb

Zone VIb-1.

Zone VIb-1, as described in the field, would classify as cumulative midden among the stratiform fills (see above). It is one of the few identified in the Mound A excavation thus far.

Zone VIb

This primary zone is a series of secondary zones that are composed of variable materials (see Figure 10-27, 10-29, and 10-31). The most widespread zone, VIb-1 consists of a horizontally extensive bed primarily composed of reddish brown mottled silty clay loam with internally sloping inconsistent lenses of red sandy clay. Images from the east-west profile in unit N40, E184 (Figure 10-34), N45, E185 (see Figure 10-30), N42, E186–187, the furthest extent of the backhoe trench (Figure 10-35) reveal that the red zones slope downward from east to west and are roughly the size of a loaded deposit. This series of loaded red zones continue across the exposure of Zone VIb.

Secondary Zone VIb-1 slopes upward to the south to a series of complex zones designated VIb-2 (see Figure 10-27). These zones are intruded by Feature 608 (interpreted as a wall trench) and include variable red sandy clay, gray silt loam and brown silty loam deposits (Figure 10-36). Along the northern end of the profile a tertiary thin VIb-1b ($\leq 3\text{cm}$) dark gray 10YR4/2 lenticular lens of micaceous sand follows a relatively irregular surface indicating that VIb-1 is not a massive deposit but accumulated through the deposition of variable materials. The parent material for VIb-1 is not found on the upper



Figure 10-34. Photograph of Unit N40 E184, South and West Profile. View to the west.

terrace where the mound is located, and most closely resembles alluvium from the floodplain below.

The limits of these exposures curtail the interpretation potential of these deposits. The absence of consistent colors and textures or clearly dichotomous colors suggests these are classified as unthematic beds that are related to a structure on or near this spot.

The mottled red, sloped loading noted above (see Figure 10-35), relative to other dichotomous beds and loading structures would likely not have produced a pronounced or consistent visual effect. This suggests that the direction of the sloping—away from the slope down to the river and the introduction of clays to the otherwise silt loam fill is obviously intentional and could fit two scenarios. The first is an attempt to stabilize the surface and decrease the potential for collapse of the surface or slump to the east. This process of adding the red silty clay loads at this ca. 13° angle would have



Figure 10-35. Photograph of north profile of N42 E186-187, deep backhoe area (arrow indicating continuation of sloping red lenses). View to the northeast.



Figure 10-36. Photograph of Submound West Profile with arrow pointing to the location of Feature 608, wall trench slump. View to the west.

created new bedding planes within the zone, a clever engineering approach to managing a steep slope. The second scenario is that these sloped deposits are the remnants of the eastern portion of an embankment (much like Zone IIIa) that has long since been truncated by the loss of the river bank.

Zone VIc

The upper secondary zone is VIc and includes a main lenticular deposit composed of dark yellowish brown 10YR4/2 silt loam matrix with variably sized clasts of yellow and red sandy clay (see Figure 10-27). To the south, the base of the deposit slopes upward and thins with the profile and turns into a series of less clearly defined and possibly locally disturbed lenses of mixed lithology. The Feature 608 wall trench appears to originate from the surface of VIc-1 but slump and other disturbance make it appear slightly lower in the profile (see Figure 10-36).

Zone VIc-1 appears to have functioned as a surface. This is especially pronounced along the northern limits of the profile where the macrostructure changes from one of individual clasts to more lenticular lenses. In thin section (GTS Appendix A, 03SM90 in particular) the upper boundary of the zone contains silt loam soil material and reworked biological aggregates of fireplace material including different types of charcoal (wood, nut, seed) (Figures 10-37 and 10-38). This appears to have functioned as a brief surface mixed with filled material just above one of the red slanted loads from IVb. The top of Zone VIc contains several prominent features including a complex prepared clay surface referred to as Zone VIc-4 (see Figures 10-27 and 10-39). The prepared surface is composed of silty clay with well-sorted medium sand in a clay matrix. The zone was laid down in a thin lens as shown in this photomicrograph (Figure 10-40). The silty clay includes lenticular concentrations of dusty clay and elongated papules suggesting the material was worked with water and spread on the surface. There are very few voids and the upper contact is abrupt. The upper contact consists of a <1mm thick concentration of charcoal and amorphous organic matter fragments, various mineral grains and few single ash crystals that can probably be directly linked to the function of the features (see Figure 10-41).

These surfaces (identified elsewhere in the submound and Mound stratigraphy), based on their hardness and enhanced color, were heated; however it is not certain they were restricted to use as hearths.

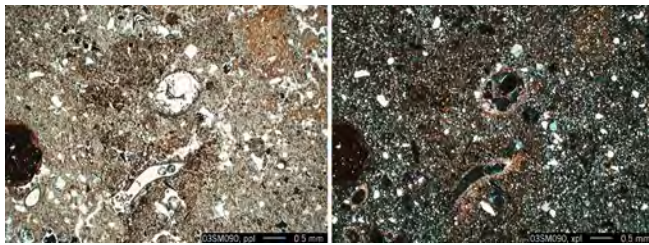


Figure 10-37. Photomicrograph illustrating fine charcoal and few ash crystals in silt loam mineral matrix, clast or infilling, note micritic coatings/hypocoatings (Zone VIc-1).

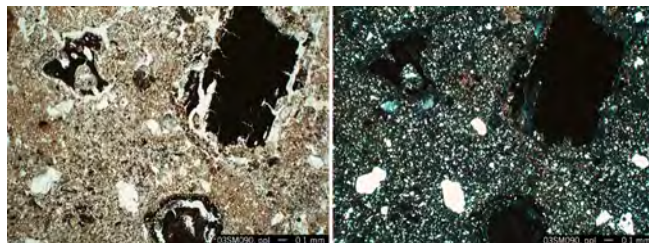


Figure 10-38. Photomicrograph illustrating variable types of charcoal including nut, wood, and likely sand (Zone VIc-1).

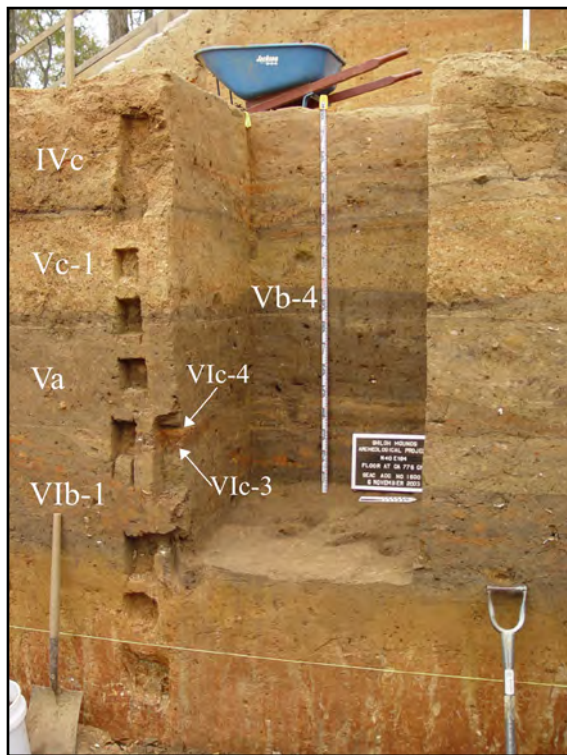


Figure 10-39. Photograph of Submound West Profile with location of prepared surface Zone VIc-4. View to the west.

They could also serve as specialized cooking surfaces. Well-sorted sand and clay micro-lenses have been observed elsewhere in a Mississippian period contexts as a lining in a puddled clay mounded cooking or fire basin. This material may have served to increase thermal conductivity and heat retention. These zones are classified as prepared surfaces under stratiform fills (see Sherwood and Chapman 2005 for more on red clay prepared surfaces).

Beneath IVc-4 are localized secondary zones (grouped as IVc-3) that appear to be laid down as substrate for the prepared surface. The slight basin is infilled with silt loam loess soil aggregates with added aggregates of silty clay loam soil (Figure 10-42). Mixed in this matrix are macro and micro artifacts (sand size burned shell and charcoal fragments and rare ash aggregates <2.5mm (Figure 10-43).

The absence of stratigraphic information to the west, limits the interpretive potential at this time as it is unclear if these burned features are associated with “inside” or “outside” activities. Closer examination of the levels removed in units N37–40, E184 may add to the interpretation of these zones composing IVc.

Stage V

Stage V consists of an approximately 80cm thick unit that contains three primary massive zones and numerous secondary zones. This stage contains the first unequivocal evidence for extensive massive fill that is potentially thematic in nature.

Zone Va

Zone Va extends across the majority of the profile consistently measuring 40cm thick with abrupt boundaries (see Figures 10-27, 28 and 10-39). The material is described as a relatively mixed dark brown silt loam soil material with organic matter and variable clasts of lighter colored soil material. The coarse fraction includes variably sized charcoal, few burned bone (Figure 10-44) and unburned bone fragments, and a few egg shell fragments. The structure is strongly aggregated indicating extensive bioturbation (Figure 10-45). Intact ash crystals can be observed in thin section (Figure 10-46), which is highly unusual due to the generally acidic conditions in the regional soils. The influx

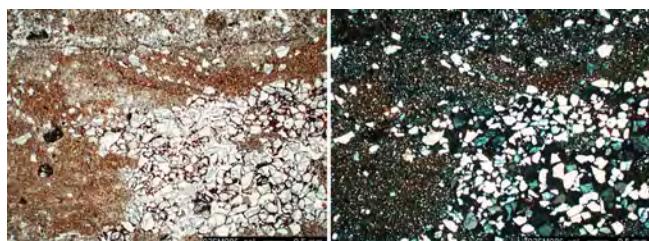


Figure 10-40. Photomicrograph illustrating silty clay matrix of prepared surface in Zone IVc-4 with lens of medium sand and clay (geofuric microfabric).

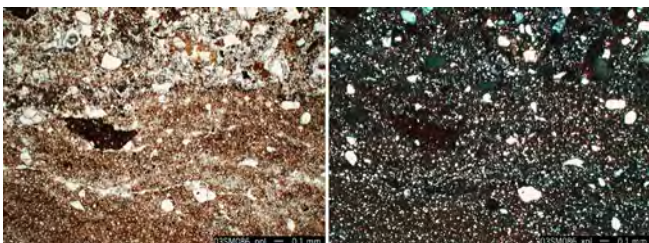


Figure 10-41. Photomicrograph illustrating upper boundary with thin charcoal concentration (Zone IVc-4).

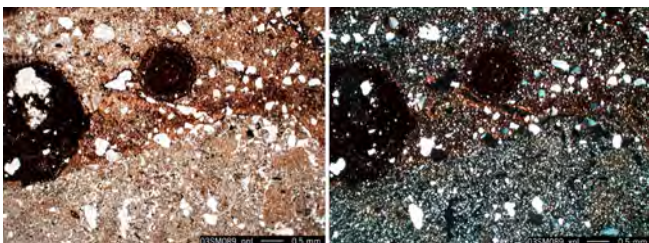


Figure 10-42. Photomicrograph illustrating portion of a red silty clay loam/silty clay aggregate containing nodules (Zone VIc-1).

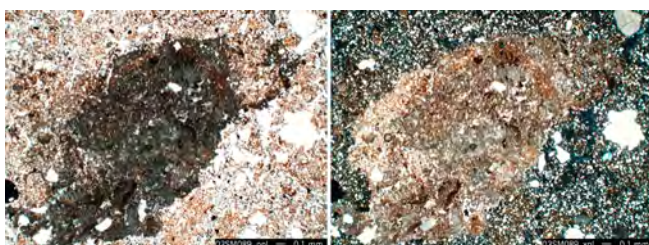


Figure 10-43. Photomicrograph illustrating ash aggregate in silt loam matrix indicating it has been transported (Zone VIc-1).

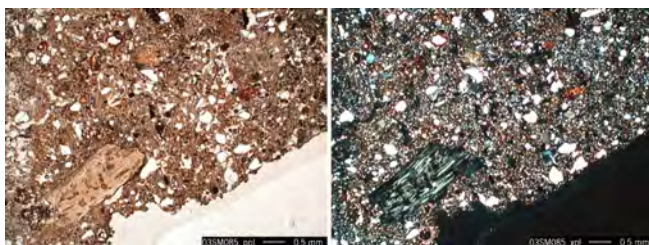


Figure 10-44. Photomicrograph illustrating burned bone fragment in mixed matrix, next to large void (Zone Va-1).

of ash and other carbonate material likely raises the pH microenvironment which is further suggested in micritic hypocoatings and coatings on root channels (Figure 10-47).

It is difficult to determine if this zone classifies as a massive fill or a cumulative midden stratiform since the contents consist of midden material and local soil material. The overall microstructure is compressed however, with relatively limited void space which is not indicative of a midden. This could have occurred due to excessive trampling and weight from the deposits above. However, the relative homogeneity (compared to a typical midden composed of isolated deposits and artifact concentrations) as well as the abrupt boundary at the base suggesting expedient and consistent filling, build a slightly stronger case for this to be interpreted as a massive bed, potentially a mantle as it immediately overlies a surface.

Zone Vb

Cutting into Zone Va is Zone Vb-1. The margin of the intrusive deposit slopes at a 45 degree angle to the north leaving a 1 to 5cm remnant of Zone Va above the contact with Stage IV. This zone is mixed making it difficult to assign one color or texture (see Figure 10-27 and 10-28). The matrix is a combination of variably sized clasts of yellow and red silt loam to silty clay loam. In the field the medium brown silt loam clasts appeared to be portions of sod blocks. The absence of wash zones at the base of this zone, overlying Zone Va, suggests it was cut and filled relatively quickly. The overall homogeneity of the zone and the absence of distinct loading boundaries suggest the zone should be classified as a massive bed fill.

Zones Vb-2 and Vb-3 were described in the field as brown 7.5YR5/3 silt loam but are not discussed in detail here based on the absence of excavation or geoarcheological data. There is, however, data collected from Zone Vb-4 immediately south of these two deposits. Zone Vb4 is a lenticular zone, measuring approximately 5cm thick and overlaps the upper surfaces of Zones Va and Vb and is composed of dark brown silt loam with common charcoal and artifacts.

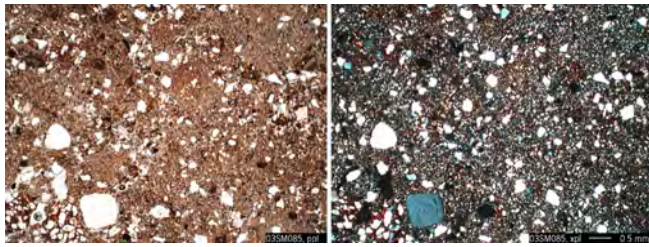


Figure 10-45. Photomicrograph illustrating general matrix view of Zone Va-1, note variable aggregates.

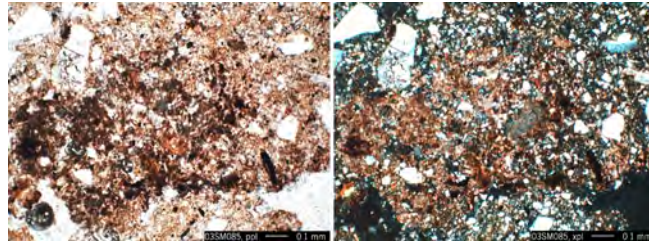


Figure 10-46. Photomicrograph illustrating aggregate containing ash, some articulated (Zone Va-1).

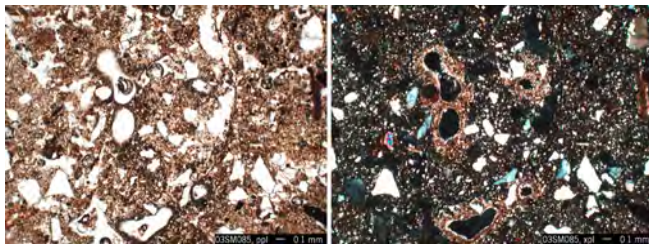


Figure 10-47. Photomicrograph illustrating root channels with micritic hypocostings (Zone Va-1).

The micromorphological analysis of Vb-4 indicates graded bedding of clean silt and fine papules and charcoal (Figure 10-48) overlying mixed silt loam loess soil material, with organic matter and variably sized charcoal fragments, many aggregates (various materials) and slaking crusts of finer materials (GTS Appendix A 03SM84). Localized areas of the microstructure include abundant bioturbation features composed of various sizes of fecal pellets and roots and an overall granular structure. Microartifacts are common and included burned and unburned bone (Figure 10-49). Based on the microstructure and contents, this zone is classified as a stratiform fill of cumulative midden.

The fine grained “laminated” bedding is actually part of an independent microstratigraphic unit that is not included in the west profile at N185, however, it is indicated at the base of Vb-4 in the N40, E184 profiles (see Figure 10-30) and above

Vb-1 in the north profile of N44, E179-185 in the backhoe trench (see Figure 10-27), and is visible in the photographs (e.g., Figure 10-30). The thin gray lens is visible in the field as a sharply defined “line” that extends across the ca. 685cmbd elevation and continues north-south across the backhoe trench exposure and at least 1m to the west. Without more exposure through a three-dimensional view of these stratigraphic units; however, it is difficult to speculate as to the source of the fine graded bedding. The overlying cumulative midden (Zone Vb-4) must have functioned as a brief dumping area. It is doubtful that it served as a floor since trampling would have destroyed the fragile structure of the underlying graded silts. It suggests a brief hiatus, not long enough for vegetation to become established but where there was no sediment introduced and the surface was periodically wet, perhaps containing pooled water.

Zone Vc

Zone Vc represents the top of Stage V and extends at a relatively consistent thickness across the full backhoe trench profile. Zone Vc-1 makes up the bulk of this zone, measuring 30cm thick, consisting of a homogeneous matrix of yellowish red silty clay loam with remarkably consistent <1cm clasts of red clay and grey clay (see Figures 10-27, 10-29, and

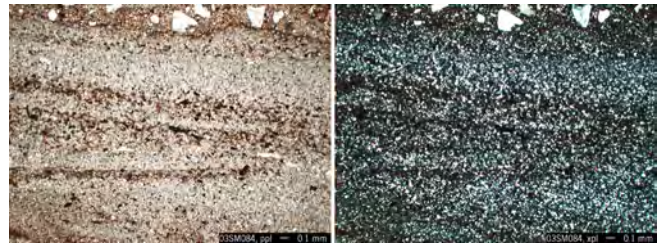


Figure 10-48. Photomicrograph illustrating graded bedding at base of thin section below Zone Vb-4.

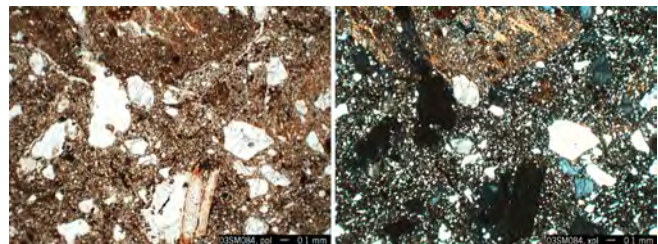


Figure 10-49. Photomicrograph illustrating detail of silt loam mixed matrix with bone fragment and edge of rip-up clast at top (Zone Vb-4).

10-34). A 2m section of Vc-1 was revealed 5m to the west of the backhoe trench appearing much the same as it does to the east suggesting >24 m³ of one homogeneous fill (Figure 10-50).

The micromorphological study of **Zone Vc-1** revealed mixed aggregates from various sources including silt loam loess soil material from various horizons, Pleistocene clayey sand, and a few grains of glauconite suggest limited mixture of Coffee Sand as well. There are virtually no microartifacts, however there are approximately <5 percent sand and silt size charcoal fragments. Unlike much of the material observed within the mound there are many post depositional clay coatings, dusty clay coatings and localized silt coatings, along aggregate boundaries (Figure 10-51). This would suggest that the clayey source material was disturbed as it was mined and transported and then redeposited in the new substrate (Figure 10-52). There are also birefringent clay coatings along the abrupt contact with zone Vb-4 at the base of the zone. Perhaps the calcareous microenvironment caused the clay to flocculate and accumulate without moving further through the profile. Voids are few and the limited evidence for bioturbation appears to have come from the source area(s). The boundaries are sharp and smooth with features originating from Vc-3 and 4 intruding from above. There is no clear evidence of loading. Based on all the attributes of Zone Vc-1,

especially the consistence across the expanse of the strata and its covering of adjacent surface areas (e.g., Vb-4, Vb-3), it is interpreted as a thematic mantle massive fill. The massive fill was clearly carefully and consistently created using relative frequencies of different materials from various areas. Whether the desired effect was due to engineering concerns or due to the distinct light color they afforded, or both, is unknown but the consistent combination of these materials and their even deposition across a relatively large area was clearly intentional.

The zones overlying Zone Vc-1 consist of a relatively complex series of secondary zones that appear to represent localized activities and prepared surfaces, perhaps related to specific activities. Some of these zones have been designated for this discussion including **Zones Vc-2, Vc-3, and Vc-4** (see Figures 10-27, 10-28, and 10-53). Zone Vc-2 is divided into Vc-2a and Vc-2b and concentrates on the north end of the deep backhoe trench around N42. Zone Vc-2a is composed brown 7.5YR5/4, silt loam and Vc-2b is described as brown 10YR4/3 silt loam. These zones were not sampled for micromorphology in the north profile, however a similar zone does appear to the west and is exposed in N44, E179-186 north profile (see Figures 10-52). Here the zone appears slightly more gray in color and composed of mixed silt loam and silt sandwiched between the “yellow” of Zone Vc-1 and the red of IVa-1.

Between Zones Vc-2a and b and **Zone Vc-3**, ca. 2m to the south is a dark yellowish brown 10YR3/4 silt loam that includes architectural features (e.g., Features 591, 592, a wall trench and post, respectively). Zone Vc-3 is a relatively thin lens (<3cm) generally described in the field as a brown 10YR4/3 silt loam directly overlying IV-1. Figure 10-54 illustrates the bioturbated nature of the contact above with Vc-4. The lower contact with Vc-1 is also bioturbated. The portion sampled in thin section consisted of mixed grayish brown aggregates



Figure 10-50. Zone Vc-1 remains in the base of the profiles visible in this plan view in Units N44 E180-181. Black arrows point to the top of the yellow Zone Vc-1.

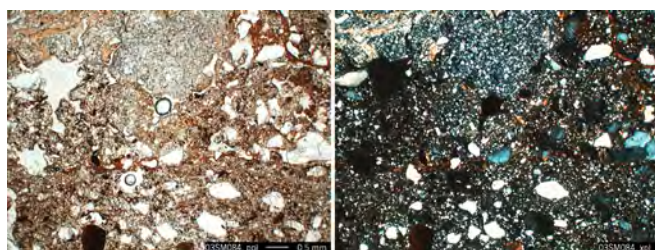


Figure 10-51. Photomicrograph illustrating Zone Vc-1 and Vb-4 contact, note clay coatings.

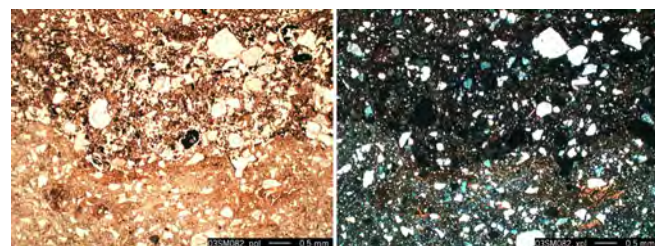


Figure 10-52. Photomicrograph illustrating the abrupt contact between Zones Vc-1 and Vc-4 w/ thin dusty clay coatings.

attributes suggest that Zone Vc-3 is a cumulative deposit or a prepared surface that would have appeared gray and yellow and not as substantial as the red sandy clay surfaces nearby. There is no microstratigraphic evidence for graded bedding indicating wash, so the zone had to have been applied thinly or accumulated relatively quickly, perhaps even smoothed out or placed as a substrate for the red prepared surface that appears in patches above, either for adhering purposes, specialized activities, or significance in the red over the yellow.

Zone Vc-4

Identified as a thin (<2cm) inconsistent red 10R 4/6 sandy clay lens, Zone Vc-4 is visible on the south end of the west profile E185 (see Figures 10-27 and 10-55). Between Vc-3 and Vc-4 is a thin wash rich in charcoal in a mixed mineral matrix (partially bioturbated) with localized graded bedding at the top with a very sharp boundary (see Figure 10-52). Though there is a limited prepared surface below, the micro-graded bedding suggests it may have been washed in or subsequently saturated. The absence of microartifacts does not support an interpretation of a floor deposit, however if one looks over the E185 profile (see Figure 10-

54) with the patches of red floors to the south, the N36–35, E1854 contiguous profiles (see Figure 10-29) and the west profile photograph at N40, E184 (see Figure 10-34) there is at least a >2m² area that includes thin discontinuous red prepared surfaces and laminated charcoal, suggesting the potential at least for a prepared surface or floor and a complex series of activities.

Stage IV

Zone IVa is currently considered the top of the submound sequence marking a clear transition from the submound zones to those associated with the first construction of the mound (see Figures 10-27, 10-28, and 10-53, see also Figure 09-01). There is fairly extensive lateral variation in the zones of Stage IV that will be described here.

Zone IVa

Zone IVa-1 extends laterally from the backhoe trench, west across the surface of the submound deposits at least as far as north and west as N45 W180 (end of the excavation) and south as far as ca. N41. **Zone IVa-1** is composed of red (2.5YR4/6) sandy clay of variable thicknesses (~20cm). The thin section analysis indicates red clayey sand and sandy clay consisting of dense red and yellow clay between grains and fragments of clay coatings (Figure 10-56). Macro and microstratigraphic observation of IVa-1 indicate that this expansive red zone is composed of slightly variable applications of red sand and clay (Figure 10-57) resulting in one massive bed of striking red leading to a classification of either a thematic bed or mantle. Thematic mantles are preferred as the stratum covers a large area, and is relatively thick and thematic simply refers to consistent selection and clear intentionality of the red color.

Immediately above Zone IVa-1, visible along the N44 north profile, are Zones IVa-1a, IVa-c, IVa-1d (see Figures 10-50, 10-53, and 10-54). Zone IVa-1c is essentially part of the larger IVa-1 but was set apart by a slightly different color. The zone is a strong brown (appears dark yellow) 7.5YR5/8 sand and clay. The microfabric suggests the careful preparation/combining of materials

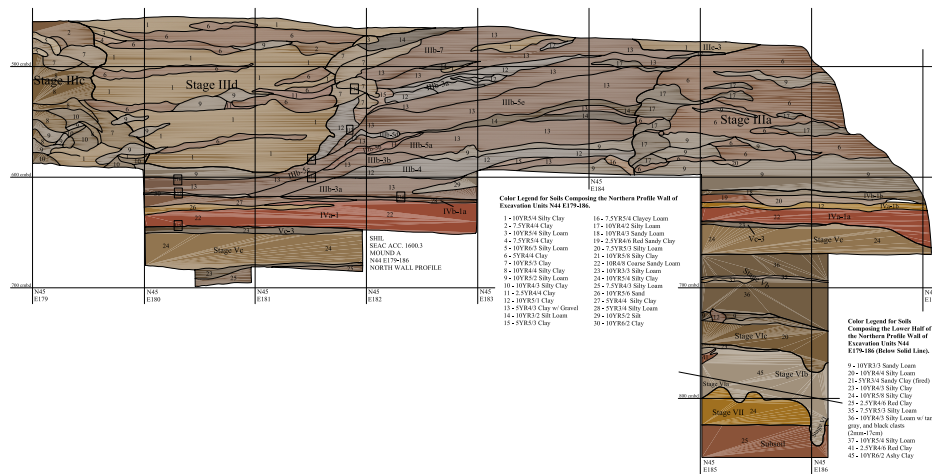


Figure 10-53. N44 E179-186, North Profile with stages, major zones and micromorphology sample locations.

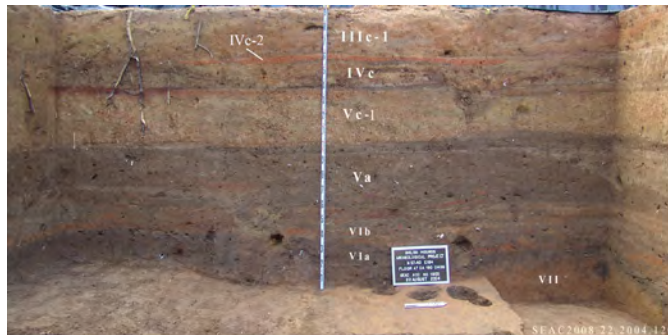


Figure 10-54. Photograph of the "submound" east wall in N37-40 E184.

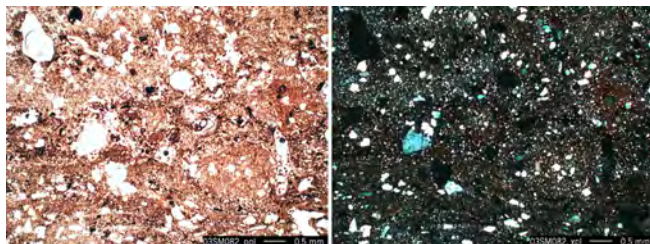


Figure 10-55. Photomicrograph illustrating mixed charcoal and silt loam soil material over abrupt, possibly heat altered, prepared surface (Zone Vc-4).

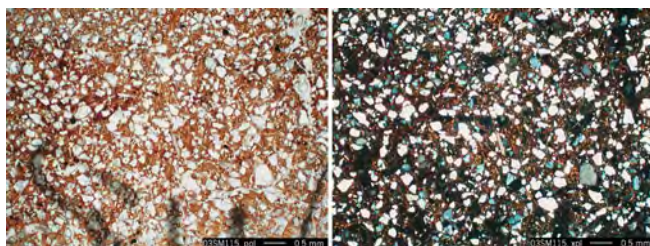


Figure 10-56. Photomicrograph illustrating red clayey fine sand matrix of Zone IVa-1 surface (note: shadows at the base of image are from the sample # scribed into the back of the glass slide).

prior to deposition. The matrix is composed of sand in a dense silty clay matrix with inclusions of yellow birefringent clay fragments. The size and composition suggest the base sediments are primarily derived from Pleistocene sand and clay deep in the Quaternary Terrace deposits. At the top of the zone are thin sand and silt "cleaner" micro-zones, that could be disturbed wash zones. Planar voids are located throughout the micro-zone with few dusty clay coatings (Figure 10-58). These zones suggest perhaps the top of the zone was wet and became desiccated prior to the deposition of IVa-1d.

Zone IVa-1d is wedge shaped, thicker to the west (ca. 10cm) that pinches up and out beneath Zone IVa-1a. It is difficult with the limited exposure to determine how this zone functioned; however, the composition is fairly unique (see Figure 10-53 and Figure 10-59). It should be noted that there is a possibility that Zone IVd (to the southeast) correlates with Zone IVa. They contain similar components although IVd is less well expressed. Zone IVa-1d is difficult to summarize with one color and texture as it is composed of clasts of different material (see Figure 10-59). The matrix is a relatively "clean" silt loam to silt (<5 percent fine sand) supporting three distinct types of clasts. The clasts include gray A horizon material with charcoal and a few pieces with the same bioturbated microfabric as observed in several of the sod blocks (see below), and deeper Bt/Bw yellow silt loam/silt soil material with clay coatings, concretions and Mn/Fe concentrations.

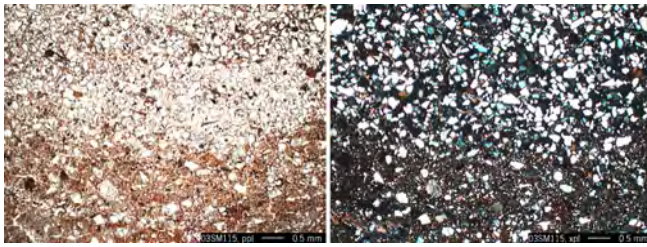


Figure 10-57. Photomicrograph of microlenses within IVa-1a, “clean” fine sand at the top of Zone IVa-1a.

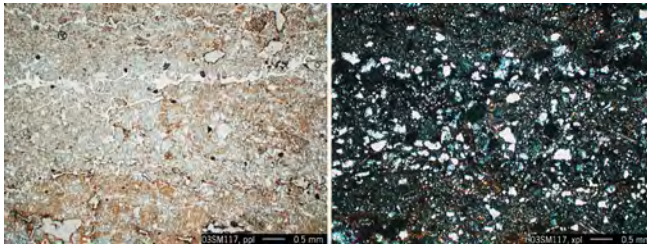


Figure 10-58. Photomicrograph illustrating clast of bedded silts containing fine sand to coarse silt fragments of yellow clay (Zone IVa-1c).



Figure 10-59. Photograph of a detail of the N45 profile where sample 03SM116 was collected. Note the consistency of the clasts included in the lower zone, IVa-1d and the abrupt boundary of the thin grey lens above.

These two materials could be derived from the same soil but they are from opposite ends of the profile, one from the surface and one from deep within the exposure >50cm. The third clast type is the red sandy clay that is used predominantly in the construction of Zone IVa-1 and other prepared surfaces in the mound. The material is likely derived from the Pleistocene Terrace Deposits, deep below the local soils. The consistency of a zone like this one clearly demonstrates the care and planning necessary to evenly distribute clasts of similar sizes from three specific sources to create a stable zone, and one that was immensely colorful.

Zone IVa-1b, a thin relatively consistent lens that appears immediately beneath Zones IIIa and IIIb (see Figure 10-53), and overlaps the eastern edge of IVa-1d. This zone is described as a darker red 5YR3/4, sandy loam in the field. In thin section

it is fairly complex and consists of “clean” fine sand to coarse silt bands with very few papules, laid on top of silt loam with well sorted medium to fine sand and few (<5 percent) red clay/sand aggregates. In turn this silt loam is laid on the red surface of IVa-1 which has micro wash zones at the upper contact. These wash zones suggest a brief hiatus after the thick red zone was created.

Zone IVa-1b, a thin relatively consistent lens that appears immediately beneath the substage of IIIa and IIIb (see Figure 10-53), and overlaps the eastern edge of IVa-1b. This zone is described as a dark reddish brown 5YR3/4, sandy loam in the field. In thin section it is fairly complex and consists of “clean” fine sand to coarse silt bands with very few papules, laid on top of silt loam with well sorted medium to fine sand and few (<5 percent) red clay/sand aggregates. In turn this silt loam is laid on the red surface of IVa-1 which has micro wash zones at the upper contact (Figure 10-60). These wash zones suggest a brief hiatus after the thick red zone was created (see Figure 10-60).

In Zone IVb-1a there is an interesting microstructure in the silt loam consisting of “brick-work” like planar voids, at 90 degree angles (Figure 10-61). These planar voids cut across aggregates and ped faces so they cannot be interpreted as soil structure. Usually such voids are indicative of desiccation/shrinkage potentially due to heating, but this seems doubtful due to the absence of charcoal or ash along the boundary, not even in the cracks. This would lead me to propose that the area may have been exposed for several hot days and essentially desiccated by the sun.

Above this desiccated silt loam soil material (still in Zone IVa-1a) is the “clean” fine sand to coarse silt band described above. These are identical in composition to the samples (GTS Appendix A, 04SM450 & 451) collected in the exposures of Coffee Sand (Figures 10-62, 10-63, 10-64). This white sand would have been laid down above Zone IVa-1 in a consistent layer immediately prior to the construction of Stages IIIa and IIIb. It is believed that this occurred immediately prior, due to the absence of significant deformation or disturbance to Zone IVa-1a.

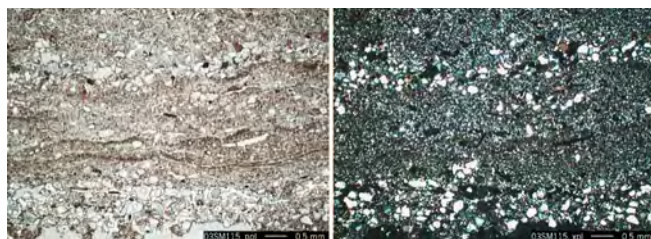


Figure 10-60. Photomicrograph illustrating clean wash lenses of fine sand of IVa-1 abruptly overlying more mixed lenses.

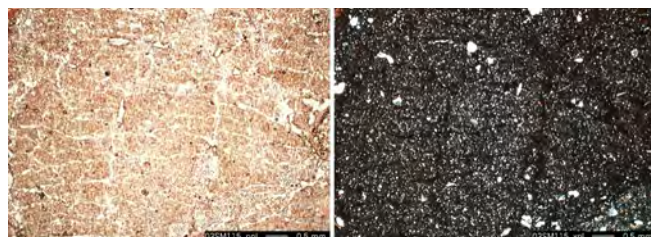


Figure 10-61. Photomicrograph illustrating "brick-like" planar voids at 90 degree angle (Zone IVb-1a).

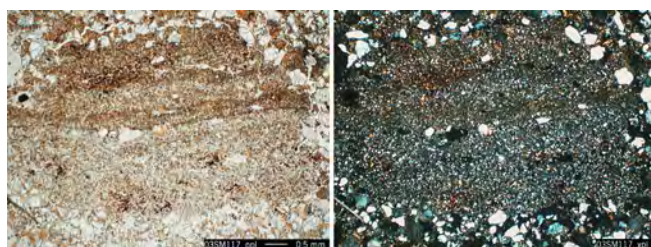


Figure 10-62. Photomicrograph illustrating clast of bedded silts containing fine sand to coarse silt fragments of yellow clay (Zone IVa-1c).

Zone IVb is a bed that interdigitates with the south margin of Zone IVa-1, overlying an extension of the lower reaches of the red sandy clay that extends to ca. N42 (see Figures 10-27 and 10-29). Zone IVb slopes slightly down from the edge of IVa-2 and pinches out around N40 directly overlying the top of Stage V. In the field the zone is described as a brown 10YR4/3 sandy clay with gravel size clasts of red sandy loam. At the top of the zone is a finely laminated micaceous zone with rare charcoal fragments. It is not clear how this fits into the larger submound space. The remaining IVb subzones are complex and are difficult to interpret with the limited exposure at the top of the backhoe trench. These zones are associated with features including structures adjacent to the red zone and may have been significantly impacted as mound construction began with the various overlying Stage III substages. Zone IVc is the thickest and most extensive of



Figure 10-63. Photograph of Coffee Sand exposure with cross-beds. Box indicates sample location.

these zones, spanning the southern half of the E185 profile with the northern, thinner margins overlying the surface of Zone IVa-1 (see Figure 10-27). In the field the zone is described as a dark brown 7.5YR3/3 silt loam. In thin section it appears as a well sorted homogeneous silt loam (few mixed sand), very few red sandy clay aggregates (Figure 10-65). There are a few microartifacts present as charcoal fragments (sand size) and one chert microdebitage fragment, a rarity in the Mound A thin sections. This zone could be a local cumulative midden, however the laminations observed in the N40, E185 profile and the description of the large clasts suggests that perhaps it is a mixed deposit that includes a cumulative midden that is mixed with building debris and material pulled from post holes, etc., capping a red floor above Stage Vc. In turn a red prepared surface is laid directly on Zone IVc. This thin red zone is not visible in the N185 profile but appearing just to the east (see Figures 10-29 and 10-66) and is picked up in the thin section sample in this area (GTS Appendix A, 03SM081). This layer, designated **IVc-1a**, appears to be burned and it is unclear if it continues further but it ends 10cm to the south in the east profile. Its shape boundaries

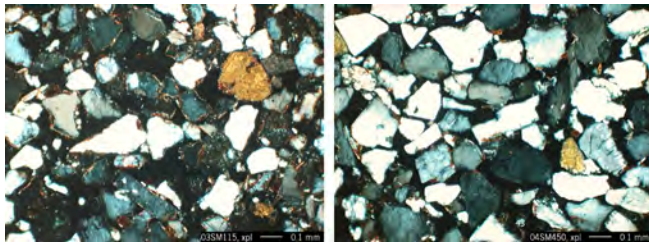


Figure 10-64. Photomicrograph comparing cross-polarized view of Coffee Sand (SM450) and Zone IVa-1a (SM115).

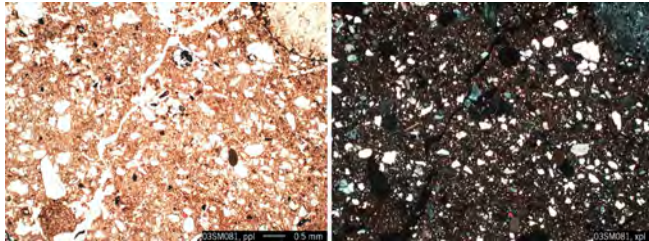


Figure 10-65. Photomicrograph illustrating the general matrix with few charcoal fragments (Zone IVc).



Figure 10-66. Photograph of Unit N40 E184, south and east profiles. The arrow points to Zone IVc-1a.

and the underlying basin shaped substrate zones are very similar to the prepared surface lower in the profile (Zone VIc-4 and VIc-3, see Figure 10-39). In thin section this zone is identified by dense red and yellow birefringent fine sandy clay suggestive of different clayey sources pressed together based on variable aggregates (Figure 10-67). The shape and composition of this zone classify it as a prepared surface (see above). There is localized graded bedding containing charcoal fragments, indicating water pooled and dried on the surface but there is no direct residual evidence of the use of the surface preserved in the thin section.

Zone IVd is composed of two irregular beds consisting of reddish brown 5YR4/4 mixed silt loam with few weathered rounded quartz pebbles and subrounded chert gravel fragments. The beds together measure ca. 10cm thick and extend across the E185 profile until it is truncated by an unidentified intrusive zone (currently referred to as IIIc-6). Zone IVd is made up of a complex series of micro-zones that from a sharp contact with IVc below, from bottom to top include localized graded bedding composed of silt and clay papules that indicate periodic slope wash and slack water deposits (Figure 10-68). The silt and clay rip up clasts are curved and slightly dislocated and topped with an aggregated silt loam loess soil material and brown silt with red papules and few fine sand beneath medium to fine sand topped with concentrated papules (Figure 10-69). This entire complex micro-sequence can be interpreted as a wash accumulating on a prepared surface followed by loading. This is classified as abed, massive fill over a micro-zone of slaking crusts. As noted above, this may link to the initial mound construction related to Stage III.

MOUND STRATIGRAPHY

Mound A stratigraphy begins with the strata above ca. 620cmbd. Note as any future excavations continue to the north this stage sequence will most likely change and evolve as more of the mound and its complexity are revealed. Mound stratigraphy uncovered in the initial testing phase, north of N54 is not discussed here. The limited nature of

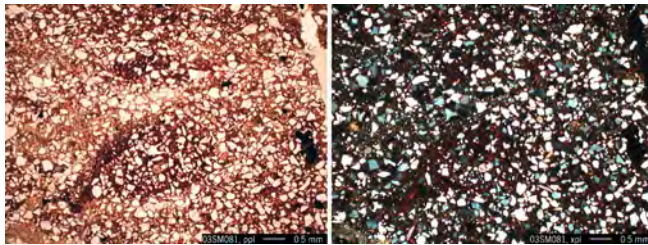


Figure 10-67. Photomicrograph illustrating variability in sandy clay making up the prepared surface (Zone IVc-1a).

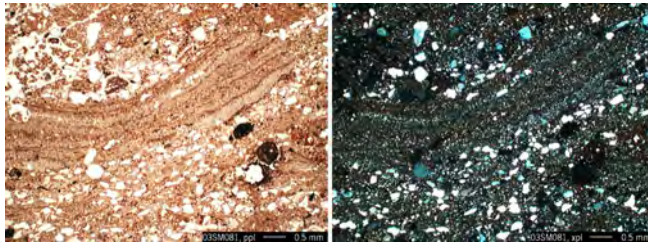


Figure 10-68. Photomicrograph illustrating curled rip-up clast above IVc-1a.

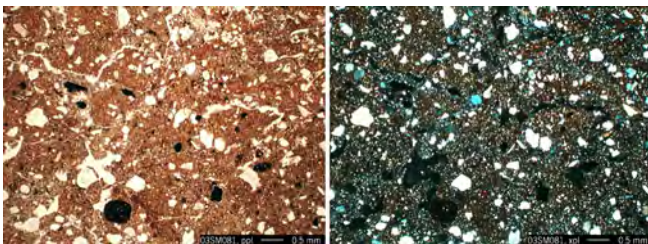


Figure 10-69. Photomicrograph illustrating representative matrix for the upper portion of the IVd-1, note presence of red aggregates.

the exposures does not allow for correlation with the larger E179 profile or Stage construction.

The large E179 profile (see Figure 09-01), combined with the N45, E179–186 east-west profile (see Figure 10-53) essentially provide the template for the overall Mound A stratigraphy from the 2001 to 2004 excavations. These profiles provide a slice through the mound from the top to the current ground surface. The upper portion of the area represented in the N45, E179–186 profile underwent a horizontally-oriented excavation strategy to uncover the full extent of the building remains on the mound stages and as such vertical profiles are limited in those areas. The east-west profiles, though only representing the lower half of the mound, provide an important dimension to facilitate a three-dimensional interpretation of the mound stages.

Stage III

Stage III is divided into nine separate substages that are interpreted as specific building or use phases. The surfaces of several of these groups of strata are characterized and defined by architectural elements such as posthole patterns. Stages IIIa through IIId appear to have been built as the initial construction or “core” of the mound and the subsequent stages as part of the actual use of the mound.

Stage IIIa

Stage IIIa is composed of a series of zones that are mounded along the current edge of the bluff (see Figure 10-53). The stage slopes up from the south and can be seen in the profile drawings and their accompanying photos trending south to north (Figures 10-70 to 10-77). The basal zone consists of a grayish brown 10YR5/2 silt loam, measuring approximately 30cm thick. Secondary zones of variable thicknesses (so far unassigned zones) consist of massive beds of reddish brown 5YR4/4 silty clay interspersed with variable silt loam loading deposits. These zones are not laid down horizontally but appear to be heaped.

While the current eastern margin is probably the result of historic slope collapse (so therefore cannot be known), the western margin is marked by a series of reddish brown 5YR4/4 silty clay inverted sod blocks (Figure 10-78). These blocks are stacked along the western edge of Stage IIIa in what would have been a steep face creating something akin to a sod wall. These sod blocks were not sampled for micromorphological analysis but were observed in the field and can be described as inverted intact elliptical blocks of dark gray A horizon grading into varying portions of a E or E/B horizon.

If one considers the east-west profiles moving south to north (as in the figure sequence given above) the slope of Stage IIIa trends upward to the north until it reaches its full height (in the current excavation) at ca. 480cmbd where it is overlain by elements of Stage IIIe. It is impossible at this point to determine the shape of the overall structure of Stage IIIa, until the area is excavated to the north. However, one can safely speculate that the overall structure likely consists of an isolated

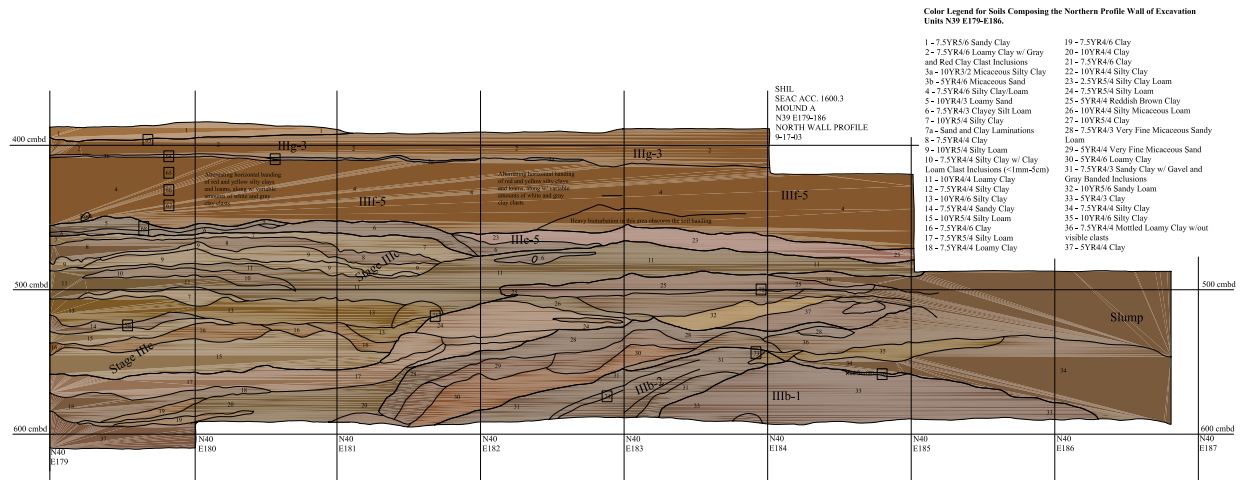


Figure 10-70. Excavation Units N39 E179-186, North Profile. N40 wall.



Figure 10-71. Photograph of the N40 E179-186 Profile. View to the north. Micromorphology sampling in progress.

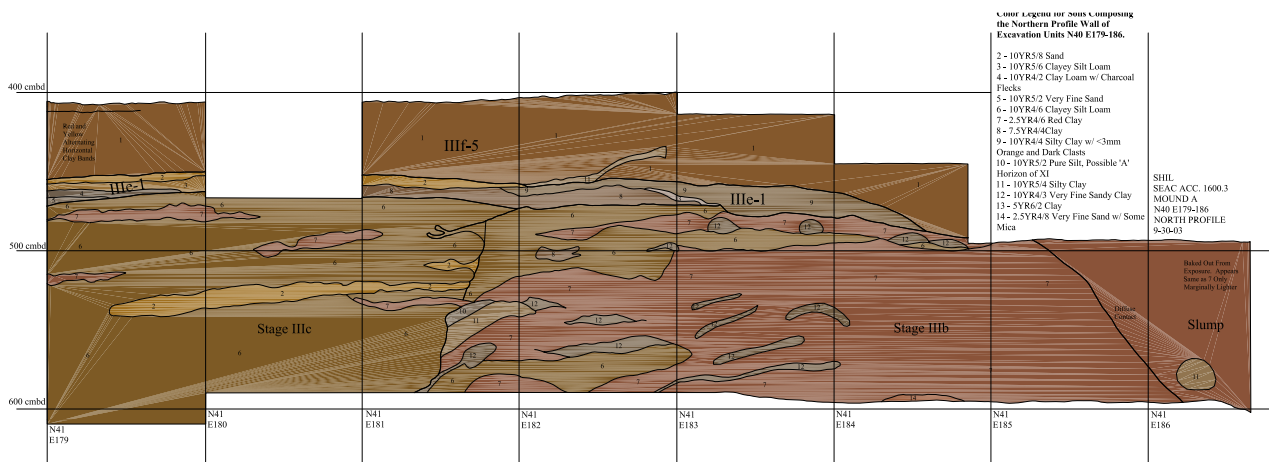


Figure 10-72. Excavation Units N40 E179-186, North Profile. N41 wall.



Figure 10-73. Photograph of the profile wall N41 E179-186. View to the north (mosaic from 3 different photos).

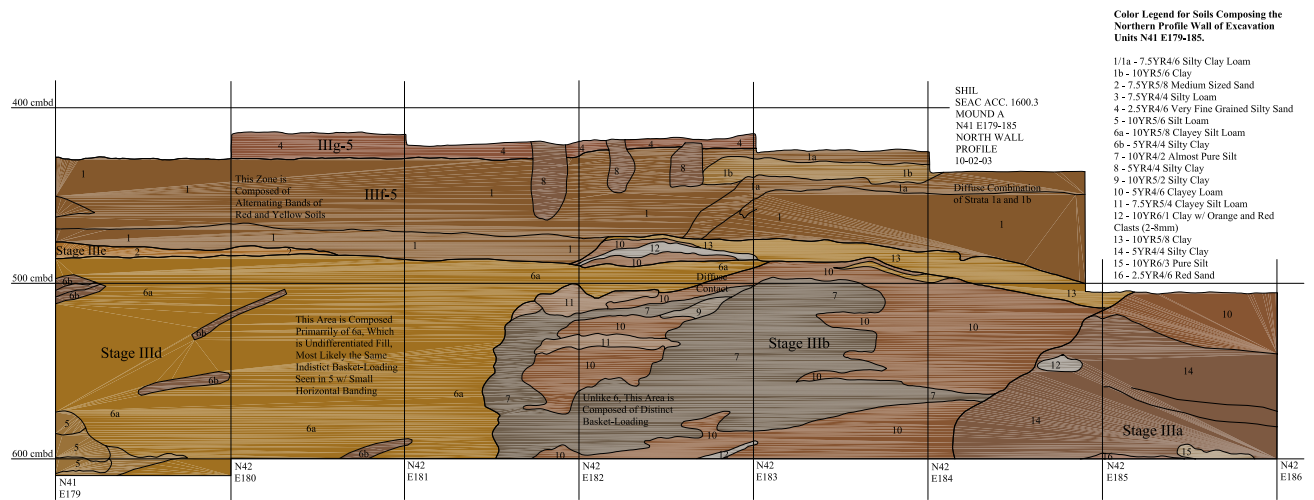


Figure 10-74. Excavation Units N41 E179-186, North Profile. N42 wall.



Figure 10-75. Photograph of the profile wall N42 E179-186. View to the north.

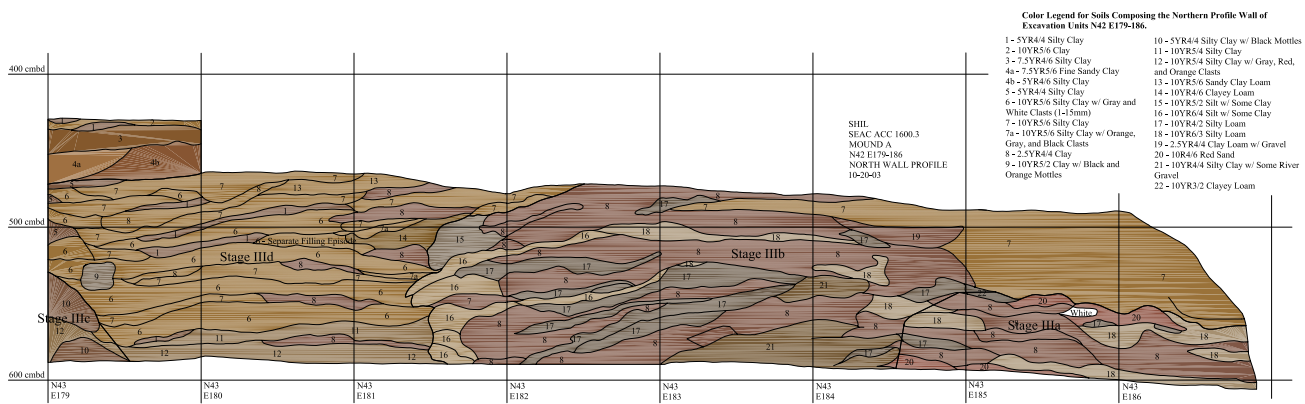


Figure 10-76. Excavation Units N42 E179-186, North Profile. N43 wall.



Figure 10-77. Photograph of the profile wall N43 E179-186. View to the north.



Figure 10-78. Photograph of Zone IIIa, including the eastern contact with Zone IIIb, Unit N43 E184-185 north wall, profile N44. Note the inverted Soil Blocks along the west boundary of IIIa.

mound or a continuous north-south embankment that parallels the river above the bluff edge. Such a feature would be in keeping with elongated features suggested in remote sensing of mound edges at other Mississippian sites (e.g. Bareis 1975; Coe 1995; Walker et al., 2008)

Stage IIIb

Zone IIIb is located adjacent to IIIa, seemingly built up against the western edge of Stage IIIa (see Figure 10-53 and 10-78). This stage is composed of a unique soil material (relative to the rest of the mound) consisting of a mixed matrix of mottled reddish brown and grey 5YR4/3 and 5/1 silt loam

with frequent mixed gravels, the majority of which appear to be rounded weathered chert. These include clasts of grey silt (no clay) and red sandy clay (dense sand with birefringent clay only in-between silty clay. The beds slope slightly downward to the west and are interspersed with thinner lenses, perhaps several loads that include darker grayish brown 10YR3/2 silt loam and gray 10YR5/1 silty clay to silt loam. The base of the western slope of IIIb pinches out at ca. 620cmbd at N45, E181 (see Figure 10-53). The small mound (or embankment) suggested by Stage IIIb was constructed on top of the red prepared surface of Zone IVa-1 with what appears to be a thin lens of white sand overlying this red surface just prior to the construction of IIIb (see the discussion for Zone IVa-1a for the nature of this substrate).

Micromorphological analysis of subzones within IIIb (e.g., IIIb-5e, see Geoarcheological Images Appendix B) consistently identified local silt loam soil material containing mixed clasts representative of the local horizons (specifically the E and Bt horizons). This included slaking crusts from the surface (Figure 10-79) to red brown Bt silty clay loam with thin localized clay coatings from the lower reaches of the source soil (Figures 10-80 and 10-81). Fine charcoal is common in the silt loam surface clasts. This is the only portion of Mound A where the local soil appears to have been used almost expediently, without additional processing or an effort to cut it as blocks or separate the different horizon materials. In Stage IIIb the full profile of the local silt loam is used including unsorted weathered gravel. These subzones are classified as massive fills where the loading is evident. Though they are all very similar, their lack of processing designates them unthematic.

As noted in the methods section it is often difficult to identify *in situ* bioturbation relative to bioturbation pedofeatures that are derived from the source area. Throughout the IIIb interior zones bioturbation that occurred following deposition is evident. This may be due to the way in which the soil was moved (in bulk), that it was not further processed like much of the material in the mound. As a result the soil fauna were moved

as well, resulting in relatively abundant post depositional bioturbation features (Figure 10-82).

Along the western limit of IIIb, as in Stage IIIa, inverted sod blocks are stacked that would have created a steep “bank” supporting the sloping beds (see Figure 10-53, 10-76, and 10-77). Soil blocks may have covered the entire stage at some point. Based on a review of the east-west profile photographs, the southern limits of the stage sloped, potentially as steep as the banks to the east and west, and were covered with inverted sod

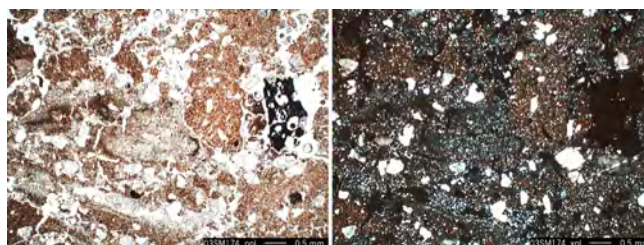


Figure 10-79. Photomicrograph illustrating slaking crusts mixed with silty clay loam aggregates and charcoal fragment (Zone IIIb-5e).

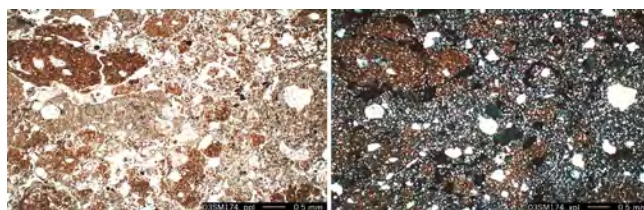


Figure 10-80. Photomicrograph illustrating aggregates of silty clay loam mixed with less well-developed soil material (Zone IIIb-5e).

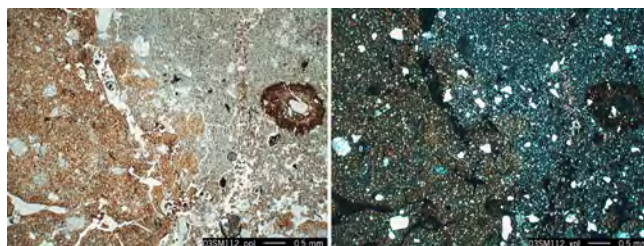


Figure 10-81. Photomicrograph illustrating adjacent clasts of silt loam soil material from different soil horizons (Zone IIIb-5e).

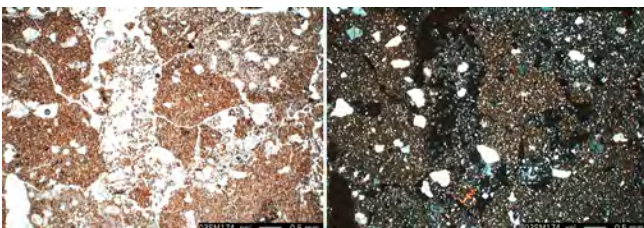


Figure 10-82. Photomicrograph illustrating partially infilled channels cutting across mixed aggregates indicating bioturbation occurred in-situ.



Figure 10-83. Photograph of the N42 E182-185 north profile, wall N43. Note the inverted Soil Blocks across much of the Stage IIIb exposure in the center of the image.

blocks. Figure 10-83 offers a view of the N42, E182-185 wall showing the soil blocks extending vertically in Stage IIIb, banked in against and interdigitating with red beds of mixed soil. The seemingly abrupt contact at the base of Stage IIIb in the photo probably represents the cutting of the slope, where sod blocks would have followed the south trending slope. The soil blocks stacked against the western upper bank are described as having formed in the local silt loam (loess) upland soil. These blocks have either a thin or partially stripped A horizon over an E horizon. The lack of granular open structure and overall compression suggests they were derived from a trampled area. There are localized micritic coatings observed in a silt based matrix in thin section (Figure 10-84) and indicate localized fine roots that likely developed prior to being moved as soil or sod blocks).

At the base of the western flank of this stage is a thin gray deposit designated Zone IIIb-3c (see Figure 10-53; zone IIIb-3c). This zone is a thin (~1cm) gray, graded fine sand, silt and dusty clay slaking crusts that appear to be undisturbed wash zones (Figure 10-85). The composition of the graded silt and clay did not point to a specific source for these washed deposits, however, they do suggest a local topographic high that would have provided the source material, most likely

the “small” Stage IIIb mound, suggesting the area accompanied by IIId, to the east of Stage IIIb, remained exposed, at least briefly.

Stage IIIc

Essentially the heart of the mound, a ~140cm high platform of stacked soil blocks is designated Stage IIIc (see Figures 09-01; 10-53 and 10-86). This zone is made up of numerous tertiary zones primarily consisting of the red and brown stacked soil blocks with intermittent south sloping beds of red silty clay mixed with sand clasts. Based on the presence of Stage IIId (adjacent to the east and discussed below) and the different parent material and structure this substage contains, it appears that slightly east of the E 179 profile marks the eastern limits of this platform (see Figure 10-53) in that area.

The exact southeastern extent of this substage is unknown. Stage IIIc in general functioned as a platform interior based on its overall positioning to the final mound structure, the relatively flat top, the external façade (Zone IIIe, discussed below) and the association of structures on the upper surface.

The red soil blocks are especially well expressed along the southern edge of the platform where the base steps outward to the south (Figure 10-87). Zone IIIc marks the greatest concentration

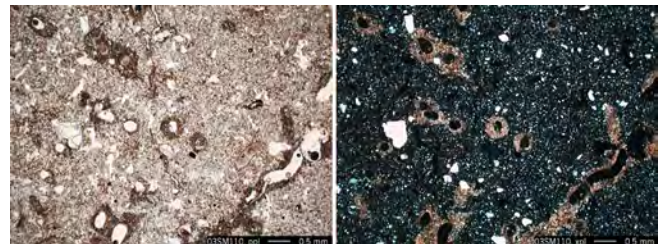


Figure 10-84. Photomicrograph illustrating concentration of micritic hypocoatings associated with root channels (Zone IIIb-7a).

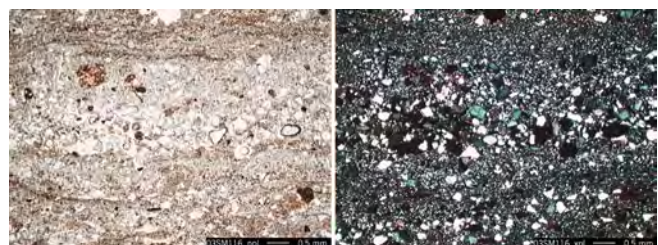


Figure 10-85. Photomicrograph illustrating banded sands and silt with slaking crusts (Zone IIIb-3c).



Figure 10-86. Profile E179, detailing the stacked Soil Blocks of IIIc.



Figure 10-87. Profile E179, detailing the south edge of the IIIc in relation to the subsequent mound slope facades.

of these blocks discovered thus far. The deeper horizon, IIIc-2a making up the block is composed of red 5YR4/6 silty clay with a clear contact (relative to the more diffuse contact of the brown soil blocks) marking the shift to the thin surface horizon. The surface horizon, generally consistent with other soil blocks contains the spongy voids in the silt to silt loam (Figure 10-88). The red silty clay is interpreted as a transitional Bw/Bt horizon with few very thin poorly developed clay coatings. The overall composition and structure matches with the comparative profile materials for local loess soils. Roots and localized micritic hypocoatings observed in

thin section (see above) suggest the blocks came from an area supporting vegetation, however as discussed in the section on the soil blocks there is no evidence for dense grass or turf.

In thin section the red soil blocks consist of silt loam soil material with few very thin localized clay coatings that match with local comparative bioturbated Bw horizon comparative profile materials (Figure 10-89). The upper (lower in profile since inverted) A horizon material consists of the same soil material but with more organic matter, bioturbation features, and roots and few localized micritic hypocoatings.

One of the most distinctive attributes of these red compound soil blocks is their clear boundary between a weak A horizon and well developed B horizon material. While in thin section there is some bioturbation along the boundary, macroscopically the boundary lacks the gradual boundary expressed in the lighter colored soil blocks (Figure 10-90). For the red soil blocks identified in Stage IIIc, this would suggest that the source area of local soil was previously truncated down into the top of the subsoil. Then the area was generally left alone or new A horizon material was encouraged with the addition of topsoil or natural buildup of organic matter. The area became stable enough for vegetation to be



Figure 10-88. Scanned image of the 03SM165 thin section showing the red subsoil microstructure of an inverted red soil block (Zone IIIc-2a).

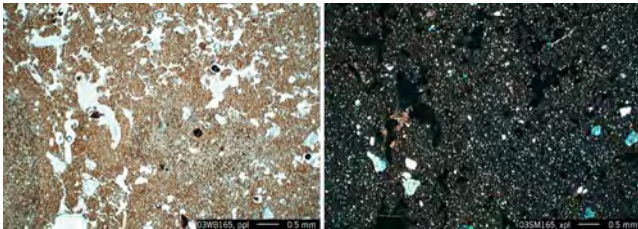


Figure 10-89. Photomicrograph illustrating spongy voids in silt loam to silty clay loam matrix (Zone IIIc-2a).

established based on the bioturbation and the root evidence but was not old enough for additional weathering to produce horizons or better blend (via eluviation and bioturbation) the A material in the truncated B horizon. Similar phenomena are documented in the sod block work conducted by Van Nest et al. (2001). They identified thin soil block A horizons with some that contained two parent materials (referred to in their work as “compound sod blocks”) where alluvial mud had been added to the source area in order to enhance the formation of the A horizon. The limited observations made of these types of sod blocks at Mound A, while also truncated, do not indicate a substantially different A horizon parent material such as local alluvium. Instead it appears that



Figure 10-90. Photograph detailing some of the inverted red soil block in Stage IIIc.

similar parent material with surface organic matter, (silt loams) formed the basis of the thin A horizons.

Stage IIId

Zone IIId was observed in all the major east-west profiles (see Figures 10-53 and 10-70 through 10-77). The zone consists of a series of yellowish brown 10YR5/4 silty clay and reddish brown 5YR4/4 silty clay loam to silty clay beds that appear as juxtaposed light and dark beds of varying thicknesses (Figure 10-91). The thicker light (yellow) beds and thinner dark (red) beds and sometimes loads are clearly thematic based on their regular juxtaposition and their consistent composition. They are also completely different from the composition and structure of the adjacent Zones IIIc and IIb. The red beds are composed of mixed aggregates from local silt loam soil material, predominantly large (gravel-size) angular aggregates of silty clay loam, Bt material with localized clay coatings (Figure 10-92). The yellow beds are composed of two clast types, lighter tan silt to silt loam clasts containing few charcoal fragments and yellowish brown clasts of silt to silt loam with localized clay coatings and added yellow papule fragments mixed in (Figure 10-93). Also



Figure 10-91. Photo detailing a N43 north profile view of Stage IIId. Arrows point to the upper corners of IIId.

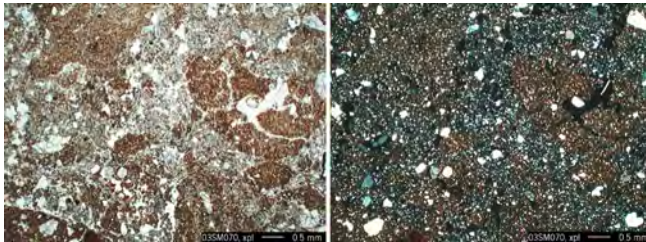


Figure 10-92. Photomicrograph illustrating "red bed" mixed aggregates of silt loam and silty clay loam composing zoned fill (Zone IIId-7a).

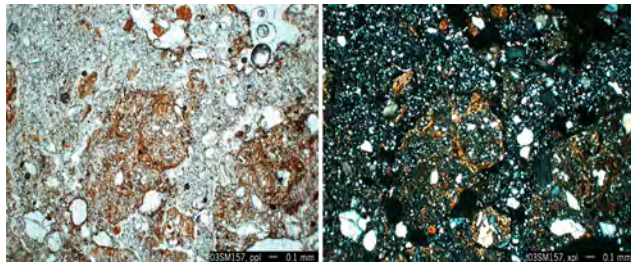


Figure 10-93. Photomicrograph illustrating "yellow bed" silt loam/silt soil material composing zoned fill (Zone IIId-7b).

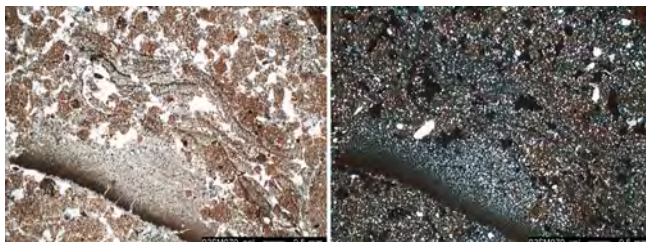


Figure 10-94. Photomicrograph illustrating aggregate of silt slaking crusts (Zone IIId-7b)

present among the lighter tan silt to silt loam clasts are occasional clasts of slaking crusts/rip-up clasts (Figure 10-94). These are likely derived from the source area. The varying thicknesses and mixing of the crusts among the other aggregates suggest they initially developed in the mining area and were manipulated and mixed during processing and placement

The overall shape of Stage IIId as it has been excavated thus far, is that of a ca. 150cm deep trough with a slightly rounded base. Zones IIIdb to the east and IIIdc to the west mark the boundaries, in each case with inconsistent inverted sod blocks sloping from their boundaries marking the edges of the "trough". One profile at N40 shows the north-south slope of the southern edge of the interior of this feature (Figure 10-95). Here the red beds are



Figure 10-95. Photo detailing the slope of the south edge of IIId. East wall of Unit N40 E180.

thinner and indicate that these zones are sloping down to the south. How this relates to the overall “trough” shape is unclear. The placement of the inverted soil blocks along the edge of Stages IIIb and IIIc do not suggest that IIId truncated these zones but instead was laid between these stabilized substages. This space left between the Stages IIIb and IIIc embankments was filled in after their construction, most likely in an effort to bridge the two earthen platforms into a larger, stable structure.

Stage IIIe

Zone IIIe represents a façade or covering over the Stage III platform interior (composed of substages III a, b, c and d) described above. Further support for the construction of Stage IIId and possibly IIIb as structural cores lies in the fact that a portion of this façade also would have covered the southern limits of Zone IIId and may have extended further east (Figure 10-96). This stage is made up of significantly different materials and they are also placed using different techniques. In the main E179 profile (see Figure 09-01), Zone IIIe is composed of numerous gently sloping small beds, with an abrupt boundary along the south slope (see Figure 10-96). These subzones are primarily composed of dark gray 10YR4/1 to 4/2 sand with fine lenses of lighter sand juxtaposed to yellowish red 5YR4/4 sandy loam lenses (Figure 10-97). Unfortunately the yellowish red (IIIe-5b) sandy loam has not been observed in thin section.

The dark gray zones (e.g. IIIe-5), are composed of relatively clean silt and sand aggregates and medium sand (including glauconite and quartz) in a chaotic microfabric. Some of the aggregates contain dense mica suggesting a source area in or near Tennessee River alluvium (Figure 10-98). Zone IIIe-5 extends over the crest of the mound core (IIId) and thins out from a thickness of ca. 20cm to the north where it disappears and is overlapped by Zone IIIe-3b (Figure 10-99).

Zone IIIe-6b (Figure 09-01) represents the zones composing the upper part of the façade, extending down slope and is a combination of interdigitated thematic loads with the gray and red zones described above (see Figure 10-97). It consists



Figure 10-96. Photo showing Stage IIIe (gray indicated by arrows) as it extends east across profile N39, covering the outer edges of substage IIIc.

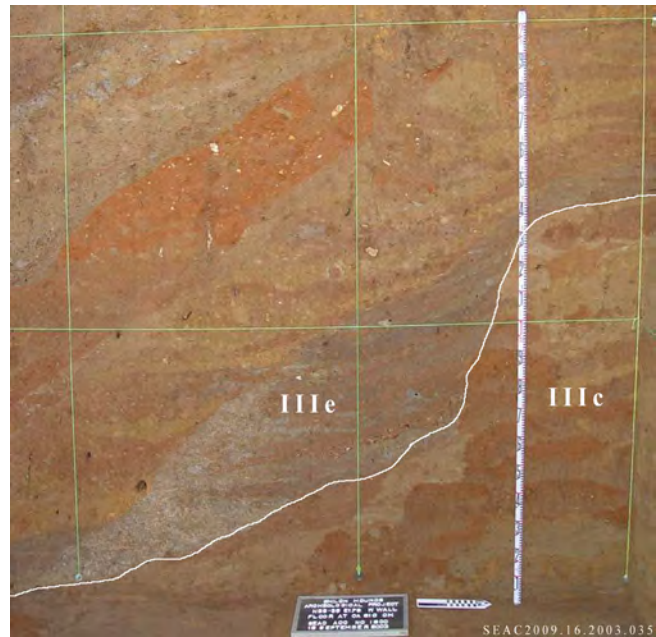


Figure 10-97. Photo of the Stage IIIe zones covering the Stage IIIc mound core on the southern slope.

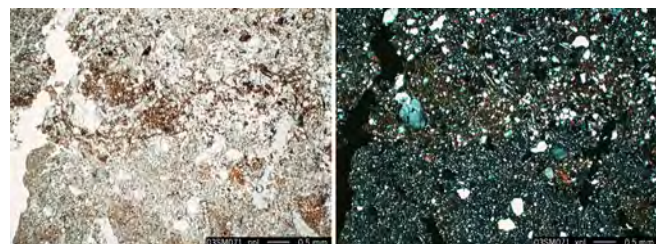


Figure 10-98. Photomicrograph illustrating Zone IIIe-5 matrix containing micaceous aggregate, note bioturbated fabric (not clear if from the source or post-depositional).

if a grayish brown 10YR5/2 loamy sand that appeared fairly homogeneous in the field. When the profile dried this combination of sandy zones emerged as surprisingly stable considering its steep slope. Extending south down the slope, representing what would have primarily been viewed of the mound exterior is IIIe-7a. At the base of the slope are horizontal thin laminated micro sand and silt lenses designated IIIe-7b (Figure 10-100). These are interpreted as cumulative slope wash from the IIIe-7a. This zone is truncated on the south by a posthole (see Figures 09-01; 10-100) that originates in overlying Stage IIIg.

Using the sample from IIIe-5 (GST Appendix A, 03SM68) we can examine the gray sand and explore why such a seemingly unstable material was used as a façade for this stage. The material is derived from two sources and laid down in thin bands, interdigitated with red silty clay loam layers. The materials are micaceous organic silt loam aggregates mixed with moderately sorted fine to medium sand (Figure 10-101) and clasts of gray silt loam soil material. The consistent alternating bands suggest that the intention was to juxtapose the two different material types. There is no macrostratigraphic evidence to support that it was washed in. There is no fine scale graded bedding in the upper portion of the façade associated with the fine bedding. The lower horizontal beds (IIIe-7b) however are wash zones that represent the exposure and slow erosion of the gray façade over time (Figure 10-102). Extending across the top of the interior platform (IIIc), sloping off the gray façade where it forms a crest (Zone IIIe-5) are Zones IIIe-3 and IIIe-3b (see Figure 09-01). Zone IIIe-3b is composed of strong brown 7.5YR5/8 sandy loam. It is overlain by Zone

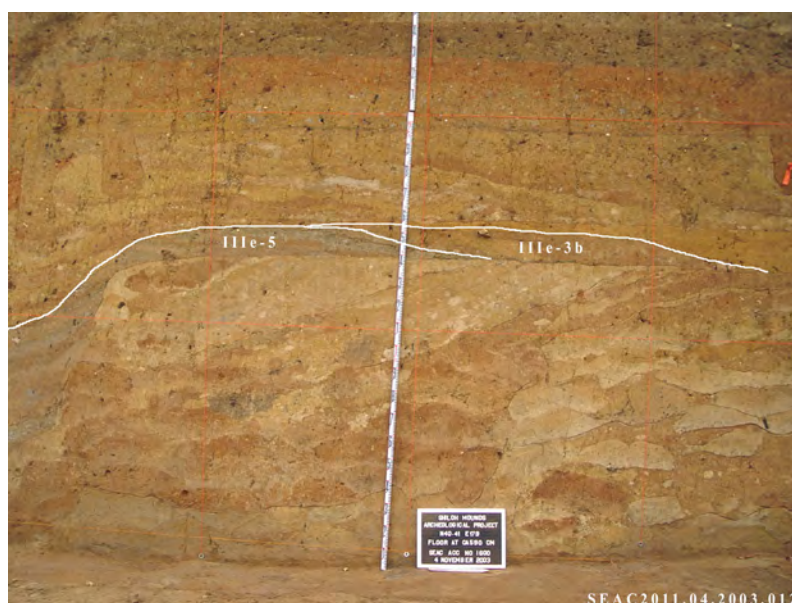


Figure 10-99. Substages IIIe-5 and IIIe-3b. N40 E179, West Profile.



Figure 10-100. Photo detailing Zone IIIe-7 at the base of the Stage IIIe toe slope. The black arrows indicate the top of Zone IIIe-7b and the white arrow points to an intrusive post hole.

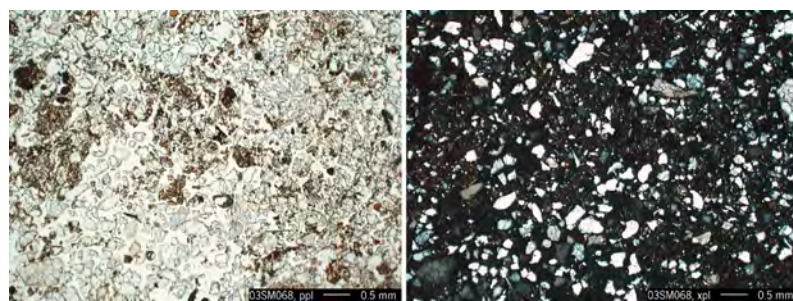


Figure 10-101. Photomicrograph illustrating micaceous organic silt loam aggregates mixed with moderately sorted fine to medium sand (Zone IIIe-7a).

IIIe-3 which is composed of yellowish brown 10YR5/8 loamy sand. IIIe-3 extends across the entire surface of the stage core IIIc and marks the top of the IIIe stage. The southern limits of IIIe-3 are thin (ca. 5cm) where it overlies IIIe-3b. Zone IIIe-3b is composed of poorly sorted sandy soil material with fragments of clay coatings (Figure 10-103). The zone is very consistent and dense with a higher sand content than most soils observed suggesting the material may be derived from deep in the local soil profile where the loess parent material overlays the Pleistocene Terrace deposits.

As noted above, Zone IIIe-3 extends across the upper surface of Stage IIIe over Stage IIIc, continuing to the eastern margins of the excavation (see Figures 10-86, 10-104) between 400 and 470cmbd. On the northern side, beneath Zone IIIe-6, a prepared floor designated IIIe-3c, is well

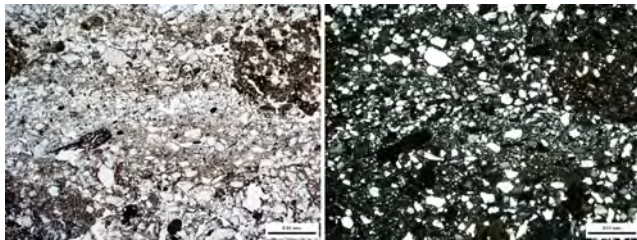


Figure 10-102. Photomicrograph illustrating subtle sorted lenses developed in IIIc-5 at the base of the IIIc-7b façade, likely produced by slope wash (Zone IIIe-7ba).

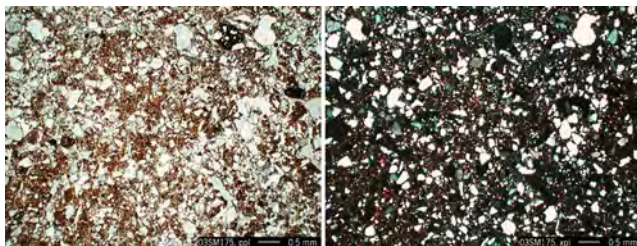


Figure 10-103. Photomicrograph illustrating poorly sorted sandy loam matrix with fragment of clay coatings (Zone IIIe-3).

preserved (see Figure 09-01 and 10-105). The floor was identified by its abrupt contact and unique parent material and measures approximately 1cm thick. The surface is composed of well-developed Bt horizon soil material, likely from the Pleistocene terrace deposits with aggregates of dense complex clay coatings mixed with unsorted fine sand and silt in a striated silty clay matrix (Figures 10-105, and 10-106). Located above IIIe-3, to the east (Figures 10-107 and 10-107) is a zone designated IIIe-4 that cannot be adequately interpreted since the excavations closed down before its extent to the north was realized. This low, mounded (~30cm high at its “peak”) deposit is comprised of mixed aggregates of local silt loam soil material collected deep within the soil profile (Bt material) similar to the zones making up the majority of Stage IIIb, with similar (but far fewer) weathered gravel inclusions (see Figure 10-107 and Figure 10-108). The deposit caps fine laminations of silt and slaking crusts at the abrupt contact with IIIe-3 (Figure 10-109) indicating IIIe-4 was placed over a surface that was not exposed for long or subsequently trampled.

Stage IIIf

Stage IIIf consists of juxtaposed colored deposits that use IIIc and IIIe as a core, essentially creating a new appearance to the same platform shaped mound and making it slightly larger and higher (see Figure 09-01 and 10-110). This change occurred in the early mid thirteenth century (see Chapter 21). We see the same stacked horizontal deposits composed of two types of zones (very similar to those discussed above in Stage IIIc), yellowish brown 10YR5/6 silt loam and yellowish red 5YR4/6 silty clay loam in this flank stratigraphy (Figures 10-110 and 10-111). These deposits are laid directly on top of the Stage

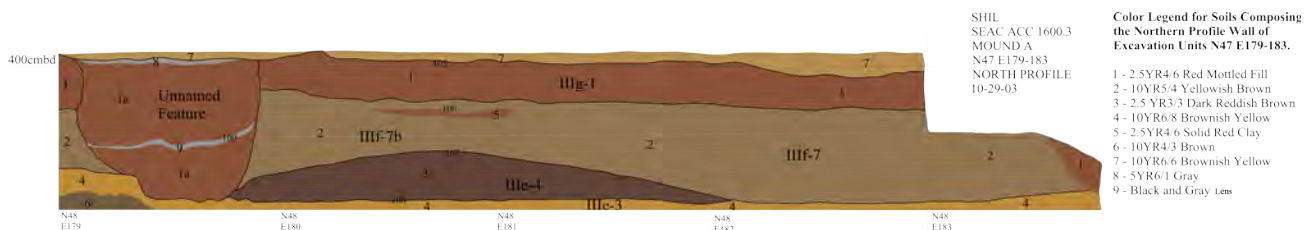


Figure 10-104. Profile of the N48 E179 to 183 wall between 390 and 470 cmbd.



Figure 10-105. Photomicrograph of the abrupt contact of the floor defined as Zone IIIe-3c (upper red colored sediment) over Zone IIIe-3 (lacking birefringent clay with a higher silt content).

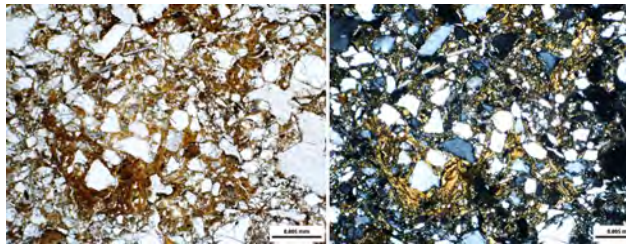


Figure 10-106. Photomicrograph of the birefringent clay material used to construct the III3-3c floor.

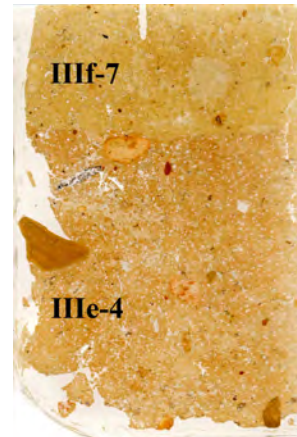


Figure 10-108. Thin section scan (5x7 cm) with abrupt contact of the overlying "yellow" Zone IIIf-7 over the "red" IIIe-4 containing coarse sand and subrounded pebbles of weathered chert inclusions.

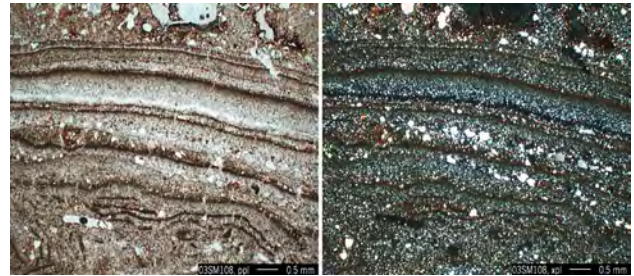


Figure 10-109. Photomicrograph illustrating silty wash zones with dusty clay and silt slaking crusts on the top of Zone IIIe-3.

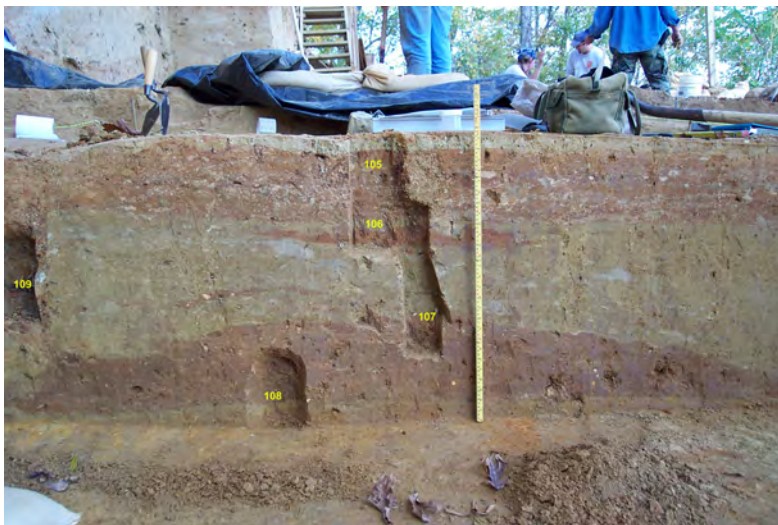


Figure 10-107. Photograph of the N48 E179 north wall. Infilled feature intrudes IIIg-1 and IIIf-7.

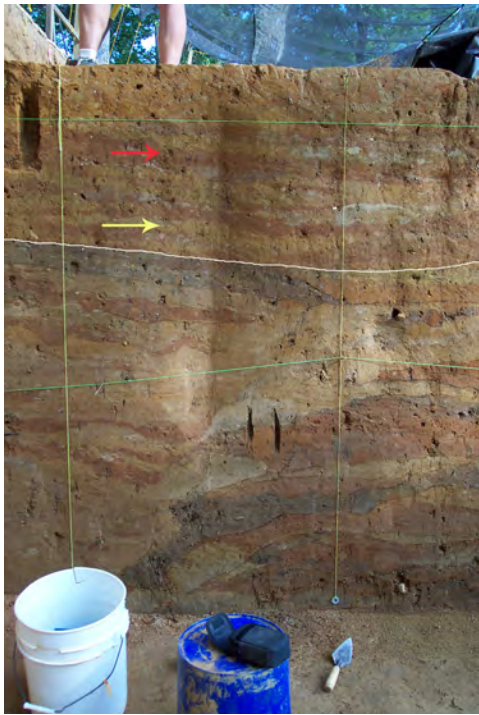


Figure 10-110. Photo of juxtaposed red and yellow beds (indicated by colored arrows) of Stage IIIf (above the white line). N40 Profile. View to the south.



Figure 10-111. Photo of juxtaposed red and yellow beds of Stage IIIf. White arrows indicate some of the horizontally placed red thematic beds. E180 Profile. View to the east.

IIIe-7b wash zones adjacent to the toe of the mound (see Figure 10-100). In the field these juxtaposed lenses were nicknamed the yellow and red “tiger stripes” for their thematic consistency. At the top of the new platform of Stage IIIf a new series of architectural and cultural features appear associated with Structures 2a and possibly 2b. These are not

created on top of the juxtaposed yellow and red but on a prepared massive deposit (Zone IIIg) laid on top (see Figure 09-01).

Different areas of the yellow silty clay loam were sampled (e.g. IIIf-3a, IIIf-1) revealing a relatively consistent composition for the “yellow” and “red” zones that centered on the combination of aggregates of silt, with large aggregates of Bw/Bt horizon material (fine weakly striated clay among the clay fraction, Figure 10-112) with complex highly birefringent laminated yellow clay coating fragments (Figure 10-113). The presence of planar voids in IIIf-3a suggests it was compressed, and compacted into place. Localized post depositional clay coatings further support the addition of clay and disruption and remobilization of illuvial clay from the original source areas (Figure 10-114).

The red beds, as in Stage IIIId, are not as thick in many cases as the yellow when they are

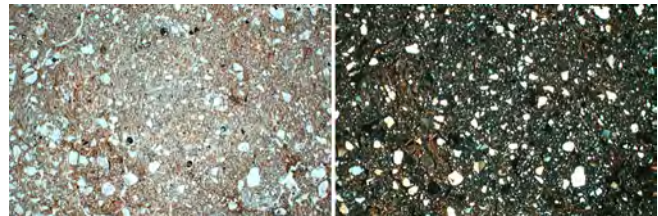


Figure 10-112. Photomicrograph illustrating silt loam matrix in Zone IIIf-3a.

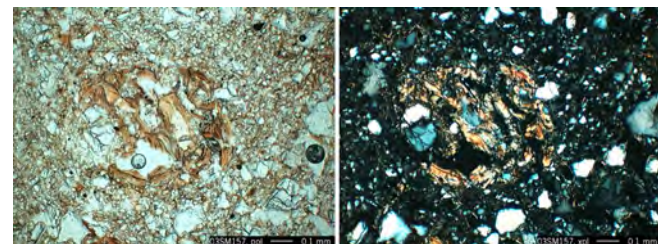


Figure 10-113. Photomicrograph illustrating papules composed of complex highly birefringent laminated coating fragments (Zone IIIf-3a).

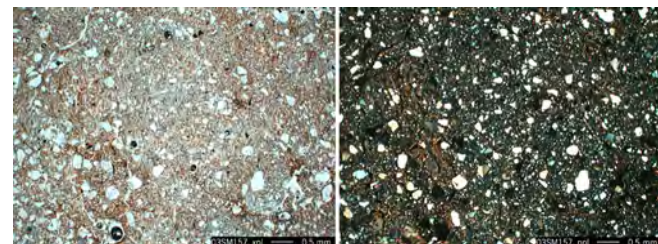


Figure 10-114. Photomicrograph illustrating conglomerate (aggregate) of fecal pellets with birefringent yellow clay filling packing voids. Note additional clay coating fragments distributed through the matrix (Zone IIIf-3a).

placed along the mound summit, and if they are then they are more variable. However on the slopes (discussed below) the red zones are thicker than the yellow. In general the red material is composed of homogeneous silt loam from deep in the profile mixed with some aggregates of surface material (A horizon) that include charcoal. This material is more like the local soils, however the course material appears to have been removed and more effort is taken to mix the material than in Stage IIb. In other areas, especially where the red lenses become beds (thicker) in the slope and on top of the platform the fill becomes less finely homogeneous with variably sized clasts of white sand appearing throughout the zones. The white sand is likely derived from the Coffee Sand Formation deep within the terrace (see above).

Moving towards the center of the mound, away from the flanks, the red and yellow “tiger strip” zones end at ca. N42. Note they do not slope

downward but the ca. 40cm thick Zone IIIf-5 banks and **Zone IIIf-6** is laid down. When viewing the full E179 profile (see Figure 09-01) this zone can be seen dipping inward from the south and the north, potentially truncated by Zone IIIg-1a. The material in this deposit is virtually the same, however it is unclear if it marks a massive deposit that was excavated out or if it was banked around the edges of a series of structures. The zone continues to the east, at least in some capacity based on its similarity to Zone IIIf-7 in the N48, E179 profile (see Figures 10-104 and 10-115). Zone IIIf-6 is composed of yellowish brown 10YR4-5/6 silty clay loam from two distinct soil materials. These materials include angular clasts of silty clay loam (local loess soil) from the upper Bt horizon with clasts of upper A horizon containing roots and some charcoal (Figure 10-116). On the north end of Zone IIIf-6 the zone immediately overlies a prepared surface (discussed above). The thin section sample that intersects this boundary at the base of Zone IIIf-6 reveals a mixture of cumulative material, mixed aggregates of silt loam soil (Bw/Bt), aggregates of sandy loam, clay loam (dense clay coatings), and frequent slaking crust fragments (Figure 10-117). Note that here aggregates relative to clasts on the south side were identified. Clasts are typically angular and in this context are derived from the source area in the mining process, whereas aggregates are usually more rounded, implying they have been reworked in the source area or, perhaps in this context in relation to a floor. The absence of microartifacts and the frequent slaking crusts in most habitation contexts would discourage interpretation as a floor deposit, however with the overall maintenance of the activity areas (cleanliness) suggested in the general absence of macroartifacts identified on the floors during the excavation, the structure and the prepared surface immediately below, lead me to interpret this as a floor or active zone above the floor (*sensu* Gé et al. 1993). The slaking crusts suggest water pooling in the area, perhaps during brief periods of inactivity. Dusty clay coatings in the zone below also support this process. Based on the spatial association with structural features at this elevation this floor appears to lie below



Figure 10-115. Photograph of the N48 E179 north wall. Infilled feature intrudes IIIg-1 and IIIf-7.

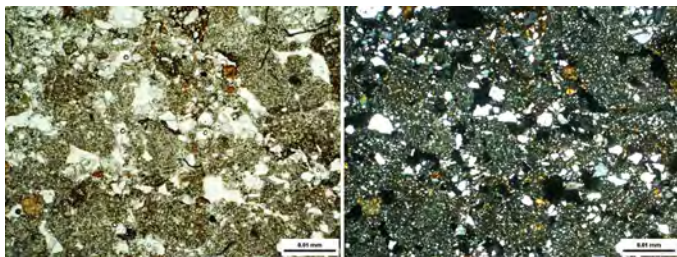


Figure 10-116. Photomicrograph of Zone IIIf-6 which includes a mixture of soil materials. This image focuses in on aggregates of silt loam (local loess soil) that may be derived from a local A horizon.

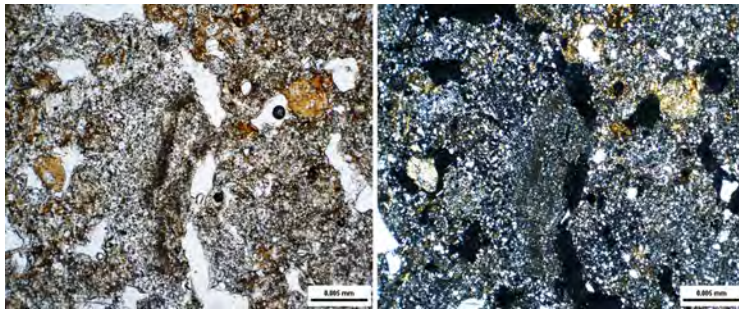


Figure 10-117. Zone IIIf-6 also includes aggregates of sandy loam, clay loam (dense clay coatings), and silt loam (likely A horizon material) that includes slaking crusts.

Structures 2a and 2b. It may have represented an open surface area prior to construction of 2a and 2b.

Stage IIIg

Stage IIIg consists of a complex series of zones that slightly expand the overall size of the mound, both in height and width. Stage IIIg contains several overlapping wall trench structures on the mound summit. This phase in the mound development dates to ca. A.D. 1225 to 1250 (see Chapter 21). The zones that make up the new flanks of the mound will be discussed first and then an attempt will be made to tie them to the Stage IIIg zones on the summit. There are two phases of slope deposits included in Stage IIIg.

This first slope deposit from Stage IIIg is **Zone IIIg-2a** and **2b** which consist of two ca. 5-10cm thick deposits that parallel the slope of the mound (see Figure 09-01, 10-100). IIIg-2a is a distinct reddish brown 5YR4/4 sandy loam that consists of clearly defined red clayey sand and white sand clasts. Though these have not yet been analyzed in thin section it is suspected that the white sand is composed of minerals that connect it to the Coffee Sand Formation. This is the only white “clean” sand in the area. It is unclear how stable such an exposure of this material would have been on a ~45 degree slope such as this one. Close examination of the profile shows large red sandy clay clasts almost “floating” in white sand. Sand, when properly compressed can be a strong substrate and was likely used effectively in mound construction more frequently than we traditionally observe

(see Sherwood et al. 2013). But as the mound developed, the Stage IIIg slopes may have been challenging to maintain, or at least have required a temporary post retaining wall during construction. This inference is supported by the presence of a post (IIIg-5a) observed at the base of this (see Figures 10-100 and 10-118). **Zone IIIg-2b** is also composed of brown 7.5YR4/4 sandy clay with variable clasts of red sandy clay and white sand also. These are distinctly different deposits however based on the clasts size and slight variation in content. Note the horizontal boundary between these two zones, again suggesting these subzones were placed as veneers to cover the top and the bottom of the mound slope with an abrupt boundary.

The wall trench and postholes associate with Feature 166 have destroyed the contacts at the crest of the mound, making it difficult to distinguish which flank and slope zones go with which summit zones (see Figure 10-124, below). At this point it is assumed, based on the similarity in the composition of Zones IIIg-2a&b, that they correlate with the Zones IIIg-1a and IIIg-2 zones. This area becomes exceedingly complex with the construction of multiple wall trench structures, many of them



Figure 10-118. Photograph detailing E179 with the Stage IIIg slope zones.



Figure 10-119. Photograph of N44-45 E179, West Profile. Arrow points to Zone IIIg-1c.

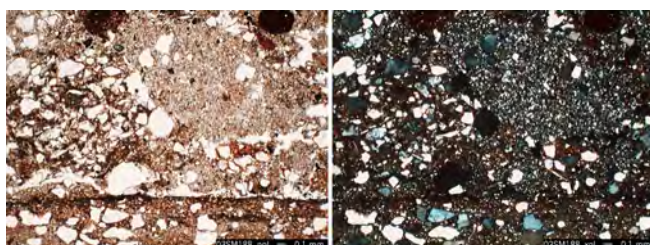


Figure 10-120. Photomicrograph illustrating possible burned surface on IIIg-1 (Zone IIIg-1a) with mixed aggregates of IIIg-1c above.

overlapping, and associated floors (see Chapter 9). In Mississippian contexts on mound summits where structures are burned, covered, and then new structures follow, the progression of summit expansion is relatively uncomplicated (e.g., Chucalissa, see Franklin and McCurdy (2005), Smith (1996)). On the Stage III summit however this is not the case. Here architectural elements (e.g., floors, hearths) and external areas were carefully maintained (as noted above), virtually devoid of macro artifacts, and, as this analysis shows, even devoid of microartifacts in the concentrations that one might anticipate in a habitation context. Posts are removed, as well as structure debris; even daub was not recovered with regularity as one would expect in a burned structure. The absence of daub however is more likely a statement of how the structures were removed than whether the area was cleaned. The absence of daub suggests

the structures were not burned but literally taken out and disposed of elsewhere.

Zone IIIg-1 may have been cut into Zone IIIf-6, or as stated above, it may have been placed on the surface of IIIe-3 and IIIg-6 were deposits banked over a previous floor and adjacent to activity on this surface. Either way, Zone IIIg-1 appears to fill a shallow basin on the summit of Stage III-g. (see Figure 09-01). The zone, though summarized as yellowish red 5YR4/6 sandy clay, is composed of red, gray and tan clasts that vary from sand to gravel in size. The zone continues east, across the top of IIIf-7, remaining relatively consistent. Only the top of this zone was examined microscopically. Based on close examination of the profile this is interpreted as a massive mantle fill that could have been used to fill an area where a previous structure was literally cut out or to cover the IIIg surface and prepare it for Structure 2a.

At the top of Zone IIIg-1a thin black zone, **IIIg-1c** is traceable across the surface of IIIg-1 and the E175 profile (Figure 10-119; and 10-120). In thin section this zone is composed of a silt to silt loam highly aggregated matrix with common clasts of broken red sandy clay material suggestive of previous destroyed prepared surfaces. This surface, relative to some of the others observed, appears to be poorly preserved but it may have instead undergone intensive use. Bioturbation pedofeatures and cracks into IIIg-1 contain concentrations of anthropogenic material including charcoal, ash aggregates, egg shell and bone fragments (Figure 10-121, 10-122, and 10-123), all relatively rare for floors observed in the mound. Also appearing in relation to this floor is a >1cm thick cumulative deposit with organic materials on top of one small section of red sandy clay burned, prepared surface. Here too, ash and charcoal are well preserved suggesting that the deposit was quickly covered and probably part of or adjacent to a burning area. As shown in Figures 104, 115, ca. 2m to the north a large intrusive pit originates from this surface, extending ca. 70cm into the top of IIIe-3. The function of this intrusive feature is not known however two phases of

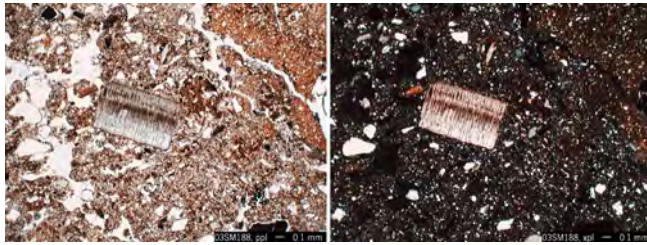


Figure 10-121. Photomicrograph illustrating burned egg shell fragment in the IIIg-1c matrix.

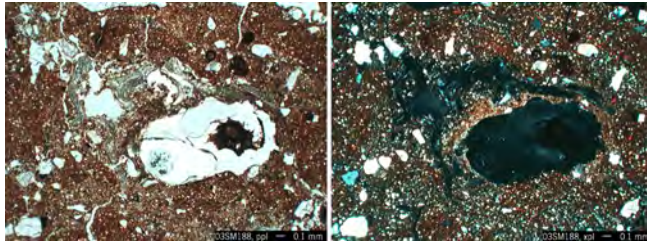


Figure 10-122. Photomicrograph illustrating bone concentration (fish?) between aggregates, adjacent to void (Zone IIIg-1).

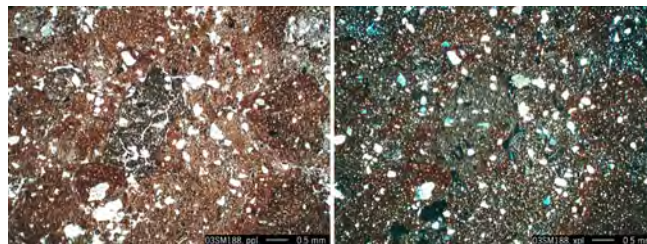


Figure 10-123. Photomicrograph illustrating ash and charcoal aggregate from the lower portion of IIIg-1 in thin section where aggregates/clasts reduce in size.

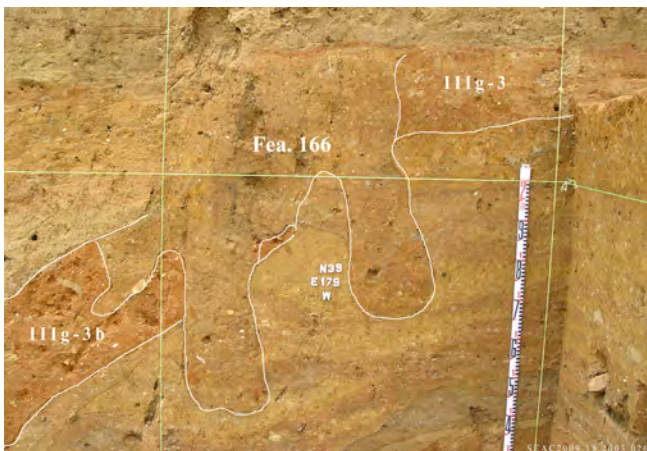


Figure 10-124. Section of N39 E179, West Profile. Note Zone IIIg-3b truncated by Feature 166 associated with IIIg-4.

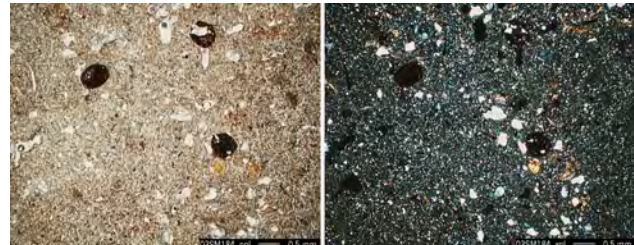


Figure 10-125. Photomicrograph illustrating yellow silt to silt loam with yellow complex clay coating fragments (Zone IIIh-2b).

infilling are suggested by the presence of a lens of gray silt with charcoal midway up the pit profile.

Zone IIIg-2 is composed of a similar mixed matrix as IIIg-1, and spans the summit surface (at least to N48) on the south half of the mound and is truncated on each end and in several places in-between by structural features (wall trenches and post holes) intruding from IIIg-4 and IIIh-2 above. Zone IIIg-2 immediately overlies Zone IIIg-1 and the IIIg-1c floor. This zone is classified as a massive mantle.

The slope deposits associated with the next phase in summit development are complex and not well understood. These zones are relatively massive and consist of thick (ca. 40cm) deposits that suggest either failed attempts at different facades and/or the removal and replacement, perhaps patching of facades.

Zones IIIg-5b, IIIg-5c and IIIg-5d are composed of variable textures and colors (see Figure 09-01). These zones, purely based on their shape in profile, are suggestive of slope failure. They may have essentially slid downward and settled in these positions, overlying the wash zones of IIIe-5, which would attest to the unstable nature of the slope and the potential for impact by precipitation. **Zone IIIg-4** is a dark yellowish brown 10YR4/6 silt loam with a localized concentration of white sand. The base of this zone follows the possible “slump” angle of the top of IIIg-5a-c. It is parallel to the existing slope and has an upper horizontal surface where the contact with Zone IIIg-3b is abrupt.

Zone IIIg-3b is an unmistakable deposit of red 2.5YR4/6 micaceous sandy loam with weathered chert gravel located at the top of the slope just below the summit (see Figures 09-01, 09-32, and 10-118). Based on careful examination of the profile the material is probably derived from

the Pleistocene Terrace deposits. The amount of weathered chert gravel varies in these deposits however it is a central component. This zone stands out in that it is not similar to those lower deposits on which it rests. How it may have articulated with the crest and the summit is not knowable with the current profiles and the truncation by Feature 166. Zone IIIg-3b ran into the E179 profile, the western margin of the excavations, but was abruptly truncated or perhaps bounded by some kind of barrier to the east just past E180, although no posts or other features were observed (see Figure 09-32). The source for material in IIIg-3b is likely the same as that for IVa-1 discussed above.

Based on following the trajectory of the zone's upper surface it would appear to connect with Zone **IIIg-3**, another significant massive deposit associated with activity on the summit. Zone IIIg-3 is composed of very similar if not the same matrix material as IIIg-3b, red 2.5YR4/6 micaceous sandy clay. IIIg-3 however, on the summit surface, contains abundant and surprisingly consistent clasts of gray silt, yellow silty clay and very few of the chert gravel inclusions. The base of IIIg-3 immediately overlies the floor of IIIg-2b. Zone IIIg-3 appears to be a remnant of what might have once been present based on the unconformable boundary along the upper contact between IIIg-3 and III-4. The boundary is wavy and general irregular, unique among the contacts on the mound summit which are typically abrupt. At N42 the irregular boundary dips down to the north and at N42.5 it pinches out over floor IIIg-1a, likely removed with the construction process for Structure 2a. **Zone IIIg-4** is generally described as a reddish brown 2.5YR4/3 sandy clay with distinct mixed large clasts of red clayey sand and yellow silt (see Figures 09-01 and 10-118). The surface of IIIg-4 extends south, and represents a larger summit than that of the underlying IIIg-3. The deposition of Zone IIIg-4 appears to mark another significant shift in the activity on the summit and the construction of structures, including Structure 2. The upper surface of IIIg-4 includes a prepared surface/floor or possibly a veneer that continues the length of the summit, where the zone is exposed, and consists

of a thin (~1–2cm) red clayey sand smoothed over the surface (Figures 10-126 and 10-127). It is important to note the succession of events related to this surface. Features 166 and 326 intrude through Zone IIIg-3 but are capped by this thin red deposit.

At its southern most extent, Zone IIIg-4 is laid over a relatively massive slope deposit identified as IIIg-7b. This yellowish brown 10YR5/6 silty clay loam was extensively weathered when it was observed, however, it is clear that it contains loading fills of variable material that are sloping at a ca. 30 degree angle, parallel with the top of IIIg-4 in the form of red zones subparallel to the

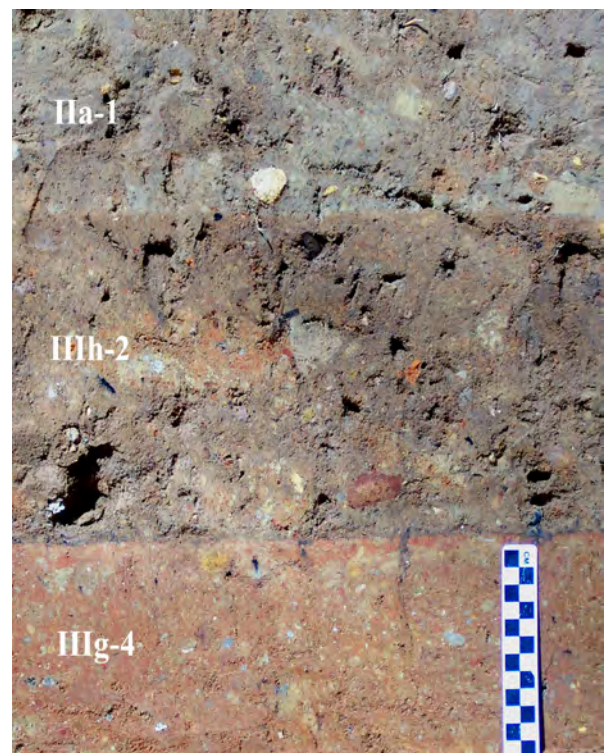


Figure 10-126. Photograph of the contacts between IIa-1, IIIh-2, and IIIg-4. Note the mixed composition of Zone IIIg-4 with an upper prepared surface. Profile N179.

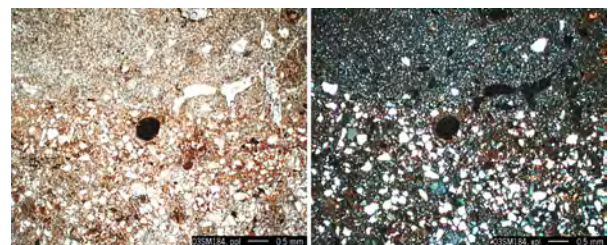


Figure 10-127. Photomicrograph illustrating surface of IIIg-4 below IIIh-2b, red clayey sand prepared surface.

ground surface (see Figure 118). There is limited consistent patterning or distinct composition within this slope zone(s), suggesting it would have lacked the aesthetic qualities of earlier stage facades. There is also a possibility however that this portion of the mound was exposed longer and has therefore experienced more soil development, destroying most of the original loading boundaries. This is certainly the case for the adjacent Stage I slope deposits. Regardless the timing of the deposition of IIIg-7b is complex. It is not clear if it was part of the IIIg mound summit expansion or is it was added on top of IIIg-4 as part of a wider and higher platform to support the stage III-h for the construction of Zone IIIk, the MCBF deposit (see Chapter 9, below). Again the intrusive nature Feature 166 has destroyed much of this contact at the E179 profile. Further to the west, deeper into this profile the relationship between the two will likely be obvious.

At the toe of the Stage IIIg slope are two discernible subzones containing stratified sands and silts. These overlay a localized burned surface that includes a 3cm thick prepared silty clay surface with charcoal distributed across the surface, possibly the top of the Stage IV construction episode (see Figures 03-23, 09-01, 10-128 to 10-130); an AMS date run from this surface was anomalously early, by a century or so (Beta 161308, 960 ± 40 BP, see Chapter 21). The overlying zones, **IIIg-6a** and **6b**, are described as yellowish red 5YR4/6 micaceous sands, silts and clays. These zones consist of varying bands of graded bedding indicating changing energies related to slope wash from the Stage IIIg mound (Figure 10-131). Zone IIIg-6b varies with a massive red micaceous clayey sand deposit of the same material as Zone IIIg-3b. This deposit may be related to slope failure. Immediately above the massive deposit are a series of tan graded silt wash zones derived from the Stage II surface (see below).

Zone IIIg-8 designates the brown 10YR4/3 silt loam massive bed or mantle on the northern most limits of the excavation corresponding to the top of the IIIg-4 (see Figure 09-01). Structure 3 was identified at the top of Zone IIIg-8. In thin section the zone includes mixed soil and sediment materials, common fine charcoal, localized



Figure 10-128. Photograph of the N30 E180, west wall. The prepared surface is exposed just above the north arrow.

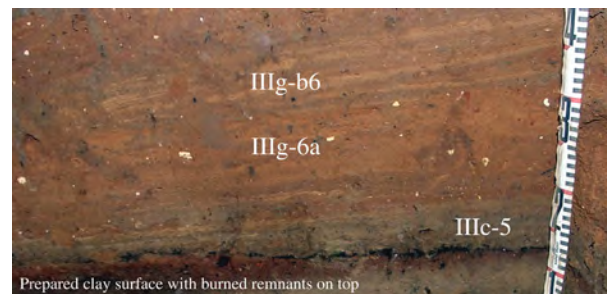


Figure 10-129. Close up of the E179 profile between N35.5 E179 and N36 E179. The base of the image is at approximately 600 cmbd.

bioturbation and aggregates of the red sandy clay (Figure 10-132). Zone IIIg-8, and the features associated with Structure 3, are overlain by a thin red zone designated IIg-2a (discussed below).

Stage IIIh

Stage IIIh is limited to the deposits immediately overlying Stage IIIg, specifically IIIg-4 (see Figure 09-01 and Figure 10-133). **Zone IIIh-2** is comprised of dark yellowish brown 10YR4/4 silt loam with mixed clasts of various sizes and compositions.



Figure 10-130. Macroscan of thin section 01SM14, intersecting the top of the burned surface, beneath IIIg-6a, collected from N35 E180.

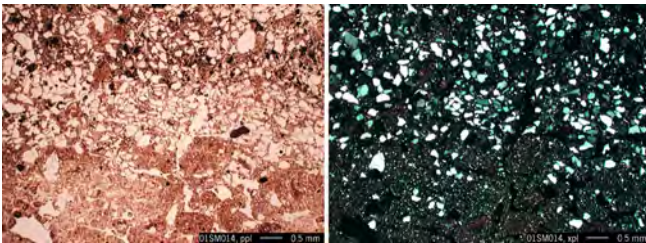


Figure 10-131. Photomicrograph illustrating contact between prepared surface and graded sand to charcoal and silts on the floor (Zone IIIc-6a).



Figure 10-132. Photomicrograph illustrating mixed clasts (Zone IIIg-8).

Immediately over the red veneer or floor of IIIg-4 is a micro-zone of concentrated fine sediments (relative to the more coarse material of IIIg-4), including mixed aggregates of various soil material, and a trace of microartifacts (Figure 10-134). Due to the fact that it abruptly covers at least one structure floor and appears fairly uniform through

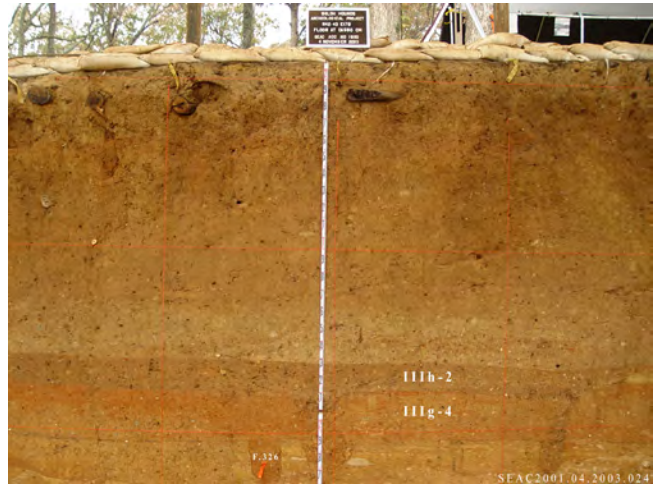


Figure 10-133. Photograph of Stages IIIh-2 and IIIg-4.

the deposit, Zone IIIh-2 is classified as a massive mantle fill. The dark color however is indicative of an increase in organics that is generally unusual among the Mound A fills and could be suggestive of a midden in the source area. The potential should be considered when interpreting the artifacts in the fill of Zone IIIh-2 that they could come from another area or time period within the site.

The northern reaches of Zone IIIh-2 thin at ca. N46 where it is met by the overlying Stage II toe slope deposits. Zone IIIh-2 immediately overlies **Zone IIIh-2b**, a ca. 10cm thick bed overlying IIIg-4. This zone is described as a yellowish brown 10YR5/6 silty clay loam with a relatively unique yellow silt loam with nearly equal parts quartz fine sand and fragments of complex yellow clay coatings or fragments of clay aggregates (Figure 10-135). Due to this careful preparation the bed is classified as a thematic bed that may or may not be immediately overlying a specific structure.

At the abrupt upper contact of Zone IIIh-2 (just east of the E179 profile) **Zone IIIk** was identified and carefully excavated. Zone IIIh-2 may have provided a surface or low platform for this “event” that has been designated as Zone IIIk and refers to the multi-color blanket fill “MCBF” that appeared immediately over Structures 2a and 2b that the archeologists believe could be in accordance with a termination ritual (see Chapter 9, Figure 09-33).

Stage II

Stage IIa and IIb designate two smaller platform mounds placed on the summit of Stage IIIg/h (see Figure 09-01). It is not clear if these two mounds were constructed and maintained simultaneously or if they were separate chronological entities. We also do not know enough about the north extension of the Stage IIb mound to know if the two mounds differ appreciably in size. But our lack of interpretive ability is not just due to the limited area of the excavations, it is also due to the proximity of this area to the top of the mound. This proximity to the surface exposes these strata, especially those within about 1m from the current ground surface, to the destructive processes of pedogenesis (soil formation). These processes include root grown, burrowing insects and fauna, chemical and physical weathering due to wetting and drying from precipitation, freeze/thaw, etc. Therefore because of this proximity to the surface, many of the abrupt contacts between zones have been masked and their boundaries reworked.

Stage IIa

Stage IIa is used to designate the small mound to the south and incorporates a series of massive zones (Figure 136) that are limited in this study to field observation. Figure 09-01 contains the brief descriptions that are not repeated here. Comments are limited to specific zones with additional information. The most important aspect of this phase in the Mound A history is that the series of zones composing Stage IIa nearly doubled the height of the mound. Of course this height increase associated with Stage IIa was limited to the southern half of the mound. It is not yet clear what, was simultaneously being constructed or used on the northern side of the mound.

Immediately overlying the Zone III-k (MCBF) is Ila-1. Zone Ila-1 is a brown 7.5YR5/3 silt loam and appears to form a kind of platform (see Figure 09-01). Zones Ila-2 is a massive fill composed of yellowish brown 10YR5/4 mottled silt loam that overlies Ila-1. Zone Ila-3 is composed of yellowish red 5YR4/6 loamy clay and extends down the southern flank of Ila-2. This flank was built up

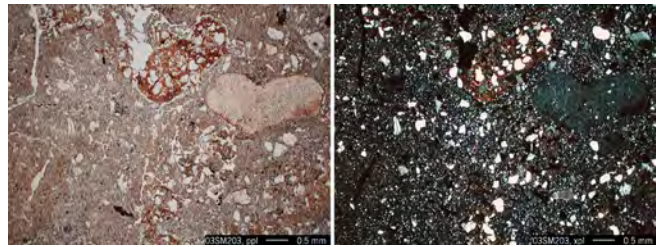


Figure 10-134. Photomicrograph illustrating contact between upper IIIh-2 and IIIg-4 (included large weathered chert piece).

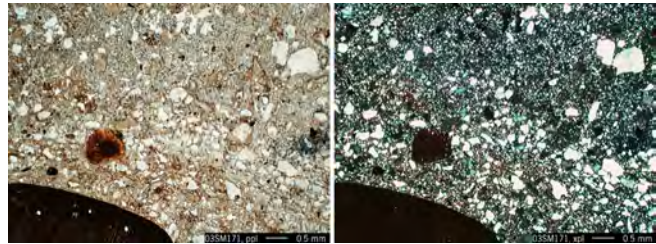


Figure 10-135. Photomicrograph illustrating dusty silt infilling vughs and packing voids in Zone IIIh-2 at the IIIh-2/IIIg4 boundary.



Figure 10-136. Photograph of the Stage IIa mound in the E179 profile. View to the northwest.

to the height of approximately 230cmbd with the massive fill of Ila-4, a brown 7.5YR4/3 silty clay loam, essentially rounding out the smaller mound.

The south flank of Stage IIa, a more gentle slope than the north side, is composed of two zones, Ila-5 and Ila-6 (see Figure 09-01). Zone Ila-5 is generally described as yellowish red 5YR5/6 sandy clay. This zone is uniquely homogeneous and slopes over the edge of the IIIg summit deposits (Figure 10-137). The homogeneous gray layer following the contact between the two zones may be

thematic, however it is not clear if this was part of the upper slope of Zone IIIg-4 or if it was laid down to help support the IIa-5 deposit, possibly a façade.

The steep northern slope of Stage IIa consists of a probable thematic bed, Zone **IIa-7**, a yellowish brown 10YR5/6 silt loam that is ca. 30-40cm thick (Figure 10-137). The zone covers the toe of this slope and pinches out approximately 2m at N47. The zone is clearly composed of clasts from various sources suggested in the starkly variable colors in profile. In thin section this bed is composed of mixed source material that is dominated by silty clay loam clasts with increased sand (Figure 10-138). Also in thin section an additional surface (not in the field profile) was identified and designated **IIa-7b**. This zone consisted of a 0.5cm thick, relatively consistent, red sandy clay (see Figure 10-139). This sandy clay, like most of the prepared surfaces identified in the mound, is derived from the deep Quaternary Terrace deposits based on presence of sand, mica and dense clay coatings. There are no micro-structures to relate this surface to the wash zones discussed below. It is not exactly clear if this prepared floor is associated with architectural features. There is, however, organic silt loam overlying the floor, distinct relative to the rest of IIa-7 and 7b (Figure 10-140), so however briefly this surface could have functioned as a floor.

Stage IIb

Stage IIb consists of a small gray platform mound that was constructed on top of Stage IIIg (see Figure 09-01). There are additional zones underlying the gray mound to the north but these were only cursorily examined in the field so are not discussed here. Above Zone IIIg-8 (see above), where features associated with Structure 3 were examined, a thin red floor called **Zone IIb-2b** extends from ca. N54 south to N50. This <3cm reddish brown 5YR4/4 silty clay varies in thickness in profile but covers Structure 3 (Figure 10-141). In thin section the well sorted fine sand is embedded in a dense clay (Figure 10-142). The parent material (based on comparison with 04SM452) suggests “soils” deep in the Coffee Sands. The zone is classified as a stratiform prepared floor.



Figure 10-137. N37 E180 West Profile. Edge of the Stage IIa slope.

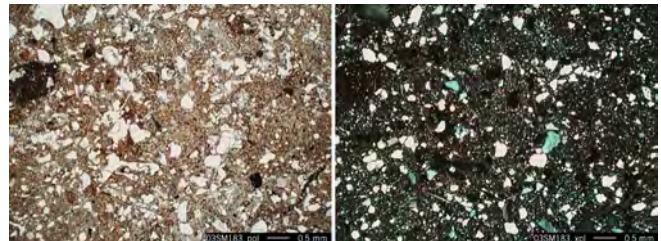


Figure 10-138. Photomicrograph illustrating IIa-7 matrix.

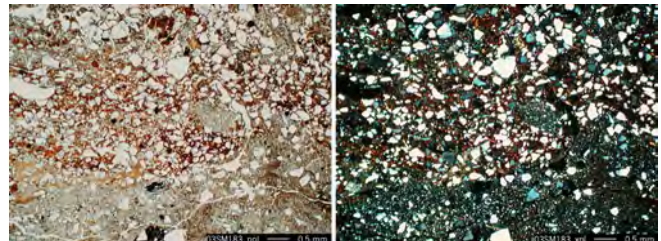


Figure 10-139. Photomicrograph illustrating red sandy clay prepared surface, note slight variability at the base with yellow clay, overlying silt loam zone (Zone IIa-7b).

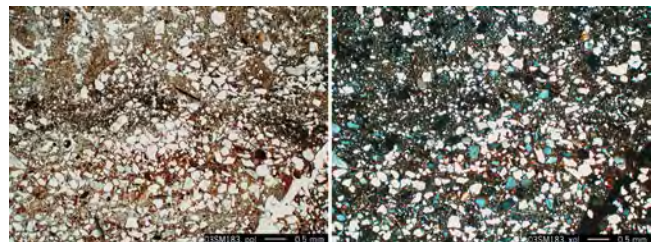


Figure 10-140. Photomicrograph illustrating upper boundary of prepared surface, concentrated organic silt loam (Zone IIa-7b).



Figure 10-141. Photograph of the N179 profile and Stage IIb mound. Note the red surface (IIb-2a) extending beneath it.

Above Zone IIb-2 is a massive zone composed of dark reddish brown 5YR5/3 silt loam soil material unconformably overlying the red floor (see Figures 09-01 and 10-141). Designated **Zone IIb-2**, this massive deposit is similar to Zone IIb-1 above (see below), as it is composed of yellowish silt loam, however it is more biologically reworked and aggregated suggesting trampling (Figure 10-143). The overall shape of the zone pinches out to the south but mounds up to the north to a thickness of ca. 40cm before it slopes back downward. There are variable clasts of the red surface below and planar cracks in the silt as if they are breaking due to compression. There are several possible explanations for this zone including a possible area where they were stockpiling building material that was ultimately covered by later efforts or a mantle like deposit overlying the IIb-2b floor. Regardless, the material appears to have been exposed for at least a brief time for biological reworking and/or trampling to take place.

The primary zone making up Stage IIb is Zone IIb-1 (see Figure 10-141). This zone appears in the field as a relatively uniform mound composed of gray 7.5YR6/1 silt loam. In actuality the small mound is made up of thematic loads, some of which are visible as slightly lighter in color (e.g. Zone IIb-1a) that produce a mound ca. 1.5m tall and at least 2m wide. The sides are sloped steeply, visible throughout the excavation units to the east of profile E179 (Figures 10-144, 10-145). In the E179 profile

the south slope appears to be stepped. It is not clear from the excavation if this was meant to function literally as steps, if it was for erosion control or if the slope naturally slumped prior to the infilling of Stage IIc. The possibility of slumping seems the least likely due to the absence of disturbance along what would have been akin to slip faults.

It was noted during the field work that when the material was moist and being removed, it was extremely “soft”, composed primarily of well-sorted silt. However, once the gray silt dried it became extremely hard which leads one to speculate

that as an isolated mound, if dry, it could have maintained a relatively steep slope and perhaps was quite stable. The surface of the Stage IIb mound was at one time, and possibly repeatedly, covered with a thin red veneer designated **Zone IIb-1b** (Figures 10-141, 10-145; see also Figures 03-26, 03-47, 09-18, 09-19). This material was examined on the surface of the “steps” and as separate zones on the mound surface and is composed of red 2.5YR4/6 sandy clay (Figure 10-146). Within the matrix there are concentrated papules, which

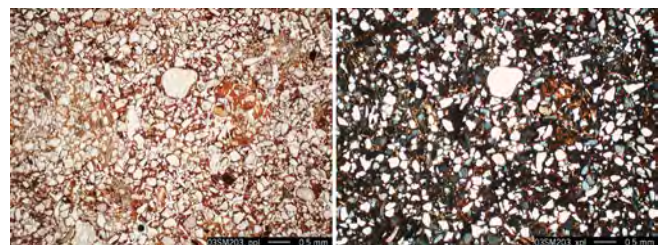


Figure 10-142. Photomicrograph illustrating fine sand with dense red interstitial clay, note yellow clay in aggregate to the left (Zone IIb-2b).

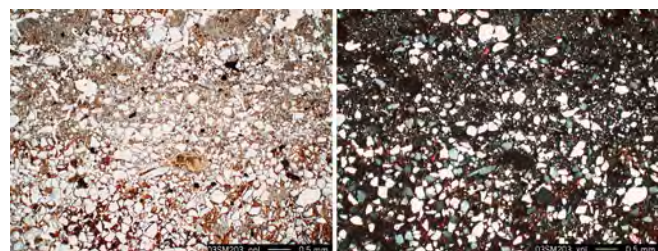


Figure 10-143. Photomicrograph illustrating abrupt contact between upper IIb-2 and the prepared surface IIb-2b.



Figure 10-144. Photograph of the Stage IIb gray platform excavation in progress (foreground). View to the north.



Figure 10-145. Photograph of the south lower slope of the Stage IIb gray platform where Zone IIb-1b appears as a veneer.

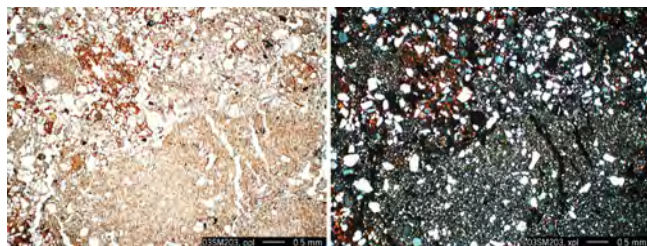


Figure 10-146. Photomicrograph illustrating IIb-1 and the IIb-1b contact.

suggest an additive process (Figures 10-147 and 10-148). The sandy clay (mined from deep in the Pleistocene Terrace) would have been combined with crushed (silt size) “pure” clay and mixed into a dense slurry and applied to gray surface. The localized clay coatings (visible in Figures 10-147 and 10-148) extending into IIb-1 suggest at least a damp application. Finally, the absence of glauconitic sand suggests a different source area for the parent material used to make the similar red surface of Zone IIb-2a below the gray mound.

At the base of Stage IIc (see below), in the depression between Stages IIa and IIb, Structure 1 on the Stage III mound was found. Above the structure there are numerous finely laminated zones extending off the slopes of the later two stages (Figure 10-149). These zones are generally referred to as Zone IIb-5 with numerous tertiary zones. It is difficult to illustrate these fine lenses in the scale presented in the large profile (see Figure 09-01) and they are better illustrated in a photograph (Figure 10-150). The tertiary zones, which were numerous, were only designated when they appeared in thin section, most are too small to delineate in the E179 profile.

The bulk of the IIb-5 zones, especially Zone IIb-5a and IIb-5d, contain well-sorted laminated gray silts. These zones suggest slope wash coming off the gray platform mound based on compositions of clean silt, and slacking crusts of dusty clay between beds (Figure 10-151). Some of the micro-zones have sand and contain microartifacts, especially charcoal (Figure 10-152) and red silty clay aggregates (presumably from the red veneers). These concentrate towards the top of Zone IIb-5 and are locally bioturbated and include deformation and loading structures. In general these wash zones appear to come from the north-northwest. The variability in the zones suggests not only variable energy (harder rainstorms and standing water between the two mounds, but also multidirectional sources. Perhaps wash zones derived from mounded zones yet to be revealed to the west and perhaps some that could have originated from the east. Whatever the direction, the local depositional environment, at the base of Stage IIc, received little disturbance or activity following

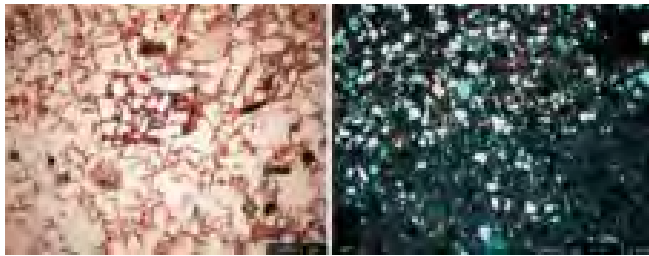


Figure 10-147. Photomicrograph illustrating clay from IIb-1b intruding into the surface of IIb-1, very localized. Note larger illuvial clay fragments.

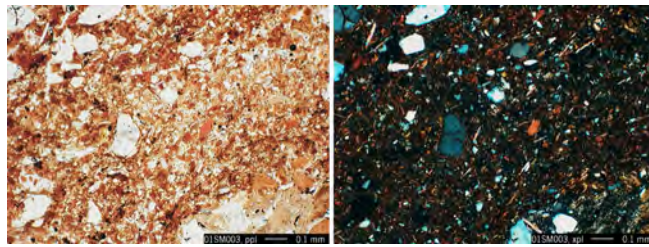


Figure 10-148. Photomicrograph illustrating concentrated fragments of dense clay coatings, coarse silt-size (Zone IIb-1b).



Figure 10-149. Photograph showing a section of the E179 profile and the relationship between Stages IIa, IIb, and the IIc depression where wash zones originate from the slopes of Stages IIa and IIb.

the deposition of the wash zones, as they are fragile sedimentary structures that have remained intact.

Stage IIc

Stage IIc-1 is used to designate the deposits used to infill the depression between Stages IIa and IIb, about which some general remarks are provided here (see Figure 10-153). Though a color is provided in the legend of the N179 profile (see Figure 09-01), the upper portion of Figure 10-153

illustrates the mixed and mottled IIc-1 matrix that incorporates silt loam soil material (various colors) along with red sandy clay concentrations and gray silt. This stage presumably accumulated over time and not in one massive filling episode, primarily due to the presence of the red zone extending off the bottom “step” of IIb-1. This zone implies limited fill over the wash zones followed by a brief hiatus when additional red material could wash across sediments deposited in IIc. At the “top” of the Stage IIa and Stage IIb mounds another hiatus is suggested by the presence of Zone IIc-2b, a dark yellowish brown 10YR4/6 micaceous sand overlying a localized gravel zone. The micaceous sand is a signature for sediments derived from the Tennessee River flood plain. For whatever reason, soil/sediments were removed from the floodplain, >30m vertical below the mound and brought to this location and deposited. Extending south from this bed are other lenses suggesting a consistent surface at an elevation of ca. 230-240cmbd, 50-60cm below the current ground surface. Prepared clay surfaces and other features suggest that this was a functional surface for some time, prior to the final stage of mound building.

Stage I

Stage I represents the last building stage of Mound A. The most noteworthy attribute of this phase in the mounds history, from a stratigraphic viewpoint, is a significant shift in the slope of the mound (see Figure 09-01). While only the south side of the mound was sufficiently exposed to address the extent of the stage, the steep slope of the Stage III and Stage II phases change with the current ground surface and the interior Stage I fill (as much as 1.5m thick at the flank and > 1m beyond the base of the mound). The result was a minimal increase in summit elevation, but a considerable overall increase in the circumference of the mound.

Soil formation and plant growth have nearly completely masked the nature of the deposition that created this final version of Mound A. Today the soil is a homogeneous dark yellowish brown 10YR4/4 silt loam altered by pedogenesis that has been underway since at least A.D. 1300, when the last

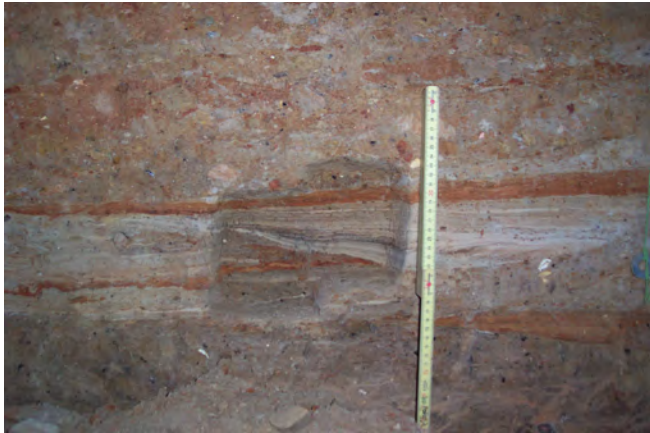


Figure 10-150. Photograph detail of the south slope of the Stage IIb where wash zones accumulated composing Zones IIb-5b and IIb-5c.

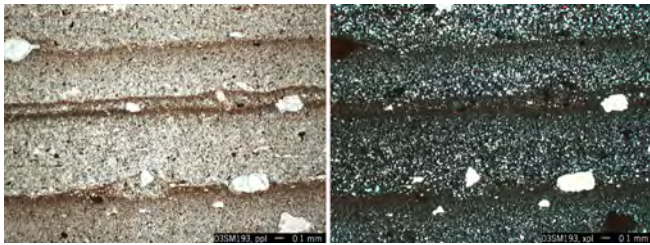


Figure 10-151. Photomicrograph illustrating silt bands with dusty clay slaking crust at the top (Zone IIb-5b).

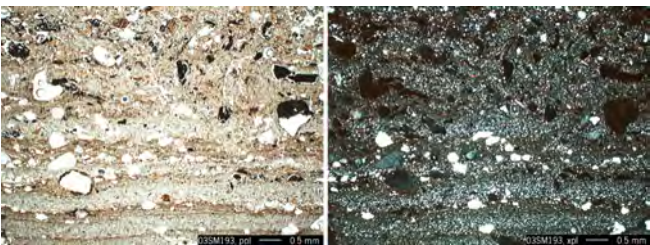


Figure 10-152. Photomicrograph illustrating bands from Zone IIb-5b including coarse sand with charcoal.

phase of mound construction ceased. This surface was also directly impacted by historic activities through the nineteenth and twentieth centuries. As a result, we are unable to distinguish specific beds or loads on the south flank. This fact also leads to an alternative hypothesis that the decreased angle of the slope was not the result of prehistoric mound building but is due to a combination of natural slope erosion, and historic modification that resulted in the optimal gradient for slope stability.

SUMMARY

Mound A at Shiloh epitomizes the rationale for a geoarcheological approach where sediments are truly artifacts. This geoarcheological assessment of the Mound A stages has been based on dirt, careful excavation and recording, radiocarbon dating, and the presence or absence of artifacts and features to identify chronology and intensity of occupation. Attributes of the mound, all in the medium of soil and sediments, inform us about the people who conceived of, and built such earthen structures. The choices they made of building materials, and the way in which they applied and maintained these monumental structures, inform us about economic decisions, engineering skills, planning, and human expression.

The people at Shiloh descended the steep slopes of the bluff overlooking the Tennessee River and its tributaries and mined sediments on the slopes to the north and south. Remnants of disturbed ground on the slopes today attest to these activities. From these deeper Quaternary geologic formations they were able to extract variable colored and textured sediments used in the mound and submound construction. They also mined the silt loam loess soils from the top of the terrace, both for more massive deposits and for intact soil blocks. Based on the few microartifacts and macroartifacts recovered in most of the mound fill indicates that most of the source areas, and the areas used to process the material, were relatively specialized, away from domestic tasks.

A systematic classification of mound fill was constructed, based on one created by Van Nest et al. (2001) for Hopewell Mounds of the Illinois Valley. Their framework has been revised and expanded to incorporate the variability observed in Mississippian contexts. By summarizing the variability identified in a particular stage we can begin to determine what the differences are between stages and within stages – do these differences indicate shifts in source areas, engineering strategies, or differences in the appearance of the mound over time.

Starting at the bottom of the mound the construction history can be summarized from a stratigraphic point of view as it stands now



Figure 10-153. Photograph of the east wall E179, between Stages IIa and IIb, basin-shaped, mixed, mottled appearance of Stage IIc

with 7 major stages that include the submound. Based on the shape of the overall topography of the ridge top and the area around Mound A (see Chapter 7) it is clear that there has been significant alteration to the terrace surface. The north side of the mound is much higher than the south side, by about 2 m, in terms of distance from the current summit to the ground surface. The natural topography had an even slope down the narrow ridge that parallels the Tennessee River suggesting that there was a platform constructed (submound) before Mound A itself was raised.

The summary of the mound construction begins at the base of the submound with the removal of the soil creating the disconformable boundary between subsoil and Stage VII. Based on the local profiles we can estimate that over 1.5m of soil was removed prior to the deposition of this initial stage. The light brown silt is not part of the natural profile here and was probably laid down by people to prepare the area for subsequent occupation. Why this area was initially excavated is not clear, however, based on the presence of similar disturbances to the south (Locale 1) along the terrace slope, it may have been a mining area for an earlier mound nearby.

Stage VI includes the earliest occupation deposits exposed in the excavation dating to approximately A.D. 1050-1150. This stage is broken down into 3 primary units. They are high in organic matter, and contain microartifacts, and microfeatures that suggest stable surfaces with plant growth. This basal zone of Stage VI is one of the only true cumulative middens found associated with the mound thus far. Zone VIb-1, overlying the midden consists of a dark gray to black deposit containing what looks like scattered large clasts of red silty clay. Examination of the deposit in three dimensions indicates the red is part of internally sloping lenses (loads); these extend across the length of the deposit, not following the natural slope of the terrace, but instead tilting in, away from the bluff edge. This may perhaps be an

early attempt to stabilize the terrace edge.

Stage V, apparently built in the late twelfth to early thirteenth centuries, is 80cm thick and contains 3 primary massive zones and numerous smaller subzones, all of which appear to have been constructed as occupation surfaces. This stage comprises the first unequivocal evidence for an extensive massive fill that is potentially thematic. Stage Va is made up of mixed, homogeneous midden material and based on its compression and boundaries appears to be an expedient and single event deposit. This could be interpreted also as a mantle, as it immediately overlies an activity surface. Zone Vb represents a cut and fill episode. The fill is composed of several parent materials and includes large intact clasts of variable materials, probably extracted from more than one location. Zone 5c is a 30cm thick homogeneous yellowish red silty clay loam, containing remarkably uniform, less than 1cm, clasts of red and grey clay. This zone appears in every unit taken to this depth. As noted above, the mixing of this zone took place prior to deposition, most likely in a specialized area.

Efforts to build Mound A began in earnest in the late twelfth or early thirteenth century with Stage IV. This stage marks a visible transition from the submound zones just discussed, and those stages associated with the first construction of Mound A. Zone IVa, an extensive red sandy clay deposit, divides the main mound from the submound. The analysis of the microfabric shows carefully prepared material, combining sand in a dense silty clay matrix with inclusions of birefringent clay fragments. Based on the micromorphological analysis it appears that after the extensive red zone was laid down it remained open for a time and was maintained, and kept clear of appreciable debris. This is primarily based in part on several fine-scale zones analyzed at the top of IVa that include wetting and drying features.

Stage IIIa is a roughly 120cm high structure that could either be a small isolated mound (similar features have been called “haystacks”) that sits along the current bluff edge. It could also be an embankment depending on what lies in the unexcavated deposits to the north. It is composed of massive beds of reddish brown silty clay and a few variable gray silt loading deposits. Banked up against the steep west edge of IIIa begins Stage IIIb. Compared to the other areas of the mound, Stage IIIa contains rather unique lithostrata, in addition to gray loading deposits, with a relatively high percentage of mixed, weathered chert gravel, and organic matter. This source material stands as a base-line with which to compare much of the rest of the submound and mound strata. This material was not prepared separately; it comes straight from one of the gravel banks nearby—in fact likely transported with the soil fauna. There is bioturbated microfabric within the layers of IIIa that suggest bioturbation continued once the deposits were laid down (something rarely observed in other parts of the mound).

Stage IIIb, build up against the west slope of IIIa, represents another low, steep sloped mound composed of dark reddish brown silty clay loam with interbedded loads of gray silt loam. Along the slopes of both IIIa and IIIb are inverted simple soil blocks incorporating the A horizon. They probably

acted like small erosion control “sandbags” inverted to grip the steep slopes and—based on the absence of washouts, at least that we have been able to observe so far—they were successful. This use of soil blocks is probably functional, as aesthetically the surface would not have portrayed a specific color or texture.

Stage IIIc represents the Mound A core and created an expansive platform, a 1.5m high nucleus that supported at least 3 major subsequent summit surfaces containing buildings. Stage IIIc is primarily composed of subsoil (E and B horizon material) soil blocks that were carefully inverted and stacked. This is the main concentration of their use in the mound, which suggests a few things. First, soil blocks probably have specific engineering properties when used in mass, in a foundation context, as discussed in greater detail below. These distinct blocks can be seen appearing in similar core contexts in early mound photos at other sites, such as at Town Creek in North Carolina (Coe 1995). Second, as noted before, the micromorphological analyses indicate the soil blocks were derived from a cleared, open area, perhaps a plaza. Their use here may suggest a major concurrent shift in the manufactured landscape elsewhere at the site, perhaps in the nearby central plaza area.

Connecting Stage IIIc and IIIb is Stage IIId. The geoarcheological data suggests that this represents the infilling of 1.5m deep, N-S trending “trough”, that is shallowest to the south. Prior to the deposition of IIId, there would have been a gap between IIIb and the IIIc core. The edges of IIIb and IIIc do not indicate truncation where a pit may have been dug out, nor does the base of IIId suggest a pit, exposed or otherwise. So at this point the working hypothesis is that this infilled trough or gap consists of a series of prepared juxtaposed light and dark red and yellow beds—of varying thickness. This may be just a construction technique to widen the platform, but the juxtaposed light and dark beds are clearly significant, and have been described in other mounds, but it has yet to be determined if this significance is geotechnical, symbolic, or both.

Once the core of the main mound was constructed a series of summit surfaces were built to support wall trench buildings (described

in detail in Chapter 9). Stage IIIe follows the IIIC core construction and the effort to expand the new mound to the east, towards the terrace edge. Stage IIIe includes a façade, or covering, of the steep slope of IIIC, made up of significantly different gray materials. The façade incorporates interdigitated thematic loads of gray sand mixed with gray organic silt loam and lenses of red silty clay loam. Rather than following the natural slope, these zones are laid horizontally, beginning at the ground level, and banked and slightly sloped up against the flank of the core mound. The visual effect would have been horizontal, discontinuous stripes of different colors higher up, with a thicker lower strip of gray at the base. This required extensive preparation and organization to begin at the bottom, laying deposits horizontally, while still working to adhere them to the steep slope. This gray façade, however, was not completely successful and it is suspected that they were short lived. At the base of the slope are a series of wash zones composed of thin laminated sand and silt lenses indicating the down slope movement of saturated sediments from this façade.

Stage IIIf, what the excavation crew referred to as the “tiger stripped mound”, directly overlies the unsuccessful grey façade. Thematic beds, yellow silt loam and red silty clay loam, enlarge the core mound and raise it approximately 30cm. The yellow zones are relatively consistent lithologically and represent another example of carefully prepared mound material (see below). The red layers are less prepared and thinner; and are composed of soil from the local profile including some organic matter and charcoal microartifacts, but with the sparse gravel removed. These zones are horizontally stacked up the slope and then banked up over the edge of the mound summit. It is not clear if this ca. 30-40cm high bank surrounded the structures on the summit or if it continued across the surface and was removed. Thin sections indicate these red and yellow thematic zoned fills were compressed and tamped into place to either insure the external stripe effect, and/or secure the material, with the alternating textures providing geotechnical stability.

In the next phase, Stage IIIg, the zones at the base are suggestive of slope failure. Those above

represent subsequent refacing or localized patching, some more successful than others. At the toe of the slope, the IIIg-6 zones signify nearly 40cm of slope wash deposits. So perhaps rather than a time of poor mound building, we are seeing an unusually wet period, maybe just a season, somewhere around 1210–1250 A.D. Scott Meeks’ data from the Mound G Pond indicate an increase in pollen concentration and accumulation rates during this time (see Chapter 5), which may suggest a period of increased precipitation. This is an empirically testable hypothesis that could be addressed with additional fine grained pollen research.

Stage II includes Stages IIa, IIb and IIc. IIa and IIb are smaller platform mounds placed on the final summit of Stage III beginning sometime around A.D. 1250. These mounds are completely different from Stage III and from each other. Stage IIa is hard to interpret geoarcheologically, as the zones are massive and directly affected by tree roots and soil formation. The initial stepped trench in the mound, however, revealed massive thematic beds that shaped this smaller mound. Mound IIb on the other hand, is nearly completely made of gray silt loam composed of thematic loads, some of which are visible as a slightly lighter color.

The IIb platform sides slope steeply to the south and east with a portion visibly stepped in the west profile. What is clear is that the fill material was a carefully selected, well-sorted loess based silt that when damp is soft and easily worked but when dry is extremely hard. Only one small area up Dill Branch was identified in the geoarcheological survey where similar sediments are exposed. A thin red veneer covered the IIb south and east surfaces, indicating the careful preparation of the small platform mound. The veneer is composed of red sandy clay, mined from deep in the Pleistocene terrace and combined with crushed sand and silt-sized pieces of processed clay. The microfabric and the presence of localized clay coatings indicate the veneer was applied as a mixed slurry.

There are complex wash lenses divided by brief hiatus zones, accumulating in the basin between the two mounds (referred to as IIc). The red veneer clearly applied more than once, is incorporated in

episodic wash zones from the small gray mound that was maintained as Stage IIc was infilled with mixed, unthematic fill. After the depression was infilled, after the mid thirteenth c., a surface was maintained across this final Stage II mound and was actively used based on the presence of several features (Chapter 9). Stage I represents one last unremarkable (geoarcheologically speaking) mound building phase, composed mostly of local silt loam soil, significantly expanding the circumference of the mound. This portion of the mound is close enough to the surface that soil formation has significantly impacted the original stratigraphy. This final surface witnessed appreciable historic activity, including the presence of an NPS staff cabin in the early twentieth century, and has also been eroded and impacted by modern foot traffic, making it difficult to discern how the final mound stage was built, used and maintained prehistorically.

CONCLUSIONS

The geoarcheological analysis indicates that nearly all of the moundfill involved significant investment, not specifically in labor, which is usually the emphasis in the study of Mississippian mounds, but in the selection process, the mixing to create specific properties and uniform fills and finally their careful, and clearly planned out application. A separate area had to be used, away from domestic activities, in order to create these relatively pure complex mixtures; such preparation area(s) may be detectible archeologically given more research at the site. Since the various components from one fill probably came from different mining areas it is doubtful that this admixture took place in the mining locations. Identifying this location on the landscape archeologically would be difficult, but it must have existed.

This geoarcheological analysis brings forth two main questions that remain to be answered. The first is “why is the moundfill so specific and dramatic in appearance and composition” and the second is “what does this new knowledge of mound stratigraphy change about the way we consider mounds and their role in the study of Mississippian cultural complexity”.

Why was such care and skill put into the preparation of the moundfill? There are various plausible hypotheses, including the most obvious, color symbolism, but this author leans towards the probability that the geotechnical reasons that underlie the selection and application of various materials may be of equal importance.

To explore the geotechnical properties we turn first to the soil blocks. These intact blocks of soil relative to loose fill, have important implications. Based on the mineralogy, these are not coming from the floodplain. They are derived from the upland soils but with no evidence for dense sod-like grasses, based on the absence of phytoliths and dense roots. But they are also not from local forest soils; they come from an open area with some small roots that give the blocks coherence. The A horizon has a microfabric that indicates bioturbation was followed by significant compaction, not like typical open granular structure of such surface horizons. The working hypothesis here is that the soil blocks are coming from open, maintained areas in the site where thick grass is lacking, perhaps due to foot traffic, but areas that lack artifact deposits, perhaps a plaza. Removing and transporting soil blocks whole would be far more difficult than filling containers with loose sediment. Their significance and/or function had to be tied to their intactness and perhaps even their compaction. The use of soil blocks from the upper reaches of the soil profile were observed inverted, and concentrated on steep internal slopes, and not as part of façades in later stages. These must have been valued for their ability to protect the steep slopes and discourage erosion. The possibility they were derived from a maintained and significant place, like a plaza, must also be considered.

In the case of the red soil blocks, composed of thin E horizons over B horizon material, it is believed their significance lies in their construction properties. These intact blocks are not uncommon in mound cores. To use a sod block or upper soil block, containing significant organic material in the form of grasses, humus and abundant rootlets would make for a poor foundation. These materials will decompose and subside causing problems in

summit surfaces and the stability of the architecture there. Loose sediments (compound loading) settling over time could also affect this stability. When the natural soil profile is disturbed, increased void spaces are immediately created—and the potential for later compression—while if the soil structure is removed intact, it significantly decreases the possibility of subsequent compression and settling. To construct a mound core of firm soil blocks, devoid of appreciable organics, would create the best *natural* foundation available beyond that of dressed stone. It is proposed that these reasons are the *why* behind the use of the soil blocks and that the façades used to cover the core were a combination of carefully selected material enhanced for both construction purposes and symbolic meaning.

The yellow silt loam to silt that appears as yellow beds in IIId and in IIIf-3 is not a locally available material. This fill was created through an additive process and included three different primary sources in order to construct this consistent and stable yellow layer. This mixture included clasts from relatively clean silt from the surface, and the mixture of deeper horizon material Bw/Bt with a birefringent yellow clay that was broken into pieces and mixed in. This yellow clay is pure and may have been *manufactured* for this purpose. This process might have been much like clay levigation. The creation of a clay slip where clayey material was worked into a water slurry and allowed to settle out with the finest materials settling last, creating laminated clays on the surface that once dried would be removed and crushed into sand and silt size fragments, resulting in a kind of pigment. The fact that these appear in thin section as angular to subangular further supports this hypothesis of limited reworking (if these fragments were being transported fluvially they would be rounded). When added to the soil/sediment medium, these materials significantly affected the color and probably the construction properties.

The use of zoned fills (often dichotomous in color) is defined by Sherwood and Kidder (2011:78), in an archeological context, as “the application of homogeneous layers placed horizontally alternating from permeable to less permeable layers and back,

to improve moisture balance and create horizontal zones that act to increase slope strength and reduce sheer stress. Moisture balance, especially in an area of relatively high rainfall, is imperative in the success of sloped earthen materials”. This technology is used in several places in the mound, especially to enlarge a mound stage to allow for a higher and larger summit and the maintenance of a steep slope.

The red surface veneers, especially IIa-1b and most of the prepared floors, are made from a similar additive process that relies primarily on the dense red clays of the Quaternary Terrace deposits with a high percentage of fine to medium sand (predominantly quartz), deep within the bluff. This material is combined with more pure clay, laminated birefringent clay as noted above, which created the red color. A certain amount of sand would also have been desirable to prevent significant shrink-swell and provide an interlocking microstructure.

Based on the geoarcheological study of Mound A, there is little to no evidence that the mound stages were ever covered in vegetation, which would have created stable slopes and flanks. Instead, mound summits were composed of carefully applied materials in order to create a specific theme, appearance or engineering property. With the exposed earth these surfaces would have required constant monitoring and maintenance. Without informed construction practices, one strong rainstorm would have affected the slopes from saturating the slopes (increasing surface run-off) resulting in probable slope failure.

In closing, now that we know that mounds were constructed well into the Archaic, Southeast archeologists are turning to these monumental earthen structures more so than ever to address questions of cultural complexity. We estimate labor costs, examine summit posthole patterns, and compare mound volumes and extrapolate planned layouts of mounds. The excavations and integrated geoarcheology at Shiloh expanded this traditional view to consider the medium of soil and sediment, and the complexity it reveals and as a result, significantly increases the interpretive potential of the archeological record.

INTRODUCTION

This chapter describes the results of a chemical analysis of 155 soil samples that were systematically collected from multiple fills, house floors, and other presumed occupation surfaces/activity loci within Mound A. The purpose of the research was to prospect for activity loci on these surfaces, as well as to aid in interpreting functional differentiation among the mound's surface features.

Reconstructing activity patterns in the archeological record often relies exclusively on inferences made from the presence and distribution of cultural materials, such as artifacts and features. However, artifacts are often found in secondary deposits (such as middens) and the functions of features are sometimes ambiguous. Recent advances in geoarcheological research on pedogenesis in cultural settings have demonstrated that soil science has powerful analytical potential for archeological reconstructions of human activities and land use practices, as the preceding chapter by Sherwood demonstrates. In the past few years there has been a notable increase in the development of analytical techniques in the realm of soil chemistry in particular. By analyzing the chemical residues of different activities in anthrosols (soils that have been modified by human activity), activity patterns can be studied in primary contexts even when little or no visible material evidence persists.

For the present study, 155 soil samples were collected and analyzed chemically from three distinct occupational surfaces within the Stage III mound. The first ("lowest") layer (immediately below fill IIIg-8) supported the remains of Structure 5. The second ("middle") layers (the tops of fills IIIg-2, IIIg-4, and IIIg-8) served as the primary occupation surfaces for Structures 1, 2A, 3, and 4. The third ("highest") layer (IIIk, the MCBF) composed a covering or blanket mantle that was likely exposed

for a very short period (see Chapters 9 and 10 for detailed descriptions of these strata and structures).

This study examined the spatial patterning of differing concentrations of phosphorus, iron, and the combined signature of eight elements (aluminum, barium, calcium, iron, potassium, magnesium, manganese, and phosphorus) on each surface. These signatures and distributions can be linked through cross-cultural ethnoarcheological studies to a variety of human activities involving food preparation and consumption. The objective of this particular examination is to evaluate the possibility that surface features on the mound were used or generated during festive activities, such as feasting, which can be linked to the production, allocation, and consumption of foods and beverages. Feasting is a target of study in the present analysis, because this behavior has been implicated in the construction and use of large earthen mounds at contemporary settlements, such as Cahokia (Kelly 2001; Pauketat et al. 2002) and Moundville (Welch 1991; Welch and Scarry 1995), and from sixteenth century Spanish accounts of chiefly largesse (Smith and Hally 1992).

BACKGROUND

Excavation in and around food preparation locales can be extremely informative for determining the kinds of material culture employed in feasting practices. However, activity patterning is more difficult to document in public spaces, such as in plazas and on civic-ceremonial mounds, because these kinds of areas were often kept clean of refuse for religious as well as practical purposes (i.e., sanitation). Without *in situ* assemblages, it is nearly impossible to determine if and where food-related activities occurred in relation to other practices.

Recent compositional studies of anthrosols suggest that soils from spaces where different kinds of dining and drinking activities took place have unique chemical signatures, and that soils contained

in refuse dumps can be linked chemically to nearby activity areas (e.g., Barba and Ortiz Butrón 1992; Bethell and Máté 1989; Cavanagh et al. 1988; Craddock et al. 1986; Lippi 1988; Middleton and Price 1996; Skinner 1986; Wells 2004). The underlying premise is that certain chemical compounds are associated with particular human activities and their byproducts. For example, the most common compounds examined are phosphates, which indicate the residues of organic substances, including food remains. Other compounds include those associated with sodium and potassium, which can be linked to the production of wood ash in hearths (Middleton and Price 1996), and iron oxide and mercuric sulfide associated with the use of pigments in ritual settings (Wells et al. 2000).

A great deal of information on the chemistry of anthrosols has come from geochemical applications in archeology concerning phosphorus. Early work by European geographers (e.g., Arrhenius 1929) revealed high concentrations of soil phosphate in areas of ancient human occupation, which can be explained by the observation that human activities involving the deposition of refuse (especially organic waste) increase the amount of phosphorus and other elements (mainly calcium, carbon, and nitrogen) in soils. Once deposited, phosphorus ions attach to iron, aluminum, or calcium ions to form relatively stable chemical compounds that can be detected and quantified with suitable methods (see Eidt 1985; Wild 1986). The basic idea is that the surfaces of certain soil particles, particularly clays, hold ions carrying a negative charge (anions) that act like magnets to attract positive ions (cations). Cations, including those from calcium, magnesium, and potassium, generated by human activities become attached to the soil particles in a process known as cation exchange. Since these compounds are rapidly fixed to the mineral surfaces of sediments, they tend to remain stable and immobile (resistant to horizontal and vertical migration) for very long periods in the form of sorbed and complexed ions on clay surfaces, and as insoluble oxides, sulfides, and carbonates, all of which can be chemically detected with appropriate analytical instrumentation (see Linderholm and Lundberg 1994). To establish the

quantity and distribution of chemicals that have accumulated on the surfaces of sediment grains as a result of human activity, one compares the concentrations of elements in anthrosols to those of soils unaffected by human settlement and land use.

Working together over the past 20 years, archeologists and soil scientists have developed an impressive arsenal of analytical techniques to characterize archeological anthrosols for a variety of purposes. Today, archeologists mostly make use of qualitative field procedures, such as those based on the concept of chromatography, for detecting phosphate signatures using commercial test kits. However, some archeologists have begun to experiment with laboratory-based weak (or mild) acid-extraction and strong acid-digestion approaches using inductively coupled plasma-optical emission spectroscopy (ICP-OES), which produces quantitative results (e.g., Terry et al. 2000). This has allowed researchers to examine the implications of elements other than phosphorus for site formation processes (e.g., Entwistle et al. 1998; Wells et al. 2000).

In the southeastern U.S., earthen floors, such as those found on mound tops, are ideal surfaces from which to extract chemical residues since they tend to be composed largely of clay-rich soils, which have been demonstrated to trap and preserve a variety of chemical compounds over very long periods (Barba 1990; Wells 2004). Inorganic phosphate and potassium compounds, for example, are retained in clayey soils by binding with complex aluminum- and iron-containing minerals, such as apatite clays (Albert 1986). The extremely small size of clay particles (<.002mm) correlates with small pore sizes between clay platelets; the high surface tension in these pores results in mechanical binding of phosphates and other chemicals (Hausenbuiller 1972:266-270). Although silt is composed of the chemically inert compound, silicon dioxide, the small size of the particles (.005-.002mm) produces some additional mechanical binding through surface tension.

Compared to the natural "background" levels of chemical elements in soils unaffected by human occupation, patterns in phosphorus and other

elements can assist in determining the locations of activity areas associated with eating and drinking, including processing, consuming, and depositing foods and beverages. It is important to point out that elemental concentrations alone are not reliable indicators of food-related practices or other human activities. Instead, chemical data provide supporting evidence for understanding the organization and spatial distribution of activities. Excavation data are thus essential for inferring activities that generated chemical residues in soils. This kind of multidisciplinary research being carried out over the past few years indicates that, by studying the chemical behavior of anthrosols in addition to excavation data, inferences can be offered and supported concerning the ranges and locations of activities within archeological contexts where little or no direct material evidence has survived.

METHODS

The immediate goal of this study was to detect the kinds and concentrations of chemical elements deposited on the surfaces of sediment grains and in clay interlayers as a result of human activity on Mound A at Shiloh. Therefore, the relevant analytical procedure involves weak or mild acid extraction of ions (in contrast to the total digestion of the sample with a strong acid or microwave catalyst) followed by elemental detection using ICP-OES.

For this study, a 2g portion was taken from each sample, pulverized with a Coors porcelain mortar, mixed with 20ml of dilute 0.60-molar hydrochloric acid (HCl) with 0.16-molar nitric acid (HNO₃) in a polyethylene vial, and shaken vigorously for approximately 30 minutes. The acids were diluted with deionized water to bring the concentrations of the elements of interest into the optimal measurement range of the instrument (ICP). For each sample, the solution was filtered using Whatman ashless filter paper and decanted into clean polyethylene vials.

All samples were analyzed using a Perkin-Elmer 4300DV ICP-OES at the Paleoclimatology, Paleoceanography and Biogeochemistry Laboratory in the College of Marine Science at the University of South Florida, St. Petersburg campus. For this

analysis, each liquid sample was drawn into the ICP where a flow of argon gas converted it into a fine aerosol. A portion of the sample aerosol was then directed through the center of an argon plasma torch, where the temperature is near 10,000°K. The energy of the plasma caused the sample ions to lose an electron and reach an “excited” state. As the excited ions relaxed to their base states, they gave off energy in the form of light. The spectrum of light frequencies emitted from each element is unique and can be used to identify the presence of that element in a sample. This emitted light was separated by wavelength using an optical spectrometer equipped with an Eschelle type grating. The separated light was focused onto a solid-state detector, which identified each wavelength and its relative intensity. The intensity of the emitted light is analogous to the concentration of an element in the sample solution.

This information was then compared to calibration data for quantification. For calibration, known solution standards containing the elements of interest in concentrations bracketing the expected concentrations of the sample were run during the analysis. By running several standards of different concentrations, calibration “curves” were generated equilibrating instrument response with known concentration. The unknown data were then plotted on these curves and the amount of each element of interest was calculated.

The calibrated concentrations of 21 elements were determined: aluminum (Al), arsenic (As), barium (Ba), beryllium (Be), calcium (Ca), cobalt (Co), copper (Cu), iron (Fe), potassium (K), lithium (Li), magnesium (Mg), manganese (Mn), sodium (Na), nickel (Ni), phosphorus (P), lead (Pb), silicon (Si), strontium (Sr), titanium (Ti), vanadium (V), and zinc (Zn). The results were reported in parts per million (ppm) of the element and subsequently converted to mg of element per kg of soil (hereafter, mg/kg) by multiplying the ppm measurement by the dry weight of each sample.

RESULTS

A total of 155 samples were analyzed for this study, each deriving from a unique provenience in the mound. The raw data are listed in the electronic

appendices as mg/kg for each element. In cases where data are not recorded, the concentration of that element in the sample was below the detection limits of the instrument. For the analyses discussed in this section (unless otherwise noted), mg/kg were converted to base-10 logarithms for comparability, since natural abundances of elements tend not to have normal distributions but to be positively skewed and log-normally distributed (Burton and Simon 1993:48; see also Ahrens 1965). While this standardization procedure is useful for the analyses and visual displays of the data presented here, it is less useful for describing patterns in terms of elemental concentrations. Therefore, in the discussion that follows elemental concentrations are referenced using the more intuitive mg/kg unit of measurement.

Summary statistics for eight primary elements (Al, Ba, Ca, Fe, K, Mg, Mn, and P) in the 155 samples under investigation appear in Table 11-01. A graphic representation of this information appears as a side-by-side boxplot in Figure 11-01. The highest overall concentrations were detected for Ca; the lowest for Mn. Both Ca and Mn have been associated with aspects of food production involving corn (Middleton and Price 1996), but there is no clear pattern to support this idea for Mound A. The elements Ca and P have the widest ranges and greatest numbers of outliers. This suggests that some samples are marked by especially high (or low) Ca or P levels, which may signal activity loci involving the deposition of organics. Two elements, Al and Fe, also have comparably wide ranges, although these elements are most likely natural constituents of the soil. This could mean that different types of soil were used in mound construction, that is, soils from different geographic locales that have slightly different geological substrates. This is a speculative observation, but merits further scrutiny, especially given the recent findings by Van Nest and colleagues (2001) at Mound House.

Table 11-02 compares Pearson product moment correlation coefficients between all elements (where $p < 0.05$),

showing strong positive correlations (linear relationships) between Ba and Al ($r = 0.71$), Ca and Al ($r = 0.73$), Fe and Ba ($r = 0.74$), P and Al ($r = 0.71$), P and Ba ($r = 0.73$), Ti and Ba ($r = 0.71$), Ti and P ($r = 0.89$), and Zn and Ba ($r = 0.73$). In the case of Ti-Ba, the elements are geochemically related, such that the elements follow similar chemical pathways with respect to their bonding properties and ionic interactions. Since Al is a major elemental constituent of local soils rich in clays [as aluminum silicates, e.g., $\text{Al}_2\text{O}(\text{SiO}_4)$], I suspect that the correlations with this and other heavy metals represent diagenetic (versus anthropogenic) processes, and so probably are unrelated to human activities apart from mound construction. The other elemental pairs involving correlations with P are likely related to anthropogenic factors of soil formation, and signal the importance of examining the distribution and concentration of P across the mound for insight into activity patterns.

Since some activities, especially those involving organic materials, result in the production and deposition of elemental P in the form of compounds that bind to the surfaces of mineral particles in soils, studying the horizontal distribution of the concentrations of different chemical elements is one way to detect original activity locations. Given that P and Fe have high elemental ranges and can both be associated with human activities (P with food-related practices and Fe with the deposition of mineral-based pigments, such as hematite, ochre, and other ferric oxides), it is instructive to examine their distributions across the mound on different surfaces.

Figures 11-02 to 11-04 shows the distribution of P (base-10 logarithms for mg/kg) for samples

Table 11-01. Summary statistics for the primary elements (mg/kg) in the study ($n = 155$).

Element	Min.	Max.	Range	Median	Mean	Std. Dev.	Variance
Al	9.03	93.76	84.72	30.59	32.42	16.26	264.52
Ba	2.04	18.63	16.59	4.93	5.67	3.03	9.17
Ca	19.39	175.55	156.15	65.00	70.13	28.74	826.19
Fe	3.05	118.69	115.64	16.60	28.13	27.44	752.87
K	.71	12.89	12.18	2.38	3.06	1.99	3.97
Mg	.86	13.73	12.87	5.54	5.84	2.16	4.66
Mn	.14	5.82	5.68	1.19	1.53	1.07	1.14
P	.37	135.91	135.55	4.58	8.85	17.05	290.66

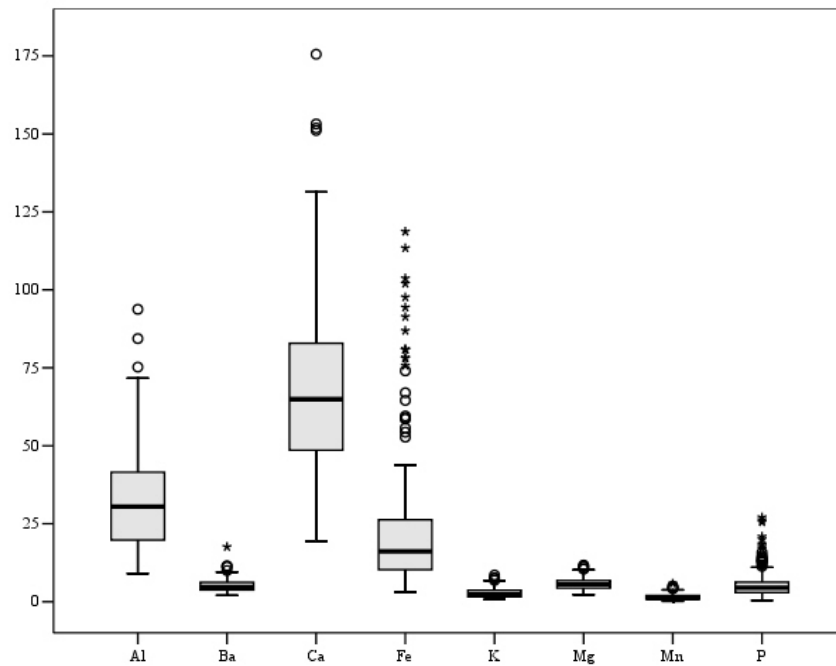


Figure 11-01. Side-by-side boxplot of the primary elements (mg/kg) in the study ($n = 155$). Outliers are represented by circles (defined as values between 1.5 and 3 times the interquartile range [the distance between the upper and lower edges of the box]) and extreme values appear as asterisks (defined as values greater than 3 times the interquartile range).

Table 11-02. Linear correlation coefficients between elements ($p < .05$).

	Al	Ba	Ca	Co	Fe	K	Mg	Mn	Na	Ni	P	Ti	Zn
Al	1.00	-	-	-	-	-	-	-	-	-	-	-	-
Ba	.71	1.00	-	-	-	-	-	-	-	-	-	-	-
Ca	.73	.63	1.00	-	-	-	-	-	-	-	-	-	-
Co	.53	.23	.38	1.00	-	-	-	-	-	-	-	-	-
Fe	.66	.74	.53	.19	1.00	-	-	-	-	-	-	-	-
K	.31	.36	.20	.28	.03	1.00	-	-	-	-	-	-	-
Mg	.48	.47	.51	.08	.35	.21	1.00	-	-	-	-	-	-
Mn	.50	.56	.43	.45	.63	.19	.20	1.00	-	-	-	-	-
Na	.62	.62	.52	.25	.51	.23	.48	.36	1.00	-	-	-	-
Ni	.52	.48	.56	.37	.53	-.12	.15	.43	.38	1.00	-	-	-
P	.71	.73	.22	-.02	.53	.41	.21	.43	.51	.13	1.00	-	-
Ti	.62	.71	.10	-.08	.63	.17	.04	.32	.42	.30	.89	1.00	-
Zn	.52	.73	.62	.27	.63	-.29	.40	.51	.40	.66	.68	.67	1.00

taken from each surface. The same series of maps was generated for Fe, which appear in Figures 11-05 to 11-07. Darker hues indicate higher concentration of the element. It should be noted, however, that higher elemental concentration does not necessarily reflect the intensity or longevity of the activity responsible for the deposition of that element, since these characteristics of activities are affected by numerous long-term processes that differentially impact elemental deposition and retention (see Bethell and Máté 1989; Hammond 1983).

The figures show kriged image maps (produced with Surfer 8.0 software) of extractable soil elements (kriging type=point, based on a linear variogram model where slope=1, anisotropy=1, 0; see Cressie 1990; Kitanidis 1997). Kriging is an empirical model that makes use of spatial dynamics and geostatistics to interpolate unknown values based on known values. The basic principle is that regions close together are more likely to have similar values than regions farther apart. Kriging is based on the assumption that the parameter being interpolated can be treated as a regionalized variable. A regionalized variable is intermediate between a truly random variable and a completely deterministic variable in that it varies in a continuous manner from one location to the next. Therefore, points that are near each other have a certain degree of spatial correlation, but points that are widely separated are statistically independent.

Conceptually, variance in kriging plays the role of a weighting function. In the kriging method, every known data value and every missing data value has an associated variance. If the value is known exactly, its variance is zero. If one places absolutely no faith in a value, its variance is one (on a normalized scale). In the kriging method employed for the present study, a neighborhood variance (a single uncertainty value for the range of the data) of zero was used, because it is assumed that the chemical concentration data are certain.

For each known data value, a linear variance function was chosen to determine the variance of data values around the known location. The minimum value (0.00) is at the known data location and the maximum value (1.00) was set arbitrarily

at 0.25m away from that point. This means that one's confidence in the data value as a predictor for unknown data values decreases up to 0.25m from its location; after that, there is no confidence in the data as a predictor. Thus, all locations outside the range (an area of 0.1963m around each data point, where the area is calculated as πr^2) are considered to be unaffected by the known data value. This is important because the units from which the samples were collected are 1m², such that a maximum value of .5m for the variance function would compromise the integrity of the kriging model.

In addition to the variance and range, kriging allows for a variance discontinuity at the known data value, commonly referred to as the nugget. This causes a stepped increase in variance just away from the known data value. In the current study, the nugget value was set to zero, producing no nugget effect.

Kriging estimates the missing data values using these variance curves as weighting functions when estimating the missing data values. The result is the creation of a variance matrix that is the same size as the data matrix. The variance matrix keeps track of the variances not only of the missing data values, but also of the known data values. The prime objective in kriging is to minimize the values of those variances and, by doing so, estimate the "best" data value for each missing data point. For the current study, the points were plotted on a regular xy grid, which was overlain on a plan view base map of each mound surface. The result is a visual probability plot of elemental concentrations as they change over space.

The range and number of outliers for P, as well as its positive correlation with several other elements, suggest that P may have been deposited onto mound surfaces during activities that involved food preparation and/or consumption in the same spaces (and perhaps at the same time) as non-food related activities involving the deposition of other chemical elements. To explore this possibility, a principal components analyses (PCA) was performed on the eight elements for each surface (using SPSS 13.0 for Windows software) and kriged image maps were generated for those distributions (Figures 11-08 to 11-10).

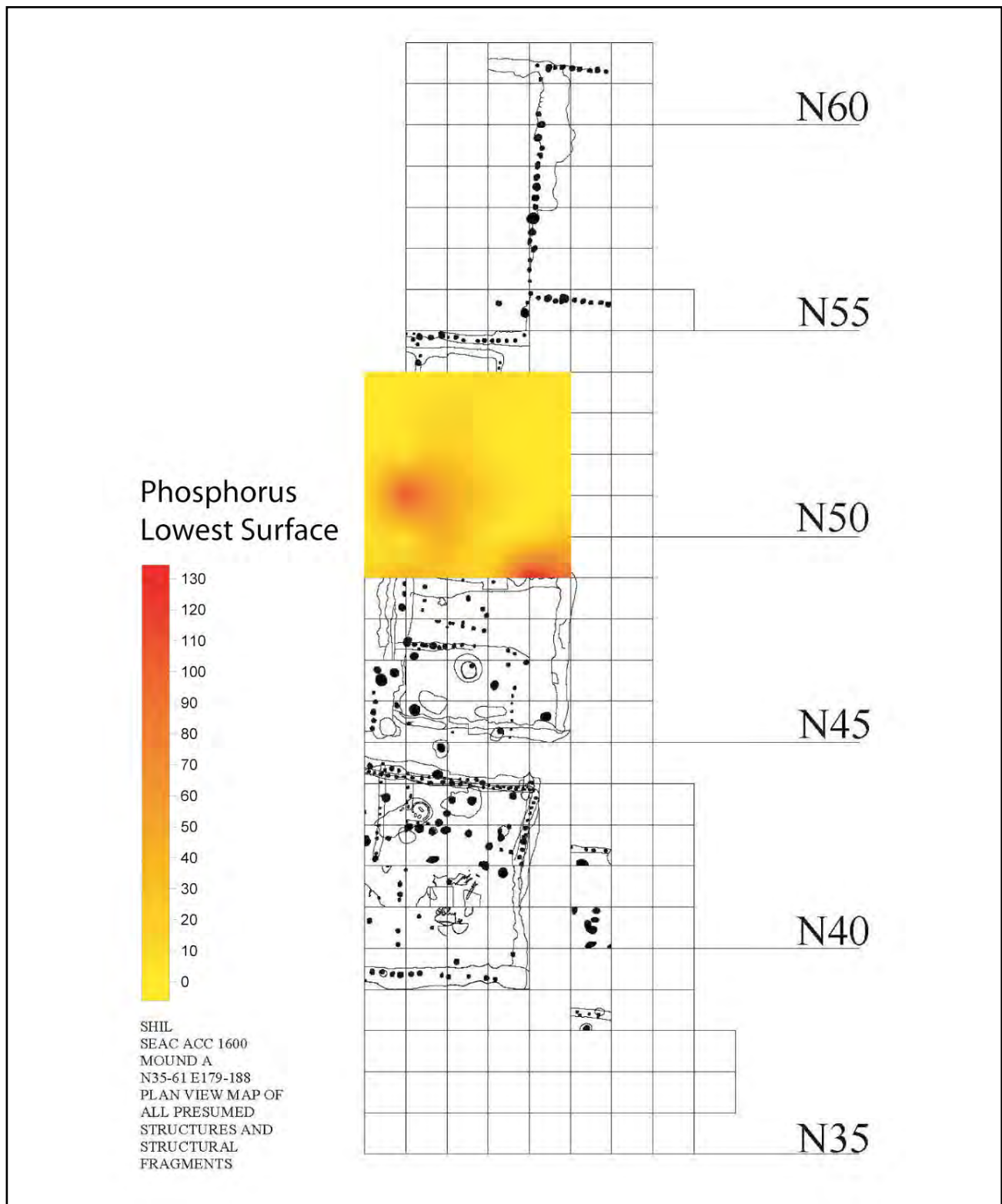


Figure 11-02. Kriged image map of extractable soil P in mg/kg from the lowest (earliest) surface.

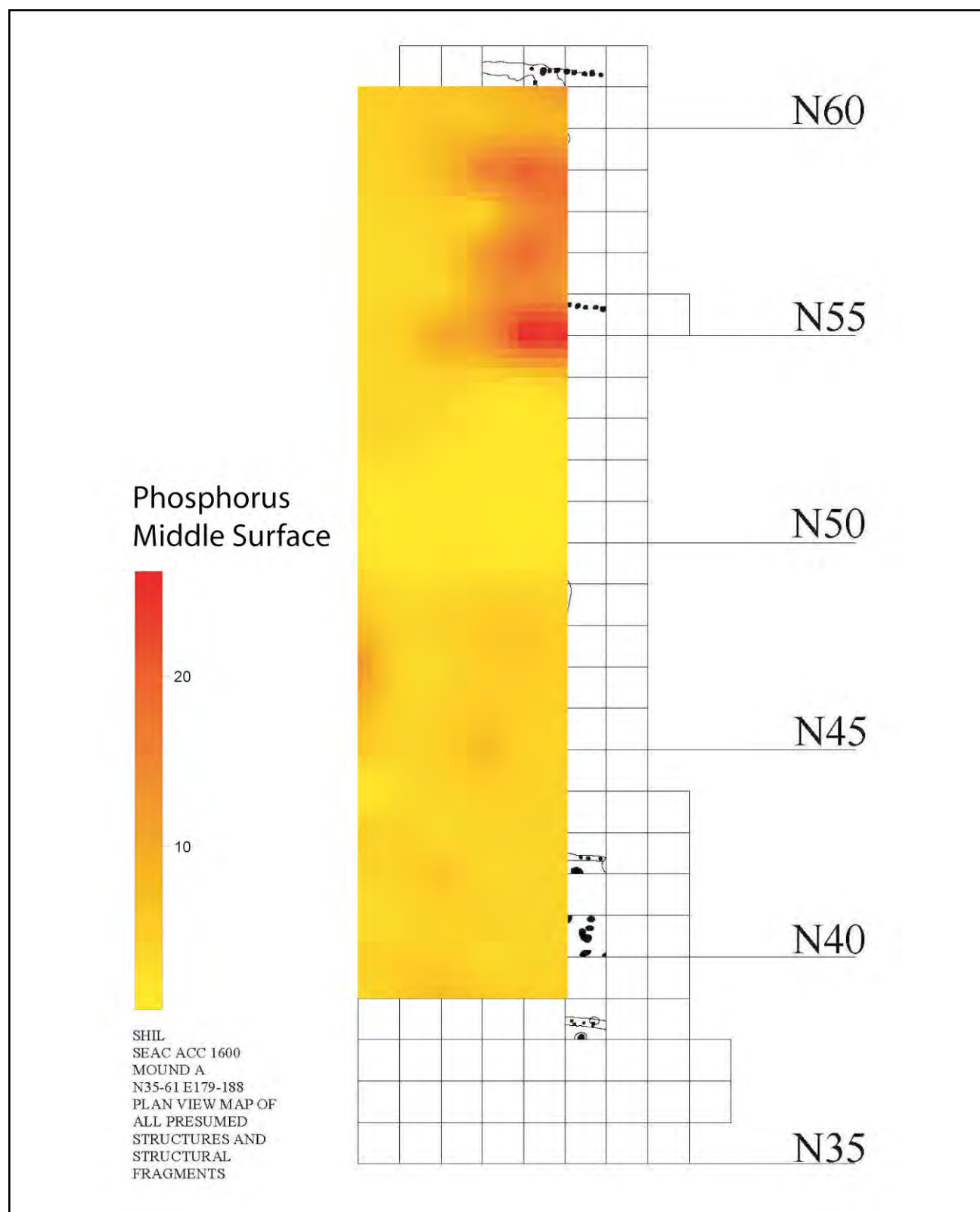


Figure 11-03. Kriged image map of extractable soil P in mg/kg from the middle surface.

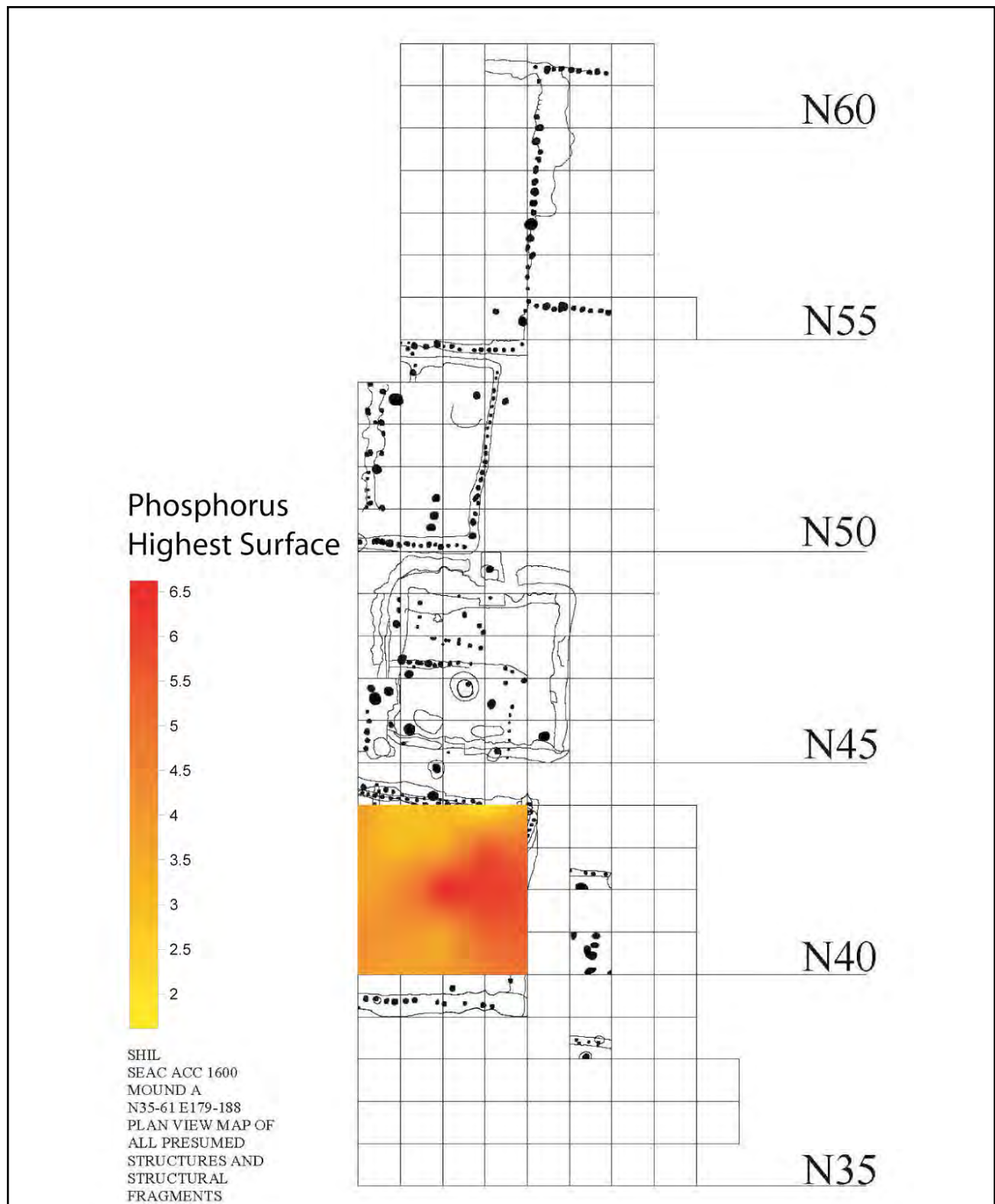


Figure 11-04. Kriged image map of extractable soil P in mg/kg from the highest (latest) surface.

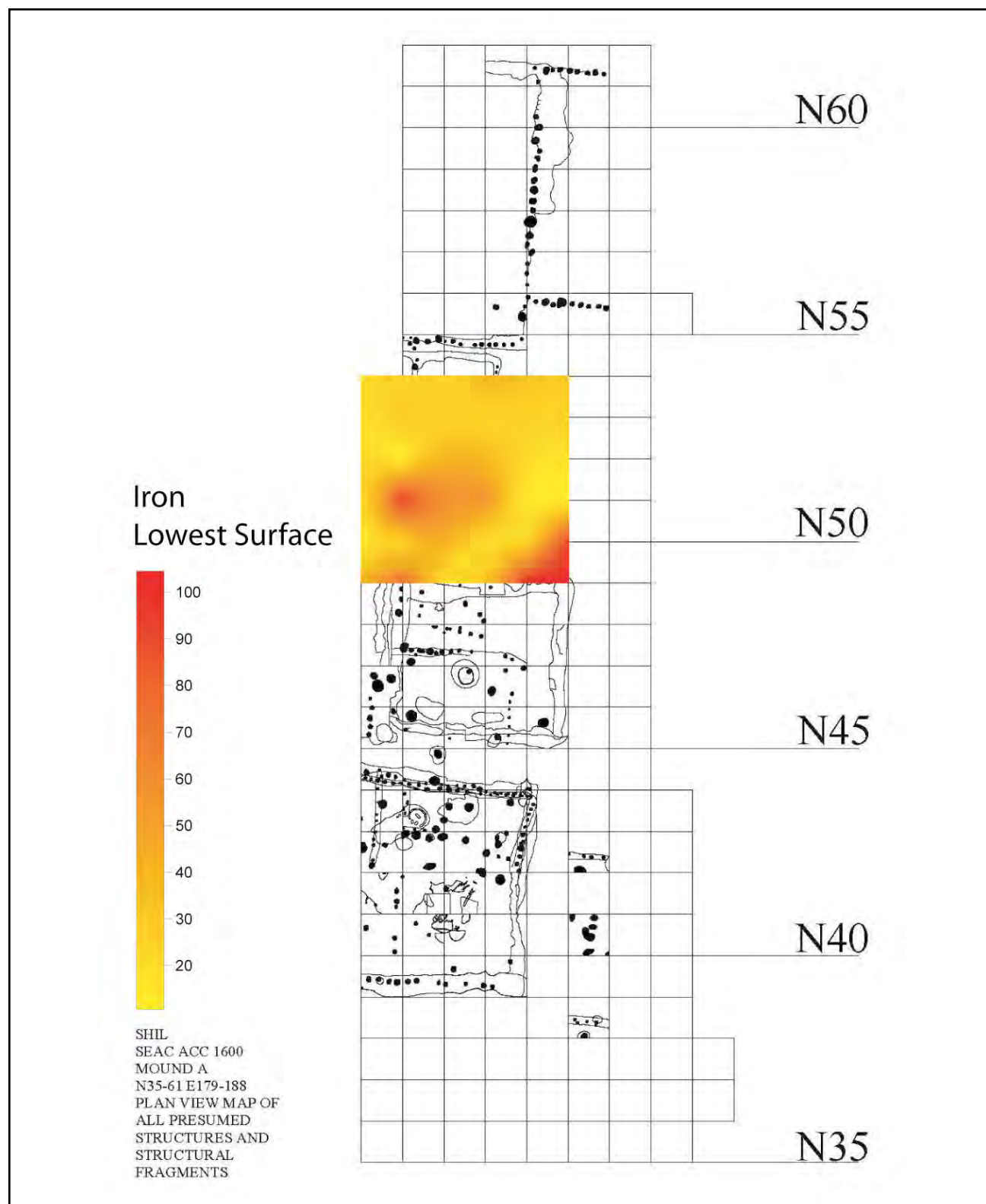


Figure 11-05. Kriged image map of extractable soil Fe in mg/kg from the lowest (earliest) surface.

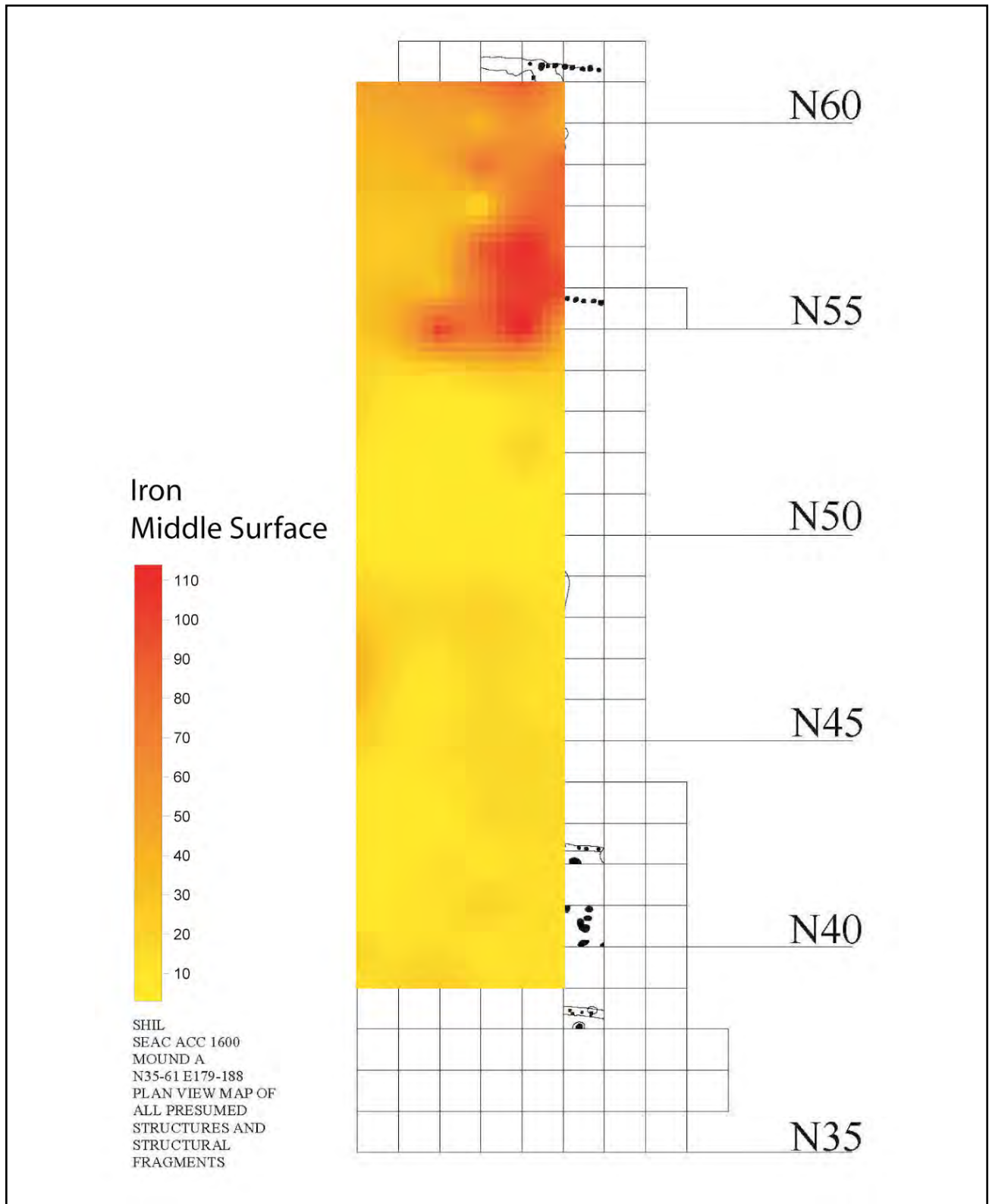


Figure 11-06. Kriged image map of extractable soil Fe in mg/kg from the middle surface.

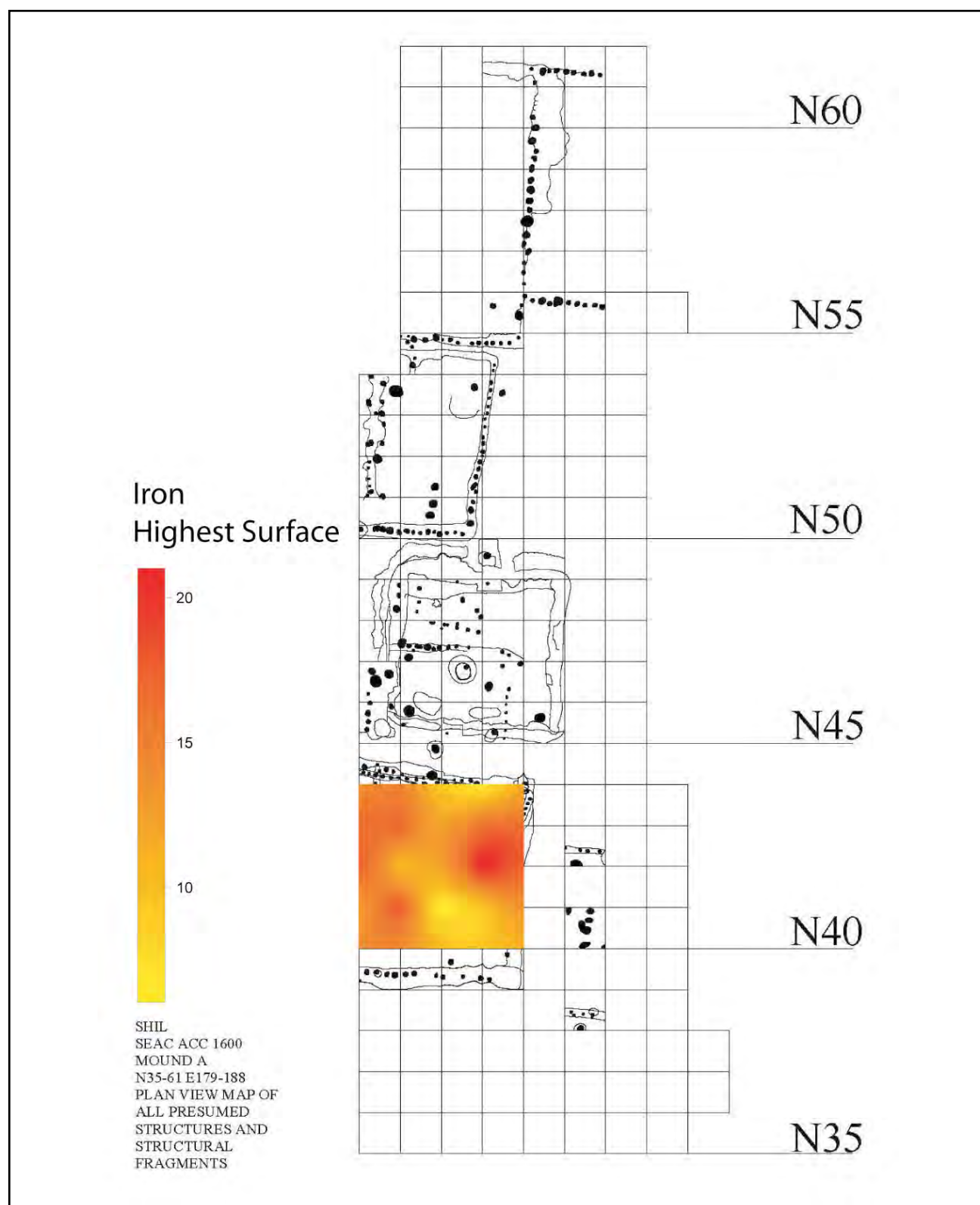


Figure 11-07. Kriged image map of extractable soil Fe in mg/kg from the highest (latest) surface.

Table 11-03 summarizes the results of the analyses for the first principal component, which accounted for between roughly 40 to 60 percent of the variance in the three analyzed datasets. Rotated component loadings are listed in the table, with those above 0.8 appearing in bold typeface. A correlation matrix (and varimax rotation with Kaiser normalization) was used for the PCA so as to give equal influence to all variables (elemental concentrations), since Ca, Fe, and P have high concentrations in the samples compared to the other elements, which could potentially dull the effects of the other elements in the study.

It is important to note that the factor plotted in the kriged maps most strongly represents the variance of different elements (i.e., those appearing in bold typeface in the table) and so should not be interpreted as the same for each surface. For example, Ca and P load most heavily on the factor score for the lowest surface and so the corresponding plot (see Figure 11-08), while showing the combined effects of all eight elements, is most impacted by Ca and P. Thus, when examining the plots, it is important to remember that the areas marked by darker hues mainly account for the variance in only a limited number of elements, and these elements change over each successive surface.

INTERPRETATION

The results show that significant concentrations of P (roughly 130mg/kg) and Fe (roughly 100mg/kg) were deposited in the lowest layer, associated with Structure 5, particularly in the area that would later be occupied by the northeast corner of Structure 1 (Figures 11-02, 11-05, 11-08). Since the limits of Structure 5 are not well defined, it is unclear exactly how these deposits are related to the structure (e.g., do they reflect internal or external activity loci?).

In the middle layer, there are high

P and Fe levels associated with the southern edge and southwest corner of Structure 4 (Figures 11-03, 11-06, 11-09). Notably, the areas encompassing the other structures further south on the summit are largely devoid of P and Fe, suggesting that these spaces may have been reserved for activities that did not involve organic substances and heavy metals. However, this pattern could also be explained by these locales being kept clean immediately following certain activities, which would have prevented phosphates and metallic ions from fixing to the mound surface. Nevertheless, based on the chemical data, it appears that Structure 4 was used in a manner different than that for the other structures.

The highest, or latest, surface—the blanket mantle—contains residues of activities involving P and Fe in the area above where Structure 2A was located, although the concentrations are extremely low (Figures 11-04, 11-07, 11-10). The greatest P levels do not exceed 6.5mg/kg, while the greatest F levels are around 20mg/kg. This finding suggests that, while activities may have taken place on this surface, they were not very intensive or long-lasting.

When considering the combined elemental signatures of all eight elements from the PCA, the same general pattern is evident, with the exception of the middle layer, which shows that activities may have taken place outside of Structure 4 on its south side. Interestingly, Mn loads most heavily (and nearly exclusively) on the PCA Factor 1 for the middle layer. Inferences to help account for this pattern of Mn deposition are problematic given extant ethnoarcheological research on which to draw. As noted previously, this pattern might be related to the preparation or storage of foods involving corn. Another explanation could be that the Mn deposits

Table 11-03. Summary results of the principal components analyses by surface and element in Mound A.

Surface	Al	Ba	Ca	Fe	K	Mg	Mn	P	Total Variance Explained
lowest	.18	.46	.96	.05	.04	.12	.32	.94	52.06%
middle	.24	.34	.22	.47	.01	.06	.95	.33	63.04%
highest	.95	.03	-.22	.86	-.09	.08	.97	.30	38.92%

Note: This table contains rotated component loadings, which are the correlations between the variable and the component. Because these are correlations, possible values range from -1 to +1. Generally, any loadings (i.e., correlations) above .5 can be thought of as “significant” (though not in a statistical sense). Several variables can contribute heavily to certain factors, although all of the factors condense some degree of variation from all of the variables. Thus, the variances associated with certain variables (namely Al, Ca, Fe, Mn, and P) contribute heavily to the extraction of Factor 1.

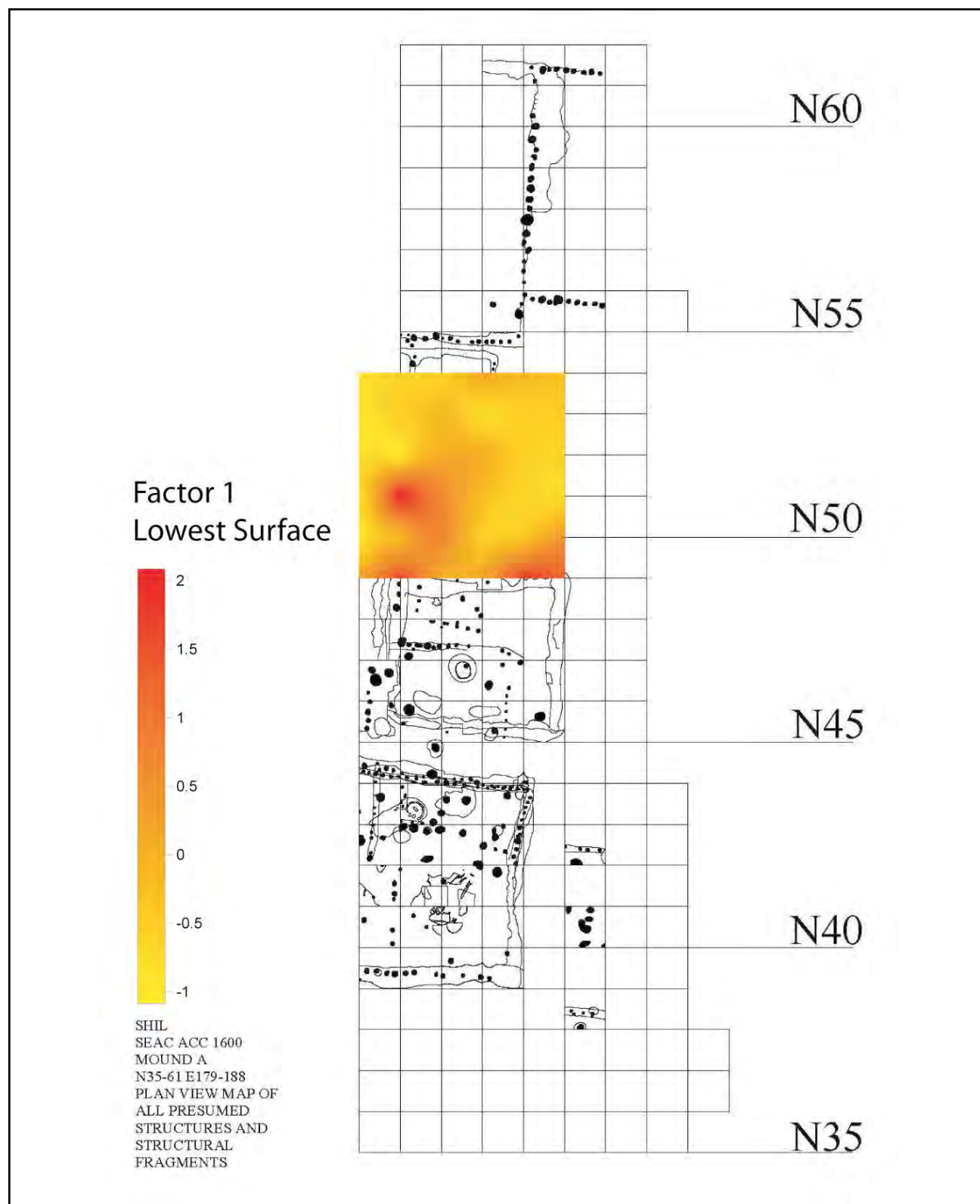


Figure 11-08. Kriged image map of Factor 1 (Al, Ba, Ca, Fe, K, Mg, Mn, and P) from the lowest (earliest) surface.

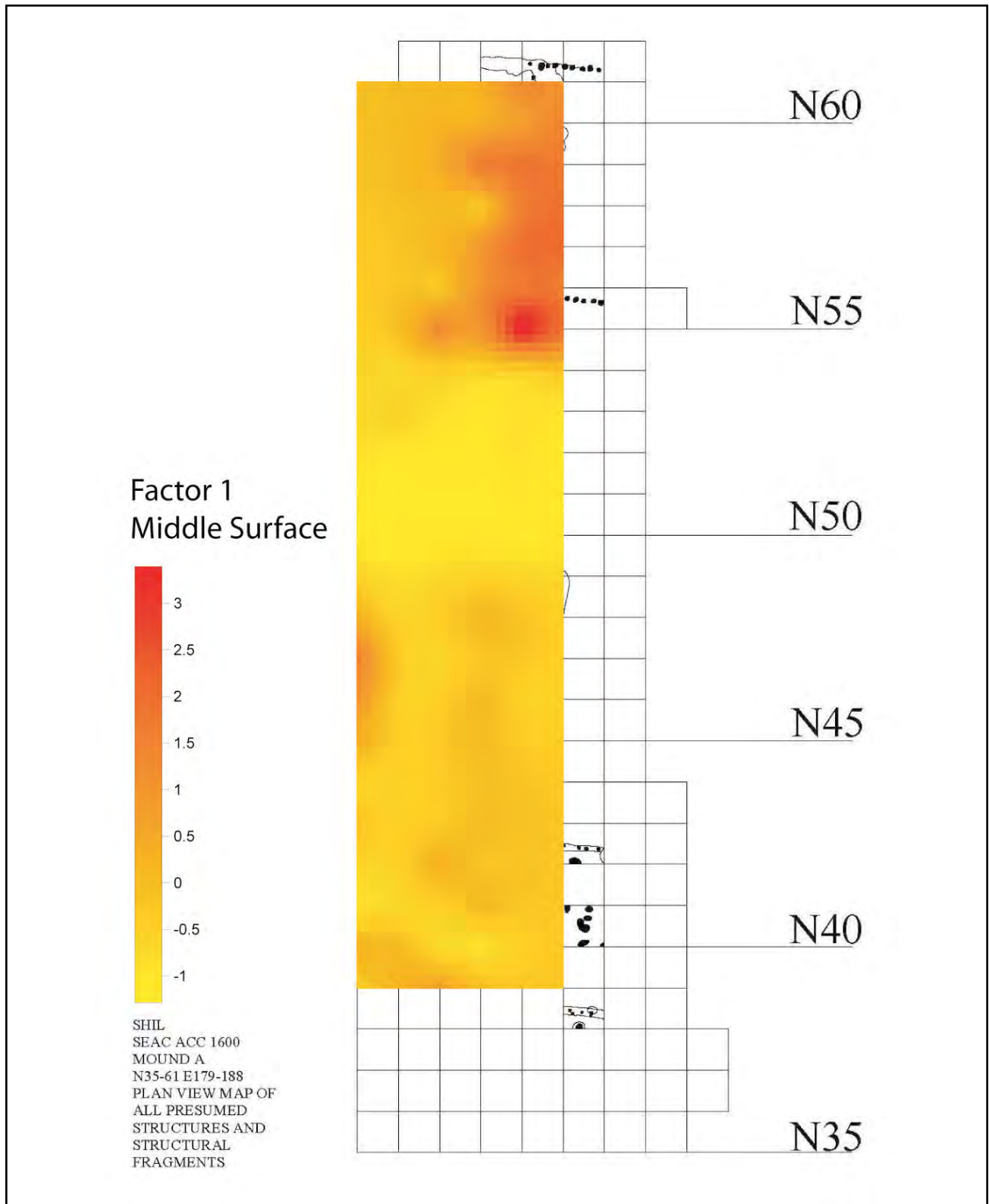


Figure 11-09. Kriged image map of Factor 1 (Al, Ba, Ca, Fe, K, Mg, Mn, and P) from the middle surface.

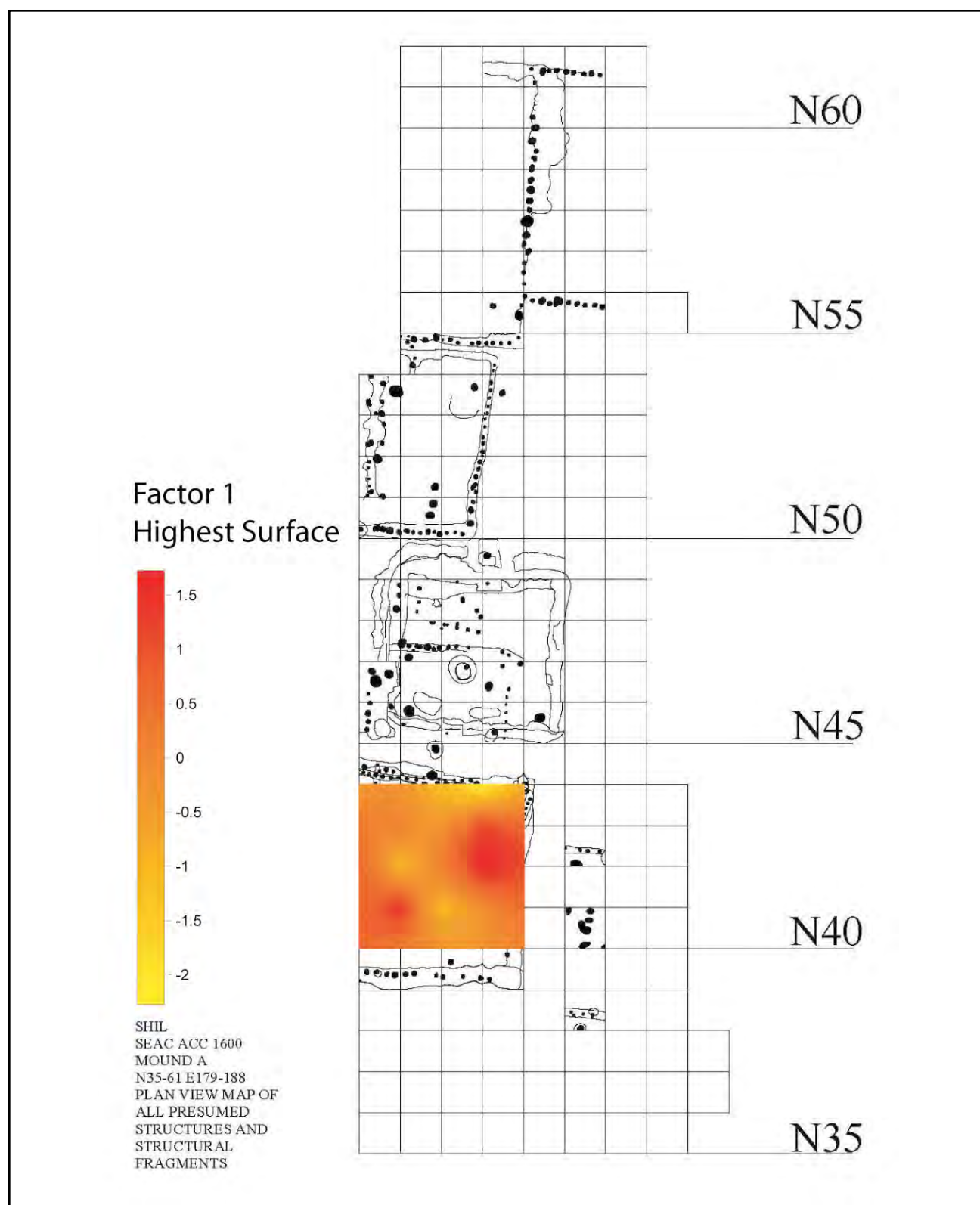


Figure 11-10. Kriged image map of Factor 1 (Al, Ba, Ca, Fe, K, Mg, Mn, and P) from the highest (latest) surface.

are associated with the use of organic pigments, such as crushed charcoal or charred bark (manganese oxide, MnO), or mineral-based pigments, such as pyrolusite (manganese dioxide, MnO₂).

Overall, the soil chemical data, while limited in their interpretive potential, show differential distributions of high concentrations of P and other elements. Based on the chemical evidence alone, it appears that the location of food-related activities, such as feasting, may have become increasingly segregated on the surface of the mound over time. The highest concentrations of P are associated with the lowest layer examined in this study, near the center of the summit area examined. At the time the middle layer was deposited, most activity on the mound's surface involving the deposition of organic materials appears to have been restricted to the area around Structure 4, at the north end of the summit.

It is important to point out that phosphate concentrations alone are not reliable indicators of

feasting practices, which often are highly complex affairs involving many other kinds of activities apart from food or beverage consumption. Instead, phosphate data serve as supporting information for understanding the organization of festive consumption, specifically, the places in which it is likely to have occurred on the mound. It should be remembered that phosphates also may mark other types of consumptive events not related to feasting, such as everyday meals or possibly food storage. As a result, excavation data are essential for developing inferences about the activities that resulted in the deposition of phosphates and other elements in the Mound A soils. Clearly, the next step is to better integrate the artifact evidence, other features, and microstratigraphy with the chemical data, as well as to analyze more samples from the lowest surface, which has the smallest numbers of samples compared to all others in the study.

CHAPTER 12

RADIOCARBON DATES FOR SAMPLES FROM MOUND A

R. A. VARNEY, KATHRYN PUSEMAN, AND THOMAS W. STAFFORD

INTRODUCTION

Forty three charcoal, wood, and botanic samples were submitted for consideration for dating from Shiloh Mound A in 2005, following completion of the fieldwork. Of these samples, 26 were ultimately selected and dated (Tables 12-01 and 12-02). The samples were selected by Anderson and Cornelison and ethnobotanical identifications were conducted by Hollenbach prior to submission for dating. A portion of the submitted samples were subsequently re-examined microscopically by Puseman to clarify/verify ethnobotanical identifications. Additional details on the archeological context and associations of each sample are presented in Chapter 9 and in the electronic appendices.

METHODS

Botanic/Charcoal Identification

The first set of samples submitted were processed in the lab for dating without macroscopic examination. Subsequent samples were first examined under the microscope to verify the sample identification. After macroscopic examination and evaluation, a total of 26 samples were selected for accelerator mass spectrometry (AMS) radiocarbon dating. Botanical samples were examined under a binocular stereo microscope at a magnification of 10x, with some identifications requiring magnifications of up to 70x. Charcoal fragments were broken to expose a fresh cross section and examined under a binocular microscope at a magnification of 70x. Macrofloral remains and charcoal are identified using manuals (Hoadley 1990; Martin and Barkley 1961; Panshin and Zeeuw 1980; Schopmeyer 1974) and by comparison with modern and archeological references.

Radiocarbon Dating

Charcoal, wood, and botanic samples submitted for radiocarbon dating are weighed prior to selecting subsamples for pre-treatment. The remainder of each sample is permanently curated at Paleo Research. The subsample selected for pre-treatment is first subjected to hot (at least 110 °C), 6N hydrochloric acid (HCl), with rinses to neutral between each HCl treatment, until the supernatant is clear. This removes iron compounds and calcium carbonates that would hamper removal of humate compounds later. Next the samples are subjected to 5 percent potassium hydroxide (KOH) to remove humates. Once again, the samples are rinsed to neutral and re-acidified with pH 2 HCl between each KOH step. This step is repeated until the supernatant is clear, signaling removal of all humates. After humate removal, each sample is made slightly acidic and left that way for the next step. Charcoal and charred botanic samples (but not wood samples) are subjected to a concentrated, hot nitric acid bath, which removes all modern organics. This treatment is not used on unburned or partially burned material because it oxidizes the submitted sample of unknown age.

Each submitted sample is then freeze-dried using a vacuum system, freezing out all moisture at -98 °C. Each individual sample is combined with cuprous oxide and ultra-pure silver in a quartz tube, then flame sealed under vacuum.

Standards and laboratory background samples also are treated in the same manner as the charcoal/botanic samples of unknown age submitted for radiocarbon dating. Standards include samples of known age, such as Two Creeks wood, which dates to 11,400 RCY B.P., wood from Alaska (collected at Eua) that is more than 70,000 years old (infinitely old in radiocarbon terms), and others. Each wood standard is run in a quantity similar to the submitted samples of unknown age and is sealed in a quartz tube

Table 12-01. Provenience data for samples selected for possible radiocarbon dating from Shiloh Mound A, Site 40HR7.

Sample No.	Feature No.	Description	Identification	Part
SAMPLES SUBMITTED FOR AMS RADIOCARBON DATING:				
750.2.5	25	Well-defined pit on north side of mound, with chinking stone and daub	KP—Hardwood knot	Charcoal
1147	44	Charred wooden beam; possible historic period	KH/KP— <i>Quercus</i> (white oak group)	Charcoal
1265	59	Black fill from hearth basin	KH— <i>Carya</i>	Nutshell
1364-1	67		KP— <i>Quercus</i> (white oak group)	Charcoal
1631	75		KP— <i>Quercus</i>	Charcoal
1665	83a	Hearth fill; from top/summit of Stage 2	KH/KP— <i>Carya</i>	Nutshell
1804	85a	From hearth fill above fired surface; at N end of Stage 2 summit	KH— <i>Carya</i>	Nutshell
2449		MCBF Basin floor	Monocot, cf. <i>Arundinaria</i>	Stem
2736	161	Charred fabric/matting	KP—Monocot, probably <i>Arundinaria</i>	Stem
2739	147/161	Charred fabric/matting	KH— <i>Arundinaria gigantea</i>	Stalk
2747a	163	Charred fabric/matting	KH— <i>Arundinaria gigantea</i>	Stalk
2940	200a	Hearth	KH— <i>Zea mays</i>	Kernel
3032	300?	Central hearth	KP—Monocot, probably <i>Arundinaria</i>	Stem
3176	262	Charcoal lens/burned matting	KH— <i>Arundinaria gigantea</i>	Stalk
3189-1	262	EU 126; Charred fabric/matting	KP—Monocot, probably <i>Arundinaria</i>	Stem
3277	280	Charred wall debris or matting from intersection of north and east walls for Structure 2A or perhaps 2B	KP— <i>Quercus</i> (red oak group)	Charcoal
3635	379	Charred matting/wall debris located at intersection of north and east walls for Structure 2A or 2B; appears to be under/ prior to these trenches	KH— <i>Arundinaria gigantea</i>	Stalk
3772	440		KP— <i>Quercus</i> (red oak group)	Charcoal
3866	473		KP—Monocot	Stem
3986	496	Fill from basin-shaped depression underlying Structure 1 near the base of Stage 3	KH— <i>Carya</i>	Nutshell
4529.1	603	Posthole at base of mound	KH/KP— <i>Zea mays</i>	Cupule
4556	612	From south end of mound	KH/KP— <i>Carya</i>	Nutshell
4696		From floor above lowest midden layer above subsoil; 138 cmbs	KH— <i>Carya</i>	Nutshell
4698	617	Hearth on Stage 4 surface	KP— <i>Quercus</i> (white oak group)	Charcoal
4702	619	190 cmbs	KH/KP— <i>Carya</i>	Nutshell
4706		Soot from floor immediately above base of mound	KP—Monocot, probably <i>Arundinaria</i>	Stem
SAMPLES SUBMITTED BUT NOT DATED:				
1147	44		KP—Vitrified tissue	
1364	67	Linear charcoal stain- possible burned log; May be historic or may date structure on last mound stage	KP—Fibrous bark/monocot stem	
1364-2	67	Linear charcoal stain- possible burned log; May be historic or may date structure on last mound stage	KP—Fibrous bark (partially charred)	
1665	83a	Dark interior hearth fill; on Stage 2 summit	KH— <i>Carya</i>	Nutshell

Sample No.	Feature No.	Description	Identification	Part
1666	83b	Hearth - fired silt/clay basin	KP— <i>Quercus</i>	Charcoal
			KH/KP— <i>Carya</i>	Nutshell
2447		MCBF Stage 3	KH—Wood	Charcoal powder
2447		MCBF - Stage 3	KH/KP— <i>Zea mays</i>	Kernel
			KP—Sand, Rootlets, Sclerotia, small charcoal flecks	
2449		MCBF Basin floor	KP—Sand, Rootlets, Root bark, small charred flecks	
2449		MCBF Basin floor	Unidentified charred flecks	
2653	147	Charred fabric/matting	KH— <i>Pinus</i> (most likely monocot)	
2653	147	Charred fabric/matting	KP—Unidentified	Charcoal
			KP—Sediment with tiny charcoal flecks	
2747b	163	EU 118; Charred fabric/matting	KP—Monocot, probably <i>Arundinaria</i>	Stem
3190	262	Charred fabric/matting	KH/KP— <i>Quercus</i> (white oak group)	Charcoal
3190-1	262	Charred fabric/matting	KP—Monocot	Stem
3277	280	Charred wall debris or matting from intersection of north and east walls for Structure 2A or perhaps 2B	KH— <i>Carya</i>	Nutshell
3650.1	375	Fill from posthole	KP— <i>Pinus</i>	Moldy wood
4706		Soot from floor immediately above base of mound	KP—Unidentified hardwood	Charcoal
KH = Kandi Hollenbach identification				
KP = Kathryn Puseman identification				

Table 12-02. Radiocarbon results for samples from Shiloh Mound A, Site 40HR7 using IntCal09 calibrations in Oxcal v.4.1.

Sample No.	Feature No.	Description	Sample Identification	Conventional Date	1-sigma Calibrated Date	2-sigma Calibrated Date	δ13C (o/oo)
750.2.5	25	Well-defined pit on north side of mound, with chinking stone and daub	Hardwood charcoal- knot area	800 +/- 15 BP	AD 1224-1256 (68.2%)	AD 1216-1265 (95.4%)	-26.2
1147	44	Charred wooden beam; possible historic period	<i>Quercus</i> charcoal (white oak group)	215 +/- 15 BP	AD 1661-1668 (20.3%) AD 1783-1797 (47.9%)	AD 1649-1675 (33.3%) AD 1777-1800 (48.0%) AD 1941-1955 (14.1%)	-26.9
1265	59	Black fill from hearth basin	<i>Carya</i> nutshell	890 +/- 15 BP	AD 1054-1078 (25.3%) AD 1153-1185 (42.9%)	AD 1047-1085 (30.0%) AD 1122-1139 (7.4%) AD 1150-1213 (58.0%)	-25.4
1364-1	67		<i>Quercus</i> charcoal (white oak group)	380 +/- 20 BP	AD 1452-1495 (53.7%) AD 1602-1615 (14.5%)	AD 1446-1522 (72.4%) AD 1575-1583 (1.3%) AD 1590-1623 (21.6%)	-23.9
1631	75		<i>Quercus</i> charcoal	810 +/- 15 BP	AD 1220-1251 (68.2%)	AD 1212-1264 (95.4%)	-26.8
1665	83a	Hearth fill; from top/summit of Stage 2	<i>Carya</i> nutshell	955 +/- 20 BP	AD 1029-1047(21.9%) AD 1090-1121 (36.3%) AD 1140-1149 (10.0%)	AD 1022-1059 (29.6%) AD 1067-1155 (65.8%)	-23.4
1804	85a	From hearth fill above fired surface; at N end of Stage 2 summit	<i>Carya</i> nutshell	785 +/- 20 BP	AD 1225-1264 (68.2%)	AD 1219-1272 (95.4%)	-24.6
2449	MCBF Floor	MCBF Basin floor	Monocot stem— <i>Arundinaria</i>	800 +/- 15 BP	AD 1224-1256 (68.2%)	AD 1216-1265 (95.4%)	-25.2
2736	161	Charred fabric/matting	Monocot stem— <i>Arundinaria</i>	760 +/- 20 BP	AD 1252-1279 (68.2%)	AD 1224-1280 (95.4%)	-27.1
2739	147/161	Charred fabric/matting	<i>Arundinaria gigantea</i> stem	785 +/- 15 BP	AD 1225-1264 (68.2%)	AD 1220-1271 (95.4%)	-24.7
2747a	163	Charred fabric/matting	<i>Arundinaria gigantea</i> stem	815 +/- 15 BP	AD 1218-1252 (68.2%)	AD 1207-1264 (95.4%)	-24.1
2940	200a	Central hearth	<i>Zea mays</i> kernel	805 +/- 15 BP	AD 1223-1254 (68.2%)	AD 1215-1264 (95.4%)	-10.1
3032	200d	Central hearth	Monocot stem— <i>Arundinaria</i>	785 +/- 15 BP	AD 1225-1264 (68.2%)	AD 1220-1271 (95.4%)	-25.5
3176	262	Charcoal lens/burned matting	<i>Arundinaria gigantea</i> stem	800 +/- 15 BP	AD 1224-1256 (68.2%)	AD 1216-1265 (95.4%)	-26.8
3189-1	262	EU 126; Charred fabric/matting	Monocot stem— <i>Arundinaria</i>	820 +/- 20 BP	AD 1214-1254 (68.2%)	AD 1180-1264 (95.4%)	-25.1
3277	280	Charred wall debris or matting from intersection of north and east walls for Structure 2A or perhaps 2B	<i>Quercus</i> charcoal (red oak group)	785 +/- 15 BP	AD 1225-1264 (68.2%)	AD 1220-1271 (95.4%)	-25.8
3635	379	Charred matting/wall debris located at intersection of north and east walls for Structure 2A or 2B; appears to be under/prior to these trenches	<i>Arundinaria gigantea</i> stem	835 +/- 20 BP	AD 1177-1225 (68.2%)	AD 1168-1256 (95.4%)	-26.6
3772	440		<i>Quercus</i> charcoal (red oak group)	775 +/- 15 BP	AD 1229-1232 (4.0%) AD 1223-1274 (64.2%)	AD 1223-1274 (95.4%)	-29.6
3866	473		Monocot stem	810 +/- 15 BP	AD 1220-1251 (68.2%)	AD 1212-1264 (95.4%)	-10.1
3986	496	Fill from basin-shaped depression underlying Structure 1 near the base of Stage 3	<i>Carya</i> nutshell	800 +/- 20 BP	AD 1224-1257 (68.2%)	AD 1212-1270 (95.4%)	-23.4
4529.1	603	Posthole at base of mound	<i>Zea mays</i> cupule	875 +/- 20 BP	AD 1160-1209 (68.2%)	AD 1052-1082 (12.2%) AD 1125-1136 (2.4%) AD 1151-1219 (80.8%)	-10.1
4556	612	From south end of mound	<i>Carya</i> nutshell	970 +/- 15 BP	AD 1022-1044 (43.6%) AD 1103-1119 (20.9%) AD 1143-1147 (3.7%)	AD 1020-1050 (48.5%) AD 1085-1125 (36.2%) AD 1136-1152 (10.7%)	-25.9
4696		From floor above lowest midden layer above subsoil; 138 cmbs	<i>Carya</i> nutshell	975 +/- 15 BP	AD 1021-1043 (52.3%) AD 1106-1118 (15.9%)	AD 1018-1048 (57.5%) AD 1088-1123 (30.1%) AD 1138-1150 (7.8%)	-25.2
4698	617	Hearth on Stage 4 surface	<i>Quercus</i> charcoal (white oak group)	810 +/- 20 BP	AD 1220-1253 (68.2%)	AD 1187-1200 (3.0%) AD 1206-1269 (92.4%)	-24.9
4702	619	190 cmbs	<i>Carya</i> nutshell	940 +/- 15 BP	AD 1037-1050 (12.5%) AD 1083-1125 (41.2%) AD 1137-1152 (14.5%)	AD 1031-1155 (95.4%)	-27.2
4706		Soot from floor immediately above base of mound	Monocot stem— <i>Arundinaria</i>	835 +/- 15 BP	AD 1179-1225 (68.2%)	AD 1170-1255 (95.4%)	-27

after the requisite pre-treatment. Once all the wood standards and submitted samples of unknown age are prepared and sealed in their individual quartz tubes, they are burned at 820 °C to enable the chemical reaction that extracts carbon dioxide (CO₂) gas.

Following this last step, all samples of unknown age, the wood standards, and the laboratory backgrounds are sent to the AMS radiocarbon facility at the University of California, Irvine, where the CO₂ gas is processed into graphite. The graphite in these samples is then placed in the target and subjected to a cesium ion beam, which produces the numbers that are converted into the radiocarbon date presented in the data section. Dates are presented as conventional radiocarbon ages, as well as calibrated ages using IntCal09 curves on Oxcal v.4.1.

DISCUSSION AND CONCLUSIONS

Radiocarbon determinations from the 26 samples dated from Mound A in 2005 are presented in Table

12-02. Additional detail on their context as well as a discussion of how they fit in with other dates obtained from the site are provided in Chapters 9 and 21.

Finally, it is interesting to note that sample 3866 represents a monocot with a C4 photosynthetic pathway, as evidenced by a $\delta^{13}\text{C}$ value of -10.1 ‰. Other monocot stems from this project, identified as *Arundinaria gigantea*, yielded $\delta^{13}\text{C}$ values consistent with a C3 photosynthetic pathway. Because plants in the C3 group produce a three carbon compound at the beginning of their photosynthetic process, they have a different $\delta^{13}\text{C}$ value than C4 plants, which produce a four carbon compound. Although most of the festucoid, or cool season grasses, are C3 grasses and most of the chloridoid and panicoid, or warm season grasses, are C4 grasses, some exceptions exist. Most non-grass monocots, such as sedges, lilies, and palms, are C3 in their pathway, meaning that sample 3866 is most likely a grass.

LABORATORY ANALYSIS PROCEDURES AND NON-CERAMIC ARTIFACTS

JESSICA MCNEIL

In the five field seasons spent excavating at Mound A, over 170,000 individual artifacts were collected. This includes numerous samples (flotation, soil, and dating), as well as prehistoric ceramics, lithics, and a variety of historic artifacts (Table 13-01 for data by specific category, see also Table 03-01 for summary data). Given the broad scope of this project a large number of the artifacts were initially cataloged at SEAC and subsequently temporarily transferred to UT, ARL for specialized analysis, the results of which are discussed elsewhere in this volume. All classes of artifacts followed the same basic guidelines for their treatment and eventual submission to the SEAC Collections Management Section.

Classification and cataloging of the artifacts followed the guidelines set forth in the *Cataloging Manual for Archeological Objects Vols. I, II, & III* (NPS 1990) and the *Museum Handbook, Museum Records, Part II* (NPS 1984). The Southeast Archeological Catalog System (SACS) guided the artifact analysis and computer data entry, with project personnel accomplishing these tasks. Finally project personnel converted the cataloged data from SACS into the Automated National Catalog System (ANCS+) and presented the data for submission to the National Cataloging System.

The artifacts to be curated were labeled with the park acronym and their assigned catalog number in indelible ink in an area where no decoration or, in the case of stone and shell tools, edge wear or other modification occurred. Small, delicate materials and bones were not labeled, but the specific information was recorded on the bag or vial within which the artifacts were housed. This information was also recorded on a tag placed in the container.

All data collected and generated during this project are curated in Tallahassee under SEAC Accession 1600. These data include, but are not limited to, field notes, maps, shovel test forms, photographic logs and negatives, FS logs, artifacts,

correspondence, and all reports generated as a result of this project. All materials (including those analyzed by specialists) were subsequently turned over to the SEAC Collections Management Section.

Five preliminary artifact categories were used to separate and analyze the materials recovered from the excavation: animal, mineral, vegetal, composite, and unidentified materials. The mineral category included materials manufactured from items such as stone, clay, and glass. The animal and vegetal categories included all faunal and floral remains. The composite category was applied to all materials which were produced from more than one material type.

Each artifact was then classified according to function. The categories used were adapted from the revised version of Robert G. Chenhall's system for classifying cultural objects (1988). The categories laid out by Chenhall include by-products from food and energy production, communication artifacts such as art and coins, non-cultural items, floral remains, personal artifacts such as clothing and toiletries, and building components. Also included is the general category of tools and equipment that is subdivided into categories such as food service, food processing, masonry and stoneworking, and technological remains.

All artifacts were weighed and the majority were counted, as appropriate, then entered into an Access database for ease of data interpretation. Completion of the entire process revealed that the artifacts collectively weighed a total of 5,190.4kg, the majority of which (by weight) was unmodified rock (3,429.8kg, 66 percent). As would be expected, the vast majority of the artifacts collected related to the occupation of the mound, although there were a few artifacts which are related to the 1862 Battle of Shiloh, the early twentieth century Superintendent's residence atop the mound, or objects dropped by visitors to the park.

Table 13-01. Summary of artifacts recovered from the Mound A excavations.

Object	Count	Quantity	Weight (g)	Object	Count	Quantity	Weight (g)
Historic				Pencil	5		0.79
Asphalt Fragment	24		18.54	Pick, Guitar	1		0.32
Asphalt Fragment --Shingle	20		6.63	Pipe, Tobacco	1		0.10
Ball, Musket	4		80.41	Plastic Fragment	72		12.60
Band, Rubber	1		0.10	Pull Top	16		6.48
Bolt	3		29.30	Rifle/musket	1		174.10
Bottle	3		33.43	Rivet	4		2.28
Brick		59 bags	305.06	Rubber Fragment	5		3.97
Buckle	1		10.57	Scabbard	1		16.29
Bulb, Flash	2		1.91	Screw	3		5.00
Bullet	6		30.33	Shell, Shotgun	3		7.96
Bullet, Minie	3		88.06	Shingle	16		2.53
Button	4		3.55	Shoelace	1		0.38
Can	1		6.90	Shot	2		3.45
Cap, Bottle	26		42.65	Slag		10 bags	7.68
Cap, Percussion	16		2.70	Spike	1		240.40
Case, Cartridge	4		4.45	Staple	9		27.69
Cinder	13		4.54	Staple, Fence	2		7.50
Cloth Fragment	2		0.36	Stone, Building	2		3.42
Coal Fragment		12 bags	23.62	Tack	124		170.25
Coin	9		33.93	Tape	2		0.26
Comb	1		0.92	Tape, Paper	1		0.05
Fastener	6		13.88	Tar Fragment	2		1.59
Foil	24		3.29	Tile	1		0.60
Gauge, Net-mesh	1		0.64	Twister, Wire	2		0.34
Glass Fragment	17		7.11	Unidentified		3 bags	2.31
Gravel		30 bags	43,365.44	Vessel Fragment, Ceramic	128		258.75
Grommet	1		0.11	Vessel Fragment, Glass	889		1,057.74
Gum, Chewing	5		0.58	Windowpane	8		5.01
Hardware	7		171.70	Wire	78		327.49
Holder, Cigar	1		1.71	Wire, Barbed	10		38.75
Holder, Neckerchief	1		6.45	Wrapper	23		15.50
Knapsack	1		9.97	Prehistoric			
Label	2		0.05	Abrader	4		244.00
Letter	1		1.25	Bead (Stone)	8		3.47
Metal Fragment		152 bags	437.24	Biface	31		337.33
Mirror	2		0.84	Blade	8		6.64
Mortar		6 bags	29.72	Burnisher	1		56.00
Nail	254		581.81	Core	446		17,569.19
Nail --tape	1		20.38	Daub		254 bags	6,895.93
Nut	1		3.56	Debitage *		184 bags	1,978.63
Paper	2		0.49				

Object	Count	Quantity	Weight (g)
Denticulate	1		3.99
Discoidal	5		56.40
Drill	10		16.20
Fabric		7 bags	1,227.50
Flake	33,102		39,788.59
Food, Plant		2 bags	0.28
Hammerstone	20		2,868.05
Hearth	1		200,000.00**
Knife	1		21.50
Metal Fragment		1 bag	2.98
Microblade	2		0.78
Pipe, Tobacco	3		25.44
Point, Projectile	127		204.09
Preform	11		44.47
Saw	1		58.17
Scraper	9		64.00
Shatter	40,080		105,085.13
Stone, Chunkey	1		443.00
Stone, Fire Cracked	14,740	111 bags	63,146.10
Stone, Worked	66		3,530.71
Tool	6		80.43
Tool, Core	25		944.52
Tool, Flake	656		3,826.95
Uniface	2		97.19
Vessel Fragment	64,948	7 bags	122,209.60
Wood Fragment		1 bag	752.30
Unknown			
Charcoal		703 bags	2,655.39
Clay, Fired		1602 bags	89,948.14
Concretion		731 bags	35,213.74
Coral Fragment --fossil	1		3.30
Fossil	591		2,656.20
Fulgurite		7 bags	24.69
Nonfood, Plant		96 bags	42.52
Nut	189		24.30
Plant		71 bags	84.56
Seed	7		2.75
Stone, Manuport		76 bags	2,439.73
Stone, Pebble	130		1,602.68
Stone, Unmodified		2273 bags	3,429,811.44
Unidentified	1	6 bags	452.52
Wood Fragment		97 bags	732.54

Object	Count	Quantity	Weight (g)
Bone and Shell			
Bone	5,778	5 bags	3,356.12
Bone Pin	1		4.91
Bone, Worked	1		6.10
Shell	7,259	42 bags	25,648.66
Shell, Worked	2		44.80
Shell Bead	2		9.42
Shell Hoe	3		170.75
Samples			
<i>Charcoal</i>			
Charcoal Sample		28 bags	1,769.61
Carbon Fourteen Sample, Charcoal		10 bags	1,891.28
<i>Fired Clay</i>			
Thermoluminescence Sample		15 bags	1,480.50
Sample, Archaeo- magnetic		6 bags	2,381.20
Sample, Fired Clay		1 bag	68.10
<i>Flotation</i>			
Flotation Sample - Heavy Fraction		1,647 bags	620,547.80
Flotation Sample - Light Fraction		1,635 bags	35,186.01
<i>Shell</i>			
Carbon Fourteen Sample, Shell		1 bag	319.30
<i>Soil</i>			
Soil Sample		387 bags	179,617.08
Accelerated Mass Spectrometer Sample		5 bags	181.70
Micromorphology Sample		147 bags	
Phytolith Sample		1 bag	4653.00
Pollen Sample		260 bags	67,437.58
Soil Chemistry Sample		254 bags	64,513.88
Total	170,235	10,981 bags	5,190,401.92

* Unsorted lithics from flotation samples

** Approximate weight (hearth removed en bloc)

Note: Bag refers to materials from specific proveniences that were typically weighed but not counted. Most of these are materials not suitable for counting.

LITHIC ARTIFACTS

The lithic artifacts recovered from the mound excavations accounted for 52 percent of the assemblage (by count). All lithic artifacts were preliminarily sorted by morphological attributes and examined for presence or absence of thermal alteration, with flakes also being examined for presence or absence of cortex. In addition to the preliminary sorting, a subsample of proveniences yielding lithic debitage were examined for raw material type and production stage. These proveniences included all lithic material collected in the ¼-inch mesh hardware cloth from six excavation units, as well as from a number of flotation samples and features. The preliminary sorting of the artifacts included 33,102 flakes, 40,080 individual pieces of shatter, 652 expedient tools, 446 cores and 27 core tools, 8 blades, 10 drills, and 127 projectile points (Table 13-02).

Debitage Sample

The chipped stone debitage chosen for more in-depth examination were selected from a variety of contexts to get a representative sample of the assemblage throughout the mound, as well as a small assortment of features (Table 13-03). The six excavation units chosen were N37–40, E184, N42, E180, and N50, E180. Although a minimal number of artifacts were typically associated with the surfaces of structures, the lithic material from Structure 1 was also chosen for further examination since the entire building had been uncovered and excavated, and therefore provided a complete picture of the artifact assemblage within its walls (see Chapter 9 for descriptions of specific structure and features). Feature 71 was chosen for a more in-depth analysis, since it consisted of a large assemblage of lithic production waste, seemingly all of the same raw material. Finally, Features 119 and 132 were chosen since they represented areas of rich midden debris.

All of the chipped stone debitage in the sample were examined for several characteristics. Six categories were used to record the amount of dorsal cortex present: 0 percent, 1-33 percent, 34-66 percent, 67-99 percent, 100 percent, and

Biface Thinning Flake (those flakes which exhibit a lipped platform). Since these categories are more useful for determining the size of the nodule being reduced rather than for determining the reduction stage (Bradbury and Carr 1995:106), several other attributes were also used. These included raw material type, presence or absence of a platform, and platform type when applicable (i.e., flat, abraded, multiple facets, covered with cortex, and collapsed).

A total of 3,584 artifacts in the debitage sample were examined, including flakes, shatter, cores, and expedient tools (Table 13-04). This number includes 929 lithic artifacts that were recovered from the flotation samples. Unless otherwise specified, no differentiation was made between debitage collected from the ¼-inch mesh hardware cloth and that collected from the flotation samples. Fort Payne, Tuscaloosa Gravel and the tri-colored Pickwick chert accounted for 49 percent (by count, 43 percent by weight) of the raw materials utilized, with a number of minor categories making up the remainder. The three of dominant materials are available locally (O'Hear et al. 1985:8) and would have been easily accessible to the occupants of the Shiloh mound complex.

In examining the complete flake sample for occurrence of cortex, it is evident that the sample is dominated by biface thinning flakes and flakes which lack any (i.e., 0%) cortex on their dorsal face (73 percent by count) (Table 13-05). Although this would seem to indicate that early cobble reduction was completed elsewhere, it is actually more of an indication that larger cobbles were being completely reduced at the site, thereby creating higher percentages of noncortical flakes (Bradbury and Carr 1995:106).

In comparing the different types of platforms present on complete flakes and proximal flake fragments in the sample, it appears that both early and late stage manufacturing was taking place with similar frequencies (Table 13-06). If flakes with flat/single platforms and those which are covered in cortex are assumed to occur during the early stages of cobble reduction, and flakes with multiple facets are assumed to occur during later

Table 13-02. Chipped stone artifacts recovered from Mound A excavations.

Typology / Type Name	Count	Weight (g)
Biface		
Bifacial Tool	30	324.75
Unhafted Biface	1	12.58
Blade		
Flake	8	6.64
Core		
Core, Random	409	14,559.78
Core, Regular	2	37.06
Core, Tested Cobble	35	2,972.35
Debitage		
Debitage *	184 bags	1,978.63
Denticulate		
Flake	1	3.99
Drill		
Bifacial Tool	10	16.20
Flake		
Flake	33,102	39,788.59
Knife		
Bifacial Tool	1	21.50
Microblade		
Flake	2	0.78
Point, Projectile		
Big Sandy	1	3.00
Clovis	1	1.28
Fort Ancient	9	16.48
Hamilton	12	11.91
Jack's Reef Corner	5	14.50
Notched		

stages (Bradbury and Carr 1995:108), as do biface thinning flakes, both early and late stages of cobble reduction was occurring at the site. Flakes with single flat platforms and those whose platforms are covered with cortex account for 50 percent of the flakes with intact platforms. Flakes with multiple facets and biface thinning flakes together represent 44 percent of the flakes with intact platforms. This evidence combined with the information obtained from examining dorsal cortex percentages and the accessibility of the raw materials found on the site would tend to indicate that large cobbles were being brought in and thoroughly reduced. The analysis also indicates that the entire process of biface

Typology / Type Name	Count	Weight (g)
Late Woodland / Miss	18	22.33
Triangular Cluster		
Ledbetter Stemmed	1	7.81
Madison	60	76.13
Untyped	20	50.65
Preform		
Preform	11	44.47
Scraper		
Scraper, End	1	0.61
Scraper, Side	1	41.63
Scraper, Thumbnail	5	9.30
Unifacial Tool	2	12.46
Shatter		
Shatter	40,080	105,085.13
Tool		
Bifacial Tool	1	15.10
Shatter	3	13.91
Tool, Core		
Core, Indeterminate	1	81.40
Core, Random	24	846.10
Core, Tested Cobble	2	68.44
Tool, Flake		
Flake	652	3,793.44
Unifacial Tool	4	33.51
Uniface		
Unifacial Tool	2	97.19

* Unsorted lithics from flotation samples

Note: Bag refers to materials from specific proveniences that were typically weighed but not counted. Most of these are materials not suitable for counting.

manufacture, from start to finish, was taking place within the vicinity of the mound.

Feature 71

Located on the top of Mound A within the Stage I fill or atop the Stage IIa mound amid the roots of a large tree stump, Feature 71 (Figure 13-01, see also Chapter 9, Figure 9-14), was a dense cluster of flakes and flake fragments from a possible reduction and cleaning episode found in a small area where it appeared to have been deliberately discarded. As such, it is a unique occurrence in the feature and artifact assemblage found in during the excavations

Table 13-03. Proveniences of lithic artifacts selected for additional examination.

FS #	Feature #	Stage #	Description	Comments	Collection Method
Feature 71 - Lithic Concentration					
1423		I, Summit	N41 E180, EU138, Level 02, Zone B	Fill Surrounding Feature 71	1/4" Screen
1476	71	I, Summit	N41 E180, EU138, Level 02, Zone B, Feature 71	Lithic Concentration	Flot Sample
Feature 119 - Dark Midden Debris on East Slope of Gray Platform					
2276	119	IIb	N52 E184, EU202, Level 03, Zone C, Feature 119		Flot Sample
2277	119	IIb	N53 E184, EU251, Level 03, Zone C, Feature 119		Flot Sample
2278	119	IIb	N54 E184, EU256, Level 03, Zone C, Feature 119		Flot Sample
Feature 132 - Fill at Base of IIc Basin					
2576	132	IIc	N44 E181, EU50, Level 17, Feature 132		Flot Sample
2577	132	IIc	N44 E182, EU104, Level 14, Zone H, Feature 132		Flot Sample
2582	132	IIc	N44 E183, EU166, Level 08, Zone F, Feature 132		Flot Sample
2585	132	IIc	N45 E180, EU89, Level 07, Zone E, Feature 132		1/4" Screen
2587		IIc	N45 E181, EU57, Level 15		Flot Sample
2588	132	IIc	N45 E181, EU57, Level 15, Feature 132		Flot Sample
2590	132	IIc	N45 E182, EU109, Level 05, Zone D, Feature 132		Flot Sample
Structure 1 - Surface					
2963		III	N45 E183, EU159, Level 08, Zone S1		Flot Sample
2975		III	N45 E182, EU109, Level 09, Zone S1		Flot Sample
2984		III	N45 E180, EU89, Level 10, Zone S2		Flot Sample
2995		III	N46 E180, EU80, Level 12, Zone S4		Flot Sample
2999		III	N46 E183, EU134, Level 07, Zone S2		Flot Sample
Tools from Flotation Samples					
3681	340	III	N53 E182, EU99, Level 12-13, Feature 340	East Wall Trench Structure 3	Flot Sample
3791	427	III	N43 E179, EU147, Level 11, Zone G, Feature 427	Yellow Feature Laden Episode	Flot Sample
4547		Unknown	N38 E184, EU296, Level 12 (Cross Contaminated)		Flot Sample
<i>EU N37, E184</i>					
4699		V	N37 E184, EU267, Level 09	Strata Sample	Flot Sample
4705		VI	N37 E184, EU267, Level 11	Strata Sample	Flot Sample
4707		VI	N37 E184, EU267, Level 13	Strata Sample	Flot Sample
<i>EU N38, E184</i>					
4237		III	N38 E184, EU296, Level 04		1/4" Screen
4285		IV	N38 E184, EU296, Level 05		1/4" Screen
4458		V	N38 E184, EU296, Level 08		1/4" Screen
4525		V	N38 E184, EU296, Level 09	1/2 of Strata Screened	1/4" Screen
4527		V	N38 E184, EU296, Level 09 (Stage 5 Surf.)	1/2 of Strata floated	Flot Sample
4526		V	N38 E184, EU296, Level 10		1/4" Screen
4534		VI	N38 E184, EU296, Level 11		1/4" Screen
<i>EU N39, E184</i>					
2164		III	N39 E184, EU295, Level 02, Zone B		1/4" Screen
4694		V	N39 E184, EU295, Level 09	Strata Sample	Flot Sample

FS #	Feature #	Stage #	Description	Comments	Collection Method
4695		V	N39 E184, EU295, Level 11	Strata Sample	Flot Sample
4697		VI	N39 E184, EU295, Level 13	Strata Sample	Flot Sample
4700		VII	N39 E184, EU295, Level 14	Strata Sample	Flot Sample
<i>EU N40, E184</i>					
1754		I, South Side	N40 E184, EU254, Level 01, Zone A		1/4" Screen
1760		I, South Side	N40 E184, EU254, Level 02, Zone B		1/4" Screen
2126		II, South Side	N40 E184, EU254, Level 05, Zone S2		1/4" Screen
2245		III	N40 E184, EU254, Level 06, Zone S2		1/4" Screen
2257		III	N40 E184, EU254, Level 07, Zone D		1/4" Screen
2764		III	N40 E184, EU254, Level 08, Zone D		1/4" Screen
4188		III	N40 E184, EU254, Level 09		1/4" Screen
4208		III	N40 E184, EU254, Level 10		1/4" Screen
4235		V	N40 E184, EU254, Level 12		1/4" Screen
4238		V	N40 E184, EU254, Level 13		1/4" Screen
4249		V	N40 E184, EU254, Level 14		1/4" Screen
4276		V	N40 E184, EU254, Level 15		1/4" Screen
4421		VI	N40 E184, EU254, Level 16		Flot Sample
4429		VI	N40 E184, EU254, Level 17		1/4" Screen
4439		VI	N40 E184, EU254, Level 18		1/4" Screen
4440		VI	N40 E184, EU254, Level 18	Strata Sample	Flot Sample
4457		VI	N40 E184, EU254, Level 19	Entire Strata	Flot Sample
4456		VII	N40 E184, EU254, Level 20		1/4" Screen
<i>EU N42, E180</i>					
970		I, Summit	N42 E180, EU106, Level 01, Zone A		1/4" Screen
1293		I, Summit	N42 E180, EU106, Level 02, Zone B		1/4" Screen
1990		II, Summit	N42 E180, EU106, Level 03, Zone S1		1/4" Screen
2533		III	N42 E180, EU106, Level 06, Zone D		1/4" Screen
2800		III	N42 E180, EU106, Level 07, Zone E		1/4" Screen
3183		III	N42 E180, EU106, Level 09, Zone F		1/4" Screen
3760		III	N42 E180, EU106, Level 12		1/4" Screen
4072		III	N42 E180, EU106, Level 14		1/4" Screen
<i>EU N50, E180</i>					
1060		I, Summit	N50 E183, EU157, Level 01, Zone A		1/4" Screen
1317		I, Summit	N50 E183, EU157, Level 02, Zone B		1/4" Screen
1385		I, Summit	N50 E183, EU157, Level 03, Zone B		1/4" Screen
1796		I, Summit	N50 E183, EU157, Level 04, Zone C		1/4" Screen
2134		II, Summit	N50 E183, EU157, Level 05, Zone C		1/4" Screen
2526		II, Summit	N50 E183, EU157, Level 06, Zone D		1/4" Screen
2630		II, Summit	N50 E183, EU157, Level 07, Zone D		1/4" Screen
3797		III	N50 E183, EU157, Level 11		1/4" Screen

Table 13-04. Summary of lithic artifacts selected for additional analysis.

Chert Type	Count	Weight (g)
Blade		
Camden	1	0.60
Core		
Buffalo River	1	7.17
Camden	1	60.86
Fort Payne	7	159.06
Tuscaloosa Gravel	6	353.35
Unidentified	7	114.74
Flake		
Bangor	3	0.75
Buffalo River	52	27.67
Camden	26	17.16
Dover	10	8.72
Fort Payne	847	626.38
Fossiliferous Bangor	1	0.31
Fossiliferous Fort Payne	12	18.52
Little Mountain Bangor	4	0.53
Pickwick	103	78.20
Tuscaloosa Gravel	407	535.94
Unidentified	561	445.13
Upper Fort Payne	11	4.94
Quartzite	9	9.68
Microblade		
Fort Payne	1	0.25
Pickwick	1	0.53
Shatter		
Buffalo River	7	16.89
Camden	9	31.88
Fort Payne	114	295.51
Fossiliferous Bangor	11	37.08
Fossiliferous Fort Payne	6	8.56
Pickwick	39	53.18
Tuscaloosa Gravel	206	637.62
Unidentified	1,075	2,710.21
Upper Fort Payne	6	13.71
Quartz	1	0.44
Quartzite	6	93.36
Tool, Core		
Tuscaloosa Gravel	3	139.97
Unidentified	1	21.60
Upper Fort Payne	1	154.34

Chert Type	Count	Weight (g)
Tuscaloosa Gravel	1	8.99
Tool, Flake		
Camden	1	1.15
Fort Payne	7	10.92
Tuscaloosa Gravel	12	43.35
Unidentified	5	20.20
Upper Fort Payne	2	7.17
Total	3,584	6,776.62



Figure 13-01. Close-up photograph of Feature 71 in situ. A dense concentration of debitage and several ceramic fragments were found under a large stump in N41 E180 in the upper part of Mound A, 12 July 2002.

Table 13-05. Occurrence of dorsal cortex by count and weight in the special debitage sample.

Dorsal Cortex	Count	% by Count	Weight (g)	% by Weight	Mean Weight (g)
0%	439	47%	524.93	47%	1.20
1-33%	86	9%	181.65	16%	2.11
34-66%	52	6%	112.37	10%	2.16
67-99%	30	3%	62.12	6%	2.07
100%	80	9%	145.77	13%	1.82
Biface Thinning Flake	246	26%	88.02	8%	0.36
Total	933		1,114.86		1.19

Table 13-06. Occurrence of complete and proximal flake fragment platform types by count and weight in the special debitage sample.

Platform Type	Count	% by Count	Weight (g)	% by Weight
Abraded	22	2%	13.51	1%
Collapsed	52	4%	39.81	3%
Covered with Cortex	276	22%	377.77	29%
Flat	342	28%	478.76	36%
Multiple Facets	162	13%	272.77	21%
Biface Thinning Flake	382	31%	139.99	11%
Total	1,236		1,322.61	

(Table 13-07). A total of 392 lithic artifacts were found in the feature, together with 10 sherds of Mississippian pottery likely coming from three separate vessels. Non-heat treated Fort Payne chert flakes (n=304) accounted for 77.5 percent by count of the lithic material recovered from the feature, and were examined in greater detail (Table 13-08). Only one complete flake exhibited any amount of dorsal cortex (with a range of from 34-66 %), and 24.6 percent (n=75) were biface thinning flakes. Of the 151 platform bearing flakes 55 exhibited multiple faceted platforms, and 75 were biface thinning flakes. In other words, 73 percent of the platform bearing flakes were produced during later stages of cobble reduction and biface manufacture. The material in Feature 71 probably represents an episode of discrete biface production, the debris from which was placed into a small hole in the mound. There is also evidence that a serrated biface was being produced as three of the biface thinning flakes in the sample had been removed from a serrated artifact.

Projectile Points

A total of 127 projectile points and projectile point fragments were recovered during the 1999 to 2004 excavations and identified in the laboratory at SEAC, 107 of which were identifiable to a particular type (see Table 13-02 and 13-09). All of the projectile points were examined for material type, and were measured and classified according to morphological characteristics. Three raw material types (Pickwick, Tuscaloosa Gravel and Fort Payne varieties) dominated the raw material, accounting for more than 60 percent of the material utilized in the production of projectile points (Figure 13-02). Ninety-three points were examined for microscopic traces of wear. The remaining points were left unwashed for possible future residue analysis. All wear examinations were conducted using a Meiji Techno stereo microscope with magnification of between 10x and 60x. There are several advantages to conducting this form of low-power use-wear analysis, not the least of which are speed and cost, permitting the examination of a large sample of artifacts (Odell & Odell-Vereecken 1980:90, 119-120). Twenty-one points exhibited evidence of use, including impact fracturing or microscopic

Shiloh Mound A Excavations

Table 13-07. Artifacts recovered from Feature 71 in the upper part of Mound A.

Object	Type Name	Count	Quantity	Weight (g)
Clay, Fired			1 bag	37.31
Daub			1 bag	1.8
Debitage		392		269.03
Sample, Fired Clay			1 bag	68.1
Sample, Flotation - Heavy Fraction			1 bag	113.19
Sample, Flotation - Light Fraction			1 bag	9.5
Stone, Fire Cracked			1 bag	116.3
Stone, Unmodified			1 bag	10
Vessel Fragment	Bell Plain, var. <i>unspecified</i>	1		2.8
Vessel Fragment	Mississippi Plain, var. <i>Shiloh</i>	8		12.64
Vessel Fragment	Moundville Engraved, var. <i>unspecified</i>	1		1.26

Debitage

	Material Source		
Flake	Bangor	1	0.11
Flake	Fort Payne	309	166.35
Flake	Pickwick	11	20.34
Flake	Tuscaloosa Gravel	2	4.33
Flake	Unidentified	41	30.23
Shatter	Fort Payne	15	31.25
Shatter	Pickwick	1	0.64
Shatter	Unidentified	12	15.78

Table 13-08. Platform bearing Fort Payne chert flakes recovered from Feature 71 in the upper part of Mound A.

Flake Portion	Platform Type	Flake Type	Dorsal Cortex %	Count	Weight (g)
Complete	Abraded		0	1	0.46
Complete	Abraded	Biface Thinning Flake	0	17	10.44
Complete	Abraded	Biface Thinning Flake	34-66	1	2.35
Complete	Collapsed		0	1	6.19
Complete	Collapsed	Biface Thinning Flake	0	4	2.03
Complete	Covered with Cortex		0	3	3.34
Complete	Covered with Cortex	Biface Thinning Flake	0	1	0.41
Complete	Flat		0	20	28.08
Complete	Flat	Biface Thinning Flake	0	4	1.08
Complete	Multiple Facets		0	19	21.03
Complete	Multiple Facets	Biface Thinning Flake	0	8	2.88
Distal Fragment			0	89	34.69
Medial Fragment			0	64	21.50
Proximal Fragment	Abraded		0	5	1.24
Proximal Fragment	Abraded	Biface Thinning Flake	0	20	8.62
Proximal Fragment	Collapsed	Biface Thinning Flake	0	3	2.60
Proximal Fragment	Flat		0	11	3.02
Proximal Fragment	Flat	Biface Thinning Flake	0	5	0.80
Proximal Fragment	Multiple Facets		0	16	9.16
Proximal Fragment	Multiple Facets	Biface Thinning Flake	0	12	4.76
Total				304	164.68

evidence of wear (Table 13-10). The major point forms found in the Mound A area excavations are described by type; the vast majority (n=99) are unstemmed triangular points of Late Woodland and Mississippian age, while the rest are earlier or unidentified forms that likely derive from earlier occupations in the site area, or where the mound fill was collected if it came from further away (see Table 13-02).

Madison

Madison points (n=60) were the most common type recovered during the Mound A excavations (Figure 13-03; see Table 13-09). These are small isosceles triangular shaped points, typically straight sided with straight, convex or concave bases, although excurve and slightly incurvate sided varieties have also been identified, and all of these forms were present in the Mound A area at Shiloh. The Madison type has been identified throughout the eastern United States and dates from ca. A.D. 800 through the historic period, and is perhaps the most common and widely recognized signature of the use of the bow and arrow (Cambron and Hulse 1964:84; Justice 1987:224-227; Perino 1968:52). The Madison points from the Shiloh Mound A excavations were produced from a variety of raw material types including Pickwick chert, Fort Payne chert, and Tuscaloosa Gravel. The mean base width was 1.6cm and mean length is 2.3cm. Eight Madison points exhibited evidence of having been utilized. Six exhibited impact fractures while the other two displayed microscopic evidence of use (see Table 13-10). One point (SHIL 24503) exhibited striations which were oriented at an oblique angle to the blade margin near the distal end of the point. The same margin exhibited moderate rounding along the entire blade. The opposite margin exhibited minimal rounding which increased near the distal end of the point. The other point (SHIL 30082) exhibited striations oriented at an oblique to the blade edge. Striations that are oriented at an oblique angle to the blade edge are an indication that the artifact may have been utilized for scraping or whittling.

Fort Ancient

Nine Fort Ancient points were found in the excavation units (see Figure 13-03; see Table 13-09). These are small to medium sized triangular points, exhibiting a long, slender isosceles form. Blade edges are typically serrated, although unserrated varieties occur to a lesser extent. These varieties however are much less common, which may ultimately be a function of the difficulty in distinguishing them from other forms of unserrated triangular points. Blade edges may be either straight or slightly concave. Basal margins are thinned and range from straight to excurve. Fort Ancient points date from the Late Woodland through the Early Mississippian periods, and have been identified from Ohio, throughout Tennessee and into Alabama (Bell 1960:40; Cambron and Hulse 1964:54; Justice 1987:227-228). Five of the points were produced from Fort Payne chert. Three Fort Ancient points exhibited evidence of having been utilized. Two (SHIL 20752 and SHIL 45867) exhibited impact fluting, while the third (SHIL 22025) exhibited polish on the distal end indicating that it may have been used as a drill (Figure 13-04; lower left).

Hamilton

Twelve Hamilton points were identified from the excavation assemblage (see Figure 13-03; see Table 13-09). Hamilton points are small isosceles shaped projectile points with incurvate blade margins. They are typically finely flaked and generally exhibit an incurvate or straight base which is always thinned. These points are a diagnostic of the Late Woodland period locally and date from ca. A.D. 500–1000. They are common throughout much of Tennessee and are named for the county from which they were originally identified (Cambron and Hulse 1964:64; Justice 1987:229-230). Two of the eight points examined microscopically exhibited signs of use wear. One (SHIL 41452) exhibited polish and rounding at the distal end, indicating that it had been used as a drill. The other (SHIL 28861) exhibited striations that were oriented at an oblique angle to the edge (see Figure 13-04, upper left).

Table 13-09. Projectile points found in the Mound A excavations.

Material	Haft Form	Blade Form	Shoulder Form	Thermal Alteration	Weight (g)	Maximum Thickness (cm)	Maximum Length (cm)	Base Width (cm)	Shoulder Width (cm)	Examined for Wear	Mound Stage	Sub-stage	Catalog #
Madison													
Bangor Chert	Unstemmed Incurvate	Straight		Heated	0.73	0.305	2.083	1.434		Yes	I, Summit		SHIL 39478
Bangor Chert	Unstemmed Straight	Straight		Heated	1.80	0.614	2.704	1.44		Yes	II, Summit	Ila/Ile	SHIL 43343
Buffalo River Chert	Unstemmed Incurvate	Incurvate		Heated	2.04	0.618	Indeterminate	1.928		Yes	Unknown		SHIL 42005
Buffalo River Chert	Unstemmed Incurvate	Straight		Heated	2.18	0.707	Indeterminate	1.572		No	II, Summit	Ila	SHIL 42972
Buffalo River Chert	Unstemmed Incurvate	Straight		Absent	1.38	0.356	Indeterminate	1.698		Yes	I, South Side		SHIL 30082
Camden Chert	Unstemmed Incurvate	Straight		Heated	0.99	0.431	Indeterminate	1.352		Yes	I, Summit		SHIL 34566
Camden Chert	Unstemmed Incurvate	Straight		Absent	1.14	0.326	Indeterminate	1.49		Yes	I, Summit		SHIL 29418
Camden Chert	Unstemmed Straight	Straight		Heated	0.82	0.349	1.58	1.46		Yes	I, Summit		SHIL 38696
Fort Payne Chert	Unstemmed Incurvate	Straight		Absent	1.38	0.496	1.779	1.694		Yes	I, Summit		SHIL 38057
Fort Payne Chert	Unstemmed Incurvate	Straight		Absent	1.50	0.50	Indeterminate	Indeterminate		No	I, North Side		SHIL 27216
Fort Payne Chert	Unstemmed Incurvate	Straight		Absent	1.50	0.489	Indeterminate	1.573		Yes	III		SHIL 39922
Fort Payne Chert	Unstemmed Incurvate	Straight		Absent	1.96	0.575	Indeterminate	1.902		Yes	II, Summit	Ila/Ile	SHIL 42523
Fort Payne Chert	Unstemmed Incurvate	Straight		Absent	0.83	0.428	Indeterminate	1.154		Yes	III		SHIL 42998
Fort Payne Chert	Unstemmed Incurvate	Straight		Heated	0.69	0.358	Indeterminate	Indeterminate		Yes	II, Summit	Ilb	SHIL 43188
Fort Payne Chert	Unstemmed Incurvate	Straight		Absent	0.84	0.261	2.077	1.588		Yes	II, South Side	Ila	SHIL 40687
Fort Payne Chert	Unstemmed Incurvate	Straight		Absent	0.49	0.336	1.413	Indeterminate		No	Unknown		SHIL 40410
Fort Payne Chert	Unstemmed Straight	Excavate		Absent	4.95	0.771	3.986	2.108		Yes	II, Summit	Ile	SHIL 40526
Fort Payne Chert	Unstemmed Straight	Straight		Heated	1.42	0.561	2.927	1.358		Yes	II, Summit	Ila	SHIL 30312
Fort Payne Chert	Unstemmed Straight	Straight		Heated	0.90	0.375	2.385	1.295		Yes	II, South Side	Ila	SHIL 39385
Fort Payne Chert	Unstemmed Straight	Straight		Absent	0.64	0.368	1.938	1.377		Yes	I, Summit		SHIL 35834
Fossiliferous Fort Payne Chert	Unstemmed Incurvate	Straight		Absent	1.10	0.316	Indeterminate	1.451		Yes	III		SHIL 41784

Material	Haft Form	Blade Form	Shoulder Form	Thermal Alteration	Weight (g)	Maximum Thickness (cm)	Maximum Length (cm)	Base Width (cm)	Shoulder Width (cm)	Examined for Wear	Mound Stage	Sub-stage	Catalog #
Fossiliferous Fort Payne Chert	Unstemmed Straight	Straight		Heated	1.10	0.400	2.239	1.481		Yes	I, South Side		SHIL 22110
Fossiliferous Fort Payne Chert	Unstemmed Straight	Straight		Absent	0.70	0.32	Indeterminate	1.527		Yes	I, Apron West		SHIL 21755
Little Mountain Bangor Chert	Unstemmed Excavate	Straight		Absent	2.25	0.541	Indeterminate	1.835		Yes	I, Summit		SHIL 35813
Pickwick Chert	Unstemmed Excavate	Excavate		Absent	2.85	0.710	Indeterminate	1.893		Yes	Unknown		SHIL 41464
Pickwick Chert	Unstemmed Incurvate	Excavate		Heated	1.65	0.372	2.757	1.654		No	I, South Side		SHIL 22829
Pickwick Chert	Unstemmed Incurvate	Excavate		Absent	0.91	0.410	2.041	1.340		Yes	I, Summit		SHIL 34731
Pickwick Chert	Unstemmed Incurvate	Incurvate		Heated	0.70	0.382	1.994	1.349		No	I, South Side		SHIL 22134
Pickwick Chert	Unstemmed Incurvate	Straight		Heated	0.69	0.327	Indeterminate	1.378		Yes	II, Summit	Ia	SHIL 40996
Pickwick Chert	Unstemmed Incurvate	Straight		Absent	2.24	0.638	2.574	1.878		No	I, Summit		SHIL 34567
Pickwick Chert	Unstemmed Incurvate	Straight		Heated	0.40	0.27	1.66	1.37		No	Unknown		SHIL 27581
Pickwick Chert	Unstemmed Incurvate	Straight		Absent	1.50	0.60	2.02	1.92		No	II, Summit	Ia	SHIL 41952
Pickwick Chert	Unstemmed Incurvate	Straight		Absent	1.02	0.342	2.297	1.571		No	VI		SHIL 52758
Pickwick Chert	Unstemmed Incurvate	Straight		Absent	0.87	0.354	2.157	1.426		No	V		SHIL 53042
Pickwick Chert	Unstemmed Straight	Excavate		Heated	2.30	0.331	2.123	1.475		Yes	II, Summit	Ia	SHIL 40289
Pickwick Chert	Unstemmed Straight	Incurvate		Absent	1.10	0.437	2.063	1.89		No	I, Summit		SHIL 39667
Pickwick Chert	Unstemmed Straight	Incurvate		Heated	0.87	0.393	2.027	1.452		Yes	II, Summit	Ia/Ile	SHIL 41379
Pickwick Chert	Unstemmed Straight	Straight		Absent	1.60	0.43	2.669	1.84		No	Unknown		SHIL 24951
Pickwick Chert	Unstemmed Straight	Straight		Heated	1.20	0.53	Indeterminate	1.137		Yes	II, Summit	Ia/Ile	SHIL 43423
Pickwick Chert	Unstemmed Straight	Straight		Heated	1.45	0.363	Indeterminate	1.830		No	III		SHIL 52178
Pickwick Chert	Unstemmed Straight	Straight		Absent	1.20	0.44	2.66	1.52		No	III		SHIL 27403
Tuscaloosa Gravel	Unstemmed Incurvate	Straight		Absent	0.95	0.243	2.294	1.685		Yes	I, South Side		SHIL 28446
Tuscaloosa Gravel	Unstemmed Straight	Indeterminate		Absent	0.90	0.408	Indeterminate	Indeterminate		Yes	II, South Side	Ia	SHIL 41817
Tuscaloosa Gravel	Unstemmed Straight	Straight		Heated	1.30	0.347	Indeterminate	1.514		No	I, North Side		SHIL 25185

Material	Haft Form	Blade Form	Shoulder Form	Thermal Alteration	Weight (g)	Maximum Thickness (cm)	Maximum Length (cm)	Base Width (cm)	Shoulder Width (cm)	Examined for Wear	Mound Stage	Sub-stage	Catalog #
Tuscaloosa Gravel	Unstemmed Straight	Straight		Heated	1.37	0.399	Indeterminate	Indeterminate		No	I, North Side		SHIL 25050
Tuscaloosa Gravel	Unstemmed Straight	Straight		Absent	1.71	0.469	3.030	1.602		Yes	I, South Side		SHIL 37413
Unidentified Chert	Unstemmed Incurvate	Incurvate		Heated	0.84	0.398	Indeterminate	1.643		Yes	I, Summit		SHIL 36192
Unidentified Chert	Unstemmed Incurvate	Straight		Heated	0.76	0.362	Indeterminate	1.473		No	I, Summit		SHIL 22894
Unidentified Chert	Unstemmed Incurvate	Straight		Absent	0.56	0.337	Indeterminate	1.521		Yes	II, Summit	IIb	SHIL 41371
Unidentified Chert	Unstemmed Indeterminate	Excavate		Absent	0.50	0.262	Indeterminate	Indeterminate		Yes	II, Summit	IIc	SHIL 40874
Unidentified Chert	Unstemmed Indeterminate	Straight		Heated	0.53	0.276	Indeterminate	Indeterminate		Yes	I, South Side		SHIL 38619
Unidentified Chert	Unstemmed Straight	Incurvate		Heated	1.30	0.390	Indeterminate	1.864		Yes	I, South Side		SHIL 22111
Unidentified Chert	Unstemmed Straight	Incurvate Excavate		Absent	1.01	0.379	2.117	1.531		Yes	I, Summit		SHIL 35173
Unidentified Chert	Unstemmed Straight	Straight		Heated	1.10	0.393	2.328	Indeterminate		Yes	I, Summit		SHIL 24503
Unidentified Chert	Unstemmed Straight	Straight		Heated	0.72	0.193	2.395	1.472		Yes	I, Apron West		SHIL 20802
Unidentified Chert	Unstemmed Straight	Straight		Heated	0.69	0.346	2.041	1.242		Yes	I, Summit		SHIL 36765
Unidentified Chert	Unstemmed Straight	Straight		Absent	1.59	0.451	2.844	1.781		Yes	III		SHIL 43255
Unidentified Chert	Unstemmed Straight	Straight		Heated	0.83	0.336	2.112	1.414		Yes	I, Summit		SHIL 42283
Upper Fort Payne Chert	Unstemmed Incurvate	Excavate		Absent	1.70	0.608	2.661	1.467		Yes	II, Summit	IIb	SHIL 45137
Upper Fort Payne Chert	Unstemmed Straight	Straight		Absent	1.88	0.72	2.58	1.48		Yes	II, South Side	IIa	SHIL 39159
Fort Ancient													
Fort Payne Chert	Unstemmed Incurvate	Straight		Heated	1.45	0.524	Indeterminate	1.514		Yes	I, Summit		SHIL 29200
Pickwick Chert	Unstemmed Straight	Straight		Heated	2.55	0.532	4.326	1.508		Yes	I, Summit		SHIL 36430
Tuscaloosa Gravel	Unstemmed Excavate	Straight		Absent	1.79	0.53	Indeterminate	1.478		Yes	Unknown		SHIL 42544
Unidentified Chert	Unstemmed Incurvate	Straight		Heated	1.72	0.560	3.303	1.262		Yes	II, Summit	IIb	SHIL 42137
Unidentified Chert	Unstemmed Indeterminate	Straight		Absent	2.00	0.457	Indeterminate	Indeterminate		Yes	I, Summit		SHIL 22025
Upper Fort Payne Chert	Unstemmed Straight	Incurvate		Absent	1.39	0.392	Indeterminate	1.601		No	I, South Side		SHIL 20752

Material	Haft Form	Blade Form	Shoulder Form	Thermal Alteration	Weight (g)	Maximum Thickness (cm)	Maximum Length (cm)	Base Width (cm)	Shoulder Width (cm)	Examined for Wear	Mound Stage	Sub-stage	Catalog #
Upper Fort Payne Chert	Unstemmed Straight	Straight		Absent	2.10	0.563	3.373	1.466		Yes	II, Summit	IIb	SHIL 45867
Upper Fort Payne Chert	Unstemmed Straight	Straight		Heated	1.33	0.381	2.969	Indeterminate		No	I, South Side		SHIL 20770
Upper Fort Payne Chert	Unstemmed Straight	Straight		Absent	2.15	0.536	3.795	1.152		Yes	Unknown		SHIL 42233
Hamilton													
Bangor Chert	Unstemmed Incurvate	Incurvate		Absent	0.83	0.392	2.781	1.304		Yes	II, Summit	IIb	SHIL 41452
Bangor Chert	Unstemmed Incurvate	Incurvate		Absent	0.70	0.331	2.123	1.475		No	I, Summit		SHIL 40263
Bangor Chert	Unstemmed Indeterminate	Incurvate		Absent	0.63	0.371	Indeterminate	Indeterminate		Yes	I, South Side		SHIL 37895
Fort Payne Chert	Unstemmed Incurvate	Straight		Absent	1.10	0.501	3.041	1.436		No	II, South Side	IIa	SHIL 39818
Pickwick Chert	Unstemmed Excavate	Incurvate		Absent	1.93	0.490	Indeterminate	2.480		No	II, Summit	IIa/IIc	SHIL 41712
Pickwick Chert	Unstemmed Straight	Incurvate		Heated	1.13	0.367	Indeterminate	1.702		Yes	II, Summit	IIa/IIc	SHIL 42494
Pickwick Chert	Unstemmed Straight	Incurvate		Heated	0.54	0.330	1.985	1.417		Yes	I, South Side		SHIL 39988
Tuscaloosa Gravel	Unstemmed Incurvate	Incurvate		Absent	1.59	0.544	Indeterminate	1.841		Yes	I, North Side		SHIL 30331
Unidentified Chert	Unstemmed Incurvate	Incurvate		Heated	0.98	0.407	2.178	1.68		No	I, Summit		SHIL 24122
Unidentified Chert	Unstemmed Incurvate	Incurvate		Absent	0.74	0.337	Indeterminate	Indeterminate		Yes	III		SHIL 46376
Unidentified Chert	Unstemmed Incurvate	Incurvate		Heated	0.93	0.372	2.426	Indeterminate		Yes	I, Summit		SHIL 28861
Unidentified Chert	Unstemmed Straight	Incurvate		Heated	0.81	0.354	Indeterminate	1.721		Yes	V		SHIL 48137
Late Woodland / Mississippian Triangular Cluster													
Bangor Chert	Unstemmed Incurvate	Straight		Heated	1.15	1.28	Indeterminate	1.340		Yes	II, Summit	IIa	SHIL 39622
Buffalo River Chert	Unstemmed Excavate	Straight		Absent	3.80	0.689	2.95	2.088		No	I, North Side		SHIL 27092
Buffalo River Chert	Unstemmed Straight	Straight		Absent	1.10	0.572	2.394	1.302		Yes	I, Summit		SHIL 20758
Camden Chert	Unstemmed Incurvate	Straight		Heated	0.70	0.420	1.589	1.424		Yes	I, South Side		SHIL 29597
Dover Chert	Unstemmed Excavate	Straight		Heated	0.53	0.317	Indeterminate	1.323		Yes	I, South Side		SHIL 38636
Fort Payne Chert	Unstemmed Excavate	Straight		Absent	1.75	0.640	2.471	1.609		Yes	III		SHIL 42150

Material	Haft Form	Blade Form	Shoulder Form	Thermal Alteration	Weight (g)	Maximum Thickness (cm)	Maximum Length (cm)	Base Width (cm)	Shoulder Width (cm)	Examined for Wear	Mound Stage	Sub-stage	Catalog #
Fort Payne Chert	Unstemmed Incurvate	Straight		Heated	0.98	0.391	2.171	1.464		Yes	I, South Side		SHIL 37824
Fort Payne Chert	Unstemmed Incurvate	Straight		Heated	1.48	0.526	3.165	Indeterminate		No	Unknown		SHIL 24024
Fort Payne Chert	Unstemmed Straight	Straight		Absent	1.74	.717	Indeterminate	Indeterminate		No	I, North Side		SHIL 25231
Fossiliferous Fort Payne Chert	Unstemmed Straight	Incurvate		Heated	0.67	0.416	Indeterminate	1.453		No	I, North Side		SHIL 25253
Fossiliferous Fort Payne Chert	Unstemmed Straight	Indeterminate		Heated	0.42	Indeterminate	Indeterminate	1.475		Yes	I, Summit		SHIL 27921
Pickwick Chert	Unstemmed Incurvate	Incurvate		Absent	1.00	0.4	Indeterminate	1.91		Yes	I, Summit		SHIL 38152
Pickwick Chert	Unstemmed Incurvate	Straight		Absent	0.90	0.478	1.699	1.593		No	I, Apron West		SHIL 21739
Pickwick Chert	Unstemmed Incurvate	Straight		Heated	0.50	0.318	1.481	1.160		Yes	I, Summit		SHIL 28194
Unidentified Chert	Unstemmed Indeterminate	Excavate		Heated	2.69	0.658	2.843	Indeterminate		Yes	I, South Side		SHIL 37896
Unidentified Chert	Unstemmed Straight	Excavate		Heated	0.98	0.312	2.067	1.402		Yes	II, Summit	Ib	SHIL 45136
Upper Fort Payne Chert	Unstemmed Incurvate	Straight		Heated	1.18	0.522	2.318	1.34		No	II, South Side	Ia	SHIL 39489
Upper Fort Payne Chert	Unstemmed Incurvate	Straight		Heated	0.76	1.677	0.568	1.146		Yes	II, South Side	Ia	SHIL 37576
Jack's Reef Corner Notched													
Dover Chert	Corner Notched	Excavate	Barbed	Absent	1.94	0.424	2.489	2.069	1.775	Yes	III		SHIL 47024
Fort Payne Chert	Corner Notched	Excavate	Barbed	Absent	2.77	0.464	Indeterminate	1.565	2.092	Yes	III		SHIL 46390
Fort Payne Chert	Corner Notched	Parallel	Barbed	Absent	2.70	0.498	Indeterminate	2.109	2.061	Yes	III		SHIL 39923
Upper Fort Payne Chert	Corner Notched	Excavate	Barbed	Absent	3.25	0.69	2.180	2.527	Indeterminate	Yes	II, Summit	Ia	SHIL 40525
Upper Fort Payne Chert	Corner Notched	Excavate	Barbed	Heated	3.84	0.57	3.27	Indeterminate	Indeterminate	Yes	II, Summit	Ic	SHIL 40717
Ledbetter Stemmed													
Upper Fort Payne Chert	Contracted Stemmed	Indeterminate	Asymmetrical	Absent	7.81	1.044	Indeterminate	1.305	2.532	Yes	I, Summit		SHIL 27815
Big Sandy													
Fort Payne Chert	Side Notched	Straight	Barbed	Absent	3.00	0.571	2.859	1.827	1.983	Yes	I, Summit		SHIL 22037
Clovis													
Fort Payne Chert	Unstemmed Auricular Parallel Rounded	Indeterminate	Indeterminate	Absent	1.28	Indeterminate	Indeterminate	2.19		Yes	I, Summit		SHIL 37218
Untyped													
Camden Chert	Indeterminate	Straight		Heated	0.82	0.366	Indeterminate	Indeterminate		Yes	Unknown		SHIL 40370

Material	Haft Form	Blade Form	Shoulder Form	Thermal Alteration	Weight (g)	Maximum Thickness (cm)	Maximum Length (cm)	Base Width (cm)	Shoulder Width (cm)	Examined for Wear	Mound Stage	Sub-stage	Catalog #
Camden Chert	Stemmed	Parallel	Horizontal	Heated	7.97	0.626	Indeterminate	Indeterminate	2.411	Yes	II, Summit	Ila	SHIL 39623
Fort Payne Chert	Indeterminate	Excavate		Absent	1.19	0.416	Indeterminate	Indeterminate		No	Apron, North Side		SHIL 25614
Fort Payne Chert	Indeterminate	Straight		Absent	0.22	Indeterminate	Indeterminate	Indeterminate		Yes	I, South Side		SHIL 37825
Fort Payne Chert	Stemmed	Excavate	Asymmetrical Horizontal Tapered	Absent	4.81	0.788	Indeterminate	Indeterminate	2.030	Yes	II, South Side	Ila	SHIL 39723
Pickwick Chert	Unstemmed Indeterminate	Incurvate		Heated	0.80	0.401	Indeterminate	Indeterminate		Yes	Unknown		SHIL 22606
Pickwick Chert	Unstemmed Straight	Straight		Heated	2.17	0.723	1.881	1.996		Yes	I, North Side		SHIL 26440
Tuscaloosa Gravel	Indeterminate	Excavate		Absent	3.10	0.503	Indeterminate	Indeterminate		No	I, North Side		SHIL 25811
Tuscaloosa Gravel	Indeterminate	Excavate		Heated	2.02	0.696	Indeterminate	Indeterminate		Yes	II, Summit	Ilb	SHIL 45866
Tuscaloosa Gravel	Indeterminate	Straight		Heated	1.18	0.422	Indeterminate	Indeterminate		Yes	III		SHIL 39707
Tuscaloosa Gravel	Indeterminate	Straight		Heated	1.31	5.17	Indeterminate	Indeterminate		No	I, Apron West		SHIL 20639
Tuscaloosa Gravel	Stemmed	Straight	Horizontal	Heated	13.50	0.93	Indeterminate	Indeterminate	3.144	Yes	II, Summit	Ila	SHIL 38959
Unidentified Chert	Expanded Stem Excavate	Indeterminate	Indeterminate	Absent	3.24	Indeterminate	Indeterminate	2.772	Indeterminate	Yes	II, Summit	Ilc	SHIL 42686
Unidentified Chert	Indeterminate	Excavate		Absent	1.10	0.348	Indeterminate	Indeterminate		Yes	I, South Side		SHIL 40032
Unidentified Chert	Indeterminate	Straight		Absent	0.80	0.388	Indeterminate	Indeterminate		No	I, South Side		SHIL 21589
Unidentified Chert	Indeterminate	Straight		Absent	0.88	0.365	Indeterminate	Indeterminate		Yes	II, Summit	Ilc	SHIL 42685
Unidentified Chert	Unstemmed Straight	Straight		Absent	0.47	0.258	1.521	Indeterminate		Yes	I, North Side		SHIL 25027
Unidentified Chert	Unstemmed Straight	Straight		Absent	1.20	0.338	Indeterminate	1.275		Yes	Unknown		SHIL 24284
Upper Fort Payne Chert	Indeterminate	Straight	Indeterminate	Absent	0.49	3.88	Indeterminate	Indeterminate		Yes	I, South Side		SHIL 20682

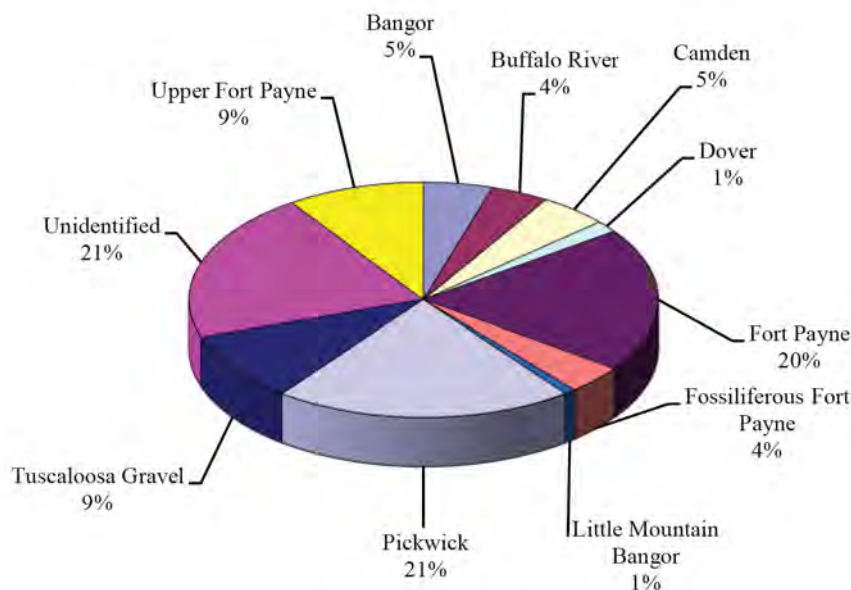


Figure 13-02. Raw material used in the production of projectile points found in the Mound A excavations.

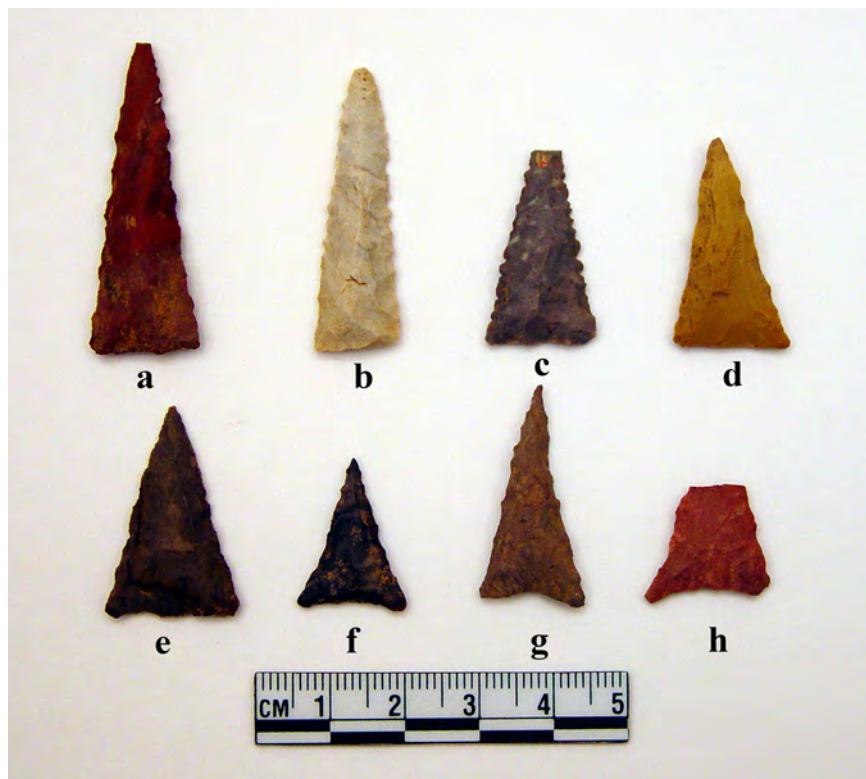


Figure 13-03. Assorted triangular projectile points found in the Mound A excavations. Fort Ancient: a (SHIL 36430), b (SHIL 42233), and c (SHIL 29200); Madison: d (SHIL 37413) and e (SHIL 43255); and Hamilton: f (SHIL 40263), g (SHIL 39818), and h (SHIL 46376).

indicating that this artifact may have been utilized for a task such as shaving wood.

Late Woodland / Mississippian Triangular Cluster

Eighteen projectile points (14 percent of the total assemblage) were assigned to this category, which represents a catchall for small to medium sized triangular projectile points that did not readily fit into an existing type (see Table 13-09). Two of these points exhibited evidence of having been utilized. One exhibited an impact fracture while the other (SHIL 37824) had received an impact fracture and was subsequently extensively reused, with moderate rounding continuous along both blade margins and heaviest at the tip, continuing over the impact fracture (see Figure 13-04; upper right). Moderate rounding indicates that the point was either utilized on a moderately resistant object such as wood or was not intensively utilized. Heavy rounding on the other hand indicates that the artifact was either extensively utilized or was used to work a highly resistant object, such as antler (C. Smith 2000).

Jack's Reef Corner Notched

Five Jack's Reef Corner Notched points were identified from the Mound A excavation assemblage (Figure 13-05:d-f; see Table 13-09). These are medium sized, corner notched points that are very thin, typically with a flattened cross section and a broad pentagonal shaped plan

Table 13-10. Projectile points and bifacial drills exhibiting evidence of use wear found in the Mound A excavations.

	Mound Stage	Mound Substage	Use Fracture	Microwear	Type
Madison					
SHIL 25050	I, North Side		Impact Fluting	Not Examined	
SHIL 24503	I, Summit			Present	Striations & Rounding
SHIL 30082	I, South Side			Present	Striations
SHIL 34566	I, Summit		Impact Fluting	Absent	
SHIL 35834	I, Summit		Impact Fluting	Absent	
SHIL 52178	III		Impact Fluting	Not Examined	
SHIL 38057	I, Summit		Impact Fluting	Absent	
SHIL 41379	II, Summit	IIa/IIc	Impact Fluting	Absent	
SHIL 35173	I, Summit		Impact Fluting	Absent	
Fort Ancient					
SHIL 45867	II, Summit	IIb	Impact Fluting	Absent	
SHIL 22025	I, Summit			Present	Polish
SHIL 20752	I, South Side		Impact Fluting	Not Examined	
Hamilton					
SHIL 41452	II, Summit	IIb		Present	Polish & Rounding
SHIL 28861	I, Summit			Present	Striations
Late Woodland / Mississippian Triangular Cluster					
SHIL 37824	I, South Side			Present	Rounding
SHIL 28194	I, Summit		Impact Fluting	Absent	
Jack's Reef Corner Notched					
SHIL 47024	III			Present	Striations
SHIL 46390	III			Present	Striations
SHIL 40525	II, Summit	IIc		Present	Striations
Untyped					
SHIL 39723	II, South Side	IIa	Impact Fluting	Absent	
SHIL 22606	Unknown		Impact Burination	Absent	
Bifacial Drills					
SHIL 35667	I, Summit			Present	Edge Rounding & Striations
SHIL 36191	I, Summit			Present	Polish & Edge Rounding
SHIL 39706	III			Present	Striations
SHIL 42231	Unknown			Present	Edge Rounding & Striations

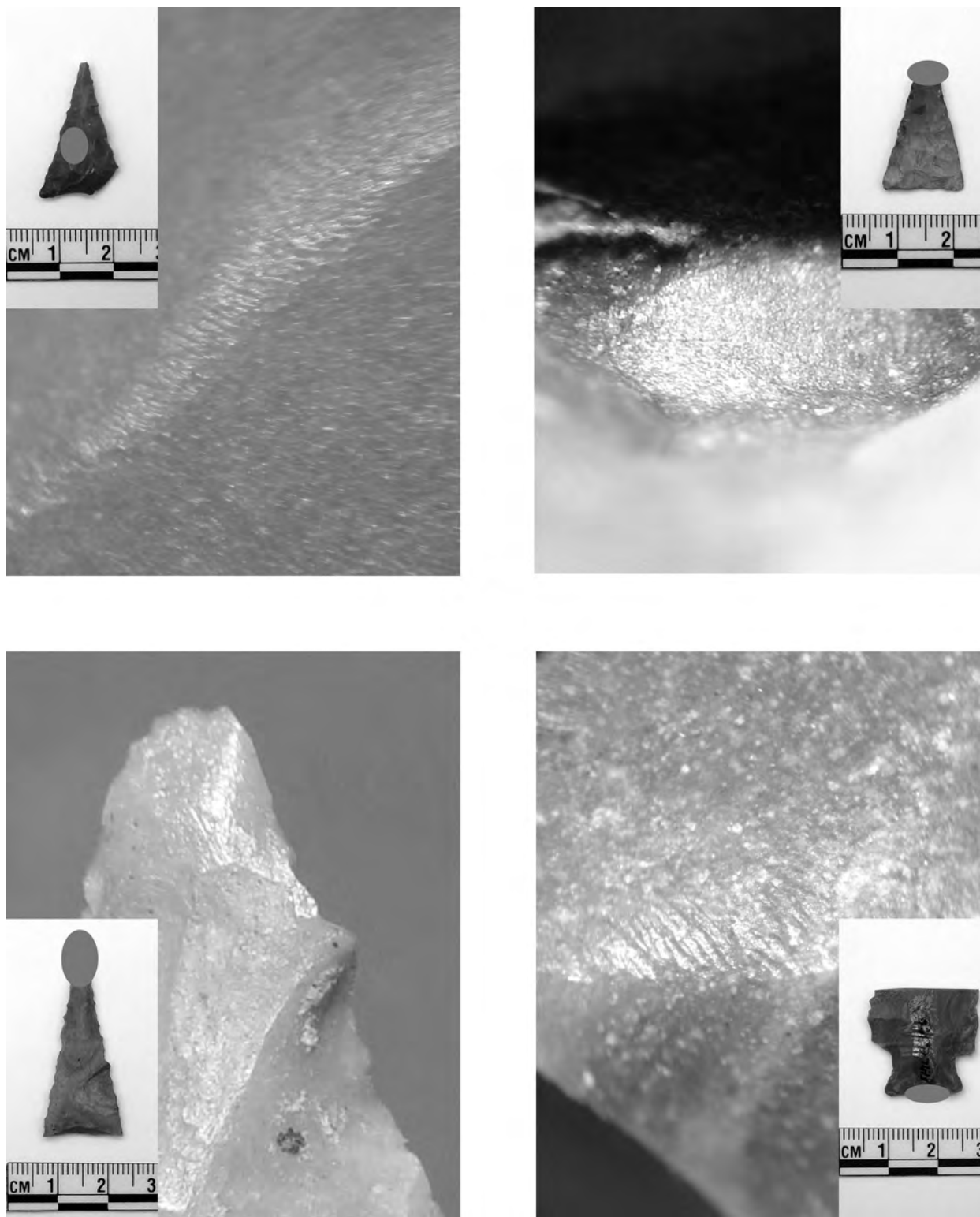


Figure 13-04. Examples of microscopic wear observed on projectile points found in the Mound A excavations. Upper Left (SHIL 28861): striations on Hamilton point (60x magnification), upper right (SHIL 37824): polish on tip of Late Woodland / Mississippian Triangular point (20x magnification), lower left (SHIL 22025): polish on tip of Fort Ancient point (10x magnification), Lower Right (SHIL 46390): hafting wear on Jack's Reef Corner Notched point (60x magnification).



Figure 13-05. Assorted projectile points found in the Mound A excavations. Ledbetter Stemmed: a (SHIL 27815); Big Sandy: b (SHIL 22037); Clovis: c (SHIL 37218); and Jack's Reef Corner Notched: d (SHIL 40717), e (SHIL 47024), and f (SHIL 39923).

view. Basal margins are typically straight, and are sometimes ground. The Jack's Reef type was originally identified from New York but are found throughout the Northeast and Great Lakes region, Tennessee, and into Alabama. The type occurs from the end of the Middle Woodland and into the Late Woodland period (Cambron and Hulse 1964:68; Justice 1987:215–219; Perino 1968:38). Four of the five points were produced from Fort Payne chert, with one having been thermally altered. The fifth

was produced from a non-thermally altered Dover chert. Three of the Jack's Reef Corner Notched points (SHIL 40525, SHIL 46390, SHIL 47024) exhibit evidence of hafting wear in the form of striations (see Figure 13-04, lower right).

Ledbetter Stemmed

One Ledbetter Stemmed point was found at the Stage 1 Summit (see Figure 13-05:a; see Table 13-09). The Ledbetter Stemmed is a large asymmetrical point with recurvate blade margins and a contracting stem. The most distinguishing characteristic of this type is its asymmetrical blade margins. They date to the Late Archaic period and are a diagnostic on sites of the Ledbetter phase (2500–1000 B.C.). They have been identified throughout the Southeast, and are common throughout the Tennessee River Valley (Bell 1960:66; Cambron and Hulse 1964:78; Justice 1987:149–150). The point recovered at Shiloh was produced from Upper Fort Payne chert and exhibited a biconvex cross-section and a thinned basal margin. No evidence for use wear was observed on the point.

Big Sandy

One Big Sandy projectile point was also found in the Stage I Summit fill (see Figure 13-05:b; see Table 13-09). These are medium sized side notched projectile points. In plan view Big Sandy points are typically an elongated triangle and often

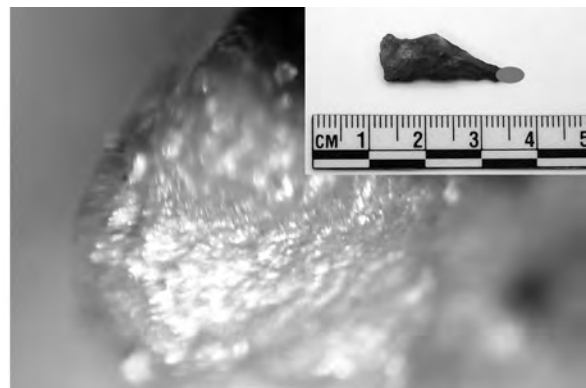
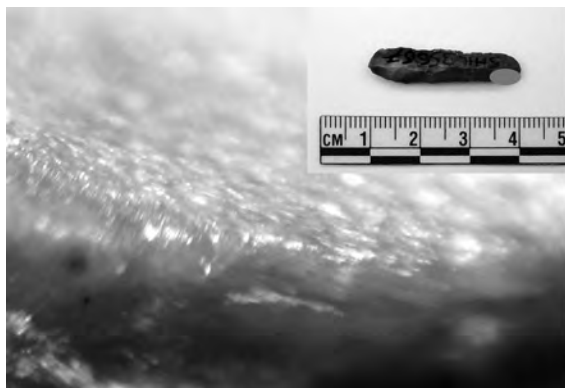


Figure 13-06. Examples of wear identified on drills found in the Mound A excavations viewed at a magnification of 60x. Left (SHIL 35667): edge rounding on bifacial drill. Right (SHIL 36161): polish and rounding on tip of bifacial drill.



Figure 13-07. Bone- and clay-working tools found in the Mound A excavations. Sandstone abrader: a (SHIL 26906), and burnishing stone: b (SHIL 47010).

exhibit either beveled or serrated blade margins. The basal margins range from straight to concave and are typically ground. These points are found throughout the Southeast where they form an Early Side Notched horizon dating to the Early Archaic period (Bell 1960:8; Cambron and Hulse 1964:14; Justice 1987:60-62). Justice assigned them a date range of 8000–6000 B.C. (1987:61). The projectile point found in Mound A exhibited a biconvex cross-section and a thinned basal margin, and was produced from Fort Payne chert. No evidence for use wear was observed on it.

Clovis

A Clovis projectile point base of Fort Payne chert was recovered from the Stage I Summit fill (see Figure 13-05:c; see Table 13-09). Originally identified at Blackwater Draw in New Mexico, the Clovis point is the earliest Paleoindian point type found widely in North America, dating to about 11,000 B.C. These are medium to large, fluted, lanceolate points with straight to incurvate bases and typically parallel sides. They may have single or multiple fluting, and are typically fluted on both faces. The flutes primarily extend to one-third



Figure 13-08. Chunkey stone (SHIL 46517) found in the Mound A excavations on the Stage IIb summit.

the length of the point, but may extend to close to the distal end. Clovis points have been found throughout North America (Bell 1958:16, Cambron and Hulse 1964:25-26, Justice 1987:17-21) with the highest concentrations occurring in the Southeast (Anderson et al. 2010). The basal fragment found at Shiloh has a pronounced transverse fracture a short distance up the blade, suggesting breakage while in use, as well as fine retouch along the margins. No evidence of wear was observed.

Bifacial Drills

A total of ten bifacial drills were identified from the Mound A assemblage. All of these artifacts were examined for use wear using the same methodology as for the projectile points. Four of the drills exhibited use wear (see Table 13-10), all with the characteristics one would expect to find with drills, specifically edge rounding, polish and striations oriented perpendicular to the edge margins, and in a circular pattern around the tip (Figure 13-06).

Assorted Additional Lithic Artifacts

A variety of additional lithic artifacts were recovered during the Mound A excavations (see Tables 13-01, 13-11). These included four sandstone abraders

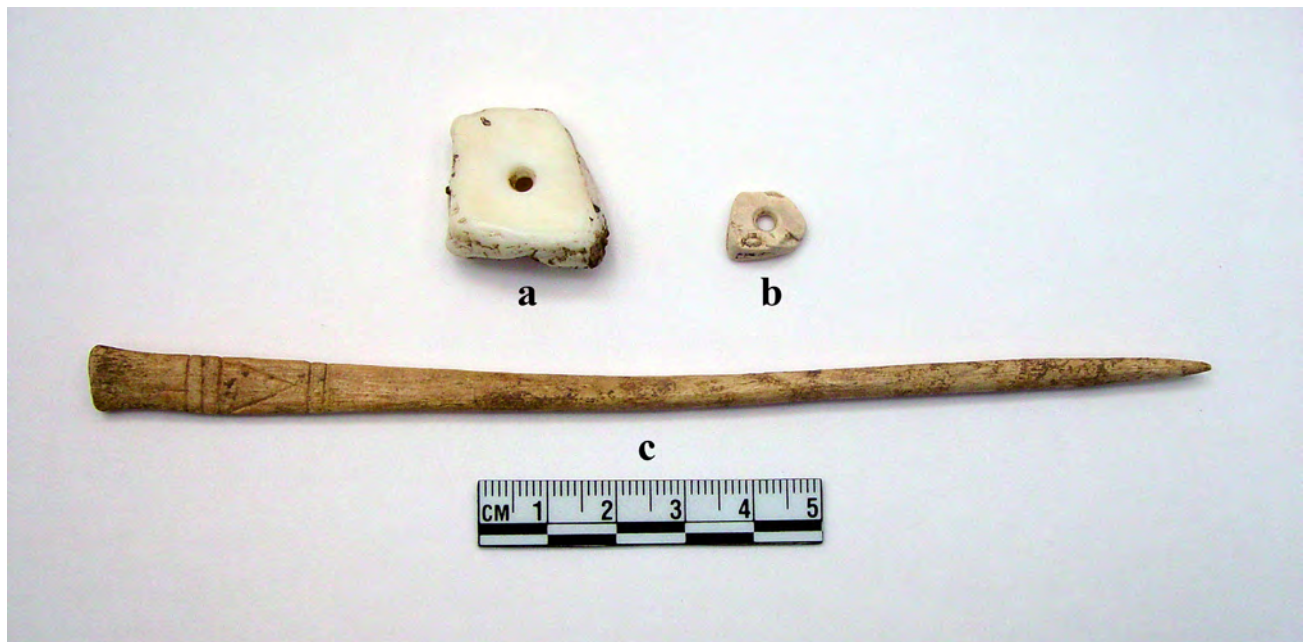


Figure 13-09. Decorated bone pin and drilled shell artifacts found in Mound A excavations. Drilled shell: a (SHIL 48429) and b (SHIL 47587); and decorated bone pin: c (SHIL 48191).

Table 13-11. Unusual prehistoric lithic artifacts found in the Mound A excavations.

Object	Manufacture Technique	Count	Weight (g)
Abrader	Ground	4	244.00
Bead	Drilled	8	3.47
Burnisher	Ground	1	56.00
Saw	Chipped	1	58.17
Stone, Chunkey	Ground	1	443.00
Stone, Worked	Drilled	2	19.41
Stone, Worked	Flaked	1	83.34
Stone, Worked	Ground	61	3121.16
Stone, Worked	Ground --Chipped	1	112.10
Stone, Worked	Polished	1	194.70
Total		81	4335.35

Table 13-12. Other unusual, nonlithic prehistoric artifacts found in the Mound A excavations

Object	Material	Count	Quantity	Weight (g)
Bead	Shell	2		9.42
Bone, Worked	Bone	1		6.10
Daub	Clay		254 bags	6,895.93
Discoidal	Clay	5		56.40
Fabric	Fiber		7 bags	1,227.50
Food, Plant	Flora Remains		2 bags	0.28
Hearth	Clay	1		200,000.00*
Hoe	Shell	3		170.75
Metal Fragment	Copper		1 bag	2.98
Pin	Bone	1		4.91
Pipe, Tobacco	Clay	3		25.44
Shell, Worked	Shell	2		44.80
Vessel Fragment	Clay		7 bags	118,253.90
		64,948		
Wood Fragment	Wood		1 bag	752.30

* = approximate weight (hearth removed en bloc)

Note: Bag refers to materials from specific proveniences that were typically weighed but not counted. Most of these are materials not suitable for counting.

(Figure 13-07:a), one burnishing stone (see Figure 13-07:b), eight stone beads produced from fossilized crinoid stems, and one sandstone saw blade. Like the saw blades recovered from Welch's 1999 excavations in Mound N (Welch 2001:105), the one found in Mound A was produced from a thin sheet of ferruginous sandstone. Burnishing stones are used to polish leather-hard clay vessels in order to produce a shiny black surface, such as those

found on the Bell Plain vessel fragments. One chunky stone was unearthed from the Stage IIb mound summit (Figure 13-08). Chunkey was played on an open field, with two players, who rolled the stone disc and then each threw spears to see whose would come closest to the resting place of the stone. This was a highly popular game throughout the Southeast during the Mississippian period and continued to be so into the Contact period, when its popularity was replaced by the hoop game (Hudson 1976:221-222, 421-425). Fifty-nine fragments of ground stone were also recovered in the excavation units. Although the majority of the

ground stone was too fragmentary to determine the original shape and/or function of the artifact, two small greenstone fragments were recovered from what appear be celts or other edged implements. The evidence suggests the use, storage, or manufacture of unusual artifacts was occurring on or near Mound A.

OTHER PREHISTORIC ARTIFACTS

In addition to the lithic artifacts recovered from the Mound A excavations a small assortment of artifacts of other raw materials were present in the assemblage (Table 13-12). One of the most the most impressive of these artifacts was a decorated bone pin recovered from Stage VI of the mound, near the base (Figure 13-09:c). This was probably produced from the fibula of a white-tailed deer, and has a linear decorative motif carved in its proximal end. Two shell beads (see Figure 13-09:a, b) and one shell bead blank were also recovered, also from the deepest strata within the mound, Stages V and VI. Several small fragments of copper were found beneath the gray platform, on the north end of the mound summit, on the Stage II summit in the vicinity of Structure 3. The copper was too fragmentary to determine whether it was manufacturing debris, or a fragment from a larger object (Figure 13-10). Pieces of charred woven material were recovered



Figure 13-10. A small piece of worked copper found in situ at the base of the Stage IIb-1 mound fill in N51 E179, 12 September 2003.

Table 13-13. Specialized samples collected during the Mound A excavations.

Sample Type	# of Samples	Weight (g)
Accelerated Mass Spectrometer	5	181.70
Archaeomagnetic	6	2,381.20
Carbon Fourteen -- Charcoal	10	1,891.28
Carbon Fourteen -- Shell	1	319.30
Charcoal	28	1,769.61
Fired Clay	1	68.10
Flotation	1,648	768,435.51
Micromorphology	147	n/a
Pollen	260	67,437.58
Soil	387	179,617.08
Soil Chemistry	254	64,513.88
Thermoluminescence	15	1,480.5

from several distinct locations within the mound, the analysis of which was conducted by James Adovasio and his colleagues at Mercyhurst College (see Chapter 19).

In addition to artifacts, a large number of samples were collected for use in a variety of analyses during the excavations at Mound A (Table 13-13). These included flotation, radiocarbon,

thermoluminescence, soil, pollen, soil chemistry, micromorphology, charcoal, and archeomagnetic samples (see Figures 03-11, 03-12, 03-17, 03-37, 03-62, 03-70, 03-74, 06-02, 06-08, 13-11). A total of 1,648 flotation samples were collected and processed over the five years excavating Mound A, including 621 from the arbitrary level excavations, 325 from floor or fill surfaces, and 664 from features. A variety of samples were also collected for use in different dating techniques (See Chapters 12, 15). These included radiocarbon samples collected of both charcoal and shell, as well as soil and fired clay samples for use in archeomagnetic and thermoluminescence dating (See Chapters 9, 12, and 15).

Preserved faunal material was also collected from the excavations, including white-tailed deer, assorted bird, rodent, opossum, and freshwater mussels (see Chapters 17 and 18) (Table 13-14). Faunal preservation increased dramatically with depth into the mound, with over two thirds of the assemblage by both count and weight recovered from Stages IV, V, VI, and VII. Stage IV was reached in only seven 1m units, and Stage's V, VI, and VII were examined in only four of 1m units. By comparison, Stage III was examined in 135 units, yet only ca. 19 percent of the faunal material recovered in the excavations by count and 11 percent by weight came from the units opened in the Stages I through III mounds. Given the small volume examined deep within Mound A, the amount of preserved material recovered was remarkable.

Additional detail on the prehistoric artifacts found during the excavations is presented in the chapters that follow.

HISTORIC ARTIFACTS

In addition to the prehistoric artifacts, a variety of historic artifacts were recovered during the excavations of Mound A (Table 13-15). These included objects dropped by visitors to the park (Figure 13-12), such as a Boy Scout neckerchief holder, as well as artifacts which relate to the Battle of Shiloh, such as three Minié balls, a J-hook from



Figure 13-11. Micromorphological block samples being collected from the Stage III Mound fill, 15 September 2003. (right) Sarah Sherwood (left) Ann Powell.

a soldiers knap-sack, a buck and ball combination, and a rifle or musket lock (Figure 13-13).

Table 13-14. Faunal material collected by major provenience during the Mound A excavations.

Stage	Count	% by Count	Weight (g)	% by Weight
	48	0%	106.38	0%
Apron South Stage I	29	0%	4.03	0%
Apron West Stage I	9	0%	16.00	0%
North Side Apron	3	0%	0.87	0%
Stage I Mound, North Side	141	0%	24.96	0%
Stage I Mound, South Side	225	1%	142.01	1%
Stage I Mound, Summit	230	0%	61.5	0%
Stage II Mound, South Side	49	0%	41.83	0%
Stage II Mound, Summit	808	2%	581.35	2%
Stage III Mound	1,074	8%	2,264.82	8%
Stages I/II/III Mounds	7	0%	2.99	0%
Stage IV Mound	256	1%	339.76	1%
Stage V Mound	3,031	25%	7,084.71	25%
Stage VI Mound	4,947	36%	10,035.13	36%
Stage VII Mound	647	9%	2,495.74	9%
Unknown	1,533	12%	4,673.34	17%
Totals	13,037	100%	27,875.42	100%



Figure 13-12. Boy Scout tour group visiting excavations at Mound A, 12 June 2002.

Table 13-15. Specific historic artifacts found during the Mound A excavations.

Object	Typology	Count	Quantity	Weight (g)
Asphalt Fragment		24		18.54
Asphalt Fragment --Shingle		20		6.63
Ball, Musket	Musket Ball	4		80.41
Band, Rubber		1		0.10
Bolt	Bolt	2		5.70
Bolt	Nut	1		23.60
Bottle	Container Glass	3		33.43
Brick			59 bags	305.06
Buckle		1		10.57
Bulb, Flash		1		1.55
Bulb, Flash	Miscellaneous Glass	1		0.36
Bullet	Jacketed	1		2.17
Bullet	Jacketed Hollow Point	1		2.41
Bullet	Non-jacketed	1		2.54
Bullet	Pistol Ball	1		7.16
Bullet	Pistol Bullet	2		16.05
Bullet, Minie	Non-jacketed Minie Ball	3		88.06
Button	Button, Single Component	2		1.52
Button	Button, Three Component	1		1.65
Button	Button, Two Component	1		0.38
Can		1		6.90
Cap, Bottle		1		3.09
Cap, Bottle	Closure, Crown Finish And Cap	25		39.56
Cap, Percussion		16		2.70
Case, Cartridge	Centerfire	3		4.15
Case, Cartridge	Rimfire	1		0.30
Cinder		13		4.54
Cloth Fragment		2		0.36
Coal Fragment			12 bags	23.62
Coin	Dime	1		2.19
Coin	Five Cent	3		14.88
Coin	Penny	4		11.29
Coin	Quarter Dollar	1		5.57
Comb		1		0.92
Fastener		6		13.88
Foil		24		3.29
Gauge, Net-mesh		1		0.64
Glass Fragment	Flat Glass	9		4.46
Glass Fragment	Indefinite Glass (insufficient Portion)	8		2.65
Gravel			30 bags	43,365.44
Grommet		1		0.11
Gum, Chewing		5		0.58
Hardware		7		171.70

Object	Typology	Count	Quantity	Weight (g)
Holder, Cigar		1		1.71
Holder, Scarf		1		6.45
Knapsack		1		9.97
Label		2		0.05
Letter		1		1.25
Metal Fragment			152 bags	437.24
Mirror	Flat Glass	2		0.84
Mortar			6 bags	29.72
Nail		50		97.96
Nail	Cut	65		102.28
Nail	Wire	139		381.57
Nail --tape	Wire	1		20.38
Nut		1		3.56
Paper		2		0.49
Pencil		5		0.79
Pick, Guitar		1		0.32
Pipe, Tobacco		1		0.10
Plastic Fragment		72		12.60
Pull Top		16		6.48
Rifle/musket		1		174.10
Rivet		4		2.28
Rubber Fragment		5		3.97
Scabbard		1		16.29
Screw		3		5.00
Shell, Shotgun	Centerfire	1		4.00
Shell, Shotgun	Shotgun	2		3.96
Shingle		16		2.53
Shoelace		1		0.38
Shot	Bb Shot	1		0.44
Shot	Buckshot	1		3.01
Slag			10 bags	7.68
Spike		1		240.40
Staple		9		27.69
Staple, Fence		2		7.50
Stone, Building		2		3.42
Tack		124		170.25
Tape		2		0.26
Tape, Paper		1		0.05
Tar Fragment		2		1.59
Tile		1		0.60
Twister, Wire		2		0.34
Unidentified			3 bags	2.31
Vessel Fragment	Container Glass	16		50.05
Vessel Fragment	Indefinite Glass	873		1,007.69

Object	Typology	Count	Quantity	Weight (g)
Vessel Fragment	Coarse Redware	2		2.66
Vessel Fragment	Untyped Refined Earthenware	26		51.50
Vessel Fragment	Refined Agateware	2		6.51
Vessel Fragment	Pearlware	2		0.83
Vessel Fragment	Purple Transfer Printed Whiteware	1		0.49
Vessel Fragment	Sepia Transfer Printed Whiteware	1		0.45
Vessel Fragment	Whiteware	65		106.70
Vessel Fragment	Stoneware	3		2.59
Vessel Fragment	Albany Slipped Stoneware	1		4.30
Vessel Fragment	Brown Salt Glazed Stoneware	3		14.16
Vessel Fragment	Salt Glazed Stoneware	20		65.67
Vessel Fragment	Untyped Coarse Stoneware	2		2.89
Windowpane	Flat Glass	8		5.01
Wire		78		327.49
Wire, Barbed		10		38.75
Wrapper		23		15.50
Total		1,883		47,785.76



Figure 13-13. Assorted Civil War related artifacts found in the Mound A excavations. Minié ball: a (SHIL 21547), buck and ball: b (SHIL 21574); and rifle / musket lock: c (SHIL 39410).

POTTERY FROM MITIGATION EXCAVATIONS AT MOUND A

PAUL D. WELCH

INTRODUCTION

All pottery from the 1999 to 2004 NPS excavation on and near Mound A at the Shiloh Mound Complex were shipped to SIUC for analysis. The questions addressed by the analysis focused on the vessel assemblage, pottery chronology, and origin of imported pottery. Prior to the excavation, it was hoped that questions about the activities carried out on mound summits could be addressed by examining the character of mound-slope refuse deposits. However, no such deposits were encountered in the excavations, and the mound summits and slopes were nearly barren of pottery. Few sherds were found on any surface, indicating that they had been swept of debris before being covered over. Thus, regrettably, the pottery that was recovered cannot be used to define activities on the summits of the Mound A stages. Almost all of the items available for analysis come from mound fill. They are items that were discarded somewhere else, presumably on the site, then later they and their matrix were dug up and redeposited to form the mound. It is not known where these pieces of pottery were originally discarded, let alone where they were originally used, hence it is not possible to reconstruct what portion(s) of the community made or used them. This severely constrains the nature of the questions that can be addressed by studying the sherds from the excavation assemblage. The constraints are exacerbated by the generally high degree of weathering of many of the sherds, which has removed the original exterior surface of many pieces. Without the original surface, it is not possible to tell whether these sherds came from local pots or whether they bore distinctive surface decoration indicative of nonlocal origins. In short, this is an assemblage consisting, for the

most part, of highly fragmented, badly weathered, redeposited sherds. However, there were surprises in the assemblage, and useful information was gleaned from it.

Prior to shipping the sherds, personnel at the SEAC in Tallahassee washed them and separated them based on whether they passed through ½-in mesh screen. At SIUC, the sherds that passed through a ½-in mesh screen were inspected only to ascertain whether handles or unusual decorative types were present; only in a handful of instances were such items included in further analysis. All sherds larger than ½-in were inspected and classified by the author. The classification used is the same as that used in Welch's (2006) synthesis of previous archeology at Shiloh, with the addition of some nonlocal types and varieties (extant in the literature) that did not occur in the samples reported there. There is one significant departure from the classification system used in the 2006 synthesis. In that work no distinction was made between varieties of grog-tempered pottery based on the color of the grog particles. In the present report, sherds which have grog particles nearly all of a white or light gray color were classified as *var. Obion* (whether Obion Plain, *var. Obion* or Mulberry Creek Cord Marked, *var. Obion*). This

Table 14-01. Condition of sherds analyzed from the Mound A excavations.

Condition	Counts	Percent
Classified sherds	16,060	24.73
Unclassified sherds, surface intact but not a recognized type	251	0.39
Unclassified sherds, eroded	2,101	3.23
Limestone tempered	(1)	
Sand tempered	(14)	
Grog tempered	(328)	
Grit tempered	(6)	
Coarse shell tempered	(1,386)	
Fine shell tempered	(366)	
Sherds <1/2"	46,541	71.65
Total Artifacts	64,953	100.00

distinction was made in order to assess whether there is any pottery in the mound fill that derives from the Obion site in northwest Tennessee.

The assemblage as a whole can be characterized as badly fragmented and extensively weathered (Table 14-01). Seventy percent of the sherds were small enough to pass through ½-in screen and hence were left untyped. An additional three percent had eroded surfaces that prevented assignment to types, although their paste characteristics were recorded. Only 25 percent (n=16,311) were potsherds sufficiently large and sufficiently unweathered to be potentially classifiable, though 251 (Table 14-02) of those could not be assigned to any recognized type. The 16,060 sherds that were assigned to named types or varieties are listed in Table 14-03, by count by type, together with the primary references for the taxa.

Weathering of the sherds is not uniform throughout the mound deposits. Several stratigraphic layers at and immediately above the base of the mound had better preserved sherds, with sharper edges and less-eroded surfaces. In these layers, shell-tempered sherds still had preserved shell in them, even at the surface of the sherd, a rarity in overlying deposits. It is therefore clear from the pottery that the majority of the mound was constructed of fill that included sheet midden in which the sherds had been extensively trampled, broken, abraded, and weathered. The basal deposits, however, contained much less degraded materials.

TYPOLGY

The majority of the named types and varieties used in this report were described in a previous report on the archeology of this site (Welch 2006:41–77), or in other references listed in Table 14-03. The following section describes only those types or varieties that require individual comment. Types are grouped together by their (predominant) tempering agent with the shell-tempered types first, followed by grit temper, grog temper, sand temper, limestone temper, fiber temper, and lastly the temperless category.

Table 14-02. Unclassified sherds with intact surfaces from the Mound A excavations.

Temper and Surface Treatment	Count
Limestone plain	1
Limestone incised	1
Sand decorated	1
Sand plain	12
Sand incised	2
Sand stamped	1
Grog plain	20
Grog burnished incised	1
Grog cord marked	1
Grog impressed	3
Grog incised	5
Grog punctated	1
Grit plain	19
Grit cord marked	3
Shell plain	45
Shell appliqued	1
Shell burnished	1
Shell burnished engraved	4
Shell burnished incised	4
Shell cord marked	6
Shell incised	50
Shell modeled	2
Shell painted	27
Shell punctated	1
Shell slipped	1
Fine shell plain	10
Fine shell burnished	1
Fine shell burnished engraved	4
Fine shell burnished incised	5
Fine shell incised	6
Fine shell painted	2
Fine shell slipped	2
Temperless plain	8
<i>Total</i>	251

Shell Temper

Kimmswick Fabric Impressed, var. unspecified

Two shell-tempered sherds with fabric impression on the exterior did not fit within the description of *var. Langston*. In both of them the paste included fine sand as well as numerous small nodules of

Table 14-03. Pottery sherds classified to type or variety from the Mound A excavations.

Type Variety	Count	Percent of Classified Sherds	Reference for Type or Variety
Alligator Incised, <i>var. unspecified</i>	1	.006	Phillips 1970:38
Avoyelles Punctated, <i>var. unspecified</i>	3	.019	Phillips 1970:41–43; Williams and Brain 1983:120–125
Baldwin Plain, <i>var. Chalk Bluff</i>	34	.212	Welch 2006:76
Baldwin Plain, <i>var. Lubbub</i>	1	.006	Jenkins 1981:123–126
Baldwin Plain, <i>var. Miller Slough</i>	39	.243	Welch 2006:76
Baldwin Plain, <i>var. unspecified</i>	6	.037	Jennings 1941:200
Barton Incised, <i>var. unspecified</i>	24	.149	Welch 2006:52–54
Baytown Plain, <i>var. McKelvey</i>	2,343	14.589	Welch 2006:68–69
Baytown Plain, <i>var. The Fork</i>	163	1.015	Welch 2006:68–69
Baytown Plain, <i>var. Tishomingo</i>	5	.031	Jenkins 1981:87–91
Baytown Plain, <i>var. unspecified</i>	73	.455	Phillips 1970:47–48
Bell Plain, <i>var. unspecified</i>	227	1.413	Welch 2006:54–56
Benson Punctated	2	.012	Heimlich 1952:21
Carthage Incised, <i>var. Summerville</i>	1	.006	Jenkins 1981:66–69; Steponaitis 1981:307, 311
Carthage Incised, <i>var. unspecified</i>	1	.006	Steponaitis 1981:307
Cormorant Cord Impressed, <i>var. Cormorant</i>	1	.006	Phillips 1970:77
Elk River Plain	1	.006	Faulkner 1968:58–65
Etowah Plain	46	.286	Wauchope 1966:70
Etowah Stamped	25	.156	Wauchope 1966:64–69
Evansville Punctated, <i>var. unspecified</i>	1	.006	Phillips 1970:78–81
Furrs Cord Marked, <i>var. Furrs</i>	2	.012	Cotter 1950:28
Furrs Cord Marked, <i>var. unspecified</i>	2	.012	Cotter 1950:28
Kimmswick Fabric Impressed, <i>var. Langston</i>	89	.554	Jenkins 1981:170; Welch 2006:56–57
Kimmswick Fabric Impressed, <i>var. unspecified</i>	2	.012	Phillips 1970:95
Kirby Incised	1	.006	Heimlich 1952:22
Mississippi Plain, <i>var. Shiloh</i>	7,423	46.220	Welch 2006:56–61
Mississippi Plain, <i>var. unspecified</i>	136	.847	Phillips 1970:130–131
Mound Place Incised, <i>var. unspecified</i>	5	.031	Welch 2006:61
Moundville Engraved, <i>var. Elliots Creek</i>	2	.012	Steponaitis 1981:314–316
Moundville Engraved, <i>var. unspecified</i>	7	.044	Steponaitis 1981:314; Welch 2006:61
Moundville Incised, <i>var. Moundville</i>	33	.205	Steponaitis 1981:324–325; Welch 2006:42–44, 62–64
Moundville Incised, <i>var. unspecified</i>	3	.019	DeJarnette and Wimberly 1941:83
Mulberry Creek Cord Marked, <i>var. Coffee Landing</i>	150	.934	Welch 2006:70–73
Mulberry Creek Cord Marked, <i>var. Mulberry Creek</i>	3,953	24.614	Welch 2006:70–73
Mulberry Creek Cord Marked, <i>var. Obion</i>	735	4.577	Garland 1992:72
Mulberry Creek Cord Marked, <i>var. unspecified</i>	22	.137	Haag 1942:518
Mulberry Creek Plain, <i>var. unspecified</i>	6	.037	Futato 1998:218–224; Peterson 1980; Welch 2006:75

Type Variety	Count	Percent of Classified Sherds	Reference for Type or Variety
Obion Plain, var. <i>Obion</i>	467	2.908	Garland 1992:64–65
O’Byam Incised, var. <i>unspecified</i>	1	.006	Phillips 1970:144
Owens Punctated, var. <i>unspecified</i>	1	.006	Phillips 1970:149
Owens Punctated, var. <i>Widow Creek</i>	1	.006	Phillips 1970:149; Williams and Brain 1983:193–196
Ramey Incised	1	.006	Griffin 1949:51; Griffith 1981
Salomon Brushed, var. <i>Fairfield</i>	1	.006	Jenkins 1981:102–103
Salomon Brushed, var. <i>unspecified</i>	1	.006	Phillips 1970:158–159
Salt Creek Cane Impressed, var. <i>unspecified</i>	7	.044	Welch 2006:65
Turkey Paw Cord Marked, var. <i>unspecified</i>	1	.006	Jenkins 1981:157–158; Welch 2006:76
Turkey Paw Plain, var. <i>unspecified</i>	8	.050	Jenkins 1981:161–162
Wheeler Check Stamped, var. <i>Edmonds Branch</i>	1	.006	Welch 2006:70–74
Wheeler Check Stamped, var. <i>Wheeler</i>	1	.006	Welch 2006:70–74
Wheeler Plain, var. <i>Wheeler</i>	1	.006	Haag 1942:513–514; Jenkins 1981:166–168
<i>Total Classified Sherds</i>	16,060	100.00	

hematite. These inclusions may naturally occur in the clay source used, rather than being intentional additions like the shell particles. Similar sand and hematite inclusions are present in some of the Mississippi Plain var. *Shiloh* pottery, as well as in the local grog-tempered ware.

Mississippi Plain, var. unspecified

Sherds whose paste differed from the shell- or shell-and-fine-sand tempering of var. *Shiloh* were left in the *unspecified* residual category. The most common reason for sherds to be thus categorized was the presence of grog particles in quantities sufficient to suggest they were intentional inclusions (n=65 of 136 sherds). The category also includes sherds with abundant small hematite nodules, and sherds with various other aplastic ingredients including bone, mica, grit, coarse sand. Many combinations of these ingredients are also found among the *unspecified* sherds. Additionally, this category includes several sherds with colors outside the usual range for var. *Shiloh* (e.g., mauve).

Moundville Engraved, var. Elliots Creek

The hallmark of this variety is the combination of engraved (actually fine, dry-paste, pre-firing incised) lines with excised or surface-roughened

zones on an otherwise burnished surface. Although this variety was defined at Moundville (Steponaitis 1981:314–316), the basic concept is widespread, with examples seen at places as far apart as the Caddoan region and the lower Chattahoochee river valley. It is likely that this method of decoration originated at Cahokia, inasmuch as it is found there both on pottery and in the Braden style of shell engraving (Brown 2004). Whether these two small sherds are from an imported vessel(s) is impossible to tell simply by visual inspection. The two sherds of var. *Elliots Creek* from Mound A are weathered almost to the point of obliterating the difference between the burnished and excised surfaces; there may well have been more sherds of this variety that have passed that point and are now lumped in the “fine shell-tempered eroded” category.

O’Byam Incised, var. unspecified

The O’Byam Incised type was defined on pottery from the lower Mississippi valley (Phillips 1970:144), but application of this name is not intended as an attribution of the sherd’s origin. The one sherd recovered in the excavations has dry paste incision on the smoothed but not burnished interior of a plate of shallow pan. It is too small to determine the motif.

Ramey Incised

One sherd (Figure 14-01) from Mound A is, at first glance, a portion of a Ramey Incised pot. It has the overall shape, and the broad, trailed incision of Ramey, and the motif is found on many Ramey pots. The Ramey Incised pottery style developed in the American Bottom. However, the pot this sherd comes from may not have been made in the American Bottom, even though it was clearly intended to look like a Ramey Incised pot. To ascertain whether the pot was of local or American Bottom origin, thin-section analysis was performed by James Stoltman, who has expertise in the compositional analysis of American Bottom pottery. Stoltman's thin-section analyses are presented in Chapter 15, but here it suffices to say that while the result was not definitive it is likely that this piece of pottery was made locally.

Grit Temper*Etowah Plain*

Sherds with paste similar to the Etowah Stamped sherds (see below), but which either had plain surfaces or surfaces that erosion had made to appear plain (n=46) were classified as Etowah Plain (Wauchope 1966:70).



Figure 14-01. Ramey Incised-like potsherd (SHIL 51563) from the Mound A excavations. (N45 E181, EU57, Lv16, Stage IIa/IIc Mound, Summit)

Etowah Stamped

One of the big surprises in this assemblage was the presence of unmistakable examples of Etowah Stamped pottery (Wauchope 1966:64–69). Twenty-five sherds had complicated stamp designs on their exterior surfaces. Most were too small to distinguish what the design was, but on two the design was the distinctive ladder-based diamond (Figure 14-02) motif of Etowah Stamped. Macroscopically, all the complicated stamped sherds as well as a set of plain sherds (see above) had similar paste, with abundant, sharply angular grains of metamorphic minerals. Thin-section analysis (see below and Chapter 15) of three of these sherds confirms an exotic origin somewhere in the region where Tennessee, North Carolina, and Georgia meet.

Grog Temper*Avoyelles Punctated, var. unspecified*

One sherd was recovered from the excavations and is illustrated in Figure 14-03. The zoned punctations fit within the definition of Avoyelles Punctated, but the sherd itself does not clearly fit within any of the named varieties (Phillips 1970:41–43; Williams and Brain 1983:120–125).



Figure 14-02. Etowah Stamped potsherd (SHIL 51745) with ladder-based diamond motif from the Mound A excavations. (N49 E183, EU164, Lv8, ZnD, Stage IIb Mound, Summit)

Cormorant Cord Impressed, var. Cormorant

One sherd was found in the excavations that fits easily into the *Cormorant* variety of this type, as defined by Phillips (1970:77) (Figure 14-04). Whether or not it actually comes from the northwest Mississippi/Yazoo basin homeland of the type cannot be told without compositional analysis. Because this is an Early Woodland type long antedating the construction of Mound A, this sherd was not among those selected for thin-sectioning.

Mulberry Creek Cord Marked, var. Obion

Grog-tempered, cord marked sherds that had white or light gray aplastic particles were classified as *Mulberry Creek Cord Marked, var. Obion* (Garland 1992:72). Thin-section analysis of three sherds, conducted by Stoltman (see Chapter 15), suggests that these sherds do not come from the Obion site.

Obion Plain, var. Obion

The Obion site in northwest Tennessee was occupied at the same time as the Shiloh Mound Complex. Though not in the Tennessee drainage, Obion is only 16km from the Tennessee River, and movement of goods as well as people between the two sites is

certainly a possibility. Obion pottery is often called “grog-tempered” but the temper particles are not crushed potsherds, which is the usual sense of “grog” as archeologists use the term. Obion is near a source of kaolin clay, and it is crushed chunks or lumps of the raw clay that are used as tempering. Being devoid of iron, the kaolin chunks remain white or light gray during firing. In planning this pottery analysis, it was decided that those sherds in which the “grog” particles were white or light gray would be sorted out from other grog-tempered sherds, in order to investigate the possibility that they might be Obion pottery. Accordingly, grog-tempered plain sherds in which the majority of temper particles, throughout the sherd (both faces and the core), were white or light gray were called *Obion Plain, var. Obion*. Similarly, grog-tempered cordmarked sherds with white or light gray temper particles were called *Mulberry Creek Cord Marked, var. Obion*.

Based on the published descriptions (Garland 1992:63–65; Kneberg 1952:195; Stoltman 1992), it appears that few if any of the Shiloh sherds are really Obion material. In nearly all the sherds from Shiloh that have white or light gray temper



Figure 14-03. *Avoyelles Punctated, var. unspecified* potsherd (SHIL 51012) from the Mound A excavations. (N50 E179, EU114, Lv4, ZnD, Stage IIc Mound, Summit)



Figure 14-04. *Cormorant Cord Impressed, var. Cormorant* potsherd (SHIL 52333) from the Mound A excavations. (N54 E183, EU152, Lv11, Stage III Mound)

particles, the particles are crushed sherds rather than the “nodules of white or buff fired clay” (Garland 1992:63) found in the Obion site material. Most grog-tempered sherds at Shiloh have at least a few light-colored temper particles, and the fraction of particles that are light varies continuously from nil to all. The Late Woodland grog-tempered pottery in this region is fired in poorly controlled conditions, resulting in enormous color variation within an individual vessel. Thus, in different parts of a single vessel, the temper particles may be all dark, or all white, or white on the interior half of the sherd but dark on the exterior, or vice versa. The nominally *var. Obion* sherds appear to be merely one extreme of this continuum. Macroscopically, other paste characteristics of the presumably local sherds match the characteristics of the nominally *Obion* sherds. For example, a minority of the presumably local sherds have small amounts of fine sand and small hematite nodules, and roughly the same percentage of the nominally *Obion* sherds also have fine sand and small hematite nodules (though sand may occur in some of the clays used by Obion potters, hematite is not described as being present in the Obion site pottery; Stoltman [1992]). Although 1,202 sherds (plain and cordmarked combined, 7.5 percent of the assemblage) were classified as *Obion*, only 5 sherds were noted as being close matches to the description of pottery from the Obion site. Two of those five are among the six nominally *Obion* sherds selected for thin-section analysis by Stoltman. A principal goal of the thin-section analysis was to assess whether the nominally *var. Obion* sherds really do resemble the Obion site material. Having previously sectioned pottery from the Obion site (Stoltman 1992), Stoltman was optimally qualified to help sort out this issue. His results indicate that the Shiloh, *var. Obion*-like sherds were likely locally produced (see Chapter 15)

Sand Temper

Baldwin Plain, var. unspecified

These few sherds (n=6) do not fit comfortably in any of the named varieties of Baldwin Plain, due to the presence of mixed tempering agents. For

example, one sherd had mixed fine and coarse sand, one sherd has sparse grog particles as well as sand, and yet another has both dark and light sand grains and wiped surfaces are similar to the “salt and pepper” appearance of Autauga Plain pottery (Jenkins 1981:126).

Furrs Cord Marked, var. Furrs (see Cotter 1950:28)

One of the two *var. Furrs* sherds is a rim that was thickened by a strip of clay added on the exterior, giving the appearance of a collar.

Significance of the Types Present

The vast majority of the pottery recovered in the excavations in Mound A is Late Woodland to Mississippian in age. Earlier components are represented by the fiber-tempered Wheeler Plain sherd and a few limestone-tempered sherds. The Turkey Paw series sherds have sparse bone as well as other tempering agents, and if their ages are the same as the Turkey Paw series pottery in the Tombigbee valley they date to around A.D. 400–600. But over 99 percent of the classified sherds are of Late Woodland or Mississippian types.

Not surprisingly, the vast majority of the pottery appears to be of local manufacture, at least to the extent that one can assess origin by macroscopic paste characteristics. This is especially true for the Late Woodland pottery. Most, if not all, of it appears to have been made locally. Possibly nonlocal wares include a few sherds tempered with sand or grog-and-sand (e.g., *Furrs Cord Marked*, Baytown Plain *var. Tishomingo*), which may come from northeast Mississippi or the upper Tombigbee drainage. Elk River Plain pottery, tempered with crushed chert, is native to south central Tennessee and the Elk River valley in north central Alabama. The distinctive Cormorant Cord Impressed pottery is most abundant in northwest Mississippi, although there is nothing about the paste of this sherd that indicates an origin outside the Shiloh area. The Late Woodland residents at Shiloh do not appear to have been well traveled, or if they did travel they were not very acquisitive.

More travel is evident in the Mississippian pottery, though here too the frequency of nonlocal pottery is low. One set of sherds that is surely nonlocal is the Etowah Stamped and Etowah Plain material. The metamorphic minerals in the temper of the Etowah Plain and Stamped indicate an origin in the zone where Etowah Stamped pottery is common: northwest Georgia, eastern Tennessee, or western North Carolina.

Some of the Mississippian sherds could come either from nonlocal pots or from local copies of nonlocal pots. One sherd that is probably local despite its exotic appearance is the Ramey Incised sherd (see Figure 14-01). Though the carinated jar shoulder and the broad-trailed motif are clearly imitations of Ramey Incised pottery from the American Bottom, the paste characteristics are more similar to local pottery than to pottery from the American Bottom. This appears to be a local “knockoff” of a Ramey pot, albeit a very good imitation. Several sherds classified as Moundville Engraved may well have come from Moundville, but the clays used at Moundville and at Shiloh are not visually distinct. Communication between Moundville and settlements along the Tennessee River just upriver from Shiloh in the Pickwick Reservoir are well attested (Welch 1991:183–190, 2006:261–262), so it would not be surprising if there was traffic between Moundville and Shiloh.

The picture of Shiloh’s relations with neighboring societies should not be based only on the nonlocal pottery that is present. The other half of the picture is what is absent—regions of the Mississippian world whose distinctive pottery is not represented in the Shiloh assemblage. The poor condition of the pottery in Mound A should lead to skepticism about apparent absence of materials, but based on the available evidence several sorts of pottery are rather conspicuously absent. There is no Mississippian pottery that is definitely from the lower Mississippi valley nor from the Caddoan region, none that appears to come from the Nashville basin, and none that indicates an origin near the Gulf Coast. The pottery at Shiloh reveals a nexus of contacts from northwest (Cahokia) to southeast (Etowah and possibly Moundville), but

not to the northeast or southwest. What makes this notable is the nearby presence of the overland route(s) of the Natchez Trace, running northeast to southwest. Either the Natchez Trace was not much traveled during the time of the occupation at Shiloh, or the travelers were not welcome at this site.

VESSEL ASSEMBLAGE

The grog-tempered vessel assemblage includes few basic shapes, with only jars and bowls represented. Most bowls are either hemispherical or beaker-like with fairly straight sides and flat or rounded bases. A few restricted bowls are also present, and there was at least one bowl with a Lower Valley-like carinated shoulder. Most jars have little outward flare above the neck, and they have either rounded or flat bases; no conical bases are present in the assemblage. The grog-tempered jars did not have handles. Jars and bowls both tend to be cordmarked (70 percent and 67 percent of rims, respectively), and other decoration is exceedingly rare.

The shell-tempered vessel assemblage is more diverse. The Mound A pottery includes sherds from: subglobular jars, which may be either plain or have wet-paste incised decoration, and at least some jars had handles; hemispherical bowls, both plain and burnished; plain restricted bowls; a burnished short-necked bowl or restricted jar; a burnished carinated bowl; outslanting and shallow flaring-rim bowls, both plain and burnished; plates; pans with plain, fabric-impressed, or mat-impressed exteriors; burnished slender ovoid bottles sometimes with engraving; a burnished hooded bottle; both burnished and painted narrow-neck or carafe bottles; a burnished collared bottle; and burnished wide-mouth bottles both plain and engraved. There was also a burnished, engraved pedestal base from a bottle of some sort. Clearly the foodways of the people who used shell-tempered pottery were more complex than those of the users of grog-tempered pottery.

Vessel orifice data have been used by a number of researchers in the Moundville area and elsewhere (e.g., Blitz 1993a; Holland 1995; Maxham 2000; Pauketat et al. 2002:269; Potter 2000:485–487; Taft 1996; Welch and Scarry 1995) to assess the

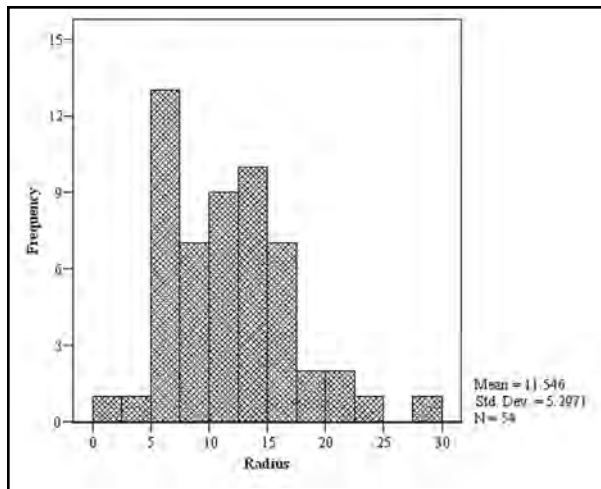


Figure 14-05. Histogram of jar orifice radii from the Mound A excavations.

activities in mound and ceremonial contexts and to assess the social status of the participants in those activities. Because the sherds from Mound A derive from fill that was moved to Mound A from unknown locales, it is not feasible to carry out such an investigation here. However, for the sake of providing baseline information about pottery at the Shiloh Mound Complex, vessel orifice radii were estimated, when possible, by visually matching an oriented rim sherd to a template sheet with arcs of known radius. Vessel orifice radii could be estimated from only 10 grog-tempered sherds: one indeterminate vessel shape (4cm); one jar (8cm); one restricted bowl (7cm); and seven bowls (1.5, 2, 3, 4, 5, 6, and 10cm). A larger sample (n=91) was available for the shell-tempered pottery. Vessel orifice radius data for four shapes of shell-tempered pottery are shown in Figures 14-05 to 14-08 (no other vessel shapes had more than one measurable rim apiece). Two aspects of the size data deserve comment. First, the histograms include bowls and jars that are clearly “miniatures,” with radii below 5cm. The functions of such miniatures in Mississippian societies are not known, though Carey’s (2005) analysis of miniatures in the lower Ohio valley area refutes the notion that many of them were “toy pots” made by children. Second, the histograms do not include some very large bowls and jars with radii so large that they could not be estimated by curve-fitting. The orifice radii

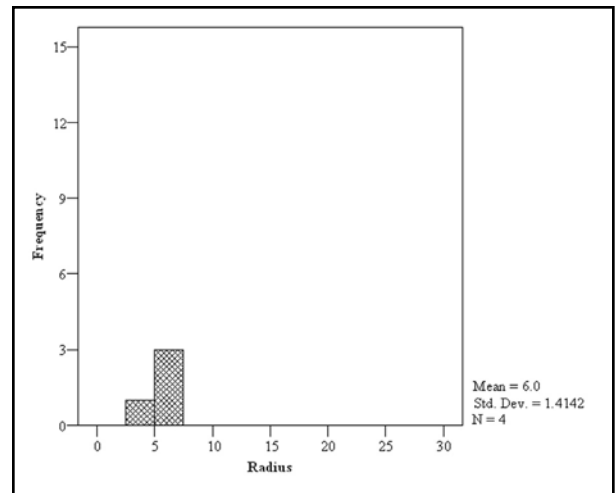


Figure 14-06. Histogram of bowl orifice radii from the Mound A excavations.

of small vessels can be estimated with even small sherds, but for very large vessels the typically small sizes of Mound A sherds usually only allowed the notation that their radii were greater than 20cm. No other studies of pottery in the northwest Alabama/northeast Mississippi/west Tennessee region have quantified the sizes of vessels, so there are no local assemblages that these histograms can be compared to. However, future studies will be able to make use of the information published here.

CHRONOLOGY

An important part of the pottery study is chronology, both what can be observed about the changes in pottery-making over time and what these changes tell us about the age of Mound A. The sources of chronological information include comparison with dated assemblages elsewhere, and absolute dating of some of the Mound A sherds. None of the styles of decoration on the Mound A pottery indicate dates after A.D. 1300, a finding consistent with the analysis of pottery from previous excavations at Shiloh (Welch 2006:42–52). This conclusion relies on the assumption that it is appropriate to compare the Shiloh pottery with dated assemblages from northeast Mississippi and the northern and central parts of Alabama, rather than with the Memphis area. Recently reported work at the Chucalissa site (Franklin et al. 2005; Sharp 2005) securely dates the first appearance of Barton Incised and Matthews

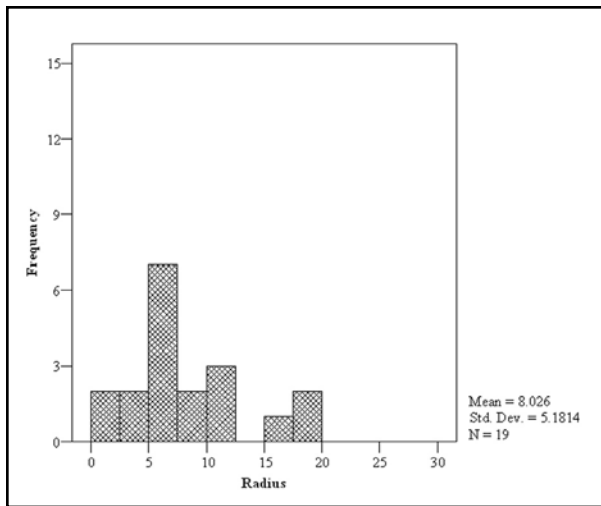


Figure 14-07. Histogram of restricted bowl orifice radii from the Mound A excavations.

(Moundville) Incised after A.D. 1300 at that site, a finding dramatically at odds with the chronology of these styles south and east of Shiloh. It is beyond the scope of this report to address the reason for this disjuncture between the chronology of pottery styles, but the results from Chucalissa reinforce Welch's (2006:42–45) earlier contention that the stylistic affinities of Shiloh pottery lie to the south and east rather than to the west. Decorative styles, however, are not the only source of chronological information provided by the pottery.

The shapes of the shell-tempered vessels are chronologically informative, both in terms of what is present and in terms of what is absent. All of the shapes present in the Mound A assemblage are known to be present at Mississippian sites in this region before A.D. 1350. Shapes that would indicate later dates, such as hemispherical bowls with beaded rims, neckless jars, and deep flaring-rim bowls, are not present. This matches the information from the pottery decoration.

The shapes of shell-tempered jar handles are also chronologically informative. Figure 14-09 (top) displays the ratios of top width to bottom width and width to thickness for the handles in the Mound A assemblage. The second graph, Figure 14-09 (bottom), is reproduced from Welch (2006:46). It shows the same handle shape ratios for handles in the collection from the 1933–1934 excavations at Shiloh, compared with handle shape

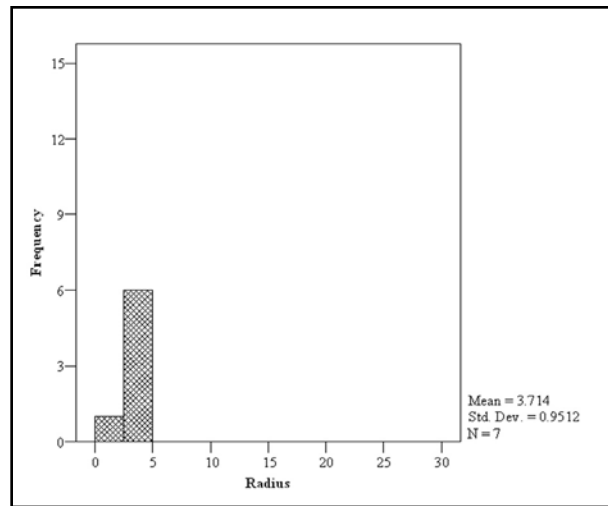


Figure 14-08. Histogram of bottle orifice radii from the Mound A excavations.

ratios for handles of known date from Moundville (Steponaitis 1981:122). The Mound A handles, like the handles from earlier excavations at Shiloh, match the Moundville I and II handles, and have little overlap with the handles from Moundville III. This also suggests a date prior to A.D. 1350. Gratifyingly, all the shape and style indicators lead to the same conclusion about the date of the latest pottery in the mound. The chronology of the early end of the mound's pottery, however, is a more complex issue.

Assessing what the pottery tells us about the beginning of mound construction inevitably raises the issue of the extent of chronological overlap between grog-tempered pottery and shell-tempered pottery. Both wares are both found in all stages of the mound fill, but this tells us more about the source of the fill than it does about the relative chronology of the two wares. As explained elsewhere (Welch 2006:49–52), assessing the amount or extent of the chronological overlap of these two pottery wares has proven remarkably vexing, though Jackson (2004) has recently provided important new information from central Alabama. Dating the grog-to-shell transition across the Southeast has been a focus of research for James Feathers (2009; Feathers and Peacock 2008), Director of the Luminescence Dating Laboratory at the University of Washington. Because luminescence dating assesses the age of sherds themselves, rather than relying on arguments that relate age assessments on other materials

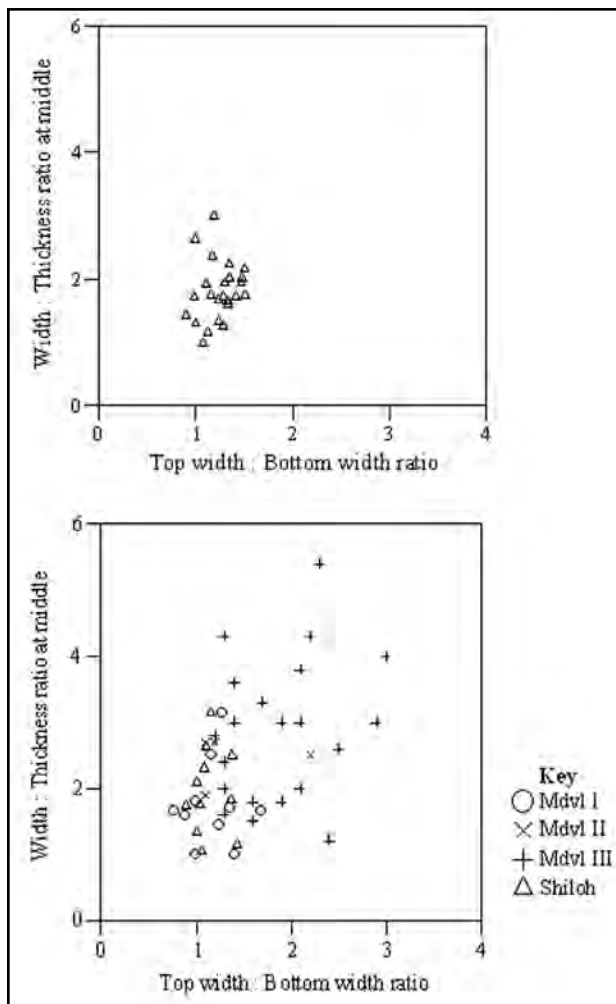


Figure 14-09. Handle shape ratios from the 1999-2004 Mound A excavations at Shiloh (top), and from Moundville [after Steponaitis 1981:122] and the 1933-1934 excavations at Shiloh (bottom).

to the ages of associated sherds, luminescence dating holds promise for resolving this issue.

To help resolve the dating of the grog-to-shell transition at Shiloh, seventeen sherds (Table 14-04) were selected from the Mound A assemblage and sent to Feathers for luminescence dating analysis. Only ten of them come from samples that were collected in the field explicitly for luminescence dating purposes. Such samples each include one sherd and associated sediment, ideally sediment that lay within 10cm of the sherd. Fifteen such samples were collected, from a total of five proveniences (two post holes, two excavation levels, one profile). All the sampled proveniences

are in the lowermost portions of the mound (Stage VI or below). Several of the sherds proved to be too small for dating purposes. However, it was possible to “match” some of the luminescence sediment samples with larger sherds obtained from screening or flotation samples of the same provenience. Estimating dates for these “matched” sherds (sherds that did not have directly associated sediment samples) assumes that there is little variation in the radiological properties of the sediment within a feature or within a layer. As it turns out, there is very little radiological difference between any of the sediment samples, which suggests that the accuracy of the estimated ages for the “matched” sherds is probably the same as for those sherds that had directly associated sediment samples.

The luminescence results (Figure 14-10) mostly fall in the A.D.800-1100 interval, which is puzzlingly early. Few archeologists will be surprised to see A.D.800-1000 estimates for the grog-tempered sherds in Figure 14-10, but many will be surprised to see similar estimates for shell-tempered pottery. Throughout this portion of the Southeast, shell-tempered pottery has been thought to post-date A.D.1000 or 1050 (see discussion in Welch 2006:42-52). At face value, the Shiloh dates argue that there was a period of 2-300 years during which both shell-tempered and grog-tempered pottery was produced. Although many archeologists may be comfortable with that conclusion, there is little evidence in support of that period beginning prior to A.D.1000. It is safe to say that these luminescence results have not settled the issue of when shell-tempering began to be adopted in this region.

Meanwhile, the luminescence estimates have not contributed much information about the date of the mound stages, as all but one of the estimates is significantly earlier than the stage dates derived from the radiocarbon assays. The one exception is a grog-tempered sherd in Mound Stage VII that was dated to A.D. 1260 $\pm$ 67, an estimate that is surely erroneous. That the sherds are generally earlier than the date at which the fills were emplaced is to be expected, because items in mound fill must be older than the date at which the fill was emplaced.

Table 14-04. Sherds selected for luminescence dating analysis from the Mound A excavations.

FS #	Mound Stage	Excavation unit	Description	Sediment sample	UW lab number, date
2802.7	IIa	N53 E180 Level 7 Zone E	Baytown Plain var. <i>McKelvey</i>	No	UW1219, A.D. 978 ± 186
2802.9	IIa	N53 E180 Level 7 Zone E	Mulberry Creek Cord Marked var. <i>Mulberry Creek</i>	No	UW1220, A.D. 874 ± 64
4544	VI	N38 E184 Level 11	Mississippi Plain var. <i>Shiloh</i>	Yes	UW 1230, A.D. 1068 ± 75
4545	VI	N38 E184 Level 11	Mississippi Plain var. <i>Shiloh</i>	Yes	UW1231, A.D. 1005 ± 58
4535	VI	N38 E184 Level 11	Mulberry Creek Cord Marked var. <i>Mulberry Creek</i> hemispherical bowl rim	Yes	UW1225, A.D. 869 ± 184
4536	VI	N38 E184 Level 11	Mississippi Plain var. <i>Shiloh</i>	Yes	UW1226, A.D. 610 ± 164
4549	VI	N38 E184 Level 12	Mississippi Plain var. <i>Shiloh</i>	Yes	UW1233, A.D. 1000 ± 64
4457.3	VI	N40 E184 Level 19	Mississippi Plain var. <i>Shiloh</i>	No	UW1222, A.D. 993 ± 75
4457.3	VI	N40 E184 Level 19	Bell Plain var. unspecified	No	UW1235, A.D. 984 ± 89
4457.3	VI	N40 E184 Level 19	Mulberry Creek Cord Marked var. <i>Mulberry Creek</i>	No	UW1223, A.D. 979 ± 61
4457.3	VI	N40 E184 Level 19	Mulberry Creek Cord Marked var. <i>Mulberry Creek</i>	No	UW1224, A.D. 882 ± 142
4457.3	VI	N40 E184 Level 19	Mississippi Plain var. <i>Shiloh</i>	No	UW1221, A.D. 870 ± 159
4548	VI	N38 E184 Level 12	Mississippi Plain var. <i>Shiloh</i> jar rim	Yes	UW1232, A.D. 837 ± 153
4552	VI	N38 E184 Level 12	Baytown Plain var. <i>McKelvey</i>	Yes	UW1234, A.D. 503 ± 118
4539	VII	N40 E184 Level 20, Fea. 605	Mulberry Creek Cord Marked var. <i>Mulberry Creek</i>	Yes	UW1227, A.D. 1260 ± 67
4542	VII	N40 E184 Level 20, Fea. 605	Mulberry Creek Cord Marked var. <i>Mulberry Creek</i>	Yes	UW 1228, A.D. 1096 ± 56
4543	VII	N40 E184 Level 20, Fea. 605	Baytown Plain var. <i>McKelvey</i>	Yes	UW1229, A.D. 462 ± 158

THIN-SECTION ANALYSIS

Several sherds were thin-sectioned and analyzed by Stoltman, as described in Chapter 15, in order to help identify their origin. Most of the Shiloh pottery, whatever its tempering, appears to be of local manufacture. That is, nothing about the macroscopic character of the paste, the vessel form, or the decorative treatment suggests a nonlocal origin. However, a few sherds may be of Moundville (or Moundville-area) origin, one is from either an American Bottom Ramey Incised pot or a good local copy of one, and a handful of complicated-stamped sherds are of a style native

to the north Georgia/east Tennessee/western North Carolina region. The Moundville connection is the least certain of these, because sourcing studies have not been conducted on the sherds and because Moundville is not the only place where their beautifully burnished, deep black surface and carefully controlled engraving could have been produced. These possible Moundville sherds are too small to distinguish the decoration's motif, but one is the engraved-and-excised pedestal of a pedestal-based bottle. For the Ramey Incised sherd and the complicated-stamped pottery, thin-sectioning provides clearer evidence of provenance. There

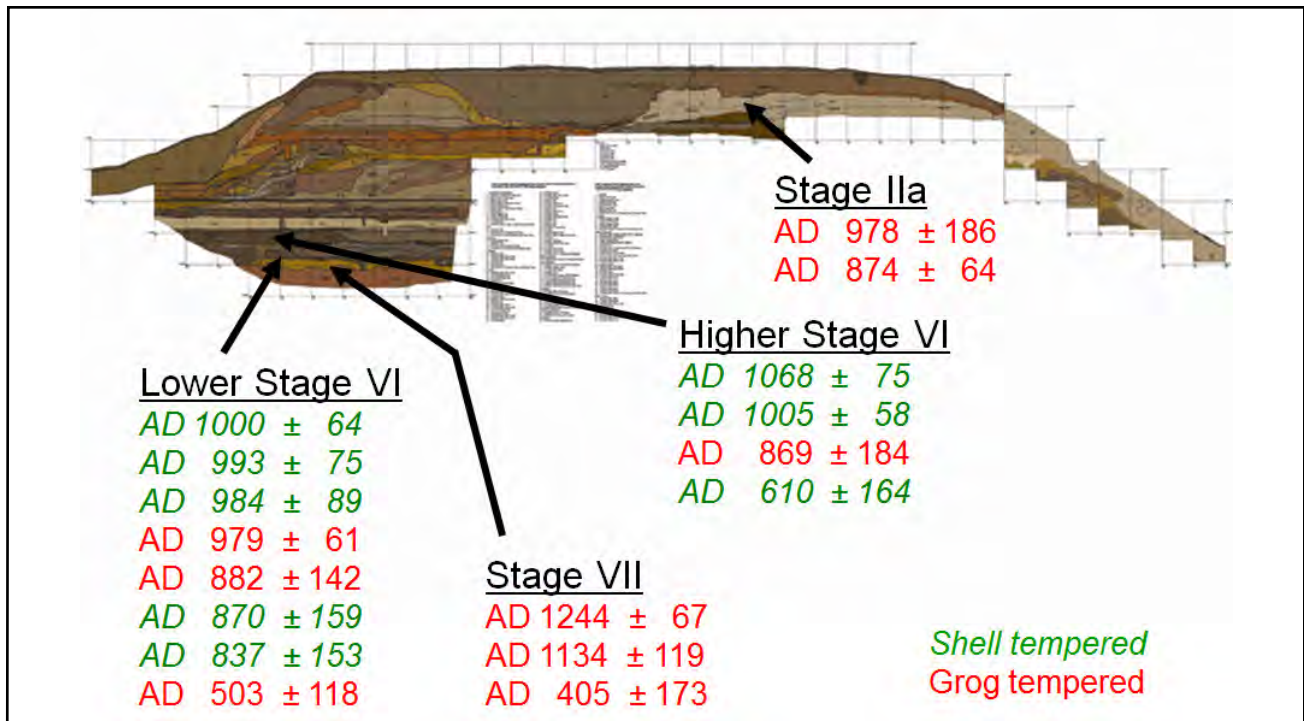


Figure 14-10. Luminescence dating results from the Mound A excavations.

was also a substantial quantity of grog-tempered pottery that could conceivably have come from the Obion site, a possibility that was also investigated by the thin-section analysis. Stoltman's work is presented in Chapter 15, and provides a description of methods, photomicrographs, and quantitative analyses. Only the conclusions of the thin-section analysis are discussed here.

One sherd from Mound A is, at first glance, a portion of a Ramey Incised pot (see Figure 14-01). It has the overall shape, and the broad, trailed incision of Ramey, and the motif is found on many Ramey pots. To test whether it actually came from the American Bottom or whether it was a local imitation of a Ramey pot, Stoltman compared a thin-section of this sherd with sections taken from 14 presumed-local sherds, and with his previously recorded data from sections of 25 Ramey Incised pots excavated at 6 sites in the American Bottom. The result was not conclusive, but the Shiloh sherd is probably of local origin. All of its paste characteristics fall within ± 2 standard deviations of the American Bottom sample, but they are closer to the "local" sample. The Shiloh sherd is burnished

but lacks a true slip (at least in the sampled portion), while slips are present on 24 of the 25 American Bottom pots. And 3 percent of the Shiloh sherd is sand, while none of the American Bottom pots had more than 2 percent sand. An origin in the American Bottom is not excluded by these data, but the more parsimonious conclusion is that the pot was made locally. However, it was made by someone who knew what American Bottom Ramey looked like; if it is a local "reproduction," it is a very good one.

In contrast, the complicated-stamped pottery is definitely not local. Most of the sherds are too eroded and too small to distinguish the motif, but two of the sherds display the ladder-based diamond motif of Etowah Stamped pottery (Figure 14-02). The angular grit temper is macroscopically unlike the more rounded quartz sand found in sand-tempered pottery made in the Shiloh region. Two of the stamped sherds, and one plain sherd of macroscopically similar paste, were thin-sectioned. They contain sharply angular mineral grains that come from metamorphosed rock of granitic composition. The two stamped sherds contain abundant amphiboles, probably from crushed

amphibolite, a metamorphic rock observed only in these two sections. The plain sherd was similar in many respects, but differed in having minor amounts of plagioclase and pyroxene, not observed in the others, plus having a higher frequency of polymineralic gneiss grains. This sherd also had a minor amount of grog in it. The differences between this sherd and the other two may simply reflect internal variation within a single bedrock source, and thus all three sherds may come from the same area even though it is clear that at least two different vessels are represented. Based upon inspection of geological maps, the primary source for metagranites/gneisses appears to be the Blue Ridge and adjacent Piedmont region. Although the precise origin of these sherds is not identified, they definitely came from an area far to the east of Shiloh. In north Georgia where Etowah Stamped pottery with the ladder-base diamond motif is most common, it dates to early Mississippian (Etowah I) times, between A.D. 1000 and 1150, an age consistent with the presence of the sherds in Mound A fill.

Thin section analysis was also conducted on another set of potentially imported pottery, specifically material which had white or light gray grog or clay-grit temper particles. Two plain and three cordmarked sherds with white clay/grog particles were thin-sectioned, along with two presumed local Baytown Plain and four presumed local Mulberry Creek Cord Marked sherds. For additional comparison, Stoltman (1992) had previously sectioned three Obion Plain sherds from the Obion site. Unfortunately, the quantitative results did not statistically discriminate an Obion source or a local source for the five sherds in question, although the sherds' paste, like the local sherds, was generally sandier and had lower abundance of temper than the sherds from Obion. Stoltman also reported a more impressionistic reason to believe the sherds in question did not come from Obion. The clays of the Obion sherds are more birefringent than those found at the Shiloh site. Stoltman's conclusion is therefore that the five sampled sherds are likely of local origin, rather than being imports from Obion. This does not mean that all of the 1202 sherds classified as *var. Obion* are of local

origin, but it is safe to say that no connection has yet been demonstrated between Shiloh and Obion.

CONCLUSIONS

When the Mound A project was being planned, many of the research questions that were specified focused on discovering what people did on top of the mound, and what sorts of people participated in those activities. Because nearly all the sherds recovered came from mound fill—material that originally was somewhere else at the site—the pottery provides no information about those mound-top activities. However, as a sample of pottery from the Shiloh site, this material does provide information about the community at Shiloh. That information falls principally in the categories of chronology and external connections.

The Mound A pottery assemblage has been studied to provide answers to two principal chronological questions. The first is: what does the pottery indicate about the overall chronology of site occupation? Welch's (2006:41–77) study of pottery from excavations antedating the Mound A mitigation project concluded that the site had been sporadically occupied over the millennia, but had a Late Woodland (grog-tempered) occupation followed by a larger Mississippian (shell-tempered) occupation. The Mound A pottery adds only a little more detail to this picture. Very small numbers of Gulf Formational through Middle Woodland sherds are present in the mound fill, but by far the two most abundant sorts of pottery are the presumably Late Woodland grog-tempered pottery (49.3 percent) and the Mississippian shell-tempered pottery (49.6 percent). The percentage representation of these two wares is similar to their representation in the collection (n=1033) from 1933–1934 excavations at the site: 46.1 percent grog and 51.1 percent shell. At this very general level, the Mound A assemblage confirms and reinforces earlier findings about the chronology of occupation at the site.

Considering the shell-tempering pottery specifically, information from Mound A points to a solution for a puzzling detail in the previously excavated pottery. The 1933–1934 excavations yielded sherds that had incised running-scroll motifs

on the shoulders of restricted jars. There were at least three such vessels; in two the incisions were made in wet paste, and in the other the incision was made in leather-hard paste but was narrow (1mm). No running-scroll motifs are present in the Mound A assemblage. Welch (2006:45–47) noted that the running-scroll motif suggested a date after A.D. 1300, unless these decorations were locally produced versions of the wide incisions on Ramey Incised pots. Those were the only previously excavated sherds that might have suggested occupation at the site after A.D. 1250 or 1300. Their presence and the existence of two radiocarbon assays with calibrated dates in the early 1400s were the basis for Welch (2006:47) stating that occupation at the site might have lasted as late as A.D. 1400. With the extensive suite of radiocarbon assays that antedate A.D. 1300 now available from Mound A, and the thin-section results indicating that there may have been a potter at Shiloh making imitations of Ramey Incised vessels, it now seems likely that those running-scroll motifs were indeed copied from Ramey Incised vessels. Assuming that is the correct interpretation, then none of the pottery at Shiloh indicates occupation past A.D. 1250 or 1300. This agrees remarkably well with the radiocarbon dates from Mound A, with only the poorly-dated final Stage I possibly post-dating A.D. 1300 (see Chapters 9, 12, and 21).

Comparison of the Mound A pottery with pottery from excavations elsewhere at the site provides a possible answer to another major research question: where did the Mound A fill come from? In the Mound A pottery, 49.6 percent of the sherds had shell tempering, which very closely matches the 51.1 percent figure for sherds recovered by the 1933–1934 excavation. Most of those excavations took place within 200m of the bluff edge. In contrast, an excavation roughly 250m from the bluff edge (Welch 2006:214) had 69.8 percent shell-tempered sherds out of a sample of 1,939, and an excavation 400m west of the bluff edge (Welch 2006:189) produced a small assemblage (n=228) of sherds in which 93.8 percent had shell tempering. The grog-tempered occupation of the site, it appears, did not extend as far from the bluff edge as the shell-tempered occupation did. This suggests that

the fill for Mound A originated within 200m of the bluff edge, rather than having been brought from sources farther away. The ponds and depressions in the western half of the site near Mounds F and G, previously thought to be borrow pits, are therefore probably not the sources of fill for Mound A.

The second chronological question which this analysis addresses is whether there is extensive overlap between the production of grog-tempered pottery and shell-tempered pottery. It was hoped that the luminescence dates from sherds in Mound A would provide evidence on the extent of the overlap. There are five luminescence assays in the A.D.800-1000 range for grog-tempered pottery, and six assays in the same range (if you include the one whose midpoint is A.D.1005) for shell-tempered pottery. The luminescence estimates indicate that these two tempering agents were used by potters simultaneously for two centuries. What is most surprising is that the overlap would begin at A.D.800. Previous research in the region, at multiple sites and involving dozens of radiocarbon dates, consistently put the introduction of shell-tempering around A.D.1000 or 1050. Thus, the shell-tempered luminescence dates at Mound A appear to be anomalously early. It would be inappropriate to dismiss the Shiloh luminescence dates altogether, but it is worth remembering that radiocarbon dating has been applied in this region for far longer than luminescence dating on sherds. Future research may reveal whether the Shiloh results are an anomaly, or whether the two dating techniques consistently produce disparate results.

The other major issue addressed in this study is that of connections between Shiloh and societies elsewhere. At the most general level, it is worth repeating that the styles of pottery at Shiloh, and the dates when those styles were used, show that Shiloh had closer connections with societies in northwest Mississippi and north and central Alabama, than with societies in the Memphis area. There is also little evidence for stylistic ties to the Nashville area, but there is such sparse occupation in the Nashville area during the time of Shiloh's occupation that the pottery there is not well characterized (Smith 1992). In the historic era, speakers of Muskogean languages

occupied the region where Shiloh's prehistoric stylistic ties lie. This is one reason for suspecting that the Shiloh occupants may have spoken a Muskogean language (or languages) of the family.

This general picture of stylistic ties is supplemented by information about items imported into Shiloh. From the presence of pots that either were made elsewhere or were made in distinctive nonlocal styles, it is clear that some individuals at Shiloh either visited, came from, or perhaps had

relatives in the American Bottom area, in the north Georgia/east Tennessee/western North Carolina area, and possibly at Moundville (Figure 14-11). The American Bottom connection had been known previously, both from the Shiloh pipe made of Missouri flint clay (Emerson et al. 2003) and from two sherds of Ramey Incised found during excavations in the 1930s (Welch 2006:48–49). Connections with Moundville were also evident in previously reported material (Welch 2006:261–

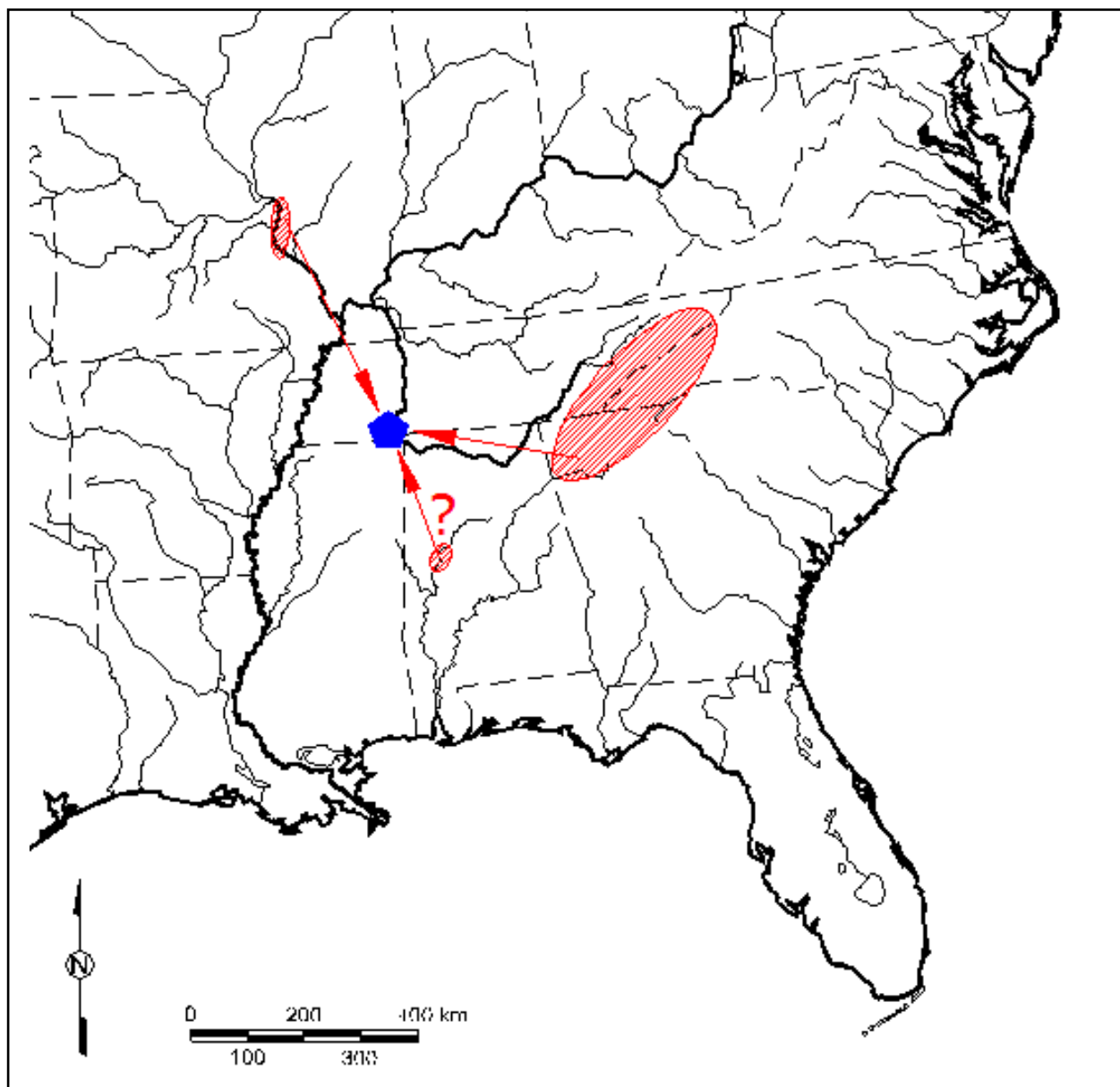


Figure 14-11. Imports or stylistic ties evident in Mound A pottery.

262). Ties to the Tennessee/Georgia/North Carolina region were not anticipated in any pottery previously recovered at Shiloh. However, copperwork at Etowah has a definite stylistic tie to Cahokia (J. Brown 2004:120–121), and Shiloh is situated along the obvious travel route—the Tennessee River—between those two centers. The Etowah Stamped and Etowah Plain pottery found in Mound A is the first tangible evidence that Shiloh’s residents may have been directly involved in the Etowah-Cahokia contacts. A small fragment of worked copper was, in fact, found at the base of the Stage IIb-1 mound fill in the vicinity of Structure 3 (see Chapters 9, 13)

It is interesting to note that no connections are visible between Shiloh and several major contemporary Mississippian centers. Perhaps most surprising is the absence of any visible pottery ties between Shiloh and the Kincaid community in southern Illinois where the Tennessee River empties into the Ohio. Chert from southern Illinois sources is present in considerable quantities at Shiloh, so it is not likely that the peoples of Shiloh and Kincaid were enemies. It is also surprising that there is

no evidence of connections between Shiloh and societies at the southwestern end of the trail system now known as the Natchez Trace. Historically this trail or trails passed close to Shiloh, and since the trail existed during the occupation of Shiloh the absence of lower Mississippi valley styles of pottery at Shiloh suggests that the people of Shiloh were on persistently bad terms with those societies.

Archeologists have much work left to do to discern the shifting patterns of alliance and opposition—the political geography—of Mississippian societies across the Southeast. Some parts of the picture are fairly clear, such as the connection between Cahokia and Shiloh, Moundville, and Etowah. Other parts of the picture are less clear, such as why Moundville and Etowah, both having connections with Cahokia, seem to have been persistently opposed to each other. What role(s) the relatively small society centered at Shiloh played in these prehistoric “superpower relations” is not clear. But the pottery from Mound A helps us see what the connections were, even if we do not yet understand how those connections worked.

CHAPTER 15

PETROGRAPHIC OBSERVATIONS ON SELECTED POTTERY SHERDS

JAMES B. STOLTMAN

This chapter describes the results of petrographic observations on 20 thin sections made from sherds recovered from Mound A at the Shiloh site. The sherds were selected by Paul Welch and sent to the author. They were then assigned individual numbers—40-95 to 40-114—within the cataloging system used at the University of Wisconsin-Madison (see Table 15-01). The thin sections were prepared by Brian Hess, a specialist in the Department of Geology at the UW-Madison. The petrographic observations were then conducted by the author in arbitrary order, employing only the thin section number, with none of the data tabulated nor compiled until the analyses of all thin sections had been completed.

METHODOLOGY

The thin sections were analyzed using a basic point-counting procedure as described in several earlier publications (Stoltman 1989, 1991, 2001). A standard counting interval of 1mm was employed. In each case the entire area of the thin section was counted, resulting in total points counted (exclusive of voids) ranging between 100 and 259 per thin section. The result of this approach was a physical characterization of each thin section in terms of the percentages of silt-size inclusions along with the species, percentages, and sizes of mineral inclusions of sand size and larger. Since individual clay particles are not identifiable in thin section, their presence is recorded generally as “matrix”.

Two different approaches were employed to characterize the physical compositions of the thin sections, depending upon the presence or absence of clearly identifiable temper. For those sherds possessing clearly identifiable temper, i.e., those with shell or grog tempers [n=16], the compositions are presented in terms of “paste” and “body” indices (see Stoltman 1991:109–110; 2001:314). Paste consists only of the naturally occurring

minerals (i.e., exclusive of human additives) in any fired clay product. It is represented quantitatively as the percentages of three natural ingredients: (1) matrix (i.e., clay); (2) silt (all mineral inclusions that range in size between .002mm and .0625mm); and (3) sand (all mineral inclusions .0625mm or larger in maximum diameter). A size index is also recorded for the naturally occurring sand grains in each thin section. This particular index is presented as an ordinal scale ranging in value from 1 to 5. It was computed for each thin section by assigning a number to each natural, sand-sized grain recorded during point counting based upon maximum diameters as follows: 1=0.0625–0.249mm; 2=0.25–0.499mm; 3=0.50–0.99mm; 4=1.00–1.99mm; 5=2.00+mm. The index itself is a single number between 1 and 5 that is the mean of all measured sand grains for each thin section.

Paste, as defined above, is the most appropriate index for assessing the local manufacture of ceramic products because it can be compared reliably to local sediments (under the so-called Provenience Postulate; e.g. see Stoltman 2001:313). When thin sections of local sediments are unavailable, as is the case in the present study, “local” paste characteristics can still be defined, albeit tentatively, based upon the summary values for those sherds accepted as “local” based upon their stylistic properties. The reliability of this characterization, of course, is dependent upon the fallible, but enabling, supposition that those sherds identified as “local” were, indeed, manufactured locally and thus are representative of the site’s pottery. Once the paste characteristics of local pottery are determined, comparisons with stylistically anomalous sherds can then be made via the so-called Local-Products-Match Postulate (see Stoltman 2001:316–317) to assess more objectively their possible nonlocal origin. The case for the nonlocal derivation of a vessel can be strengthened if its paste not only differs from

Table 15-01. Sherds selected for thin section analysis from the Mound A excavations.

Thin Section #	FS-Lot #	Mound Stage	EU/Provenience	Type
40-95	2711-7	Ila/IIC, Summit	N45, E181, EU57, Lv16	Moundville (Ramey?) Incised
40-96	4526-58 [30]	V	N38, E184, EU296, Lv10	Bell Plain, var. <i>unspecified</i>
40-97	1418-40 [23]	I, South Side	N37, E179, EU158, Lv02	Obion Plain, var. <i>Obion</i>
40-98	4527-16 [3]	V	N37, E184, EU296, Lv09	Obion Plain, var. <i>Obion</i>
40-99	4249-37 [3]	V	N40, E184, EU254, Lv14	Mississippi Plain, var. <i>Shiloh</i>
40-100	4249-37 [3]	V	N40, E184, EU254, Lv14	Mississippi Plain, var. <i>Shiloh</i>
40-101	4526-32 [29]	V	N38, E184, EU296, Lv10	Mississippi Plain, var. <i>Shiloh</i>
40-102	2927-5	Iib, Summit	N49, E183, EU164, Lv08, Zn D	Etowah Stamped
40-103	2535-12 [9]	III	N42, E182, EU135, Lv06, ZnD	Etowah Plain
40-104	2461-7	Ila, Summit	N42, E183, EU176, Lv05, Zn E	Etowah Stamped
40-105	1418-41 [23]	I, South Side	N37, E179, EU158, Lv02, Zn B1	Mulberry Creek Cord Marked, var. <i>Mulberry Creek</i>
40-106	1418-41 [20]	I, South Side	N37, E179, EU158, Lv02, Zn B1	Mulberry Creek Cord Marked, var. <i>Mulberry Creek</i>
40-107	1418-41 [20]	I, South Side	N37, E179, EU158, Lv02, Zn B1	Mulberry Creek Cord Marked, var. <i>Mulberry Creek</i>
40-108	355-13	I, South Side	N36, E180, EU37, Lv06	Mulberry Creek Cord Marked, var. <i>Coffee Landing</i>
40-109	3898-14 [3]	III	N50, E180, EU88, Lv13	Mulberry Creek Cord Marked, var. <i>Obion</i>
40-110	1418-42 [21]	I, South Side	N37, E179, EU158, Lv02, Zn B1	Mulberry Creek Cord Marked, var. <i>Obion</i>
40-111	1418-42 [21]	I, South Side	N37, E179, EU158, Lv02, Zn B1	Mulberry Creek Cord Marked, var. <i>Obion</i>
40-112	1418-30	I, South Side	N37, E179, EU158, Lv02, Zn B1	Baytown Plain, var. <i>McKelvey</i>
40-113	1418-30 [24]	I, South Side	N37, E179, EU158, Lv02, Zn B1	Baytown Plain, var. <i>McKelvey</i>
40-114	4249-8	V	N40, E184, EU254, Lv14	Baldwin Plain, var. <i>Miller Slough</i>

Numbers in brackets represent the lot number of the artifact prior to destructive analysis.

that of local sherds but also matches that of soils and/or sherds from a suspected external source.

In contrast to paste, body normally represents an artificial mixture of at least two materials, paste and temper, that typically derive from different geological sources. The discrimination of paste and body depends first and foremost upon the reliable identification of intentional, humanly introduced inclusions, i.e., temper. Two main tempers were identified in the present study, shell and grog. The identification of these inclusions as temper was relatively straightforward, facilitated by their large size, high angularity, and distinctive compositions in contrast to the natural sand inclusions. In four of the five shell-tempered sherds the shell was preserved, thus was counted directly, but in one vessel (#40-95), the shell had been leached out. In this case the temper was identified from the distinctive, tabular-shaped, parallel-sided voids that remained after leaching had occurred.

The body index, then, is comprised of three components: (1) natural sand, (2) temper, and (3) matrix (silt is included here, along with the clay, unless positive identification as temper was possible). A separate size index, using the same 1–5 ordinal scale used to measure sand grains, is also reported for temper.

Temper type, size, and amount are all variables that directly reflect human actions, thus are likely to be heavily culturally determined. Body indices, then, can provide a valuable basis independent of paste to assess the local vs. non-local status of pottery sherds. An important caveat in dealing with temper as a culturally determined variable is to be aware that it may not necessarily be a passive reflection of a traditional way of making pottery but a more active reflection of design considerations of the potters, who could be using different body recipes for vessels intended to perform different functions (e.g., ritual vs. cooking vs. storage vs. serving, etc.).

For four thin sections [nos. 40-102, 40-103, 40-104, and 40-114], a modification of the above procedure was used to record their physical compositions. The sherds that produced these thin sections are characterized by relatively fine, angular inclusions of metamorphic rocks. Because of the fineness of these rock fragments, it was impossible to discriminate them objectively from the natural sand inclusions also present in their bodies: the paste/body distinction simply could not be objectively determined. Therefore, the compositions of these sherds are presented as “bulk compositions” in terms of three main parameters: percent matrix, percent silt, and percent sand.

RESULTS

The findings of this study are reported in three parts below. The first part describes the sherds derived from grog-tempered vessels. Because such sherds are the most numerous in the thin-section sample (11 of the 20), and the likelihood is greatest that the vessels represented were made locally, an analysis of their physical composition provides the strongest basis for characterizing the clay-rich sediments used in pottery manufacture in the Shiloh vicinity. The second part considers five thin sections in the sample derived from what are believed to be five separate shell-tempered vessels. Based upon the foregoing analysis of the sherds from grog-tempered vessels, the alternatives of local versus exotic manufacture of these “Mississippian” vessels can then be productively investigated. The third group of thin-sectioned sherds, four observed to contain abundant and generally modestly sized fragments of metamorphic rock, are considered separately because the distinction between paste and body employed in the first two parts could not be applied reliably. For these four sherds, which are often referred to as “sand tempered” but which here are considered to have fine grit (i.e. crushed rock) tempers, bulk composition will be employed to characterize them.

GROG-TEMPERED POTTERY

The results of the petrographic analyses of the eleven grog-tempered sherds are recorded in Table

15-02. The type names are those assigned by Welch before the petrographic analyses were conducted. As can be seen from this table, the paste and body compositions of these sherds are relatively uniform. An exception is the Mulberry Creek Cord Marked *var. Coffee Landing* sherd (#40-108). The salient distinction of this sherd in contrast to the other ten (cf. Figures 15-01–15-05) is its high incidence of sand: 16 percent of paste, 14 percent of body. In both cases these values exceed the grand means by more than two standard deviations (i.e., are beyond the ± 95 percent confidence limits), the only values in the table to do so.

Although the amount of “loose” sand in sherd 40-108 is uniquely high, the size of these inclusions, which are preponderantly quartz, are mostly in the fine-sand size range (note the sand size index for paste is 1.06 in Table 15-02), thus could easily be natural inclusions. Whether they should be regarded as sand (i.e., natural) or as temper (i.e., human additives) must thus be considered uncertain. For the remaining ten sherds, no objective basis exists for accepting any as of exotic origin. By removing sherd 40-108 from consideration as “local” based upon the uncertainties concerning its sand content, the mean paste value for the remaining ten sherds is here accepted as the best available basis for defining the physical composition of clay-rich sediments used in pottery manufacture at Shiloh:

90.9 $\pm$ 3.8 percent matrix, 5.3 $\pm$ 2.9 percent silt, 3.8 $\pm$ 2.5 percent sand

Before turning to the shell-tempered vessels, let us consider the possibility that some of the grog-tempered sherds may derive from vessels imported from the Obion site (Garland 1992; Welch 2006). As can be seen in Tables 15-01 and 15-02, Welch tentatively identified several of the grog-tempered sherds from Shiloh as being Obion-like: two sherds were classed as Obion Plain and three as Mulberry Creek Cord Marked *var. Obion*. In comparing these five sherds to the other five “local” grog-tempered sherds (again, excluding 40-108), no obvious differences can be seen in Table 15-02.

Further light might be shed on this issue by comparing the grog-tempered sherds from

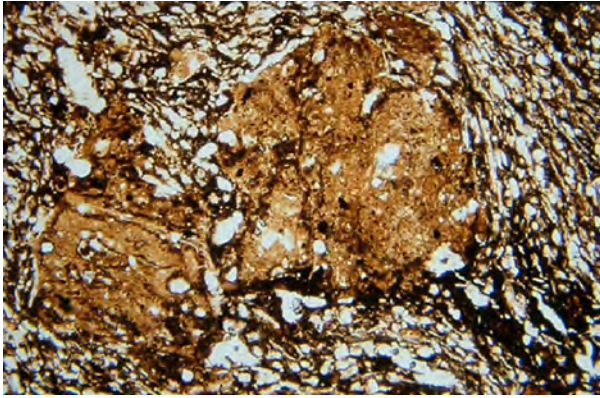


Figure 15-01. Shiloh Thin Section #40-108; Mulberry Creek Cord Marked var. Coffee Landing, Grog Temper in Sandy Paste; scale: frame width ~ 4.5mm (largest grog = 1.775mm); viewed in plane polarized light at 10X magnification.

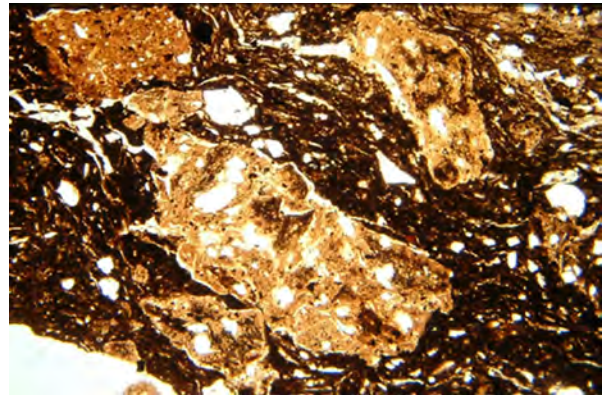


Figure 15-03. Shiloh Thin Section #40-111; Mulberry Creek Cord Marked var. Obion, Grog Temper; scale: frame width ~ 4.3mm (largest grog = 2.15mm); viewed in plane polarized light at 10X magnification.

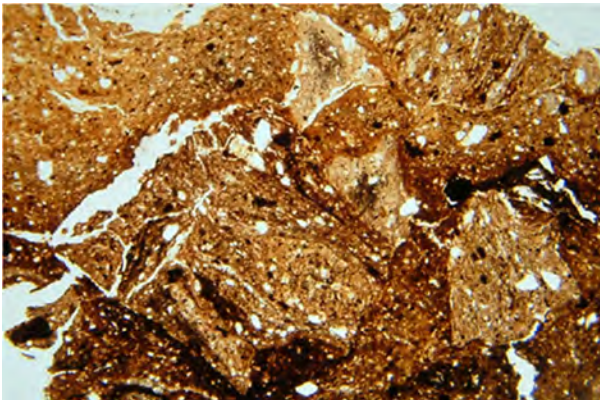


Figure 15-02. Shiloh Thin Section #40-105; Mulberry Creek Cord Marked var. McKelvey, Grog Temper; scale: frame width ~ 5.5mm (largest grog = 1.825mm); viewed in plane polarized light at 10X magnification.

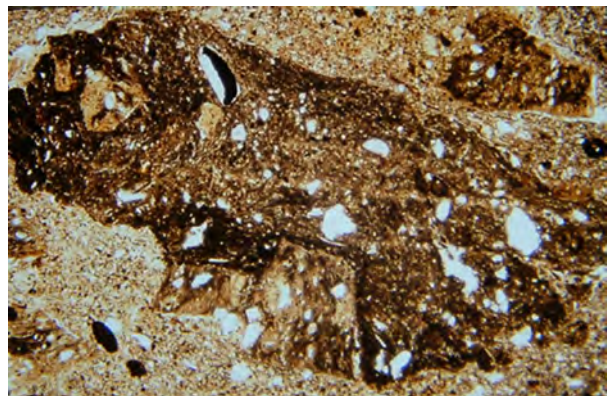


Figure 15-04. Shiloh Thin Section #40-112; Baytown Plain, note Presence of Grog Temper within the Large Grog Grain; scale: frame width ~ 4mm (largest grog = 3.95mm); viewed in plane polarized light at 10X magnification.

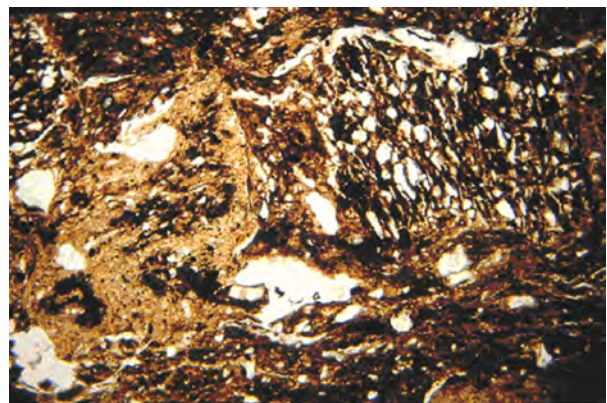


Figure 15-05. Shiloh Thin Section #40-97; Obion Plain, Grog temper; scale: frame width ~ 3.2mm (Sandy grog on right=1.70mm); viewed in plane polarized light at 10X magnification.

Shiloh to a small sample of three Obion Plain vessels from the Obion site that the author had thin sectioned previously for Garland (Stoltman 1992). Unfortunately, this sample of Obion vessels was apparently selected to reveal the compositional diversity at the site. The paste and body values for these three vessels are recorded in Table 15-03 (see Figures 15-06 and 15-07).

The small sample and great internal diversity (note the relatively high standard deviations for all parameters), make generalizations about the composition of Obion-site pottery problematic at best. Two points stand out about these data. First, vessel 40-37 is considerably sandier than the other two. Indeed, in this respect it is similar to vessel 40-108 from Shiloh, raising the possibility that they could share a common ancestry. Second, the temper size in vessel 40-35, at 2.50, is the smallest by far of any of the 14 grog-tempered sherds listed in Tables 15-02 and 15-03 (Figure 15-06). Possessing fine grog, it should be noted, was the defining property employed by Garland (1992:65) to distinguish *var. Work Farm* from *var. Obion* within Obion Plain at the Obion site. It appears that her observations were correct (cf. Figures 15-06 and 15-07). While *var. Work Farm* is a minority type at Obion, at least it can be stated that nothing like it occurs within the sample of thin-sectioned sherds from Shiloh.

Referring to Figures 15-08 and 15-09, the following generalizations are offered, highly tentatively, concerning possible relationships between Shiloh and Obion. First, Shiloh pastes are generally sandier than those of Obion when sherds 40-37 and 40-108 are excluded from consideration (cf. Figures 15-02/15-05 vs. Figures 15-06 and 15-07). Second, again setting aside sherds 40-37 and 40-108, the amount of temper used by Obion potters is generally greater than at Shiloh. These differences are not great enough to be statistically significant, but they are consistent with the personal impression gained through extra time spent comparing and contrasting thin sections from the two sites. That personal impression is that the clays at Obion are more highly birefringent (i.e., show more pronounced interference colors when viewed under crossed polars) and less sandy than

those of Shiloh (cf. Figures 15-02–15-05 vs. 15-06 and 15-07). This impression along with the relative homogeneity of the “Shiloh ten” suggests that the most parsimonious and reasonable interpretation of these data is that all ten of these grog-tempered sherds are best regarded as derived from vessels locally produced in the vicinity of Shiloh.

SHELL-TEMPERED VESSELS

Five vessels tempered with shell were included among the twenty thin-sectioned sherds. The types assigned to these vessels and their compositions are recorded in Table 15-04 (see Figures 15-10–15-12). It is noteworthy that the amount of internal variation among these five vessels is minimal, no one of them possessing a compositional index greater or less than two standard deviations of any of the group means (Table 15-04).

Comparing the pastes of these vessels as a group versus the postulated “local” paste values derived from the foregoing discussion of grog-tempered pottery, then, allows us to evaluate the possibility of the differential origins of these two pottery groups. As can be seen by comparing the data recorded in Tables 15-02 and 15-04, all paste values for the five shell-tempered vessels collectively, and for each of the five vessels individually, fall within $\pm$ two standard deviations of the “local” means determined from the ten grog-tempered sherds. It thus is fair to conclude that the grog-tempered and shell tempered pottery vessels at Shiloh were manufactured from similar clays, a finding consistent with the view that both were locally produced at Shiloh. This is not to say that these data can be regarded as proof of local production of all the shell-tempered vessels, only that the compositional evidence provides no unambiguous evidence in favor of their exotic origin.

Vessel 40-95 (Figure 15-10) merits special consideration because in terms of vessel form and incised motif, it is reminiscent of the American Bottom type, Ramey Incised (e.g., Griffin 1949). In order to evaluate this proposition, the author has available comparable compositional data from 25 Ramey Incised vessels from six sites in the American Bottom. The mean paste

Table 15-02. Paste and body values for grog-tempered sherds selected for thin section analysis from the Mound A excavations at Shiloh.

PASTE						
Type	Thin Section #	Mound Stage	% Matrix	% Silt	% Sand	Sand Size Index
Mulberry Creek Cord Marked						
var. <i>Obion</i>	40-109	III	90	2	8	1.15
var. <i>Obion</i>	40-110	I, South Side	89	6	5	1.50
var. <i>Obion</i>	40-111	I, South Side	92	6	2	1.00
var. <i>Mulberry Creek</i>	40-105	I, South Side	95	4	1	1.00
var. <i>Mulberry Creek</i>	40-106	I, South Side	89	9	2	1.33
var. <i>Mulberry Creek</i>	40-107	I, South Side	95	3	2	1.00
var. <i>Coffee Landing</i>	40-108	I, South Side	74*	10	16*	1.06
Obion Plain	40-97	I, South Side	86	9	5	1.22
Obion Plain	40-98	V	90	3	7	1.25
Baytown Plain	40-112	I, South Side	86	9	5	1.10
Baytown Plain	40-113	I, South Side	97	2	1	1.00
Grand Mean & Std Dev	[n=11]		89.4±6.2	5.7±3.1	4.9±4.4	1.15±.16
Mean/Std Dev – #40-108	[n=10]		90.9±3.8	5.3±2.9	3.8±2.5	1.16±.17
BODY						
Type	Thin Section #	Mound Stage	% Matrix	% Sand	% Grog	Temper Size Index
Mulberry Creek Cord Marked						
var. <i>Obion</i>	40-109	III	82	7	11	3.46
var. <i>Obion</i>	40-110	I, South Side	74	4	22	3.18
var. <i>Obion</i>	40-111	I, South Side	86	2	12	3.33
var. <i>Mulberry Creek</i>	40-105	I, South Side	79	1	20	3.43
var. <i>Mulberry Creek</i>	40-106	I, South Side	85	2	13	3.94
var. <i>Mulberry Creek</i>	40-107	I, South Side	84	2	14	3.38
var. <i>Coffee Landing</i>	40-108	I, South Side	78	14*	8	3.25
Obion Plain	40-97	I, South Side	77	4	19	3.80
Obion Plain	40-98	V	77	6	17	3.50
Baytown Plain	40-112	I, South Side	76	4	20	3.77
Baytown Plain	40-113	I, South Side	93	1	6	3.88
Grand Mean & Std Dev	[n=11]		81.0±5.6	4.3±3.8	14.7±5.3	3.54±.26
Mean/Std Dev – #40-108	[n=10]		81.3±5.8	3.3±2.1	15.4±5.0	3.57±.26

Asterisk denotes values > ± 2 standard deviations of the grand mean.

Table 15-03. Paste and body values for three grog-tempered, Obion Plain vessels selected for thin section analysis from the Obion Site.

PASTE					
Type	Thin Section #	% Matrix	% Silt	% Sand	Sand Size Index
Obion Plain, var. <i>Work Farm</i>	40-35	90	9	1	1.00
Obion Plain, var. <i>Obion</i>	40-36	100	0	0	-
Obion Plain, var. <i>Obion</i>	40-37	75	11	14	1.00
Mean & Std Dev	[n=3]	88.3±12.6	6.7±5.9	5.0±7.8	1.00±0.0

BODY					
Type	Thin Section #	% Matrix	% Sand	% Temper	Temper Size Index
Obion Plain, var. <i>Work Farm</i>	40-35	79	1	20	2.50
Obion Plain, var. <i>Obion</i>	40-36	72	0	28	3.38
Obion Plain, var. <i>Obion</i>	40-37	73	11	16	3.80
Mean & Std Dev	[n=3]	74.7±3.8	4.0±6.1	21.3±6.1	3.23±.66

and body values $\pm$ one standard deviation for these 25 Ramey Incised vessels are as follows:

Paste: 96.0±2.8 percent matrix; 3.3±2.7 percent silt; 0.7±0.7 percent sand; sand size=1.17±.36

Body: 78.1±6.5 percent matrix; 0.6±0.6 percent sand; 21.3±6.4 percent temper; temper size=2.24±.37

By comparing these values with the comparable ones in Table 15-04 for vessel 40-95, it can be seen that all values for vessel 40-95 fall within the two standard deviation range of the American Bottom vessels. Stated another way, there appear to be no significant differences in composition between vessel 40-95 and a

substantial sample of Ramey Incised vessels from the American Bottom. It would be overstating the case, however, to cite these data as “proof” of an American Bottom origin for vessel 40-95.

A local derivation of vessel 40-95 is the more likely based upon the following considerations: (1) all of its paste parameters fall comfortably within the range of variation of the ten grog-tempered sherds accepted as local products; (2) all of its paste and body parameters fall comfortably within the range of variation observed for the other four shell-tempered vessels from the site; (3) while admittedly dealing with a minor paste component, it is nonetheless noteworthy that not a single one of the 25 American Bottom vessels has a sand percentage greater than

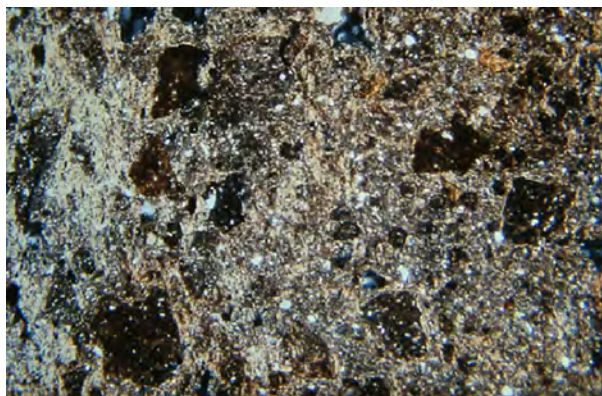


Figure 15-06. Thin Section #40-35 from the Obion Site; Obion Plain var. *Work Farm*, fine grog temper; scale: frame width ~ 4.1mm (dark grog nearest upper edge =0.45mm). viewed under cross-polarized light at 10X magnification.

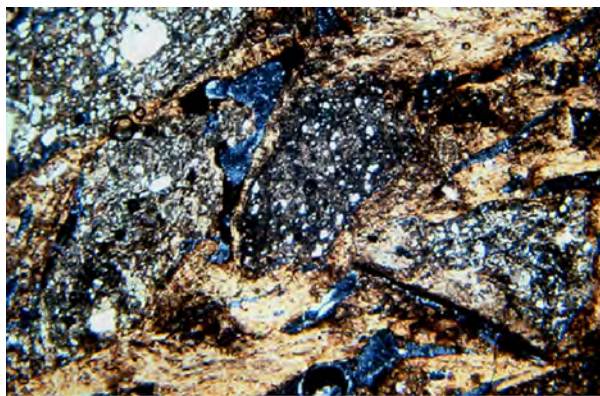


Figure 15-07. Thin Section #40-36; from the Obion Site Obion Plain var. *Obion*, note silty grog temper in fine, highly birefringent paste; scale: frame width ~ 4.2mm (grog grain on Right = 1.40mm); viewed under cross-polarized light at 10X magnification.

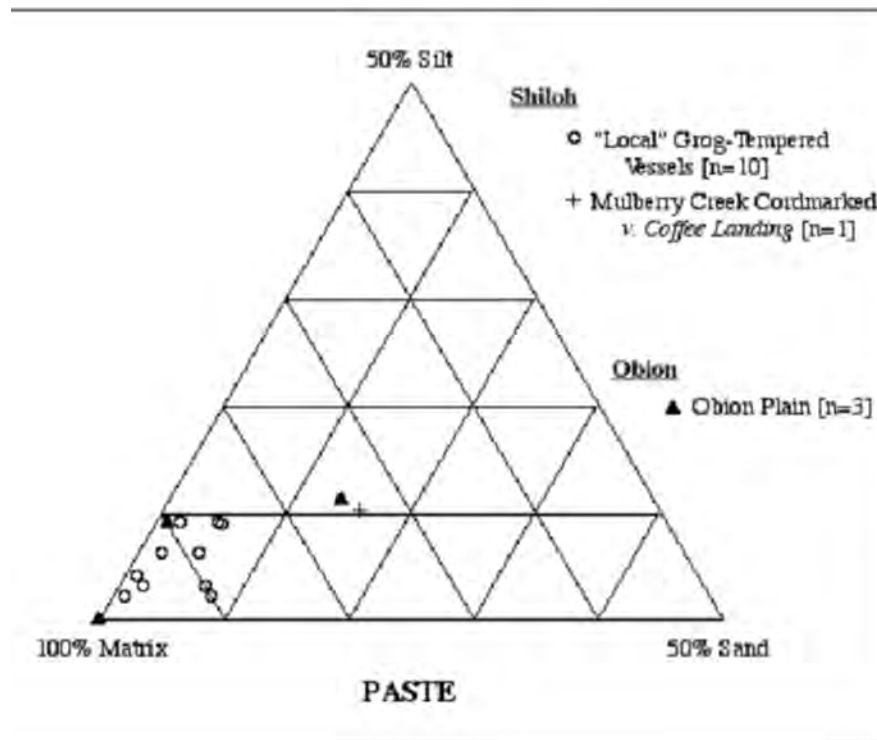


Figure 15-80. Ternary Diagram comparing paste values for eleven grog-tempered vessels from the Mound A excavations at Shiloh with three vessels from Obion.

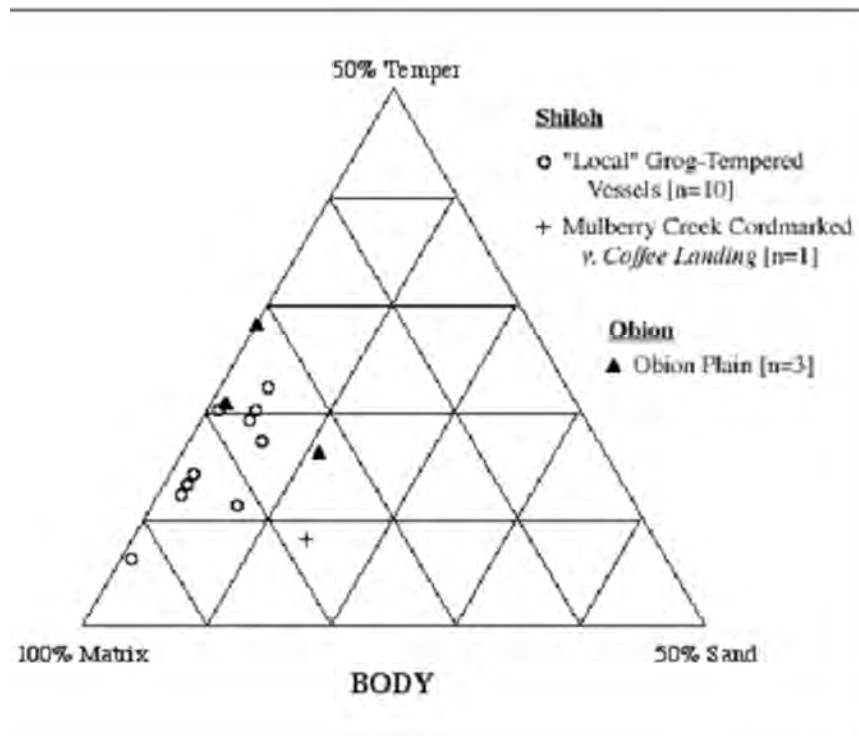


Figure 15-09. Ternary Diagram comparing body values for eleven grog-tempered vessels from the Mound A excavations at Shiloh with three vessels from Obion.

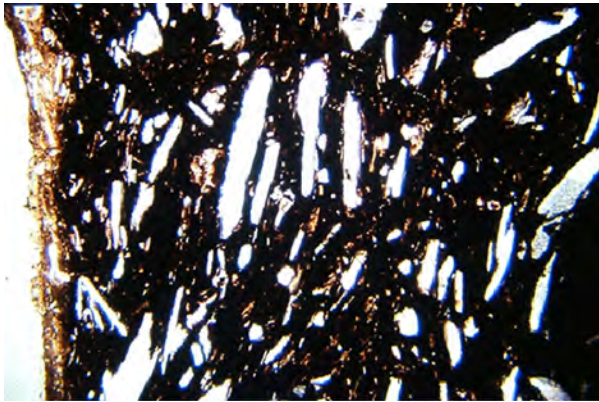


Figure 15-10. Shiloh Thin Section #40-95; Moundville (Ramey?) Incised, Leached Shell Temper; scale: frame width ~ 3.5mm (longest shell Void = 1.00mm); viewed in plane polarized light at 10X magnification.

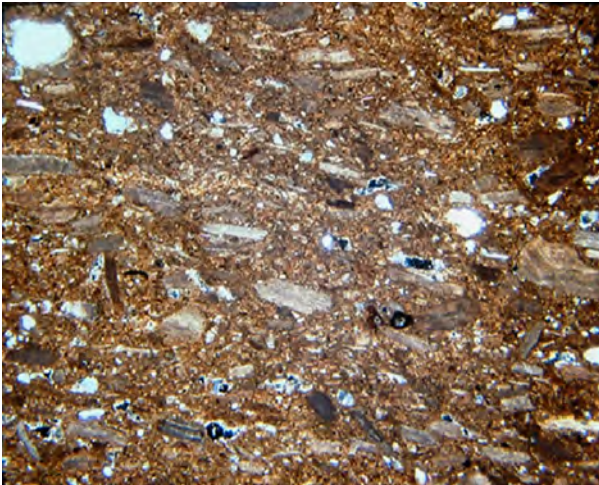


Figure 15-11. Shiloh Thin Section #40-96; Bell Plain, Shell Temper; scale: frame width ~ 2.6mm (large quartz grain in upper left corner = 0.35mm); viewed under cross-polarized light at 10X magnification.

2 percent in contrast to the 3 percent sand recorded for vessel 40-95; (4) a positively identifiable slip was observed on 24 of the 25 American Bottom vessels, but the presence of a slip could not be confirmed on the vessel 40-95 thin section (but this could easily be a sampling problem); and, finally, (5) when it comes to the paste parameter, it is possible that alluvial clays throughout much of the Southeast may be so generally similar that pronounced regional differences in percentages of silt and sand may not exist, or expressed another way, may frequently be subject to equifinality. All these factors considered, then, it seems most

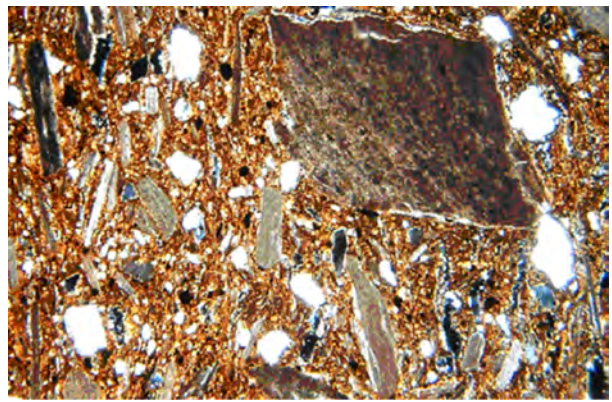


Figure 15-12. Shiloh Thin Section #40-100; Mississippi Plain, Shell Temper; scale: frame width ~ 7.6mm (largest shell = 1.90mm); viewed under cross-polarized light at 10X magnification.

prudent to accept vessel 40-95 as the product of a local Shiloh potter, which is the position taken here.

Vessel 40-96 is also deserving of special consideration (Figure 15-11). Assigned to the type Bell Plain by Welch, it has an undecorated, burnished surface. While its paste properties fall well within the range of variation of the “local” sample, its body is distinctive in two respects: the volume of shell is slightly greater (at 26 percent) than in any of the shell-tempered vessels and its temper size index, 1.44, is substantially smaller than any other shell-tempered vessel (Table 15-04). Whether these properties identify this vessel as of exotic origin or simply reflect “engineering” considerations on the part of local potters who designed it to perform a specific function must remain an open question at the present time.

VESSELS TEMPERED WITH FINE GRIT

For the remaining four sherds, there can be no doubt of their exotic origin (see Figures 15-13 to 15-16). Sherds 40-102, 40-103, 40-104, and 40-114 are all characterized by abundant and relatively fine-grained mineral inclusions. Because of both the fineness and abundance of such inclusions, sherds such as these are typically considered to be sand tempered when examined in hand specimen. Indeed, this is what happened in the case of sherd 40-114, which Welch initially attributed to Baldwin Plain, a sand-tempered type associated with the Miller culture of northern Mississippi (e.g., Jenkins

Table 15-04. Paste and body values for shell-tempered vessels selected for thin section analysis from the Mound A excavations at Shiloh.

PASTE						
Type	Thin Section #	Mound Stage	% Matrix	% Silt	% Sand	Sand Size Index
Moundville Incised	40-95	Ila/Ilc, Summit	94	3	3	1.00
Bell Plain	40-96	V	96	1	3	1.00
Mississippi Plain	40-99	V	95	4	1	1.50
Mississippi Plain	40-100	V	87	5	8	1.64
Mississippi Plain	40-101	V	93	2	5	1.40
Mean & Std Dev	[n=3]		91.6±4.2	3.3±1.5	4.7±3.5	1.51±.12
Grand Mean & Std Dev	[n=5]		93.0±3.5	3.0±1.6	4.0±2.6	1.31±.29
BODY						
Type	Thin Section #	Mound Stage	% Matrix	% Sand	% Shell	Temper Size Index
Moundville Incised	40-95	Ila/Ilc, Summit	79	2	19	2.67
Bell Plain	40-96	V	72	2	26	1.44
Mississippi Plain	40-99	V	75	1	24	2.38
Mississippi Plain	40-100	V	76	6	18	2.26
Mississippi Plain	40-101	V	72	4	24	2.93
Mean & Std Dev	[n=3]		74.3±2.1	3.7±2.5	22.0± 3.5	2.52± .36
Grand Mean & Std Dev	[n=5]		74.8±2.9	3.0±2.0	22.2±3.5	2.34±.56

and Krause 1986).

The fineness of the inclusions does present a problem in dealing with temper attribution, even when viewing them in thin section. Nonetheless, while admitting that “sand-tempered” may ultimately prove to be the more appropriate identification, it is here suggested that all four of these sherds are best considered to have fine grit tempers, i.e., they were tempered with finely crushed metamorphic rocks. Mineralogically, there can be no doubt that the rocks present in these four sherds ultimately are derived from the Blue Ridge Province of the Appalachian Mountains well to the east of Shiloh. Moreover, due to the high angularity of the grains, it is highly improbable that this suite of minerals could have been recovered locally in alluvial sediments near Shiloh.

As discussed earlier, distinguishing natural inclusions (sand) from human additives (temper) is extremely difficult, if not impossible, for such sherds. Thus, as an alternative to attempting to record paste and body, the compositions for these sherds are recorded in bulk fashion. Table 15-05 records the bulk compositions for these four sherds, with the “sand” variable containing all sand-sized inclusions no matter their origins. A salient property of these sherds is the relative fineness of the mineral inclusions: note in Table 15-05 that the size indices for such inclusions (excluding a few grog grains in sherd 40-103, which may be incidental) range between 1.34 and 2.14. These are normal size ranges for “sand-tempered” pottery, but extraordinarily fine for grit-tempered pottery, which typically has values in the 2.50 to 4.00 range. From Table 15-05, it can also be observed that the

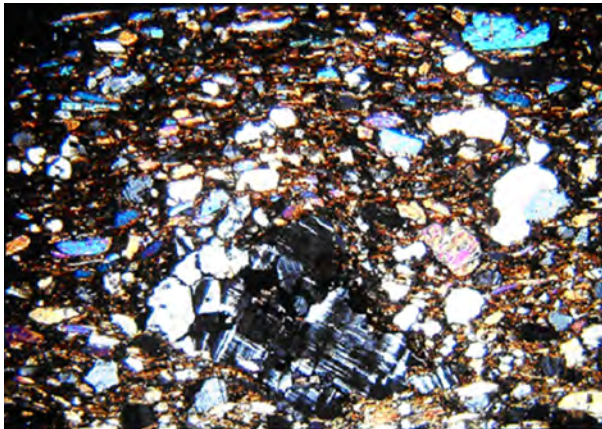


Figure 15-13. Shiloh Thin Section #40-102; Etowah Stamped, Fine Grit Temper; note Microcline (with distinctive tartan twinning) and polycrystalline quartz (untwinned on left) dominate the large grain; this large grain is unique in the thin section, with the remainder of the field of view more typical; scale: frame width ~ 3.7mm (large polyminerallc grain of Gneiss = 1.575mm); viewed under cross-polarized light at 10X magnification.

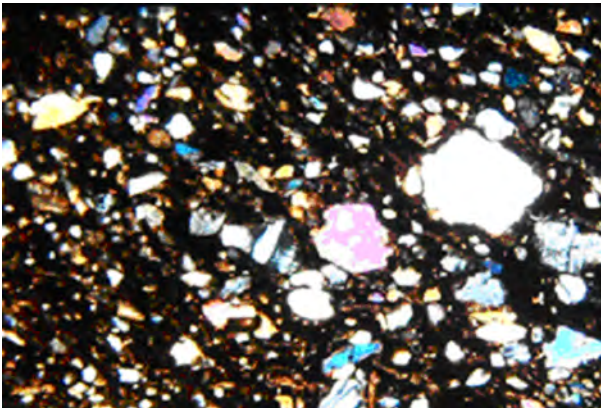


Figure 15-15. Shiloh Thin Section #40-104; Etowah Stamped, Fine Grit Temper; scale: frame width ~ 3 mm (largest Microcline, with tartan twinning = 0.425mm); viewed under cross-polarized light at 10X magnification.

bulk sand size indices for sherds 40-102, 40-103,

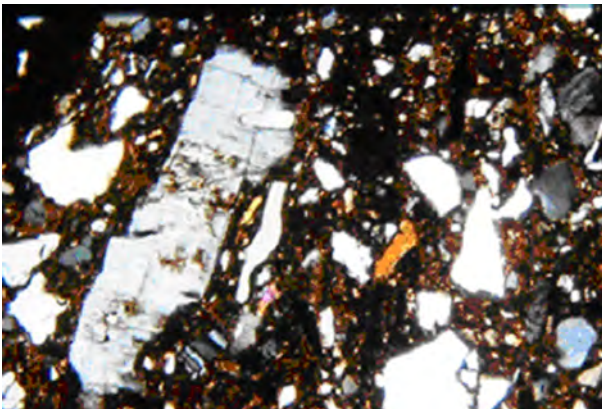


Figure 15-14. Shiloh Thin Section #40-103; Etowah Plain, Fine Grit Temper; scale: frame width ~3.4mm (largest grain, composed of untwinned feldspar and quartz = 1.375mm); viewed under cross-polarized light at 10X magnification.

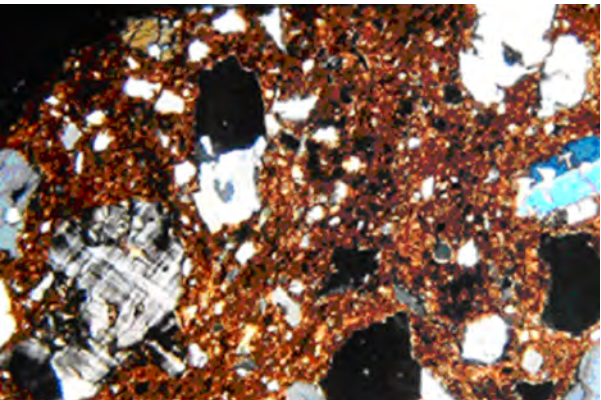


Figure 15-16. Shiloh Thin Section #40-114; "Baldwin Plain," fine grit temper; scale: frame width ~ 3mm (large polycrystalline quartz grain near center = 0.75mm); viewed under cross-polarized light at 10X magnification.

Table 15-05. Bulk composition of sherds with fine grit temper subjected to thin section analysis from the Mound A excavations.

Type	Thin Section #	Mound Stage	% Matrix	% Silt	% Sand	Sand Size Index
Etowah Stamped	40-102	IIb, Summit	65	4	31	1.66
Etowah Stamped	40-104	IIa, Summit	71	4	25	1.34
Etowah Plain	40-103	III	56	3	38	1.94
					+3% grog	3.67
Baldwin Plain	40-114	V	65	6	29	2.14

and 40-104 are smaller (all between 1.34 and 1.94), whereas this index for sherds 40-114 is 2.14. This should not be viewed as a trivial difference, rather, reflects a difference in rock type used as temper.

The mineral contents of all four of these sherds derive from metamorphosed rocks of granitic composition. That is, all could be referred to as metagranites or gneisses, but that said, there are notable differences among the sherds that may be indicative of two and possibly 3 different sources. The essential ingredients in all of these sherds include polycrystalline quartz with undulose extinction and sutured boundaries (indicative of metamorphic alteration), amphiboles, and potassium feldspar, especially microcline. Sherd 40-114, whose attribution to the Baldwin series must be reconsidered, is distinctive in having a high incidence of polycrystalline quartz (Figure 15-16). In sherds 40-102 and 40-104, by contrast, the co-dominant minerals are amphiboles and microcline (Figures 15-13 and 15-15). The abundance of amphiboles in these latter two is surely partly due to the presence of amphibolite, another metamorphic rock observed only in these two sections. Sherd 40-103 was similar to the latter two sherds in many respects, but differed in having minor amounts of plagioclase and pyroxene, not observed in the others, plus having a higher frequency of polymineralic gneiss grains (Figure 15-14). It is perhaps for this latter reason that the size index for sherd 40-103 was higher (1.94 vs. 1.34 and 1.66) than the other two. The unique presence of minor amounts of grog in sherd 40-103 may also be indicative of a distinctive ancestry. Since direct comparisons with potential bedrock sources for these tempers has not been attempted, it should also be noted that the observed differences may simply reflect internal variation within of a single bedrock source. Considering the internal variability observed in the thin sections for these four sherds, it is reasonable to postulate that a minimum of three separate vessels are represented: sherds 40-102 and 40-104 could be from the same vessel while the other two sherds probably derive from two different vessels.

One final point of interest deserves mention concerning the mineral suite observed in sherds

40-102 and 40-104 in particular. In an ongoing comparative study of pottery thin sections from the major Hopewell centers of southern Ohio and the greater Southeast, the author encountered this same rock type in vessels from no fewer than five Ohio sites plus one in northern Kentucky. So far, the number of such vessels recorded totals 19, 17 of which are simple stamped and two of which are plain. All are considered exotic to the middle Ohio valley region. In contrast only three such vessels have been encountered within the greater Southeast, one from Garden Creek, North Carolina and two from Icehouse Bottom in Tennessee. In both of the latter cases these vessels are minority types and regarded as exotics. Thus, so far no known source for vessels containing this distinctive rock has been identified. Based purely upon geological maps, the primary source for metagranites/gneisses appears to be extreme northeastern Tennessee along the North Carolina border (Miller 1974:Figure 6). Only future research will determine the derivation of this rock type. If the typological assignment of the Shiloh sherds is correct, i.e., three of the four being Etowah-affiliated, then the use of this distinctive rock (or sediments containing this rock?) continued in the manufacture of pottery containers well beyond Middle Woodland times. On the other hand, it would be prudent to consider the contextual evidence at Shiloh concerning the possibility that these sherds might be of Middle Woodland affiliation.

CONCLUSIONS

In this study thin sections of twenty pottery sherds recovered at the Shiloh site were subjected to petrographic analysis. The first goal was to determine the physical composition of locally made Shiloh pottery. With no samples of local clay-rich sediments available for direct analysis, the pastes of the 11 grog-tempered sherds in the sample were used for this purpose because of the high probability of their local production.

Ten of these 11 sherds were determined to have been made from a reasonably uniform clay-rich sediment with an average composition of ca. 91 percent matrix, 5 percent silt, and 4 percent sand. Only one of the 11 grog-tempered sherds, #40-108,

was found to have any paste value greater or less than ± 2 standard deviations of the grand means for these sherds, thus could be reasonably suspected as of nonlocal origin. This sherd (see Figure 15-01), classed as Mulberry Creek Cord Marked *var. Coffee Landing*, is characterized by an unusually sandy paste and probably derives from a unique vessel. Since there were no unusual or exotic minerals in those sands, it was impossible to discount the possibility that this was a local vessel to which sand had been added, along with the grog, as temper. It is regarded as possibly, but not certainly, of nonlocal origin.

Because affinities to pottery of the Obion site in east Tennessee (Garland 1992) were seen by Welch in his typological analysis, the compositions of these grog-tempered sherds were compared with a small sample of thin sections of Obion Plain pottery from the Obion site studied previously (Stoltman 1992). One of these vessels (#40-37) was similar to sherd 40-108 from Shiloh in being characterized by an unusually sandy paste, raising the interesting possibility of a common origin. However interesting this possibility, it cannot currently be confirmed.

Excluding the two sandy sherds, the pastes of the grog-tempered sherds from the two sites (but the Obion sample is now only 2 sherds!) show an overlapping range of variation. Lacking clear evidence to the contrary, it seems likely that the observed paste similarities between the two sites is best viewed as evidence of equifinality, that is, the clay-rich sediments used by potters in both regions are too similar to distinguish reliably. In seeking objective criteria that might distinguish clays from the two regions, considerable microscope time was devoted to viewing thin sections comparatively. The result was only a frankly impressionistic conclusion that the Obion pastes were more birefringent and less sandy than those of Shiloh (cf. Figures 15-02–15-04 vs. 15-06 and 15-07). In attempting to address explicitly the issue of exchange versus local production of grog-tempered pottery between the Shiloh and Obion sites, only a tentative, frankly impressionistic preference for the latter alternative, local production at both sites, can be offered.

Despite the temper differences between Woodland (i.e., grog tempered) and Mississippian

(i.e., shell tempered) pottery at Shiloh, the pastes of both classes proved to be closely similar (cf. Tables 15-02 and 15-04). The simplest explanation, tentatively put forth because of the small sample size coupled with uncertainties of how much clay variability exists across relevant parts of the region, is that both classes of pottery were made locally at Shiloh.

A more detailed consideration of vessel #40-95 (Figure 15-10), a Ramey Incised-like vessel, involving comparisons with 25 Ramey Incised vessels from the American Bottom, revealed no significant paste or body differences. Thus, the possibility of an exotic origin for this vessel should be left open; however, its relative sandiness, absence of clear evidence of slipping, and quantitatively “local” paste parameters all can be cited in support of the alternative view of local production at Shiloh.

A second shell-tempered vessel, #40-96 of the type Bell Plain (Figure 15-11), also merits consideration as a possible trade vessel. While fully “local” in its paste parameters, it possesses distinctive body parameters—relatively abundant and fine shell temper (see Table 15-03)—that may be interpreted alternatively as evidence of exotic origin or local production of a functionally distinct vessel. Both alternatives remain viable at the present time.

In contrast to what are here viewed as locally produced grog-tempered and shell-tempered pottery (with the possible exceptions of sherds 40-108, 40-95, and 40-96), four sherds characterized by fine grit tempers are clearly of exotic origin. These four sherds; nos. 40-102, 40-103, 40-104, and 40-114 (Figures 15-13 to 15-16) have finely crushed (this is my view) fragments of metamorphic rocks (the latter is undeniable) that identify the origins of these sherds as somewhere in the Blue Ridge Province of the Appalachian Mountains.

Three of the fine-grit sherds were tentatively attributed by Welch to the Etowah ceramic series, presumably reflecting north Georgia contacts during what is termed the Early Mississippian period there (e.g., King 2003:29–30). The fourth fine-grit vessel (#40-114) was initially identified as Baldwin Plain, a sand-tempered type associated with the Miller

culture of northern Mississippi (e.g., Jenkins and Krause 1986), but is now in need of reclassification.

Particular attention should be paid to the provenience of these fine-grit sherds at Shiloh because of the possibility that they may be of Middle Woodland affiliation. The reason for raising this issue is that the same fine-grit temper observed in sherds 40-102, 40-103, and 40-104 (which is derived from metamorphic rocks rich in microcline and

amphibole plus lesser amounts of mica) characterizes trade vessels in Hopewellian contexts in southern Ohio and northern Kentucky. Whatever the true cultural affiliation of these sherds, the occurrence of this microcline-amphibole-rich gneiss as fine grit temper at Shiloh is the first such occurrence so far reported outside of the context of Hopewellian sites of the middle Ohio Valley and the Appalachian highland portions of North Carolina and Tennessee.

CHAPTER 16

PLANT REMAINS FROM SHILOH MOUND A

KANDACE D. HOLLENBACH, AMANDA TICKNER, AND KIMBERLY A. SCHAEFER

The excavations at Mound A provide an opportunity for the collection and examination of plant remains from such a specialized context. Although a number of Mississippian platform mounds have been excavated in the Southeast over the past century, relatively few have been investigated as extensively as Mound A since the WPA era, or in other words, since the recovery of plant remains has become a regular component of field work. As such, the plant remains recovered from Mound A have the potential to significantly inform us about the use and discard of plants on and within a platform mound.

SEAC approached the sampling design for plant materials with several questions in mind, as part of an overall project research design (Anderson and Cornelison 2001a, 2002a, 2002b; see Chapter 1). These can be divided into spatial and temporal categories. Spatial questions include how the slopes of the mound were used, particularly whether trash was dumped down the sides of the mound. If so, was dumping performed in a favored corner, perhaps related to ceremonial or feasting behavior? Temporal questions address how plant use may have changed over the course of the construction of the mound. These include possible shifts in the intensity of maize agriculture, as well as in the use of native cultigens and wild plant foods. How these might relate beyond economic concerns to shifts in the use of the mound and to the political history of the Mississippian center at Shiloh are also of interest.

It is also important to ask how the plant remains became part of the archeological record of the mound. In addition to pondering whether the hearths and structures associated with the various stages of mound construction may be related to ceremonial and/or domestic activities, it is important to consider whether the deposits are primary, secondary, or tertiary in nature. In particular, plant remains recovered from general mound fill are not as likely to represent activities performed on the mound as much as activities performed in

the location(s) from which the fill was obtained. These may still be useful for understanding the economic practices of the community living in the vicinity of and building the mound, however.

An analysis of plant remains recovered during the 2001–2004 excavations at Shiloh Mound A is presented below. These plant materials derive from flotation samples, collected both from features and general proveniences, as well as more specialized samples that were not processed using flotation. The latter include soil samples collected for radiocarbon and AMS dating, in addition to specimens of charred matting. Details of the nature of the plant materials recovered from the various sample sets, and the information about plant use and seasonality that can be drawn from them, are discussed. The plant assemblages from Shiloh Mound A are also compared with those from contemporaneous sites. Finally, the spatial and temporal questions posed in the project research design, and the potential that the plant assemblage holds for answering them, are addressed.

METHODS

The various samples were collected by SEAC crew members during the 2001–2004 field seasons. Flotation samples include both general provenience and feature deposits. General provenience samples were excavated in columns from the northeast corner of every unit in the 1m trenches opened in 2001, and from several other units (see Chapter 3). The columns measured 10x10 cm, and were excavated in arbitrary 10cm levels (Abbott 2003). Collection of samples from features varied with feature size. Smaller features were sampled in their entirety. From larger features, at least 10L of fill were collected; if multiple zones were noted in the cross-section of larger features, each zone was sampled separately (Anderson and Cornelison 2001a, 2002a, 2002b; NPS 2003). Soil and flotation samples were

routinely collected from structure floor surfaces, where these were well defined; additional samples include carbonized materials, such as charred matting, which were collected and bagged but not floated. A total of 1648 flotation samples from 773 separate proveniences weighing 655,733 grams were recovered during the excavations at Mound A (see Chapters 3, 11, and 19). A preliminary analysis of 50 samples collected in 2001 were examined by Abbott (2003), 38 from arbitrary levels and 12 from features. Abbott's report is included in the report electronic appendices.

Once the samples were weighed and their volumes measured, SEAC personnel processed them using a Flote-Tech Model A machine. Heavy and light fractions were captured using 0.425mm mesh (Abbott 2003). Once the samples dried, the heavy fractions were sieved through ¼-in screens. Carbonized plant remains were removed from the portions greater than ¼-in in size, weighed, and bagged. These plant remains, along with the heavy fraction materials less than ¼-in in size and the light fractions, were sent to us for analysis.

Both heavy and light fractions were sieved through a set of geologic screens. Non-flotation samples were treated as heavy fractions. Materials were examined using a stereoscopic microscope with magnification between 10x and 40x. All materials greater than 2mm in size were sorted into categories; plant materials were further identified to the lowest possible taxonomic level, counted and weighed. All materials less than 2mm in size were scanned for seeds and taxa not present in the larger screen. To mitigate biases against recovery, acorn shell and maize cupules, glumes, and kernels were pulled from the 1.40mm screens as well. Identifications were made with reference to Martin and Barkley (1961), as well as the comparative collection housed at the University of North Carolina's Ethnobotany Laboratory. Dr. Margaret Scarry also generously assisted with difficult identifications. Due to the low potential for preservation of uncarbonized plant materials on open-air sites in the Southeast, only carbonized plant remains were considered in this analysis.

RESULTS

From the 68 flotation samples and 20 other samples selected for analysis here, nearly 875g of plant materials were recovered (Table 16-01). Much of this is represented by wood, weighing just over 850g. Among the non-wood plant remains, over 40 taxa were identified (Table 16-02). These include nuts, wild fruits, crops, edible seeds, weedy seeds, and miscellaneous taxa (Table 16-03). Each of these non-wood categories are discussed in turn, and then their recovery among the various sample and feature types is compared.

Nuts

Among the food plant remains recovered from the samples, nuts—particularly hickory nuts—are present in the greatest quantity, both by count and weight. Acorn was recovered in smaller quantities, but this is in part due to its lower potential for preservation. The thinner, more fragile shells of acorn are less likely to be preserved than more robust hickory nutshell. In addition, hickory nutshell, which is relatively high in oil, may be used as a fuel once the nutmeats are extracted. This further increases its likelihood for preservation and recovery (Lopinot 1984). In addition to hickory and acorn, several fragments of nutshell that could only be identified to the Walnut family were recovered. One nutshell fragment, similar to hazelnut (*Corylus* sp.) in thickness and shape but lacking the characteristic longitudinal channels through the shell, was also recovered.

Although both hickory and acorn nuts ripen in autumn and grow within a variety of wooded settings, their processing requirements and nutritional values are markedly different. Hickory nuts can be processed in bulk by crushing and boiling. The nuts—both shell and meats—are pulverized and then placed in boiling water. The nutmeats float and may be skimmed from the top of the mixture, while the shells sink. The meats may be further melted to produce a rich milk or oil. This milk is then added to stews, hominy, puddings, or consumed as a beverage (Carr 1895:171–172, 182–183; Fritz et al. 2001; Gardner 1997;

Table 16-01. Materials recovered from the paleoethnobotanical samples examined by ARL Personnel from the excavations in Mound A. Asterisk (*) indicates non-flotation samples.

F.S. No.	EU	Level	N	E	Stage	Feat. No.	Volume (liters)	Sample weight (grams)	Sub-sample weight (grams)	Plant weight (grams)	Wood weight (grams)	Residue weight (grams)	Contaminant weight (grams)
Charred beam/log													
1147	80,86,118	2	46,47	179,180	I	44	9	357.49		188.21	185.88	110.64	54.23
1364	164	2	49	183	II	67	83.5	1364.87	273.44	6.49	6.35	121.58	205.35
3650	140	11	43	180	III	375	*	494.59		494.59	494.59		
Charred fabric/matting													
2653	82,90	14,9	40	180,181	III	147	*	0.25					
2706	118	8	46	179	II		87	709.83	195.48	2.34	2.29	88.72	103.78
2736	138	9,10	41	180	III	161	*	0.21		0.14		0.07	
2739	125	15-17	41	181	II	147/161	*	2.63					
2747	118	8	46	179	III	163	*	0.43					
2767	125	17	41	181	III	161	*	0.23		0.23	0.23		
3176	126	10	43	182	III	262	0.7	7.86		0.05	0.05	7.4	0.39
3189	126		43	182	III	262	*	0.04					
3190	126	10	43	182	III	262	*	0.22		0.03	0.02		0.19
3277	12a	11	40	182	III	280	4	15.72		2.45	2.44	6.29	6.85
3615	126	12	43	182	III	379	4.5	66.15		7.46	6.88	34.72	22.93
3616	104	17	44	182	III	379	1	19.25		4.87	4.87	10.69	3.5
3617	168	9	43	183	III	379	<.1	8.38		2.94	2.94	5.13	0.29
3618	166	10	44	183	III	379	<.1	4.28		0.24	0.24	3.97	0.06
3619	166	10	44	183	III	379	*	39.48		7.77	0.98	17.67	13.08
3635	104	17	44	182	III	379	*	34.57		15.36	5.23	12.21	1.02
3636	126	12	43	182	III	379	*	69.69		15.82	12.51	27.92	24.85
3866	79	16	49	182	III	473	*	NA					
Fired clay basin/heart surface													
1609	125	5	41	180	II	59	6	338.08		negligible	negligible	119.33	216.63
1666	42	5,6	47	181	II	83b	5	211.06		0.13	0.1	22.85	160.06
1829	136,133,111	8	57,58	181,182	II	85a	11	540.83		0.18	0.17	200.04	338.22
Sooted floor													
2447	126	6	43	182	II/III	MCBF	*	36.53		0.01			35.77

F.S. No.	EU	Level	N	E	Stage	Feat. No.	Volume (liters)	Sample weight (grams)	Sub-sample weight (grams)	Plant weight (grams)	Wood weight (grams)	Residue weight (grams)	Contaminant weight (grams)
2448	140	5	43	180	II/III	MCBF	*	46.54		negligible	negligible		45.02
2449	104	13	44	182	II/III	MCBF	*	49.36		0.02	0.02		48.42
2451	141	6	44	179	II/III	MCBF	*	14.74		negligible	negligible		14.65
4696	295	12	39	184	VI		*	311.38		0.06	0.05	151.27	294.88
4706	267	12	37	184	VI		*	310.77		0.39	0.39	204.53	99.83
Wall trench fill													
4038	86	15	47	180	III	507	9	60.61		0.05	0.02	34.1	
4431	140	16	43	180	IV	581	6	44.29		0.29	0.26	25.44	18.34
4463	140	17	43	180	IV	594	10	193.21		0.77	0.69	81.75	110.12
Posthole													
2215	165	4	57	183	II	109	1	29.07		0.21	0.2	11.64	17.14
2596	78	7	52	180	II	136	0.75	8.49		0.02	0.02	2.83	5.6
3233	157	7	50	183	II	272	15	31.45		0.08	0.08	10.49	20.86
4221	254	11-14	40	184	IV	561	1	91.84		1.65	1.43	43.91	45.08
4278	296	5	38	184	IV	572	4	110.63		0.58	0.53	33.02	76.84
4279	296	5	38	184	IV	572	5	177.2		0.45	0.44	52.56	123.92
4425	55	25	43	181	III/IV	559	13	130.87		0.77	0.74	58.33	71.26
4432	140	16	43	180	IV	582	<1	3.54		0.04	0.04	1.98	1.51
4433	140	16	43	180	IV	583	<1	2.5		0.01	0.01	1.41	1.08
4434	140	16	43	180	IV	584	<1	2.34		0.03	0.03	1.13	1.19
4435	140	16	43	180	IV	585	1	6.06		0.04	0.04	2.77	3.26
4438	296	5-8	38	184	IV	572	4	56.94		0.67	0.67	19.19	37
4459	296	7	38	184	V	590	5	50.79		0.52	0.51	20.72	29.49
4466	55	28	43	181	V	598	1	8.54		0.15	0.15	3.75	4.63
4528	254	20	40	184	VII	602	<1	6.68		0.09	0.09	2.42	4.15
4529	254	20	40	184	VII	603	3	26.56		0.4	0.28	9.75	16.22
4530	254	20	40	184	VII	604	2	33.2		0.5	0.28	13.04	19.66
4531.2	254	20	40	184	VII	605	7	104.47		0.63		41.61	61.08
4533	254	20	40	184	VII	607	1	1.09		0.37	0.3	0.7	0.02
4553	296	13	38	184	VII	609	<1	1.93		0.01	0.01	0.74	1.17

F.S. No.	EU	Level	N	E	Stage	Feat. No.	Volume (liters)	Sample weight (grams)	Sub-sample weight (grams)	Plant weight (grams)	Wood weight (grams)	Residue weight (grams)	Contaminant weight (grams)
4554	296	13	38	184	VII	610	<1	6.03		0.05	0.01	1.96	3.93
4555	296	13	38	184	VII	611	<1	3.45		negligible	negligible	0.92	2.5
4556	296	13	38	184	VII	612	<1	4.76		0.07	0.01	1.67	2.98
4683	254	20	40	184	VII	606/607	NA	217.62		0.14	0.14	16.49	200.74
4702	295	15	39	184	VII	619	5	39.5		0.52	0.4	0	30.41
Hearth fill													
1631	83	4	41	179	II	75	4	9.68		0.59	0.59	0	3.76
1665	42	5,6	47	181	II	83a	9	188.12		0.51	0.38	34.85	123.88
1804	136,137,111	10	57,58	181,182	I/II	85a	8	144.42		0.74	0.7	97.11	45.1
1814	136	7	57	182	I/II	85b	1.5	21.44		0.09	0.09	2.98	1.37
2652	82,90	9,14	90	180,181	III	147	2.5	59		0.63	0.59	15.76	42.58
2688	90	16	40	181	III	159	4	30.19		0.1	0.06	11.52	18.61
2690	182	11	40	180	III	158	3	12.92		negligible	negligible	5.83	7.11
2693	138,125	9,16	41	180,181	III	161	11	101.74	38.8	27.13	27.13	17.97	17.97
2795	50	18	44	181	II/III	172	6	106.2		0.43	0.39	27.56	78.14
2939	41	17	46	181	II	200	3.5	2.82		0	0	1.91	0.87
2940	41	17	46	181	II	200a	1	625.49		4.08	3.21	239.9	372.19
3032	41	17	46	181	II	200	*	194.16		1.37	1.27	104.29	82.18
3052	41	17	46	181	II	200c	9	110.31		0.99	0.52	42.17	67.16
3111	87	8	54	180	I	247a	5	91.61		2.34	2.34	33.23	55.9
3771	57	23	45	181	III	440	20.5	311.47	142.35	4.39	4.39	76.27	95.43
3772	57	23	45	181	III	440	5	264.84		24.92	24.92	54.02	67.5
3774	57	23	45	181	III	440	3	45.58		0.04	0.04	16.4	29.15
3780	57	23	45	181	III	440	*	11.47		11.47	11.47	0	0
4698	267	62cm	37	187	V	617	2	11.1		3.35	3.35	0	0.19
Column sample													
4226	254	11	40	184	V		12	221.96	24.96	2.08	2	88.25	102.86
4421	254	16	40	184	V1		NA	1794.02	243.78	1.75	1.52	105.99	135.25
4440	254	18	40	184	V1		NA	1451.98	174.03	1.54		85.28	81.53
4441	296	6	38	184	V		13	169.79		0.9	0.83	84.55	83.4

F.S. No.	EU	Level	N	E	Stage	Feat. No.	Volume (liters)	Sample weight (grams)	Sub-sample weight (grams)	Plant weight (grams)	Wood weight (grams)	Residue weight (grams)	Contaminant weight (grams)
4457	254	19	40	184	VI		NA	751.65	188.39	4.62	3.46	87.52	95.9
4527	296	9	38	184	V		NA	828.48	222.38	3.18	13.47	64.33	152.04
4547	296	12	38	184	VI		NA	2583.09	238.86	15.47	12.06	79.45	142.72
4680	98	16	44	180	III/IV/V		NA	135.23		2.06	2	63	69.28
Other													
2437	91	5	42	179	II	126	6	36.96		0.07	0.07	13.59	23.24
3695	131	14	47	179	III	419	12.1	146.29		0.82	0.82	57.93	87.09
3986	100	14	47	182	III	496	15.5	401.57		0.26	0.14	182.38	218.85
750.2.5	60, 64	7, 8	73	181	*	25	NA	26.1		0.01	0.01	0	12

* Cannot assign stage. Feature is a small pit at the base of the mound on the north side.

Table 16-02. Non-wood plant remains recovered from the paleoethnobotanical samples examined by ARL personnel from the excavations in Mound A.

F.S. No.	Feat. No.	Cupule (ct.)	Cupule weight (g.)	Kernel (ct.)	Kernel weight (g.)	Acorn (ct.)	Acorn weight (g.)	Hickory (ct.)	Hickory weight (g.)	Unidentifiable (ct.)	Unidentifiable weight (g.)	Unidentified weight (g.)	Other
Charred beam/log													
1147	44	3				1		5	0.05	11	0.1		1 acorn cf., 1 Juglandaceae nutshell (0.01g); 1 kernel cf.; 4 monocot stem (0.04g); 1 persimmon cf.; 93 pitch (0.81g); 3 stem (0.01g)
1364	67			3	0.04			8	0.1	18	0.09	9	0.03
3650	375												pine cf. (uncarbonized)
Charred fabric/matting													
2653	147												cane cf. (0.24g); 1 monocot stem (0.01g)
2706		1		1	0.01	1		5	0.04			6	0.01
2736	161												4 cane (0.14 g)
2739	147/161												cane/monocot stem (2.63 g)
2747	163												1 cane (0.01g); cane cf. (0.42g)
2767	161												
3176	262												
3189	262												
3190	262												3 cane cf. (0.04g)
3277	280												3 cane cf. (0.01g)
3615	379			1	0.01			1	0.01				1 cupule cf. 41 pine cone/wood (0.23g); 1 unidentifiable seed
3616	379									91	0.34		
3617	379											2	
3618	379												
3619	379												10 cane cf. (0.04g)
3635	379									264	6.75		8 cane cf. (0.07g); 2 persimmon cf.
											10.06		
3636	379									256	3.28		2 monocot stem (0.02g); 3 persimmon cf. (0.01g)

F.S. No.	Feat. No.	Cupule (ct.)	Cupule weight (g.)	Kernel (ct.)	Kernel weight (g.)	Acom (ct.)	Acom weight (g.)	Hickory (ct.)	Hickory weight (g.)	Unident- ifiable (ct.)	Unident- ifiable weight (g.)	Unident- ified (ct.)	Unident- ified weight (g.)	Other
3866	473													pine cf.
Fired clay basin/hearth surface														
1609	59											2		
1666	83b	1		1				8	0.03			8	0.03	
1829	85a			1	0.01					5	0.01	5	0.04	1 blueberry; 1 chenopod cf.; 1 cucurbit seed; 1 Poaceae seed
Sooted floor														
2447	MCBF													1 kernel cf.
2448	MCBF													
2449	MCBF													
2451	MCBF													
4696														
4706										2				1 Juglandaceae nutshell (0.01g) 2 chenopod
Wall trench fill														
4038	507					1		1		1				1 cane; 1 corn kernel cf.; 6 monocot stem (0.06g); 1 unidentified seed
4431	581							4	0.03			6	0.02	1 maygrass
4463	594							8	0.08			13	0.06	2 copperleaf; 1 dock cf.
Posthole														
2215	109	1	0.01											1 maygrass
2596	136													1 bedstraw; 1 carpetweed; 1 chenopod; 9 cupule cf.; 5 kernel cf. (0.01g); 3 persimmon seed coat; 3 persimmon seed cf. (0.02g); 4 purslane; 11 unidenti- fied seeds; 3 unidenti- fiable seeds
3233	272													
4221	561	19	0.1	2		5	0.01	4	0.02	13	0.06			
4278	572			1				4	0.05			3		1 Grass family

F.S. No.	Feat. No.	Cupule (ct.)	Cupule weight (g.)	Kernel (ct.)	Kernel weight (g.)	Acom (ct.)	Acom weight (g.)	Hickory (ct.)	Hickory weight (g.)	Unident- ifiable (ct.)	Unident- ifiable weight (g.)	Unident- ified (ct.)	Unident- ified weight (g.)	Other
4279	572	2								4	0.01			
4425	559	1						2	0.03			17	0.06	1 sedge
4432	582													
4433	583													
4434	584													
4435	585													
4438	572	1						3						1 erect knotweed; 2 knotweed, 1 maygrass
4459	590	1						4			0.01			1 blueberry cf.; 1 chenopod
4466	598													
4528	602													
4529	603	21	0.05	2	0.01			4	0.05			24	0.07	1 cheno-am; 5 glume (0.01g)
4530	604	10	0.08					8	0.07	6	0.05	4	0.02	
4531.2	605	5	0.04	1	0.01			27	0.56					2 black walnut (0.02g)
4533	607							3	0.06					3 maygrass (0.01g)
4553	609					2								
4554	610							4	0.04					3 chenopod; 1 cupule cf.; 1 kernel cf.; 1 un- identified nutshell; 8 unidentified seeds
4555	611					1		1						
4556	612					1		1	0.06					
4683	606/607	1								2				
4702	619	5	0.02	2	0.01	1		7	0.08			1	0.01	
Hearth fill														
1631	75													
1665	83a	5	0.01					17	0.05			22	0.12	4 chenopod; 1 glume;
1804	85a													1 Grass family
1814	85b							5	0.04			5	0.02	1 grape; 4 grape cf.

F.S. No.	Feat. No.	Cupule (ct.)	Cupule weight (g.)	Kernel (ct.)	Kernel weight (g.)	Acorn (ct.)	Acorn weight (g.)	Hickory (ct.)	Hickory weight (g.)	Unident- ifiable (ct.)	Unident- ifiable weight (g.)	Unident- ified (ct.)	Unident- ified weight (g.)	Other
2652	147			1				4	0.04	2	0.01			
2688	159	1	0.01					8	0.03			2	0.01	
2690	158											1		
2693	161									9	0.11	1		
2795	172	1								6	0.04			1 maygrass; 3 unidentified seeds
2939	200			1								1		1 chenopod cf.
2940	200a	2	0.03	5	0.07			61	0.74	19	0.06	25	0.01	1 chenopod cf.
3032	200									5	0.02			17 cane (0.08g); 1 unidentified seed
3052	200c	2	0.02	5	0.04			29	0.4			23	0.04	29 cheno-am (0.01g)
3111	247a													
3771	440											3	0.06	
3772	440											3	0.08	cane cf.; diffuse porous wood; pine
3774	440													1 acorn cf.; 2 chenopod cf.; 3 Grass family; 1 pitch; 2 purslane; 1 sunflower/ sumpweed; 4 unidentified seeds
3780	440													cane cf; softwood
4698	617											7	0.04	cane; diffuse porous wood; white oak
Column sample														
4226								8	0.08			10	0.02	1 maygrass
4421		4	0.02					10	0.11	46	0.09	3		1 blackberry/ raspberry; 1 cheno-am; 2 erect knotweed; 1 grape; 3 Grass family; 2 knotweed cf.; 2 maygrass; 10 smart-weed (0.01g)

F.S. No.	Feat. No.	Cupule (ct.)	Cupule weight (g.)	Kernel (ct.)	Kernel weight (g.)	Acorn (ct.)	Acorn weight (g.)	Hickory (ct.)	Hickory weight (g.)	Unident- ifiable (ct.)	Unident- ifiable weight (g.)	Unident- ified (ct.)	Unident- ified weight (g.)	Other
4440				37	0.12	82	1.27	14	0.07	55	0.22	7	0.05	2 bulrush; 1 bulrush cf.; 4 cheno-am; 12 chenopod; 6 knotweed; 2 little barley; 20 maygrass (0.01g); 1 poke cf.; 1 Spurge family; 1 yellow stargrass; 4 unidentifi- able seeds
4441						14	0.07					28	0.05	2 corn glumes (0.02g); 1 little barley
4457		10	0.09	18	0.09	9	0.02	86	0.72	30	0.17			20 amaranth; 2 bedstraw; 5 blackberry/ raspberry; 1 black walnut; 1 blue- berry; 1 cheno-am; 13 chenopod; 6 corn glumes (0.02g); 4 Grass family; 7 knotweed; 19 Knotweed family; 5 little barley; 2 maygrass; 1 mulberry; 8 purslane; 1 squash; 2 sunflower cf.; 30 unidentifiable seeds
4527		98	0.36	8	0.08	24	0.07	107	2.48	16	0.05			14 chenopod; 2 erect knotweed (0.01g); 16 knotweed (0.03g); 2 little barley; 2 purslane
4547		8	0.04	10	0.07	10	0.05	193	3.16			7	0.06	
4680						5	0.06							
Other														
2437	126	1												1 blackberry/ raspberry; 1 Panicoid grass seed
3695	419	1		1										
3986	496					11	0.12					2	0.02	
750.2.5	25	1	0.01											

Table 16-03. Summary of non-wood plant remains recovered from the paleoethnobotanical samples examined by ARL personnel from the excavations in Mound A.

	Count	Weight (g)	Seasonality		Count	Weight (g)	Seasonality
NUTS							
Acorn (<i>Quercus</i> spp.)	106	0.27	Fall	Knotweed family (<i>Polygonaceae</i>)	19		Late summer/fall
Acorn cf. (<i>Quercus</i> spp. cf.)	2		Fall	Little barley (<i>Hordeum pusillum</i>)	10		Spring/early summer
Hickory (<i>Carya</i> spp.)	746	10.73	Fall	Maygrass (<i>Phalaris caroliniana</i>)	35	0.02	Spring/early summer
Walnut family (<i>Juglandaceae</i>)	5	0.04	Fall	Smartweed (<i>Polygonum</i> sp.)	10	0.01	Late summer/fall
Unidentified nutshell	1			Sunflower cf. (<i>Helianthus annuus</i> cf.)	2		Late summer/fall
WILD FRUITS				Sunflower/sumpweed (<i>Helianthus annuus/Iva annua</i>)	1		Late summer/fall
Blackberry/raspberry (<i>Rubus</i> sp. cf.)	7		Summer	WEEDY SEEDS			
Blueberry (<i>Vaccinium</i> sp.)	2		Summer	Bedstraw (<i>Galium</i> sp.)	3		
Blueberry cf. (<i>Vaccinium</i> sp. cf.)	1		Summer	Bulrush (<i>Scirpus</i> sp.)	2		
Grape (<i>Vitis</i> sp.)	2		Summer	Bulrush cf. (<i>Scirpus</i> sp. cf.)	1		
Grape cf. (<i>Vitis</i> sp. cf.)	4		Summer	Carpetweed (<i>Mollugo</i> sp.)	1		
Mulberry (<i>Morus</i> sp. cf.)	1		Summer	Copperleaf (<i>Acalypha</i> sp.)	2		
Persimmon seed coat (<i>Diospyros virginiana</i>)	3		Fall	Dock cf. (<i>Rumex</i> cf.)	1		
Persimmon seed cf. (<i>Diospyros virginiana</i> cf.)	9	0.03	Fall	Grass family (<i>Poaceae</i>)	14		
CROPS				Pokeweed cf. (<i>Phytolacca americana</i> cf.)	1		
Cucurbit (<i>Cucurbitaana</i> sp.)	2		Late summer/fall	Purslane (<i>Portulaca</i> sp.)	16		Summer/fall
Maize cupule (<i>Zea mays</i>)	206	0.89	Late summer/fall	Sedge family (<i>Cyperaceae</i>)	1		
Maize cupule cf. (<i>Zea mays</i> cf.)	12		Late summer/fall	Spurge family (<i>Euphorbiaceae</i>)	1		
Maize glume (<i>Zea mays</i>)	14	0.05	Late summer/fall	Yellow stargrass (<i>Hypoxis hirsuta</i>)	1		
Maize kernel (<i>Zea mays</i>)	63	0.45	Late summer/fall	MISCELLANEOUS			
Maize kernel cf. (<i>Zea mays</i> cf.)	11	0.02	Late summer/fall	Bark/wood	17	0.08	
EDIBLE SEEDS				Cane (<i>Arundinaria gigantea</i>)	23	0.23	
Amaranth (<i>Amaranthus</i> spp.)	20		Late summer/fall	Cane cf. (<i>Arundinaria gigantea</i> cf.)	24	0.82	
Cheno-am (<i>Chenopodium/Amaranthus</i> spp.)	37	0.01	Late summer/fall	Cane/monocot stem	--	2.63	
Chenopod (<i>Chenopodium</i> spp.)	50		Late summer/fall	Monocot stem	13	0.1	
Chenopod cf. (<i>Chenopodium</i> spp. cf.)	3		Late summer/fall	Pine cone/wood	24	0.15	
Erect knotweed (<i>Polygonum erectum</i>)	5	0.01	Late summer/fall	Pitch	94	0.81	
Knotweed (<i>Polygonum</i> spp.)	31	0.03	Late summer/fall	Stem	3	0.01	
Knotweed cf. (<i>Polygonum</i> spp. cf.)	2		Late summer/fall	Unidentifiable	880	21.59	
				Unidentifiable seed	5		
				Unidentified	253	0.93	
				Unidentified seed	61		

Kavasch 1977:2; Kuhnlein and Turner 1991:209; Swanton 1946:265, 354, 365; Talalay et al. 1984).

Acorn meats, on the other hand, contain bitter tannins that must be leached prior to consumption. For white oak acorns, the tannins may be released to some degree by toasting, which would also prevent the meats from molding or germinating. However, toasting also hardens the meats, making them more difficult to grind into a flour. If not parched, the nuts are cracked open to release the meats, which are then coarsely ground. The meats are then soaked in running water or boiled in successive changes of water to leach the tannins. Once dried, the meats may be ground further into a flour and used to make breads or porridge, or to thicken stews (Carr 1895:172; Densmore 1974:320; Gilmore 1932:189; Kuhnlein and Turner 1991:200–201; Niethammer 1974:35; Newberry 1887:38; Palmer 1871:409–410; Petruso and Wickens 1984:368; Powers 1873–74:374; Swanton 1946:259–260, 265, 279, 366).

Hickory nuts and acorns thus serve different dietary roles. High in fat and protein, hickory nuts add flavor and nutrients to otherwise starchy dishes. These fats may be particularly important during winter, when game is lean and diets are otherwise low in fats. In contrast, acorns are higher in carbohydrates, and thus served as a starch, and perhaps a staple, in the diets of prehistoric southeastern peoples (Scarry 2003).

Although hickory nuts and acorns generally ripen in autumn, their window of availability is shortened to several weeks, usually in October, by competition from wildlife such as squirrels, turkeys, deer, and birds, as well as molds and insects (Gardner 1997; Radford et al. 1964; Schopmeyer 1974; Talalay et al. 1984). In addition, mast trees, namely hickories and oaks, only produce sizeable crops every two to five years, depending on the species (Schopmeyer 1974). In between bumper crops, competition from wildlife is even keener, as trees within as much as a 400km radius produce relatively few nuts (Koenig and Knops 2000, 2005).

Wild Fruits

Relatively few wild fruits were recovered from the samples, represented by low numbers of seeds.

These include seven blackberry/raspberry seeds, two definitive and one possible blueberry seeds, two definitive and four possible grape seeds, one mulberry seed, and three persimmon seed coats and nine possible persimmon seed fragments. Their low recovery is certainly related to their preservation potential rather than their use. Fruits require little or no processing; as such, seeds are often consumed along with fruits, particularly when the seeds are small. The seeds are thus not as likely to be introduced to fire and carbonized as food items that require more processing (Yarnell 1982). This is seen to some extent among the fruits. Persimmon seeds are much larger and are primarily removed prior to eating. It is not surprising, then, that persimmon is better represented in the samples than blueberry, with its much smaller seeds.

Blackberries, raspberries, blueberries, grapes, and persimmons are generally found in similar habitats, primarily thickets and woods. Mulberries prefer low, rich soils, including river bottoms. The brambles and persimmons also favor more disturbed grounds, such as abandoned fields (Radford et al. 1964). The berries and grapes ripen in summer, while persimmons do not ripen—and are therefore not palatable—until fall. Fruits are generally high in sugar, and therefore carbohydrates, as well as vitamins and minerals (Kuhnlein and Turner 1991). Because they require little processing, they provide a significant amount of calories relative to the amount of energy expended to obtain them. Native groups used them to flavor a number of dishes, such as stews, porridges, and beverages, as well as eating them both fresh and dried (Densmore 1974; Kuhnlein and Turner 1991; Niethammer 1974; Palmer 1871; Peterson 1977; Swanton 1946; Yanovsky 1936).

Crops

Crop taxa recovered from the samples include maize remains and a single cucurbit seed. Maize is represented by kernels, as well as by cupules and glumes. While the kernels are eaten, cupules and glumes comprise the byproducts produced during the shelling of kernels from the cob. Within these samples, as well as those analyzed by Abbott (2003), the ratio of kernels to cupules and glumes

is approximately 0.2 to 0.5 (Table 16-04). The processing of maize is thus better represented than its consumption in the Shiloh Mound A deposits. This may reflect their secondary or tertiary nature rather than the types of activities undertaken on the mound. Further comparisons with ratios of other Mississippian assemblages will be discussed below.

Originally domesticated in Mesoamerica and introduced to the Southeast around A.D. 200 through human interaction, likely through the America Southwest and Plains, maize did not become a significant component of agricultural fields in the Southeast until between 1200 and 1000 years ago (Hart et al. 2002; Johannessen 1993; Scarry 1993). Planted in spring and harvested green in late summer or when dried on the ear in autumn, maize became a staple carbohydrate in late prehistoric groups' diets. The green ears could be simply roasted or boiled. Dried kernels were boiled in lye to loosen their hulls, which were then removed by rinsing. The resulting hominy could then be boiled and eaten as a porridge, or dried and ground into a flour. The flour could then be made into breads, dumplings, or porridge, or used to thicken stews or beverages (Moerman 2003; Ulmer and Beck 1951).

Although no cucurbit rind fragments were found, Late Woodland and Mississippian peoples cultivated squashes for their fleshy rinds as well as their edible seeds (Cowan 1997). Historic native groups planted cucurbits in between maize stalks in the spring, allowing their shoots and leaves to cover the cultivated ground, discouraging weeds and retaining moisture. Also harvested in late

summer or fall, the rinds could be boiled and eaten as a vegetable or mashed and added to corn meal to make bread or porridge. The seeds could be eaten raw or toasted (Moerman 2003; Wilson 1917).

Edible Seeds

Several edible seed taxa were recovered from the samples. These include amaranth, chenopod, erect knotweed, little barley, maygrass, and smartweed. Two possible sunflower seeds, as well as a seed fragment that may be either sunflower or sumpweed, were also recovered. In addition, a number of seeds were identified as cheno-ams. This category includes those seeds that may be either amaranth or chenopod, but are either too poorly preserved or too fragmentary to confidently identify as belonging to one of the two genera. Of note, 29 of the 37 cheno-ams derive from a single feature, a hearth at the center of Structure 1, Feature 200 (see Chapter 9).

These edible seed taxa may be considered part of the Eastern Agricultural Complex (Yarnell 1993). Among these taxa, chenopod, sunflower, and sumpweed demonstrate morphological changes related to domestication. Domesticated chenopod seeds display a truncate margin configuration as well as a thinner and smoother seed coat (Smith 1985). The seed coat thickness of the specimens recovered here was not measured using an electron microscope, but the lack of seed coat on a number of specimens speaks to their thinness and suggests a domesticate status (Smith 1985). In addition, the presence of truncated margins on several specimens was noted. In general, it appears that this

Table 16-04. Comparison of maize kernel to cupule ratios from Late Woodland and Early Mississippian contexts at Shiloh Mound A and in the Moundville polity.

	Context	Kernel (count)	Cupule (count)	Kernel/cupule ratio
Shiloh Mound A – Stages I-III ^a	Mound	83	143	0.58
Shiloh Mound A – Stages IV-VII	Pre-mound	44	189	0.23
Big Sandy ^b	Farmstead	170	371	0.46
Oliver ^b	Farmstead	141	313	0.45
Hog Pen ^b	Mound	603	409	1.47
Moundville Riverbank ^b	Elite domestic	2029	1248	1.63
Moundville North of Mound R ^b	Elite domestic	1740	1154	1.51

^a Includes samples from Abbott (2003).

^b Data from Welch and Scarry (1995).

assemblage includes both domesticated and wild varieties of chenopod. Domesticated sunflower and sumpweed seeds are marked by an increase in size (Yarnell 1994). The specimens recovered here are too fragmentary to measure, but do suggest that the occupants of Mound A cultivated sunflower and possibly sumpweed. This inference is supported by the sunflower pollen found in Mississippian age deposits in the core taken from the pond near Mound G by Meeks (Chapter 5).

Amaranth, knotweed, smartweed, little barley, and maygrass do not exhibit morphological changes, but are nonetheless considered to have been cultivated by prehistoric Native Americans. These taxa commonly occur in contexts along with chenopod, sunflower, and sumpweed (Yarnell 1993, 1994). In addition, maygrass is often found at sites outside of its natural distribution (Cowan 1994). Although recovered in relatively low numbers, both in these samples and those analyzed by Abbott (2003), the regular occurrence of these and other edible seed taxa suggests that peoples who built and used Shiloh Mound A cultivated native starchy seeds as well as maize and squash.

The edible seed taxa thrive in disturbed grounds, such as cultivated fields (Radford et al. 1964). Harvest and processing of the various taxa would also have been similar. Harvesters likely cut the mature seed heads, bundled them, and carried them back to their settlement to thresh and winnow the seeds (Murray and Sheehan 1984; Peterson and Munson 1984; Seeman and Wilson 1984). While the oily seeds (sunflower and sumpweed) generally would have been eaten raw or toasted, the starchy seeds could have also been boiled as a porridge. Alternatively, they could have been ground into a meal and made into mush or bread (Bare 1979; Kavasch 1977; Kindscher 1987; Kuhnlein and Turner 1991; Moerman 2003; Niethammer 1974; Palmer 1871; Peterson 1977; Yanovsky 1936). The taxa do differ in their season of availability, however. Chenopod, amaranth, knotweed, smartweed, sunflower, and sumpweed are sown in the spring and ripen in autumn; harvesters may have waited until the seed heads had been dried by the first frost to collect them (Murray and Sheehan 1984;

Peterson and Munson 1984; Seeman and Wilson 1984). In contrast, maygrass and little barley ripen in spring or early summer, and are likely to have been sown in winter (Cowan 1994; Radford et al. 1964). As the earliest source of carbohydrates available in the growing season, maygrass and little barley may have played a different dietary role than the other native starchy seeds.

Weedy Seeds

A number of weedy seed taxa, each represented by only one or several seeds, were recovered from the samples. These include bedstraw, bulrush, carpetweed, copperleaf, purslane, yellow stargrass, and seeds tentatively identified as dock and pokeweed. In addition, members of the Grass, Sedge, and Spurge families were identified. The seeds are likely incidental inclusions. All thrive in disturbed grounds, such as cultivated fields and habitation sites. They may have been brought in with harvested seeds, or on clothing.

The possible exceptions are pokeweed, purslane and dock, the seeds of which may be boiled and eaten as a porridge (Moerman 2003). In addition, carpetweed, purslane, and dock have edible leaves, as do chenopod and amaranth (Yarnell 1993). The spring leaves of these taxa are particularly tender and palatable. Although they may have been boiled and dried for future use, leafy greens were probably a welcome addition to spring diets after a winter of lean meats and stored plant foods (Bare 1979; Hunt 1992; Kavasch 1977:22; Kindscher 1987; Kuhnlein and Turner 1991; Niethammer 1974; Palmer 1871; Peterson 1977; Yanovsky 1936).

It is also important to note that historic native groups used most of the weedy taxa, particularly bedstraw, copperleaf, dock, and purslane, for a variety of medicinal and other non-food purposes (Moerman 2003; Mooney 1891). Although there is no evidence to support non-economic uses of these various plants, the late prehistoric peoples living in the region certainly employed a wide range of plants for an even broader array of tasks and purposes.

Miscellaneous Taxa

Among the miscellaneous taxa recovered from the samples are cane, monocot stem, bark, and possible pine cone. Along with wood, these taxa may have served as raw materials for creating various items of material culture. These include matting or fabric, which was recovered from a number of contexts within Mound A. Charred fragments of matting were associated with hearths as well as wall trenches, suggesting that woven mats may have been used to cover both walls and floors. Fragments of cane were frequently identified in the samples from charred matting. The recovery of such delicate items from Mound A speaks to the remarkable nature of the deposits. Perhaps more importantly, they serve as a reminder that archeologists routinely recover a notably limited range of the material culture, most commonly pottery sherds and stone tools and debitage, used by prehistoric peoples (see Chapter 19 for further information regarding the woven artifacts found in the Mound A excavations).

Although a detailed analysis of wood recovered from the samples was not undertaken, in large part because pollen analyses provide richer descriptions of the nature of the surrounding habitat (see Chapter 5), specimens from several samples were identified. Among these were wood fragments from Feature 375, that appeared to derive from a large, uncarbonized post (see Chapter 9). Unfortunately, the wood had molded by the time we had received it for analysis, but it appears to have been pine. For comparison, pine served as the primary construction material for a large structure on Mound V at Moundville, an Early Mississippian mound center in central Alabama (Tickner 2004). In addition to pine, several fragments of white oak, red oak, and hickory were identified in several samples from hearths, postholes, and charred matting from Shiloh Mound A (see Table 16-02).

Comparisons among Contexts

Although the samples yielded relatively few non-wood plant remains, several comparisons among contexts can be made. The samples derive from several types of contexts, including general mound fill (column samples), sooted floors, postholes and

wall trenches, hearths and the clay basins associated with them, and charred fabric, matting, beams and posts.

The two flotation samples from charred beams are unsurprisingly high in wood. They also contain some food remains, including maize and hickory, which were likely processed and/or eaten in the structures that the beams represent. An additional sample from a large, uncarbonized post yielded only wood, which appears to be pine.

The charred matting samples are almost exclusively cane or monocot stem. Cane, which grows quickly and is relatively flexible, thus seems to have been the material of choice for matting. Among the unidentifiable specimens are what appear to be compressed pieces of wood or monocot stem that had been situated perpendicular to each other. These specimens are reminiscent of plywood, with the grain of the wood or stem changing direction at least once. This patterning may reflect the original weave of the charred matting. Several fragments of maize and hickory, and one fragment of acorn shell, were also recovered from three of the charred matting flotation samples.

The sooted floor samples are also scarce in plant materials, even though all prepared floor surfaces were removed and floated in their entirety in 1x1m units, save for small samples retained from each square for pollen and phytolith analyses. The largest of these samples contained acorn, hickory, and two chenopod seeds. The paucity of plant remains in the sooted floor samples is in part related to their smaller size, but also suggests that floors were kept relatively clean of food debris. As such, these samples appear to be of limited use for determining plant use.

The structure wall trenches and postholes, in contrast, contain notable amounts of plant remains, even though most of the flotation samples are relatively small in size. Hickory and acorn were recovered in low but consistent numbers. Perhaps more surprising are the large numbers of maize cupules found in several of the posthole samples. Three postholes account for one-fourth of the cupules in the entire assemblage. A wide variety of seed taxa were also recovered from the posthole samples. The relative richness of these samples begs

the question of how the plant remains came to be in the postholes. It is possible that the plant materials were purposefully placed in the holes before the posts were inserted, but more likely the holes were filled with refuse after the posts were removed.

The flotation samples from hearth features similarly contain a variety of non-wood plant remains. Hickory nutshell is well represented in these samples, while acorn is notably absent. Maize remains regularly occur, although in low numbers. A wide range of seeds, including squash, blueberry, and grape seeds, were found in the hearth samples. Presumably related to food processing and preparation, the hearths are key contexts for sampling plant use on the mound.

The eight column samples yielded the richest recovery of plant remains. Over half of the maize cupules and kernels in the entire assemblage derive from these samples, as well as the majority of hickory and acorn shell. In addition, a broad variety of edible seed and fruit taxa were recovered from the column samples. Abbott (2003) similarly found a wide range of plant materials in column samples. The larger question, however, is whether these samples represent plant use on the mound. If the column samples comprise mound fill, as their context indicates, then the plant remains in the samples may better reflect plant use away from the mound, in areas from which the mound fill was obtained. Regardless, they do indicate how peoples who made, used, and lived near the mound used plants, and thus they suggest the overall economy of these peoples.

Quantitative comparisons can be made among the context types as well. Ubiquity, or the percent of samples from which a particular taxon was recovered, measures the frequency with which taxa are recovered. Items that are used more frequently in a given context will display higher ubiquity values (Popper 1988:60-61). Table 16-05 demonstrates that the ubiquity of maize and hickory are relatively high, suggesting their importance to the diet of the peoples who used Mound A. Fruits, edible seeds, and weedy seeds generally display lower, although consistent, ubiquity values.

Abbott (2003) similarly found high ubiquity values for maize and hickory in his analysis of plant remains from Mound A (see Table 16-05). Fruit and weedy seeds also display low ubiquity values. Starchy seeds, however, have a notably high ubiquity (75 percent) among Abbott's (2003) feature samples. The majority of these (eight) are postholes, two are wall trenches, one is a possible hearth basin, and one is a pit.

Few trends in ubiquity are apparent among the context types. The only two types that display values above zero in all categories are postholes and column samples. Additional quantitative comparisons among sample types can be made using boxplots. The boxplots presented here include data from this analysis as well as from samples included in Abbott's (2003) analysis. Plant density, defined as the total plant weight (g) divided by the volume (L) of a sample, is highest among samples from charred beams, matting, and hearths,

Table 16-05. Ubiquity of non-wood plant remains by context type in the paleoethnobotanical samples recovered from the excavations in Mound A.

Sample Type	N	Maize (%)	Acorn (%)	Hickory (%)	Fruits (%)	Edible Seeds (%)	Weedy Seeds (%)
Charred beam/log	2	100	100	100	0	0	0
Charred fabric/matting	7	29	0	29	29	0	0
Fired clay basin	3	67	0	33	33	33	33
Wall trench fill	3	0	33	100	0	33	33
Posthole	25	48	20	44	8	28	12
Hearth fill	17	41	0	35	6	24	12
Column sample	8	50	50	100	25	75	50
Other	4	75	0	25	25	0	25
Abbott's (2003) features	12	58	75	92	17	75	17
Abbott's (2003) columns	38	82	74	95	18	32	16

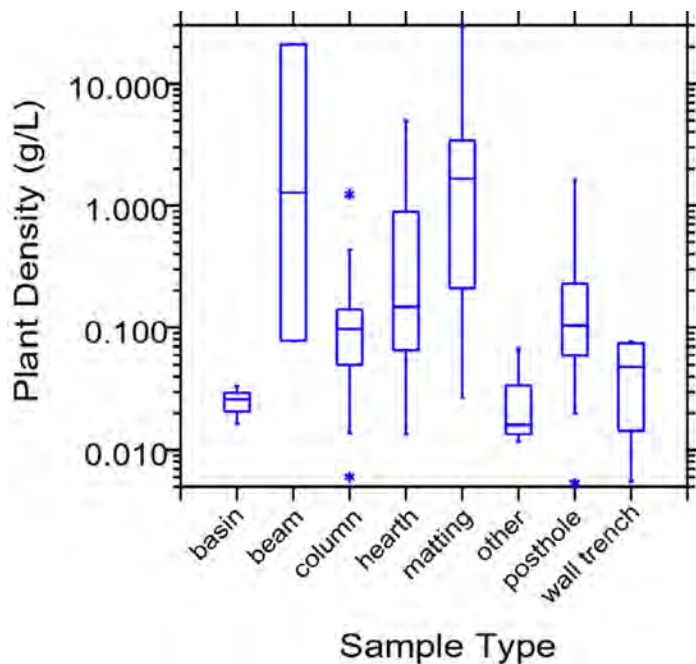


Figure 16-01. Boxplot comparing plant density by context type in the paleoethnobotanical samples recovered from the excavations in Mound A. Note that the y-axis is scaled logarithmically.

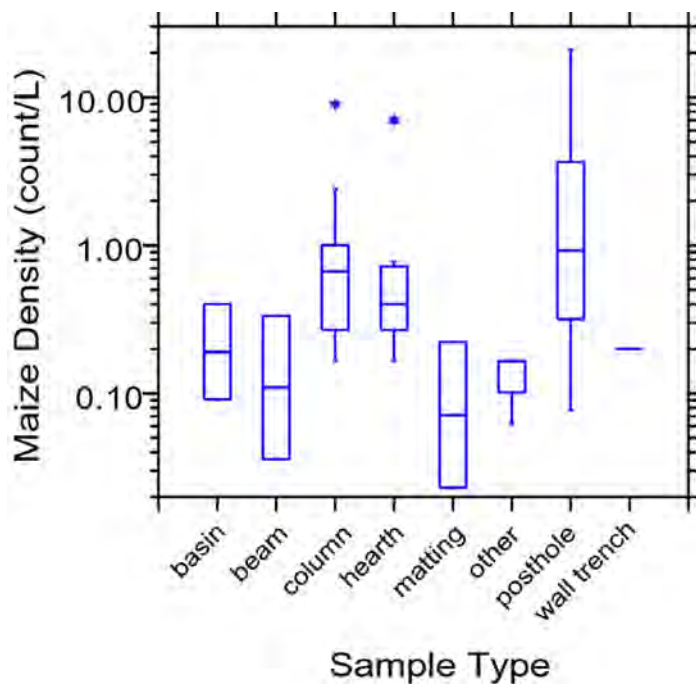


Figure 16-02. Boxplot comparing maize density by context type in the paleoethnobotanical samples recovered from the excavations in Mound A. Note that the y-axis is scaled logarithmically.

but these are heavily influenced by several samples with large quantities of wood charcoal (Figure 16-01). The densities of food remains show different patterns, however. The densities of maize remains and nutshell, defined as the count of these remains divided by the volume (L) of a sample, are highest in column samples, hearths, and postholes (Figures 16-02 and 16-03). The high values for postholes are somewhat misleading, as they are significantly influenced by the small volumes of these samples. Many are less than one liter in size, which would give a sample with one nutshell a density of 10 per liter. Edible seeds were regularly recovered from column, hearth, and posthole samples, while fruits and seeds from plants with edible greens were scarce outside of column and posthole samples (Figures 16-04, 16-05, and 16-06).

Comparisons of samples by the stratigraphic stage from which they were excavated also reveal interesting patterns. Plant density appears to be highest in Stage III, but these samples are heavily influenced by charred matting, which had high values of wood charcoal. Excluding Stage III, plant density is highest in Stages V, VI, and VII (Figure 16-07). Similar trends are apparent in boxplots of individual plant categories. The densities of maize remains are higher in the early stages of the mound (Stages IV through VII; Figure 16-08). Nutshell density is more evenly distributed, but is highest in Stage VI (Figure 16-09). The density of edible seeds is distinctly higher in Stages VI and VII (Figure 16-10). Although recovered less frequently, fruits and greens display a similar pattern, occurring in high density in the early construction stages (Figures 16-11 and 16-12).

This decrease in the density of food remains through time may be explained in part by better preservation in deposits sealed by the efforts of mound construction that began in earnest with Stage III (see Chapters 9 and 10). Sichler (see Chapter 17) found an even more pronounced difference in the recovery of animal bone from Stages I through III compared with from Stages IV through VII. Preservation of bone was significantly better in the lower stages. It is the

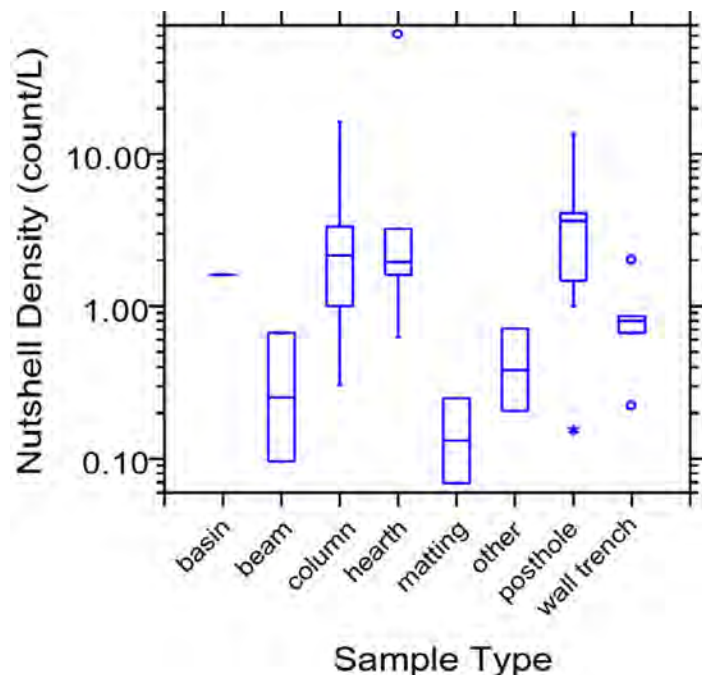


Figure 16-03. Boxplot comparing nutshell density by context type in the paleoethnobotanical samples recovered from the excavations in Mound A. Note that the y-axis is scaled logarithmically.

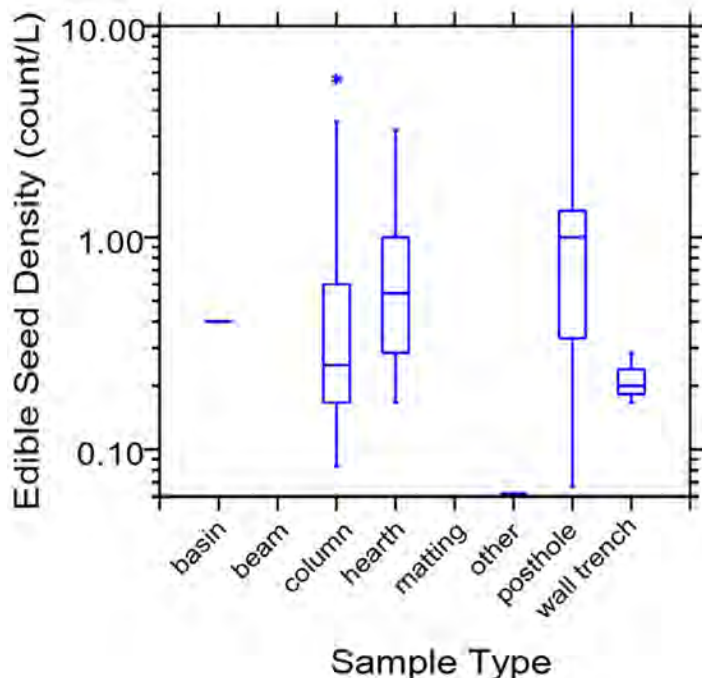


Figure 16-04. Boxplot comparing edible seed density by context type in the paleoethnobotanical samples recovered from the excavations in Mound A. Note that the y-axis is scaled logarithmically.

opinion of the authors, however, that the greater recovery of plant taxa below the mound is related at least in part to differences in use of the area before and after Stage III was built. The lowest stages may have been used for a wider variety of purposes by a less-restricted group of people. In contrast, the samples in Stages I through III may reflect more limited use of the space.

It seems, then, that some of the richest information regarding plant use at Mound A derives from contexts below the most significant mound construction events documented by the fieldwork, in Stages I through III. Hearth and posthole samples provide the best data about plant use on the mound; the former largely represent *in situ* use, while postholes likely contain plant remains used in or near the structures that fell into the holes as posts were pulled up. Column samples, particularly those from the lower stages of the mound, also contained significant amounts of plant materials. These lower column samples are more likely to reflect use of plants in the immediate vicinity than those from stages with significant mound fill. Plant remains recovered from mound fill probably represent plant use in areas from which the fill was excavated rather than on the mound itself.

DISCUSSION

The plant assemblage derived from samples collected at Shiloh Mound A indicates that the peoples who constructed and used the mound relied both upon gathering wild plant foods such as nuts and fruits, as well as cultivating field crops for their subsistence. The data cannot be used to suggest the relative dietary importance of the various food items. Each played a different dietary role—hickory nuts and oily seeds provided fats and proteins; maize, acorns, and starchy seeds supplied carbohydrates; and fruits and leafy greens contributed vitamins and minerals, as well as flavor, to dishes.

All of the plant foods may be stored, include leafy greens, if first dried (Moerman 2003). Therefore their seasonal availability provides little insight regarding the possible seasons

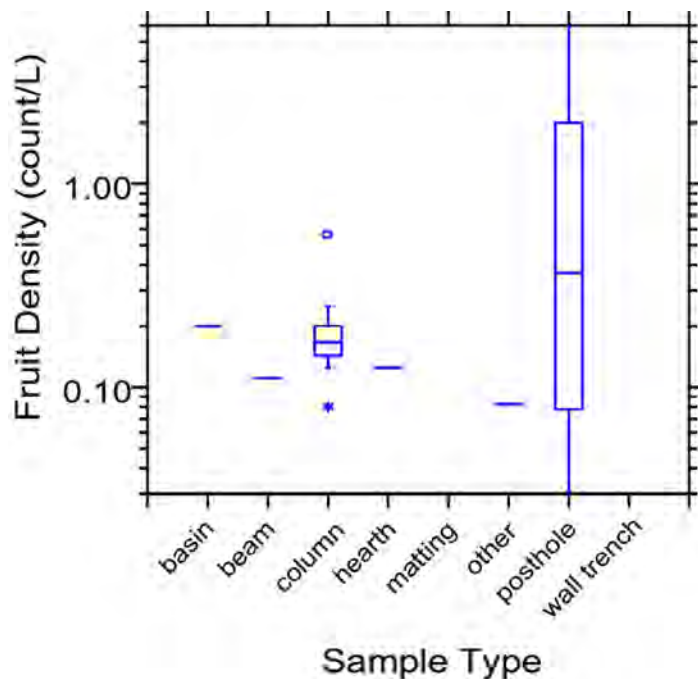


Figure 16-05. Boxplot comparing fruit density by context type in the paleoethnobotanical samples recovered from the excavations in Mound A. Note that the y-axis is scaled logarithmically.

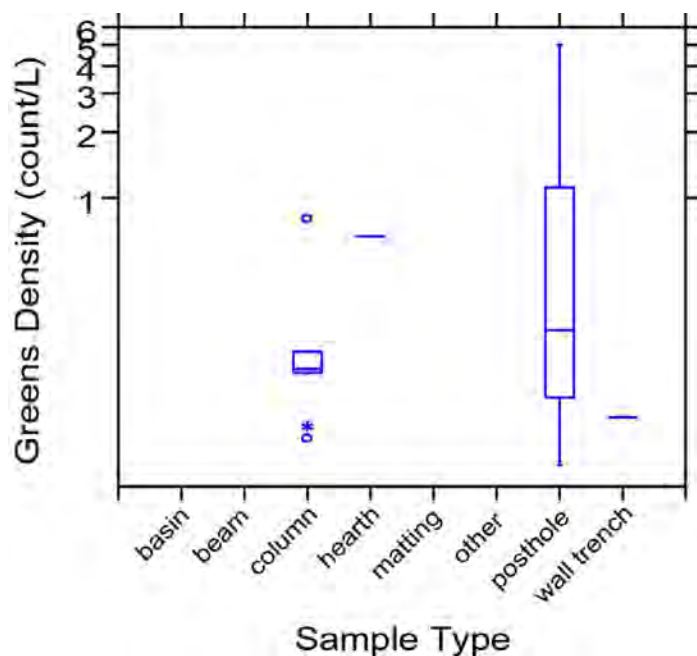


Figure 16-06. Boxplot comparing edible greens by context type in the paleoethnobotanical samples recovered from the excavations in Mound A. Note that the y-axis is scaled logarithmically.

of site occupation. However, the activities associated with exploiting the various plant foods are suggestive. Fields must be prepared and seeds planted in spring, when leafy greens are also available for collection. Early seeds such as maygrass and little barley are harvested in late spring and early summer. Wild fruits can be gathered through summer into early autumn, when crops are ready for harvest. Gardeners may have harvested starchy seeds along with maize, but might have opted to collect the seed heads in late autumn, after nut collection, when the plants have dried and the seeds are more easily processed. They may also have sown maygrass and little barley in late autumn or early winter. The plant remains thus suggest that these peoples maintained, cultivated, and harvested fields and gathered wild plant foods in the vicinity of Shiloh Mound A from spring through late autumn. It is quite possible that they lived off stores from these harvests and collections through winter as well.

The Shiloh Mound A paleoethnobotanical assemblage is similar to those recovered from other Late Woodland and Early Mississippian sites in the Midsouth. The mix of wild nuts and fruits with cultivated foods such as maize and starchy and oily seeds, accompanied by seeds of leafy greens and weeds, has been found at contemporaneous sites in eastern Tennessee (Chapman and Shea 1981; Kline and Crites 1979) and northern and central Alabama (Caddell 1982; Scarry 1986), as well as further afield in the Eastern Woodlands (Johannessen 1993; Scarry 1993, 2003; Yarnell and Black 1985). Comparisons of the ratios of starchy seeds to nuts recovered from these assemblages do suggest some differences among them. The ratio is much higher in the American Bottom and the Ohio Valley than in regions to the south and east of these areas (Johannessen 1993; Scarry 1993, 2003). Scarry (2003) suggests that acorn may have played a larger dietary role in these more southern regions than in the American Bottom or the Ohio Valley. Rather than investing further in cultivating starchy seeds, peoples in the Mid- and Lower South appear to have intensified their collection of acorns, which

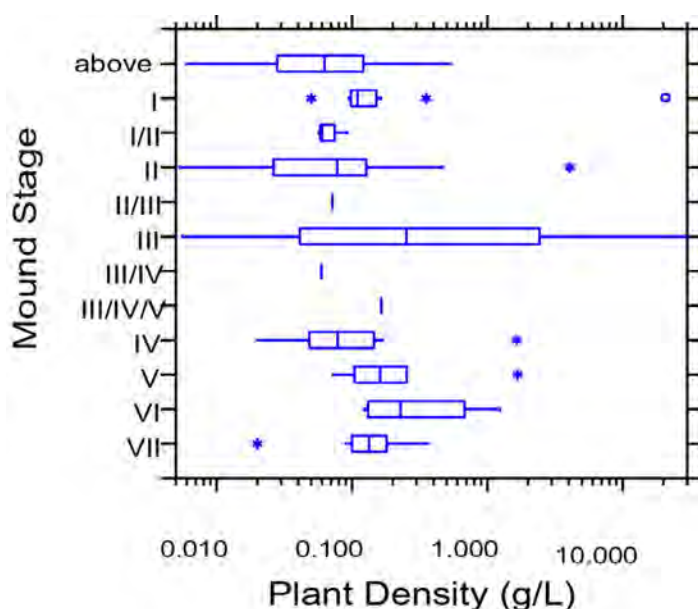


Figure 16-07. Boxplot comparing plant density by mound stage in the paleoethnobotanical samples recovered from the excavations in Mound A. Note that the x-axis is scaled logarithmically. "Above" refers to samples that cannot be assigned to a stage beyond "above Stage IV."

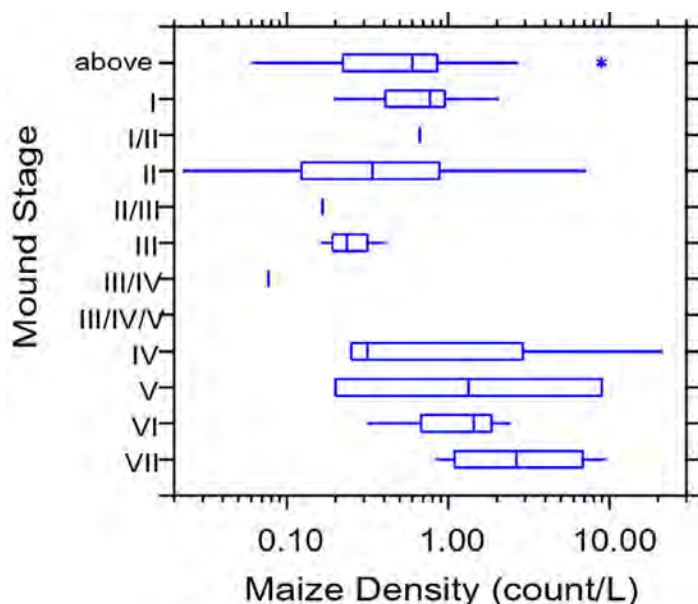


Figure 16-08. Boxplot comparing maize density by mound stage in the paleoethnobotanical samples recovered from the excavations in Mound A. Note that the x-axis is scaled logarithmically. "Above" refers to samples that cannot be assigned to a stage beyond "above Stage IV."

are similarly high in carbohydrates. Although acorn remains are not particularly abundant in the Shiloh samples, the quantities of starchy seeds recovered are notably low. With a ratio of edible seed counts to nutshell fragments of 0.26 among these samples and 0.16 among Abbott's (2003) samples, as compared to the value of 2.6 for the American Bottom and 0.02 for the Black Warrior Valley (Scarry 1993), the Shiloh assemblage seems to follow this Midsouth pattern.

Another ratio of interest is the kernel to cupule ratio for maize remains. As noted above, this ratio is relatively low in the Shiloh Mound A samples, particularly those from contexts below Stage III. It is more comparable to ratios seen at Early Mississippian farmsteads in the Moundville polity, Big Sandy and Oliver, than more elite contexts (see Table 16-04). The latter include residential areas within the site of Moundville itself, as well as refuse from a secondary mound within the polity, Hog Pen (Welch and Scarry 1995). The higher quantity of kernels in these elite contexts may reflect provisioning of higher-status individuals. These individuals may have been supplied with processed maize, perhaps as a form of tribute. At the very least, the processing of maize ears does not appear to have been practiced very often in these elite areas at Moundville (Welch and Scarry 1995).

If kernel to cupule ratios are considered a marker of elite contexts, then access to the area at Shiloh Mound A does not seem to have been restricted prior to the construction of Stage III. Maize processing, not to mention nut processing, appears to have taken place in the immediate area. The kernel to cupule ratio is slightly higher in within-mound contexts, but is still significantly lower than elite contexts in the Moundville polity. As noted above, these contexts may not directly represent plant use on the mound, but rather in areas from which mound fill was obtained. The recovery of cupules from posthole and other feature contexts does suggest, however, that food processing indeed took place on Mound A.

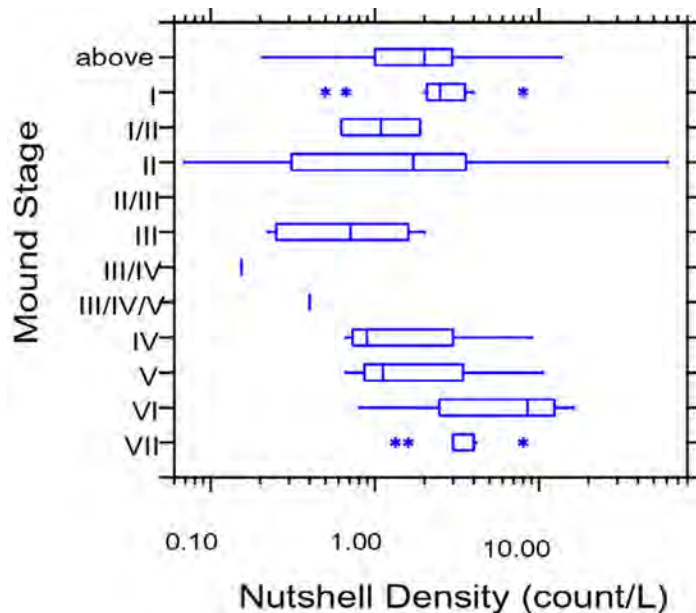


Figure 16-09. Boxplot comparing nutshell density by mound stage in the paleoethnobotanical samples recovered from the excavations in Mound A. Note that the x-axis is scaled logarithmically. "Above" refers to samples that cannot be assigned to a stage beyond "above Stage IV."

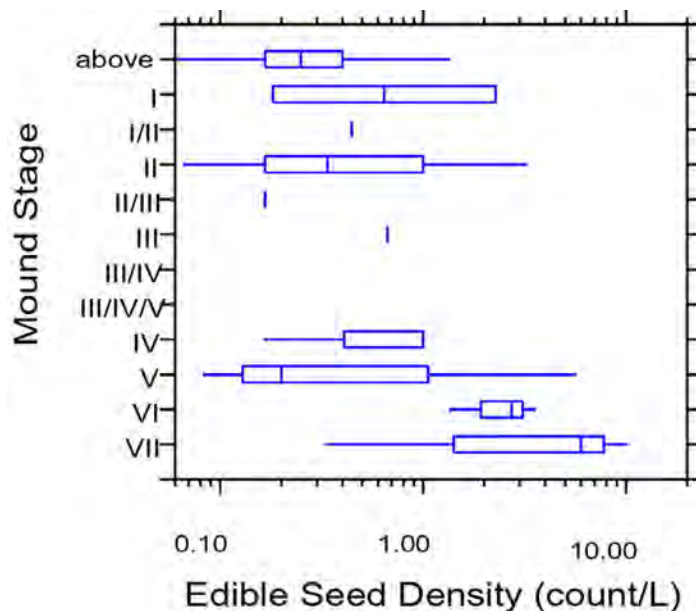


Figure 16-10. Boxplot comparing edible seed density by mound stage in the paleoethnobotanical samples recovered from the excavations in Mound A. Note that the x-axis is scaled logarithmically. "Above" refers to samples that cannot be assigned to a stage beyond "above Stage IV."

CONCLUSIONS

The plant assemblage from Shiloh Mound A is comparable to those recovered from other Late Woodland and Early Mississippian sites in the Midsouth. They reflect use of both cultivated and wild plant foods, and suggest a calendar of planting, tending, harvesting, and gathering that spans early spring through late autumn. Cultivated plant foods include both domesticated crops and cultivated starchy seeds, although use of the latter does not appear to have been particularly intensive. The relatively high ratio of maize byproducts recovered in the samples suggests that food processing occurred in the area prior to construction of Stage III, and perhaps on the mound as well.

The spatial and temporal questions posed by Anderson and Cornelison in the project research design (2001a, 2002a, 2002b) are difficult to answer at this point. Given the fact that column samples more likely represent mound fill than dumping episodes, it is difficult to choose samples which may reflect preferential dumping on a particular side of the mound. Indeed, no evidence for dumping of debris of any kind was found on the mound slopes in the areas examined from 2001 to 2004 (see Chapters 9 and 10). Spatial differences among the various structures represented by postholes and features may be a more fruitful avenue to pursue in future studies, especially considering that these contexts more likely represent activities that occurred on the mound itself. These data might also be compared with Wells' analysis of chemical signatures within the structures (see Chapter 11). Although the plant materials recovered from these features are relatively limited, they do suggest that people processed maize and nuts on Mound A.

Temporal differences are suggested by changes in the density of plant remains recovered by mound stage. However, use of native cultigens and wild resources does not seem to change; rather, it is the use of the mound area before and after the construction of Stage III that appears to change. Use of the area prior to large-scale mound construction seems to have been less restricted,

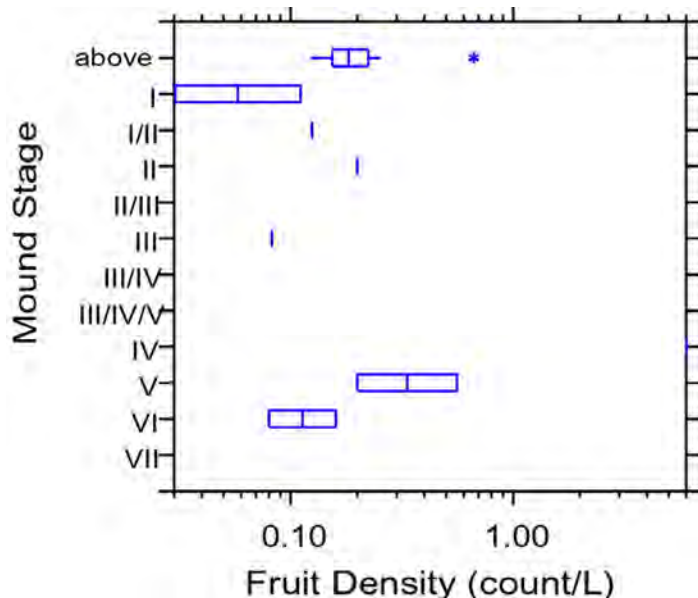


Figure 16-11. Boxplot comparing density of fruit taxa by mound stage in the paleoethnobotanical samples recovered from the excavations in Mound A. Note that the x-axis is scaled logarithmically. "Above" refers to samples that cannot be assigned to a stage beyond "above Stage IV."

perhaps in both the types of tasks performed and the number of people with access to the area.

If excavations resume at Shiloh Mound A in the future, several sample sets would be key to expanding existing knowledge about plant use at the site. These would include additional samples from contexts below Stage III, as well as samples from non-mound contexts. The latter would help distinguish between possible ceremonial use on the mound and "background noise" or domestic contexts. Regardless, the plant assemblage recovered to date from Shiloh Mound A provide a notable set of data regarding plant use by the Early Mississippian peoples that constructed and used the mound. These data are further useful for comparison with the broader community surrounding the Shiloh Mounds and across the region.

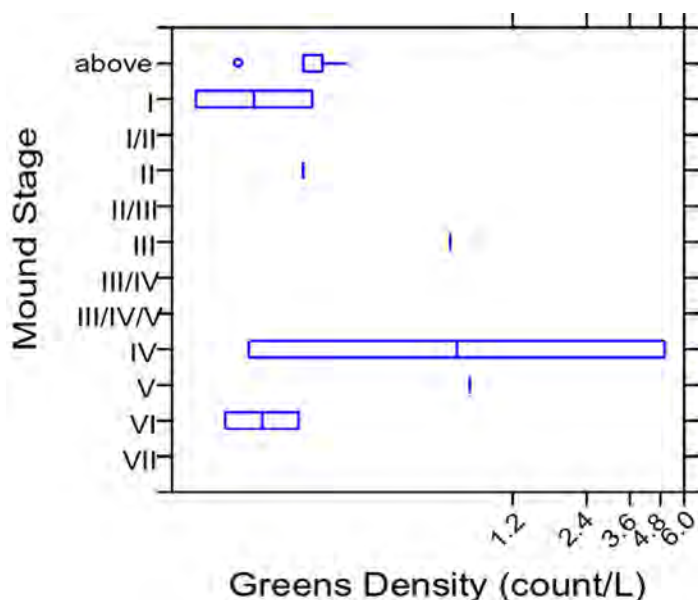


Figure 16-12. Boxplot comparing density of taxa with edible greens by mound stage in the paleoethnobotanical samples recovered from the excavations in Mound A. Note that the x-axis is scaled logarithmically. "Above" refers to samples that cannot be assigned to a stage beyond "above Stage IV."

VERTEBRATE FAUNAL REMAINS FROM SHILOH MOUND

JUDITH A. SICHLER

INTRODUCTION

The remains reported on here can be divided into two broad sub-sample categories: those from units within the mound (Stages I through III) and those from units below the mound, or at least from construction episodes for which no evidence for mound construction was recovered (Stages IV through VII), that appear to reflect the leveling and filling of the area, possibly associated with the construction of smaller or earlier stage mounds within the Mound A (see Chapters 9 and 10). An important research question for the Mound A project is whether ceremonial or feasting activities took place on or near the mound (see Chapter 1). This is a question that zooarcheological data can help answer (see Blitz 1993; Bogan 1983; Hayden 1996; Jackson and Scott 1995; Kelley 1997; VanDerwarker 1999; Welch and Scarry 1995; Yerkes 2005). Ideally, to assess the presence of feasting behaviors, one needs more than one locale from which remains are recovered (i.e., mound contexts and village contexts) to compare.

Additionally, accumulation of faunal remains, and possible feasting or ceremonial behaviors, may be related to the placement of different construction stages as evidenced by the various colored layers of the mound. Features located on the mound and their contents are used to investigate these potential behaviors.

Despite the limitations of the data for recognizing feasting behavior, given the absence of other extensive samples from the site, the Mound A faunal materials provide a unique picture of foodways at the mound center that dominated this portion of the Tennessee River valley from ca. A.D. 975–1350.

MATERIALS AND METHODS

The Shiloh faunal remains from the vicinity of Mound A were recovered using ¼-in gauge screen and flotation techniques. Faunal samples examined

were from excavation units within and below the mound and included feature contexts. One hundred percent of the bone recovered in the 2001–2003 excavations was examined for this research project. Vertebrate remains recovered from Mound A were identified at the ARL and the Zooarchaeology Laboratory at the UT Department of Anthropology using modern comparative collections.

Initial sorting and classification of faunal remains was done to the most specific taxonomic level as possible. The taxonomic nomenclature used for vertebrates follows the Petersons Field Guides (e.g. Burt and Grossenheider 1980; Conant and Collins 1991; Page and Burr 1991; and Peterson 1980). Other information recorded includes element, side, portion, fusion, and whether any modification was noted on the bone.

When identification was limited to class, a size category was assigned when feasible. ARL faunal protocol for mammals is as follows. Large mammals are those represented by wild taxa such as white-tailed deer (*Odocoileus virginianus*) and black bear (*Ursus americanus*). Representative of the medium/large-sized category include animals referred to as canids (*Canis* spp.), primarily the coyote, wolf, and dog. The medium-sized mammal category includes wild taxa such as foxes (*Urocyon cinereoargenteus*- gray fox and *Vulpes fulva*- red fox), beaver (*Castor canadensis*), and raccoon (*Procyon lotor*). Medium-to-small mammals include wild taxa such as cottontail rabbit (*Sylvilagus floridanus*), opossum (*Didelphis marsupialis*), woodchuck (*Marmota monax*), and skunk (*Mephitis mephitis*). Examples of small-sized mammals include squirrels (*Sciurus* sp.) and other rodents. Very small-sized mammals are represented by taxa such as mice, voles, and bats. Similar size classes are used when discussing bones attributable only to class Aves, the birds. Large-sized birds are represented by turkey (*Meleagris gallopavo*), large raptors (hawks and eagles),

and large geese. Medium-sized birds include larger ducks. Smaller-sized birds are represented by jays, warblers, and buntings, primarily the passerines or song-birds. Size classes were not used in discussing reptiles, amphibians, or fish.

Minimum Numbers of Individuals (MNI) and Number of Identified Specimens (NISP) were calculated as a basic method of quantifying the assemblage. As stated by others, both MNI and NISP have their shortcomings (Breitburg 1991; Grayson 1979, 1984; Klein and Cruz-Urbe 1984; Ringrose 1993). MNI is calculated by looking at paired skeletal elements. First introduced by White (1953), it is done by separating the most abundant elements into their left and right sides and using the largest number as the unit of calculation. The measure can be further refined by assessing age and size variables (Grayson 1979). With MNI, the greatest problem deals with aggregation. The criteria used to aggregate a site effects the calculation of MNI. The more divisive the contexts, such as strata, arbitrary levels, time periods, or features, the closer the MNI values will approach NISP values (Grayson 1979, 1984; Reitz and Scarry 1985). However, if the contexts are not mixed and the aggregation units cannot be further divided, the MNI values may actually be more representative of actual individuals brought back to the site (Grayson 1984:67). Other problems with MNI include the assumption that the entire animal was consumed at the site, with the animal being represented by the identified element. This may or may not be the case, as indicated by butchery, exchange behaviors, or market evidence. By examining element distribution from the assemblage, the evidence can be evaluated. Another problem concerns the importance of smaller species in the diet. While smaller species, such as fish, may be identified at a site, their relative importance in the diet when compared to one identified deer is considerably less (Reitz and Scarry 1985).

NISP is obtained by an actual count of bone or tooth fragments assigned to a particular taxon. Criticisms exist for this measurement of taxonomic abundance in a faunal assemblage as well. First, the measure is affected by butchery and subsequent patterns thereof, and the subjective

nature of species identification. Collection and taphonomic agents also affect the validity of the measurement. The greatest criticism deals with element interdependence (Grayson 1979, 1984). How do we know which elements and fragments come from different animals in the assemblage?

Despite the criticisms, MNI and NISP values were calculated for the Mound A faunal materials. However, only NISP measures are used here when considering taxonomic abundance. While it is acknowledged that there is the problem of element interdependence, it is assumed to be less of a problem than site aggregation.

Other characteristics of the bones were noted as well. Taphonomic alteration of the bone in the form of burning (see Bennett 1999; McCutcheon 1992), cut marks (Lyman 1994; Reitz and Wing 1999), and carnivore or rodent gnawing (Morey and Klippel 1991; Thornton and Fee 2001) was also recorded for the assemblage. The primary analysis data is summarized in the tables that follow, and is included by specific excavation provenience in the electronic appendices.

RESULTS

The Mound A vertebrate faunal assemblage is comprised of 5,885 bones weighing 2,420.1g (Table 17-01). Of this total, 1,343 bones were identifiable to class and 4,542 were identified only as UID vertebrate. Bones identifiable to class are predominantly those from class Mammalia. Taphonomic alteration was noted on 1,554 bones in the assemblage with thermal alteration representing the majority of the altered bone.

As stated previously, the Mound A faunal assemblage was divided into two sub-samples, within and below the mound contexts. Below the mound contexts consist primarily of columns placed within units N37, E184, N38, E184, N39, E184, and N40, E184. These correlate to mound Stages IV through VII, using criteria developed by Sherwood (see Chapters 9 and 10). Bone from within the mound contexts are defined as all other recovered bone not in the aforementioned contexts and are represented by Stages I through III.

Table 17-01. Vertebrate faunal remains recovered in the excavation units in Mound A.

Taxon		Common Name	NISP	Wt. (g)
<i>Didelphis</i>	<i>marsupialis</i>	opossum	2	3.9
<i>Scalopus</i>	<i>aquaticus</i>	eastern mole	1	0.1
<i>Canis</i>	sp.	dogs, wolves, and foxes	1	2.2
Carnivora (sm.)		small-sized carnivore	2	0.2
<i>Sciurus</i>	<i>carolinensis</i>	gray squirrel	1	0.3
<i>Sciurus</i>	sp.	squirrels	17	7.2
cricetidae		mice, rats, and voles	4	0.1
<i>Sylvilagus</i>	sp.	cottontail rabbits	4	1.7
cervidae		deer	1	1.1
<i>Odocoileus</i>	<i>virginianus</i>	white-tailed deer	54	598.2
<i>Odocoileus</i>	<i>virginianus</i> cf.	white-tailed deer	8	73.1
l.mammal		large-sized mammal	197	533.3
m/l.mammal		medium/large-sized mammal	3	9.6
m.mammal		medium-sized mammal	3	8.8
s.mammal		small-sized mammal	11	1.3
v.s.mammal		very small-sized mammal	4	0.1
v.s.mammal/bird		very small-sized mammal/bird	1	0.1
UID mammal		indeter. mammal	688	344.4
UID mammal/aves		indeter. mammal/bird	5	1.4
anatidae		ducks and geese	1	0.3
<i>Anas</i>	<i>platyrhynchos</i>	mallard	7	4.6
<i>Anas</i>	<i>platyrhynchos</i> cf.	mallard	2	1.1
<i>Anas</i>	sp. cf.	ducks	1	0.3
<i>Meleagris</i>	<i>gallopavo</i>	wild turkey	13	41.3
<i>Meleagris</i>	<i>gallopavo</i> cf.	wild turkey	1	0.5
passeriformes		perching birds	1	0.1
l.aves		large-sized bird	3	2.3
v.s.aves		very small-sized bird	2	0.2
UID aves		indeter. bird	45	24.2
<i>Lepisosteus</i>	sp.	gar	3	0.6
<i>Moxostoma</i>	<i>carinatum</i> cf.	river redhorse	2	3.2
<i>Ictalurus</i>	<i>punctatus</i>	channel catfish	1	1.4
<i>Ictalurus</i>	sp.	catfish	4	2.0
<i>Stizostedion</i>	sp.	walleye/sauger	3	0.4
<i>Aplodinotus</i>	<i>grunniens</i>	freshwater drum	26	10.7
UID osteichthyes		indeter. fish	166	10.8
Testudines		turtles	40	22.5
emydidae		box and water turtles	2	2.4
<i>Terrapene</i>	<i>carolina</i>	eastern box turtle	2	8.8

Taxon		Common Name	NISP	Wt. (g)
<i>Apalone</i>	<i>spinifera</i>	spiny softshell turtle	2	2.6
colubridae		non-poisonous snake	3	0.5
UID reptile		indeter. reptile	1	0.1
<i>Rana/Bufo</i>	sp.	frogs and toads	4	0.3
UID		UID vertebrate	4543	692.0
Total			5885	2420.1

Below the Mound

A total of 4,678 bones weighing 1,625.6g from 15 contexts (excavation units and features) from below the mound were identified (Tables 17-02 and 17-03). The analysis was directed to material that came from levels and features in four 1x1m excavation units (N37–N40, E184) that were columns placed into contexts below the mound (see Chapters 3 and 9). Tiny amounts of bone from Features 559, 561, and 593 in three units opened into the Stage IV mound, N43, E180–181, and N42, E184 are listed below but are not included in the summary data or comparative analyses, either because their provenience was uncertain at the time the analysis was conducted, or because they were not in the column opened on the southeastern part of the mound. The bones examined from the below the mound thus came from the four contiguous 1x1m excavation unit samples spanning Stages IV through VII, and consist of both ¼-in and <¼-in waterscreen samples and feature flotation samples (¼- and less than ¼-in). Bone recovered from below the mound was extremely well preserved compared to bone from contexts within the mound. Of the total bone recovered below the mound, taphonomic alteration was noted on 845 bones. Burned bone (n = 508, wt. = 162.1g) and calcined bone (n = 330, wt. = 68.3g) were the most frequent bone modification (Table 17-04). The majority of the burned and calcined bone by count was recovered in units N40, E184 (41.3 percent) and N38, E184 (46.9 percent). Butchering was noted on four bones: two of which were white-tailed deer distal humeri diaphyses, one a white-tailed deer distal tibia diaphysis, and one large mammal femur diaphysis (likely white-tailed deer). These cut marks were most likely associated with dismemberment and portioning of the carcass. One piece of worked bone was found

in each of the four units below the mound. A piece of worked bone was identified in unit N40, E184 with polished edges and scratches present, however the function of this artifact is not known. An incised bone pin was recovered from N38, E184, Level 11 (see Chapter 13). It is likely a large bird or mammal long bone. Two bones exhibiting carnivore gnawing were recovered, a white-tailed deer femur head recovered in unit N40, E184 and a *Canis* sp. proximal ulna diaphysis was identified in unit N37, E184.

Features

Approximately twenty percent of the below mound assemblage is from feature contexts (Table 17-05), from both ¼- and <¼-in flotation samples (n = 777, wt. = 114.1g). Of this, approximately nine percent (n = 67, wt. = 5.8g) of the feature bone is thermally altered, with roughly equal numbers being burned (n = 30, wt. = 3.0g) and calcined (n = 37, wt. = 2.8g). Additional detail on the features in Stages IV through VII is presented in Chapter 9.

Feature 559 (N43, E181; 618cmbd)

This feature, identified as a posthole, was located in the Stage IV construction episode, and contained four fragments of UID vertebrate bone which were calcined.

Feature 561 (N40, E184; 646cmbd)

This feature, identified as a posthole, was located on the Stage V surface, contained 99 bones weighing 2.3g. The majority of the bone was UID vertebrate, with one small mammal fragment and 18 indeterminate fish fragments present.

Table 17-02. Species list of vertebrate faunal remains recovered in the excavation units below the mound, in Stages IV-VII.

Taxon		Common Name	NISP	% NISP	MNI	% MNI	Wt. (g)
<i>Didelphis</i>	<i>marsupialis</i>	opossum	1	<0.1	1	2.9	1.3
<i>Scalopus</i>	<i>aquaticus</i>	eastern mole	1	<0.1	1	2.9	0.1
<i>Canis</i>	sp.	dogs, wolves, and foxes	1	<0.1	1	2.9	2.2
Carnivora (sm.)		small carnivore	2	<0.1	1	2.9	0.2
<i>Sciurus</i>	<i>carolinensis</i>	gray squirrel	1	<0.1	1	2.9	0.3
<i>Sciurus</i>	sp.	squirrels	15	0.3	3	8.8	6.4
cricetidae		mice, rats, and voles	4	0.1	1	2.9	0.1
<i>Sylvilagus</i>	sp.	cottontails	3	0.1	1	2.9	1.4
cervidae		deer	1	<0.1	1	2.9	1.1
<i>Odocoileus</i>	<i>virginianus</i>	white-tailed deer	26	0.6	2	5.9	334.4
<i>Odocoileus</i>	<i>virginianus</i> cf.	white-tailed deer	5	0.1	1	2.9	60.5
l.mammal		large-sized mammal	100	2.1	--	--	352.1
m/l.mammal		medium/large-sized mammals	3	0.1	--	--	9.6
m.mammal		medium-sized mammals	3	0.1	--	--	8.8
s.mammal		small-sized mammal	8	0.2	--	--	1.0
v.s.mammal		very small-sized mammal	4	0.1	--	--	0.1
v.s.mammal/bird		very small-sized mammal/bird	1	<0.1	--	--	0.1
UID mammal		indeter. mammal	525	11.2	--	--	249.0
UID mammal/aves	indeter. mammal/bird		3	0.1	--	--	0.6
<i>Anas</i>	<i>platyrhynchos</i>	mallard	6	0.1	2	5.9	5.1
<i>Anas</i>	<i>platyrhynchos</i> cf.	mallard	2	<0.1	1	2.9	1.1
<i>Anas</i>	sp. cf.	ducks	1	<0.1	1	2.9	0.3
<i>Meleagris</i>	<i>gallopavo</i>	wild turkey	10	0.2	3	8.8	32.5
<i>Meleagris</i>	<i>gallopavo</i> cf.	wild turkey	1	<0.1	1	2.9	0.5
l.aves		large-sized bird	3	0.1	--	--	2.3
v.s.aves		very small-sized bird	2	<0.1	--	--	0.2
UID aves		indeter. bird	39	0.8	--	--	22.6
<i>Lepisosteus</i>	sp.	gars	3	0.1	1	2.9	0.6
<i>Moxostoma</i>	<i>carinatum</i> cf.	river redhorse	2	<0.1	1	2.9	3.6
<i>Ictalurus</i>	<i>punctatus</i>	channel catfish	1	<0.1	1	2.9	1.4
<i>Ictalurus</i>	sp.	catfishes	4	0.1	1	2.9	2.0
<i>Aplodinotus</i>	<i>grunniens</i>	freshwater drum	9	0.2	2	5.9	4.5
UID osteichthyes	indeter. fish		141	3.0	--	--	9.8
Testudines		turtles	34	0.7	1	2.9	20.3
emydidae		box and water turtles	2	<0.1	1	2.9	2.4
<i>Terrapene</i>	<i>carolina</i>	eastern box turtle	2	<0.1	1	2.9	8.8
<i>Apalone</i>	<i>spinifera</i>	spiny softshell turtle	1	<0.1	1	2.9	0.3
colubridae		non-poisonous snakes	3	0.1	1	2.9	0.5
UID reptile		indeter. reptile	1	<0.1	--	--	0.1
<i>Rana/Bufo</i>	sp.	frogs and toads	4	0.1	1	2.9	1.0
UID		UID vertebrate	3700	79.1	--	--	476.5
Total			4678	100.0	34	100.0	1625.6

Table 17-03. Taxa identified in the excavation units below the Mound, in Stages IV-VII.

Northing and Easting	Taxon		Common Name	NISP	Wt. (g)
N40, E184	Carnivora (sm.)		small carnivore	1	0.1
	<i>Sciurus</i>	<i>carolinensis</i>	gray squirrel	1	0.3
	<i>Sciurus</i>	sp.	squirrels	4	0.8
	<i>Sylvilagus</i>	sp.	cottontail rabbits	1	0.4
	<i>Odocoileus</i>	<i>virginianus</i>	white-tailed deer	10	145.2
	<i>Odocoileus</i>	<i>virginianus</i> cf.	white-tailed deer	3	37.4
	l.mammal		large-sized mammal	31	114.2
	m/l.mammal		medium/large-sized mammal	3	9.6
	m.mammal		medium-sized mammal	2	4.3
	v.s.mammal		very small-sized mammal	3	0.1
	UID mammal		indeter. mammal	155	87.1
	UID mammal/aves		indeter. mammal/bird	1	0.1
	<i>Anas</i>	<i>platyrhynchos</i>	mallard	3	3.3
	<i>Meleagris</i>	<i>gallopavo</i>	wild turkey	4	14.6
	<i>Meleagris</i>	<i>gallopavo</i> cf.	wild turkey	1	0.5
	l.aves		large-sized bird	3	2.3
	UID aves		indeter. bird	21	10.2
	<i>Lepisosteus</i>	sp.	gars	2	0.3
	<i>Ictalurus</i>	sp.	catfishes	3	1.3
	<i>Aplodinotus</i>	<i>grunniens</i>	freshwater drum	7	3.5
	UID osteichthyes		indeter. Fish	57	4.5
	Testudines		turtles	11	7.5
	emydidae		box and water turtles	2	2.4
	<i>Terrapene</i>	<i>carolina</i>	box turtle	2	8.8
	<i>Apalone</i>	<i>spinifera</i>	spiny softshell turtle	1	0.3
	UID reptile		indeter. reptile	1	0.1
	<i>Rana/Bufo</i>	sp.	frogs and toads	1	0.1
	UID		UID vertebrate	1913	200.2
N37, E184	<i>Canis</i>	sp.	dogs, wolves, foxes	1	2.2
	<i>Sciurus</i>	sp.	squirrels	2	1.4
	<i>Odocoileus</i>	<i>virginianus</i>	white-tailed deer	2	34.7
	l.mammal		large-sized mammal	17	55.5
	m.mammal		medium-sized mammal	1	4.5
	v.s.mammal/bird		very small-sized mammal/ bird	1	0.1
	UID mammal		indeter. mammal	90	30.7
	<i>Meleagris</i>	<i>gallopavo</i>	wild turkey	1	5.2
	UID aves		indeter. bird	2	0.7
	<i>Moxostoma</i>	<i>carinatum</i> cf.	river redhorse	1	3.5
	UID osteichthyes		indeter. fish	5	0.7
	Testudines		turtles	7	2.9
	UID		UID vertebrate	88	29.7

Northing and Easting	Taxon		Common Name	NISP	Wt. (g)	
N39, E184	Carnivora (sm.)		small carnivore	1	0.1	
	<i>Sciurus</i>	sp.	squirrels	2	1.9	
	cervidae		deer	1	1.1	
	<i>Odocoileus</i>	<i>virginianus</i>	white-tailed deer	4	63.5	
	<i>Odocoileus</i>	<i>virginianus</i> cf.	white-tailed deer	1	18.2	
N39, E184	l.mammal		large-sized mammal	26	92.0	
	s.mammal		small-sized mammal	4	0.9	
	UID mammal		indeter. mammal	89	42.6	
	UID mammal/aves		indeter. mammal/bird	2	0.5	
	<i>Anas</i>	<i>platyrhynchos</i> cf.	mallard	2	1.1	
	<i>Anas</i>	sp. cf.	ducks	1	0.3	
	<i>Meleagris</i>	<i>gallopavo</i>	wild turkey	1	2.1	
	v.s.aves		very small-sized bird	1	0.1	
	UID aves		indeter. bird	13	10.3	
	<i>Ictalurus</i>	<i>punctatus</i>	channel catfish	1	1.4	
	<i>Ictalurus</i>	sp.	catfishes	1	0.7	
	<i>Aplodinotus</i>	<i>grunniens</i>	freshwater drum	1	1.0	
	UID osteichthyes		indeter. fish	3	0.9	
	Testudines		turtles	3	1.8	
	colubridae		non-poisonous snake	1	0.2	
	UID		UID vertebrate	116	33.5	
	N38, E184	<i>Didelphis</i>	<i>marsupialis</i>	opossum	1	1.3
		<i>Scalopus</i>	<i>aquaticus</i>	eastern mole	1	0.1
		<i>Sciurus</i>	sp.	squirrels	7	2.3
		cricetidae		mice, rats, and voles	4	0.1
<i>Sylvilagus</i>		sp.	cottontail rabbits	2	1.0	
<i>Odocoileus</i>		<i>virginianus</i>	white-tailed deer	7	57.6	
<i>Odocoileus</i>		<i>virginianus</i> cf.	white-tailed deer	1	4.9	
l.mammal		large-sized mammal	24	75.2		
s.mammal		small-sized mammal	2	0.1		
v.s.mammal		very small-sized mammal	1	0.1		
UID mammal		indeter. mammal	137	65.4		
<i>Anas</i>		<i>platyrhynchos</i>	mallard	3	1.7	
<i>Meleagris</i>		<i>gallopavo</i>	wild turkey	3	8.6	
UID aves		indeter. bird	3	1.5		
<i>Aplodinotus</i>		<i>grunniens</i>	freshwater drum	1	0.1	
UID osteichthyes		indeter. fish	48	2.6		
Testudines		turtles	8	5.6		
colubridae		non-poisonous snake	2	0.3		
<i>Rana/Bufo</i>		sp.	frogs and toads	1	0.8	
UID		UID vertebrate	906	177.8		
Total			3901	1512.1		

Table 17-04. Thermally altered bone recovered in the excavation units below Mound A, in Stages IV-VII.

Northings and Eastings	Burned NISP	Burned Wt. (g)	Calcined NISP	Calcined Wt. (g)
N40, E184	205	34.1	141	33.8
N37, E184	37	16.5	13	5.5
N39, E184	28	53.8	21	7.3
N38, E184	238	57.7	155	21.7
Total	508	162.1	330	68.3

Table 17-05. Taxa identified in features excavated below Mound A in Stages IV-VII.

Feature	Northings and Eastings	Taxon	Common Name	NISP	Wt. (g)
561	N40, E184	s.mammal	small-sized mammal	1	0.1
		UID osteichthyes	indeter. fish	18	0.4
		UID	UID vertebrate	80	1.7
				99	2.2
572	N38, E184	UID	UID vertebrate	19	0.1
				19	0.1
602	N40, E184	UID	UID vertebrate	2	0.1
				2	0.1
603	N40, E184	s.mammal	small-sized mammal	1	0.1
		v.s.aves	very small-sized bird	1	0.1
		UID osteichthyes	indeter. fish	1	0.0
		UID	UID vertebrate	19	1.5
				22	1.8
604	N40, E184	UID osteichthyes	indeter. fish	1	0.1
		UID	UID vertebrate	9	0.1
				10	0.2
605	N40, E184	UID mammal	indeter. mammal	8	3.4
		UID osteichthyes	indeter. fish	1	0.1
		<i>Rana/Bufo</i> sp.	frogs and toads	1	0.1
		UID	UID vertebrate	120	4.8
				130	8.3
608	N38, E184	<i>Odocoileus virginianus</i>	white-tailed deer	3	33.5
		l.mammal	large-sized mammal	2	15.2
		UID mammal	indeter. mammal	27	12.1
		<i>Moxostoma carinatum</i> cf.	river redhorse	1	0.1
		UID osteichthyes	indeter. fish	5	0.4

Feature	Northing and Easting	Taxon	Common Name	NISP	Wt. (g)
		Testudines	turtles	4	1.5
		<i>Rana/Bufo</i> sp.	frogs and toads	1	0.1
		UID	UID vertebrate	427	27.1
				470	90.0
609	N38, E184	UID osteichthyes	indeter. fish	1	0.1
				1	0.1
610	N38, E184	UID	UID vertebrate	1	0.1
				1	0.1
619	N39, E184	UID mammal	Indeter. mammal	8	2.6
		<i>Meleagris gallopavo</i>	wild turkey	1	2.1
		Testudines	turtles	1	1.0
				10	5.7
620	N39, E184	UID mammal	indeter. mammal	11	5.1
		<i>Lepisosteus</i> sp.	gars	1	0.3
		UID osteichthyes	indeter. fish	1	0.2
				13	5.6
Total				777	114.1

Feature 572 (N38, E184; 631cmbd)

Nineteen pieces of UID vertebrate bone were recovered from this posthole and postmold feature in the Stage IV construction episode.

Feature 591 (N43, E180; 622cmbd)

Three indeterminate mammal fragments were identified with two of them being calcined. This feature was identified as a wall trench on the Stage IV surface.

Feature 593 (N42, E184; 652cmbd)

One large-sized mammal thoracic vertebra fragment was identified in this possible posthole feature from the Stage V surface and it also had some carnivore gnawing on the bone.

Feature 602 (N40, E184; 788cmbd)

Two pieces of UID vertebrate bone were recovered from this possible posthole at the base of the mound,

beginning in and continuing below the Stage VII construction episode.

Feature 603 (N40, E184; 788cmbd)

Feature 603, a posthole at the bottom of the mound, beginning in and continuing below the Stage VII construction episode, primarily contained UID vertebrate fragments ($n = 19$, wt. = 1.5g). One each of small mammal, very small bird, and indeterminate fish fragments were also identified.

Feature 604 (N40, E184; 788cmbd)

Identified as a posthole at the base of the mound, beginning in and continuing below the Stage VII construction episode, this feature contained nine fragments of UID vertebrate and one fragment of indeterminate fish bone.

Feature 605 (N40, E184; 788cmbd)

Within Feature 605, a posthole at the base of the mound, beginning in and continuing below the

Stage VII construction episode, UID vertebrate bone ($n = 120$, wt. = 4.8g) was the most numerous. Indeterminate mammal ($n = 8$, wt. = 3.4g), indeterminate fish ($n = 1$, wt. = 0.1g), and frog and/or toad ($n = 1$, wt. = 0.1g) were also recovered.

Feature 608 (N38, E184; 751cmbd)

Bone identified in this feature, a wall trench or surface on the Stage VI construction episode, included white-tailed deer, large and indeterminate-sized mammal, turtle, frog and/or toad, river redhorse (*Moxostoma carinatum*), indeterminate fish, and UID vertebrate.

Feature 609 (N38, E184; 795cmbd)

Feature 609, identified as a posthole in a wall trench or surface near the base of the mound, beginning in and continuing below the Stage VII construction episode, contained one fragment of indeterminate fish bone.

Feature 610 (N38, E184; 795cmbd)

One fragment of UID vertebrate bone was identified in this posthole in a wall trench or surface near the base of the mound, beginning in and continuing below the Stage VII construction episode.

Feature 619 (N39, E184; 790cmbd)

The remains included in this posthole at the base of the mound, beginning in and continuing below the Stage VII construction episode, included eight fragments of indeterminate mammal bone, one wild turkey fragment, and one fragment identified as turtle.

Feature 620 (N39, E184; 790cmbd)

Eleven fragments of indeterminate mammal bone, one gar (*Lepisosteus* sp.) scale, and one indeterminate fish bone fragment were recovered in this posthole feature beginning in and continuing below the Stage VII construction episode.

Stages

Mound A Stage IV contained 31 bones. The only bone identifiable to species

was white-tailed deer (Table 17-06). The remaining bone was medium/large-sized mammal and indeterminate vertebrate bone. A total of fourteen taxa were identified to genus or species in Stage V. Five families or orders were identified as well (Table 17-07). Twenty-two percent of the bone from Stage V was attributable to class and approximately 74 percent was indeterminate vertebrate. Bone attributable confidently to Stage VI totaled 2,887 pieces (Table 17-8). Similar to Stage V, fourteen taxa were identified to genus or species and five orders or families were identified. A large portion of the Stage VI assemblage was indeterminate vertebrate (81.3 percent; $n = 2,348$). Seventy-six bones were questionable as to their association with Stage VI and were tallied separately (Table 17-09). Stage VII contained 185 bones and is mostly identifiable only to class with 90 percent of the bone being indeterminate vertebrate (Table 17-10).

Within the Mound

A total of 1,205 bones weighing 789.9g from 144 contexts (excavation units and features) within or near the mound were identified (Table 17-11 and Table 17-12). Samples consisted of ¼-in waterscreen samples and feature flotation samples (¼-in). Of this total, taphonomic alteration was noted on 709 bones. Burned bone ($n = 60$, wt. = 27.7g) and calcined bone ($n = 646$, wt. = 163.1g) were the most frequent bone modification. The majority of the bones were too fragmented to identify beyond class and as such, most were UID vertebrate. Within one unit N42, E184 opened into the base of the Stage III mound and possibly extending a short distance into the Stage IV mound, but included in the current sample, other taphonomic signatures noted were butchering cut marks on a probable white-tailed deer femur diaphysis ($n = 1$; 628.25cmbd), carnivore gnawing

Table 17-06. Species list, Mound A Stage IV.

Taxon	Common Name	NISP	Wt. (g)
<i>Odocoileus virginianus</i>	white-tailed deer	1	0.14
m/l.mammal	medium/large-sized mammal	1	1.99
UID	UID vertebrate	29	4.06
Total		31	6.19

Table 17-07. Species list, Mound A Stage V.

Taxon		Common Name	NISP	Wt. (g)
<i>Didelphis</i>	<i>marsupialis</i>	opossum	1	1.3
Carnivora (sm.)		small-sized carnivore		0.1
<i>Sciurus</i>	<i>carolinensis</i>	gray squirrel	1	0.29
<i>Sciurus</i>	sp.	squirrels	4	0.7
cricketidae		mice, rats, and voles	2	0.06
<i>Sylvilagus</i>	sp.	cottontail rabbits	2	1
cervidae		deer	1	1.07
<i>Odocoileus</i>	<i>virginianus</i>	white-tailed deer	10	83.16
<i>Odocoileus</i>	<i>virginianus</i> cf.	white-tailed deer	3	50.4
l.mammal		large-sized mammal	64	204.59
m.mammal		medium-sized mammal	1	2.5
s.mammal		small-sized mammal	4	0.57
v.sm.mammal		very small-sized mammal	1	0.01
UID mammal		indeter. mammal	198	85.12
UID mammal/aves		indeter. mammal/bird		0.09
<i>Anas</i>	<i>platyrhynchos</i>	mallard	4	2.87
<i>Anas</i>	<i>platyrhynchos</i> cf.	mallard	2	1.07
<i>Anas</i>	sp. cf.	ducks	1	0.33
<i>Meleagris</i>	<i>gallopavo</i>	wild turkey	6	21.47
v.sm.aves		very small-sized bird	1	0.06
UID aves		indeter. bird	23	15.46
<i>Ictalurus</i>	sp.	catfish	1	0.3
<i>Aplodinotus</i>	<i>grunniens</i>	freshwater drum	2	0.64
UID osteichthyes		indeter. fish	41	1.79
Testudines		turtles	10	6.18
<i>Terrapene</i>	<i>carolina</i>	eastern box turtle	2	8.8
<i>Apalone</i>	<i>spinifera</i>	spiny softshell turtle	1	0.3
colubridae		non-poisonous snake	1	0.2
UID		UID vertebrate	1105	198.69
Total			1494	689.12

on a large mammal thoracic vertebra fragment ($n = 1$, 651cmbd), and one large mammal bone fragment with ochre staining (620.75cmbd).

Features

Approximately four percent of the within mound faunal assemblage by count and 15 percent by weight is from feature contexts ($n = 44$, wt. = 125.1g) (Table 17-13). Of this, 44 percent by count ($n = 20$,

wt. = 11.4g) of the feature bone is thermally altered, with most of the bone being calcined ($n = 16$, wt. = 10.7g). Additional detail on the feature in Stages I through III is presented in Chapter 9.

Feature 105 (N45, E183; 288cmbd)

This feature, identified as an amorphous dark area in the lower part of the Stage II mound fill, contained

Table 17-08. Species list, Mound A Stage VI.

Taxon		Common Name	NISP	Wt. (g)
<i>Scalopus</i>	<i>aquaticus</i>	eastern mole	1	0.1
Carnivora (sm.)		small-sized carnivore	1	0.14
<i>Sciurus</i>	sp.	squirrels	11	5.66
cricketidae		mice, rats, and voles	2	0.02
<i>Sylvilagus</i>	sp.	cottontail rabbits	1	0.43
<i>Odocoileus</i>	<i>virginianus</i>	white-tailed deer	14	225.25
<i>Odocoileus</i>	<i>virginianus</i> cf.	white-tailed deer	2	10.06
l.mammal		large-sized mammal	29	118.89
m/l.mammal		medium/large-sized mammal	2	7.6
m.mammal		medium-sized mammal	2	6.31
s.mammal		small-sized mammal	3	0.42
v.sm.mammal		very small-sized mammal	3	0.04
v.s.mammal/bird		very small-sized mammal/ bird	1	0.13
UID mammal		indeter. mammal	304	154.96
UID mammal/aves	indeter. mammal/bird		2	0.47
<i>Anas</i>	<i>platyrhynchos</i>	mallard	1	1.4
<i>Meleagris</i>	<i>gallopavo</i>	wild turkey	4	11.03
<i>Meleagris</i>	<i>gallopavo</i> cf.	wild turkey	1	0.5
l.aves		large-sized bird	3	2.28
UID aves		indeter. bird	14	6.38
<i>Lepisosteus</i>	sp.	gar	2	0.46
<i>Moxostoma</i>	cf. <i>carinatum</i>	river redhorse	2	3.5
<i>Ictalurus</i>	<i>punctatus</i>	channel catfish	1	1.35
<i>Ictalurus</i>	sp.	catfish	3	1.69
<i>Aplodinotus</i>	<i>grunniens</i>	freshwater drum	7	3.89
UID osteichthyes	indeter. fish		96	7.84
Testudines		turtles	21	11.19
emydidae		box and water turtles	2	2.43
colubridae		non-poisonous snake	2	0.25
UID reptile		indeter. reptile	1	0.06
<i>Rana/Bufo</i>	sp.	frogs and toads	1	0.02
UID		UID vertebrate	2348	246.55
Total			2887	831.3

Table 17-09. Species list, remains possibly associated with Mound A Stage VI.

Taxon		Common Name	NISP	Wt. (g)
<i>Canis</i>	sp.	dogs, wolves, and foxes	1	2.23
<i>Sciurus</i>	sp.	squirrels	2	1.38
<i>Odocoileus</i>	<i>virginianus</i>	white-tailed deer	1	25.89
l.mammal		large-sized mammal	7	28.63
v.s.mammal/bird		very small-sized mammal/bird	1	0.13
UID mammal		indeter. mammal	13	4.11
UID osteichthyes	indeter. fish		1	0.09
Testudines		turtles	2	0.42
UID		UID vertebrate	48	15.04
Total			76	77.92

Table 17-10. Species list, Mound A Stage VII.

Taxon		Common Name	NISP	Wt. (g)
s.mammal		small-sized mammal	1	0.03
UID mammal		indeter. mammal	8	3.38
v.s.aves		very small-sized bird	1	0.03
UID aves		indeter. bird	2	0.8
<i>Lepisosteus</i>	sp.	gar	1	0.12
UID osteichthyes	indeter. fish		3	0.03
Testudines		turtles	1	2.53
<i>Rana/Bufo</i>	sp.	frogs and toads	1	0.01
UID		UID vertebrate	167	11.08
Total			185	18.01

one piece of indeterminate mammal bone that was calcined.

Feature 132 (N44, E181; 316.5cmbd/N44, E182; 316.5cmbd/N44, E183; 321.5cmbd)

Bone within this feature included three fragments of indeterminate mammal bone and two fragments of UID vertebrate bone, all of which are calcined. This feature was identified as a filling episode located at the base of a basin midden in the lower part of the Stage II mound,

Feature 144 (N43, E179; 351cmbd)

Feature 144, identified as a well-defined wall trench segment from a fragmentary structure on the upper part of the Stage III mound, contained one piece of UID vertebrate bone.

Feature 242 (N38, E183; 474cmbd)

A distal femur fragment in this feature, a possible posthole on the Stage III mound, was identified as belonging to squirrel.

Feature 244 (N47, E180; 372cmbd)

One piece of bone, a large calcined mammal fragment, was identified in this feature, an irregular lens of material in the upper part of the Stage III mound.

Feature 275 (N47, E179; 367.25cmbd/N47, E183; 378cmbd/N48, E179; 368.5cmbd)

Feature 275, the wall trench for Structure 1 atop the Stage III mound, contained three fragments of white-tailed deer bone (tooth fragment, proximal diaphysis of a metacarpal, and the distal

Table 17-11. Species list of vertebrate faunal remains recovered in the excavation units in Mound A Stages I-III.

Taxon		Common Name	NISP	% NISP	MNI	% MNI	Wt. (g)
<i>Didelphis</i>	<i>marsupialis</i>	opossum	1	0.1	1	5.9	2.6
<i>Sciurus</i>	sp.	squirrels	2	0.2	1	5.9	0.8
<i>Sylvilagus</i>	sp.	cottontail rabbits	1	0.1	1	5.9	0.3
<i>Odocoileus</i>	<i>virginianus</i>	white-tailed deer	28	2.3	2	11.8	263.8
<i>Odocoileus</i>	<i>virginianus</i> cf.	white-tailed deer	3	0.2	1	5.9	12.7
l.mammal		large-sized mammal	96	8.0	--	--	175.1
s.mammal		small-sized mammal	3	0.2	--	--	0.3
UID mammal		indeter. mammal	163	13.5	--	--	95.4
UID mammal/aves	indeter. mammal/bird		2	0.2		0	0.8
anatidae		ducks	1	0.1	1	5.9	0.3
<i>Anas</i>	<i>platyrhynchos</i>	mallard	2	0.2	1	5.9	0.3
<i>Meleagris</i>	<i>gallopavo</i>	wild turkey	3	0.2	1	5.9	8.8
passeriformes		perching birds	1	0.1	1	5.9	0.0
UID aves		indeter. bird	7	0.6	--	--	1.6
<i>Stizostedion</i>	sp.	walleye/sauger	3	0.2	1	5.9	0.4
<i>Aplodinotus</i>	<i>grunniens</i>	freshwater drum	17	1.4	4	23.5	6.2
UID osteichthyes	indeter. Fish		24	2.0	--	--	1.0
Testudines		turtles	6	0.5	--	--	2.2
<i>Apalone</i>	<i>spinifera</i>	spiny softshell turtle	1	0.1	1	5.9	2.3
<i>Rana/Bufo</i>	sp.	frogs and toads	1	0.1	1	5.9	0.1
UID		UID vertebrate	840	69.7	--	--	214.9
Total			1205	100.0	17	100.0	789.9

diaphysis of a humerus). One fragment of large-sized mammal bone was identified. Additionally, five fragments of indeterminate mammal and two fragments of UID vertebrate bone were in this feature.

Feature 275a (N46, E179; 380cmbd)

Feature 275a, a portion of the wall trench for Structure 1 atop the Stage III mound contained three fragments of indeterminate mammal bone, all of which were burned.

Feature 340 (N53, E182; 352cmbd)

Feature 340, a wall trench for the eastern wall of structure 3 atop the Stage III mound, contained three fragments of calcined, indeterminate mammal bone.

Feature 448 (N47, E180; 396.5cmbd)

One right and one left acetabulum and ischium fragments of a white-tailed deer were identified in this feature, a posthole in a possible E/W wall line for a fragmentary structure under Structure 1 in N47, E180-181, in the upper part of the Stage III mound.

Feature 496 (N47, E182; 442cmbd)

One indeterminate mammal bone fragment exhibiting burning was recovered in this basin shaped lens of burned debris found under Structure 1 in the Stage III mound

Feature 536 (N57, E183; 422.5cmbd)

Feature 536, a posthole in the central wall line for Structure 4 atop the Stage III mound, contained one fragment of large-sized mammal bone.

Table 17-12. Taxa identified in the excavation units in Mound A Stages I-III.

Northing and Easting	Taxon	Common Name	NISP	Wt. (g)
UP	UID	UID vertebrate	5	0.9
GC	<i>Odocoileus virginianus</i> cf.	white-tailed deer	1	6.7
N23E180	Testudines	turtles	1	0.5
N31E192	UID mammal	indeter. mammal	1	0.2
N32E179	UID mammal	indeter. mammal	1	0.2
N33E179	UID	UID vertebrate	1	0.1
N33E181	UID	UID vertebrate	2	1.1
N34E179	UID mammal	indeter. mammal	1	0.4
N34E179	UID	UID vertebrate	5	0.8
N34E180	UID mammal	indeter. mammal	1	0.3
N34E181	UID	UID vertebrate	5	1
N35E179	UID	UID vertebrate	11	2.4
N35E180	UID mammal	indeter. mammal	1	0.3
N35E181	UID	UID vertebrate	2	0.2
N35E182	UID	UID vertebrate	6	0.2
N36E179	<i>Odocoileus virginianus</i>	white-tailed deer	2	3.4
N36E179	l.mammal	large-sized mammal	1	2.8
N36E179	UID mammal	indeter. mammal	3	9.7
N36E179	UID	UID vertebrate	32	6.4
N36E181	l.mammal	large-sized mammal	1	4.7
N36E181	UID	UID vertebrate	11	2.4
N36E182	<i>Sylvilagus</i> sp.	cottontails	1	0.3
N37E179	UID mammal	indeter. mammal	13	2.9
N37E179	l.mammal	large-sized mammal	5	11.3
N37E179	UID	UID vertebrate	32	6.2
N37E180	UID mammal	indeter. mammal	5	1.6
N37E181	UID	UID vertebrate	6	2.9
N38E179	<i>Odocoileus virginianus</i>	white-tailed deer	2	16.5
N38E179	l.mammal	large-sized mammal	1	1
N38E179	UID	UID vertebrate	12	2.4
N38E180	l.mammal	large-sized mammal	1	3
N38E180	UID mammal	indeter. mammal	23	12.8
N38E180	UID	UID vertebrate	2	0.5
N38E181	UID mammal	indeter. mammal	2	1.8
N38E181	UID	UID vertebrate	2	0.4
N38E182	l.mammal	large-sized mammal	1	12.4
N38E182	UID	UID vertebrate	6	1.1
N39E180	<i>Odocoileus virginianus</i>	white-tailed deer	1	18.9
N39E180	UID mammal	indeter. mammal	3	1.6
N39E180	UID	UID vertebrate	2	0.5

Northing and Easting	Taxon	Common Name	NISP	Wt. (g)
N39E181	UID	UID vertebrate	10	1.9
N39E182	UID	UID vertebrate	6	0.1
N40E180	UID	UID vertebrate	7	1.9
N40E181	UID mammal	indeter. mammal	1	1.6
N40E182	UID aves	indeter. bird	1	0.1
N40E183	<i>Aplodinotus grunniens</i>	freshwater drum	1	0.2
N41E179	UID	UID vertebrate	2	0.5
N41E180	UID	UID vertebrate	6	0.8
N41E181	UID	UID vertebrate	4	0.8
N41E183	UID	UID vertebrate	13	0.5
N41E184	UID	UID vertebrate	1	2.2
N42E180	UID	UID vertebrate	1	0.3
N42E181	UID	UID vertebrate	3	0.3
N42E182	<i>Odocoileus virginianus</i>	white-tailed deer	1	0.1
N42E182	UID	UID vertebrate	2	0.1
N42E184	<i>Didelphis marsupialis</i>	opossum	1	2.6
N42E184	<i>Sciurus</i> sp.	squirrels	1	0.5
N42E184	<i>Odocoileus virginianus</i>	white-tailed deer	2	5.3
N42E184	<i>Odocoileus virginianus</i> cf.	white-tailed deer	1	6
N42E184	l.mammal	large-sized mammal	12	31.8
N42E184	s.mammal	small-sized mammal	1	0.1
N42E184	UID mammal	indeter. mammal	25	7.7
N42E184	UID mammal/ aves	indeter. mammal/bird	2	0.8
N42E184	<i>Meleagris gallopavo</i>	wild turkey	2	6.1
N42E184	UID aves	indeter. bird	4	1.4
N42E184	UID osteichthyes	indeter. fish	2	0.3
N42E184	Testudines	turtles	5	1.7
N42E184	UID	UID vertebrate	89	26.4
N43E180	<i>Odocoileus virginianus</i>	white-tailed deer	2	14.4
N43E180	<i>Meleagris gallopavo</i>	wild turkey	1	2.7
N43E180	UID	UID vertebrate	38	10.7
N43E181	l.mammal	large-sized mammal	1	1.6
N43E181	s.mammal	small-sized mammal	1	0.2
N43E181	anatidae	ducks and geese	1	0.3
N43E181	UID	UID vertebrate	10	2
N43E182	UID	UID vertebrate	1	0
N43E183	<i>Odocoileus virginianus</i>	white-tailed deer	3	0.4
N43E183	UID	UID vertebrate	9	0.8
N44E179	UID	UID vertebrate	1	0.3
N44E180	<i>Apalone spinifera</i>	spiny softshell turtle	1	2.3

Northing and Easting	Taxon	Common Name	NISP	Wt. (g)
N44E180	UID	UID vertebrate	2	21.3
N44E181	UID	UID vertebrate	14	3.2
N44E182	UID	UID vertebrate	4	1.3
N44E183	UID	UID vertebrate	3	0.8
N44E185	<i>Odocoileus</i> <i>virginianus</i>	white-tailed deer	1	28.9
N44E185	l.mammal	large-sized mammal	1	7.8
N45E179	UID	UID vertebrate	1	0.2
N45E180	<i>Odocoileus</i> <i>virginianus</i>	white-tailed deer	1	0.4
N45E180	l.mammal	large-sized mammal	10	2.2
N45E180	UID	UID vertebrate	5	2
N45E181	UID mammal	indeter. mammal	1	1
N45E181	UID	UID vertebrate	7	1.7
N45E182	UID	UID vertebrate	3	0.8
N45E183	UID	UID vertebrate	4	0.2
N46E179	<i>Odocoileus</i> <i>virginianus</i>	white-tailed deer	1	6.1
N46E179	l.mammal	large-sized mammal	1	2.4
N46E179	UID	UID vertebrate	20	7.2
N46E180	UID mammal	indeter. mammal	1	2.7
N46E180	UID	UID vertebrate	3	0.9
N46E181	UID mammal	indeter. mammal	25	6.2
N46E181	UID	UID vertebrate	14	4.5
N46E182	UID mammal	indeter. mammal	1	0.4
N46E182	UID	UID vertebrate	4	0.9
N46E183	UID	UID vertebrate	1	0.9
N46E184	UID	UID vertebrate	9	4.8
N47E179	<i>Odocoileus</i> <i>virginianus</i>	white-tailed deer	1	24.1
N47E179	l.mammal	large-sized mammal	1	2.9
N47E179	UID mammal	indeter. mammal	2	1.5
N47E179	UID	UID vertebrate	9	2.7
N47E180	<i>Odocoileus</i> <i>virginianus</i>	white-tailed deer	1	0.5
N47E180	UID	UID vertebrate	4	2
N47E181	UID	UID vertebrate	2	0.5
N47E182	UID mammal	indeter. mammal	1	0.3
N47E182	UID	UID vertebrate	5	1
N47E183	l.mammal	large-sized mammal	3	2.5
N47E184	passeriformes	perching birds	1	0.1
N47E184	UID	UID vertebrate	1	0.3
N48E179	UID	UID vertebrate	14	2.9
N48E179	UID	UID vertebrate	1	0.6
N48E180	UID	UID vertebrate	2	0.6
N48E181	UID	UID vertebrate	11	2.4

Northing and Easting	Taxon	Common Name	NISP	Wt. (g)
N48E182	UID	UID vertebrate	25	0.6
N48E183	UID	UID vertebrate	3	1.2
N48E184	UID	UID vertebrate	1	0.2
N48E184	UID	UID vertebrate	6	2.8
N49E180	UID	UID vertebrate	18	1.7
N49E181	<i>Odocoileus virginianus</i>	white-tailed deer	1	17.2
N49E181	l.mammal	large-sized mammal	1	2.4
N49E181	UID mammal	indeter. mammal	1	7.8
N49E181	UID	UID vertebrate	1	0.4
N49E182	l.mammal	large-sized mammal	1	3
N49E182	UID	UID vertebrate	8	1.3
N49E183	l.mammal	large-sized mammal	1	3.6
N50E179	UID	UID vertebrate	22	1.8
N50E180	UID	UID vertebrate	1	0.2
N50E181	UID	UID vertebrate	1	0.5
N50E184	UID osteichthyes	indeter. fish	1	0.1
N50E184	UID	UID vertebrate	7	2.2
N51E179	UID mammal	indeter. mammal	1	2.1
N51E179	UID	UID vertebrate	1	0.3
N51E180	UID	UID vertebrate	15	0.9
N51E182	UID	UID vertebrate	2	0.1
N51E183	UID	UID vertebrate	1	0.1
N51E184	UID	UID vertebrate	1	0.2
N52E179	UID	UID vertebrate	4	0.5
N52E180	UID	UID vertebrate	3	0.6
N52E181	UID	UID vertebrate	5	0.6
N52E183	UID	UID vertebrate	1	0.2
N52E184	UID	UID vertebrate	2	0.1
N53E179	UID mammal	indeter. mammal	1	5.1
N53E179	UID	UID vertebrate	16	3.7
N53E180	UID	UID vertebrate	10	1.8
N53E181	UID	UID vertebrate	50	9.2
N53E182	UID	UID vertebrate	7	1.5
N53E183	UID	UID vertebrate	1	0.1
N53E184	UID osteichthyes	indeter. fish	1	0.1
N53E184	UID	UID vertebrate	2	1.3
N54E180	UID mammal	indeter. mammal	4	3.3
N54E180	l.mammal	large-sized mammal	14	10.2
N54E180	UID	UID vertebrate	13	5.4
N54E181	<i>Odocoileus virginianus</i>	white-tailed deer	2	55
N54E181	UID mammal	indeter. mammal	3	4.9

Nothing and Easting	Taxon	Common Name	NISP	Wt. (g)
N54E181	UID	UID vertebrate	14	4.3
N54E182	UID mammal	indeter. mammal	7	4.2
N54E182	UID	UID vertebrate	20	5.5
N54E183	UID mammal	indeter. mammal	5	3.7
N54E183	l.mammal	large-sized mammal	3	17.8
N54E183	UID	UID vertebrate	11	2.3
N55E181	UID	UID vertebrate	3	0.3
N55E183	UID	UID vertebrate	2	0.6
N56E180	UID	UID vertebrate	14	0.4
N56E181	UID	UID vertebrate	4	0.2
N56E182	<i>Anas</i> <i>platyrhynchos</i>	mallard	1	0.2
N56E182	UID	UID vertebrate	3	0.7
N56E184	UID	UID vertebrate	4	0.6
N57E181	UID osteichthyes	indeter. fish	1	0.1
N57E181	UID	UID vertebrate	1	0.1
N57E182	UID aves	indeter. bird	1	0.1
N57E182	<i>Aplodinotus</i> <i>grunniens</i>	freshwater drum	1	0.4
N57E182	UID	UID vertebrate	3	0.7
N57E183	UID	UID vertebrate	1	0.1
N58E181	<i>Stizostedion</i> sp.	walleye/sauger	3	0.4
N58E181	<i>Aplodinotus</i> <i>grunniens</i>	freshwater drum	2	1
N58E181	UID osteichthyes	indeter. fish	7	0.2
N58E182	<i>Aplodinotus</i> <i>grunniens</i>	freshwater drum	1	0.5
N58E182	UID osteichth-eyes	indeter. fish	1	0.2
N58E182	UID	UID vertebrate	1	0.2
N58E183	UID osteichthyes	indeter. fish	1	0.1
N58E183	UID	UID vertebrate	7	1.9
N59E180	UID osteichthyes	indeter. fish	1	0.1
N59E182	<i>Aplodinotus</i> <i>grunniens</i>	freshwater drum	3	0.6
N59E182	UID osteichthyes	indeter. fish	4	0.1
N59E183	<i>Odocoileus</i> <i>virginianus</i> cf.	white-tailed deer	1	0.1
N59E183	<i>Aplodinotus</i> <i>grunniens</i>	freshwater drum	1	0.4
N59E183	UID	UID vertebrate	6	5.9
N60E181	UID mammal	indeter. mammal	1	0.6
N60E181	UID osteichthyes	indeter. fish	1	0.1
N60E182	UID aves	indeter. bird	1	0.1
N60E182	<i>Aplodinotus</i> <i>grunniens</i>	freshwater drum	6	2.1
N60E182	UID osteichthyes	indeter. fish	2	0.1
N60E182	UID	UID vertebrate	2	1.2
N60E183	UID	UID vertebrate	1	0.2
N61E181	UID	UID vertebrate	1	0.3

Northing and Easting	Taxon	Common Name	NISP	Wt. (g)
N61E182	<i>Aplodinotus grunniens</i>	freshwater drum	1	1
N61E183	UID	UID vertebrate	2	0.5
N62E180	UID	UID vertebrate	1	0.1
N62E181	UID	UID vertebrate	1	0.3
N62E182	<i>Aplodinotus grunniens</i>	freshwater drum	1	0.1
N62E182	UID	UID vertebrate	1	0.1
N63E182	UID	UID vertebrate	1	0.1
N64E182	UID mammal	indeter. mammal	1	0.1
N66E181	UID mammal	indeter. mammal	1	1.4
N67E183	UID	UID vertebrate	1	0.1
N68E180	UID mammal	indeter. mammal	1	0.3
N68E183	UID	UID vertebrate	1	0.1
N70E180	UID mammal	indeter. mammal	1	1.8
N70E180	UID osteichthyes	indeter. fish	1	0.1
N70E181	l.mammal	large-sized mammal	31	7.6
N71E180	UID	UID vertebrate	5	2.3
N71E180	s.mammal	small-sized mammal	1	0.1
N71E182	UID	UID vertebrate	1	0.2
N71E183	UID	UID vertebrate	1	0.1
N72E180	<i>Odocoileus virginianus</i>	white-tailed deer	1	0.6
N72E180	UID mammal	indeter. mammal	1	0.4
N72E180	UID	UID vertebrate	1	0.6
N72E181	UID mammal	indeter. mammal	1	0.1
N72E182	UID	UID vertebrate	1	0.1
N72E183	l.mammal	large-sized mammal	1	1.1
N73E183	UID osteichthyes	indeter. fish	1	0.1
N83E184	UID mammal	indeter. mammal	1	0.3
Total			1159	667.0

Feature 547 (N60, E183; 433cmbd)

Feature 547, a posthole in the central wall line for Structure 4 atop the Stage III mound, contained one fragment of large-sized mammal bone.

Feature 562 (N54, E180; 391cmbd)

One fragment of an unfused, right femur head identified as white-tailed deer came from this posthole feature, a narrow linear disturbance in the upper part of the Stage III mound. Additionally, one fragment of indeterminate vertebrate bone was identified.

Feature 575 (N54, E180; 404.5cmbd)

Three fragments of indeterminate mammal bone were identified in this feature, a posthole in the southern wall line for Structure 4 atop the Stage III mound.

DISCUSSION

Assemblages from contexts below and within Mound A were examined to see if any evidence of feasting or ceremonial behavior, or status differences, can be recognized within or between them. According to Kelly (1997, 2001) and others (see Blitz 1993; Bogan 1983; Hayden 1996; Jackson

Table 17-13. Taxa identified in features in Mound A Stages I-III.

Feature	Northing and Easting	Taxon		Common Name	NISP	Wt. (g)
105	N45, E183	UID mammal		indeter. mammal	1	0.4
132	N44, E181/N44, E182					
	N44, E183/N45, E180					
	N45, E181/N45, E182	UID mammal		indeter. mammal	3	0.7
		UID		UID vertebrate	2	0.8
144	N42, E179/N43, E179					
	N44, E179	UID	UID vertebrate		1	2.3
242	N38, E183	<i>Sciurus</i>	sp.	squirrels	1	0.4
244	N47, E180	l.mammal		large-sized mammal	1	7.5
275	N45, E179-183					
	N46, E179/N46, E183					
	N47, E179/N47, E183					
	N48, E179/N48, E183					
	N48, E184					
	N49, E179-184	<i>Odocoileus</i>	<i>virginianus</i>	white-tailed deer	3	14.8
		l.mammal		large-sized mammal	1	13.8
		UID mammal		indeter. mammal	5	1.9
		UID		UID vertebrate	2	0.4
		UID mammal		indeter. mammal	3	0.6
340	N50, E181/N51, E181					
	N52, E181/N52, E182					
	N53E182/N54E182	UID mammal		indeter. mammal	3	0.7
448	N47, E180	<i>Odocoileus</i>	<i>virginianus</i>	white-tailed deer	2	53.1
496	N47, E182	UID mammal		indeter. mammal	1	0.1
536	N57, E183	l.mammal		large-sized mammal	1	0.9
547	N60, E183	l.mammal		large-sized mammal	1	6.8
559	N43, E181	UID		UID vertebrate	4	0.1
562	N52, E182/N54, E180	<i>Odocoileus</i>	<i>virginianus</i>	white-tailed deer	1	4.1
		UID		UID vertebrate	1	0.2
575	N54, E180	UID mammal		indeter. mammal	3	0.9
591	N43, E180	UID mammal		indeter. mammal	3	0.8
593	N42, E184	l.mammal		large-sized mammal	1	14.0
Total					44	125.1
Total Within Mound					1203	791.1

and Scott 1995; VanDerwarker 1999; Welch and Scarry 1995; Yerkes 2005), there are two types of zooarcheological studies that are generally used to identify status or differential access to resources. The first involves studying body-part representation of the main vertebrate species, usually deer, as is the case at Mound A. The assumption being that if differential access to cuts of meat occurred due to social status differences, this should be evident in the anatomical parts represented and consumed by various groups within the society (Kelly 1997:70, 2001). Lyman (1994) and others (Marshall and Pilgrim 1993) caution researchers in the use of body-part distributions that taphonomic factors can alter what is seen in an assemblage. Taphonomic alterations, both cultural and non-cultural, must be considered (Lyman 1994). Non-cultural alterations such as trampling and carnivore and rodent gnawing are not prevalent in the Mound A assemblages and do not seem to be a factor. NISP will be used to evaluate the presence of high, medium, and low utility deer parts in the assemblage. The cultural implications, much more complex to discern, will also be discussed.

The second type of zooarcheological study utilized to understand status is the diversity of species represented. If different social classes had access to and consumed different species, this should be evident in the assemblage. Methods involve looking at the species composition and any differences in percentages of taxa (Kelly 1997:73, 2001; Yerkes 2005). Kelly (1997) excludes taxa that are not of significant food value (rodents, reptiles, amphibians, and molluscs). However, turtles are a significant portion of the Mound A assemblage and these are considered food items in this analysis. Diversity of species also informs us as to what habitats surrounding the mound were being exploited.

Food utility indices (FUI) associated with white-tailed deer were computed for the below and within mound assemblages (Table 17-14 and Table 17-15, Figure 17-01). Low-utility carcass parts predominate both contexts. However, more of the higher utility cuts are found below the mound. Mid-level utility carcass cuts are more frequent within the mound. It should be noted

Table 17-14. Comparison of food utility indices (FUIs) for major excavation contexts at Mound A.

Utility	Below the Mound	Within the Mound
LOW UTILITY		
Antler		
Skull	1	
Maxilla		
Mandible	1	2
Teeth	7	11
Axis/Atlas		
Phalanges	4	
Carpals		1
Total Low NISP	13	14
% Low Utility	40.6	45.2
MID UTILITY		
Vertebrae		
Pelvis+Sacrum	2	2
Ribs		
Scapula	1	1
Humerus	3	7
Radius/Ulna	3	2
Total Mid NISP	9	12
% Mid Utility	28.1	38.7
HIGH UTILITY		
Sternum		
Femur	2	3
Tibia+Tarsals	8	2
Total High NISP	10	5
% High Utility	31.3	16.1
Total NISP	32	31

that these samples sizes are quite small and any interpretations regarding differential access based on status are tentative. It does seem that the presence of low utility parts indicate the entire carcass was present and no provisioning occurred when compared to the standard deer. A somewhat elevated high FUI percent for below the mound may indicate provisioning and redistribution or the presence of a habitation site (Kelly 1997:88).

Table 17-15. Comparison of food utility indices (FUIs) for major excavation contexts at Mound A: summary data.

	Below the Mound	Within the Mound	Standard Deer
Low FUI NISP	13	14	129
Low Utility Percent	40.6	45.2	59.5
Mid FUI NISP	9	12	65
Mid Utility Percent	28.1	38.7	29.0
High FUI NISP	10	5	25
High Utility Percent	31.3	16.1	11.5
Total NISP	32	31	217

Species diversity at Mound A provides another avenue for investigating differential access to resources. Deer and reptiles (mainly turtle shell) comprise the most abundant taxa represented below the mound (Table 17-16). Mammals, fish, and birds represent approximately equal contributions to the diet in below the mound contexts. For contexts within the mound, deer and fish represent the most consumed dietary elements. Small mammals are the least represented taxa. For both contexts, terrestrial mammals predominate, with aquatic and semi-aquatic taxa present in approximately equal percentages below the mound and a three to

one difference in representation within the mound (Table 17-17 and Figure 17-02). Inhabitants of the site before construction of the mound exploited a variety of habitats just as those who lived during the mound utilization. Table 17-18 indicates that more species diversity is present in contexts below the mound than within, perhaps indicating some sort of habitation site existing on the site before mound construction.

CONCLUSION

The faunal assemblage from Mound A is comprised of 5,885 bones weighing 2420.1g. A total of sixteen species of vertebrates were identified. Approximately 23 percent of the bone could be identified to class or below. Mammals, specifically white-tailed deer, were the most prevalent class identified. Reptiles (23 percent), fish (19.4 percent), and birds (12.9 percent) were also represented.

The assemblage was broken down into below and within the mound contexts, with approximately 80 percent of the bone recovered coming from below the mound. Of the total burned and calcined bone ($n = 1544$, $wt. = 421.1g$), 54

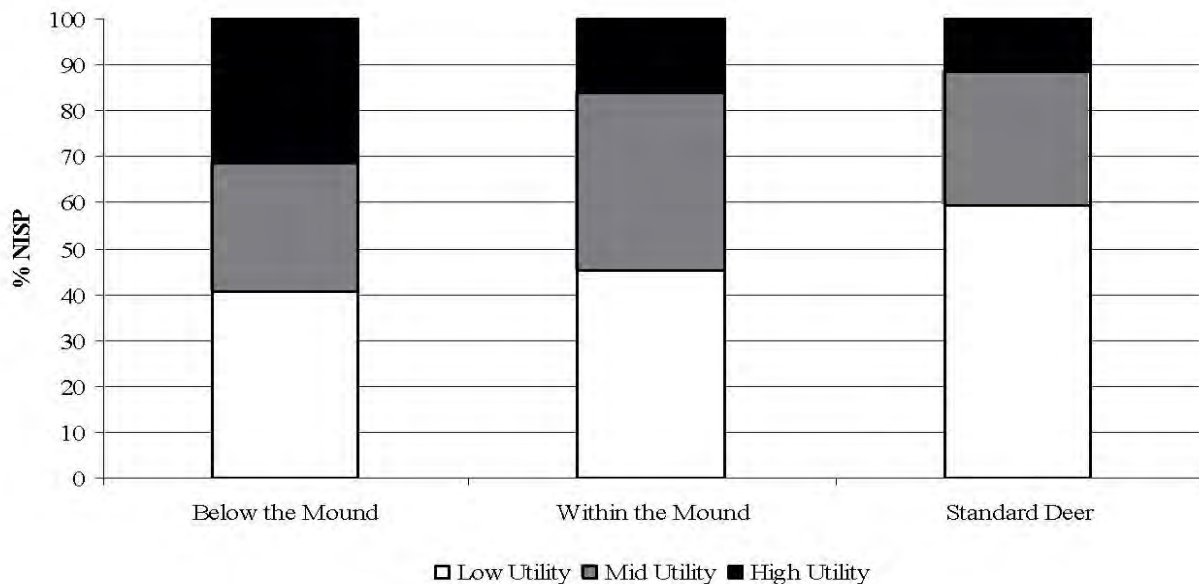


Figure 17-01. Comparison of Food Utility Indices (FUIs) in the major excavation contexts at Mound A.

Table 17-16. NISP and percent NISP for major faunal classes recovered from major excavation contexts at Mound A.

	Below the Mound	Within the Mound
Mammal	23	4
%	17.3	5.9
Deer	32	31
%	24.1	45.6
Fish	19	20
%	14.3	29.4
Bird	20	6
%	15.0	8.8
Reptile	39	7
%	29.3	10.3
Total NISP	133	68

Table 17-17. Percent NISP for types of vertebrates from major excavation contexts at Mound A.

	Below the Mound	Within the Mound
Aquatic	28	23
%	21.1	33.8
Semiaquatic	39	7
%	29.3	10.3
Terrestrial	66	38
%	49.6	55.9
Total NISP	133	68

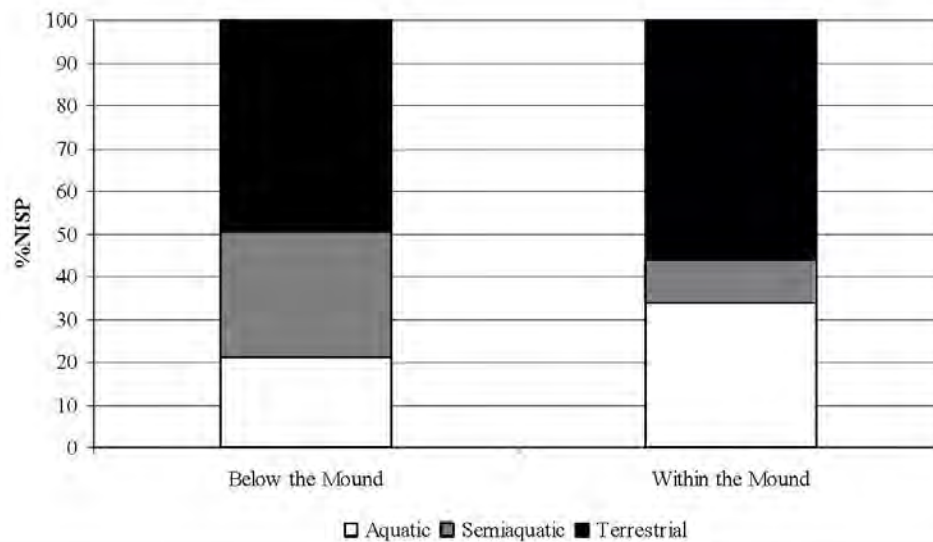


Figure 17-02. Percent of Number of Identified Specimens (NISP) of vertebrates from different habitats in the major excavation contexts at Mound A.

percent was recovered below the mound. Better bone preservation was present in contexts below the mound as well, with less fragmentation occurring. Some of this differential preservation is likely due to the unusual quantity of shellfish noted in the lower part of the mound (see Chapter 18).

Body-part representation and species diversity were examined to evaluate the presence or absence of feasting or ceremonial behaviors at the mound. Food utility indices for the predominant terrestrial species (white-tailed deer) indicates that low-utility carcass cuts are more prevalent in both below and within the mound contexts. Additionally, below the mound contexts contain more high-utility cuts than within the mound. Mid-level utility carcass cuts are more frequent within the mound. The more numerous low-utility cuts in both contexts indicate the entire carcass was present and divided on site. This also suggests little provisioning of higher status individuals with higher quality cuts of meat during mound occupation and construction events.

It is difficult to infer much regarding species diversity, or body-part representation for that matter, due to small sample sizes. Of the identifiable remains, the below the mound assemblage outnumbers the within the mound assemblage nearly two to one. However, in examining the total number of taxa identified, nearly twice as many were identified below the mound. This is likely due to sample size. While information regarding feasting behavior on the various mound stages is inconclusive, what is indicated is the location of Mound A was an important habitation or place of meaning prior to the construction of Stages I through III. The inhabitants of the Shiloh Mound Complex, both before and during the construction of Mound A, exploited a variety of habitats utilizing a significant number of terrestrial, semi-aquatic, and aquatic taxa with white-tailed deer providing the majority of the meat-based diet.

Table 17-18. Species diversity by major excavation contexts at Mound A.

	Below the Mound	Within the Mound
MAMMALS		
white-tailed deer	32	31
opossum	1	1
cottontail rabbits	3	1
squirrels	16	2
dogs, wolves, foxes	1	
carnivores	2	
Total NISP	55	35
No. Taxa	6	4
BIRDS		
mallard	8	2
ducks	1	1
wild turkey	11	3
Total NISP	20	6
No. Taxa	3	3
FISH		
river redhorse	2	
channel catfish	1	
catfishes	4	
gars	3	
walleye/sauger		3
freshwater drum	9	17
Total NISP	19	20
No. Taxa	6	2
REPTILE		
box and water turtles	2	
eastern box turtle	2	
spiny softshell turtle	1	1
turtles	34	6
Total NISP	39	7
No. Taxa	4	2
Total NISP	133	68
No. Taxa	19	11

CHAPTER 18

FRESHWATER MOLLUSCAN REMAINS FOR MOUND A

PAUL W. PARMALEE

Construction of Kentucky Dam by the Tennessee Valley Authority (TVA) at TRM 22.4 was completed in August 1944, impounding the lower Tennessee River from the dam to the tail waters of Pickwick Landing Dam upstream, a distance of ca. 290km (180 miles). This stretch of the river (Kentucky Lake) was now navigable to barge traffic, and the wake of these and pleasure boats, fluctuating water levels, and certain channel changes began to erode the bluffs. The area of Mound A, the largest of the group that measured ca. 6.7m (22ft) high by 36.57m (120ft) in diameter, began eroding into the river soon after the dam was completed. Construction of massive retaining walls below the mound were undertaken by the NPS, but, according to Anderson (Finger 2004:33), based on studies undertaken by the Corps of Engineers, in spite of this stabilization effort, “we are still going to lose...at least 25 feet of the mound in the next two decades.”

Exploratory archeological field work at Mound A was initiated in the summer of 1999 and extensive excavations were conducted from 2001 through 2004. Mound A was found to have been built in a series of at least seven successive construction stages; the higher and hence more recent stages contained very few artifacts and faunal remains (see Chapters 9, 10, 13, 17, and 21). In the case of mollusks, 20 features in these upper stages (Stages I to III) contained one or two unidentifiable chalky flakes of freshwater mussel valves. In the lower, earlier levels of the mound (Stages IV through VII), however, archeologists found midden deposits containing large quantities of freshwater mussels, gastropods, and bone that were, for the most part, extremely well preserved (see Chapter 17). Most of the shellfish came from Stages V and VI, just above the initial construction

episode, Stage VII. Forty species of unionids (1,105 valves) and five species of freshwater gastropods (1,071 shells) were identified from the excavation sample (Tables 18–01 and 18–02).

Prior to impoundment, the main stem of the Tennessee River—particularly the numerous shoals—provided habitat for immeasurably vast populations of freshwater mussels that were represented by a large and diverse assemblage of taxa. Upstream from the Shiloh Mound Complex, between TRM 234.6–287.7, in Lauderdale/Colbert Counties, Alabama, a stretch of river known as Muscle Shoals was famous for the abundance and variety of mussels found there. Ortmann (1924:565–66) noted that “there is no other place upon the whole wide world which could be compared with this one in this respect.” In addition to reports of collections made of living specimens (e.g., Ortmann 1924, 1925; van der Schalie 1939; Stansbery 1964), analyses of shell recovered from aboriginal refuse middens such as those reported by Morrison (1942) and Parmalee (1994) in the Pickwick Basin area provide the means of determining past and present mussel abundance, distribution and species diversity. A total of approximately 63 species has been identified from Muscle Shoals (Stansbery 1964) and 74 taxa from the Pickwick Basin shell mounds (Morrison 1942).

The quantity of freshwater mussel and aquatic gastropod shell found in the lower levels of Mound A, although not large when compared to what has been found in the massive shell middens that occur along the river in the Pickwick Basin upstream, indicates a former shoal was probably adjacent to or in close proximity to the Shiloh Mound Complex. The concentrations of shell, bone, and cultural artifacts found in the lower mound levels also suggests that at least some of the fill from this particular stage of construction came from a general living or habitation site (see Chapters 16 and 17). None of the mussel valves from the lower part of the

Table 18-01. Freshwater mussels identified from Mound A.

Species	Number of valves	%
<i>Actinonaias ligamentina</i> , mucket	16	1.45
<i>Amblema plicata</i> , threeridge	5	.45
<i>Cyclonaias tuberculata</i> , purplewartyback	132	11.94
<i>Cyprogenia stegaria</i> , fanshell	20	1.81
<i>Dromus dromas</i> , dromedarypearlymussel	121	10.95
<i>Ellipsaria lineolata</i> , butterfly	2	.18
<i>Elliptio crassidens</i> , elephantear	30	2.71
<i>Elliptio dilatata</i> , spike	129	11.67
<i>Epioblasma arcaeformis</i> , sugarspoon	36	3.26
<i>Epioblasma brevidens</i> , Cumberlandian combshell	3	.27
<i>Epioblasma haysiana</i> , acornshell	7	.63
<i>Epioblasma obliquata</i> , catspaw	1	.09
<i>Epioblasma propinqua</i> , Tennessee ruffleshell	66	5.97
<i>Epioblasma stewardsonii</i> , Cumberland leafshell	3	.27
<i>Epioblasma torulosa torulosa</i> , tubercled blossom	110	9.95
<i>Epioblasma</i> spp.	24	2.17
<i>Fusconaia subrotunda</i> , longsolid	112	10.13
<i>Lampsilis fasciola</i> , wavyrayed lampmussel	3	.27
<i>Lampsilis</i> , L. cf. <i>ovata</i> , pocketbook	5	.45
<i>Lemiox rimosus</i> , birdwing pearlymussel	7	.63
<i>Lexingtonia dolabelloides</i> , slabside pearlymussel	3	.27
<i>Obovaria retusa</i> , ring pink	3	.27
<i>Obovaria subrotunda</i> , round hickorynut	41	3.71
<i>Plethobasus cicatricosus</i> , white wartyback	4	.36
<i>Plethobasus cooperianus</i> , orangefoot pimpleback	6	.54
<i>Plethobasus cyphyus</i> , sheepnose	1	.09
<i>Pleurobema clava</i> , clubshell	45	4.07
<i>Pleurobema cordatum</i> , Ohio pigtoe	8	.72
<i>Pleurobema plenum</i> , rough pigtoe	34	3.08
<i>Pleurobema rubrum</i> , pyramid pigtoe	60	5.43
<i>Pleurobema</i> spp.	17	1.54
<i>Ptychobranhus fasciolaris</i> , kidneyshell	3	.27
<i>Ptychobranhus subtentum</i> , fluted kidneyshell	1	.09
<i>Quadrula cylindrica</i> , rabbitsfoot	2	.18
<i>Quadrula intermedia</i> , Cumberland monkeyface	2	.18
<i>Quadrula metanevra</i> , monkeyface	4	.36
<i>Quadrula pustulosa</i> , pimpleback	31	2.80
<i>Quadrula sparsa</i> , Appalachian monkeyface	2	.18
<i>Toxolasma lividus</i> , purple lilliput	1	.09

Species	Number of valves	%
<i>Unio merus tetralasmus</i> , pond mussel	1	.09
<i>Villosa iris</i> , rainbow	1	.09
<i>Villosa taeniata</i> , painted creekshell	3	.27
Totals	1,105	100.03

mound were modified for use as a tool or ornament; therefore, they probably were gathered as a food resource. The number of individual mussels and gastropods in the sample could easily have been gathered in a few hours or less. Further excavation of the early construction stages in the Mound A area, as well as more work in house mounds and village occupation areas, may better define the role mollusks played in the subsistence of these people.

Of the 40 species of freshwater mussels identified from the Mound A midden, five (*Cyclonaias tuberculata*, *Dromus dromas*, *Elliptio dilatata*, *Epioblasma t. torulosa*, and *Fusconaia subrotunda*) comprised 55 percent of the sample. Except for the longsolid (*F. subrotunda*), Morrison (1942) also found shells of the other four taxa abundant in the Pickwick Basin mounds. Valves of these five mussels comprised 73 percent of the archeological sample recovered at Diamond Island (Hughes and Parmalee 1999). Several species represented in the Mound A midden (*Elliptio crassidens*, *Obovaria retusa*, *Ellipsaria lineolata*, *Pleurobema cordatum*, *Plethobasus cicatricous*, and *P. cooperianus*) typically inhabit deep water and would have been inaccessible except during periods of minimum flow.

During the excavations conducted at Shiloh during the early 1930s a small sample of shell consisting of 11 freshwater mussel valves (9 species) and 15 aquatic gastropods (4 species) were apparently recovered overlying a burial beneath

the apron west of Mound A. These specimens were identified at the Division of Mollusks, U.S. National Museum, Washington, D.C. (see Welch 2006:130). The species identified from this “layer of clam shell” were represented in the sample recovered in 2001–2004 from within Mound A. The five species of aquatic gastropods identified thus far from the Shiloh Mound Complex still occur in the upper reaches of Kentucky Lake.

Since impoundment, the Tennessee River has undergone major changes relative to the species diversity and abundance of freshwater mussels. Of the 40 taxa represented in the Mound A sample, five are extinct (*Epioblasma* spp.), 16 extirpated from the main stem Tennessee River (Kentucky Lake) in Tennessee, and six are rare and/or localized. Only four species appear to be fairly common to common. In a statewide commercial mussel report, Hubbs (2001) listed 16 species inhabiting the Tennessee River in the vicinity of Diamond Island. Valves of seven of these species were present in the Shiloh Mound A sample. With the establishment of reservoirs throughout the length of the Tennessee River following dam construction, the once free-flowing river has experienced an immigration of numerous species from downstream. The ebony shell (*Fusconaia ebena*) is a classic example: although known to occur, but rare, at Muscle Shoals in the early twentieth century, it is now extremely abundant in the Diamond Island/Shiloh stretch of the river. No valves of it were recovered from Mound A.

Postscript: Dr. Paul Parmalee died in the summer of 2006. Prior to his death, he had completed a short paper on an unusual discovery from the base of Mound A at Shiloh. This paper, entitled “A Prehistoric Record of the Pond Mussel (*Unio merus tetralasmus*) from the Tennessee River, Hardin County, Tennessee” was printed in *Ellipsaria*, The Newsletter of the Freshwater Mollusk Conservation Society Volume 7(1):7-8, in April 2005. Portions

Table 18-02. Freshwater gastropods identified from Mound A

Species	Number of Shells
<i>Campeloma decisum</i> , pointed campeloma	120
<i>Pleurocera canaliculata</i> , silty hornsnail	597
<i>Leptoxis praerosa</i> , onyx rocksnail	88
<i>Lithasia verrucosa</i> , varicose rocksnail	60
<i>Lithasia salebrosa</i> , muddy rocksnail	206
Total	1,071

of this article, lightly edited, are included below, and the full text of the article can be found in the Appendices, reproduced with the permission of the Freshwater Mollusk Conservation Society.

The Pond Mussel, *Unio* *tetralasmus* (Say 1830), is a widely distributed species throughout much of the central and lower Mississippi River drainages, occurring west to Colorado, Oklahoma, and Texas (Parmalee and Bogan 1998). It is a fairly common mussel in all drainages in West Tennessee, becoming quite abundant in shallow river embayments, sloughs and water-filled borrow pits. A stable substrate composed of clay and/or compacted sand and mud appears to provide the most suitable habitat for this species.

The Shiloh Mound Complex (40HR7), a prehistoric village and mound complex comprising some 16ha (40ac), is located along the west bank of the Tennessee River at Tennessee River Mile (TRM) 198.4, Hardin County, Tennessee. Judging from the analyses of ceramics recovered at the site, Shiloh is considered to be an early Mississippian mound center, probably dating from ca. A.D. 1050 to 1350 (Finger 2004). ...After impoundment of the lower Tennessee River as a result of construction of Kentucky Dam (1944), the largest mound (Mound A) situated on the bluff edge began eroding into the river prior to and during the 1980s. Archeological salvage operations were initiated in 1999 and were continued periodically during the following summers through 2004. Although the quantity of aquatic mollusks recovered was not great, the diversity of species represented suggest the presence of a former extensive shoal adjacent to the site. Naiad taxa representing both Ohioan/Interior Drainage Basin (e.g., *Pleurobema* *clava*, *Quadrula* *metanevra*, *Ellipsaria* *lineolata*) and Cumberlandian (e.g., *Quadrula* *intermedia*, *Dromus* *dromas*, *Epioblasma* *arcaiformis*) origins were recovered.

Of special interest was the recovery of a right valve (missing portions of the posterior end and

ventral margin) of the Pond Mussel, *Unio* *tetralasmus*, from the base of Mound A. Heretofore it has not been recorded from extensive aboriginal shell middens along the main stem Tennessee River (e.g., Morrison 1942; Hughes and Parmalee 1999). In a study dealing with the stability of recent unionid communities (Bogan 1990) based on shell samples (ca. 278,900 valves representing 99 taxa) from 17 aboriginal sites in the Midwest and Midsouth, *Unio* *tetralasmus* was not listed. It has not been encountered during modern collections (e.g., Ortmann 1925) in the main stem Tennessee River. However, Brown and Pardue (1980) reported on a population of the Pond Mussel inhabiting Hurricane Creek, which generally runs north to south (Henderson and Hardin counties), that flows into White Oak Swamp. The swamp is drained by White Oak Creek, which flows into the Tennessee River at approximately TRM 173.6. Brown and Pardue (1980) noted that the population of this mussel in Hurricane Creek was restricted to stretches with a tightly packed clay substrate. It was absent from other creeks adjacent to Hurricane Creek and from stretches of Hurricane Creek with substrates of predominately loose sand and gravel.

It seems unlikely that inhabitants of the Shiloh Mound Complex would have carried mussels some 25 river miles upstream from Hurricane Creek/Oak Creek (TRM173.6) to Shiloh (TRM 198.4), considering the abundant and diverse mussel fauna to be gathered easily from the shoals adjacent to the site. In all probability the Pond Mussel once inhabited creeks flowing into the Tennessee River at or near Shiloh and/or in backwater sloughs and slow-moving side channels. In any case this valve of *Unio* *tetralasmus* represents a second record of this taxon from or adjacent to the main stem Tennessee River in Middle Tennessee and the first evidence of its use as a food resource by aboriginal peoples living along the river course [Parmalee 2005:7].

CHAPTER 19

CONSERVATION, AND ANALYSIS OF PERISHABLE MATERIAL FROM MOUND A JAMES M. ADOVASIO, JEFF. S. ILLINGWORTH, ALLISON. N. REXROTH, ERICA. J. CLEGHORN, AND ANNE E. MARJENIN

INTRODUCTION

In 2003, contrary to expectations, while excavating the upper surfaces of the Stage III mound, it became evident that the mound deposits contained carbonized fragments of organic materials which, upon initial exposure appeared to include cordage, basketry, and/or textile-like objects.

At this juncture, one of the co-Principal Investigators (Anderson) contacted J. M. Adovasio at the Mercyhurst Archaeological Institute (MAI), Erie, Pennsylvania, for consultation on the appropriate protocols to be employed in the field stabilization, documentation, and ultimate removal of the suspected perishables. After a series of discussions with Shiloh project personnel, it was decided to remove the perishables *en bloc*. This process involved the creation and subsequent removal of large blocks of sediment (Figure 19-01) adherent to which or within which were an unknown quantity and diversity of carbonized plant materials (see Chapters 3 and 9).

After extraction and stabilization with wooden frames (Figure 19-02), in late 2003 the blocks and some associated materials were transported to the R. L. Andrews Center for Perishable Analysis of the MAI for further excavation, conservation, and analysis. Upon arrival at MAI, the major blocks and associated materials were transported to the conservation facility. The blocks were then tabulated, preliminarily measured, and described.

SPECIMEN INVENTORY

Block A (Feature 147, FS 2653)

Block A was a large basically rectangular two-stepped block of sediment, containing much of the fill of a central hearth, designated Feature 147/160/161 for Structures 2A

and 2B atop the Stage III mound (Figure 19-03). This hearth feature was removed in three blocks, here designated A, B, and C. As discussed below, this block complex yielded the only perishable construction of the material submitted to MAI. Block A is 95.6–96.0cm in length and 63.9cm–67.9cm in width (all directions in all descriptions reflect original *in-situ* orientation). The height of the lower step, on the southern half of the block, was 16.2cm; the upper step began at a distance of 45.8cm from the southern edge of the block; the height of this area was 29.0cm. The sediment in Block A was highly friable and was predominantly composed of silt-sized particles ($< 1/16$ mm). The upper step (Figure 19-04) was strong brown (Dry: 7.5YR4/6) to dark yellowish brown (Wet: 10YR4/4) in color with pockets of yellowish red (Dry: 5YR5/8, Wet: 5YR4/6) thermally altered sediment in the northeastern and southwestern corners. It exhibited extensive desiccation cracks throughout the central portion. Small to medium-sized roots (ranging from 0.5–1.0cm in diameter) were present



Figure 19-01. Blocks A, B, and C, Features 147/160/161, the central hearth for Structure 2A atop the Stage III mound, prior to removal from the field 19 August 2003. (Photo courtesy SEAC)



Figure 19-02. Block B, Feature 147/161, a portion of the central hearth for Structure 2A atop the Stage III mound secured in wooden frame. 20 August 2003. Note Block A, which shares a profile with B in the background. (Photo courtesy SEAC)

on the central portion of the upper step. There was pale brown (Dry: 10 TR 6/3) to brown (Wet: 10YR4/3) mottling on the northern half and a small accumulation of carbonized material in the north central corner of Block A. Minute yellow (Dry: 10YR7/6) to brownish yellow (Wet: 10YR6/6) fibrous plants/ fungi were present on the southern portion of the step. The lower step displayed deep

crevices (Figure 19-05) which were much more extensive than those present on the upper step. The largest “chasm” ran north to southeast. It was ca. 40cm in length, 1cm in maximum width, and extended to the bottom of the block (probably as a result of transport). Some cracks exhibited a ca. 1cm deep accumulation of dark carbonized material (Figure 19-06), while other cracks were devoid of such material. The lower step also was penetrated by small to medium sized roots. The surface of the lower step was yellowish brown (Dry: 10YR5/4) to dark yellowish brown (Wet: 10YR3/6), but the cracks reveal red (Dry: 2.5YR4/6) to dark reddish brown (Wet: 2.5YR3/4) thermally altered sediment at depth. The surface color changes to yellowish red (Dry: 5YR5/8, Wet: 5YR4/6) in the eastern section of Block A.

There were large amounts of carbonized material that were focused in the north-central and east-central areas.

A large piece of three-strand braided material, approximately 4cm in length and 1.25cm in width (Figure 19-07), lay in the north central region, to the east of the largest crevice (see below).



Figure 19-03. General view of Block A, Feature 147, in the laboratory prior to the removal of its protective sheathing.

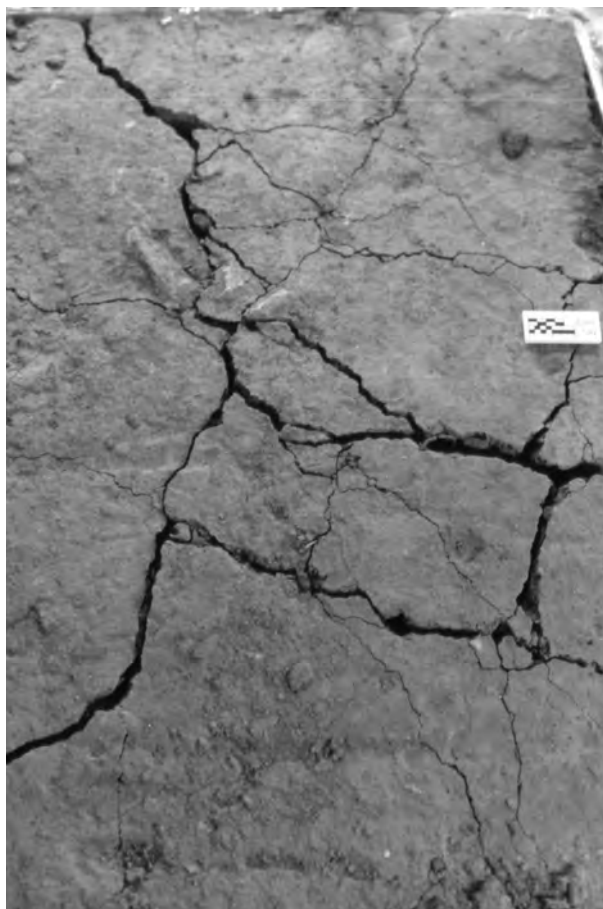


Figure 19-04. Upper step of Block A, Feature 147. Note extensive desiccation and seismic cracking.

Block B (Feature 147/161, FS 2739)

Block B was a large, rectangular block of sediment which displayed a large amount of carbonized perishable material on its surface (see below), that was directly contiguous with Block A, and part of the same feature, but that was removed separately to protect the sediments and for ease of transport (Figure 19-08). It was 83–85cm in length, 49.3–49.5cm in width, and 13.5–15.5cm in height. The block was extensively thermally altered at the northern and southern ends (Figure 19-09). The sediment was highly friable and consisted of silt-sized particles ($< 1/16\text{mm}$). The sediment ranged in color from strong brown (Dry: 7/5YR4/6) and dark yellowish brown (Wet: 10YR3/6) to dark reddish brown (Dry: 2.5YR3/4; Wet: 2.5YR2.5/4), red (Dry: 2.5YR4/8) and dark red (Wet: 2.5YR3/6).



Figure 19-05. Lower step of Block A, Feature 147. Note extensive desiccation and seismic cracking.

Block C (Feature 161, FS 2767)

Block C was a small square block of sediment that exhibited carbonized material. It was 31cm in width, 39–39.5cm in length, and 14–17cm in height (Figure 19-10). The surface of the sediment exhibited an elevational change which began in the north central region and proceeded to the southwest corner. This elevational change was attributable to a root approximately 1–1.5cm in width, which was apparently removed by the SEAC Shiloh field crew. The sediment was highly friable and was composed of silt-sized particles ($< 1/16\text{mm}$). The northern and western edges of Block C contained sediment that ranged in color from red (Dry: 2.5YR4/8) to dark red (Wet: 2.5YR3/6), while the southeastern portion was composed of light yellowish brown (Dry: 10YR6/4) and dark yellowish brown (Wet: 10YR4/4) sediment. The central region exhibited



Figure 19-06. Close-up of the largest crack on the lower step of Block A, Feature 147. Note extensive occurrence of carbonized perishable remains.



Figure 19-07. Close-up of three-strand braid cordage fragment in the crack depicted in Figure 19-06, Block A, Feature 147, the central hearth for Structure 2A atop the Stage III mound.

dark brown (Dry: 7.5YR3/3) and very dark brown (Wet: 7.5YR2.5/2) sediment. Fibrous growth (see Figure 19-10), presumably fungus or small roots, appeared on the surface of this specimen. Suspected plant-fiber artifacts were present on the surface and were exposed during laboratory excavation (see below).

TRAY 1 (FEATURE 163, FS 2747-A)

Tray 1 was a thin rectangular block of sediment that contained a discontinuous thin lens of carbonized material found on the northwest side of Structure 1 atop the Stage III mound. It was 22–28cm in width, 45cm in length, and 3.5–4.7cm in height (Figure 19-11). The sediment was highly friable and composed of silt-sized particles ($< 1/16$ mm). The sediment was brownish yellow (Dry: 10YR6/6) to dark yellowish brown (Wet: 10YR4/6). The carbonized lens was 1.25cm at its thickest on its southern edge (Figure 19-12) and pinched out to the north to 0.1cm; it extended to the west and east as well. There was also thermally altered sediment in contact with the carbonized material. The southern edge appeared to line up with the northern edge of Tray 2. Tray 1 is half of Feature 163, the other half of which was removed separately. The small size of the area subsumed by Trays 1 and 2 and the thinness of the carbonized material initially suggested that they may have been a small plant-fiber construction

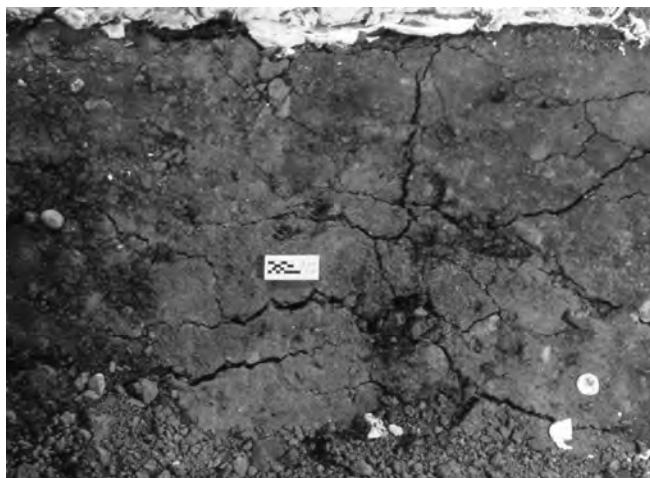


Figure 19-08. General plan view of Block B, Feature 147/161, a portion of the central hearth for Structure 2A atop the Stage III mound. Note extensive presence of thermally altered sediment and surficial occurrence of carbonized perishable material.



Figure 19-09. Close-up of the Block B, Feature 147/161, surface exhibiting extensive spread of loose sediment and carbonized perishable material.

or, perhaps, a segment of hide or leather (Figure 19-13). There were, however, no noticeable structural attributes to directly suggest that the specimen was a fiber construction nor was there any evidence that it was hide or leather. Rather, it appears to have been a thin lens of disaggregate plant material of indeterminate taxonomic ascription.

Tray 2 (Feature 163, FS 2747-B)

Tray 2 is a thin rectangular block of sediment which contained a thin lens of carbonized material, found on the northwest side of Structure 1 atop the Stage III mound, similar to that found in Tray 1, which was the other half of this feature. It was 19cm in width, 35–37cm in length, and 1.6–4.5cm in height (Figure 19-14). The sediment was highly friable and composed of silt-sized particles ($< 1/16$ mm). The surface sediment ranged from brownish yellow (Dry: 10YR6/6) and strong brown (Dry: 7.5YR5/8) to dark yellowish brown (Wet: 10YR4/6). This



Figure 19-10. General surface view of Block C, Feature 161, a portion of the central hearth for Structure 2A atop the Stage III mound. Note extensive thermal alteration of sediment, the extensive distribution of carbonized perishes, and a single lithic fragment in the bottom, center of the image. Running vertically along the left of the block is a root depression. This specimen also exhibits a white, fibrous growth across its surface.

half of Feature 163 contained the majority of the carbonized material. Thermally altered sediment was also present. The easternmost portion/edge ranged from 0.5cm to 1cm in thickness. On the northern edge of the specimen, the carbonized material was 1.25cm thick (Figure 19-15). The location and thickness suggest that this segment should be congruent with the southern edge of Tray 1. As with Tray 1, there were no apparent structural attributes to directly suggest that the specimen was a fiber construction nor was there any evidence that it was hide or leather. Rather, it appears to have

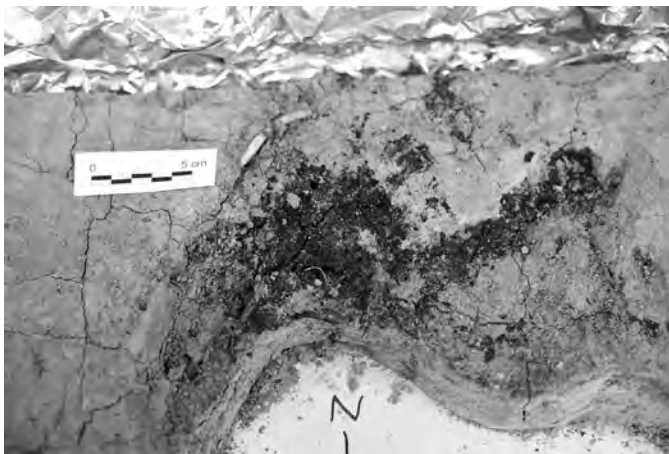


Figure 19-11. General view of Tray 1, Feature 163, a mass of charred material found on the northwest side of Structure 1 atop the Stage III mound. The feature was removed in two parts, designated Trays 1 and 2.

been a thin lens of disaggregate plant material of indeterminate taxonomic ascription.

Foil Cylinder and Associated Fragment (Feature 161, FS 2736)

This specimen was a highly friable aggregate of silt-sized particles ($< 1/16\text{mm}$) that was originally a mass ca. 20cm E/W by 10cm N/S and 11cm thick that was removed separately from the western side of Feature 161 because it appeared to have appreciable carbonized material present. It was 14.4cm in width and 35.7cm in length (Figure 19-16) and was composed of large irregularly shaped chunks of sediment that range 5–7cm in width, 6.5–11.5cm in length, and 5–8cm in height. The specimen, wrapped in foil, arrived with a detached fragment with the same provenience data, that broke off when the block was being removed and was bagged separately (Figure 19-17). The detached fragment was not treated separately from the larger aggregate. Both the larger aggregate and the detached fragment were composed of yellowish red (Dry: 5YR5/8) and strong brown (Wet: 7.5YR4/6) sediment. The larger aggregate was root-penetrated and also contains carbonized plant matter. While replete with carbonized plant matter, there was no evidence of perishable construction within this mass. Rather, it appears to have been a conglomeration of soft plant-matter which was carbonized *in situ*.

BOXED MATERIAL (FEATURE 262, SAMPLE 1 OF 2, FS 3189)

This specimen was a composite of multiple chunks of loose unconsolidated sediment, the first of two samples of material taken from the northern east/west wall trench in Structure 2 atop the Stage III mound (Figure 19-18). In the field the material appeared to be charred woven thatching, which is why it was collected. Dimensional measurements and Munsell color samples were not taken due to the instability of the material. A few segments of this sample exhibited carbonized plant material which exhibited no discernible construction engagement. If, as suspected in the field, that these specimens

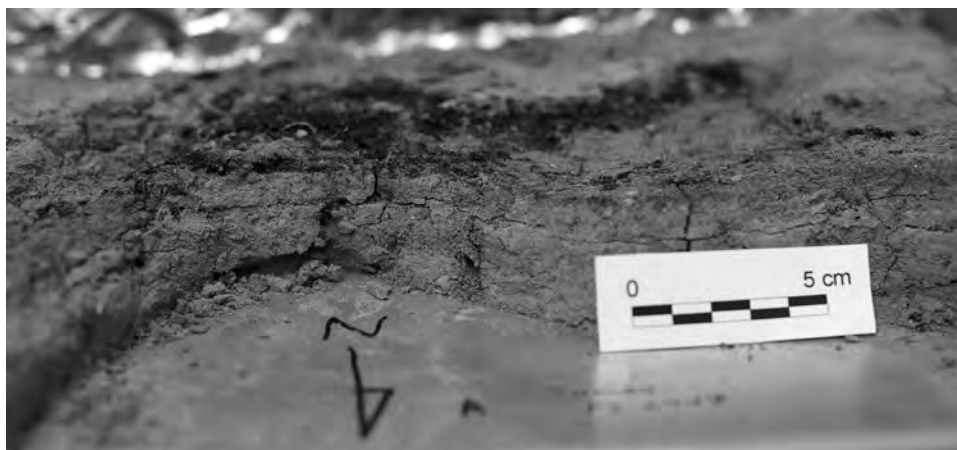


Figure 19-12. Close-up view of the north end profile of Tray 1, Feature 163. Note distinct lens of carbonized organic material.

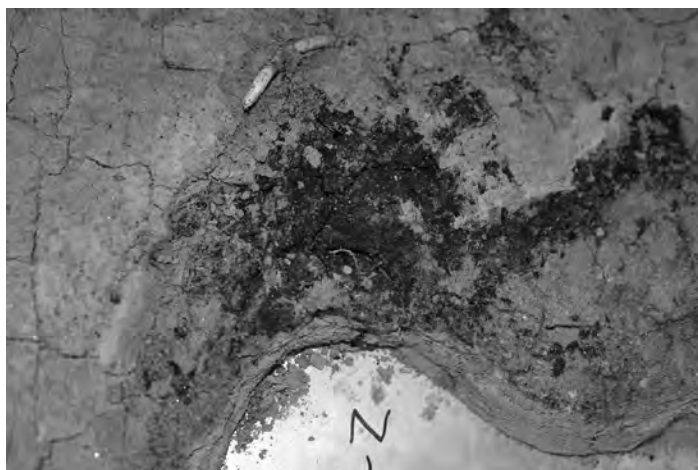


Figure 19-13. Close-up of carbonized material in Tray 1, Feature 163. As discussed in the text, this may be part of a leather or hide construction.

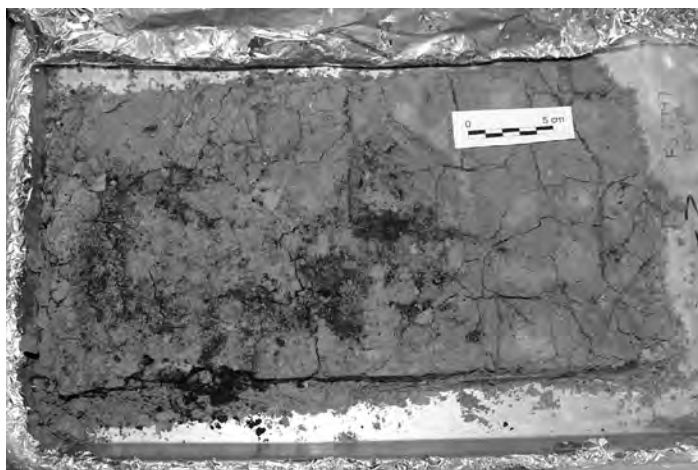


Figure 19-14. General view of Tray 2 sample, Feature 163, a mass of charred material found on the northwest side of Structure 1 atop the Stage III mound. The feature was removed in two parts, designated Trays 1 and 2.

represented thatching, such mechanical engagement did not survive transport to MAI.

Boxed Material (Feature 262, Sample 2 of 2, FS 3190)

This specimen was also a composite of multiple chunks of loose unconsolidated sediment, the second of two samples of material taken from the northern east/west wall trench in Structure 2 atop the Stage III mound

(Figure 19-19). No dimensional measurements were taken. No Munsell color samples were taken due to the instability of the material. The sample is very similar to FS # 3189, and while the carbonized material initially presented an appearance similar to plaited constructions, it proved to be a highly thermally checkered “smear” of hickory (*Carya* sp.) wood.

EXCAVATION, ANALYSIS, DOCUMENTATION, AND CONSERVATION PROTOCOLS

Excavation

Excavation of the blocks was conducted by arbitrary 1 or 2cm levels within natural stratigraphic units as defined on textural and compositional parameters. In certain cases, the arbitrary levels were increased to 5cm. Single-edged razor blades and small paint brushes were used to remove the sediment from Block A, Trays 1 and 2, and a combination of razor blades and a micro-suction vacuum device were used to remove the sediment from Block B and C. Razor blade “dissection” was undertaken on the remaining samples. As noted below (see Conservation), where necessary, excavation of carbonized perishable material was preceded by temporary consolidation with cyclododecane or, more rarely, with polyvinyl acetate.

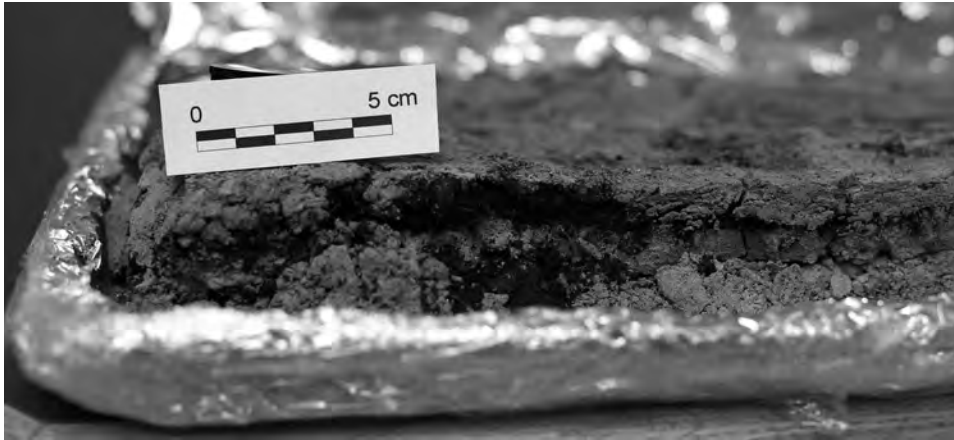


Figure 19-15. Close-up of northern profile of Tray 2, Feature 163. As discussed in the text, this may be part of a leather or hide construction.

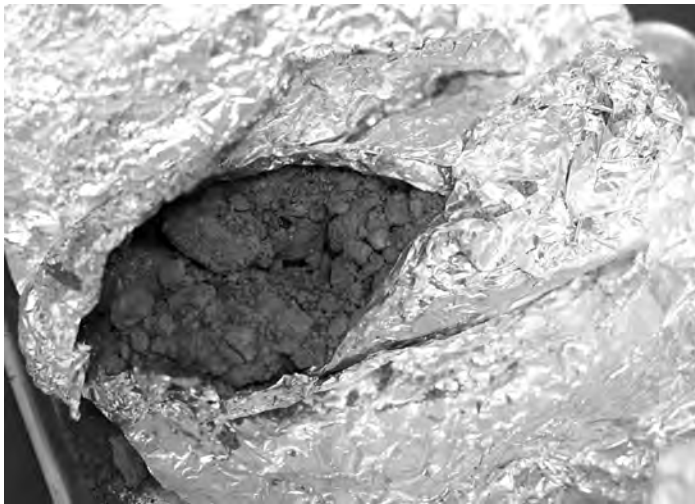


Figure 19-16. General view of the foil cylinder specimen, a block removed separately from the western side of Feature 161.

A micro-suction vacuum (Figures 19-20 and 19-21) was created to facilitate the removal of sediment from between the exposed sections of perishable material. The device was produced by attaching a long piece of plastic piping onto the arm of a mini-vac with duct tape to serve as an extension, thus decreasing the amount of suction. A narrow-head nozzle was then added to this extension. The contraption was further modified by twist-tying a small piece of mesh onto the end of this nozzle decreasing the suction yet again. The mesh also worked as a barrier that would prevent diagnostic pieces from being pulled from their position and into the holding chamber of the vacuum. A few months into the project,

however, more professional and standardized micro-suction mini-vac adapters were acquired. The original narrow head nozzle, displaying its obviously larger opening, and clumsy suction shield were deemed deficient and were replaced. However, both sets of utensils worked well to extract the sediment and leave the perishables *in situ*. The smaller diameter nozzle was crucial, however, in allowing more delicate extractions that permitted the preservation of diagnostic attributes. After the removal of each arbitrary level of sediment, the vacuum bag was emptied into the appropriately labeled sediment bag so that only minimal amounts of sediment were lost.

Excavation proceeded by small vertical slices (Figure 19-22) across the surface of each excavated block or tray until a carbonized phenomenon was exposed or, if no carbonized material was detected, excavation continued to the base of the predetermined arbitrary level. In the rare instance that a different microstratum or lens was encountered before the base of the arbitrary level, excavation ceased.

When a carbonized object was encountered excavation focused on the exposure of the adjacent lateral surfaces which might contain additional carbonized material connected to or associated with the “original” carbonized item. Special care was taken not to cross-cut any artifact bearing surfaces and the arbitrary levels took account of surficial topographic variability such as described above for several specimens.

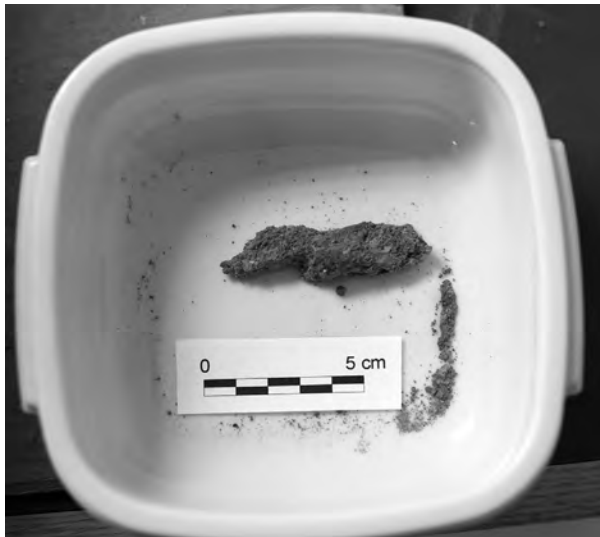


Figure 19-17. General view of the "Associated Fragment." This specimen is associated with the Foil Cylinder specimen, and was removed separately from the western side of Feature 161, the central hearth for Structure 2A atop the Stage III mound.

All sediment removed from the excavations of Blocks A and B and Trays 1 and 2 was bagged by natural and/or arbitrary level for future qualitative and quantitative sedimentological analysis. The unstratified sediment samples were similarly bagged. Samples collected for 14C assay were placed in doubled aluminum foil and sealed in Zip-Loc® bags. These were returned to the project ethnobotanist, who identified them prior to including them in samples submitted for dating (see Chapters 9, 12, and 16).

The artifacts and perishable fragments were provenienced with the creation of an artificial datum placed on each of the blocks. Mini-grid systems were created for Blocks A, B, and C as well as Trays 1 and 2. Because of the fact that the majority of these specimens were encompassed by more than one excavation unit during the field investigations, although the sample block locations were drawn and mapped in the field with the total station, because the mapping notes were not available it was virtually impossible to tie any artifacts into the site grid system created by the original excavators. Therefore, temporary grids were constructed for the individual specimens to allow precise proveniencing. Two adjacent sides of each specimen acted as the excavation boundaries

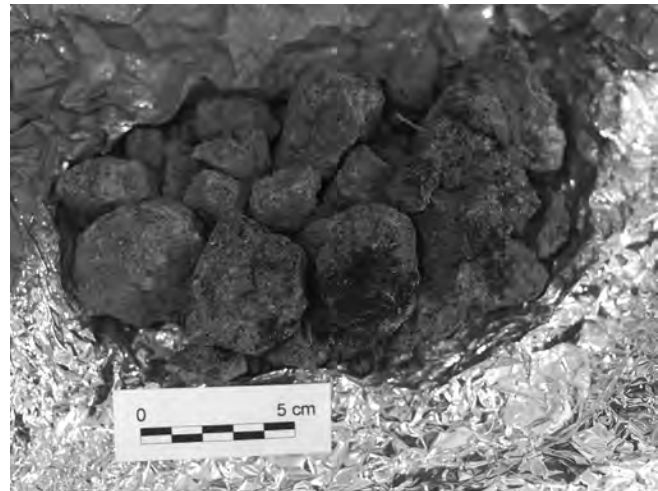


Figure 19-18. General view of boxed material FS #3189, Feature 262, one half of a sample of taken from the northern east/west wall trench in Structure 2 atop the Stage III mound.

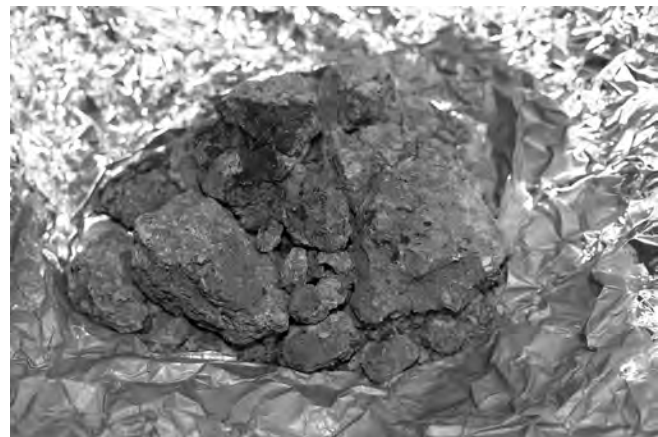


Figure 19-19. General view of boxed material FS #3190, Feature 262, one half of a sample of taken from the northern east/west wall trench in Structure 2 atop the Stage III mound.

and were utilized as lines from which the excavator determined the x and y coordinates of an artifact's position. Individual elevational datums were placed in the corner where the two sides met; depths were recorded as positive numbers below datum. Trays 1 and 2 were placed on pieces of plywood that had two 2x4s nailed into them so that they conjoined at a 90° angle; nails were then placed in the corners, and string was utilized to create the gridlines. An outline of the trays upon which the specimens rested was traced onto the plywood to ensure that the specimen was always in the proper place when measurements were being taken.



Figure 19-20. A. Rexroth (co-author) operating the mini-vac on Block B, Feature 147/161.



Figure 19-21. Close-up of mini-vac operation on Block B, Feature 147/161. Note that the main feature complexes of Block B are outlined in string to enhance the visibility afforded to the conservator.

Documentation

Documentation was a critical part of the Shiloh perishable analysis and conservation enterprise. As indicated above, the initial description of



Figure 19-22. Close-up view of excavation of Block B, on Block B, Feature 147/161. Note the use of a single-sided razor blade.

each specimen included the recording of a series of qualitative and quantitative attributes. These specifically included: metric dimensional measurements of the sediment blocks and exposed surface specimens; qualitative assessment of the compositional and textural parameters of the sediment matrix; observation on the presence/absence and extent of root penetration; identification and location of carbonized materials; assessment of stability or integrity; itemization and location of adherent objects such as lithics or bone; initial description of surficially exposed carbonized specimens; and wet/dry recordation of sediment colors via Munsell charts.

The sequence of the exposure, excavation, and conservation process was documented on standardized recordation forms. During this phase of documentation, notes were taken on: the condition of each object before excavation and conservation was initiated; the specific techniques and protocols used in each subsequent phase of the project; the ongoing status of the objects during the excavation and conservation process; and the occasion and explicit reasons for any modifications to excavation or conservation protocols.

DVDs with field photographs were provided by SEAC and were employed to ascertain the original (i.e., *in situ*) position of all specimens though, as noted above, it was not possible to micro-position

each observed item relative to the original grid, although this could be done at some point in the future.

Each specimen was initially photographed in plan view and was thereafter photographed periodically during subsequent exposure. Photos were taken at the initial appearance of cultural material, during progressive stages of exposure, and when exposure was completed. The before and after pictures were ultimately key steps in this project. The unwrapping and partial excavation of the aluminum foil cylinder was also videotaped. The sediment blocks and related materials were photographed in color with Kodak 160 T Ektachrome film, in a bracketed format. The cameras and lenses utilized in the project photography were a Kodak DCS pro SLR/n 13.8 megapixel, a Nikon D90, a Nikon F5, and a Nikon F6, with a 60mm micro lens and a 28–70 zoom. The individual items were photographed in both plan view and close-up perspectives. Additionally, hand-drawn plan and profile maps were produced where warranted. Scales were included in the majority of the photographs, situated in such a way that they could be cropped out later if so desired. Scales were not included in close-up photos taken of specific portions of the feature or on specific attributes of the perishable material.

Experimentation and Conservation

Early in MAI's involvement with the Shiloh project consultation with N. Odegaard and her colleagues at the Arizona State Museum determined that the primary vehicle for the initial stabilization of any carbonized plant-fiber material would be cyclododecane ($C_{12}H_{24}$). Cyclododecane is a high purity solid 12-carbon cycloalkane solid (Smith 1999), consisting of large translucent white crystals with a waxy texture (Kremer 2004), that is a non-reactive sublimable adhesive that provides temporary consolidation for fragile textiles (Smith 1999). It has been used to temporarily stabilize objects in preparation for handling and transport. Cyclododecane can be applied as a melted solid, using a brush, heated spatula, or hot-glue gun. It may be dissolved in a non-polar or aromatic solvent and applied as a saturated solution. The solution can be painted

or sprayed onto the surface, or it may be injected with a syringe. The choice of delivery method is guided by the condition of the substrate, desired effects of coating and penetration, as well as the toxicity, volatility, and migration of solvents as discussed below. The solvents chosen for use were heptane and n-butanol. Sublimation can be delayed by sealing the object in an airtight environment or by covering the object with plastic. Conversely, sublimation can be hastened by increasing direct or indirect ventilation and/or temperature (Kremer 2004). Odegaard had successfully used cyclododecane in solid form in the stabilization of ceramics and other durable media and believed that it could be successfully employed in solution to treat nominally perishable items

Before employing cyclododecane on any of the Shiloh specimens, it was deemed critical to test it on simulated substrates which closely approximated the condition of the carbonized Shiloh materials. Pursuant to this end, untreated, commercial-grade sisal (*Agave sisalana*), manilla (*Musa textilis*), jute (*Corchorus* sp.), rafia (*Raphia*



Figure 19-23. General view of west wall profile of Block B, on Block B, Feature 147/161. Note the complex microstrata and multiple features which cross-cut each other.

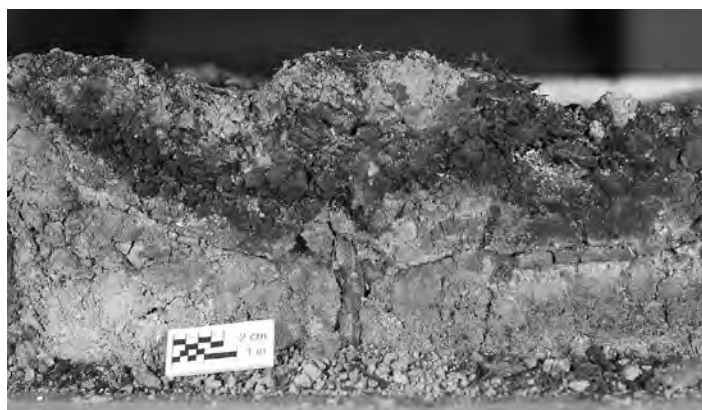


Figure 19-24. Close-up of north end of west wall profile of Block B, Feature 147/161. Note the extensive presence of twisted and braided cordage and the presence of additional features and microstrata.

farinifera), hemp (*Apocynum cannabinum*), and beeswax-coated hemp were secured and all but two were replicated into three-strand braid constructions, each 4cm in length. Due to the diameter of the sisal and manila in commercial form, these raw materials were not braided.

Each example of raw material was then completely carbonized using a propane torch and transported to a large, circular tray (Figure 19-25) by sliding sheets of mylar underneath the fragile items. Each carbonized raw material type was then labeled and stored pending determination of the appropriate strength of cyclododecane solution.

The percent solution suggested for use by Odegaard was a 10 percent by weight solution created by adding the cyclododecane solid solute to a solvent composed of heptane and n-butanol in a 3:1 ratio. She suggested the use of the solvent mixture because it seemed to produce smaller crystals than when using heptane alone. Initially, this solution was to be dispersed via spray. Tanks of nitrogen gas were to be utilized, which would force the gas through a glass container which held the solution. This glass bottle was designed so that an experimenter could control the amount of pressure forcing the spray out and onto the material by placing a finger over a strategically placed hole/valve. This process, however, produced a spray that when directly focused on the material was too forceful and damaged the fragile material. Indirect application by this method was also deemed inadequate; by spraying the solution into the air and allowing it to fall onto the pieces produced an uneven coating of the material and did not satisfactorily saturate it. Ultimately, the most functional and successful method involved the use of a pipette to apply the solution. The diameter of an eye-dropper was found to be too large and produced a drop that damaged the material when released, due to its weight. Therefore, a 1mm diameter pipette (Figure 19-26) was used to create a less substantial drop that would not deform the carbonized material.

The drop was introduced to the side of the item, rather than from above further minimizing deformation. This method also allowed the droplet to be readily absorbed and distributed through the piece with no perceptible damage. After allowing a few minutes of drying time, the experimenter was then able to physically handle the specimen. One specimen was actually picked up and allowed to hang vertically by one end without any noticeable effects to the piece.

It was further determined that the cyclododecane solution would occasionally be used in sediment removal, to provide: further cohesion of the matrix, easier excavation, and to prevent mold growth. The solution was fully absorbed into the carbonized perishable fibers in five minutes and allowed for 14 hours of increased stability. Additionally, reapplication ensured constant reinforcement and decreased the likelihood of artifact deterioration or collapse. Frequent reapplication also occurred so that the sediment could be more easily removed. As noted above, transportation of the replicated specimens was



Figure 19-25. Example of carbonized test material on metal support tray.

affected with one thickness of mylar (5 micrometers). Several shapes of mylar were tested, including squares and rectangles; however, one specific shape did not produce better results than the other.

As the excavation process progressed, the use of a 10% reagent grade polyvinyl acetate (PVA) solution was used to provide more robust stabilization to large and convoluted masses of carbonized perishable material. This solution was applied using a 1 mm pipette in much the same manner that the cyclododecane was applied. Once the solution set, the perishable conglomerate was separated from its surrounding matrix and stored in a fine sand cradle.

Analytical Methodology

The single twined specimen recovered from the Shiloh Mound sub-assembly submitted to MAI was allocated to a single structural types based on the number and sequence of warps engaged at each weft crossing and/or on the spacing of the weft rows. This item also was analyzed for selvage, method of starting, method of insertion of new warp and weft elements, method of preparation of warps and wefts, form, wear patterns, function, decorative patterns and mechanics, type and mechanics of mending, and raw materials. Width of individual warp and warp unit, number of warps per centimeter, width of individual weft ply and weft unit, weft gap, and number of wefts per centimeter

also were recorded where applicable. The standard descriptive terminology and protocols followed those employed by Emery (1966), Adovasio (1977), and Hurley (1979).

Type I: Open Simple Twining, Paired S Twist Weft (Figures 19-27 to 19-33)

Number of Specimens: 1

Types of Specimens: Wall fragment(s) without selvage, 1

Number of Individual Forms: 1 (?)

Types of Forms: Unknown 1

Technique and Comments: This specimen employs plain twined weaving over single warps. The wefts are paired and spaced to expose the warps. Individual weft plies are two ply, S spun, Z twist cordage while the warps are three strand braid, the individual strands of braid are unspun. The specimen exhibits no discernible splices, knots, mends, decoration, or other mechanical attributes. The specimen is fully carbonized and extensively disarticulated. This disarticulation appears to be peridepositional and probably a result of burning. Both warps and wefts are composed of the same indeterminate monocot.

Warp diameter ranges from 7.65 mm to 8.25 mm with a mean of 7.87 mm and they occur on average 2 per cm. Weft diameter ranges from 2.15 mm to 2.85 mm with a mean of 2.35 mm and they occur on average 0.5 per cm. Weft spacing, in the one instance where it can be determined, is 19.85 mm. The braided elements which constitute the warps exhibit a strand diameter range from 3.35 mm to 3.70 mm with a mean of 3.55 mm. The cordage of which the wefts are composed exhibits a cord diameter range of 1.85 mm to 2.05 mm with a mean of 1.95 mm; a ply diameter which ranges from 0.95 mm to 1.05 mm with a mean of 1.00 mm; a twist per-centimeter occurrence which ranges from 3 to 3.5 with a mean of 3.33; and an angle-of-twist which ranges from 18° to 23° with a mean of 20.5°. This specimen and its attendant fragments (e.g., Figures 19-29 to 19-33) derive solely from the Feature 147/161 (Blocks



Figure 19-26. Application of cyclododecane solution via small diameter pipette.



Figure 19-27. Close-up of three-strand braid present in Block B, Feature 147/161, a portion of the central hearth for Structure 2A atop the Stage III mound.

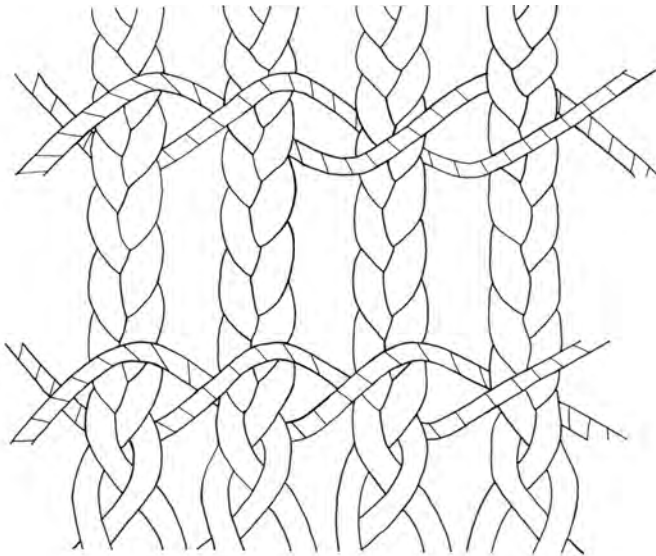


Figure 19-28. Example of Open Simple, S-Twist Twining using three-strand braid cordage as warp elements (Illustration by Sarah Hagarty, Mercyhurst Archaeological Institute).

A, B, and C) complex from structures 2A and 2B, atop the Stage III mound (see Chapter 9 and below).

Internal Correlations

As outlined in Chapter 9, the Block A, B, and C components of Feature 147/161 derive from the central hearth of Structures 2A and 2B (a large, rectangular wall trench and post structure) in Mound Stage III. Laboratory excavation of this hearth revealed no detectable microstratigraphy within the sediment bloc and only ash-settling derived microstratigraphy in the fire feature itself. The textile mass in this feature appears to have been

a single, minimally worn, open twined flexible bag or mat of indeterminate dimensions which was burned in a single firing event. In direct association with this item is a large amount of charcoal which has been identified as hickory (*Carya* sp) and oak (*Quercus* sp.) in a ratio of 1:11, respectively. It should be noted that the majority of the oak fragments derive from the Block A portion of the pit. In addition there were some minimal fragments of pine (*Pinus* sp) as well as many disarticulated, carbonized monocot fragments—which are presumed to

be disaggregated parts of the twined perishable. Small fragments (less than 5 mm) of calcined bone from an unidentified small animal (possibly avian) were also recovered as well as two spalls (less than 10 mm) of ceramic matrix, and minimal microdebitage.

External Correlations

The excavations of the Shiloh Mound Group have provided an unparalleled opportunity to examine a facet of Mississippian material culture which is very unevenly documented for both preservational and, to some extent, field recovery protocols. In comparison to much of western North America with its relatively abundant dry caves and rockshelters and attendant conditions for excellent preservation of organic materials, eastern North America has suffered more broadly and intensively from the tyranny of preservation.

In much of the vast region east of the Mississippi watershed, generally wetter and/or more humid conditions prevail and dry closed sites are relatively scarce. Additionally, though it is generally well known that once carbonized (and if undisturbed, post-depositionally), plant fiber artifacts are relatively indestructible, few excavations are conducted with appropriate rigor to recover such materials. The Shiloh Mound Group excavation stands out as a laudable exception to this lamentable situation.

Shiloh, and a few other sites notwithstanding, the development of so-called perishable plant

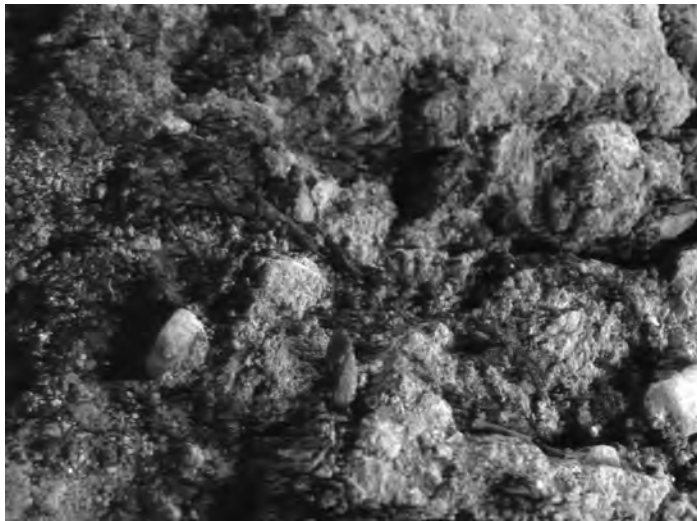


Figure 19-29. Close-up of the mass of carbonized perishables on Block B, F 147/161, a portion of the central hearth for Structure 2A atop the Stage III mound. Note the presence of a final Z-twist cordage strand running, roughly, from top left to bottom right.

fiber derived technologies in eastern North America has numerous lacunae. This is not to suggest, however, that the evolution of perishable plant fiber artifact production is a tabula rasa. Indeed, the general outlines and, in some cases, precise details this long developmental sequence have been known for some time.

Andrews and Adovasio (1996:30-41) provided the initial synthesis of plant fiber perishables production in eastern North America. Six years later, Andrews et al. (2002:127-168) published the

spectacular suite of Archaic perishables from the Windover Bog in Florida which included a revised perspective on perishable developments in eastern North America. Somewhat later, Drooker (2004) edited a volume which focused on basketry, textile, and related industries in northeastern North America including chapters on the very ancient materials from sites in the upper Ohio Valley (Adovasio and Illingworth 2004) and adjacent New York State (Adovasio et al. 2004). Still more recently, Thompson and Simon (2008:1720174) provided an abbreviated synoptic summary of eastern North American fiber industries as part of an exposition of textile fragments from the Janey B. Goode site in Illinois.

In order to avoid tedious redundancy, the authors elect not to reiterate the developmental trajectories of or most of the extra-site comparisons presented in any of the aforementioned works. Instead, the following salient points about fiber artifact production in eastern North America are offered to provide an admittedly broad context in which to place or view the Shiloh perishable materials.

In eastern (and western) North America, the oldest basketry, textiles, or cordage materials are generally assignable to the mid-twelfth radiocarbon millennium B.P. Though very few specimens have been recovered from well-dated contexts. As of this writing, the oldest bona fide basketry (or perishable plant fiber artifact) of any subclass

or type from eastern North America derives from Middle Stratum IIa at Meadowcroft Rockshelter in Pennsylvania (Andrews and Adovasio 1996; Stile 1982). The item is a carbonated wall fragment of a basket without selva constructed of simple plaiting with single elements in a 1/1 interval. It is bracketed by radiocarbon dates of $12,800 \pm 870$ B.P. and $11,300 \pm 700$ B.P. and is associated



Figure 19-30. General plan view of Block B, F 147/161, a portion of the central hearth for Structure 2A atop the Stage III mound showing three major feature complexes outlined with string.



Figure 19-31. Close-up of possible weft engagement on Block B, F 147/161, a portion of the central hearth for Structure 2A atop the Stage III mound.

with the Miller Complex occupation at that site. According to Andrews and Adovasio (1996:39), a far older but more tentatively classified perishable from Meadowcroft Rockshelter derives from Lowest Stratum IIa and is directly dated to $19,600 \pm 2400$ radiocarbon B.P. The specimen consists



Figure 19-32. Close-up view of Z-twisted cordage on Block B, F 147/161, a portion of the central hearth for Structure 2A atop the Stage III mound.

of a single element of intentionally cut birch-like (cf. *Betula* sp.) bark which is quite similar in overall morphology to the strips employed in all later Meadowcroft plaiting. If the specimen is a portion of a plaited basket and even if one sigma is subtracted from the date (i.e. 17,650 RCY BP), it is at once the oldest basket fragment in all of North or South America. Basket fragment or not, it is the oldest anthropogenically modified perishable object in the hemisphere.

While, as noted below, plaiting or its textile equivalent, plain weave, is represented in later eastern North American contexts including Mississippian (e.g. Drooker 1992; Thompson and Simon 2008), none was recovered from the Shiloh Mound Group. However, based on its deep antiquity in eastern North America as well as its sporadic but persistent occurrence in later sites, the absence of plaiting in the recovered Shiloh samples is probably an artifact of sampling and/or preservation.

Though plaiting is represented in very early contexts at Meadowcroft Rockshelter, Pennsylvania, as well as elsewhere in North America, most early eastern or western North American basketry or textiles are twined. The ancient pedigree of twining in eastern North America is documented by a remarkable positive cast of a fragment from the Hiscock site in western New York (Adovasio et al. 2003, 2004). This unique specimen was produced with very fine gauge cordage warps and wefts via close diagonal twining with a Z-twist weft slant (Adovasio et al. 2004:34-35, Figs 3.2-3.5). Recovered from the upper portion of the Fibrous Gravely Clay later, the age of the

specimen is somewhat ambiguous. With too little organic material to be directly dated, the Hiscock twining, on stratigraphic grounds is minimally $9,475 \pm 95$ to $9,205 \pm 50$ radiocarbon years old. An AMS date run a twig of unidentifiable wood from the matrix of the Hiscock

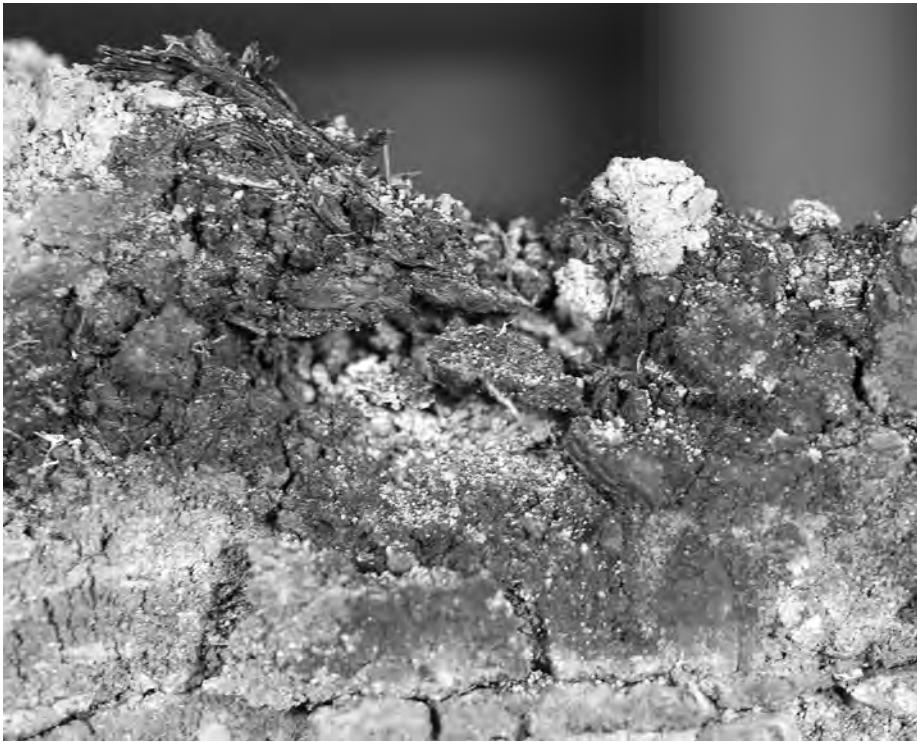


Figure 19-33. Close-up view of north end of west wall profile from Block B, F 147/161, a portion of the central hearth for Structure 2A atop the Stage III mound. Note extensive occurrence of braided and twisted cordage.

twining produced an uncorrected date of $10,180 \pm 50$ B.P. This determination is consistent with the Late Pleistocene ascription of the deeper portions of this depositional unit which dates from $11,450 \pm 50$ to $10,220 \pm 120$ RCYBP. Use of the Hiscock site during this time is attributed to itinerant fluted point makers of Clovis affinity. Whatever its exact age, the Hiscock twining is the oldest in eastern North America and, if it is indeed of Clovis age, it is the oldest example of twining in this hemisphere.

By ca. 9950 – 7950 B.P., perishable plant fiber artifacts are widely represented in eastern North America (Adovasio and Illingworth 2004:19-30; Andrews and Adovasio 1996:34-36) in the form of basketry, cordage, and sandals (Kuttruff et al. 1998:72-75). These alter materials notably include negative impressions from Graham Cave in Montgomery County, Missouri (Klippel 1991:22; Logan 1952:74), Ice House Bottom in Monroe County, Tennessee (Chapman and Adovasio 1977:620) and Russell Cave, Alabama (Griffin 1974:62).

Significantly, in all of these cases, the impressions represented twined constructions. The specimen from Level 6 (Zone IV) at Graham Cave is bracketed by dates of 9700 ± 500 RCYBP and 9290 ± 300 RCYBP. Originally described as coiled (Logan 1952:58), this specimen is actually the second oldest example of twining from eastern North America. Examination of a clay positive made directly from the impression indicate that the original construction was composed of close simple twining with S-twist wefts. Like the Shiloh specimen, the wefts of the early Graham Cave impression are paired and each weft consists of loosely Z-spun fibers. The composition of the warps is not discernible. If the

warps were rigid, the Graham Cave specimen probably represents a container of some sort. If they were flexible, like the Shiloh specimen, it may be a bag or, less likely, a mat fragment.

Later levels (Zones) at Graham Cave produced additional basketry impression, again on fired clay (Logan 1952:58). A minimum of two types of twining were recovered from Level 5 (Zones IV/III), Level 4 (Zone III) and Level 2 (Zone II). Collectively, these specimens date between 8830 ± 500 RCYBP and 7630 ± 120 RCYBP. One of these types (Logan 1952:Plate XXIc) is an impression of open simple, S-twist twining over what appears to be two ply, Z-spun, S-twist cordage warps. The other type (Logan 1952:Plate XXIb) is either a representative of the same basic type (except with Z-twist warps) or it is open diagonal twining, again with Z-twist warps. At the fibrous nature of the warps and wefts may indicate, both types may represent portions of flexible twined containers or bags.

Southeast of Graham Cave, Icehouse Bottom, Tennessee, (Chapman and Adovasio 1977:620) also yielded an assemblage of impressions of Early Archaic vintage. Among the 30 specimens from Icehouse Bottom, 27 derive from Strata M-O, the Lower Kirk Horizon, and span a narrow period from 9450 to 9250 RCYBP (Chapman and Adovasio 1977:623). The remaining three fragments originated in Strata L and J, the Upper Kirk Horizon, with an associated date range of 9250 to 8850 RCYBP.

Twenty-nine specimens represent impressions of open simple twining with Z-twist wefts. Both warps and wefts consist of two ply, S-spun, Z-twist cordage and were, hence, probably originally flexible “wall” fragments of bags or matting. The raw material is indeterminate. Interestingly, and as discussed further below, many of the Icehouse Bottom twined impressions are associated with fire features and/or thermally altered sediment.

While the Graham Cave and Icehouse Bottom perishables are definitively of Early Archaic ascription, the age of the Russell Cave, Alabama specimens is more problematic. The four specimens from Layer G may date between ca. 8950 and 6950 RCYBP if they are not intrusive from later and stratigraphically higher levels. Though originally identified as simple plaiting (Griffin 1974:62), the single published photograph appears to represent functional wrapped twining, with one semi-flexible fixed weft and one flexible running weft. Whatever the actual age, basketry subclass, or type of the Russell Cave specimens, the Hiscock, Graham Cave, and Icehouse Bottom assemblages attest to the deep antiquity and widespread distribution of twining in early eastern North American contexts. They also demonstrate that the use of flexible warp and weft elements as in the solitary Shiloh specimen has a venerable pedigree east of the Mississippi River.

By Middle Archaic times, ca. 7950 to 5950 RCYBP, the production of often quite sophisticated plant fiber perishables is well established in eastern North America. The spectacular assemblage of actual specimens from the Windover Bog cemetery near Cape Canaveral, Florida not only attests to the complexity of both twined and plaited textiles and basketry as well as cordage at this time but also, and

significantly, to their role in apparently elaborate mortuary practices (cf. Andrews et al. 2002:121-165).

While space considerations and the aforementioned desire to avoid redundancy constrain any detailed summary of the 87 Windover textile, basketry, and cordage specimens, suffice to note the assemblage is dominated by flexible twining. Four types of twining are represented among the 73 twined constructions with both open and close, simple and diagonal weft manipulations. The twining collection notably includes technologically complex trebled weft as well as the more common paired weft varieties. With one exception, all of the twining exhibits a final S-twist. The raw material employed in virtually all of the Windover twined assemblage is a member of the palm family (Arecaceae) either *Sabal* sp. or, less likely *Serenoa repens* (Andrews et al. 2002:149).

Given the unanticipated complexity of the Windover plant fiber artifact assemblage, it is scarcely surprising that later Archaic and Woodland—including Mississippian—non-durable technologies are often even more technologically complex.

Late Archaic (ca. 5950 to 2950 RCYBP) materials from sites such as Hart Falls (Overlook I) in central Maine (Andrews and Adovasio 1996:43), Long Branch in Alabama (Webb and DeJarnette 1942; Walthall 1980), Salts Cave in Kentucky (King 1974), and the Ozark Bluff Shelters, Arkansas (Sholtz 1975) all attest to manufacture of often quite complex plant fiber products ranging from utilitarian containers, bags, and mats to much more sophisticated non-heddle loom woven cloth. Significantly, as at Windover, much of this material is twined and much of it occurs in mortuary contexts.

As noted above, the continued elaboration of plant-fiber based industries is well documented into post 2950 RCYBP Woodland/Mississippian horizons and is represented by both actual specimens and literally thousands of impressions on ceramics.

Sites from as far afield as Boucher in northwestern Vermont (Heckenberger et al. 1996); Juntunen in Michigan (Hamilton et al. 1996); The Seip Mound Group in Ohio (Shetrone and Greenman 1931; Willoughby 1938; Church 1983, 1984); Etowah in Georgia (Sibley et al.

1996); Spiro in Oklahoma (King and Gardner 1981); Mound bottom in Tennessee (Kuttruf and Kuttruf 1996); Wickcliffe in Kentucky (Drooker 1992); Janey B. Goode in Illinois (Thompson and Simon 2008); the Silver Creek (Hurley 1974) and Effigy Mound sites in Wisconsin (Hurley 1975) indirectly and collectively attest to the scope and scale, diversity and complexity of Woodland and Mississippian basketry, textile, cordage, and related plant fiber artifact production in eastern North America. Once again, twining dominates these assemblages and though plaiting is represented and, occasionally, is both numerous and technically complex, twining continues to represent the most common plant fiber artifact production medium.

In light of the foregoing, it is clear that the solitary twined specimen from Shiloh cannot possibly be representative of the full range of Woodland or Mississippian-era plant fiber artifact production. While it does fit comfortably and conformably into the known Mississippian perishable milieu, perhaps the most significant observation is that the lone Shiloh twined specimen represents an actual—rare to the area—example of a plant fiber artifact tradition of very deep antiquity. Furthermore, and, finally, its occurrence in a burial context likewise represents the continuation of a very ancient mortuary practice and attests, as do all such examples, to the importance of this preservationally ephemeral aspect of material culture in death as well as in life.

PHYTOLITH PILOT STUDY AT MOUND A

KATHERINE R. MICKELSON

INTRODUCTION

A pilot study of eight samples was conducted to assess the presence and abundance of phytoliths from different proveniences within Mound A. The results of this study allow recommendations to be made regarding the potential value of future phytolith analyses, at Shiloh and at other mound sites., Potentially diagnostic phytoliths were present in all samples, although their abundance varies greatly by provenience. Potentially diagnostic phytoliths are silica bodies that have distinct morphological characteristics that may aid in their identification. Additional, in-depth collection and analysis of phytolith samples from Mound A at Shiloh would yield information important to the interpretation of environmental conditions in the mound area, and how it was used.

The analysis of phytoliths from archeological contexts provides ways to aid in the understanding of past environmental conditions, vegetation and human plant use. Phytoliths are formed when silica, in the form of monosilicic acid, is absorbed from groundwater by a plant via its vascular system (Pearsall 2000; Piperno 1988; Rovner 1983). The silica travels to all parts of the plant where water is absorbed or perspired. In many plants this silica conforms to the shape of plant cells or intercellular spaces. These may include cell walls, solid cell casts, cell linings or appendages such as hooks and spines (Rovner 1983). Phytoliths form in the roots, stems, leaves, seeds and inflorescences of many plants (Metcalf 1960; Pearsall 2000). Phytoliths are produced continuously throughout the life of a plant. Once a plant dies the silica structures are left behind as constituents of the sediment. The production of phytoliths in plants is variable. Some plant classes, such as grasses, are prolific in their phytolith production while other plants, such as many trees, may produce few thin and fragile phytoliths.

One of the keys to phytoliths analyses is that many cellular structures of plants are cast in an often durable, inorganic silica form (Rovner 1983). Since phytoliths are inorganic, they do not readily dissolve or decay in non-alkaline soils. They represent a unique opportunity to examine past environmental conditions, vegetation cover, or economically valuable plant resources.

METHODS

A total of eight phytolith soil samples (phytosoil samples) from Mound A contexts were sent to the Paleoenvironmental Laboratory at the University of Alabama, Tuscaloosa, Alabama. Each phytosoil sample was catalogued and weighed. A sub-sample was removed from each of the phytosoil samples (Table 20-01), which were sent to the Paleoethnobotany Laboratory at the Ohio State University, a facility designed for the chemical extraction of phytoliths from soil samples. Karen Royce, a PhD. candidate at the Ohio State University with extensive experience processing phytosoil, conducted the chemical processing of the Shiloh phytosoil samples. Once processed, the phytolith extract from each of the phytosoil samples was returned to the Paleoenvironmental Laboratory at the University of Alabama where a portion of phytolith extract from each provenience was mounted onto slides for microscopic analysis scanned for the presence of phytoliths using an Olympus DP10 stereoscopic microscope (100x).

The chemical processing of each Shiloh phytosoil sample generally follows those promulgated by Pearsall (2000). Phytosoil samples are dried in a low temperature oven (100C). Dried samples are homogenized by blending the soil using a mortar and pestle. The homogenized soil is then screened through a 16-mesh geologic sieve to isolate large particles (e.g., rock and bone) which are removed. A small quantity of the

Table 20-01. Phytolith pilot study sample processing Data, Mound A, Shiloh Mound Complex.

Context	FS#/OSU#	Amt. Phytosoil Processed(g)	Silica Recovered (g)	Phytosoil pH
N47, E181, EU42, LV17 Structure 1 floor	3014/88	6.973	0.02	5.6
N42, E180, EU106, LV08, ZN S3 Structure 2A floor	3143/89	6.932	0.045	5.4
N53, E181, EU53, LV20 Structure 3 floor	3596/95	6.955	0.203	5.5
N49, E183, EU164, LV12 Structure 5 daub	4071/90	7.113	0.069	5.1
N52, E183, EU122, LV12, ZNS3 Structure 5 floor	4114/92	6.966	0.086	5.6
N50, E181, EU52, LV21, ZN S2 Structure 5 floor	4139/94	7.123	0.08	5.3
N58, E184, EU255, LV06, ZN S1 Structure 4 floor	4316/93	6.947	0.055	5.6
N58, E182, EU111, LV07, ZN S2 Structure 4 floor	4417/91	6.951	0.038	5.4

screened phytosoil (e.g., 5 to 10g) is transferred to a beaker, distilled water is added and the pH of the sample is recorded. The recordation of the pH of a sample is necessary since highly acidic soils can affect phytolith preservation. Phytoliths are generally very stable in soils up to a pH of nine, after which rapid chemical dissolution of phytoliths can occur (Pearsall 2000; Rovner 1983).

Once the pH of each sample is recorded (Table 20-01) the chemical extraction of phytoliths begins with the removal of carbonates and oxides using a strong acid mixture of hydrochloric acid (HCL) and nitric acid (HNO₃) in a water bath. Next, organic matter is removed using household bleach and technical grade hydrogen peroxide (H₂O₂; full strength 27 percent). Once carbonates, oxides, and organic matter have been removed, the remaining portion of each sample is placed in a reciprocating shaker with a dispersion solution (Na₂H₂ EDTA; disodium salt of ethylene diamine tetraacetic acid) for 12 hours to physically separate the particles. Upon completion of the dispersion process, each sample is sieved using a 60-mesh geologic sieve to separate phytolith-size particles from larger sand-size particles. After the process of sedimentation is complete, a heavy liquid solution of zinc iodide (ZnI₂) and concentrated hydrochloric acid (HCL) is used to precipitate or "float" the phytoliths. In some cases, additional processing to remove excess zinc iodide is necessary. The precipitate (phytolith extract) is dried in a low temperature oven (100 C). A small quantity of the dried phytolith extract (e.g., 0.1g) is mounted on a labeled clean slide using Canada Balsam. Slides are laid flat and air-

dried. Dried slides are examined under an Olympus stereomicroscope and scanned to assess the presence and abundance of phytoliths for each sample.

A quick-scanning method is employed to determine if phytoliths are present and to assess their relative abundance. This method generally follows that of Pearsall (2000) and is known as ribbon counting (Orton 2000). Because the goals of this study were to evaluate (1) the presence or absence of phytoliths, and (2) the relative abundance of phytoliths from difference proveniences in Mound A at Shiloh, a total of three rows of each slide were scanned and the number and the type of phytolith were recorded. Quick-scanning is derived from Pearsall's (2000) quick-scan method where phytoliths are characterized as being Very Abundant, Abundant, Moderately Abundant, Rare or Very Rare based on the number of occurrences of phytoliths of a particular category on each slide. This method of quick-scanning is used in two manners for the Shiloh phytosoil samples. First, the overall relative abundance of all phytoliths, regardless of phytolith category, was tallied (Table 20-02). This allows for a rapid assessment of the relative abundance of phytoliths by provenience for each of the eight phytosoil samples. Second, this method was used to determine the relative abundance by phytolith category for each of the samples (Table 20-03).

The classification of phytoliths from the Shiloh phytosoil samples is based on Pearsall (2000:388) and includes eight categories. Epidermal quadrilaterals (1) are large cells of the epidermis of plants and are quadrilateral and square to elongate in shape. Epidermal, non-

Table 20-02. Quick-scan results for phytoliths by abundance category, Mound A, Shiloh Mound Complex.

Context	FS#/OSU#	Very Abundant (VA)	Abundant (A)	Moderate (M)	Rare (R)	Very Rare (VR)
N47, E181, EU42, LV17 Structure 1 floor	3014/88		X			
N42, E180, EU106, LV08, ZN S3 Structure 2A floor	3143/89				X	
N53, E181, EU53, LV20 Structure 3 floor	3596/95				X	
N49, E183, EU164, LV12 Structure 5 daub	4071/90	X				
N52, E183, EU122, LV12, ZNS3 Structure 5 floor	4114/92	X				
N50, E181, EU52, LV21, ZN S2 Structure 5 floor	4139/94			X		
N58, E184, EU255, LV06, ZN S1 Structure 4 floor	4316/93	X				
N58, E182, EU111, LV07, ZN S2 Structure 4 floor	4417/91			X		
VA: 40-50+/row; A: 30-40/row; M: 20-30/row; R:10-20/row; VR:<10/row						

Table 20-03. Quick-scan results for phytoliths by category, Mound A, Shiloh Mound Complex.

Context	FS#/OSU#	Epidermal quadrilateral	Epidermal non-quad.	Short cell	Dermal appendage	Bulliform cells	Anatomical UK	Sphere	Other bio- genic
N47, E181, EU42, LV17 Structure 1 floor	3014/88	R	R	VA	R	R	R	---	---
N42, E180, EU106, LV08, ZN S3 Structure 2A floor	3143/89	VR	VR	VR	---	VR	VR	---	---
N53, E181, EU53, LV20 Structure 3 floor	3596/95	VR	VR	VR	VR	R	R	---	---
N49, E183, EU164, LV12 Structure 5 daub	4071/90	A	A	A	R	VR	M	R	VR
N52, E183, EU122, LV12, ZNS3 Structure 5 floor	4114/92	M	VR	VA	M	R	A	---	---
N50, E181, EU52, LV21, ZN S2 Structure 5 floor	4139/94	A	R	---	---	R	M	---	---
N58, E184, EU255, LV06, ZN S1 Structure 4 floor	4316/93	VA	R	VA	VR	A	A	---	---
N58, E182, EU111, LV07, ZN S2 Structure 4 floor	4417/91	R	VR	VR	VR	VR	A	---	R
VA: 13-15; A: 10-12; M: 7-9; R:4-6; VR:<=3; ---: not present									

quadrilateral (2) phytoliths are large cells of the plant epidermis and are irregular in shape. Short cell (3) phytoliths are derived from epidermal cells of grass (Gramineae) leaves. Identification of sub-classes of short cells is based on the shape of the cell. There are three distinctive classes of short cells. The panicoid class consists of tall grass species and favor moist and warm conditions and is often associated with forested areas (Pearsall 2000; Twiss et al. 1969). The festicoid class of grasses is indicative of cool and somewhat moist environments. Finally, chloridoid grasses, or short grasses, dominate in warm and dry environments (Pearsall 2000; Twiss et al. 1969). The dermal appendage (4) category includes plant epidermal appendages such as prickles, hairs, edge spines, and base cells. Bulliform cells (5) are located in the mesophyll (the soft tissue of a leaf located between the lower and upper epidermis) or epidermis and are indicative of moist or wet habitats. The anatomical origin unknown (6) category is used to classify plant silica of unknown origin. Phytoliths classified as spheres (7) are derived from mesophyll cells and are spherical-spheroidal in shape. The other biogenic silica (8) category includes non-botanical silica such as diatoms and sponge spicules.

The classification of phytoliths from the Shiloh samples is limited to the aforementioned classes. Access to a phytolith comparative collection is necessary for a more precise identification. Despite the inability to make a more detailed description of the phytoliths present or identify diagnostic phytoliths (e.g., *Cucurbita pepo*) the presence of potentially diagnostic phytoliths is indicative of the value of future, in-depth phytolith analyses at Shiloh.

RESULTS

The goals of this pilot study were to determine if phytoliths are present in the Shiloh phytosoil samples and to assess their relative abundance. The results of analysis of each of the eight phytosoil samples are discussed below (see Tables 20-02 and 20-03). The presence and abundance of phytoliths are then used to make recommendations for future phytolith studies at Shiloh.

Sample N47, E181, EU42, LV17, (FS 3014)

This sample came from the floor of Structure 1 atop the Stage III mound, immediately north of the central hearth, Feature 200 (see Chapter 9). Phytoliths are abundant in the sample and are dominated by potentially diagnostic grass short cells. Additional processing to remove excess zinc iodide does not appear to have biased the occurrence of phytoliths in the sample. Each of the epidermal quadrilateral, epidermal non-quadrilateral, dermal appendage, bulliform, and unknown phytolith categories are represented but phytoliths are rare. Despite the fact that phytoliths, other than grass short cells are rare, the potential to obtain data on past environmental conditions and vegetation cover at Shiloh is good based on the number of grass short cells.

Sample N42, E180, EU106, LV08, ZN S3 (FS 3143)

This sample came from the floor of Structure 2A atop the Stage III mound, about 1m northwest of the central hearth, Feature 147/161 (see Chapter 9). Phytoliths are rare in this sample and there is no single category that dominates in the sample. Epidermal quadrilateral, epidermal non-quadrilateral, short cell, bulliform and unknown phytoliths are all present, but in very small quantities. Although rare, potentially diagnostic phytoliths are present in this sample and additional analyses are warranted.

Sample N53, E181, EU53, LV20 (FS 3596)

This sample came from the prepared floor for Structure 3, and was taken ca. 50cm northwest of a possible hearth-like feature (Feature 342) in the northern portion of the structure (see Chapter 9). Overall, phytoliths are rare in this sample. The unknown and bulliform phytolith categories rank slightly higher in abundance than other categories but are still considered to be very rare. Phytoliths from the epidermal quadrilateral, epidermal non-quadrilateral, short cell and dermal appendage categories are present but are rare in terms of relative abundance. Additional processing to remove excess zinc iodide from the sample was required and could have resulted in the loss of phytoliths from this sample. However, this explanation for the

low occurrence of phytoliths in the sample seems unlikely as other samples that required additional processing are characterized as having moderate to very abundant phytoliths. Rather, the most parsimonious explanation for the low abundance of phytoliths in the sample is that phytoliths are not preserved in the provenience from which the sample was collected. However, additional testing of phytosol samples from the provenience is necessary to test this hypothesis.

Sample N49, E183, EU164, LV12 (FS 4071)

This sample was taken from a mass of fired daub found in the southeastern corner of the Structure 5 area (see Chapter 9). Phytoliths are very abundant in this sample. The epidermal quadrilateral, epidermal non-quadrilateral, and short cell categories dominate the assemblage by relative abundance. The abundance of potentially diagnostic grass short cells illustrates the potential for future elucidation of paleoenvironmental analyses at Shiloh with a more in-depth phytolith analysis. Phytoliths were also identified in the anatomical unknown (moderate relative abundance), the sphere and dermal appendage (both are rare in relative abundance), and the bulliform and other biogenic (both are very rare by relative abundance) categories. Additional analysis of phytoliths from this provenience is warranted based on the overall abundance of phytoliths and the abundance of grass short cell phytoliths.

Sample N52, E183, EU122, LV12, ZNS3 (FS 4114)

This sample came from the Structure 5 area, from a well prepared floor found at a depth of about 390cmbd (see Chapter 9). Overall, phytoliths are very abundant in this sample and additional processing to remove excess zinc iodide does not appear to have biased the occurrence of phytoliths in the sample. The short cell category dominates the assemblage and is classified as very abundant. Phytoliths from the anatomical unknown category are abundant although it is unknown if additional analysis would clarify the classification status of any of the phytoliths in this category. The epidermal

quadrilateral and dermal appendage categories are well represented; a moderate abundance of phytoliths was identified in each of the categories. Phytoliths in the epidermal non-quadrilateral category are very rare and rare in the bulliform category. Additional analysis from this provenience is recommended based on the overall abundance of phytoliths and the abundance of grass short cell phytoliths.

Sample N50, E181, EU52, LV21, ZN S2 (FS 4139)

This sample came from the Structure 5 area, from a well prepared floor found at a depth of about 380cmbd. Overall, this sample has a moderate abundance of phytoliths. Silica bodies in the epidermal quadrilateral category rank first in terms of abundance (very abundant), followed by the anatomical unknown category, which has a moderate abundance of phytoliths. Only two additional phytolith categories were identified in this sample, the epidermal non-quadrilateral and bulliform categories, and both were rare in terms of relative abundance. Very few potentially diagnostic phytoliths were identified in the sample

Sample N58, E184, EU255, LV06, ZN S1 (FS 4316)

This sample came from the well prepared floor of Structure 4, just east of the wall line near the center of the structure (see Chapter 9). Phytoliths are very abundant in this sample and additional processing to remove excess zinc iodide does not appear to have biased the occurrence of phytoliths in the sample. Phytoliths in the short cell and epidermal quadrilateral categories rank first by relative abundance; both categories are considered to be very abundant. The bulliform category is abundant and may be indicative of a moist, at least episodically, environment. Phytoliths in the anatomical unknown category are also abundant. Far fewer quantities of phytoliths were identified in the epidermal non-quadrilateral category (rare in abundance) and the dermal appendage category (very rare in abundance). Based on the overall abundance of phytoliths and the number of potentially diagnostic

phytoliths, additional analysis of this provenience is recommended.

Sample N58, E182, EU111, LV07, ZN S2 (FS 4417)

This sample came from the well prepared floor of Structure 4, just west of the wall line near the center of the structure (see Chapter 9). Overall, moderate quantities of phytoliths are present in this sample. Phytoliths in the anatomical unknown category are dominant in the sample and are abundant. Phytoliths in the epidermal quadrilateral and other biogenic categories are rare. The epidermal non-quadrilateral, short cell, dermal appendage and bulliform categories are all represented, but phytoliths are considered to be very rare in abundance. Very few potentially diagnostic phytoliths were identified in the sample

SUMMARY

The pilot study to determine the presence and abundance of phytoliths from eight proveniences in Mound A, all from floor surfaces or debris from structures atop the Stage III mound, indicate that phytoliths are present in all samples analyzed, but vary greatly in abundance. Phytoliths were rare in two samples, Sample N42, E180, EU106, LV08, ZN S3 (FS 3143; Structure 2A floor) and Sample N53, E181, EU53, LV20 (FS 3596; Structure 3 floor). The former sample had few phytoliths overall, but those that are present are potentially diagnostic. Additional processing to remove excess zinc iodide

was needed in the latter sample and could have biased the results. However, this may be due to the absence of phytoliths in the phytosoil sample. Additional testing would be needed to evaluate such a hypothesis.

The abundance of phytoliths is moderate in two additional samples: Sample N58, E182, EU111, LV07, ZN S2 (FS 4417; Structure 4 floor) and Sample N50, E181, EU52, LV21, ZN S2 (FS 4139; Structure 5 floor). Potentially diagnostic phytoliths were rare in both of these samples.

In one sample, Sample N47, E181, EU42, LV17: FS3014 (FS 3014; Structure 1 floor), phytoliths are abundant and in three additional samples, Sample N58, E184, EU255, LV06, ZN S1 (FS 4316; Structure 4 floor), Sample N52, E183, EU122, LV12, ZNS3 (FS 4114; Structure 5 floor), and Sample N49, E183, EU164, LV12 (FS 4071; Structure 5 daub/debris), phytoliths are classified as very abundant. All four of these samples contained numerous potentially diagnostic phytoliths and numerous grass short cell phytoliths that are useful for assessing past environments and vegetation cover. Additional testing of these proveniences is recommended.

Based on this pilot study additional in-depth phytolith analysis is warranted from proveniences of Mound A. It is recommended that samples be collected as a column, with samples representing all major stratigraphic levels analyzed for diagnostic phytoliths. Furthermore, samples should be collected from various surface deposits to act as control samples.

SHILOH MOUND A: CONCLUSIONS AND RECOMMENDATIONS

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INTRODUCTION

The SEAC investigations at Mound A at the Shiloh Mound Complex have taught us much about Native American ceremony in the late prehistoric Southeast, particularly about how mounds were built what they may have looked like when in use. The research at Mound A tells us that in some cases mound construction was far more complicated and time consuming than we once thought, and that both symbolic and engineering considerations were important. The work at Mound A also tells us that mound fills are not always uniform deposits, but at least in some cases are extremely complicated, with numerous micro-construction episodes. Multiple prepared surfaces with both unusual as well as mundane fills, as well as a variety of structures, were found atop some stages, for reasons probably tied to both spiritual and mundane concerns, such as religion and cosmology, the succession of leaders or changes in the numbers and kinds of occupants, and the renewal or replacement of deteriorating structures and living surfaces. Most critically from a resource management perspective, the fieldwork overturned earlier interpretations about Mound A's construction history and significance, that held that it had been built in a single stage, and contained deposits of little significance. Exactly the opposite is now known to be the case. Shiloh's Mound A has proven to be one of the most significant sources of information about Mississippian mound building and ceremony examined in recent years. It also has much left to tell us, and hopefully more will be learned from it before even more is lost to erosion.

The excavations conducted at Mound A from 1999–2004 recovered information from the top to the bottom of the mound in the area under threat by the bluff edge, a vertical span over 6.5m in height on the south side and 9m on the north side. Seven major construction stages and over 600 features were found in the portion of Mound A examined.

The major mound stages were labeled I through VII, from highest to lowest within the deposits, in the order in which they occurred stratigraphically, and were encountered during the excavations. Stages I through III, clear examples of mound construction, were the most extensively examined during the fieldwork, with several hundred cubic meters of fill carefully removed and documented. Much smaller excavation samples, a few cubic meters at most, were obtained from Stages IV through VII, more or less level filling episodes around and below the base of the Stage I–III mounds. While smaller, older mounds may exist deeper in Mound A, within the area covered by the Stages I–III mounds, this possibility has not been confirmed by the excavations and remote sensing undertaken to date. Apron fills, shown to be up to 2m deep on the south and west sides of the mound by the 1933–1934 and 1999–2004 fieldwork, are absent on the north side, and whether they existed on the former east side is unknown, given the erosion that has occurred. It is likely such fills were present, however, given that our primary evidence about Stages IV–VII comes from a small number of units opened on the southeast side of the Stages I–III mounds, by the modern bluff edge.

Evidence for the construction and use of Mound A found during the 1999–2004 excavations has been documented stage by stage, including occupation surfaces, structures, individual features, and major construction episodes. Geoarcheologically-based interpretations of how the mound was built and used have been presented, together with detailed analyses of the material remains found associated with each stage. These include the results of radiocarbon and thermoluminescence dating, analyses of the soil chemistry of occupation surfaces and summary discussions of the lithic, ceramic, and paleosubsistence remains (i.e., carbonized plant remains, bone, phytoliths, and shell) found in the deposits. Carbonized textiles found in the mound

deposits, remote sensing and mapping activity over much of the site area, and coring to document soil deposits and pollen/vegetation history are also summarized. The primary assemblage cataloging and analysis data from all of this work are included in the project electronic appendices, which include scanned copies of daily field notes, standardized square/level, feature, special sampling forms, the drawings of floors and profiles, and nearly 12,000 digital high resolution photographs taken during the fieldwork. These electronic appendices also include an integrated artifact and special sample catalog and database, as well as the primary analysis data sets produced by project specialists.

The abandonment of structures and mound summit surfaces, and their replacement with new ones, the work at Mound A has demonstrated, was often accompanied by elaborate ceremony and required great technical skill (see also Anderson 2012; Pauketat 2007; Pursell 2004, 2012; Sherwood and Kidder 2011). We now know that brightly colored soils, some of colors such as red and white that were highly symbolic to many southeastern Indian groups (Hudson 1976: 126-127, 132), were sometimes used to cover portions of the sides and top of Mound A's stages, or were used in filling episodes within them (see also Sherwood and Kidder 2011; Welch 2006). These were part of activities associated with mound refurbishment and renewal, on a scale of every few years or perhaps decades. Whether these changes materialized successional events, the replacement of one chief or ruling lineage by another, or collective earth/fertility renewal, is unknown. Among many southeastern Indian groups, the color red was associated with "conflict, war, fear, disunity, and danger" while white was "the color of that which is old, established, pure, peaceable, holy, united, and so forth" (Hudson 1976: 235). These colors were also associated with kinship groupings such as clans and even whole towns, reflecting social divisions within the societies. What this color symbolism means at Shiloh is unknown, but it is quite clear that use of color, and red in particular, played a major role in the construction and use of Mound A. Since the fieldwork at Shiloh from 1999–2004,

in fact, it has become evident, in large part through the work of Paul Welch (2006:257–258) and Corin Pursell (2004, 2012), that the use of color played a major role in the construction of other mounds at Shiloh, and at other centers across the region (see also Anderson 2012; Anderson and Sassaman 2012, Pauketat 2007, 2012, Sherwood and Kidder 2011).

Perhaps the most important finding from our fieldwork is that Mound A was dramatically different in appearance than at present, and this appearance sometimes changed dramatically from stage to stage. Earlier excavations at the site, and remote sensing and excavations conducted during the 1999–2004 fieldwork documented the presence of large buildings at the base of the mound on the apron to the south and west, that probably represent ceremonial structures, storage areas, temples, and possibly the residences of lesser elites. The mound itself was built using carefully selected colored fills, and at least two stages, II and III, apparently had exterior surfaces colored with red, gray, and reddish orange soils, possibly in bands in places. Interior filling episodes varied from stage to stage, and some were characterized by the use of similar colored fills. When structures were abandoned on the surfaces of the Stage II and Stage III mounds, particularly when these stages were closed off and a construction of a new one began, special layers of colored soil were sometimes laid down over part or all of the surface, in what appear to have been ritual termination episodes. Bright red or reddish orange surfaces in particular were found atop both the Stage II and III mounds, requiring the collection or preparation of fills of these colors, and hence a deliberate choice. These surfaces or the soils used on them may have additionally been fired or heated in part or overall, perhaps to help stabilize the surface or accentuate the colors.

The fieldwork at Mound A also showed that multiple small structures were built away from the plaza on the river or eastern side of the Stage III mound summit, and on two small platforms making up the Stage II mound. These buildings may have been where chiefs or priests lived, or their families, and some may have been storage areas, given the minimal evidence for domestic activities occurring

on surfaces. Larger temples, if present, may have been closer to the center or western side on the summit. Some of the small structures found during the 2001–2004 fieldwork were rebuilt in almost the exactly same place as earlier ones, while others were built in the only general area where earlier, underlying structures had been present. Except for fragments of single post in ground structures found at the base of the mound, most of the structures were built using wall trenches, with fairly small posts 10–15cm in diameter, with somewhat larger or smaller interior posts serving as major supports or partitions. Only one large post was found at the base of the surfaces where structures were built on the Stage III summit, Feature 375, that may have been a marker of some kind and that, remarkably, still had preserved wood in place. Preserved carbonized textiles were also found on the Stage III surfaces, and it is all but certain that even better preservation is present deeper within the mound. If further excavations occur in Mound A, it might be possible to determine how these materials were employed. It is apparent that the summit structures were carefully built, and it is probable that they were elaborately decorated as well, employing carved wood, textiles, and a variety of colors, based on descriptions of what they looked like from early historic accounts (e.g., Garcilaso de la Vega, in Clayton et al. 1993:298–304). Mound A, located right by the bluff edge, with its colored surfaces and associated structures, would have been a dramatic feature when viewed by visitors coming upon it from the river below.

As we first noted in 2002 when we were presenting the results of the fieldwork (see below), the work at Shiloh Mound A has shown us that the traditional way many Mississippian mounds have been interpreted for many decades in park exhibits, paintings, and archeological writings—as green, cropped grass covered earthen masses, with simple thatched buildings on top, and few if any structures near the base—is almost certainly incorrect. Mississippian ceremonial centers were instead appreciably more colorful and impressive cultural landscapes than we have assumed and portrayed to date. The Native peoples of the Southeast created and lived in far

richer and symbolically far more meaningful landscapes than most archeologists and historians imagined, or given them credit for having. When exploring, interpreting, and portraying the record of southeastern peoples, we need to consider their world from the perspective of Mound A at Shiloh, especially at any mound site under examination..

Much more, however, remains to be done at the Shiloh Mound Center and particularly at and near Mound A before the portion of the site threatened with loss to riverbank erosion can be considered mitigated. There is much yet to be learned. Only the upper reaches of Mound A were examined, yet within that area large numbers of well-preserved structures, features, and ceremonial fills were documented. We do not, know much about the size, shape, age, or function of the buildings on the summits or surfaces below the Stage III mound (which was itself only partially examined), nor about the structures around the base of the mound, nor the extent to which the mounds sides were colored, or whether these colors formed designs or patterns of some kind. Only a tiny fraction of the lower half of the mound area was examined, comprising the level filling episodes making up Stages IV through VII and the upper part of the apron, yet these deposits yielded evidence for the presence of buildings and dense, well preserved paleosubistence remains, including of shell, bone, and charcoal. There are undoubtedly many more buildings and features, as well as rare and delicate artifact categories like the charred textiles found on Stage III, as well as many new details about the construction and use of the area that are as of yet undiscovered and undocumented deeper in Mound A.

We have thus examined only a few square meters of the area from the lowest four stages and the underlying premound surface, and many questions remain. We do not know whether smaller mounds are present in the interior, whose tops or sides did not extend far enough out to be intersected by the units opened to date. Only the three highest and most recent mound stages (I–III) have been examined in any detail, and there may be several more within the mound. Charred fabrics and preserved wood were found on the Stage III

mound, and excellent preserved paleosubsistence remains were found in the stages below them. Since the occurrence and degree of preservation of a host of perishable artifact categories got better and better with depth, it is difficult to predict what might be present in Mound A's deeper deposits, other than to say, probably important and wonderful things.

Although the mitigation of the loss of portions of Mound A to erosion is not yet complete, a number of remarkable discoveries came from the excavations, and we know far more about the mound itself and life at the Shiloh center than we did before the work started as a result. The information reported in this monograph and accompanying electronic appendices, and the lessons learned, should guide, and hopefully greatly simplify, future work at the mound. What we do know is that the most intensive use of the Mound A area, given the content of the fills employed in its construction and on its stage surfaces, notably the projectile points and ceramics that were found, was during the Late Woodland and Mississippian periods, from roughly A.D. 1000–1350 (Tables 21-01, 21-02; see Chapters 13 and 14). Occupation in the site area, or at least in the areas where the Mound A fill came from, was almost exclusively Late Woodland or Mississippian in age given that large and small triangular projectile points, grog tempered plain and cord marked pottery, and shell tempered plain and incised pottery were just about the only diagnostics recovered in any incidence. Only a small number of earlier Woodland, Archaic, or Paleoindian points and

sherds were found during the 1999–2004 fieldwork, or during earlier excavations at the site (Welch 2006:53–54, 77–83). The work at Mound A thus reinforces conclusions that only intermittent use of the site area occurred during these earlier periods.

Examining the diagnostic artifact assemblage for changes over time, no logical stratification is evident in the occurrence of the projectile points by type in the construction episodes in Mound A (Table 21-01). Most points came from the upper three stages, I–III, with no real distinction evident in the distributions of the presumably Mississippian small triangular types and Woodland and earlier forms (Table 21-01). A few very early forms, including a Clovis, a Big Sandy, and a Ledbetter Stemmed were found, but all three occurred in the Stage I fill, which appears to include midden obtained from somewhere else, probably on the site itself given the large numbers of Mississippian and late Woodland ceramics and points in it. Given the volume of fill examined from Stage I, the low numbers of earlier diagnostics suggests these occupations were sparse, and if the fill is local, that use of the site area was not intensive until fairly late, about the time construction of the mound complex began.

Some 65,000 prehistoric potsherds were recovered from the 1999–2004 Mound A excavations, many of which were very small, with the result that only about a quarter (n=16,050) could be identified to a specific type or variety (cf. Table 09-01, 14-03; see Chapter 14). Of these, 14,232 typed specimens could be identified to a specific

Table 21-01. Projectile points found in the major construction stages and areas at Mound A, Shiloh Mound Complex, during the 2001 to 2004 excavations.

Projectile Point Type	APRON			STAGES							Totals
	South	West	North	I	II	III	IV	V	VI	VII	
Clovis				1							1
Big Sandy				1							1
Ledbetter Stemmed				1							1
Jack's Reef Corner Notched					2	3					5
Hamilton				6	4	1		1			12
Late Woodland /Miss Triangular Cluster		1		11	4	1					17
Fort Ancient				5	2						7
Madison		2		27	18	6		1	1		55
Totals	0	3	0	52	30	11	0	2	1	0	99

Table 21-02. Identifiable prehistoric ceramics found in the major construction stages and areas at Mound A, Shiloh Mound Complex, during the 2001 to 2004 excavations.

Pottery Type	APRON			STAGES							Totals
	South	West	North	I	II	III	IV	V	VI	VII	
Alligator Incised, <i>var. unspecified</i>				1							1
Avoyelles Punctated, <i>var. unspecified</i>	1				2						3
Baldwin Plain, <i>var. Chalk Bluff</i>	1			21	4	2		2			30
Baldwin Plain, <i>var. Lubbub</i>				1							1
Baldwin Plain, <i>var. Miller Slough</i>	2			12	19	1		3	1		38
Baldwin Plain, <i>var. unspecified</i>				3	3						6
Barton Incised, <i>var. unspecified</i>		1	1	10	6	3					21
Baytown Plain, <i>var. McKelvey</i>	26	26	6	890	662	351	7	48	65	7	2,088
Baytown Plain, <i>var. The Fork</i>	8	2	5	73	30	29					147
Baytown Plain, <i>var. Tishomingo</i>				4		1					5
Baytown Plain, <i>var. unspecified</i>	2	4	2	38	11	4			1		62
Bell Plain, <i>var. unspecified</i>	27	7	2	69	38	24	1	14	17	3	202
Benson Punctated				1							1
Carthage Incised, <i>var. unspecified</i>					1						1
Cormorant Cord Impressed, <i>var. Cormorant</i>						1					1
Etowah Plain	1	1	1	23	11	8					45
Etowah Stamped				16	5	1		1	1		24
Furrs Cord Marked, <i>var. Furrs</i>				1		1					2
Furrs Cord Marked, <i>var. unspecified</i>				1		1					2
Kimmswick Fabric Impressed, <i>var. Langston</i>	2	3		37	25	8		5	1		81
Kimmswick Fabric Impressed, <i>var. unspecified</i>				2							2
Kirby Incised					1						1
Mississippi Plain, <i>var. Shiloh</i>	143	101	97	2,391	2,451	1,048	28	132	165	13	6,569
Mississippi Plain, <i>var. unspecified</i>	9	3	4	60	17	6			1		100
Mound Place Incised, <i>var. unspecified</i>	1	1			2						4
Moundville Engraved, <i>var. Elliotts Creek</i>			2								2
Moundville Engraved, <i>var. unspecified</i>				3	1	1					5
Moundville Incised, <i>var. Moundville</i>	2	1	2	18	8	1					32
Moundville Incised, <i>var. unspecified</i>				2	1						3
Mulberry Creek Cord Marked, <i>var. Coffee Landing</i>	3	6	3	90	25	10		1			138
Mulberry Creek Cord Marked, <i>var. Mulberry Creek</i>	56	62	14	1,265	1,166	567	13	119	199	31	3,492
Mulberry Creek Cord Marked, <i>var. Obion</i>	31	23	6	367	166	47	3	1	4	1	649

Pottery Type	APRON			STAGES							Totals
	South	West	North	I	II	III	IV	V	VI	VII	
Mulberry Creek Cord Marked, <i>var. unspecified</i>	2			12	3	4					21
Mulberry Creek Plain, <i>var. unspecified</i>				1	1	4					6
Obion Plain, <i>var. Obion</i>	17	5	3	248	99	48		2			422
O'Byam Incised, <i>var. unspecified</i>			1								1
Owens Punctated, <i>var. unspecified</i>						1					1
Owens Punctated, <i>var. Widow Creek</i>						1					1
Ramey Incised, <i>var. unspecified</i>					1						1
Salomon Brushed, <i>var. Fairfield</i>				1							1
Salomon Brushed, <i>var. unspecified</i>				1							1
Salt Creek Cane Impressed, <i>var. unspecified</i>					7						7
Turkey Paw Cord Marked, <i>var. unspecified</i>				4	1						5
Turkey Paw Plain, <i>var. unspecified</i>					4						4
Wheeler Check Stamped, <i>var. Edmonds Branch</i>						1					1
Wheeler Check Stamped, <i>var. Wheeler</i>					1	1					2
Totals	334	246	149	5,666	4,772	2,175	52	328	455	55	14,232

construction stage or apron; the rest (n=1818 typed sherds) were from mixed or uncertain provenience (Table 21-02). Most of the identifiable ceramics were grog- or shell-tempered plain wares, or grog-tempered cord-marked wares, classified by specific types and varieties. When these major temper categories, grog and shell, came into use in the Southeast has been the subject of appreciable research and debate in recent years (Feathers 2009; Feathers and Peacock 2008). Grog tempering has long been known to occur prior to shell tempering in the central and Lower Mississippi Valley and adjoining areas, including at Shiloh, with the former attributed primarily to the Woodland and the latter to the Mississippian periods (e.g., Phillips 1970; Phillips et al. 1951; Morse and Morse 1983; Welch 2006:46–52; see also Chapter 14). Examining their occurrence within Mound A, in both the 1979 testing (Table 02-01) and the 2001 to 2004 excavation samples (Table 21-02), shell and grog tempered wares occurred from the top of the mound to the

very bottom, with grog tempered wares becoming slightly more common in incidence compared to shell tempering only near the bottom of the mound, below level 28 in the 1979 sample, and in the lowest two construction episodes, Stages VI and VII, in the more recent sample. The stratigraphic evidence from Mound A thus suggests that, at least in this location, the two tempers were likely used concurrently, with grog tempering somewhat more common earlier in the occupations than shell tempering. Of course, their co-occurrence in the mound fills tells us nothing about their stratigraphic relationships in the sources of these fill. If assemblages consisting solely of grog tempered pottery occur at the site, they have yet to be found, save for the hint that they may be present at the very bottom of Mound A (see also Welch 2006:48–52).

An analysis of the age and possible contemporaneity of grog and shell tempered wares was also conducted with sherds from Mound A using thermoluminescence dating, with results

that proved equivocal with regard to the absolute dating of the mound itself, yet supportive of a likely co-occurrence of the tempers, in line with the stratigraphic evidence (Chapter 14). A total of 17 TL age determinations were obtained, nine on grog tempered sherds and eight on shell tempered (Table 14-04). Almost all the dates fall from the ninth through eleventh centuries A.D., from ca. one to several centuries earlier than the dates obtained from similar proveniences from the AMS analyses (cf. Chapters 12, 14; Tables 14-04, 21-03). The fact that both shell and grog tempered sherds from multiple contexts in Mound A were TL dated to roughly the same interval, even if this was earlier than when the mound itself was built and used, suggests the two tempers were both in use concurrently early in the site history. The range and average age of the shell tempered midpoints (A.D. 610–1068; average = A.D. 920.9) was slightly later than that for the grog tempered sherds (A.D. 462–1260; average = A.D. 878.1), in line with expectations from the local/site and regional archeological record. The TL dating of these sherds is earlier than the AMS derived dates when the mound construction occurred, however, and the dates for some of the sherds, particularly one of the shell tempered sherds (i.e., A.D. 610), and possibly all of them dating prior to the tenth or eleventh centuries, appears too early. Given that the TL dates were on the sherds in fill and feature context (and hence are intrusive, from previously made vessels), while many of the AMS dates were obtained from charcoal formed when the mound or the feature it came from was in use (i.e., burned matting, soot from surfaces, charcoal from hearths), the fact that the TL dates are somewhat earlier is not surprising. Some of the mound fill included occupational debris; whether it came from the immediate site area as early as some of the TL dates indicates, that is, prior to ca. A.D. 800 or 900, however, is not considered likely, given the scarcity of earlier Woodland diagnostics, nor evidence disturbance due to vegetation clearing and burning in the site area prior to the Late Woodland in the pollen evidence (see below; Chapter 5).

A few ceramics found in Mound A were styles produced at major Mississippian centers located

elsewhere in the region, like Etowah in northern Georgia, Moundville in Alabama, or Cahokia in the American Bottom of western Illinois. Almost all these wares, indeed almost all the decorated shell tempered pottery found in Mound A, came from the final three construction episodes, Stages I–III, although one sherd each of Etowah Complicated Stamped pottery came from Stages V and VI. Most of the decorated sherds came from the upper two stages, although this was almost certainly because the volume of screened fill was greatest from these stages. The one sherd of Ramey Incised pottery found in Mound A came from the Stage IIa/IIc boundary fill, which would put it at the late end of its dating at Cahokia, during the Stirling phase and after, from ca. A.D. 1050–1250 (Welch 2006:48–49). Even if a local copy, when the vessel the sherd came from was made or arrived at Shiloh could be any time during this interval or after. Like the shell tempered pottery, grog tempered sherds from earlier varieties other than common cord marked, fabric impressed, and plain finishes were rare in the lower stages of Mound A. This also supports the conclusion that intensive Woodland occupation in the immediate site and Mound A area began fairly late, although with larger samples from the lower levels of the mound, and hence potentially more diagnostic grog tempered wares, this impression might change.

A remarkably consistent series of radiocarbon dates were also obtained from within the mound during the 2001 to 2004 fieldwork that date its construction history quite closely, and that complements the dating arrived at from the artifactual evidence (Table 21-03; Figures 21-1 to 21-03; see also Chapter 12). Mound A, in fact, with 36 radiocarbon and 17 TL dates, is arguably one of the most intensively dated earthen mounds in eastern North America. A Bayesian analysis of the AMS dates indicates when individual construction episodes occurred, and how reliable the various dating efforts proved to be.

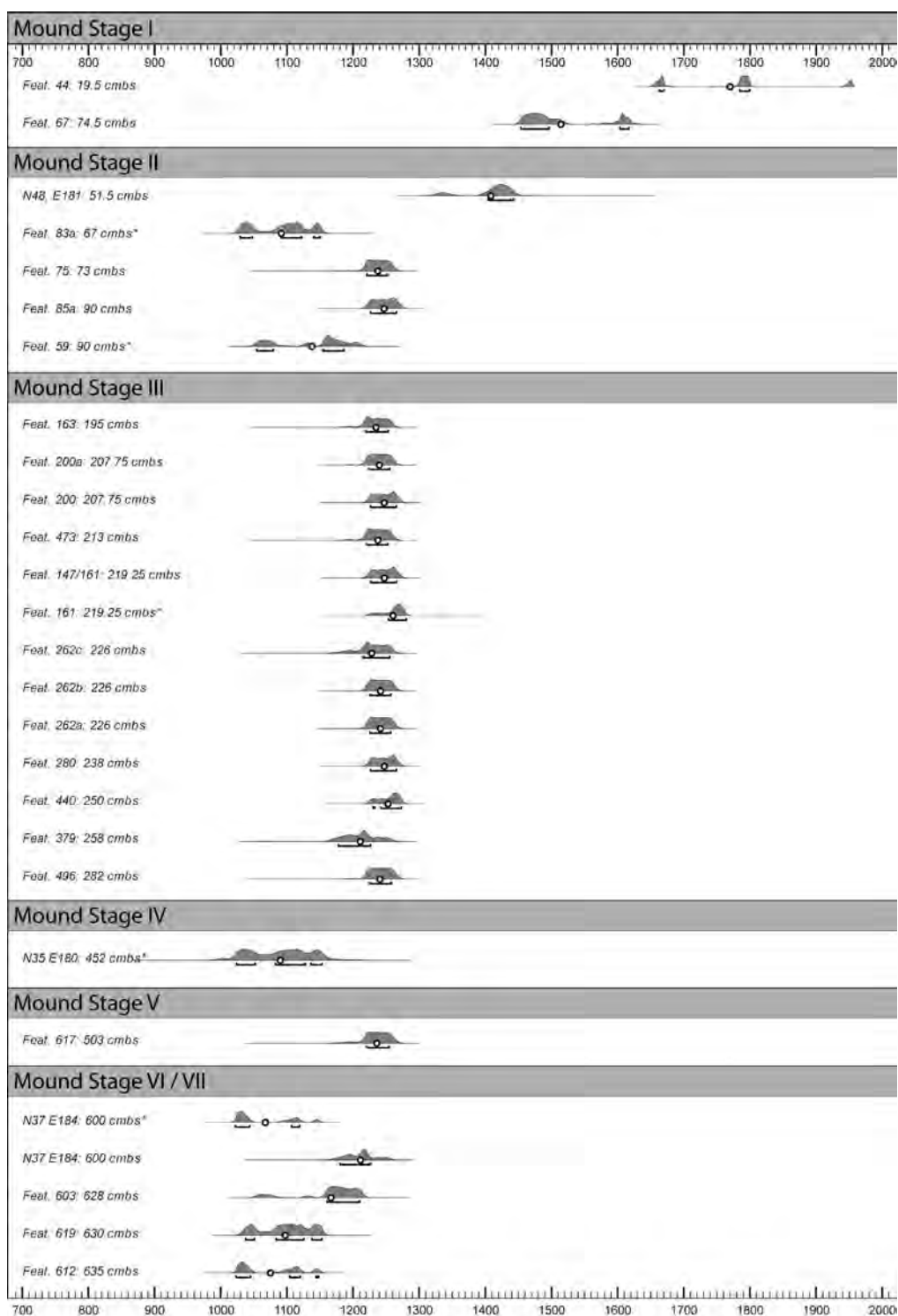
The use of Bayesian modeling in the calibration of radiocarbon dates involves the imposition of known, or prior, constraints on a sequence of radiometric assays where the relative age of respective samples is known, as in the case of the

Table 21-03. Radiocarbon dates from the Shiloh Mound Complex. Dates from Mound A have been calibrated and modeled except where otherwise indicated (see also Figures 21-01, 21-02). All other dates are calibrated but unmodeled. Calibrations and Bayesian modeling were done using OxCal 4.1 (Ramsey 2001) based on the IntCal 2009 calibration curve (Reimer et al. 2009).

Laboratory Number	Date (yr BP)	Standard Deviation	13C Ratio	Material	Provenience	Stage	Elevation	Unmodeled BCE / CE				Modeled BCE/CE*				Reference	
								cmbd	1-σ (68.2%) Range	2-σ (95.4%) Range	μ	σ	1-σ (68.2%) Range	2-σ (95.4%) Range	μ	σ	
Mound A 2001 to 2004 Excavations																	
PRI-1147	215	15	-26.9	charcoal	Feat. 44	I	20	179.5	1661-1797	1649-1955	1768	94	1656-1798	1648-1953	1758	87	Chapter 12
PRI-1364-1	380	20	-23.9	charcoal	Feat. 67	I	75	234.5	1452-1615	1446-1623	1512	57	1453-1615	1446-1624	1513	57	Chapter 12
Beta-161309	510	40	-26.8	wood charcoal	N48 E181	II	52	211.5	1403-1441	1318-1450	1407	36	1309-1344	1294-1430	1337	32	Data appendices
PRI-1665	955	20	-23.4	charred nutshell	Feat. 83a	II	67	227	1029-1149	1022-1155	1090	40	Agreement index = 0.0%				Chapter 12
PRI-1631	810	15	-26.8	charcoal	Feat. 75	II	73	233	1220-1251	1212-1264	1236	15	1246-1262	1235-1267	1252	8	Chapter 12
PRI-1265	890	15	-25.4	charred nutshell	Feat. 85a	II	90	250	1225-1264	1219-1272	1245	15	1248-1270	1237-1276	1257	10	Chapter 12
PRI-1804	785	20	-24.6	charred nutshell	Feat. 59	II	90	250	1054-1185	1047-1213	1136	52	Agreement index = 3.7%				Chapter 12
PRI-2747a	815	15	-24.1	charred fabric/matting	Feat. 163	III	195	355	1218-1252	1190-1264	1233	16	1229-1249	1223-1255	1239	8	Chapter 12
PRI-3032	785	15	-25.5	charred fabric/matting	Feat. 200	III	207.75	367.75	1223-1254	1215-1264	1238	14	1229-1248	1223-1255	1239	8	Chapter 12
PRI-2940	805	15	-10.1	charred maize	Feat. 200a	III	207.75	367.75	1225-1264	1220-1271	1246	14	1229-1248	1223-1255	1239	8	Chapter 12
PRI-3866	810	15	-10.1	charred grass	Feat. 473	III	213	373	1220-1251	1212-1264	1236	15	1229-1249	1223-1255	1239	8	Chapter 12
PRI-2739	785	15	-24.7	charred fabric/matting	Feat. 147/161	III	219.25	379.25	1225-1264	1220-1271	1246	14	1229-1248	1223-1255	1239	8	Chapter 12
PRI-2736	760	20	-27.1	charred fabric/matting	Feat. 161	III	219.25	379.25	1252-1279	1224-1280	1259	15	Agreement index = 1.6%				Chapter 12
PRI-1447	800	15	-25.2	charred fabric/matting	Feat. 262	III	226	386	1214-1254	1180-1264	1227	22	1229-1249	1223-1255	1239	8	Chapter 12
PRI-3176	800	15	-26.8	charred fabric/matting	Feat. 262	III	226	386	1224-1256	1216-1265	1240	14	1229-1248	1223-1255	1239	8	Chapter 12
PRI-3189-1	820	20	-25.1	charred fabric/matting	Feat. 262	III	226	386	1224-1256	1216-1265	1240	14	1229-1248	1223-1255	1239	8	Chapter 12
PRI-3277	785	15	-25.8	charcoal	Feat. 280	III	238	398	1225-1264	1220-1271	1246	14	1229-1248	1223-1255	1239	8	Chapter 12
PRI-3772	775	15	-29.6	charcoal	Feat. 440	III	250	410	1229-1272	1223-1274	1251	15	1229-1248	1223-1255	1239	8	Chapter 12
PRI-3635	835	20	-26.6	charred fabric/matting	Feat. 379	III	258	418	1177-1225	1168-1256	1210	25	1229-1249	1222-1255	1239	9	Chapter 12
PRI-3986	800	20	-23.4	charred nutshell	Feat. 496	III	282	442	1224-1257	1212-1270	1239	16	1229-1248	1223-1255	1239	8	Chapter 12
Beta-161308	960	40	-22.7	wood charcoal	N35 E180	IV	452	612	1023-1152	996-1166	1089	47	Agreement index = 5.9%				Data appendices
PRI-4698	810	20	-24.9	charcoal	Feat. 617	V	503	663	1220-1253	1187-1269	1234	18	1210-1232	1186-1240	1217	12	Chapter 12
PRI-4706	835	15	-27	charred fabric/matting	N37 E184	V1	600	760	1021-1118	1018-1150	1066	43	Agreement index = 55.3%				Chapter 12
PRI-4696	975	15	-25.2	charred nutshell	N37 E184	V1	600	760	1179-1225	1170-1255	1210	22	1169-1201	1164-1219	1190	15	Chapter 12
PRI-4529-1	875	20	-10.1	charred maize	Feat. 603	VI/VII	628	788	1160-1209	1051-1219	1165	44	1157-1194	1125-1217	1173	26	Chapter 12
PRI-4702	940	15	-27.2	charred nutshell	Feat. 619	VI/VII	630	790	1037-1152	1031-1155	1097	36	1115-1155	1079-1160	1128	24	Chapter 12
PRI-4556	970	15	-25.9	charred nutshell	Feat. 612	VI/VII	635	795	1022-1147	1020-1152	1074	43	1106-1152	1029-1155	1124	27	Chapter 12
PRI-750-2-5	800	15	-26.2	charcoal	Feat. 25, N side	n/a			1224-1256	1216-1265	1240	14	-	-	-	-	Chapter 12
Mound A 1979 Test Unit 2 Excavations																	
UM-1807	860	70	-25.0e	wood charcoal	Level 2	?	40	n/a	1051-1255	1031-1270	1156	70	Agreement index = 0.0%				Johnson and Stipp 1980
UM-1808	1190	60	-25.0e	wood charcoal	Level 9	?	180	n/a	724-940	687-974	833	77	Agreement index = 0.0%				Johnson and Stipp 1980

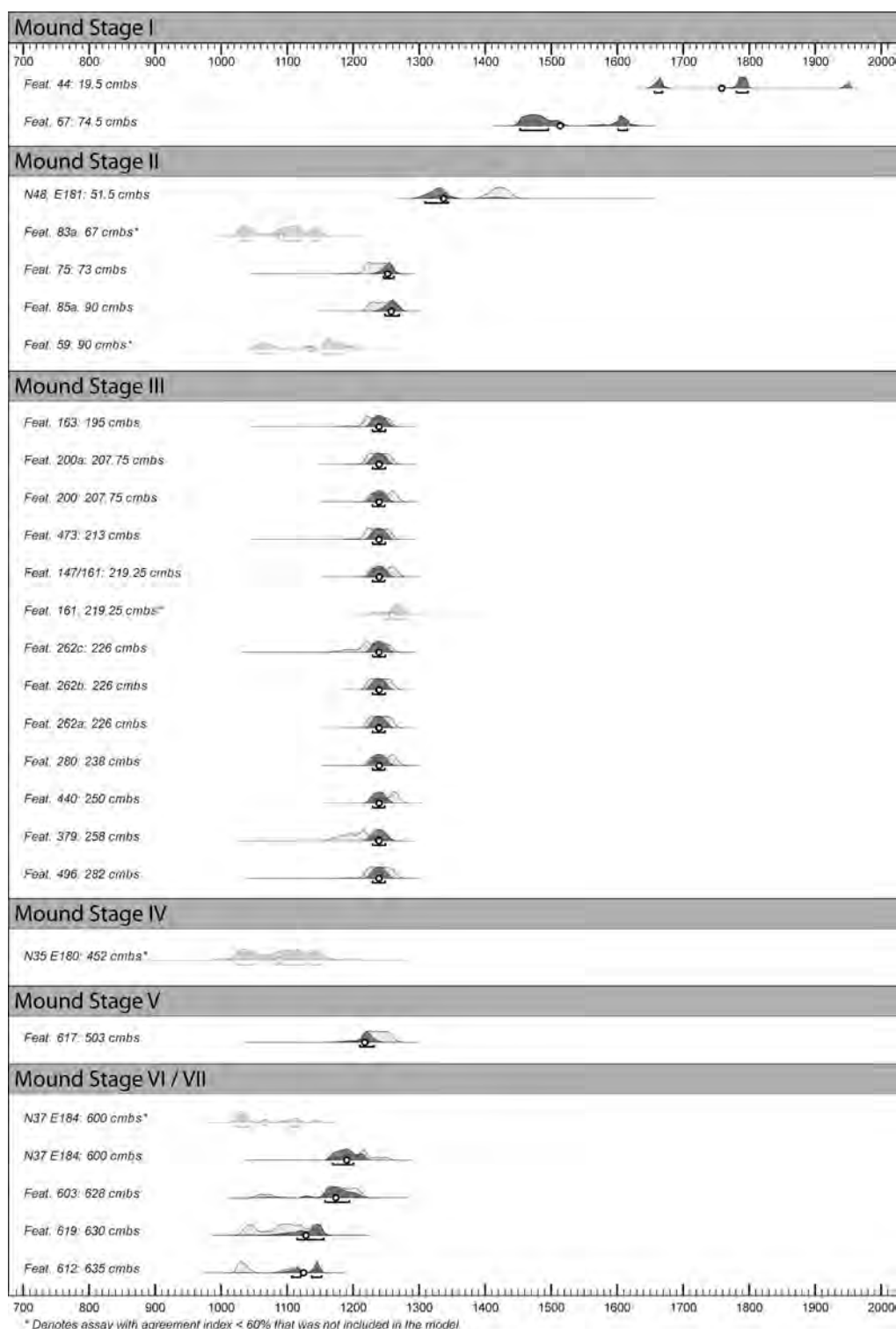
Laboratory Number	Date (yr BP)	Standard Deviation	13C Ratio	Material	Provenience	Stage	Elevation	Unmodeled BCE / CE		Modeled BCE/CE*	Reference				
UM-1809	1130	80	-25.0e	wood charcoal	Level 11	?	220	n/a	782-990	688-1028	888	90	Agreement index = 0.0%	Johnson and Stipp 1980	
UM-1810	1220	50	-25.0e	wood charcoal	Level 23	?	460	n/a	719-880	674-940	800	68	Agreement index = 0.0%	Johnson and Stipp 1980	
UM-1811	1810	180	-25.0e	wood charcoal	Level 26	?	520	n/a	5-418	340 BCE-605	196	209	Agreement index = 0.0%	Johnson and Stipp 1980	
UM-1872	2280	90	Yes	marine shell	Level 26	?	520	n/a	477-196 BCE	747-61 BCE	346 BCE	140	Agreement index = 0.0%	Johnson and Stipp 1980	
UM-1873	2360	70	Yes	marine shell	Level 26	?	520	n/a	731-374 BCE	757-231 BCE	494 BCE	131	Agreement index = 0.0%	Johnson and Stipp 1980	
UM-1874	2270	80	Yes	marine shell	Level 31	?	620	n/a	401-206 BCE	723-100 BCE	321 BCE	116	Agreement index = 0.0%	Johnson and Stipp 1980	
1933-34 Excavations, Samples From Southwest of Mound C Area															
Beta-113782	780	50	-26.7	charred cane	W330.45 S90.38	n/a	n/a	n/a	1217-1277	1156-1296	1235	41	-	-	Welch 2006:33-34, 110, 158
Beta-113780	840	50	-12.7	charred maize	n/a	n/a	n/a	n/a	1160-1258	1045-1274	1182	60	-	-	Welch 2006:33-34, 110
Beta-113781	1000	50	-7	charred maize	n/a	n/a	n/a	n/a	986-1150	899-1162	1051	63	-	-	Welch 2006:33-34, 110
House Mound 7															
Beta-143850	820	60	-27.1	wood charcoal	Feature 1	n/a	n/a	n/a	1166-1266	1044-1284	1193	63	-	-	Welch 2006:183-184
Beta-143848	860	50	-26.8	wood charcoal	Feature 1	n/a	n/a	n/a	1053-1251	1040-1264	1161	62	-	-	Welch 2006:183-184
Beta-143849	870	50	-24.6	wood charcoal	Feature 1	n/a	n/a	n/a	1049-1222	1040-1257	1152	62	-	-	Welch 2006:183-184
House Mound N															
Beta-143851	320	60	-27.9	wood charcoal	old trench fill	n/a	n/a	n/a	1495-1642	1447-1794	1569	77	-	-	Welch 2006:225-228
Beta-143852	560	60	-28.6	wood charcoal	undisturbed fill	n/a	n/a	n/a	1311-1426	1294-1440	1367	44	-	-	Welch 2006:225-228
Pond G Pollen Core															
Beta-194567	101.3	0.5pMC	-28.6	Organic sediment	Sediment Core	n/a	4-8	n/a	1699-1916	1696-1919	1812	79	-	-	Chapter 5
Beta-194568	530	40	-28.3	Organic sediment	Sediment Core	n/a	14-18	n/a	1328-1435	1310-1445	1390	40	-	-	Chapter 5
Beta-194569	1350	40	-28.6	Organic sediment	Sediment Core	n/a	28-32	n/a	643-762	614-771	680	39	-	-	Chapter 5
Beta-195531	1140	40	-28.1	Organic sediment	Sediment Core	n/a	63-67	n/a	830-975	779-987	898	58	-	-	Chapter 5
Beta-195532	1940	60	-27.3	Organic sediment	Sediment Core	n/a	98-102	n/a	20 BCE-CE 129	88 BCE-CE 230	62	73	-	-	Chapter 5
Beta-195533	8080	50	-23.5	Organic sediment	Sediment Core	n/a	126-130	n/a	7171-6861 BCE	7286-6823 BCE	7042 BCE	102	-	-	Chapter 5

* Agreement Index is greater than 60% unless otherwise; all dates with Agreement Indices below 60% were excluded from the model.



Unmodeled A.D.

Figure 21-01. Sequence of 27 radiocarbon dates (calibrated but unmodeled) obtained from Mound A, Shiloh Mound Complex, during the 2001 to 2004 excavations. All calibrations were done using OxCal 4.1 (Ramsey 2001) based on the IntCal 2009 calibration curve (Reimer et al. 2009).



Modeled A.D.

Figure 21-02. Calibrated and modeled Mound A radiocarbon sequence. Grayed probability distributions indicate outlier samples that were excluded from the model at A < 60%. All calibrations and Bayesian modeling were done using OxCal 4.1 (Ramsey 2001) based on the IntCal 2009 calibration curve (Reimer et al. 2009).

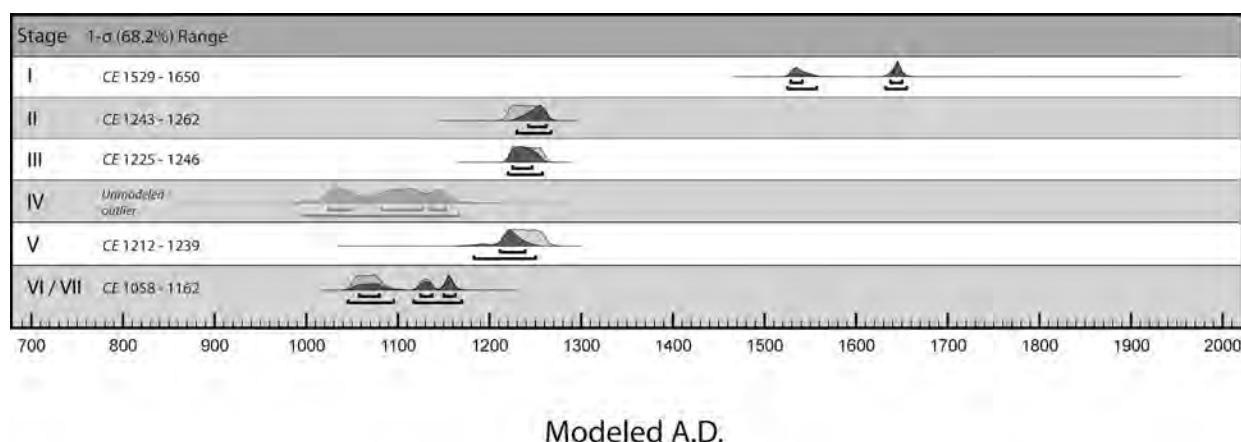


Figure 21-03. Modeled and calibrated summed probability distributions for radiocarbon dates by mound construction episode obtained from Mound A, Shiloh Mound Complex, during the 2001 to 2004 excavations. Grayed probability distribution for Stage IV indicates outlier. Only non-outlier assays (see Figure 21-02) were included in this combined model. All calibrations and Bayesian modeling were done using OxCal 4.1 (Ramsey 2001) based on the IntCal 2009 calibration curve (Reimer et al. 2009).

samples taken at intervals within the sequence of stratigraphically superimposed construction stages in Mound A. The necessity for the calibration of raw radiocarbon dates to produce calendrical estimates of the age of individual samples (and the context from which they derive) is well known, and multiple software packages have been developed to allow for the application of increasingly high-resolution radiocarbon correction curves (e.g., Reimer et al. 2009) to raw ^{14}C data. These packages use sophisticated statistical algorithms to convert to calendar years from measured radiocarbon years.

Because the half-life of the ^{14}C radioisotope is determined statistically (see Chiu et al. 2007:26-33; Ramsey 2008:254), both raw radiocarbon data and the calibrated calendar estimates produced from them also are statistical predictions, and as such are characterized by a degree of known uncertainty, expressed as the standard deviation of individual measurements. While improvements in the sensitivity of carbon radioisotope detection, as well as pre-treatment processes used to prepare samples for analysis, have helped to reduce the average standard deviations for ^{14}C assays to only a few decades and even sometimes only a few years, closely-spaced series of assays such as those from Mound A often exhibit overlapping standard deviations, which can present problems with respect to the accurate interpretation of sequences of dated events.

Bayesian analyses can be used to trim overlapping standard deviations of dates within stratified or sequential deposits, helping to reduce concerns that multiple dates at close temporal intervals are effectively “statistically indistinguishable.” Furthermore, Bayesian methods provide a powerful diagnostic tool for assessing the reliability of individual radiocarbon assays within a sequence, as well as the stratigraphic integrity of a site, by enabling the construction and testing of specific predictions concerning the distribution of dated samples within a site. In the case of the Mound A dates at Shiloh, a model was constructed to test the null hypothesis that there was a direct relationship between the age of radiocarbon samples and the depth from which they were recovered are directly related, i.e., that dated specimens from deep within the mound are older than specimens deriving from nearer the mound’s upper surface.

The OxCal software package (Ramsey 2001) offers a versatile and powerful implementation of Bayesian modeling for radiocarbon calibration, and was used to produce a calibration model for the dated samples taken during the 2001–2004 excavations. OxCal 4.1 provides a wide variety of options and potential models, but a simple depositional model was most appropriate to the radiocarbon sequence in Mound A. Within the model, depths in meters below surface were specified for each recovered and dated sample, and samples were

grouped by construction stage of origin. The approximate depths at which subsequent construction stages began and ended were also indicated.

The initial model included only the 27 Mound A samples for which a construction stage and depth were known (Table 21-03); unmodeled determinations and modeled calibrations are included in this table, and are displayed graphically in Figures 21-01 and 21-02. Summed modeled probability distributions for samples from each mound stage are displayed in Figure 21-03. It should be noted that the summed probability distributions presented in the latter figure are not equivalent to 1- or 2-sigma ranges for individually dated samples from the respective stages, but represent modeled and calibrated statistical combinations of dates from mound stages, indicating the approximate duration of activity associated with each period of activity or construction.

Of the 27 dates entered into the model, 22 (81.5%) exhibited an agreement index (A)—a measurement of the conformity of individual dates to the specified model—greater than 60%, indicating that they strongly conformed to the specified model. That model was relatively minimal in its constraints, and essentially only required that samples recovered from progressively shallower depths exhibit more recent radiocarbon ages, and that the ages of samples from within the same construction stage should approximately agree with each other. The 22 dated samples with A-values greater than 60% were considered to present an accurate estimate of the age of the mound stages from which they were recovered. Of the five remaining 2001–2004 samples considered out of position or inaccurate, four were older than expected for their positions. The fifth, a sample of charred matting or fabric from Feature 161 in Mound Stage III, was only slightly younger than expected given the ages of other samples in that stage, but because of the large number of dated specimens from Stage III, produced a low A-value and was removed from the model.

As indicated in Table 21-03, dated activities on the location of what would become Mound A began at least as early as the late 11th or early 12th century A.D., based on calibrated dates from three

Stage VI/VII postholes (Features 612, 619, and 603) and one additional sample taken at a depth of 600 cmbs. A fifth sample taken at the same depth was unexpectedly early (unmodeled calibrated 1-sigma A.D. 1066 ± 43) relative to depth in comparison to the other dated specimens in the same stage. Based on the prior constraints of the specified depositional model, a substantially earlier date recovered at the same level as a dated sample which falls into the predicted depositional sequence (as indicated by upper and lower assays) will produce a low agreement index value. Although the A-value for the excluded sample was relatively high (55.3%) compared to other samples excluded on the basis of A-values less than 60%, the sample was excluded from the model. The modeled duration of activities represented by dates from Stage VI/VII was approximately one century based on the modeled range (Figure 21-03), from A.D. 1058–1162 (Figure 21-03). The excluded sample, it should be noted, falls at the very early end of this range (Table 23-03).

The modeled calibration for the single date from Stage V indicated an age of A.D. 1217 ± 12 . A single assay from the overlying Stage IV was unacceptably early (unmodeled calibrated: A.D. 1089 ± 47) given the depth from which it was recovered, compared to other dated specimens above and below in the mound sequence, and was excluded from the model (A = 5.9%).

Stage III constituted the most extensive construction episode in Mound A, but represented a relatively short period of time. The calibrated mean intercept for eleven of the twelve modeled Stage III dates was identical: A.D. 1239 ± 8 . For the twelfth, a modeled calibration of A.D. 1239 ± 9 was obtained, differing from the other calibrated assays only in the 9-year modeled standard deviation. The calibrated range for the 12 modeled dates from Stage III was A.D. 1225–1246, a period of 21 years (Figure 21-03). One additional Stage III assay, taken from Feature 161, was excluded from the model (A = 1.6%). The unmodeled calibrated mean intercept, A.D. 1259 ± 15 , likely exhibited a low A-value only due to the large number of assays of similar ages from Stage III.

In the case of Stage III, it seems possible that the modeled calibration produced a series

of estimated intercepts that are too similar, given their likely associations with at least four separate structures within Stage III. However, in the case of both the modeled and unmodeled calibrations, it appears that the use of the Stage III summit took place over a relatively short period of time, on the order of a few decades at most.

Subsequent construction of the Stage IIa and IIb platforms atop Stage III likely occurred sometime between the mid-1240s and the early 1260s (Figure 21-03), as indicated by a pair of modeled dates (Feature 85a, A.D. 1257 ± 10 ; Feature 75, A.D. 1252 ± 8). A third dated sample in Stage II was excluded from the model with an A-value of 0.0%; the unmodeled calibrated intercept was A.D. 1090 ± 40 , seemingly too early for Stage II. A fourth specimen, deriving from the upper Stage IIc surface, dated roughly 80 years later than other samples from Stage II (modeled calibration: A.D. 1337 ± 32). Although likely too late to relate to the construction of Stage II, its position on the surface of the stage in between mounds IIa and IIb suggests it post-dated their construction and its deposition occurred at some point well after their completion.

Two late dates from Stage I suggest late activity on Mound A, substantially post-dating the active use of the mound. These have been suggested previously to be associated with possibly natural burning (Feature 67: modeled calibration A.D. 1513 ± 57) on the site, or the intrusion of an historic-era fencepost (Feature 44: modeled calibration A.D. 1758 ± 87).

Based on the modeled radiocarbon distribution, the majority of activity in the area of Mound A or directly related to its construction dates to a period extending between approximately A.D. 1100 and A.D. 1340, with major mound construction (Stage III and Stage II) occurring mainly during the early and mid-13th century A.D.

These results call into question the reliability of a series of eight radiocarbon assays obtained from wood charcoal and marine shell from excavations in Test Unit 2 at the site in 1979 (Johnson and Stipp 1980). The deepest sample in the 1979 test unit, at 620 cmbs was calibrated at 321 ± 116 B.C. (unmodeled). Feature 603 from the 2001-2004 excavations occurred at a similar depth, and

produced an unmodeled calibrated age of A.D. 1165 ± 44 . The remaining dates obtained from the 1979 testing were likewise too early, by several hundred years to a millennium or more. Insertion of the raw radiocarbon determinations for these eight samples into the Mound A model produced A-values of 0.0% for all eight (Table 23-03). It is possible that the shell and charcoal found in the 1979 test unit near the presumed base of the mound may derive from earlier midden deposits, but resolution of this will probably require additional analysis of the collections, or new fieldwork at Mound A.

The AMS radiocarbon dating of samples collected from Mound A from 2001 to 2004 was supported by the palynological analysis of cores taken from the pond near Mound G, which found no indication for human use of the area prior to the Late Woodland and Mississippian periods intensive enough to produce recognizable increases in charcoal particulates from burning, or changes in vegetation from forest clearing or other anthropogenic disturbance. Such changes are, however, clearly indicated during the tenth to the fourteenth centuries in the core sediments (see Chapter 5). Indeed, Shiloh is also one of the few archeological sites anywhere on the planet where a well preserved pollen record spanning much of the prehistoric occupation of the immediate region exists from within the site itself, in this case from a location inside the palisade line, at the base of a mound just off the main plaza. The pollen record documents the clearing and post abandonment reforestation of the area, as well as the fact that during the Mississippian period sunflower, but apparently not maize—whose pollen does not travel very far—was grown within the palisade lines. Multiple independent lines of evidence, including diagnostic artifacts, radiocarbon and TL dating, and palynology converge and support the dating of major use of Mound A, and the Shiloh Mound Complex area in general.

***SOME THOUGHTS ON MISSISSIPPIAN MONUMENTALITY
BASED ON THE WORK AT SHILOH MOUND A¹***

The Mississippian period in Eastern North America is dated to between ca. 1000 and 400 cal yr B.P. in most sequences, encompassing the last few centuries before sustained European contact across much of the region. Exactly what Mississippian is as a cultural entity has been the subject of as much debate as its beginning and end points and, indeed, the two subjects are intertwined. Over the past century Mississippian societies have been defined based on the presence of attributes taken individually or collectively that have included such things as the presence of intensive maize agriculture, the widespread use of shell tempered pottery, the appearance of wall trench architecture, aspects of iconography and religion, or adaptations to specific environments like riverine floodplains or the oxbow lakes (e.g., Griffin 1967:189, 1985:63; Knight 1986; Pauketat 2007:82–87; Smith 1986:486, 488). Most scholars would agree that monumental construction, and specifically the building of mounds, earthworks, and enclosures, and their placement adjacent to or around plazas, and with sturdy fortifications at larger centers, is a particularly characteristic feature of Mississippian culture. While not all Mississippian sites are characterized by the construction of monuments, or monumentality, and indeed it is rare or nonexistent at hamlets or smaller communities, it does appear to have been an integral part of life at larger communities. The work at Shiloh allows us to examine what was meant by monumentality during the Mississippian period, and offer a new perspective on how the subject is currently being examined by southeastern archeologists.

Mound and plaza arrangements have great time depth in Eastern North America. The existence of an architectural grammar, or an appropriate way to design communities, has long been assumed to exist within Mississippian culture. To one group of

scholars, its “main architectural elements include plazas, platform mounds and other earthworks, entryways, various means of segregating space and activities, defensive works, and natural terrain features” (Lewis et al. 1998:5). Indeed, some have argued that such a grammar was both cosmologically grounded, ritually proscribed, and precisely determined, and had great time depth in the region and perhaps across the Americas (Clark 2004; Lewis et al. 1998; Sassaman 2010a, 2011:203–206). Whether such consistency existed even during the Mississippian period, much less continuity across the upwards of twelve millennia of human occupation across the region that came before it has been debated, and while there is no consensus of opinion, some general themes are acknowledged (e.g., Anderson 2002:268–269, 2004:282–293; Milner 2004a; Pauketat 2007, 2012; Sassaman 2005a, 2005b, 2010a, 2011). In particular, dispersed populations appear to have periodically come together at specific and perhaps special (resource rich, sacred) locations throughout much of prehistory, perhaps seasonally, annually, or less frequently, to engage in information exchange, ritual and ceremony, and the maintenance of populations through kin and mating network regulation, activities that all served to promote group and cultural identity. Indeed, such patterning appears to date back to the earliest readily identifiable occupation of the region. At Paleoindian sites like Bull Brook, Massachusetts, Debert, Nova Scotia, Shoop, Pennsylvania, or Williamson, Virginia, multiple artifact concentrations have been found that are thought to reflect the camping areas of individual bands, and that in some cases may have been contemporaneous (Gingerich 2013). At Bull Brook it has been argued that multiple camps surrounded a central space that was used for public activity, including possible ceremony (e.g., Robinson and Ort 2011; Robinson et al. 2009). Thus, an arrangement of people and structures around a central space or plaza appears to date back to the earliest settlement of the region.

There is no question that true monumentality appears in a number of parts of Eastern North America during the latter part of the ensuing

¹ Portions of this section have been published in somewhat different form in a paper entitled “Monumentality in Eastern North America during the Mississippian Period” by Anderson that appears in the volume in *Early New World Monumentality*, edited by Richard L. Burger and Robert M. Rosenwig, pp. 78–108, University of Florida Press, Gainesville, Florida.

Mid-Holocene era, from ca. 8900–5700 cal yr B.P. (Anderson and Sassaman 2004; Kidder and Sassaman 2009; Sassaman 2010a, 2011; Sassaman and Anderson 1996, 2004). Isolated earthen mounds and groups of mounds appear in the lower Mississippi Valley from ca. 6500 to 5000 cal yr B.P., at places like Caney, Frenchman's Bend, Hedgepeth Mounds, Monte Sano, and Watson Brake (Russo 1994, 1996a; Saunders et al. 1997, 2005; Saunders 2010, 2012), while mounds of earth and shell appear about the same time or slightly earlier in coastal areas and along the St. Johns River in Florida, at locations like Harris Creek, Hontoon Dead Creek Mound, Live Oak Mound, and the Silver Glen Run Mound (Randall 2011; Russo 1996b, 2006; Sassaman 2010a, Sassaman and Randall 2012). Accumulations of shell and earth have also been found along in many interior waterways of the region, particularly in the Midsouth and along the Savannah and Ogeechee Rivers of Georgia, with the earliest dating back to ca. 8000 cal yr B.P. (e.g., Anderson et al. 2007; Claassen 1996, 2010; Dye 1996; Marquardt and Watson 2005; Sassaman 2005a, 2010a, 2010b, 2011; Thompson 2010). In eastern North America monumentality and particularly mound building appears often if not ubiquitously cosmologically grounded, tied with ideas of lower and upper worlds, and is associated with mortuary behavior in some but not all cases. The monumental architecture that appears during the Mid-Holocene has links to earlier practices of group aggregation and dispersal, as seen in Paleoindian sites, and to concepts of a watery or lower world, as seen in Florida with its submerged cemeteries, and in later mounds built in or near wet areas, and in some cases composed of materials from watery environments such as shellfish, or back swamp clays (Kidder 2011; Sassaman 2010a).

Appreciable variability is evident in the location and scale of monumental architecture in the Mid-Holocene in Eastern North America, a pattern that continues throughout the Late Holocene. After ca. 3200 cal yr B.P., during the Woodland and Mississippian periods locally, what are assumed to have been tribal and chiefdom-level societies were present in a number of areas.

Monumental architecture occurred in many parts of the region, in the form of causeways, ditches and embankments, enclosures, fortifications, mounds, and plazas, with surviving evidence indicating earth, earth and shell, and occasionally stone were commonly used (e.g., Mainfort and Sullivan 1998; Anderson and Mainfort 2002; Sassaman and Anderson 2004). Wood, of course, is known to have been used in the Mississippian and early historic periods to create massive structures like earth lodges or council houses, marker posts (like the one found on the Stage III surface in Mound A at Shiloh), and wood henges, and during earlier times log tombs and charnel houses/temples, although the full extent of its use in creating monumental architecture prehistorically is unknown (e.g., Knight 2010; Rodning 2010; Pauketat 2004, 2007, 2009). Perhaps the best descriptions of the potential of perishables like wood, aside from discoveries at submerged sites like Key Marco (Cushing 1897), are those of historic council houses, like the one at Mission San Luis (Shapiro and McEwan 1992), or the description of the Temple of Talimeco encountered by DeSoto in A.D. 1540 in the province of Cofitachequi (Garcilaso de la Vega, in Clayton et al. 1993:II:298–306). This temple, atop an earthen mound, was described as being large with a high and steeply pitched roof of reed and cane and covered with shells, giving it a striking appearance. Inside were carved human figures, numerous chests of human/ancestral bones, river pearls, and other valued objects. Around the main temple building were eight smaller structures, 'apparently for its embellishment and service' (Clayton et al. 1993:II:303), themselves filled with weapons. While the description may be somewhat fanciful and overdrawn, it indicates that great care and crafting likely went into the perishable structures and other objects that were associated with the more imperishable monuments that survive. Given the care that went into the selection of soils used in some stages of Mound A at Shiloh, it is likely that similar great care and effort went into the associated perishable architecture on the summit and around the base of the mound. The smaller structures found in the excavations on the east side of Mound A, and

around the base in the remote sensing, appear similar to those observed at Talimoco, and may have served as storage space as well as domiciliary functions.

How monuments were erected in the Southeast, unfortunately, has received far less research attention than the contents of the structures or burials associated with them, although recent research at sites like Shiloh, Poverty Point, and at Cahokia indicates their construction was often, from an engineering perspective, a highly sophisticated endeavor, and at least on occasion a ritually highly charged activity (e.g., Kidder 2011; Kidder et al. 2008, 2009; Pauketat 2007:98–99; Pursell 2004; Sherwood 2006, Sherwood and Kidder 2011; Chapter 10). Construction of monuments in all periods likely required appreciable technical as well as leadership skills, and how this was manifest is not well understood, especially in Archaic and Woodland societies where coercive authority was presumably weak or absent. While at some sites and in some areas evidence for hereditary inequality is suggested during the Woodland period in Eastern North America, and is clearly present in the ensuing Mississippian period—when most or all of the construction of Mound A occurred—social integration and organization in many areas was much like it was in the preceding Archaic period: fluid and uncomplicated much of the time, and only becoming more structured when people came together in larger numbers, such as when they engaged in monumentality.

The construction of platform mounds is first well documented at a number of Middle Woodland period sites in the Southeast (Anderson 1998; Dickens 1975; Knight 1991, 2001; Lindauer and Blitz 1997), rendering moot assumptions that these mound types were unique to Mississippian culture and monumentality. During the later Woodland the bow and arrow spread rapidly over the region and concurrently evidence for fortifications, a form of monumental architecture, increases dramatically. Intensive maize agriculture appears after ca. 1100 cal yr B.P. and becomes increasingly important in some areas, and appears to contribute to an observed growth in regional population (Milner 2004b). About the same time, chiefdoms characterized by

hereditary inequality emerged in portions of the central and lower Mississippi valley, and spread rapidly over the region, albeit with appreciable local variation, and within a span of three to four centuries were found across much of the southeast and lower Midwest (Anderson 1999:225–227; J. Brown 2004; Pauketat 2007, Smith 1990). The fact that the most impressive Mississippian society in terms of size and complexity, Cahokia, was also the earliest, meant it would have had a tremendous influence through example if not outright force on the behavior of contemporaneous societies. Once they appeared, the ideas represented and made form at Cahokia would have spread, probably through competitive emulation of the religious and organizational forces behind them, but also possibly through warfare or the threat if not actual use of force (i.e., Carneiro 1970, 1981). While the emergence of Cahokia has been called the ‘Big Bang’ by Pauketat for its seemingly sudden and dramatic emergence, in recent years it has been recognized that early Cahokia resulted from a coalescence of peoples from across the surrounding region, with the resulting Mississippian culture and society that emerged different from its constituent parts (Alt 2002, 2006; Pauketat 2004, 2007, 2009).

The origin and spread of *chiefdom organization* is not, however, the same thing as that of *Mississippian culture*, especially Mississippian ideology, iconography, and religion, including aspects of monumentality like the construction of sub-pyramidal mounds as platforms for temples and elite residences. Some archeologists argue that Mississippian culture itself did not exist until after the emergence of Cahokia as a regional center around A.D. 1050 (Anderson 1997, 1999; J. Brown 2004; Pauketat and Emerson 1997; Pauketat 2004, 2007, 2009). By this definition, monumental construction in the Mound A area at Shiloh, if a Mississippian phenomenon, as appears likely, probably began in eleventh or twelfth centuries, even if occupations were present earlier, during the Late Woodland period, something also indicated by the radiocarbon analyses discussed previously. The final three construction episodes in mound A, Stages I–III,

are true Mississippian platform mounds, and date to the twelfth through early fourteenth centuries.

As discussed in Chapter 2, mounds in Eastern North America have captured the attention of investigators both professional and otherwise for generations, and thousands have been examined over the past two centuries, since Thomas Jefferson's day. Indeed, the occurrence of truncated pyramidal or platform mounds about plazas, exemplified in the layout of the Shiloh Mound Complex, is perhaps the most visible symbol of Mississippian culture to many archeologists, even though we now know such platforms appeared far earlier in prehistory in the region. A first step at any site with monumental architecture, accordingly, should be dating the individual features (i.e., mounds, plazas, earthworks, fortifications, etc.) and their constituent stages or major construction episodes. This is especially critical in areas the lower Southeast, where monumental construction dates back thousands of years. Just because a site or mound looks to be later Archaic, Woodland or Mississippian in age, and has artifacts on top of or around it dating to this period, does not mean that it dates to that time, or that earlier components are not present, buried by subsequent construction or alluvial or other depositional activity (e.g., Arco et al. 2006; Arco and Ortmann 2010; Morse 1986). The excavations and associated artifact analyses and absolute dating conducted at Mound A demonstrate that, at least in the area examined, it is Late Woodland to Mississippian in age and, in the absence of much in the way of associated earlier artifacts, is extremely unlikely to have earlier Archaic or Early or Middle Woodland period mounds within it. Likewise, while the effort devoted to dating Mound A has made it one of the best dated single mounds in the Southeast, it also indicates the extent of excavation and numbers of dates needed to achieve the moderately refined chronology we have at present. The dating remains somewhat uncertain, especially for the lowest (i.e., IV–VII) and highest (i.e., I and II, and the apron) stages, and many more AMS dates should be run from new contexts if the excavations resume.

Likewise, wherever possible centers need to be studied as complexes, and not piecemeal. This is easier said than done, of course, given the high cost of survey and excavation. Nonetheless, any work on a site, such as the work at Mound A, should consider how the area examined fits into the totality of occupation and use. One way to do this is to conduct careful and comprehensive mapping and remote sensing of as much of a site's extent as possible as a first step in a long term investigation, as we tried to do at Shiloh, and has been done recently at sites like Etowah, Kincaid, and Poverty Point (e.g., Kidder 2002a; Kidder et al. 2008, 2009; King et al. 2011; Lydick 2008; see Chapters 7 and 8). Such information can guide subsequent excavation and interpretation. The arrangement of monuments at large centers, for example, are thought to have represented sociograms, depictions of the social order, the spatial representations of kin groups or other subsets of society and their status with respect to one another. At Moundville, for example, Knight has argued that the arrangement of paired mounds about the central plaza represented the residence and mortuary/burial areas of ranked clans (Knight 1998, 2010:360–364; Steponaitis and Knight 2004:168). Likewise, Welch (2006:257–258) has argued that the layout of colored mounds at Shiloh, and specifically the use red and white/colored coverings, may reflect a dual social organization, and possibly differences between Shiloh and other nearby Mississippian centers like the Savannah mound group (Welch 1998b). The size and position of specific mounds or other monuments at prehistoric sites, furthermore, may reflect the status or power of the groups building and using them, following arguments based on social space and space syntax theory (e.g., Grøn 1991; Hillier and Hanson 1984; Hillier 1999; Russo 2004). Such linkages between the built environment—specifically the size and spacing of structures, monuments, and settlements—and social organization, may well reflect cultural practices dating back to the earliest mound building in the region during the Mid-Holocene (e.g., Anderson 2002, 2004; Randall 2011; Russo 2004, 2010; J. Saunders et al. 1994;

1997, 2005; J. Saunders 2004, 2010; R. Saunders 1994; Sassaman 2005b, 2010a, 2010b, 2011).

Focused geoarcheological research on how site features were constructed is a third direction recent research has taken. The effort that went into the construction of Mississippian site complexes was far greater than the constraints of excavating and moving earth (Pauketat 2007:98–99; Sherwood 2006; Sherwood and Kidder 2011). As Sherwood and Kidder (2011; see Chapter 10) have documented, based on careful geoarcheological analyses at settings like Shiloh’s Mound A, Monks Mound at Cahokia, and the main or ‘bird’ mound at Poverty Point, the labor required to build mounds was often appreciable, involving the careful selection, processing, and placement of special sediments. As such, traditional estimates of the labor required to build such monuments are likely understated in some and perhaps many cases (e.g., Blitz and Livingood 2004; Milner 1998:144–150; Muller 1997:273–275; Steponaitis 1978:446–449). Statements such as “the most important factor influencing the costs of digging and moving earth was the distance over which soil was carried” (Milner 1998:15) or that “even given differences in tools and enthusiasm, the costs of construction... were probably close to 1 person–day per 1.25m³” (Muller 1997:273–274) must be reconsidered, with construction estimates derived on a case by case, or stage by stage, or even fill by fill basis. That is, while ethnohistoric research has shown that the amount of fill that can be excavated using hand labor may be impressive (e.g., Erasmus 1965; Kaplin 1963; Rosenwig and Masson 2002:224–229), these estimates can be considered viable only in certain cases. Where monumentality involved more than simply digging and moving fill, that is, if the processing, mixing, or careful placement of fill was involved, than much more time, effort, and ceremony may be involved. In the construction of earthen monuments, particularly in the Mississippian period where the use of colored fills is widely documented (e.g., Pursell 2004), sometimes all of these circumstances may have applied. As Tim Pauketat (2007:98) has observed “Building an earthen pyramid was about much more than digging, carrying, and dumping

dirt” (see also Sherwood and Kidder 2011). Actualistic experiments, that is, time-task studies of the effort involved to acquire fills of a certain kind, or construct a segment of a ditch or palisade, may help yield more accurate estimates for construction (e.g., Blitz 1993:121–123; Coles 1973).

The effort involved in the construction of earthen mounds from one site to the next cannot, therefore, be assumed to be a fixed relationship between time and manpower in the absence of excavations and actualistic experiments documenting construction practices. At Shiloh, for example, as Sherwood’s (2006; Sherwood and Kidder 2011; see Chapter 10) geoarcheological research at Mound A has demonstrated, while great care went into the selection of fills used in some of the mound stages, in other stages it is clear that general midden from nearby areas was employed. A small mound elaborately constructed, such as the Stage III Mound A at Shiloh with its carefully selected, processed and layered colored fills, likely took far more labor to erect than a much larger mound of nearby midden debris as, indeed, large portions the upper two stages of Mound A were at Shiloh (see Chapters 9 and 10; Sherwood 2006). Focused geoarcheological research can also reveal details of fill preparation and construction, such as the removal of organic matter or the mixing of differing sediments, the use of sod or soil blocks or embankments to contain fills, or how thin colored fills or veneers may have been applied, as done at Mound A, as well as elsewhere (Sherwood 2006; Sherwood and Kidder 2011). Examinations of the weathering or lack thereof of mound fill, particularly exposed surface sediments, furthermore, can give an idea as to how long the construction process may have taken. At Poverty Point, for example, such evidence has been used to argue for a rapid construction of portions of the primary mound (Kidder 2011; Kidder et al. 2008, 2009). Likewise within Mound A, some stage surfaces and slopes showed greater signs of weathering than others, and some structure or mound termination episodes, in which elaborately colored veneers were placed down and then quickly covered, show no sign of weathering whatsoever (see Chapters 9 and 10).

The maintenance of mounds, and particularly dealing with weathering and erosion, were likely as major a societal concern, and perhaps required as much effort, as their initial construction (Pauketat 2007:98–99; Sherwood and Kidder 2011).

This is particularly likely given recent indications that our traditional perspective on the appearance of Mississippian mounds, and indeed of many earthen monuments, at least those that were used regularly, is likely incorrect. As Anderson and Cornelison noted in their 2002 report on the fieldwork on the main mound at Shiloh:

Perhaps the most important finding from our fieldwork is that Mound A was dramatically different in appearance when it was in use than it looks at present, and that even when in use its appearance changed somewhat from stage to stage. During the Mississippian era, a series of large buildings were located at the base of the mound, that probably represent associated ceremonial structures, storage areas, temples, and possibly the residences of lesser elites. The mound itself was colored with red, gray, white, and yellowish orange surfaces and possibly bands, and interior filling episodes made use of similar bright colors. Large and elaborate structures were apparently built on the summit, and a raised platform with a bright red surface was present atop one stage, like a smaller mound atop a larger one. There is some evidence to suggest large areas of the summit were fired, perhaps to help stabilize the surface or accentuate the firing colors. Structures atop the mound were likely elaborately decorated, based on descriptions of what they looked like from early historic accounts (e.g., Garcilaso de la Vega, in Clayton et al. 1993:298–304). The mound would have been

a dramatic feature when viewed by visitors, or from a distance, as from the river below.

The traditional way Mound A at Shiloh, and indeed perhaps many Mississippian mounds are interpreted in park exhibits, paintings, and archaeological writings, as green, cropped grass covered earthen masses, with simple thatched buildings on top, and few if any structures near the base is probably dead wrong. Mississippian ceremonial centers were instead, we believe, appreciably more dramatic and impressive cultural landscapes than we have given them credit for and portrayed to date. While we shouldn't accept such a perspective uncritically, we need to think about it, and test its possibility at the sites we explore (Anderson and Cornelison 2002:51–52).

When essentially the same paragraphs were read at the 2002 meeting of the Southeastern Archaeological Conference, they were accompanied by two images, the first showing L. K. Townsend's classic painting of the Cahokia mounds as green, and covered with cropped grass, and the second, showing the same painting with the caption "The way the mounds may have actually looked" showing them colored either all red, or banded red, gray, and white (see Figures 03–33 and 03–34). It will hard to forget the audible gasp throughout the hall when the second image went up. Paul Welch (2006), who at the time had worked for several years synthesizing earlier work at the site, in fact, with then SEAC archeological technician Emily Yates, helped produce versions of the images depicting the colored mounds, and with Anderson and Cornelison helped guide interpretive paintings subsequently produced for the site.

We know that pyramids in Mesoamerica were often elaborately colored, so that the same should be true in the Southeast, at least on occasion, is not

altogether surprising. Likewise, while stone and bone sickles could have kept vegetation down on the sides and tops of mounds, clay surfaces would have likely been equally if not more resistant to erosion. Besides being more colorful if carefully maintained, they would have been difficult to climb, especially when wet, when they were exceedingly treacherous, as anyone working at Shiloh from 1999–2004 can attest from personal experience. Since weed whackers and lawnmowers, what park personnel across the region use to maintain these sites, were unknown to Mississippian and earlier peoples, most traditional depictions of them as covered in short green grass, are in need of rethinking (see also Pauketat 2007:98–99). Recent paintings of life at Shiloh correct this deficiency, it should be noted, although how accurate they are will itself require far more fieldwork in the sites mounds.

Cosmological considerations as well as the perhaps more mundane aspects of life, such as the maintenance of cultural identity, can also be considered when examining monuments. Knight (1986:678) has argued that southeastern Mississippian mounds were receptacles of the sacred that had:

...deeply rooted and expressive symbolic significance, related to the ubiquity of multi-stage episodes of destruction and construction... Periodic rebuilding of the mound surfaces by the addition of a new blanket mantle of earth, the special characteristic of these mounds, demands to be seen as a purely expressive act....arguably an act of burial, a mortuary rite for the mound itself rather than for any individual, sometimes complete with funereal furnishings placed upon the old surface (Schnell et al. 1981:133–134). ...the symbolism of the earthen platform is that of an icon representative of earth, manipulated by periodic burial as a temporary means of achieving

purification in the context of a communal rite of intensification.”

Knight (1986:678–679) further argued that linguistic and ethnohistoric evidence, specifically terminology used among Muskogean and Choctaw peoples to describe mounds as well the rituals associated with their construction and use, indicated their symbolic importance was tied in as much to their building and maintenance as to their finished appearance. The shape of platform mounds in particular, as truncated pyramids, it was suggested, was related to the quartering of the cosmos, reflected in some cases by mound orientations aligned to cardinal directions (Knight 1986:679); a similar patterning is also widespread in Mississippian art and iconography (e.g., Lankford 2004). The regular gathering together of people in the collective ceremony and ritual associated with mound construction was thus, at least to some southeastern peoples, deeply important activity, as much about reinforcing belief systems and the creation and maintenance of cosmological principles and individual and group identity as it was about the production of a final monument. Likewise, the fact that monumentality occurred so widely and in societies of such varying levels complexity suggests it was not primarily or exclusively about maintaining power relationships, although these may well have been a consideration in labor mobilization, given evidence for the suppression of monumentality at outlying sites in some cases (i.e., Steponaitis 1978; Blitz 1993:50, 58). Given that monumentalization continued at many Mississippian sites, no ‘final’ product was likely envisioned. As such, greater effort should be directed to how monuments were built, than to their final form or the objects found in or on them.

When considering the process of monumentalization, it is as important to emphasize open and empty areas within sites, particularly plazas, as well as the features that demarcate them, and the community as a whole, such as embankments or ditch and palisade lines. At many sites in Eastern North America, as exemplified by fieldwork at Cahokia, Poverty Point, and Shiloh,

great labor apparently went into construction of the plazas, with appreciable cutting and filling involved to create the surface appearance and characteristics desired, sometimes covering over impressive works of evidence for unusual behavior (Anderson et al. 2011; Holley et al. 1993; Kidder 2001, 2002a, 2004b; Pauketat et al. 2002, 2007:93–96; Stout and Lewis 1998:235). As Pauketat (2007:93) has argued, “the central plazas, not the encircling mounds, were the anchoring features of these central built landscapes (Dalan et al. 2003; Holly 1999:24).” Likewise, palisades at such sites, while not traditionally thought of in this fashion, required great labor investment, comparable to that put into mounds and plazas themselves, and in addition to serving as defensive works served to delimit monumental compounds (e.g., Milner 1998:147–148; Pauketat 2007:99–101). Within Mississippian centers there may be features related to monumentality, such as borrow pits, whose extent and contents should be determined should be determined. Sometimes such work can yield unexpected results. At Shiloh, for example, a roughly 9000 year pollen record, with particular fine grained temporal resolution during the period the center was occupied, was found in a pond just off the plaza a few meters from a small mound (Meeks 2006; see Chapter 5). Assumed to be a water-filled borrow pit, it instead turned out to have been a permanent water source within the palisaded center, whose sediments provided a record of climax forest clearance and re-emergence with the initiation, use, and abandonment of the center over the interval from ca. A.D. 900–1350.

It is likely that both cultural and environmental factors shaped the extent of Mississippian monumentality, and consideration of the latter is important, especially for societies dependent upon the production of agricultural surpluses for their continued wellbeing. The emergence of Mississippian culture occurs during the Medieval Warm Period from ca. A.D. 800–1300, a period thought to have been highly favorable to agricultural food production in the southeast (Anderson 2001:166; Benson et al. 2009; Broecker 2001; Crowley 2000; DeMenocal et al. 2000; Hughes and Diaz 1994). When climate was favorable for surplus

mobilization of redistribution, monumentality was likely more feasible; indeed, the very existence of social complexity, including among Mississippian societies, was apparently tied to climatic conditions, as demonstrated in a number of parts of the Southeast and lower Midwest, such as at Cahokia, and along the Chattahoochee, Tennessee, and Savannah Rivers (e.g., Anderson 1994:274–289, 2001:165–166; Anderson et al. 1995; Benson et al. 2009; Blitz and Lorenz 2006:131–135; Meeks and Anderson 2013; Nolan and Cook 2010). Indeed, during the first three centuries of the Mississippian era, from A.D. 1000–1300, far more monumental architecture appears to have been created across the region than during the centuries that followed (e.g., Anderson 1994:136–137; Payne 1994), although the effects of contact after A.D. 1500 likely played a major role in the decline after that time, though disease related depopulation.

After A.D. 1100 and particularly a century or two later, following the onset of the Little Ice Age, there is evidence for increased warfare and fortification, particularly in the northern part of the region, together with greater settlement nucleation in some areas or dispersal away from major transportation arteries in others, and a decrease long distance exchange and monumental construction (Anderson 1994:136–137; Fagan 2000; Griffin 1961:711–713; Milner 1999:123–126). While fortifications appear to occur with roughly similar incidence throughout the Mississippian era (Milner 1999:123), they increase in the northern part of Eastern North America after ca. A.D. 1300, when agriculture would have been more difficult. Determining when the fortifications at the Shiloh Mound Complex were erected might help us come to a better understanding as to when and why the site was abandoned, and whether this abandonment was, as suspected, related to larger patterns of climate change. Previous excavations along the palisade line to the west of the mounds and plaza, in 1933–1934 and 1976, indicated only one line of posts was present, suggesting it was not rebuilt, at least in the areas examined (Smith 1977; Welch 2006:24–26, 148–150; 259–263). The palisade may have been constructed in the years immediately

prior to the abandonment of the center, perhaps during a period of increased hostilities in the region, but this is only speculative, and will need to be documented through further archeological investigation and dating of this feature.

A widespread abandonment leading to what is known as the ‘Vacant Quarter’ as first defined by Stephen Williams (1983, 1990, 2001) occurred in the fourteenth century among the Mississippian societies in portions of the central Mississippi River Valley and adjoining areas of the lower Midwest and Midsouth, including in the lower Ohio and Tennessee River valleys, and encompassing the area where the Shiloh Mound Complex was located. Indeed, the Shiloh center and most of the surrounding Mississippian sites in what Welch has called the Shiloh phase were abandoned about this time (Welch 2006:252–258). Such abandonments were not infrequent events in the Mississippian Southeast as well as in earlier periods well back into the Archaic (e.g., Anderson 1991, 1994, 1996; Anderson and Sassaman 2012; Cobb and Butler 2002, 2006; Mainfort 2001; Meeks and Anderson 2013; Milner et al. 2001, Sassaman 2010a; Williams 1983, 1990). These abandonments are thought caused by many factors, including warfare between societies, changes in political organization and complexity in the polities in an area, and climate change, specifically extended periods of decreased precipitation, sometimes so substantial that they have been called “megadroughts” (Anderson et al. 1995; Benson et al. 2009; Blitz and Lorenz 2006; Meeks 2009; Meeks and Anderson 2013; Stahle et al. 2007). Shiloh appears to have been abandoned sometime around A.D. 1300, although precisely when this occurred is difficult to determine precisely, even given the number of dates from the center. The final activity on Mound A, on the summits and slopes of what is called the Stage I mound, was heavily disturbed by bioturbation, although abandonment sometime in the fourteenth century is indicated from the evidence collected from 1999 to 2004 and reported herein, and from earlier excavations (Welch 2006:258, 263). From the pollen record obtained from the pond near Mound G and inside the palisade line (see Chapter

5), furthermore, it appears that when the center was abandoned the area was not reoccupied for centuries, until historic settlement began in the nineteenth century. The Shiloh Mound Complex would thus appear to be an idea place, should further work at the site occur, from which to examine events leading up to both the abandonment of a particular center and polity, and how this related to what was occurring over the larger region, the causes and consequences of the ‘Vacant Quarter.’

Finally, it is critical to examine how often or regular the practices of monumentality were that occurred at centers like Shiloh. Just as mound building traditions varied over time and over space in Eastern North America (e.g., Sassaman 2010b), so too did the tempo of mound building and use change, with “very different timing or rhythms of creation” in differing areas (Thompson 2010:219). Examination of the number and duration of stages in Mississippian mounds has received appreciable attention in recent years (e.g., Anderson 1994:126–129; Blitz and Livingood 2004; Hally 1993:145, 1995). Major episodes of stage construction appear to have occurred about every 25–50 years (e.g., Blitz and Livingood 2004:296–297; Hally 1995:112), and while variously inferred to reflect instances of chiefly succession, or alternatively or concurrently purification and earth fertility/renewal ceremonies (e.g., Knight 1986), they clearly were not common events. These same studies, furthermore, indicate most Mississippian societies characterized by mound building lasted less than a century to perhaps twice this duration (Hally 1995:124; Blitz and Livingood 2004:296), and that ‘rules’ about mound construction, inferred from relationships between mound volume, duration, and number of construction stages, while similar for most sites, were decidedly different at the largest centers. At the largest centers these relationship were much less direct, in part because mound volumes were so much greater, and the number of stages higher (Blitz and Livingood 2004:298–299).

The infrequency of these major construction episodes meant that when they occurred, they were likely the focus of appreciable societal energy. This is clearly indicated in some of the construction

stages in Mound A at Shiloh. There, stages were replaced only infrequently, and the summits of some of the resulting mounds, such as Stage III, were used for fairly extended periods, up to a half century or more. Individual structures were replaced, and fill added to both the summit and sides of the Stage III mound, and in some cases special termination episodes occurred, characterized by the placement of colored veneers. These latter typically occurred prior to the abandonment of a major portion of the summit and the construction of a major new stage, in this case the Stage IIa and IIb platforms. When Stage II was itself abandoned, another termination episode appears to have occurred, in this case the placement of colored and possibly fired soils over the entire surface (see Chapters 9 and 10).

Monumentality thus played out somewhat differently in individual Mississippian societies, and while some commonalities may have existed, each case, and each mound, plaza, or palisade, or other signature of monumentality, must be examined separately. Inspection of Mississippian site plans indicate that no ideal size or layout existed, however often certain elements appeared (e.g., Holly 1999; Lewis and Stout 1998; Pauketat 2007:87–106). In areas where there has been more fieldwork, estimates of site hierarchies and polity duration based on the number and size or volume of mounds or other monuments are likely to be much more accurate than in areas where less work has occurred. Political geography, the location of centers on the landscape and their relationship to one another, accordingly, must also be considered. Some major polities appear to have deliberately suppressed the construction efforts and hence presumably the religious and political behavior of their smaller neighbors. Centers around Moundville had mounds reduced in size and number, and fortifications may not have been tolerated, although mound size does appear to have increased with distance from the center (Blitz 1993; Steponaitis 1978:444–449). Even when abandoned or depopulated, as for example when centers of power moved elsewhere, some sites likely maintained an ‘aura of grandeur and power long after they ceased to function as administrative centers’ (Hally 1995:119). The site

of Moundville, for example, went from a densely populated center around ca. A.D. 1200–1300 to a near deserted ‘vacant’ ceremonial center/necropolis during the period ca. A.D. 1300–1400 (Knight and Steponaitis 1998; Knight 2010:361–363). The site of Etowah was still occupied centuries after mound building ceased and political power moved north to the Little Egypt site, the presumed capital of the Coosa paramountcy (Smith 2000:32). The later population at Etowah was only a fraction of that formerly present, living literally in the shadow of and not atop the massive mounds (King 2003:81–83). Macon Plateau and Shiloh were vibrant centers that were abandoned after ca. A.D. 1150 and 1300, respectively, and were not used again for centuries in the case of the former, or apparently ever again in the case of Shiloh, save perhaps for occasional visits by historic Indian war or hunting parties (Hally 1995:119–120; Welch 2006:263). The decline or abandonment history of Mississippian centers, numerous examples from across the region indicate, was highly varied. The fact that centers once abandoned were not inevitably or invariably reoccupied suggests that the production of the monuments was closely tied to the people who made them, and once the people left, such locations no longer held their former importance, and were perhaps considered places as much to be avoided as reused. The lack of evidence for the regular or routine co-option of former places of power by subsequent elites, in fact, suggests that group identity was closely linked to home communities, and that finished architecture by itself did not symbolize that identity. The process of monumentalization, and not just the finished monument, was what was important.

While common themes are evident, particularly an arrangement of people, dwellings, or monuments around open areas or plazas, it is thus clear that variation characterizes the long tradition of monumentality in Eastern North America. While no constant and exacting architectural grammar existed over the course of prehistory, dictating precisely the forms that were created, there is also no doubt that later inhabitants were well aware of the constructions of those who came before them, which occurred widely and obviously upon the

landscape. Mississippian monumentality is not, one could thus argue, “clearly distinguishable from that of societies in other times and places” (Lewis et al. 1998:5). It is neither unique nor appreciably different in scale from much of what came before it, even if the peoples engaged in it used differently designed or tempered pottery, or favored earth instead of shell, made use of different iconography, or were ranked instead of more egalitarian in nature. Instead, peoples in many areas continued to follow a pattern established thousands of years previously during the Archaic if not earlier: the periodic and typically brief aggregation of people who in many cases were dispersed over the landscape much of the time in small household or village groupings (Anderson 2002:268–269; Blitz 1993:123–125). When they came together, these peoples engaged in a range of activities that varied from society to society, but likely included such things as communal ceremony, ritual, and monumental construction, elaborate mortuary behavior, promotion or differentiation of group identities, buffering of subsistence or other resource uncertainties, and aggrandizing behavior on the part of certain individuals or groups. In their monumentality these people were writing their history on the landscape and continually creating and reaffirming their identity, and while the monuments that remain may be the most archeologically visible aspect of their existence, it was only part of a much larger picture.

CONCLUSIONS AND RECOMMENDATIONS

Approaches to mound building by the Mississippian peoples of the Southeast varied from site to site, mound to mound and, as the work conducted at Shiloh from 1999 to 2004 at Mound A shows, from stage to stage within individual mounds. While the Stage I fill was uniform in color and texture, and appears, on the basis of artifacts consistently found within it, to have been midden from the surrounding site area, the underlying Stage II and Stage III mounds had unusual and diverse surfaces and fills, many of which were devoid or nearly devoid of artifacts. The lower deposits, in Stages IV through VII, making up the apron and a series of built up surfaces, in contrast, were characterized by varied

but typically more mundane fills and numerous artifacts, suggesting derivation from midden areas.

It must be recognized that our view of Mound A is a partial one, constrained by the amount of work conducted in the project direct impact area, which comprised those parts of the mound within 7.5m (25ft) from the bluff edge. The impact area was thus about one quarter of the mound that remains at present, and approximately one fifth of the total volume that existed prior to erosional losses along the riverbank. Between roughly one quarter and one third of the impact zone within the mound itself was actually excavated, with the exact extent by area and volume to some degree unknown because the location of underlying ground surface was never determined across the entire profile, beyond a ca. 10m section opened on the southeast side of the mound late in the 2003 field season, and at the base of the mound in the north side. Thus, while a great deal of fill was moved and a lot of important information was collected and examined, it must be remembered that the 2001 through 2004 fieldwork reported here encompassed at most as no more than roughly 10 percent of the total original fill that went into Mound A, and a much lower portion of the volume contained in the surrounding apron.

No archeological fieldwork has occurred in the vicinity of Mound A since 2004, although a great deal of effort directed to analysis and reporting has taken place in the years since. The results of the fieldwork and analyses contain a wealth of information about the construction and use of Mound A, and life at the Shiloh Mound Center by the Mississippian inhabitants. The excavations most important contribution to knowledge, we believe, has been the shedding of new light on the meaning and importance of Mississippian mounds to the people who built them, and the skills, care, and ceremony they brought to these efforts.

While a great deal of information was recovered, much of the portion of the Shiloh Mound Complex threatened with loss, and Mound A in particular, remains unexplored. The excavations documented substantial portions of the Stage I through III mounds before fieldwork ceased, as well as much smaller samples of the underlying Stages IV through

VII construction episodes. Between one quarter and one third of the impact area was carefully examined during the fieldwork. The fieldwork ended before the last buildings on the north-central part of the Stage III mound summit were removed, over an area encompassing about 50–75m² under Structures 1 and 3. One and possibly two deeper floors were indicated in this area in the profile by the erosional face, in ca. 75cm of fill. Likewise, whether earlier buildings underlay Structure 4 at the extreme north end of the Stage III summit was also unresolved. Our knowledge of the underlying deposits, in construction stages IV through VII, is minimal because only a tiny fraction of it was examined.

A remarkable amount of information was collected from Mound A, however, as summarized in the chapters of this document, and in thousands of pages of field notes and >10,000 photographs, and through the work of over two dozen specialists in an array of disciplines, whose primary analysis results are presented in this monograph and in the electronic data appendices. These records permit fine-grained reconstructions of mound construction activity, as well as the descriptions of stages and features recounted here and in Chapter 10. Extensive collections of artifacts and other specialized samples were collected from the Mound A investigations, a valuable source of information about the site. A total of 1568 flotation samples were collected during the 2001–2004 field seasons, for example, from all recognizable features and structure floors, as well as from many of the filling episodes and stage top and side surfaces. These samples, whose volume was recorded together with their dry

weight, provide an extensive, fine screened record of mound contents, as do the other soil, charcoal, and artifacts that were recovered. While some of these samples were analyzed, the vast majority were not due to funding constraints, but all of them have been carefully curated and are available for future research purposes (see Chapters 11, 16, and 17).

The Shiloh Mound Complex, and particularly the area along the Tennessee River bluff including and near Mound A, is an endangered National Historic Landmark and National Register of Historic Places property. NPS has a legal responsibility for the mitigation of its eventual loss. Given the significance of Mound A and the amount of information that remains under imminent threat, particularly in the largely unexamined lower portions of the mound, additional fieldwork, analyses, and reporting must be undertaken before this valuable resource is lost forever. The results of the archeological investigations undertaken from 1999–2004 reported here will provide valuable insight when mitigation planning resumes. Much of the research and analyses needed to guide such investigations has already been completed, ensuring that any final mitigation that does occur will be efficient and cost effective. That as much work occurred as actually did from 1999–2004 and after and that a detailed final report was ultimately produced, however, remains a remarkable professional and scientific achievement. As such, it reflects positively on the leadership and commitment of NPS personnel at the Shiloh National Military Park and the Southeastern Archeological Center, as well as the volunteers and scientists associated with the project.

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