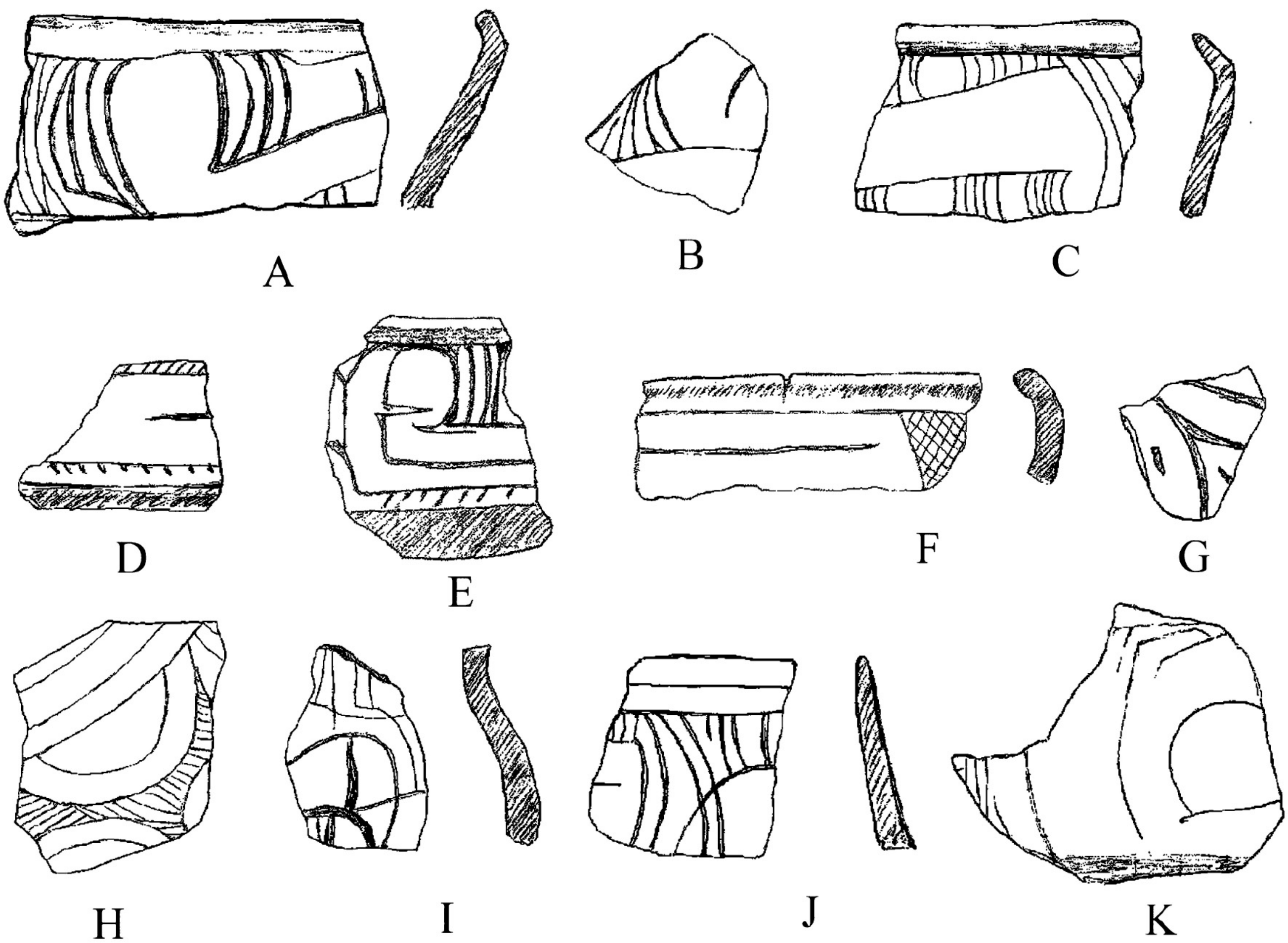
Caddo Archeology Journal



Volume 16 **Spring 2007**

CADDO ARCHEOLOGY JOURNAL

P.O. Box 8419
Austin, TX 78712-8419

ISSN 1522-0427

Printed in the United States of America
at Morgan Printing in Austin, Texas

2007

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PROPOSAL FOR A 2007 CADDO ARCHAEOLOGY SUMMIT MEETING

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The Caddo Indian peoples lived in parts of the four states of Arkansas (specifically southwest Arkansas), Louisiana (the northwestern part of the state), Oklahoma (the eastern region), and Texas (all of East Texas) from deep in prehistoric times until the early 1840s. They left behind an extensive archaeological record marked by important mound centers where the social and political elite lived and led community-wide rituals, ceremonies, and traditions; villages, hamlets, and farmsteads where the people carried out their daily lives; numerous cemeteries and burial grounds where the people were laid to rest following long-standing religious burial ceremonies; as well as salt-making sites, stone tool quarries, hunting camps, and other evidence of the Caddo people's use of the land long before Americans settled the region.

Archaeological research on the Caddo peoples is currently booming, mainly because of increased federal, state, and private development projects across the four-state region in recent years. New and significant information is being obtained every day on the archaeological heritage of the Caddo Indian peoples. Archaeologists in the Caddo area are also beginning to be more actively involved in working together with the modern descendants of the prehistoric Caddo peoples—the Caddo Nation of Oklahoma—to understand and document their rich native history.

All these developments are exciting, and serve as testimony to the fact that Caddo archaeology is alive and well. However, this excitement and promise must be tempered by the fact that the Caddo archaeological area is large, there are few archaeologists working in the Caddo area that specialize in the study of Caddo archaeology, and much of the current knowledge about the archaeological heritage of the Caddo peoples is not widely shared or understood within the archaeological community or by the broader and interested public in the four-state region.

Caddo archaeologists and the Caddo Nation of Oklahoma have been working together for some years on archaeological and cultural heritage issues of mutual interest. This has occurred principally through the annual Caddo Conference (which has been meeting on and off since the 1940s), the development of one-on-one working relationships between archaeologists and Caddo peoples, and through occasional jointly attended symposia, such as the 2005 Caddo History and Culture Symposium held at the Caddo Nation's tribal complex in Binger, Oklahoma.

No venue currently exists, however, where practicing Caddo archaeologists, and members of the Caddo Nation of Oklahoma, can actively share information and perspectives on new and past archaeological findings in the way it is envisioned by some Caddo archaeologists (myself included) is now necessary to improve and strengthen our understanding of Caddo culture. The time is right—given the burgeoning archaeological data base and the past history of successful communication between the Caddo peoples and archaeologists—for the full development of a partnership of Caddo archaeologists and the Caddo Nation of Oklahoma. That partnership should be one where we can work together to innovatively study current research issues, themes, or topics that transcend a single site or region (i.e., such as the prehistoric origins of the Caddo peoples or the development and adoption of agriculture by the Caddo, to mention just a few research issues), but are basic to a broader and more compelling understanding of the cultural heritage of the Caddo Indian peoples. Working towards a new understanding of the prehistoric and early historic archaeology of the Caddo peoples demands a new synthesis of the archaeological record, based on knowledge gained from archaeological research, information from historical documents and maps, and the practices and memories of living Caddo members, especially tribal elders. New syntheses of archaeological findings will advance the field of Caddo archaeology and can also provide new information and products (i.e., books, websites, exhibits for local museums, tourism brochures, development of heritage trails, etc.) for those members of the general public interested in the heritage of the four-state region. Such new syntheses will also be important in identifying needs and priorities for future research which will benefit archaeologists, the Caddo Nation, and state and federal agencies responsible for the management of the region's archaeological heritage.

With this proposal, efforts are underway seeking funding to support the convening of a 4 day summit meeting in 2007 of Caddo archaeologists (perhaps four archaeologists from each state, or some other combination of 16 archaeologists) actively working in the four-state region and members of the Caddo Nation of Oklahoma (staff of the Historic Preservation Department and the Heritage Museum, and interested members of the Tribal Council and tribal elders). The purpose of the meeting would be three-fold: (1) to discuss the development of a partnership of Caddo archaeologists and the Caddo Nation of Oklahoma that can enhance the professional and public understanding of the cultural heritage of the Caddo peoples; (2) to discuss and reach consensus on how we can go about achieving a better and broader understanding on current and future research and heritage management issues and topics pertinent to each part of the Caddo archaeological area; and (3) to propose specific ways we can bring this better and broader understanding before the professional and avocational archaeological community as well as the general public.

Although meeting details have not been finalized, it will be important that the meeting should be held in a centrally-placed facility within the four-state Caddo archaeological region, relatively accessible to all participants. The summit meeting could be led by 2-3 organizers who also would be participating in the summit.

TENTATIVE AGENDA OF THE SUMMIT MEETING

The proposed Caddo archaeology summit meeting would take place over four days and cover a considerable amount of ground in terms of discussions on archaeological research issues along with a vision for the future (i.e., a five year plan for research in the Caddo area, if you will); publication needs and opportunities; data base and management priorities and logistics; and other endeavors. If anyone reading this article has specific comments on the scope and direction of the proposed Caddo archaeology summit meeting—or would like to participate in the summit—please do not hesitate to contact the author.

The tentative agenda is as follows:

Day 1: (a) Setting the Stage for why the Summit is needed; (b) Discussing the Partnership between Caddo archaeologists and the Caddo Nation of Oklahoma; and (c) Identifying current research issues and themes and heritage management/planning concerns.

Days 2 and 3: Break-out Sessions to: (a) discuss current and future research issues and topics pertinent to each part of the Caddo archaeological area, as well as shared strategies to pursue productive research directions; (b) discuss the content and preparation of a guiding document on needs and priorities for future research on Caddo archaeology; and (c) a general discussion on the development and use of modern technologies that can enhance archaeological understanding and facilitate broad syntheses and access to key information, such as sharing existing data bases of archaeological information (i.e., radiocarbon data bases, whole vessel data bases, etc.) and the development of a Caddo cyberinfrastructure (cf. Snow et al. 2006), sharing GIS layers of archaeological information, and the general use and sharing of remote sensing technologies.

Day 4, Summary of the Summit Meeting: (a) discuss the findings, proposals/strategies, and research agendas from the Day 2 and 3 Break-out-Sessions; (b) general discussion of how we can and will develop informative and synthetic products/resources for the archaeological community and the general public; and (c) ending with a consideration of future summit meetings and where does Caddo archaeology go from here.

Stay tuned for further news on the Caddo archaeology summit meeting.

ACKNOWLEDGEMENTS

I appreciate the comments received by Ann M. Early, George Sabo III, Robert Cast, and Gregory Vogel on the Caddo archaeology summit meeting proposal.

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Byram Ferry (16BO17): A Middle to Late Caddo Period Mound Site in the Red River Floodplain, Northwest Louisiana

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INTRODUCTION

One of the few remaining Caddo mounds in northwest Louisiana is located at the Byram Ferry site (16BO17) in northern Bossier Parish near the Arkansas state line (Figure 1). Until recently, a brief description by Clarence B. Moore (1912) and a few comments by Clarence H. Webb in his undated and unpublished field notes constituted the only information about the site available to archeological researchers (Weinstein et al. 2003:64). A collection of sherds and one intact vessel from Byram Ferry are present in the Ralph McKinney collection currently on loan to the History Center at the Bossier Parish Library in Bossier City, Louisiana. Examination of this collection in 2003 prompted us to re-locate the site and conduct limited subsurface tests to determine whether or not intact cultural deposits remain. In this article I summarize earlier fieldwork, describe the 2003 testing, and present a descriptive analysis of the collections. The testing demonstrated that undisturbed buried cultural deposits are present at Byram Ferry. Represented ceramic types relate to the Middle Caddo period (Bossier phase) and the Late Caddo period (Belcher phase). Two radiocarbon assays suggest occupation took place in the 15th century A.D.

Early Investigations

On his 1912 Red River expedition, Clarence B. Moore (1912:525) stopped at Byram Ferry and described two mounds "within a few yards of each other." The largest mound was less than 9 ft. high, 132 ft. across at the base (north to south), and oblong with rounded corners. The summit had a flat top and was 80 ft. across (north to south). Moore dug an unspecified number of holes into the mound and, on the north side, found a layer of clay over fine sand. The entire southern portion of the mound was of sand. No bone or artifacts were recovered. The smaller mound, constructed entirely of sand, was 4 ft. high, had a circular base 75 ft. in diameter, and a summit 35 ft. in diameter. Moore excavated an 18 ft. square pit and several trial holes in the small mound. He encountered a 6-inch thick layer of dark material that was 4 ft. 10 inches from the surface of the summit. Nothing was found except "one rude arrowhead of flint."

Clarence H. Webb later visited the site and made a brief description in his undated field notes. At that time, the site was split between the Adams and Petty Plantations and Byram Ferry was known as Missionary Ferry (a name that still appears on USGS topographic maps). Webb noted that the site appeared to be adjacent to an old Red River channel, less than a mile from the active channel. The mound on the Adams property had a tenant house on the summit. Webb (n.d.) stated that "considerable washing around the sides has exposed 1 feet, the

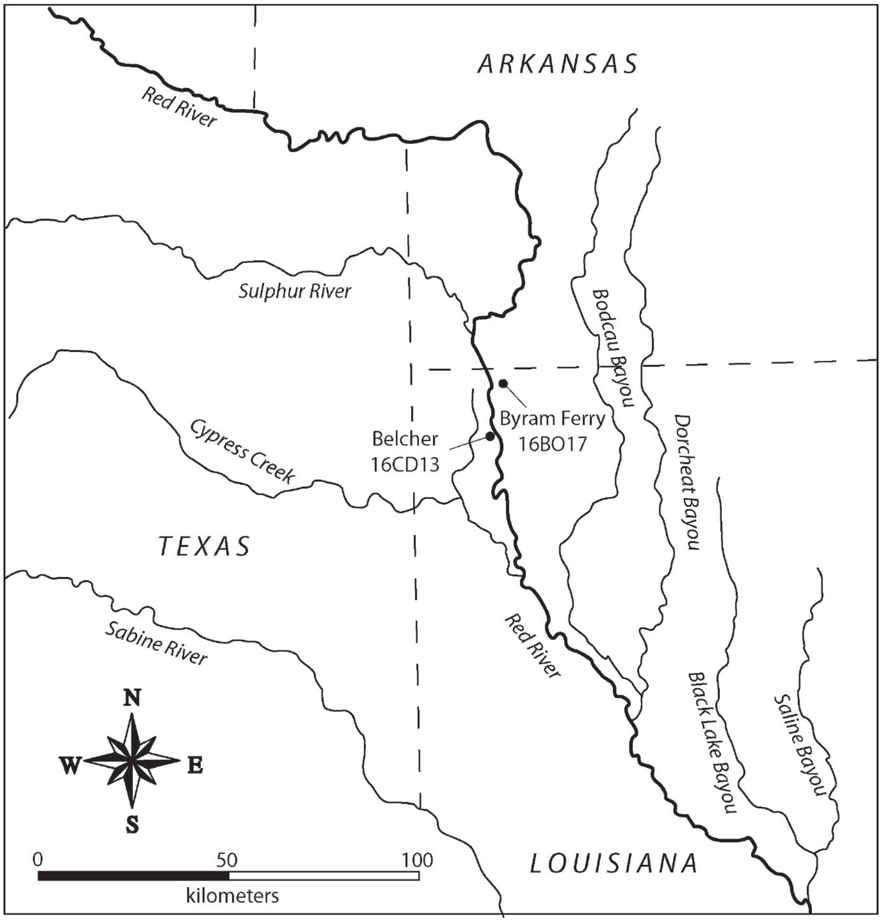

Figure 1. Location of the Byram Ferry and Belcher sites.

top 6 to 10 inches of which is a black midden with pottery, charred wood, shell, clay daub, etc—apparently a house floor. About a dozen large sherds of Belcher Ridged type pottery found in situ." I assume that the Adams mound was the larger of the two noted by Moore. The second mound was located in the Petty field about 100 yards away and Webb made a surface collection from the surrounding area. According to Webb's notes, the mound was partially plowed down but seemed to be about 100 ft. in diameter and 5 ft. high.

During the middle 1950s, a group of local residents led by Mary Helen (Hattie) Horneman of Plain Dealing, Louisiana, excavated the remaining portions of the smaller mound. The present landowner was a child at the time but remembers that the entire mound area was excavated several feet below the present surface. Apparently involved in the work was Ralph McKinney, a local rancher who had worked with Webb at the Mounds Plantation site (Webb and McKinney 1975). McKinney retained one intact vessel (Figure 2), a large sample of sherds, and a few stone artifacts from the excavations. It is likely that the collection does not include all of the material from the work; other participants apparently kept some items as well. McKinney made a few notes and sketches, but the information is too vague to determine much about the nature of the deposits, or about the possible presence of features within or beneath the mound.

The Byram Ferry site was visited in the 1970s during a survey of the Red River floodplain that was described in a report to the U.S. Army Corps of Engineers (Gulf South Research Institute [GSRI] 1975). A tenant house remained on the existing mound when visited by the GSRI survey crew. They interviewed Ralph McKinney,

Figure 2. Engraved effigy vessel from the Byram Ferry site in the McKinney Collection.

who stated that numerous pottery vessels were recovered from a burial pit north of the mound (apparently within or beneath the small mound). Other local sources suggested that skeletal remains were exposed during levee construction west of the mound. The GSRI report noted that alluvium had buried the site surface. The field crew collected four brushed sherds and one engraved sherd (a carinated bowl fragment).

2003 Investigations

In January 2003, Louisiana Archaeological Society members Louis Baker, Nita Cole, Mike Montgomery, and I visited the site. The mound still had the general configuration noted by Moore—it slopes up from south to north and has a flat summit (Figure 3). On the north, the summit was a little over 1 m high, but was only about 50 cm high to the south (somewhat smaller than Moore's description). The outline was generally quadrilateral, but the peripheries were eroded. The mound was oriented roughly southwest to northeast and about 35 m long and 25 m across, similar in size to Moore's estimate. The ruins of the earlier reported tenant house remained on the north end of the mound.

The landowner of the existing mound expressed interest in protecting the site, but did not want it mapped or any subsurface investigations on the property. However, the landowner who owns the property to the north, where the smaller mound was located, granted permission for Baker and I to carry out shovel tests to determine whether or not intact deposits remain.

Initially, a bucket auger was used to test for remnants of the excavated mound. Subtle variations in the color and texture of the deposits were noted, but we could not detect a buried surface. We then decided to excavate a series of 50 x 50 cm shovel tests. The first two were placed in the former mound area (Figure 4). A thin A soil horizon was underlain by three distinct depositional zones. The upper zone was a homogeneous, dark reddish-brown, very fine sandy loam that extended to between 16 and 20 cm below the surface (bs). It was separated by an abrupt smooth break to a stratified deposit, generally similar in color and texture, but with lenses and narrow strata of silt loam. This second zone contained a small number of artifacts. An abrupt smooth boundary separated this zone from an underlying, brown, fine sand deposit, that was homogeneous and without artifacts. An auger test placed at the base of the shovel test indicated that the fine sand extends to 1.9 m bs, at which point slightly redder, saturated deposits were encountered. On the southeast, the boundary between the second and

Figure 3. Looking south at the remaining mound at the Byram Ferry site. Shovel Test 4 is in the foreground.

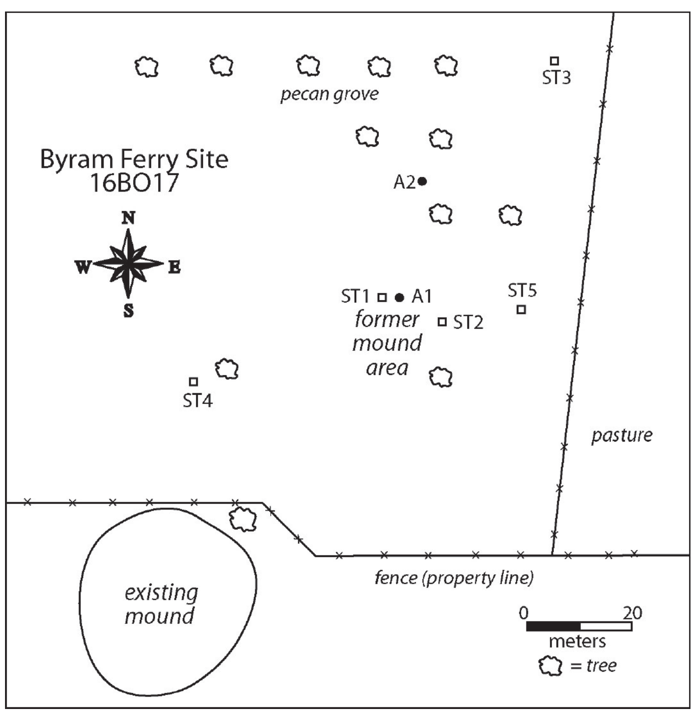

Figure 4. Sketch map of the Byram Ferry site.

third zones was 40 cm bs, but this dipped to 60 cm bs in the other portions of the unit. The middle zone appeared to have partially washed in (perhaps backfilled) and almost undoubtedly represented the old excavation pit. Deposits probably were not screened and the presence of a few small artifacts was not surprising.

The final three shovel tests were excavated away from the former mound area. All had similar, undisturbed soil profiles. Beneath a thin A soil horizon was dark reddish-brown silt loam alluvium to about 30 cm bs. An abrupt change marked a buried A horizon consisting of dark brown fine sandy loam. A transition to a slightly redder and finer-textured B horizon was evident between 55 and 70 cm bs. Artifacts were recovered only within the 2A horizon.

Several small lumps of wood charcoal were recovered from Shovel Test 2. The charcoal was submitted to the Center for Isotope Studies at the University of Georgia for radiocarbon analysis and resulted in an age of 420 ± 40 B.P. (UGA12294, wood charcoal, 13C=-28.09). A second sample was submitted of charcoal in the McKinney collection that reportedly came from the mound. The result was 470 ± 40 B.P. (UGA12295, wood charcoal, 13C=-24.92). Calibration of the assays strongly suggests that the site was occupied during the 15th century A.D. (Table 1), a result that conforms to our expectations given the range of pottery types present in the McKinney and Webb collections.

Pottery in the McKinney and Webb Collections

A little over 1000 sherds are present in the McKinney and Webb collections from the Byram Ferry site. Since Caddo potters often treated vessel bodies and rims as separate design fields and vessels often break along the rim-body juncture, body and rim sherds are classified separately in this study (Tables 2 and 3). Included with rims are specimens where the lip is intact as well as those that can be determined to be rims by their shape. All sherds from the McKinney collection probably came from excavation of the small mound, whereas those in the Webb collection are from the surface near the mound.

Table 1. Calibration of radiocarbon assays.*

Lab No.	Radiocarbon age	1 Sigma Range	2-Sigma Range
UGA12294	420±40	1433-1491 (0.959)	1419-1522 (0.843)
		1603-1609 (0.041)	1572-1627 (0.157)
UGA12295	470±40	1413-1451 (1.000)	1333-1338 (0.006)
			1399-1488 (0.994)

*from CALIB REV4.4.2

Belcher Ridged and Pease Brushed Incised

These types constitute the bulk of Caddo utilitarian pottery for the Middle and Late Caddo periods in northwest Louisiana. Belcher Ridged was described by Webb (1959:136-139) as characterized by:

> Vertical ridging, made by pushing up clay on each side of troughs with a round-tipped tool, possibly at times with the finger, or less likely, by marking with a notched tool, while the clay was soft. On a few vessels, the ridges peel or flake off, suggesting that soft mix was applied to a harder surface, then tooled. Incising or brushing on outer rim surfaces.

Webb suggested that the type developed during the Bossier focus (Middle Caddo period), possibly as a variation on Pease Brushed Incised. Pease differs in that "the ridges are heavier, nearly always appliquéd, spaced further apart, notched, and the intervening spaces are further roughened by brushing or incising" (Webb 1959:139). In

Table 2. Body Sherds in the McKinney and Webb Collections.			
Body Sherds	McKinney Collection	Webb Collection	Total
Belcher Ridged, var. *Belcher*	12	14	26
Belcher Ridged, var. *Byram Ferry*	14	24	38
Belcher Ridged, var. *Gore*	11	3	14
Pease Brushed-Incised	33	16	49
Haley Complicated Incised	1	0	1
Harleton Appliqued	1	0	1
miscellaneous brushed	81	73	154
miscellaneous appliqué	10	0	10
miscellaneous ridged/brushed	17	15	32
Foster Trailed Incised	7	1	8
Mound Tract Incised and Brushed	1	0	1
Cowhide Stamped	2	0	2
miscellaneous incised	3	1	4
Glassell Engraved	2	0	2
Hodges Engraved	1	1	2
Belcher Engraved	1	0	1
miscellaneous engraved	30	18	48
undecorated, red slipped	1	0	1
undecorated, polished	92	8	100
Undecorated	242	213	455
Total Undecorated	335	221	556

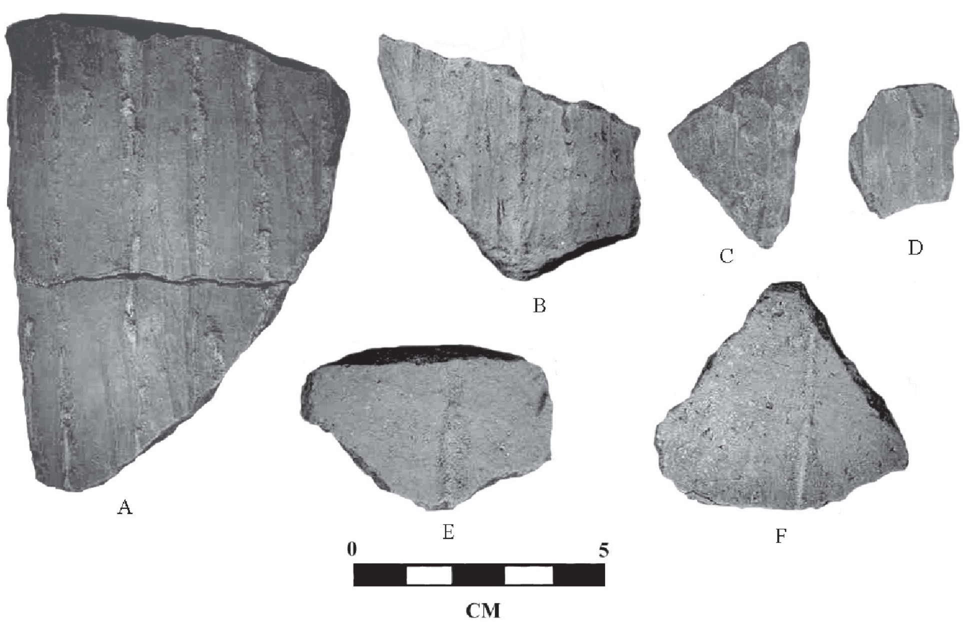

Figure 5. Belcher Ridged sherds: *var. Byram Ferry* (a-b), *var. Belcher* (c-d), and *var. Gore* (e-f)

Table 3. Rim sherds in the McKinney and Webb Collections.			
Rim Sherds	McKinney Collection	Webb Collection	Total
brushed, horizontal	18	14	32
brushed, diagonal	2	8	10
brushed, vertical	4	3	7
incised, horizontal	1	1	2
incised, vertical	3	2	5
incised, diagonal	1	0	1
miscellaneous ridged	1	5	6
neck banded	1	0	1
Punctated	3	0	3
Engraved	9	6	15
Undecorated	12	3	15
Total	55	42	97

a later paper, Webb acknowledged some problems with differentiating the two types:

> Difficulties in typing sherds, insofar as Pease type is concerned, arise in those instances where sharp vertical ridges, like those of Belcher Ridged type, are widely spaced and have vertical brushing between them. This, in fact, may have been the method by which the type Belcher Ridged originated as a variant of Pease type. In doubtful instances, we attempt to determine whether any scoring or irregularities in the valleys were intentional or were incidental to production of the ridges. By Belcher Focus times, the technique of producing Belcher Ridged with uniform, closely placed ridges and smooth valleys had improved to the extent that typing problems are rare (Webb 1983:185).

The ambiguity in the type definitions is particularly apparent in the Byram Ferry collections. For descriptive purposes, I suggest sub-dividing Belcher Ridged into three varieties that may further our understanding of ceramic chronology in the region. In the Byram Ferry collection, many sherds have the thin, unnotched ridges of the type Belcher Ridged, but also have distinct vertical brushing between the ridges. These are classified as a distinct variety of Belcher Ridged that I call *var. Byram Ferry* (Figure 5a-b). Typologically, they are intermediate between Pease Brushed Incised and Belcher Ridged (and could be classified with either type). The fifteenth century dates from Byram Ferry corroborate Webb's suggestion that Belcher Ridged represents a variant of Pease Brushed Incised that became dominant in the Late Caddo period (ca. A.D. 1500-1700). Sherds lacking brushing between the ridges, that conform more closely to Webb's (1959) type definition, I classify as *var. Belcher* (Figure 5c-d).

Another variation on the general Belcher Ridged theme are sherds that have smooth ridges formed like those in Belcher Ridged but placed at wide intervals (>1.5 cm) with no intervening brushing. The specimens lack the "troughs" of the standard Belcher Ridged type. It may be beneficial to classify these specimens separately as well, and here I call them Belcher Ridged, *var. Gore* (Figure 5e-f).

Relatively tall, horizontally brushed jar rims (Form A) are common at the Byram Ferry site (Table 4; Figures 6 and 7). These rims commonly occur on Pease Brushed-Incised vessels. Short, flared rims (Form B) with vertical or diagonal incised or brushed lines are characteristic of Belcher Ridged and Karnack Brushed jars. Some Belcher Ridged vessels have inverted rims, usually with a rolled lip (Form C), with ridging usually extending almost to the lip. Schambach and Miller (1984:120) used this trait as diagnostic of the classic variety of Belcher Ridged, and separated vessels with incised, brushed, or punctated rims as *var. Wilson's Island*.

Table 4. Rim forms (see Figure 6).

Rim Form:	A	B	C	D	E	F	G	NC	Total
brushed, horizontal	10	0	1	3	1	0	0	17	32
brushed, diagonal	5	0	1	1	0	0	0	3	10
brushed, vertical	2	2	0	0	0	0	0	3	7
incised, horizontal	1	0	0	0	1	0	0	0	2
incised, vertical	0	4	0	0	0	0	0	1	5
incised, diagonal	0	1	0	0	0	0	0	0	1
miscellaneous ridged	0	0	2	0	0	1	0	3	6
Neck banded	1	0	0	0	0	0	0	0	1
punctated	2	0	0	0	0	0	1	0	3
engraved	2	1	1	1	6	1	0	3	15
undecorated	1	0	0	2	4	0	1	7	15
Total	24	8	5	7	12	2	1	37	97

NC = Not Classified

Haley Complicated Incised

One sherd has notched appliquéd ridges in multiple directions with brushing and linear punctations between the ridges (Figure 8g). The specimen appears to relate to the type Haley Complicated Incised (Suhm and Jelks 1962:59). This type is thought to have been made primarily in the Early and Middle Caddo periods and seems early given the nature of the rest of the collection.

Harleton Appliqued

A single body sherd has appliqué ridges in a nested diamond pattern (Figure 8h) and appears to relate to the type Harleton Appliqued (Suhm and Jelks 1962:65). This type is associated most closely with the Late Caddo period Titus phase in the Big Cypress Creek drainage of northeast Texas.

Miscellaneous Brushed Sherds

Webb classified vertical brushed vessels that have essentially the same vessel shapes as Belcher Ridged jars in the type Karnack Brushed. Originally Karnack Brushed was limited to vertical brushed vessels. Webb (1983:193) later pointed out the difficulty with determining the orientation of brushing on most sherds and, in his paper on the Bossier focus, classified all (non-ridged) brushed sherds as Bossier Brushed. At Byram Ferry, it appears that most of the brushing is vertical, but too many specimens are ambiguous to classify sherds by orientation.

Miscellaneous Ridged and Brushed/Ridged

A small number of ridged specimens have portions of ridges but were too small or broken in a manner that they could not be related to one of these groups. These specimens are tabulated as miscellaneous ridged (where no brushing is visible) or brushed/ridged.

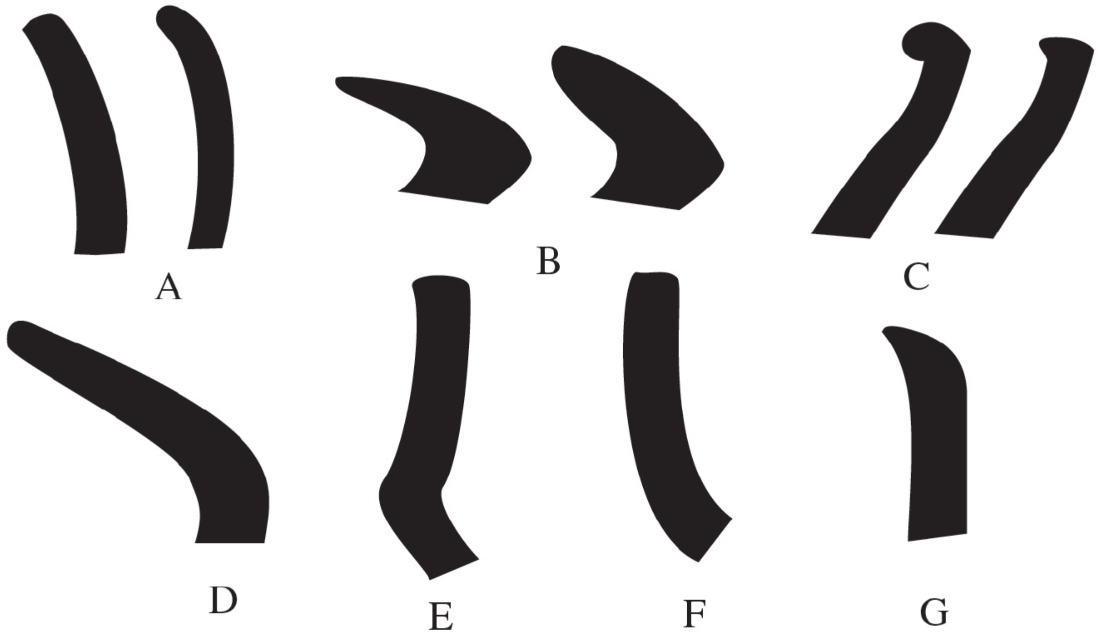

Figure 6. Rim forms for the Byram Ferry Site.

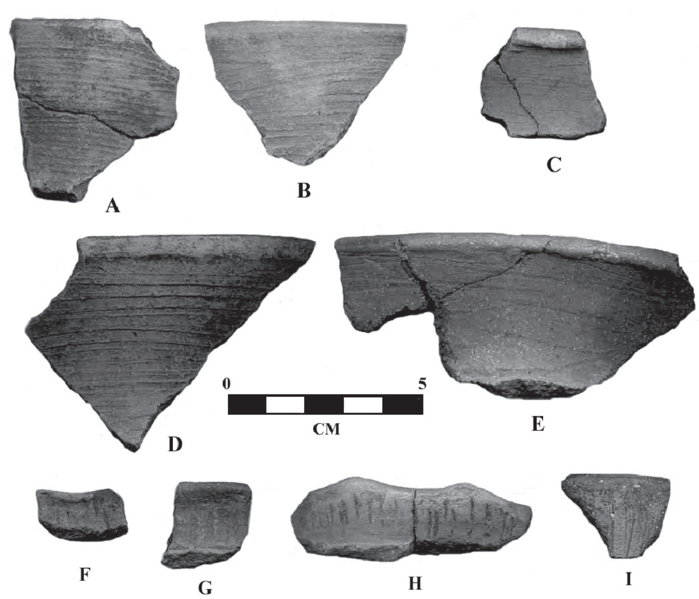

Figure 7. Brushed and incised rim sherds.

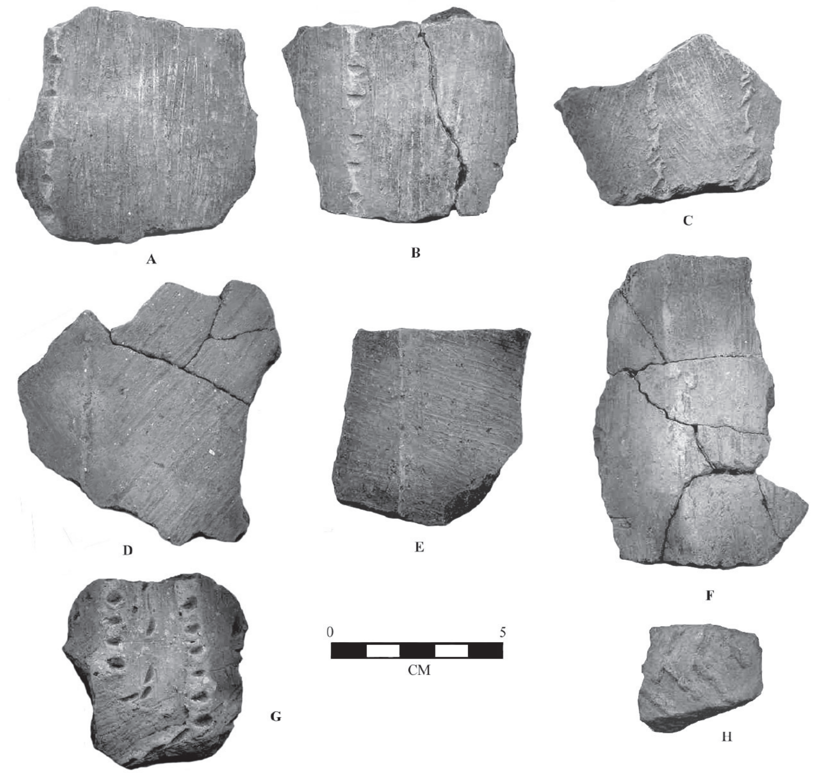

Figure 8. Brushed and ridged sherds: Pease Brushed Incised (a-f), Haley Complicated Incised (g), Harleton Appliqued (h).

Avery Engraved

One rim sherd has multiple horizontal lines on a polished black surface. The rim is tall and flares outward at the lip in a manner common on Avery Engraved vessels (this is a very tenuous classification). The sherd has fine-textured paste with no visible temper. The effigy vessel (see Figure 2) in the McKinney collection has a design that also resembles Avery Engraved.

Belcher Engraved

One body and one rim sherd appear to relate to the type Belcher Engraved. The body sherd (Figure 9g) has curvilinear engraved lines separated by short, dashed lines. The interior is rough and the sherd likely is from a bottle. The rim has the characteristic form of Belcher Engraved bowls with two horizontal engraved lines and a dashed line between. Both sherds have fine-textured paste with no obvious temper.

Glassell Engraved

Three rim and two body sherds are classified as Glassell Engraved (Figure 9d-f). All are from carinated bowls. One of the sherds has finely crushed bone in the paste. The rest have no visible temper. The sherds have rec-

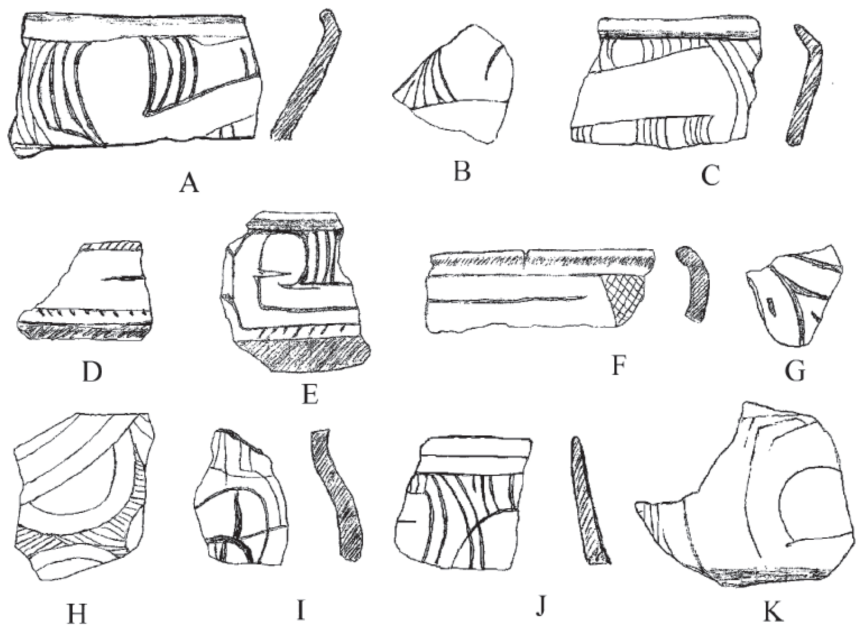

Figure 9. Selected engraved sherds: Hodges Engraved (a-c, h), Glassell Engraved (d-f), Belcher Engraved (g), miscellaneous engraved (i-k).

tilinear panels with parallel arcs characteristic of the type. Webb typed most specimens with cross-hatched zones (as in Figure 9f) with Maddox or Friendship Engraved rather than Glassell Engraved. However, several vessels typed as Glassell Engraved from the Belcher site (16CD13) (Webb 1959:Figure 118) have small cross-hatched zones that separate panels.

Hodges Engraved

Three rims and one body sherd have negative scrolls separated by arcs or hatching (Figure 9a-c). All are on carinated bowls (the "body" sherd actually is part of a rim with the lip missing). There is some ambiguity with typing these specimens. Schambach and Miller (1984:Figure 11-36) classified a vessel with a similar design element as Glassell Engraved, *var. McGee*, and Suhm and Jelks (1962:Plate 27) include one vessel with a similar scroll in the type Glassell Engraved. However, this element seems to differ fundamentally from the horizontal scrolls or panels on most Glassell Engraved vessels, and to fit more closely to the Hodges Engraved type. Webb (1959: Figure 107c, f) typed similar vessels as Hodges Engraved. Admittedly, the arc-like hatching is reminiscent of Glassell.

Two other body sherds typed as Hodges Engraved have negative curvilinear zones separated by hatched bands (Figure 9h). Both have rough interiors and are likely to be from bottles. One appears to have sparse finely crushed bone in the paste. The rest of the Hodges Engraved sherds have no apparent temper.

Miscellaneous Engraved

The remaining engraved sherds cannot be related to specific types. Twenty-four have one or more straight lines (two are spurred or ticked), and 16 have multiple curvilinear lines (Figure 9i-j). Hatched zones are present on nine specimens and hatched bands on three. Two specimens have what appear to be portions of sloppy scrolls (Figure 9k).

Foster Trailed Incised

Seven punctated sherds probably are from tall rims of Foster Trailed Incised vessels. Because no distinct rim curvature is visible they have been tabulated with the body sherds. The sherds either have numerous small punctations (Figure 10a-b) or fingernail punctations in horizontal rows (Figure 10c-d). Three rims (e.g., Figure 10j) also have punctations in horizontal rows and may relate to this type. Two or the rims curve outward (Type A) and one is vertical (Type G). None of the rim diameters can be measured. The final sherd classified with this type has a trailed curvilinear line (Figure 10e). The body sherds are relatively thin (Table 5). Temper varies: three specimens have grog temper, three bone, one shell, and one has no visible temper.

Foster Trailed Incised first appeared at the Belcher site in Belcher 2 times and became common in the Belcher 3 houses (Webb 1959). The rims at Byram Ferry are suggestive of some of the earlier varieties at the Cedar Grove site (3LA97) in southwestern Arkansas (Schambach and Miller 1984). Foster Trailed Incised was abundant in the Belcher phase contexts at the Cedar Grove site, but appeared to diminish in importance in the Chakanina phase (ca. middle 17th century).

Mound Tract Incised and Brushed

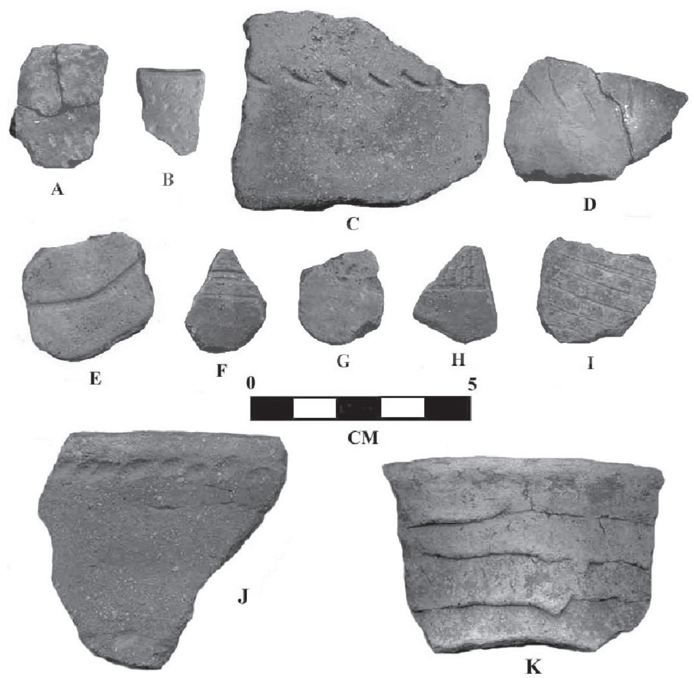

Figure 10. Miscellaneous decorated sherds: miscellaneous punctated (a-d), Foster Trailed (e), Mound Tract Incised and Brushed (f), Cowhide Stamped (g-h), miscellaneous incised (i), punctated rim (j), and neck-banded rim (k).

One small sherd has a brushed band bordered by incised lines. This design element was initially included by Webb with the type Cowhide Stamped, but examples from the Ouachita River drainage later were separated by Kidder (1988) into a different type called Mound Tract Incised and Brushed. This type is present at the Belcher and McLelland sites. Although commonly thin and shell-tempered, the specimen from Byram Ferry is relatively thick and has grog temper.

Cowhide Stamped

Two sherds (Figure 10g-h) are classified as Cowhide Stamped. One has a rocker stamped band bordered by incised lines. The other has a simple stamped band without borders. Both specimens have well smoothed to lightly polished surfaces. One has grog temper and the other has no visible temper. Although both sherds are tabulated as body sherds, they are small and could be portions of rims. Cowhide Stamped appears restricted primarily to the Belcher phase (Late Caddo period), although the type is never abundant and not well dated.

Miscellaneous incised

Four body sherds have multiple, parallel incised lines (Figure 10i). None are large enough to relate to a specific type. Two have grog temper and two have bone temper.

Six of the eight incised rim sherds are on short, flared rims (Form B) and probably relate to Belcher Ridged or Karnack Brushed vessels. One exception is a small sherd with an incised horizontal line that appears to be on a carinated bowl rim. The second exception is a thick, Form A rim that has closely-spaced horizontal lines that could be considered as neatly brushed rather than incised.

Red Slipped

A single red-slipped sherd is present in the collection. Red slipping occurs throughout the Caddo prehistoric and early historic ceramic sequence but appears to have been more common in the Early and Middle Caddo periods. Late Caddo Titus phase sites in parts of the Big Cypress Creek basin also have abundant red-slipped ceramics.

Polished Plain

Although identification is somewhat subjective, sherds with polished surfaces are tabulated separately. The sherds tend to be relatively thin and many have no visible temper (see Table 5), suggesting that undecorated portions of engraved vessels are abundantly represented in this group. No rim sherds are present in the polished plain wares.

Other Undecorated

Fifteen of the 97 rim sherds (15.5%), and 562 (59.2%) of the 949 body sherds are undecorated. Four of the undecorated rims appear to be from carinated bowls. The relatively low percentage of undecorated sherds is typical for Middle to Late Caddo period assemblages in this region. Temper was not recorded for these sherds. Many of the thickest sherds (9-14 mm) are flat and appear to represent vessel bases.

Stone Artifacts

Table 5. Characteristics of body sherds.

		Temper				Thickness	
	No.	Grog	bone	shell	none	mean	s.d.
Belcher Ridged, var. *Belcher*	26	18	8	0	0	6.12	1.03
Belcher Ridged, var. *Byram Ferry*	38	31	7	0	0	6.34	1.38
Belcher Ridged, var. *Gore*	14	14	0	0	0	6.79	0.58
Pease Brushed-Incised	49	39	10	0	0	6.43	1.00
Hailey Complicated Incised	1	1	0	0	0	7.00	
Harleton Appliquéd	1	1	0	0	0	6.00	
miscellaneous brushed	154	133	21	0	0	6.38	0.95
miscellaneous appliqué	10	9	1	0	0	5.60	0.52
miscellaneous ridged/brushed	32	25	7	0	0	6.31	0.97
Foster Trailed Incised	8	3	3	1	1	5.38	1.19
Mound Tract Incised and Brushed	1	1	0	0	0	8.00	
Cowhide Stamped	2	1	0	0	1	5.00	0.71
miscellaneous incised	4	2	2	0	0	6.50	2.52
Glassell Engraved	2	0	0	0	2	5.00	0.00
Hodges Engraved	2	0	1	0	1	4.50	0.71
Belcher Engraved	1	0	0	0	1	4.00	
miscellaneous engraved	47	10	8	0	29	5.85	0.93
undecorated, red slipped	1	1	0	0	0	5.00	
undecorated, polished	100	56	6	2	36	5.97	1.30
Undecorated	455					6.51	1.09

Table 6. Stone artifacts in the McKinney and Webb Collections.

	McKinney Collection	Webb Collection
cortical flakes	28	0
interior flakes	17	0
pebble core	10	0
pebble biface blank	0	2
thick biface fragment	1	2
quartz crystal fragment	3	0
grinding slab	1	0
pitted grinding stones	0	2
pebble hammerstone	0	1
celt fragments	1	1

It is doubtful that deposits were screened during the mound excavation and the McKinney collection probably is not representative of the actual quantities of flakes present. Webb rarely collected chipping debris in his surface collections. Overall, however, the stone artifact collection from the Byram Ferry site exhibits similarities to other floodplain Caddo sites in the region (Table 6). High proportions of cortical flakes, and many pebble cores reflect the dominant use of relatively small, local chert pebbles for stone tool manufacture. Pebble blanks suggest that arrow points and perhaps perforators were made at the site, although no completed specimens are present in the collections. Three quartz crystal fragments in the McKinney collection are of interest and might reflect special ceremonial activity associated with the use of the mound.

Grinding equipment is rarely plentiful at Caddo sites, but pitted grinding stones and small sandstone grinding slabs occur in the nearby Willow Chute Bayou area and at other floodplain sites. Celt fragments also are commonly found on local Caddo sites. The Byram Ferry specimens are typical for the area in that they are made of a grayish-green indurated quartzite that probably is from a source in the Ouachita Mountains.

Artifacts from the 2003 Test Units

A small number of artifacts was recovered in the auger and shovel tests conducted south of the existing mound in 2003. Sherds are similar to those in the McKinney and Webb collections (Table 7). Two Pease Brushed Incised and three brushed sherds were recovered. One sherd has multiple, parallel incised lines. The single engraved sherd is a portion of a negative scroll and likely relates to the type Hodges Engraved.

Chipping debris was relatively numerous (Table 8). Interestingly, the highest flake densities were recovered in the two shovel tests (1 and 2) into the disturbed deposits in the former mound area. It is apparent that flakes were not retained by the mound excavators. Of the 75 recovered flakes, seven are novaculite, two are fine-grained quartzite, and the remaining 65 are local cherts. Twenty-two flakes have some remaining cortex.

Also recovered were two small fragments of quartz crystals, a flake biface blank, and a pebble biface blank. The flake biface blank is a thick chert flake with bifacial retouch along portions of its margins. The specimen apparently was discarded before the margins were shaped into a specific form. The pebble blank is a small chert pebble with only portions of the cortex removed. One margin has been bifacially retouched, but the specimen does not appear to represent a finished tool.

Table 7. Sherds from the 2003 investigations.

	ST1	ST2	ST3	ST4	ST5	AU1	Surface	Total
Pease Brushed Incised	0	1	0	0	1	0	0	2
miscellaneous brushed	1	0	1	0	0	0	1	3
miscellaneous incised	0	0	0	0	0	0	1	1
Hodges Engraved	0	0	1	0	0	0	0	1
Undecorated	2	2	3	1	5	1	4	18
Total	3	3	5	1	6	1	6	25

Table 8. Stone artifacts from the 2003 investigations.

	ST1	ST2	ST3	ST4	ST5	AU1	Surface	Total
Flakes	37	20	2	6	9	1	0	75
quartz crystal fragment	1	0	1	0	0	0	0	2
flake biface blank	0	0	0	0	0	0	1	1
pebble biface blank	0	0	0	0	0	0	1	1

SUMMARY AND CONCLUSIONS

The Byram Ferry site is one of the few remaining Caddo habitation and ceremonial centers in northwest Louisiana. Recent alluvium has capped most of the cultural deposits and it is likely that structural remains and other significant features are preserved. A poorly documented excavation in the 1950s destroyed one of the site's two mounds. The remaining mound has undergone negative impacts from erosion and a 20th century residence. However, the mound appears to have essentially the same size and shape as described in 1912 by C. B. Moore. Few recorded sites are present in the Red River floodplain in the immediate vicinity of Byram Ferry. Recent alluvium has buried old land surfaces and limited surface exposure of artifacts. Considerable subsurface testing will be necessary to identify the extent of habitation areas associated with the mounds.

Two known collections of sherds from the site have been described in this article. Clarence H. Webb made one collection around the surface of the small mound. The other is part of the Ralph McKinney collection and relates to excavation of the small mound during the 1950s. The collections are similar, and clearly show continuity in ceramic styles from the Middle to Late Caddo periods in this area. Particularly apparent is the transition in utilitarian jars from Pease Brushed Incised to Belcher Ridged with the Belcher Ridged *var. Byram Ferry* as a variant likely to be temporally, as well as stylistically, intermediate.

Two radiocarbon assays, one on charcoal from a test unit excavated in 2003, and another from charcoal retained by McKinney from the mound excavations, calibrate to the 15th century A.D. The mounds probably were built at approximately the same time as mound construction began at the Belcher site (16CD13), located approximately 25 km to the south (Webb 1959). At both sites, the mounds are located within a few meters of one another. However, the Belcher primary mounds eventually were combined into a single earthwork and Belcher was occupied long after Byram Ferry was abandoned. The pairing of mounds at both sites during the 15th century suggests dualities in intra-community Caddo social organization at that time.

ACKNOWLEDGEMENTS

This study was carried out as part of the State of Louisiana's Regional Archaeology Program based at Northwestern State University of Louisiana. The program has been financed with state funds and with federal funds from the National Park Service, U.S. Department of the Interior. Thanks to Louis Baker who assisted with all aspects of the 2003 field studies, and to Mr. O. L. "Sonny" Gore for permission to conduct the test excavations. I also would like to thank the History Center of the Bossier Parish Library and the McKinney family for permission to analyze artifacts in the McKinney collection.

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Archeological Investigations of the Lang Pasture (41AN38) Midden Deposits on private property west of the SH 155 Right-of-Way, Anderson County, Texas

Timothy K. Perttula, with contributions by Bo Nelson,

Mark Walters, and LeeAnna Schniebs

INTRODUCTION

In the spring of 2006 data recovery investigations were completed at the Lang Pasture site (41AN38) by Coastal Environments, Inc. (Baton Rouge, Louisiana) and Archeological & Environmental Consultants, LLC (Austin and Pittsburg, Texas) for the Texas Department of Transportation. The site is situated along the SH 155 right-of-way in the Caddo Creek basin in northeastern Anderson County, Texas, in the Caddo archeological area of Northeast Texas (Perttula et al. 2005; Kelley et al. 2006). The archeological excavations indicate that the site was primarily occupied by Caddo peoples during the Frankston phase, sometime after A.D. 1400. The number and kinds of features identified in the right-of-way—portions of two circular structures, two possible ramadas or work platforms, several large pit features, and a number of extended burials with associated funerary offerings—indicate that the Lang Pasture site is likely a domestic farmstead occupied by more than 1-2 families. Most of the site occurs outside the right-of-way on private property.

At the time of the data recovery work, Bo Nelson and Mark Walters noted dark midden-stained sediments in gopher mounds ca. 8-15 m west of the 4-5 m wide right-of-way (ca. N189 E184 on the 41AN38 right-of-way grid, see Kelley et al. 2006: Figure 2-1), but on private property. Since no midden deposits had been identified (and were never identified) in the SH 155 right-of-way, despite extensive excavations, we felt it was important as part of a better and broader understanding of the archeological record at the Lang Pasture site (41AN38) to investigate the midden to establish its content, age, and overall extent. Permission was obtained from the private landowner, Mr. Earl Lang, to carry out a limited amount of work, and this work was done in March 2006. This article presents the results of the archeological investigations at these prehistoric Caddo midden deposits.

Field Investigations

Six shovel tests (ST 1-6) and a 50 x 50 cm unit (ST 7) were excavated in and around the midden deposits. The midden is approximately 10 m in diameter, and in its center (ST 1), the very dark grayish-brown (10YR 3/2) loamy sand sediments were approximately 30 cm thick, and overlay a yellowish-red (5 YR 5/8) loamy fine sand that extended to at least 60 cm below the surface (bs). Small amounts of ash were noted in ST 3 (20-40 cm bs) and ST 7 (20-40 cm bs).

Five of the six shovel tests turned out to be within the midden, and the midden deposits ranged from 23-30 cm in thickness away from its center. ST 6 was outside the midden, and had dark yellowish-brown (10YR 4/4) loamy fine sand sediments from at least 0-40 cm bs. In ST 7 (placed 1 m west of ST 1), the midden deposits are approximately 44 cm in thickness.

The ST 7 excavations also exposed parts of two cultural features. The first (Stain 1) is more than 50 cm in diameter, and appears to be a pit feature; it extended to 66 cm bs. Stain 2 is 16-18 cm in diameter, and is probably a post hole. Its bottom depth was 65 cm bs. The occurrence of cultural features in and below the midden suggests that the midden may have accumulated over (or in?) an abandoned prehistoric Caddo structure that stood west of the two other Caddo circular domestic structures in the SH 155 right-of-way. Small flotation samples were taken of the fill from both stains, and animal bone, burned clay, and ceramic sherds were relatively common in the fill of both of them. Charred nutshells and other charred plant remains are present in Stains 1 and 2, but they have not been studied at this time.

Recovered Material Culture Remains

A relatively large number of prehistoric material culture remains, as well as animal bone, have been recovered in the very limited investigations at the Lang Pasture (41AN38) midden (Table 1). In the apparent heart of the midden (i.e., ST 1 and ST 7), artifact densities are ca. 170-190 per m^2, while outside the midden (i.e., ST 6), the densities are much lower: only ca. 40 per m^2. In other shovel tests in the midden, the artifact densities range from ca. 40-80 per m^2 (see Table 1).

The material culture remains from the midden are dominated by plain and decorated ceramic sherds from Caddo ceramic vessels. Not including the animal bone (which accounts for 48% of all the artifacts found in the midden investigations), sherds comprise 74% of the recovered material culture artifacts, followed by lithic debris (17%), burned clay (7%), a ceramic elbow pipe sherd, and an unusual ceramic object discussed in more detail below.

The ceramic sherds are from vessels tempered primarily with grog (crushed sherds), with a small number having had burned bone added to the paste as temper. The use of bone temper is minimal in prehistoric and early historic Caddo ceramic assemblages in the upper Neches River basin (see Perttula et al. 2005: Table 1), generally less than 5% in any one assemblage.

The plain/decorated sherd ratio (P/DR) for the small sample from the Lang Pasture (41AN38) midden is 0.88. This is consistent with a Group II Frankston phase age for the midden deposits, based on a still developing seriation of decorated Caddo ceramic sherds from the area (see Perttula et al. 2005: Table 1). Group II Frankston phase sites are estimated to date sometime after ca. A. D. 1450 but before ca. A.D. 1600 or thereabouts. Since the P/DR value in assemblages seems to decreases towards 0.10 the younger the ceramic assemblage is (i.e., in historic Allen phase Caddo sherd assemblages, the P/DR has been documented to be at about 0.20 to 0.30 from several sites), the P/DR of 0.88 also suggests that the midden may have accumulated relatively late in the overall occupation of the Lang Pasture site (41AN38), because the P/DR from the test excavations in the SH 155 right-of-way (Lohse et al. 2004) is a higher 1.98 (falling in the Group III Frankston phase).

The decorated sherds are dominated by those that are brushed. There are 35 parallel brushed body sherds, two vertical brushed Bullard Brushed rims (Figure 1c) and one horizontal brushed rim, two parallel brushed-tool punctated body sherds (with the tool punctations in a row above the brushing, see Figure 1d), and one brushed-appliqued body sherd (i.e., parallel brushing on either side of an appliqued fillet). All together, 82% of the sherds in the Lang Pasture (41AN38) midden decorated sherd sample have some form of brushing decoration on them. Other decorated utility wares in the assemblage include two sherds with rows of tool punctations on the vessel (see

Table 1. Recovered artifacts from the 41AN38 midden.

Provenience	PS*	DS	BC	Pi	LD	AB	Other	N
Surface	5	5						10
ST 1, 0-20 cm	4	6			3	2		15
ST 1, 20-40 cm	1	5			1	8		15
ST 1, 40-60 cm	2	2				2		6
ST 2, 0-20 cm	1	4			1	1		7
ST 2, 20-40 cm	1					2		3
ST 3, 0-20 cm	2	1				1		4
ST 3, 20-40 cm	6				1	4		11
ST 4, 0-20 cm	1				1			2
ST 4, 20-40 cm	1	1			1	4		7
ST 5, 0-20 cm	2	2			2	3		9
ST 5, 20-40 cm					1	1		2
ST 6, 0-20 cm					3			3
ST 6, 20-40 cm	2							2
ST 7, 0-10 cm	4	5	2		3	9		23
ST 7, 10-20 cm	2	5			1	8		16
ST 7, 20-30 cm		4	1		1	9		15
ST 7, 30-40 cm		5		1	1	19		26
ST 7, 40-50 cm	6	1				19		26
ST 7, Stain 1	2		6		1	13		22
ST 7, Stain 2	2	4			1	13	1	21
Total	44	50	9	1	22	118	1	245

PS=plain sherd; DS=decorated sherd; BC=burned clay: Pi=pipe; LD=lithic debris; AB=animal bones

Figure 1e), and three sherds with straight or diagonal incised lines, the latter decoration being on a jar rim sherd.

Only four of the sherds (8%) are from engraved fine wares. One of these has horizontal engraved lines, while another has broad curvilinear lines (see Figure 1b) with a red pigment smeared in the engraved lines. This sherd is probably from a Poynor Engraved vessel (see Kleinschmidt 1982: Figure 19), as is another sherd (ST 7, 10-20 cm) that has part of an engraved negative oval. Finally, there is a Patton Engraved body sherd from ST 7 (0-10 cm) (see Figure 1e). It has large triangular tick marks pendant from a horizontal engraved line.

There is a plain elbow pipe rim sherd from ST 7 (30-40 cm bs). Similar elbow pipe sherds—both from plain and decorated elbow pipes—have been recovered from excavations at the Lang Pasture site (41AN38) in the SH 155 right-of-way (Kelley et al. 2006).

The one unusual clay object is from Stain 2 in ST 7 (50-58 cm bs). It is flat and smoothed on one side, and

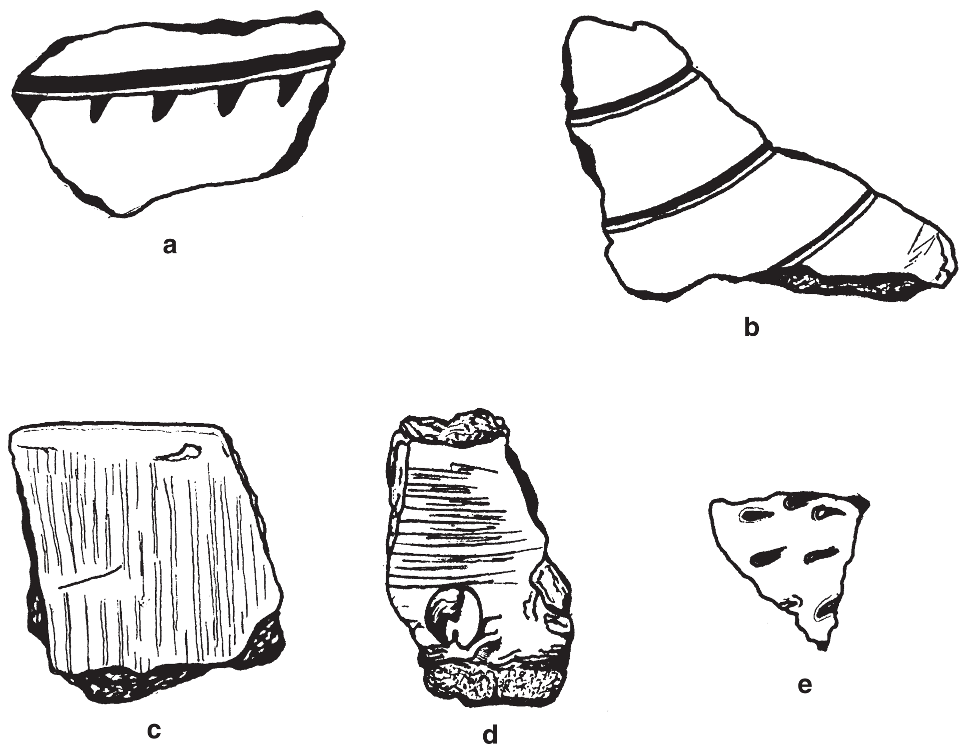

Figure 1. Decorated sherds from the Lang Pasture (41AN38) midden: a, Patton Engraved; b, curvilinear engraved; c, vertical brushed; d, brushed-tool punctated; e, tool punctated. Provenience: a, ST 7, 0-10 cm; b, ST 1, 20-40 cm; c, ST 1, 0-20 cm; d, ST 7, 30-40 cm; e, Surface. Drawings by Bobby Gonzalez.

noticeably conical-shaped and roughened on the other. I interpret this fired piece of clay as some sort of clay plug, perhaps to insert in the opening of a seed jar or a similar kind of vessel.

The nine pieces of burned clay are all from ST 7 (see Table 1). These pieces represent evidence of incidental burning on the midden during the course of the Caddo occupation, perhaps to reduce the odor of decaying plant and animal remains in the midden. No daub was recovered in the midden investigations, suggesting that any structure that may have stood in the vicinity of the midden had not been burned before or after it was abandoned.

The 22 pieces of lithic debris are all small, non-cortical pressure and retouch flakes from the final manufacture of stone tools, probably produced during the manufacture of arrow points and/or flake tools. A wide variety of lithic raw materials are represented in the lithic debris, including chert (64%), novaculite (23%), quartzite (4.5%), petrified wood (4.5%), and ferruginous sandstone (4.5%). The cherts are primarily gray in color (n=11), along with red (n=1) and brown (n=2). These materials may have been gathered from river gravel along the nearby Neches River, as beds of chert gravel that may be the source of this knappable material have been reported in the vicinity of the dam at Lake Palestine on the Neches River. The novaculite is gray (n=3) and dark gray (n=2) in color. This material could have been obtained in Red River gravels in northeastern Texas, or from Bowie gravels along the stream divide between the Red and Sulphur rivers. Nevertheless, this material is not locally available, but would have been brought from a considerable distance to the site. The other raw materials—quartzite, petrified wood, and ferruginous sandstone—are locally available in gravels by LeeAnna Schniebs

Investigations in the Lang Pasture area at 41AN38 yielded 118 faunal specimens. These fragments were recovered from five shovel tests and a 50 x 50 cm unit (ST 7), and depths range from 0-63 cm bs. The purpose of the faunal analysis is to determine the animal subsistence practices of the Caddo residents of the site, including the utilization of available natural resources of the area. The methodology employed in this analysis has been spelled out in detail in Schniebs (2005:347-348). The complete inventory of the faunal sample can be found in Table 2.

The identifiable vertebrate taxa include reptile and mammal. Number of identified specimens (NISP) and minimum number of individuals (MNI) for each taxon are summarized in Table 3, as are weights for each taxon and approximate percentages of the assemblage. Composition of the anatomical elements for each taxon can be found in Table 4.

Class Reptilia

Order Testudinata (Family indeterminate): Unidentifiable turtle is represented by three small shell fragments. They were recovered from three levels in ST 7. It is likely that they are musk/mud or box turtle, based on size. Turtles are dietary supplements often found in archeological contexts. They are easily procured and usually readily available. One fragment is burned.

Order Testudinata, Family Emydidae: Box turtle (*Terrapene* sp.) is represented by two shell fragments, recovered from two levels in ST 7. One piece is burned. The three-toed box turtle (*T. carolina*) prefers woodlands and thickets, and the ornate box turtle (*T. ornata*) occurs in open, treeless areas; these are dry-land turtles that close their shells tightly when danger threatens (Conant 1975).

Class Mammalia

Order Marsupialia, Family Didelphidae: Virginia opossum (*Didelphis virginiana*) is represented by a mandible fragment with three broken teeth in socket. It was recovered from ST 7 at 40-50 cm bs. The opossum is widespread throughout eastern Texas, and probably occur in every county; next to the raccoon, opossums are probably the most common medium-sized mammal in eastern Texas (Schmidly 1983). Sometimes it is hunted for sport, especially in the South, but the edible meat is oily (Burt and Grossenheider 1980).

Order Lagomorpha, Family Leporidae: Rabbit is represented by one burned femur fragment recovered from ST 7 at 30-40 cm bs. Fragmentation prevented specific identification, although it compares favorably in size to swamp rabbit. Two species of cottontail inhabit the area: the Eastern cottontail (*Sylvilagus floridanus*) prefers heavy brush, strips of forest with open areas, edges of swamps, and weed patches; swamp rabbit (*Sylvilagus aquaticus*) prefers swamps, marshes, and wet bottomlands (Burt and Grossenheider 1980). Osteologically, the swamp rabbit is the largest of the cottontails within its range (Davis 1978). It is unlikely the remains of jackrabbit (*Lepus californicus*) because its range borders on the extreme southern edge of Anderson County. Rabbits are easily procured by hunters and frequently found in Caddo faunal assemblages.

The Eastern cottontail occurs throughout eastern Texas in all vegetational regions and in all habitats except the aquatic ones. In the forested Pineywoods region, the swamp rabbit is usually more common than any other lagomorph in second-growth timber over twelve years old (Schmidly 1983).

Table 2. Complete Inventory of Faunal Specimens from the Lang Pasture (41AN38) Site.

ST No.	Depth, cm bs	Qty	Taxon	Element/Portion	Side	Age	Taph.	Burn	Gnaw	Wt/g	Comments
1	0to20	2	med mam	unid			none	wh		0.5	
1	20to40	1	lg mam	unid			none	blk		2.1	
1	20to40	1	lg mam	l.b.frag			none	not		2.9	spir frac
1	20to40	1	lg mam	l.b.frag			none	not		1.5	
1	20to40	2	med mam	l.b.frag			none	wh		0.4	
1	20to40	2	med mam	unid			none	wh		0.3	
1	20to40	1	unid	unid			none	not		0.3	poss fish
1	40to60	1	deer	tib crest	R		exfol	not		4.9	
1	40to60	1	med mam	unid			none	wh		0.2	
2	0to20	1	lg mam	l.b.frag			none	wh		0.1	
2	20to40	1	deer	ulna shft frg			none	not		0.3	
2	20to40	1	deer	antler frg			none	wh		0.2	
3	0to20	1	deer	mtpod shft frg			none	wh		0.5	
3	20to40	1	deer	phx2 dist	R		none	wh		1	spir frac
3	20to40	1	lg mam	l.b.frag			none	wh		0.4	
3	20to40	2	med mam	unid			none	not		0.6	
4	20to40	1	lg mam	l.b.frag			exfol	not		1.8	
4	20to40	1	med mam	unid			none	wh		0.1	
4	20to40	2	sm mam	unid			none	wh		0.1	
5	0to20	1	lg mam	l.b.frag			none	not	rodent	2.6	
5	0to20	2	lg mam	l.b.frag			none	wh		0.7	
5	20to40	1	lg mam	l.b.frag			none	wh		0.2	
7	0to10	1	lg mam	unid			none	char		0.2	
7	0to10	1	lg mam	unid			none	not		0.3	
7	0to10	7	lg mam	unid			none	wh		1	
7	10to20	1	lg mam	l.b.frag			none	wh		0.2	
7	10to20	2	med mam	unid			none	not		0.3	
7	10to20	3	med mam	unid			none	wh		0.3	
7	10to20	1	sm mam	unid			none	not	rodent	0.1	
7	10to20	1	turtle	shell frg			none	not		0.2	prob box
7	20to30	1	box turtle	neural	A		none	char		0.3	
7	20to30	6	lg mam	unid			none	wh		1.2	
7	20to30	1	med mam	unid			none	not		0.4	
7	20to30	1	turtle	shell frg			none	not		0.1	
7	30to40	1	box turtle	peripheral frg			none	not		0.1	
7	30to40	1	deer	mttar dx	R	imm	none	not		11.7	
7	30to40	1	deer	petrous	R		none	not		6.7	
7	30to40	1	lg mam	unid			none	blk		0.3	
7	30to40	4	lg mam	l.b.frag			none	wh		1.5	
7	30to40	1	lg mam	unid			none	wh		0.4	
7	30to40	1	med mam	unid			none	not		0.6	
7	30to40	1	rabbit	fem dist frg			none	wh		0.2	prob swamp
7	30to40	1	sm mam	unid			none	not		0.2	
7	30to40	6	sm mam	unid			none	wh		0.6	
7	30to40	1	turtle	shell frg			none	wh		0.1	
7	40to50	2	lg mam	l.b.frag			none	blk		0.7	
7	40to50	1	lg mam	l.b.frag			abraded	not	rodent	0.6	
7	40to50	2	lg mam	unid			exfol	not		2	
7	40to50	1	lg mam	l.b.frag			none	wh		0.8	spir frac

7	40to50	6	lg mam	unid			none	wh		1.6	
7	40to50	1	med mam	unid			none	not		0.3	
7	40to50	3	med mam	unid			none	wh		0.4	
7	40to50	1	opossum	mand t'row	L		exfol	not		1.4	inc I,P3,P4 frg
7	40to50	2	sm mam	unid			none	wh		0.1	
7	50to58	1	lg mam	unid			abraded	not	rodent	2	Stain 2
7	50to58	1	med mam	unid			none	wh		0.1	Stain 2
7	50to58	2	sm mam	unid			none	not		0.1	Stain 2
7	50to58	9	sm mam	unid			none	wh		0.2	Stain 2
7	50to63	2	lg mam	l.b.frag			none	wh		0.4	spir frac; Stain 1
7	50to63	1	med mam	unid			none	wh		0.1	Stain 1
7	50to63	10	sm mam	unid			none	wh		0.1	Stain 1

Table 3. Taxonomic Composition of Lang Pasture (41AN38) Faunal Sample.

Scientific Name	Common Name	NISP	MNI	% of Site	Wt/g
Vertebrata (indeterminate)	unidentifiable	1		1	0.3
Testudinata	turtle	3		3	0.4
Terrapene sp.	box turtle	2	1	2	0.4
Mammalia (small)	sm. mammal	33		28	1.5
Mammalia (medium)	med. mammal	23		19	4.6
Mammalia (large)	lg. mammal	47		39	25.5
Didelphis virginiana	opossum	1	1	1	1.4
Leporidae	rabbit	1	1	1	0.2
Odocoileus virginianus	White-tailed deer	7	1	6	25.3
	TOTAL	118	4	100	59.6

Order Artiodactyla, Family Cervidae: Whitetail Deer (*Odocoileus virginianus*) is represented by seven fragments, including the remains of one immature individual. They were recovered from three levels in four shovel tests, and three pieces are burned. Deer are found in suitable brushy or wooded country throughout the state (Davis 1978). They occur in all vegetal regions, but in eastern Texas they are found in larger numbers in timbered areas (Schmidly 1983). Deer is the most common large game animal preferred by the Caddo, and also one of their main subsistence animals. The Caddo were adept imitators of deer, and a hunter disguised with the antlers and hide of a deer was able to approach his quarry closely, and even to attract it to himself (Newcomb 1993).

Unidentifiable large mammal bone fragments dominate the faunal sample (n=47, 39%), and these are most likely the remains of deer. Unidentifiable small mammal bones are also plentiful (n=33, 28%). These could be the remains of rabbit as well as possible squirrel. Squirrel is another small animal common in Caddo faunal assemblages. The unidentifiable medium mammal (n=23, 19%) could be opossum, raccoon, or the remains of immature deer.

The faunal collection from the Lang pasture area at 41AN38 is generally well-preserved, but fragmented. Tapho-

Table 4. Composition of Lang Pasture (41AN38) Faunal Elements.						
Scientific Name	Common Name	Element				
		unid	cranial	long bone	phalanx	other
Vertebrata (indeterminate)	unidentifiable	1				
Testudinata	turtle					3
Terrapene sp.	box turtle					2
Mammalia (small)	sm. mammal	33				
Mammalia (medium)	med. mammal	21		2		
Mammalia (large)	lg. mammal	27		20		
Didelphis virginiana	opossum		1			
Leporidae	rabbit			1		
Odocoileus virginianus	White-tailed deer		1	4	1	1
	TOTAL	82	2	27	1	6
NOTE:						
"Cranial" inc. one petrous and a mandible fragment with teeth fragments in socket.						
"Long Bone" inc. tibia, ulna, metapodial, and femur fragments as well as indeterminate shaft fragments.						
"Other" inc. shell and antler fragments.						

nomic patterns are absent on most of the collection, although several pieces are exfoliated or abraded. Eighty-nine specimens are burned (Table 5), probably the result of trash disposal rather than cooking or catastrophic events. Four large mammal long bone fragments and the deer toe are spirally fractured, possible evidence of human impact. Three large mammal bones and one small mammal bone are slightly rodent gnawed.

The majority of bone fragments were recovered from ST 7 (n=90). Quantities from the other shovel tests range from three to 12 specimens each (see Table 1).

The faunal sample from the Lang Pasture area at 41AN38 is a typical Caddo collection. It provides a sketchy view of dietary preferences that appear to be comprised of, but not limited to, deer, rabbit, and turtle. The Caddo undoubtedly utilized much more of the rich animal resources available in East Texas than is reflected in this small faunal assemblage.

SUMMARY AND CONCLUSIONS

There is a well-preserved Caddo midden deposit on the Lang Pasture site (41AN38), located on private prop-

Table 5. Summary of Burned Faunal Specimens from Lang Pasture (41AN38).					
Scientific Name	Common Name	Degree of Burning			
		not burned	charred	black	white
Vertebrata (indeterminate)	unidentifiable	1			
Testudinata	turtle	2			1
Terrapene sp.	box turtle	1	1		
Mammalia (small)	sm. mammal	4			29
Mammalia (medium)	med. mammal	7			16
Mammalia (large)	lg. mammal	9	1	4	33
Didelphis virginiana	opossum	1			
Leporidae	rabbit				1
Odocoileus virginianus	White-tailed deer	4			3
	TOTAL	29	2	4	83

erty less than 15 m west from the SH 155 right-of-way fence. The right-of-way was the scene of intensive Texas Department of Transportation-sponsored excavations in the spring of 2006 (Kelley et al. 2006). In an effort to better understand the contents and character of the midden deposits, by themselves and by how they may relate to the features and archeological deposits from the Lang Pasture site (41AN38) in the right-of-way, six shovel tests and one 50 x 50 cm unit were excavated in and adjacent to the midden in March 2006. The midden feature turned out to be approximately 10 m in diameter and ca. 23-40 cm in thickness, and there were pit and post hole features preserved below the midden in ST 7, suggesting it might have accumulated in the area of an abandoned Caddo structure. Animal bones and charred plant remains are preserved in the midden as well.

Although no radiocarbon dates have been obtained on samples from the midden (there are charred nutshells from Stains 1 and 2 in ST 7 that could be suitable for dating), the recovery of both Poynor Engraved and Patton Engraved in the decorated sherds—as well as a low P/DR value of 0.88, falling in Group II of the provisional seriation of Late Caddo components (Frankston phase) in this part of the upper Neches River basin (Perttula et al. 2005: Table 1)—strongly suggests that the midden began to accumulate sometime after ca. A. D. 1450. Poynor Engraved was made by Caddo potters from ca. A.D. 1400-1650 (and later), indicating the broad range of time in which the midden may have been used. The one post-A.D. 1650 Patton Engraved sherd from the top of the midden also implies a very late protohistoric use of the midden area, although not necessarily leading to any midden accumulation at that time; Patton Engraved sherds have also been found in low numbers at 41AN38 in the SH 155 right-of-way deposits (Kelley et al. 2006).

Analysis of the recovered material culture remains from the SH 155 right-of-way archeological deposits, in combination with radiocarbon and TL dates from the area, should permit a more refined consideration of the temporal and spatial associations between the Lang Pasture (41AN38) midden deposits and the features and artifacts recovered from the site in the Texas Department of Transportation right-of-way. Those analyses are now underway.

ACKNOWLEDGMENTS

I would like to thank Bo Nelson and Mark Walters, who volunteered their time to investigate the 41AN38 midden deposits that they observed across the project right-of-way fence. No Texas Department of Transportation monies were spent in carrying out these investigations, or in the writing up of the results of their work as presented here. Bobby Gonzalez (Caddo Nation of Oklahoma) drew the decorated sherds in this article. LeeAnna Schniebs (Archaeofaunas) completed the faunal analysis. Finally, I thank the landowner, Mr. Earl Lang, for permission to carry out this work.

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Remote Sensing at the Horace Cabe Site (41BW14)

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INTRODUCTION

A magnetometer survey was conducted at the Horace Cabe Mound site (41BW14) in 2005 by Walker and Schultz (2006) as part of the Bowie County Levee Realignment project in Bowie County, Texas (Sundermeyer et al. 2006). The purpose of the survey was to attempt to locate anomalies that may represent potential archaeological features at this important Late Caddo mound center near the Red River. The area was surveyed using a Geometrics portable G858 cesium sensor magnetometer and a G-856 proton magnetometer base station. This article puts on record another substantive example of Caddo archaeology as seen through the use of remote sensing technology.

The original processing and interpretation of this data presented in Sundermeyer et al. (2006) are not simply re-hashed here. Further data processing has revealed several possible Caddo structures on and in the immediate vicinity of Mounds B and C at the Cabe site.

THE KNOWN ARCHAEOLOGY OF THE HORACE CABE SITE

The Horace Cabe site is a Haley (ca. A.D. 1200-1400) and Texarkana (ca. A.D. 1400-1700) phase Caddo mound center on natural levee alluvial deposits along Summerhill Lake, a channel lake in the meander belt of the Red River (Perttula et al. 1995; Guccione and Hays 2006; Sundermeyer et al. 2006). The current channel of the river is 2.5 km to the north of the site.

There are eight constructed mounds at the Cabe site (Perttula et al. 1995: Figure 4), seven of which (Mounds A-G) are part of a cluster of mounds in a single group. The mounds and associated known habitation areas cover approximately 55 acres. The recovery by collectors of shell-tempered McKinney Plain, Simms Engraved, Barkman Engraved, Belcher Ridged, Taylor Engraved, Avery Engraved, Nash Neck Banded, Emory Punctated-Incised, and Bailey Engraved vessels indicate that the main Caddo use of the mounds and much of the habitation areas was during the latter part of the Texarkana phase. Glass beads have been recovered by collectors from Cabe, further suggesting some use of the site in the latter part of the 17th century and early part of the 18th century A.D.

Five of the mounds (Mounds A-E) are arranged in a semi-circular or U-shaped pattern with an open area to the south (Figure 1). Mounds F and G lie some distance to the west of Mound D, which is ca. 10 m west of

Mound C. There is a slightly raised (ca. 40 cm) or higher platform area between Mounds A and E. This platform is apparently composed of midden deposits and possible fill from mound erosion (Perttula et al. 1995). The platform probably functioned as a deliberately constructed plaza.

Mounds A-C are between 0.85 and 2 m in height, and Mound A is the largest at Cabe, measuring 25 m in diameter (see Figure 1). Mounds B and C are between 18 and 21 m in diameter. These three mounds appear to be part of a single conjoined mound, probably covering a series of Caddo temple structures (cf. Webb 1959).

Available archaeological evidence (mainly profiles of potholes and noted artifacts) indicates that Mound A was built in two stages, with Caddo structures at the base of the mound and atop the final mound stage. These structures were burned and then capped with earthen mound fill. Both Mounds B and C were likely built to cover special purpose structures on the crest of the mounds that were used by the Caddo political elite. Large amounts of daub in a pothole between Mounds B and C suggest that a structure may have also stood in this area, as well as on or near the crest of each mound. A pothole on the platform area showed a dark midden zone almost 1 m in thickness, but no evidence of structures. Mound D also contained evidence of burned structures as well as human skeletal remains, apparently from disturbed Caddo burials placed in the mound. Little is currently known about Mounds E-G.

The Texarkana phase mounds at the Horace Cabe site contain archaeological evidence for the construction, burning, and deliberate burial of daub-covered Caddo structures. We can expect burned Caddo structures on the crest and base of the mounds, as well as in areas between the conjoined mounds (Mounds A-C), and on flatter and lower mound areas overlooking the platform or plaza. Only thick midden deposits have been reported from the platform area.

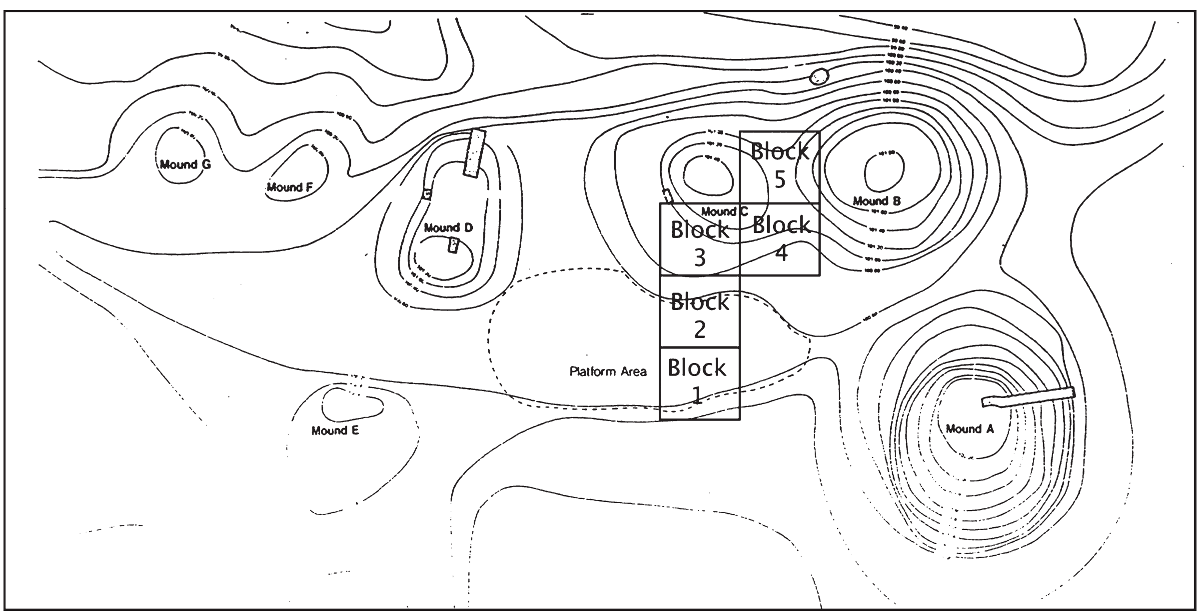

Figure 1. Map of the Cabe site (41BW14) with grid locations.

REMOTE SENSING METHODS

A total of 7 20 x 20 m grids were placed at and around the Cabe site as part of the Bowie County Levee Realignment project. Five grids were collected on the main part of the Cabe site (see Figure 1) and two more grids were collected to the south across Langdon Road (CR 2342) in hopes of detecting possible prehistoric Caddo habitation areas.

Magnetometer data in both areas were collected in adjacent 20 x 20 m blocks that were oriented north-south. The hand-held counterbalanced staff was used with two sensors spaced 50 cm apart. The center of the hand-held staff was carried along the survey line, allowing for each sensor to extend 25 cm on either side. Survey lines were spaced at 1 m intervals with data collected on a 0.1 second interval, thus collecting approximately 10 readings per m. A G-856 proton magnetometer base station was used to collect data at 10 second intervals in order to record the ambient magnetic presence or observed diurnal variation.

Collected remote sensing data were downloaded using MagMap 2000. Employing MagMap 2000, the base station diurnal correction was applied to the files, and grid coordinates were assigned to each collection block. Magnetometer data were imported into ArchaeoSurveyor 2.0 and a composite was created, combining the individual grids into a master grid. Metal debris and possible buried pipelines or cables did obscure to some extent the remote sensing data for these Cabe site areas. Because of this, data processing was a bit complex and differed from block to block; detailed descriptions of data processing accompany the discussion of the remote sensing findings for each area.

REMOTE SENSING FINDINGS AT THE HORACE CABE SITE

South of Langdon Road

Magnetometer data from south of the Langdon Road (CR 2342) were collected in two 20 x 20 m blocks. Unfortunately, the remote sensing data in both of these blocks was severely obscured by magnetic debris, and no useful archaeological information was observable in this area (Figure 2).

North of Langdon Road

The five 20 x 20 m blocks north of Langdon Road were located in the platform area south of Mound C, along the southern flanks of Mound C, and along the western side of Mound B (see Figure 1). While the magnetometer data in these five blocks was also severely obscured by metallic debris, in this case it was possible to obtain some useful geophysical and archaeological information. Originally, Walker and Schultz (2006) identified one possible archaeological anomaly or feature (Feature 1) in the center of Block 1 (Figure 3).

Feature 1

Feature 1 is a horseshoe-shaped high return approximately 2.5 m in diameter. Due to the poor quality of the remote sensing data, despite the re-processing, it is not possible to determine if this is the geophysical signature of an archaeological feature. To the west of Feature 1 is a shallow northwest-running drainage ditch. Further north is an area of enhanced magnetic returns that corresponds with the area between Mounds B and C (See Figure 3). There are several other simple dipole returns spread across the blocks that are interpreted as metal debris.

Figure 2. Plots of magnetometer grids south of Langdon Road (CR 2342).

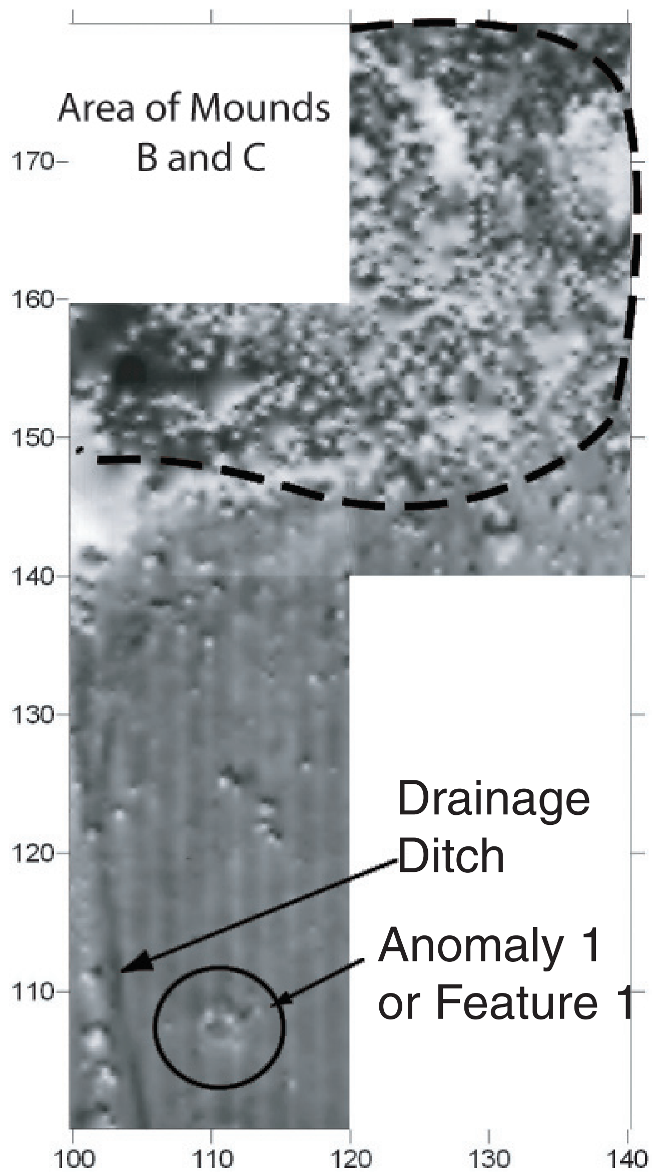

Figure 3. Original plots of magnetometer grids at the Cabe Site (41BW14).

The main issue with the geophysical data at Cabe is the disturbance caused by metal debris at the site. The amount of metallic noise can be easily seen in a 3D view of the survey blocks (Figure 4). With the use of ArchaeoSurveyor 2.0, the remote sensing data from Cabe was re-processed and several additional archaeological features have been identified. The re-processing of the magnetometer data began with a de-spiking filter to remove spikes and dropouts. Due to the excessive amount of metal debris, this filter was passed through the data three different times: first with a mean threshold of 1.5 standard deviations (SD) with a 10 x 10 cell window; secondly with a 3 SD threshold and a 5 x 5 cell window; and finally with a 2.5 SD threshold and a 3 x 3 cell window. Next the data was clipped to 4 SD twice and at 3 SD for three iterations. A low pass Gaussian filter with a 3 x 3 cell window was also used, and the filtered data was interpolated so the X and Y axis matched. With this rather robust processing workflow, three new anomalies (Features 2, 3 and 4) became visible (Figure 5).

As can be seen in Figure 4, the majority of metallic noise is present in Block 4 in the southern part of Mounds B and C. This grid was simply removed from the composite created in ArchaeoSurveyor and the remaining magnetometer data then re-processed. Data was again de-spiked for three iterations, beginning with a threshold of 3 SD with a 10 x 10 cell window, next with a 2 SD threshold and a 7 x 7 cell window, and finally with a 1 SD threshold and a 3 x 3 cell window. These data were clipped to 3 SD, and a de-striping median traverse filter was passed through the data. Finally the data were interpolated so that the X and Y axis match. The result of this round of data processing (Figure 6) brought out much more spatial detail on all three of the new features, especially Feature 2 and 4 (Figure 7).

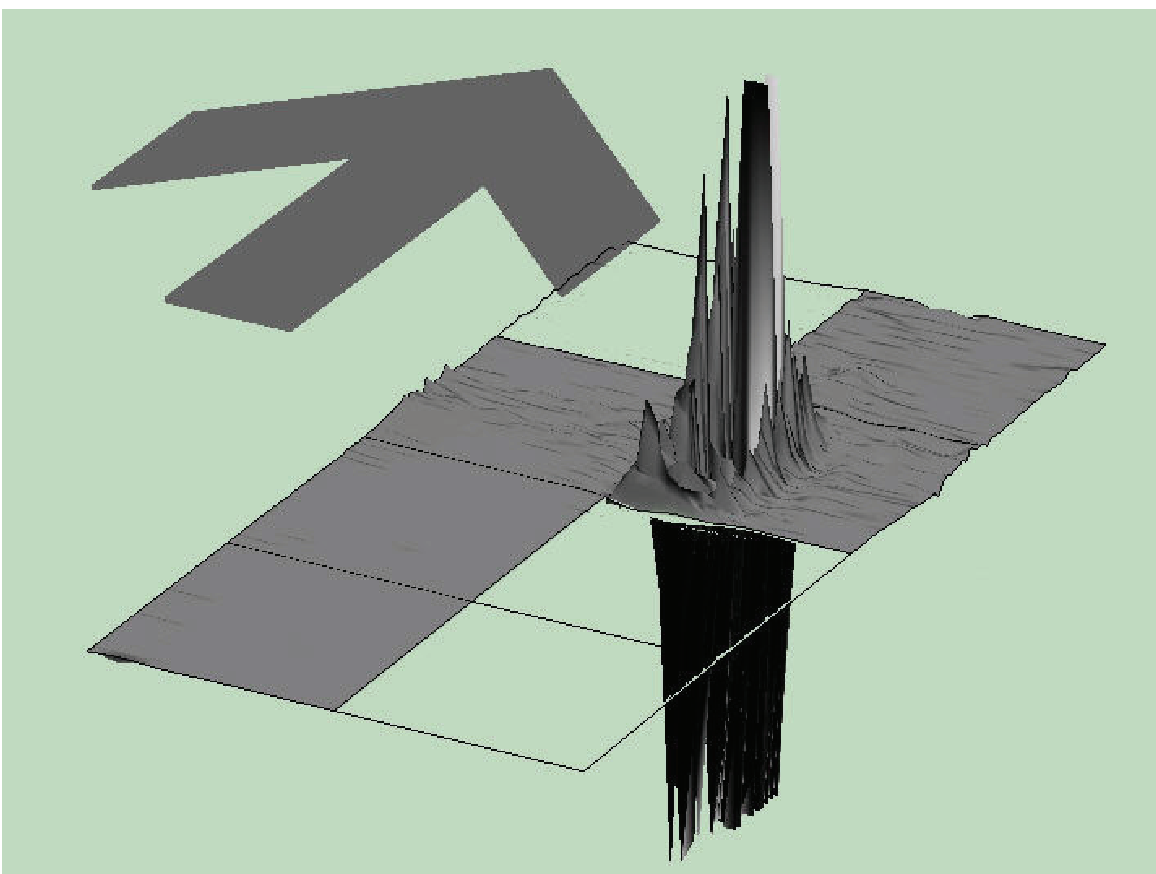

Figure 4. 3D Plot of magnetometer grids at the Cabe Site (41BW14).

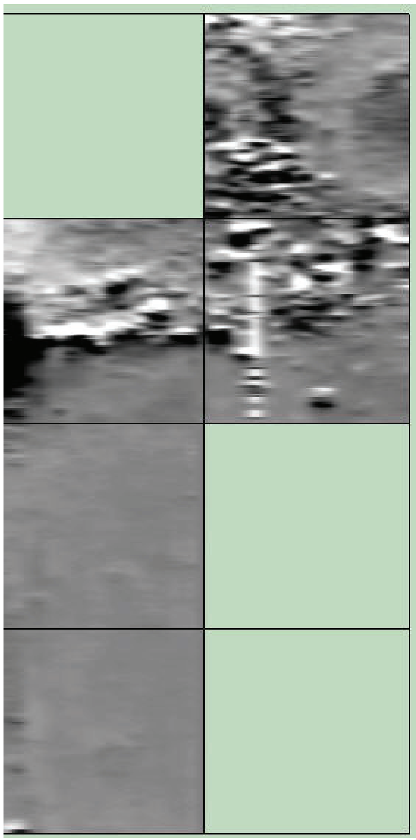

Figure 5. Plots of magnetometer grids from the Cabe Site (41BW14).

Feature 2

Feature 2 consists of a faint circular outline approximately 15 m north/south and 17 m east/west, positioned directly in front of Mound C. A strong return in the approximate center of the outline probably represents a central fire hearth within the outlines of a large prehistoric Caddo structure. Across the center of the feature is a series of complex dipole returns. These are more than likely noise resulting from some sort of buried pipe or pipeline.

Feature 3

Feature 3 is the most legible of the four geophysical features present in our remote sensing data from the Cabe site. The feature is approximately 16 m in diameter with a central hearth measuring approximately 2 m in diameter. This feature is located on the northwestern side of Mound C.

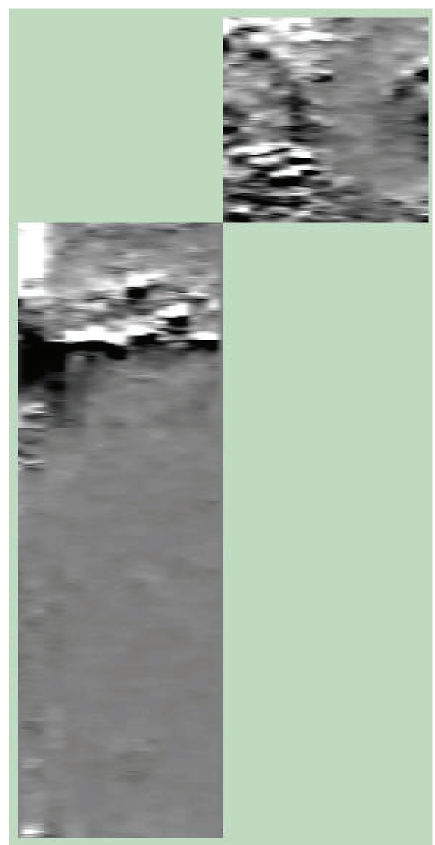

Figure 6. Plots of magnetometer grids with Block 4 removed.

Feature 4

Feature 4 is the most ephemeral of the four features we have been able to define in the remote sensing work at Cabe. It was not clearly defined until the data was re-processed after the removal of Block 4 because of metallic noise. This feature is approximately 12 m in diameter and has a possible central hearth. Feature 4 is located on the northwestern corner of Mound B.

DISCUSSION

It is important to note that the geophysical features presented here from the Cabe Mound site are not nearly as obvious and easily definable as other geophysical features recently discovered at other East Texas Caddo sites such as the George C. Davis site and the Hill Farm site (Creel et al. 2004, Walker and Schultz 2006, Perttula et al. n.d.). It took a robust series of data processing before the geophysical features at Cabe were apparent.

Nevertheless, it is our opinion that the geophysical features detected in the processing of the magnetometer data presented here represent prehistoric and/or early historic Caddo structures that were likely daub-covered. The structures were probably burned and then covered with earth during the construction and reshaping of the mounds at the Horace Cabe site. Large mound top structures are well known at other Caddo mound sites in East Texas and along the Red River (including such sites as George C. Davis, Belcher, and Hatchel, to name but a few), and it appears from the geophysical data that there were structures on at least two of the mounds at Cabe; the limited archaeological data suggest that Mounds A-D had structures on them.

It is exciting that even with the amount of noise caused by metal debris in the remote sensing blocks that geophysical returns as subtle as these created by archaeological features at the Cabe site can still be identified and are interpretable. We look forward to the opportunity to conduct more extensive remote sensing surveys on the other mounds at Cabe, as well as in the known habitation areas.

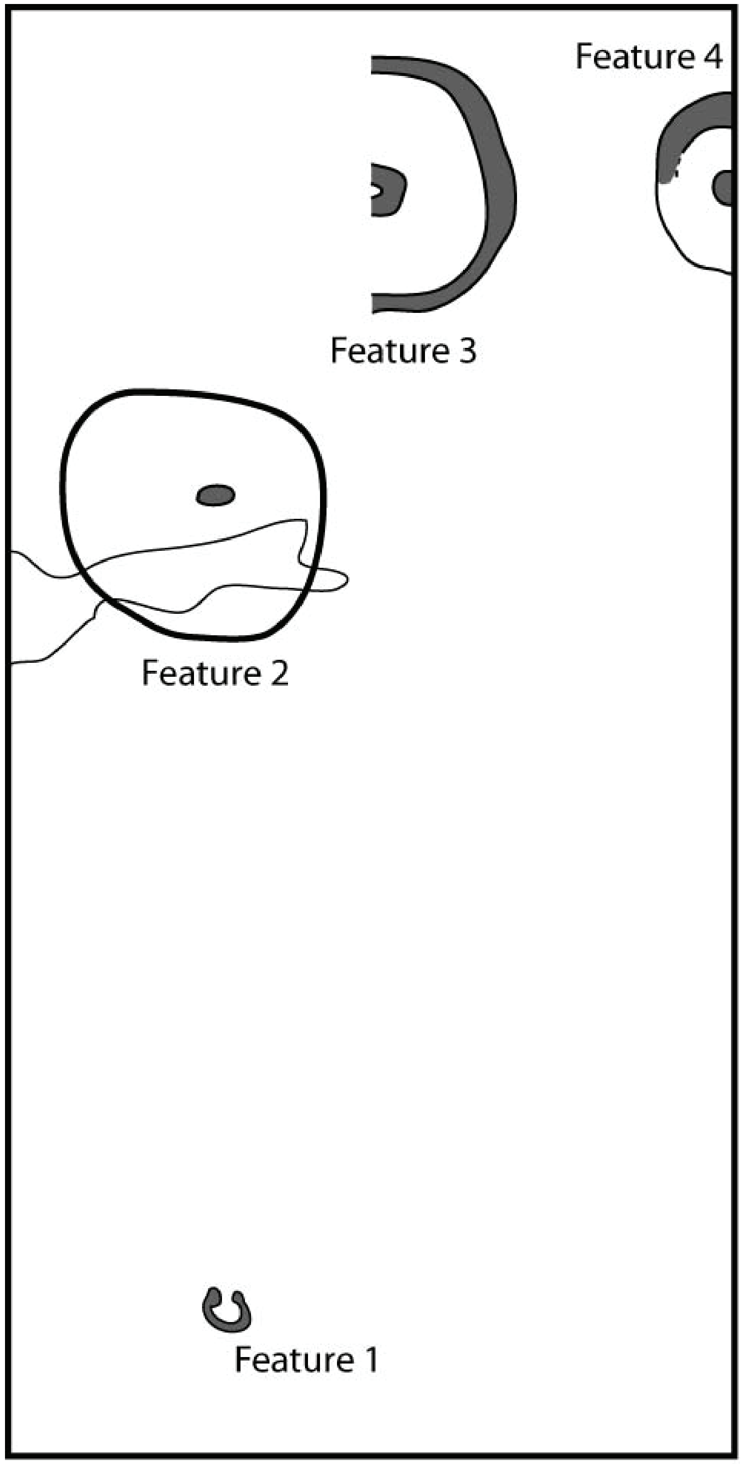

Figure 7. Interpretations of magnetometer data from the Cabe Site (41BW14).

ACKNOWLEDGMENTS

We are grateful to John T. Penman, Scott Sundermeyer, and Ken Shingleton for permission to use the archaeological and remote sensing data from the Bowie County Levee project for this article. We also thank David Wilbourn of DW Consulting for developing an import routine for GeoMetrics Data into ArchaeoSurveyor 2.0.

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The History of Archaeological Investigations at The Jamestown Mound Site (41SM54), An Archaeological Conservancy Preserve in Smith County, Texas

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INTRODUCTION

The Jamestown Mound site (41SM54) is an Archaeological Conservancy (TAC) preserve in northern Smith Country, Texas in the northeastern part of the state. The Jamestown site is one of the largest Caddo mound centers in East Texas, with seven recorded mounds and an associated village area of unknown extent and internal complexity (Perttula 1989, 1994). It is also one of the four premier mound centers in the Sabine River basin, the other three being Hudnall-Pirtle (41RK4, see Bruseth and Perttula 2006), a TAC preserve, Pine Tree Mounds (41HS15) (Gadus and Fields 2005), also a TAC preserve as of 2006, and Boxed Springs (41UR30, see Perttula et al. 2000), and was obviously an important civic and ceremonial center for the prehistoric Caddo peoples that lived there and in surrounding communities. Unfortunately, at the present time very little is known about the archaeological record preserved at the Jamestown site, or the exact locations of several of the smaller mounds on the preserve. Here, I summarize the history of archaeological research at the Jamestown site. This article is intended to be a companion piece to the report to be submitted to the TAC on the results of on-going remote sensing activities at the Jamestown preserve.

The Jamestown preserve covers approximately 18 acres of pasture (Figure 1) divided into two tracts by a north-south running fence (Figure 1, with the dividing fence removed). It is a large prehistoric Caddo mound center, with multiple mounds (Figure 2), roughly arranged in a circular pattern, with an open area (or plaza) between the mounds. The largest mound (Md. A) (Figure 3a-b), measuring ca. 43 m in diameter and 4 m in height, is situated in the southwestern side of the circle of mounds (see Figures 1 and 2). Mounds B-E (15-20 m in diameter and 40 cm-1 m in height) are probably mounds built over houses with a clay floor and a clay cap. The exact locations of Mounds D and E within the TAC preserve are not currently known. Md. A is known to have two levels of burned structural remains in the upper mound fill.

Previous Research

There has been very little archaeological attention given to the Jamestown Mound site before or after its establishment as an archaeological preserve by The Archaeological Conservancy.

The previous investigations that we are aware of that took place prior to our on-going 2005-2007 remote sensing effort include work by Sam Whiteside in the 1950s, who actually identified and recorded the site a few years earlier. Sam Whiteside was a dedicated avocational archaeologist who lived east of Tyler in Smith County,

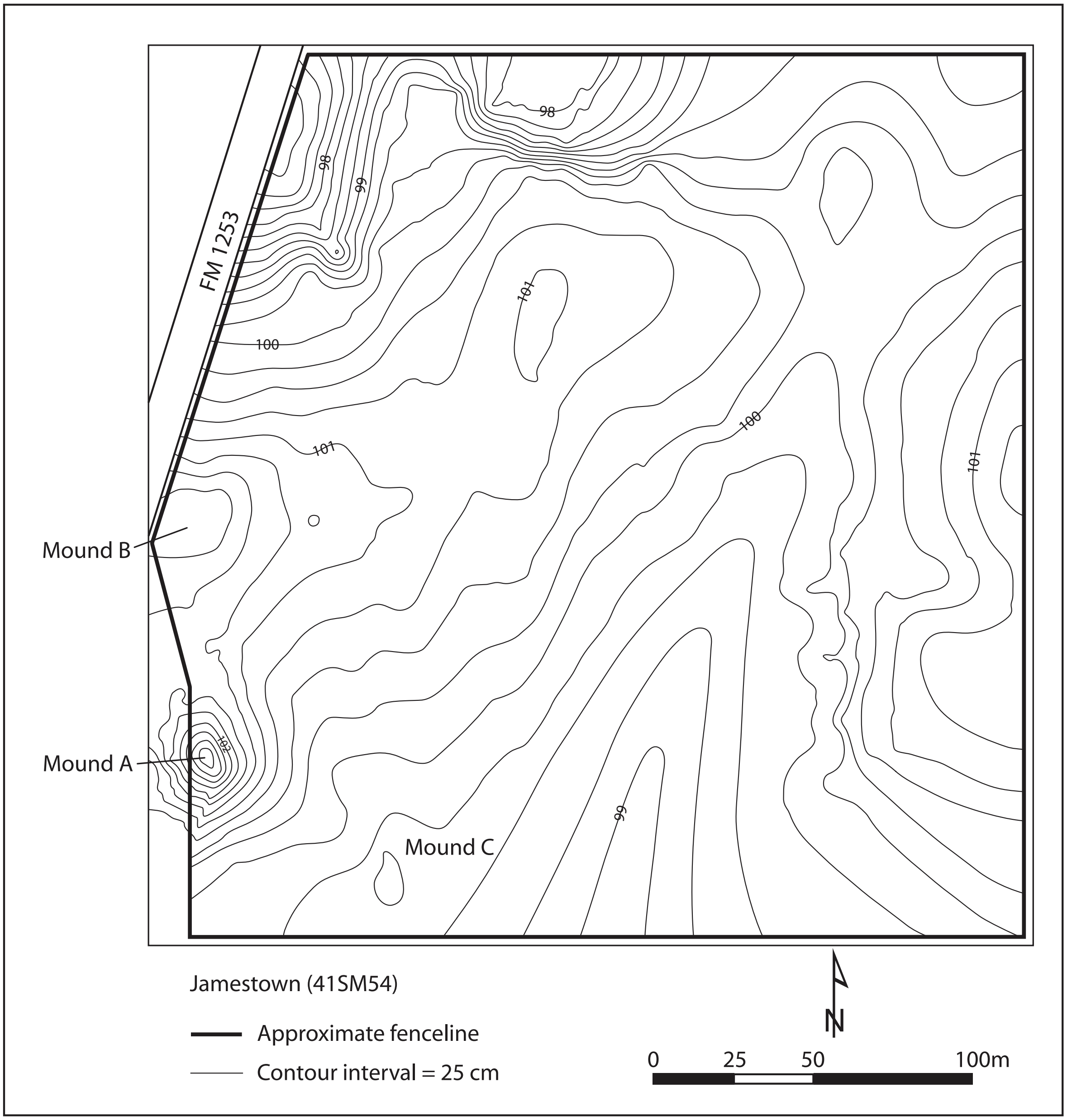

Figure 1. Contour map of the Jamestown site preserve.

Texas (Walters 2005). Whiteside's work at the Jamestown site in ca. 1959 included a surface collection, and various excavations in and off the mounds, which are discussed in detail below. Whiteside's collections from Jamestown are in the possession of Mark Walters (a Texas Archeological Steward living in Kilgore, Texas) and the Texas Archeological Research Laboratory at The University of Texas at Austin.

His first excavations were about 120 m north and 100 m east of Mound A. In this area he encountered a large pit feature that was 1.7 x 1.3 m in size and 100 cm in depth (Figure 4). At 60 cm below surface (bs), a layer of ash was encountered in the excavation of the pit. The pit fill was very dark in color, with considerable amounts of charcoal and bone fragments (including a portion of a deer mandible and mussel shell). There was also a layer

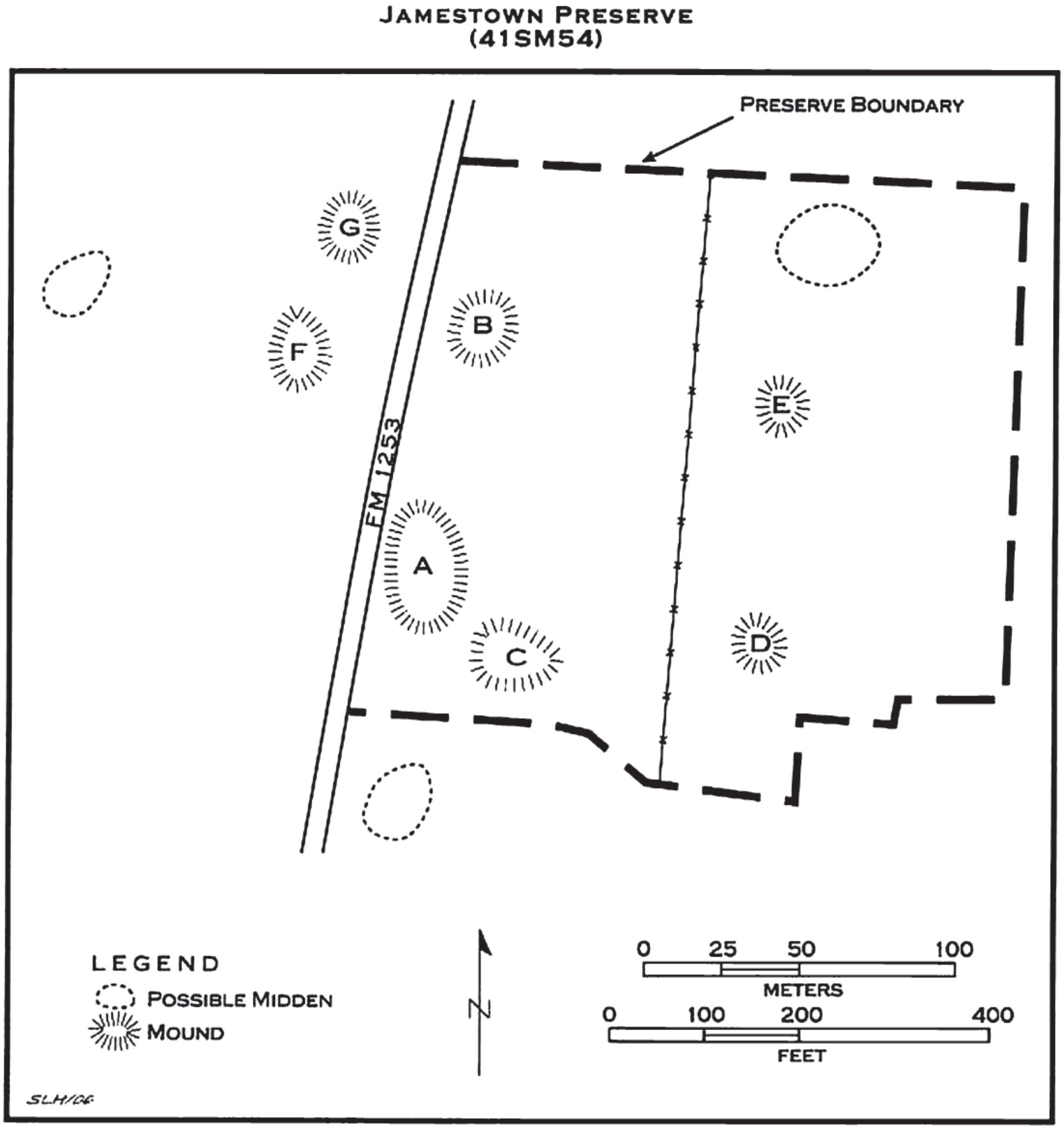

Figure 2. Mound and known midden areas at and near the Jamestown site preserve.

of burned dirt associated with the pit, which led Whiteside to conclude that the pit represented a "fireplace."

The large pit feature (see Figure 4) contained numerous artifacts in its pit fill. These included a plain body sherd from 0-15 cm bs, along with a possible bottle sherd that has been red-slipped and also has 2+ rows of fingernail punctates near the neck; this may be an example of a Maxey Noded Redware bottle sherd, examples of which are scattered on Middle Caddo period sites in the Red, Sulphur, and Sabine river basins in Northeast Texas. Deeper in the pit was a plain sherd from a carinated bowl along with a horizontal engraved bowl rim sherd. From 45-60 cm bs, Whiteside found a plain, polished body sherd, and from 60-75 cm, he recovered a plain bone-tempered rim. A large number of artifacts came from 15-30 cm in his excavations, among them a graywacke celt resharpening flake, two pieces of gray chert lithic debris, and eight sherds. One of these is plain, and one is a red-slipped bottle sherd. Other decorated sherds in the pit feature include an opposed incised utility

Figure 3a. 2005 photograph of Md. A at the Jamestown site, looking southwest.

Figure 3b. Md. A. in 2005 photograph, looking west.

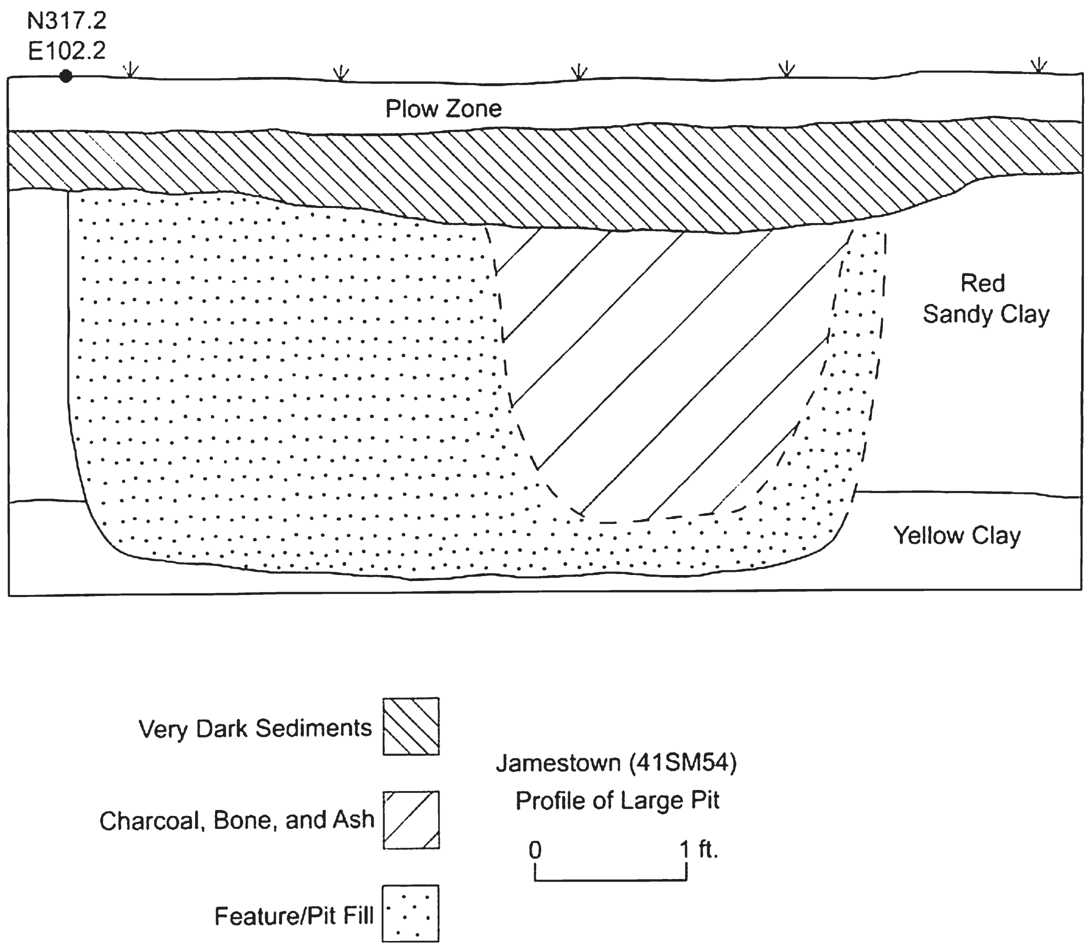

Figure 4. Profile of the pit feature, from Sam Whiteside notes.

ware, two with tool punctated rows, one body sherd with a large single appliqued node, another with a large single node placed adjacent to an appliqued ridge, and an everted rim from a jar with tool punctated rows near the top of the rim, and a single appliqued node below the punctated row.

The second excavations by Whiteside were in Md. C, about 100 ft. southeast of Md. A (see Figures 1 and 2). This unit was about 2.5 x 4.6 ft. in dimension, and was dug to 3 ft in depth. In it, Whiteside uncovered a top 30 cm thick fill of sterile clay overlying a thin occupational lens, along with a single post hole that originated from the buried occupational lens (Figure 5). The post hole was filled with clay, suggesting it had been pulled at the time the clay fill was used to cap the mound, thus filling the hole.

In the Md. C excavations, Whiteside recovered one incised grog-tempered sherd from under the clay cap (see Figure 5). The sherd has intersecting incised lines on the vessel sherd body.

The third Whiteside excavation was a 7 x 2 foot unit placed 45 feet northeast of Md. B. This showed in profile a thin clay cap overlying a very dark occupational deposit that contained ceramic sherds (Figure 6). This occupational deposit rested on the natural or original soil on the landform. Several post holes from a prehistoric Caddo structure were recognized and defined in the excavations, and they apparently originated from the occupational deposit in this area.

In Md. A, Whiteside excavated a unit (no data available on its total size) to expose a profile of the fill in the upper mound. This work identified two buried occupational zones, marked by concentrations of charcoal and ash at 27 cm bs, and also at 82-92 cm bs (Figure 7). These two zones were separated by a clayey mound fill, and there was clayey mound fill above the uppermost occupational zone. The concentrations of charcoal that marked both zones suggest that they represent the remnant of two different Caddo structures that stood on the mound, before they were burned and covered up by mound fill.

In another excavation 45 ft. north of Md. A, a 7 x 2 ft. unit, Whiteside exposed four post holes that may mark the corner of another prehistoric Caddo structure (Figure 8).

Most of the artifacts in the Sam Whiteside collection from the Jamestown site are from surface collections from prehistoric Caddo habitation deposits with an unknown provenience within the site.

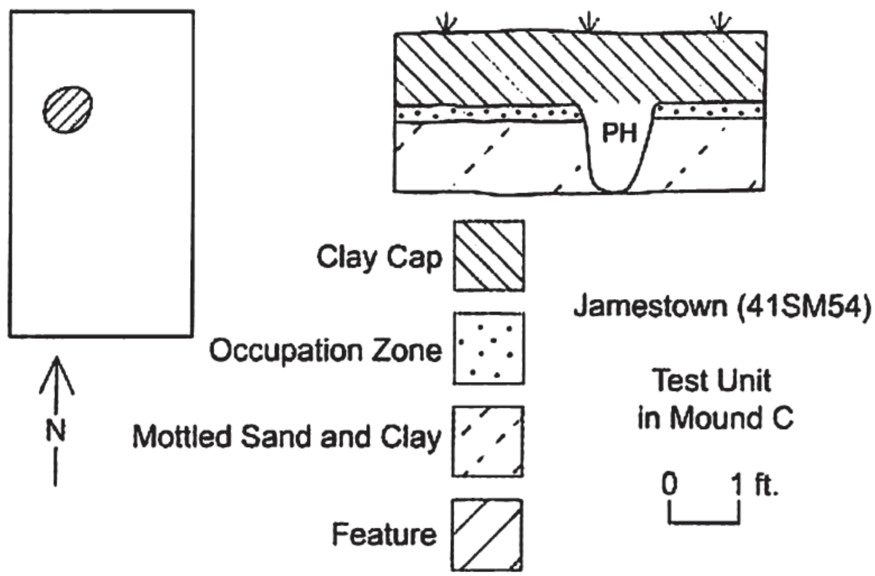

Figure 5. Profile of unit in Md. C, from Sam Whiteside notes.

One surface artifact collected was a Gary, *var. LeFlore* dart point made from a coarse-grained quartzite. It has a stem width of 15.77 mm and a thickness of 7.41 mm. The thickness and stem width of this one point suggests some use of the Jamestown site during the earlier part of the Woodland period (cf. Schambach 1982).

Other artifacts found in the surface collections are a number of decorated sherds, as well as plain body sherds (n=11), and plain grog-tempered rim sherds (n=7). There is one spindle whorl on a base sherd. A single piece of daub is in the Whiteside surface collection. Among the decorated sherds, red-slipped rims (n=2) and body sherds (n=26) are quite common, followed by tool punctated (n=7), opposed incised (n=3), cross-hatched incised (n=3), diagonal incised (n=3), and horizontal incised (n=2) decorative elements on body sherds. Other decorated utility ware sherds include fingernail punctated (n=2), zoned incised-punctated (n=6, including one

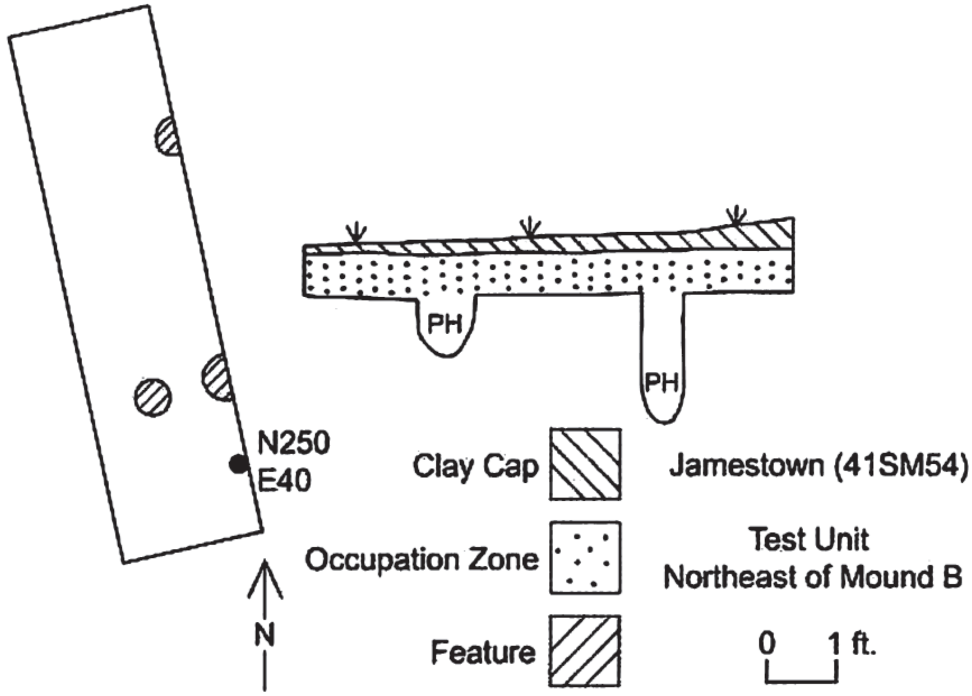

Figure 6. Profile and plan of unit northeast of Md. B, from Sam Whiteside's notes.

that resembles Crockett Curvilinear Incised), brushed (n=1), brushed-punctated (n=1), pinched (n=1), and punctated-appliqued (n=1) decorative elements.

The decorated fine wares are all engraved (n=10), and 10% of those have been red-slipped on exterior and interior vessel surfaces, indicating they are from bowls and carinated bowls. The engraving consists of rather simple decorative elements, among them sets of horizontal lines, sets of parallel engraved lines, diagonal lines, and opposed engraved lines. One body sherd has an equal cross-arm design, similar to that seen on a sherd from the Middle Caddo period Lake Clear site (41SM243) (Walters 2006:Figure 5).

Other than the previously mentioned Gary dart point, the lithics in the surface collection include six pieces of lithic debris; a Perdiz arrow point (or a late variety of Alba points, cf. Shafer 1973) of quartzite; a gray chert arrow point tip; and a single platform chert core.

Of the 73 decorated sherds from various investigations carried out by Sam Whiteside at the Jamestown site, more than 23% are red-slipped, which is in my view a good indication of a Middle Caddo period age (ca. A.D. 1200-1400) for prehistoric Caddo sites in the upper Sabine River basin, including the Caddo occupation at Jamestown. Brushed pottery accounts for only 4.1% of the decorated sherds, including two with brushed-punctated design elements. Similar brushed-punctated sherds are seen in the post-A.D. 1350 Caddo occupation at the Oak Hill village in Rusk County, Texas (Rogers and Perttula 2004). Also well-represented in the decorated sherds are those that have been punctated (19%), incised (23%), as well as the engraved fine wares (15%). Other utility wares that are decorated are sherds with incised-punctated (8.2%), appliqued (2.7%), incised-punctated-appliqued (1.4%), and punctated-appliqued (1.4%) elements.

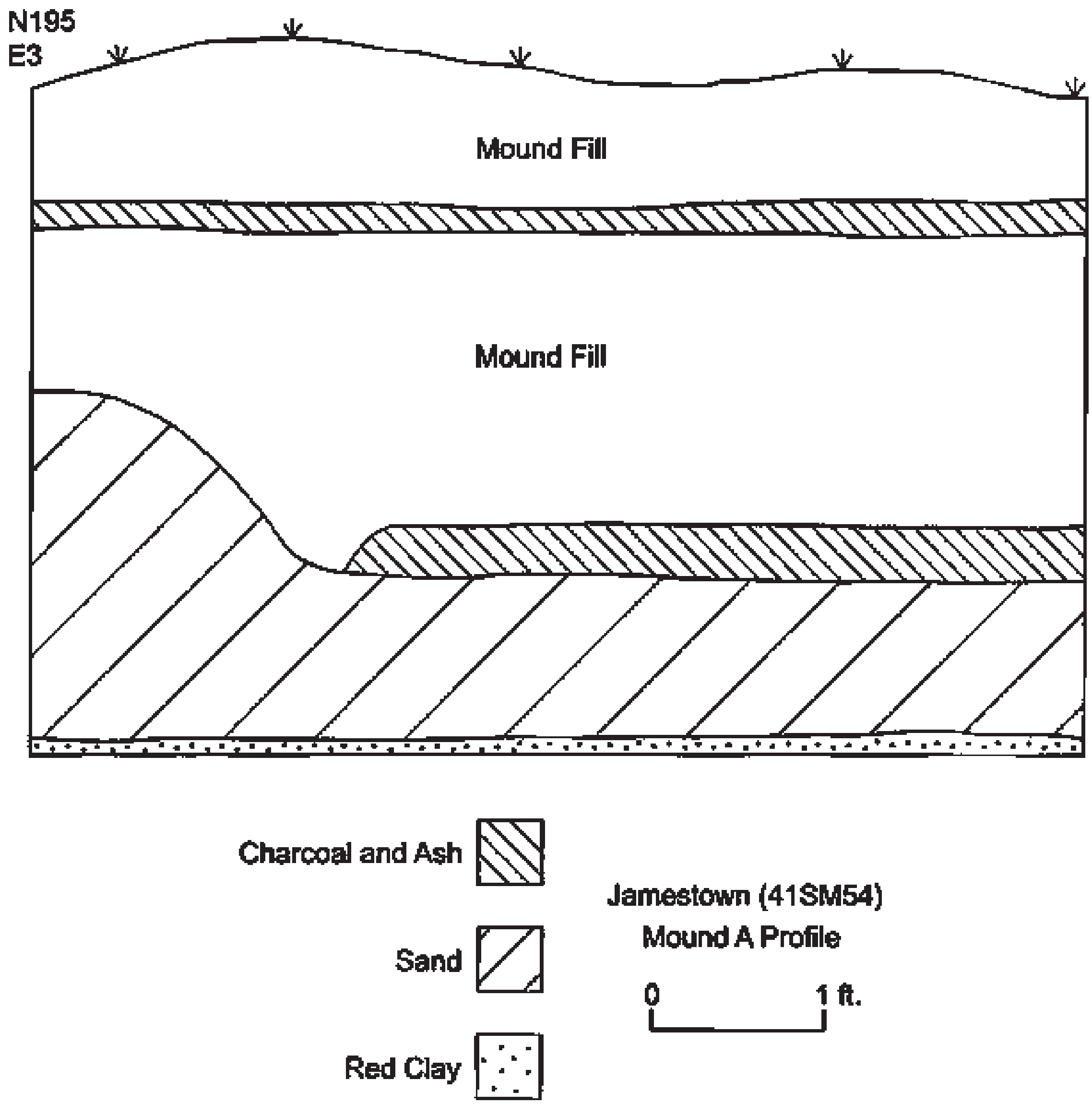

Figure 7. Profile of unit in Md. A, from Sam Whiteside's notes.

Later Archaeological Investigations at Jamestown

In 1959, archaeologists from The University of Texas visited the Jamestown site (because of the information they obtained about it from Sam Whiteside), and they reported that the main mound (Md. A) was in good condition with the exception of one large hole near the crest of the mound (probably Whiteside's excavations). No artifacts were collected from the mound at the time, but during their reconnaissance of the site, a large amount of artifacts were collected from the plowed surface of the field north and east of Md. A (see Figures 1 and 2), especially 100-200 m northeast of the mound in the areas suspected to contain possible midden deposits (see

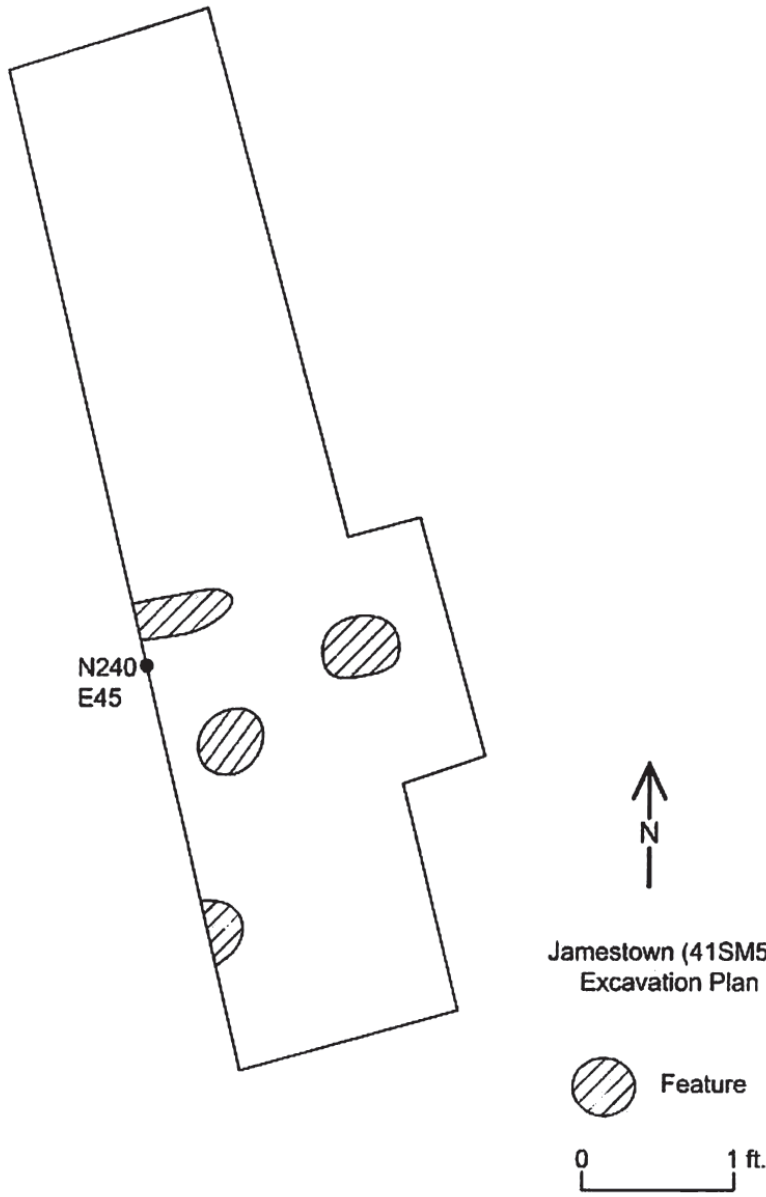

Figure 8. Plan of Sam Whiteside excavations south of Md. A.

Figure 2). Their collection includes 204 sherds, six pieces of burned clay, two Alba arrow points, a portion of an abrader, a fire-cracked rock, two pitted stones, and six pieces of lithic debris. Approximately 23% of the sherds were decorated, including incised, engraved, and red-slipped decorated sherds.

In the early 1970s, Mr. Robert Turbeville, an avocational archeologist living in Mineola, Texas, purchased a house lot that was situated at the south end of the Jamestown site, about 50 m south of Mound A. He apparently conducted limited excavations/explorations in a garden area north of his house (see Figure 2), but outside the TAC preserve, and recovered many ceramic sherds from this work (Perttula 1989:68). This collection has not been studied at this time.

In the late 1970s, Dr. James Bruseth (then at Southern Methodist University) and Bob Skiles visited the site. They excavated a small unit on Md. A at the site adjacent to a large pothole on the crest of the mound (this hole is probably the 1950s Whiteside excavations on the mound). They noted evidence of different fill zones, but only a few ceramic sherds were recovered or noted.

Finally, in the 1980s, archaeologists from the University of North Texas visited the site as part of an examination of Caddo mounds in the Sabine River basin. They excavated a number of shovel tests (Perttula 1989: Figure 24) on the eastern side of the site (the eventual TAC preserve)

The 16 shovel tests were placed in five of the mounds (Md. A-E) and then in areas around the mounds. Most of them contained prehistoric archaeological material. Mound fills were recognized in different shovel tests by a charcoal-streaked sandy loam A-horizon visible in shovel test profiles. Midden deposit was identified in one shovel test by a dark brown to black sandy loam deposit with charcoal and ceramics between ca. 28-40 cm bs. The midden area—in the far northeastern part of the preserve (see Figure 2)—was demarcated as a slight rise (see Figure 1), but it seemingly represents an accumulation of refuse rather than a product of a deliberately constructed mound. Outside of the mound and the midden, the archaeological deposits in the shovel tests were thin, and they were primarily restricted to the plow zone.

Artifacts found in the shovel testing were concentrated in Md. B and the midden. The density is 3.5 artifacts per shovel test, which is about 35-40 artifacts per cubic meter in the archaeological deposits. Including artifacts from the surface, a total of 64 items were found, namely six fire-cracked rocks, 10 pieces of lithic debris, a flake tool, five burned clay pieces, and 42 ceramic sherds.

The sherds were tempered with grog and grog-bone, and some of the sherds had crushed pieces of hematite in the paste. The decorated sherds were few (n=6), and the small assemblage has a plain-decorated sherd ratio of 6.00 (i.e., six plain sherds to every one decorated sherd). Three of the sherds had a red-slip, one had a row of fingernail punctates, and two were cross-hatched incised body sherds.

During a first effort at remote sensing at Jamestown in 2005 (to be reported separately), we had the opportunity to observe artifacts visible on the surface of the site across the TAC preserve. There were four areas where we noted prehistoric Caddo artifacts on the surface. The first was at the entrance to the property (between Mds. A and B along FM 1253), where a diagonal engraved body sherd was noted. Two thin-walled body sherds were also noted in a gopher mound at the far eastern end of the preserve, and two more plain body sherds were noted northeast of Md. A. In a drainage/eroded area at the north-central boundary of the preserve (see Figure 1), a large number of prehistoric Caddo artifacts were noted. These included seven pieces of chert lithic debris, two chert cores (one being a single-platform core, and the another is a bipolar core), and 20 Caddo sherds. Sixteen of the sherds were plain body sherds, but four were body sherds that were decorated: one with parallel engraving; two with an exterior red slip; and one with curvilinear incised lines.

SUMMARY

Although there has been very little archaeological work done at the Jamestown Mound site (41SM54) since it was first recorded in the 1950s, there is some information available from disparate sources (especially the excavations and artifact collections by Sam Whiteside) that provides a glimpse of the nature of the prehistoric Caddo occupation at this mound center. The mounds either capped important structures, or had structures that stood on them (Md. A) that were burned and capped with clay, probably as part of community-level rituals and ceremonies. There are Caddo habitation deposits in several areas at Jamestown, marked by midden deposits and features, including large pits and post holes from structures.

It will be important in coming years that archaeological work at the Jamestown Mound site focus on relocating all the mounds on the TAC preserve. The exact locations of Mds. D and E are not known with any precision, and there are no obvious surface manifestations of these two mounds. Also key for future TAC management and research needs at Jamestown will be to identify and define the distribution of prehistoric habitation deposits, features, and middens at the site as these constitute the unstudied but important settlements of the Caddo people that lived and used the mound center. The available artifacts recovered from the site do suggest that its principal Caddo use was ca. A.D. 1200-1400, when it was one of the premier mound centers in the Sabine River basin in Northeast Texas.

The remote sensing effort—if successful—will be a good step in this direction, particularly if it can identify midden and structure locations across the site. A program of systematic shovel tests across the TAC preserve could—at very little expense and minimal impact to the archaeological deposits—serve the same purpose and help obtain information on the intra-site character of Caddo habitation deposits. This work would also have the added benefit of recovering samples of artifacts from a controlled context to better understand the settlement of the Jamestown site. Furthermore, under the right circumstances, the finds from controlled shovel tests (artifacts and material remains) could be used to help establish the absolute age (from radiocarbon and thermoluminescence dating) of the prehistoric Caddo occupation at the Jamestown site.

ACKNOWLEDGMENTS

I want to thank Amy Espinoza-Ar, Jim Walker, and Dee Ann Story of The Archaeological Conservancy for their assistance in obtaining permission to conduct non-invasive remote sensing research at the Jamestown Mound site preserve. I also appreciate the assistance and advice provided by Dr. Lewis Somers (Geoscan Research) in the magnetometer and resistivity surveys conducted at the site by Chester P. Walker. The volunteer help provided by Shawn Marceaux and T. Clay Schultz in the work, along with that of Bo Nelson and Mark Walters, is gratefully acknowledged. Mark Walters also provided useful comments on this manuscript. Finally, I thank Mr. Orval Johnston, who gave us his permission to work on the land.

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Leaning Rock Site (41SM325) Lithics

Harry J. Shafer

INTRODUCTION TO THE LITHIC ANALYSIS

The intent of the lithic analysis from the Leaning Rock site (41SM325) in Smith County, Texas, is to glean all possible information from the artifacts. Lithic studies have taken the back seat in materials analysis from sites and projects in East Texas where archaeologists focus primarily, if not exclusively, on formal tool analysis, if any analysis is done at all. Stone tools often had complex histories, and reading these histories can provide some useful, if not the only source for, insights into tool technologies, function, style, and social inferences. Stone tools were used in entirely different functional contexts than were ceramics, and provide complimentary and often unique information not provided by any other material artifact class.

The lithic analysis was conducted first to provide a descriptive report of the sample, and second to assess stylistic, chronological, functional, and behavioral information where possible. Smith County is an impoverished region in terms of lithic natural resources (Banks 1990). The materials available to the prehistoric Woodland and Caddo populations consisted mainly of orthoquartzite pebbles from extensively reworked Uvalde Pliocene gravels, small chert pebbles, silicified wood, ferruginous sandstone, and hematite. The orthoquartzite, chert, and silicified wood occur as secondary deposits in local streams. Imported chert, or rarely novaculite, can often be identified in finished artifacts such as dart points, arrow points, and finely finished biface knives (Shafer 1973:343). In the latter cases, the artifacts themselves were most likely introduced in finished form. Ground stone artifacts such as celts also were imported in finished form from Caddo populations that had access to the lithic resources found in the Ouachita Mountains of eastern Oklahoma and southwestern Arkansas (Shafer 1973:308).

Given the impoverished nature of the locally available lithic resources, one of the objectives of the debitage analysis was to plot the raw material types. Technological information was limited because of the very small and fragmentary nature of the flakes and other debitage. Despite this shortcoming, some interesting observations regarding technology were possible, such as the identification of punch-produced thinning flakes and bipolar technology. The latter may have been primarily associated with silicified wood and chert pieces used as wedges to split wood. More on this topic is presented below with the discussion of "battered pieces" or wedges.

ARTIFACT DESCRIPTIONS

The lithic artifacts were divided into material classes following standard procedures for sorting and classifying lithic assemblages. Artifacts were first sorted on the basis of overall technology (chipped stone and ground and/or pecked stone). Chipped stone artifacts were grouped into functional and/or technological classes. Artifacts were grouped into functional and descriptive classes, although these categories could not always be logically followed. The groupings are: projectile points, perforators, bifaces, battered pieces or wedges, utilized flakes, and chipped adze/celt. Ground and/or pecked stone artifacts are grouped into the following categories: celt fragments, hammerstone or pecking stone, and pot polishing stones. Miscellaneous artifacts and chipping debitage are also described under separate headings.

Chipped Stone

Projectile points

The projectile points are divided into arrow points and dart points based on technology and morphology.

Arrow Points (n=4)

The four points are illustrated in Figure 1A-D. One untyped point (Figure 1A) has a parallel stem, rounded base, and a shouldered serrated blade. The material is a non-local gray-tan chert. The point was recovered from TU-9, 20-30 cm. Length: 16 mm; Width: 9 mm; Thickness: 2.5 mm.

Another untyped point (see Figure 1B) is unifacially fashioned from gray chert; it has a short stem that contracts to a point, as well as a shouldered but not barbed blade. The point may not have been finished. The point was recovered from TU-1, 40-50 cm. Length: 19 mm; Width: 11.5 mm; Thickness: 3.5 mm.

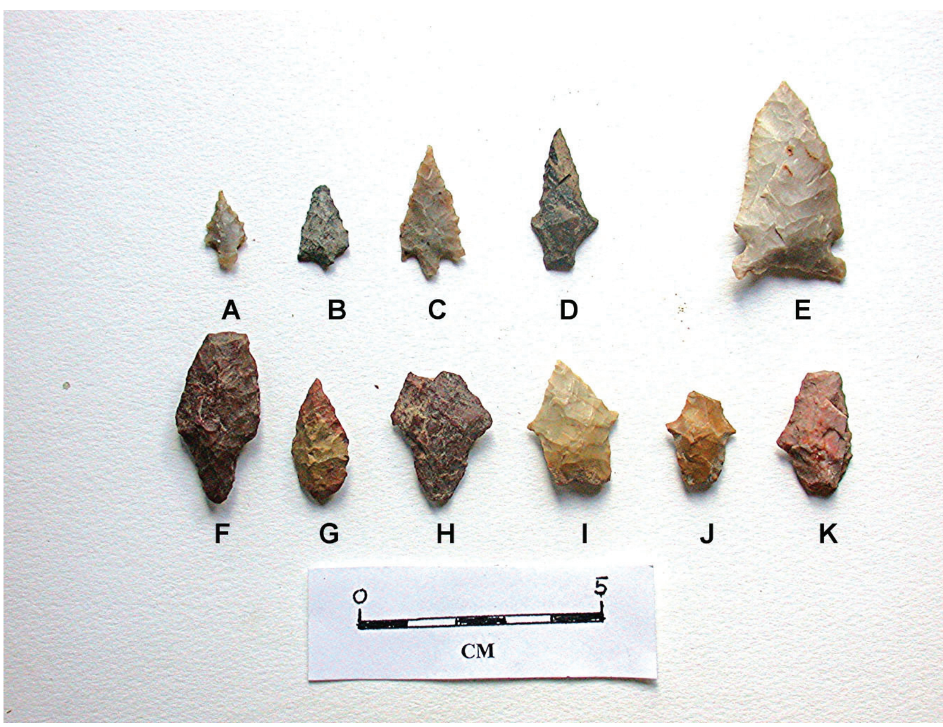

Figure 1. Projectile points. Arrow points: A-C, possible Perdiz-Bassett; D, Friley; Dart points: E, Big Sandy; F-K, Gary.

A third untyped specimen (see Figure 1C) is of a non-local tan chert with dark brown spots. It too has a short, contracting stem with a barbed blade that is slightly serrated. The artifact was recovered from TU-13, 20-30 cm. Length: 29 mm; Width: 14 mm; Thickness: 3 mm.

The fourth example (Figure 1D) conforms to the Friley type, albeit a very crude example. It has a square stem, concave blade edges below the shoulders, and a long narrow blade. The flaking is entirely unifacial. The material is silicified wood. Provenience: TU-13, 20-30 cm. Length: 29 mm; Width: 14 mm; Thickness: 5 mm.

Arrow Point Preform (n=1)

This artifact (Figure 2A) is a failed attempt to make an arrow point from a silicified wood flake. The distal tip is bifacially formed and tapered to a point. The proximal end is largely unworked and apparently the effort was thwarted by the thickened striking platform of the flake blank. Provenience: TU-12, 20-30 cm. Length 25.5 mm., Width: 19 mm.; Thickness: 7 mm.

Comments on Arrow Points

The typological assessment of the small arrow point sample from the Leaning Rock site is somewhat problematic. The Friley example is the exception, and probably predates the remaining three points. The variability represented in the remaining three points is doubtfully significant given the tiny sizes and raw material. Two are of non-local chert. All three fall into the Perdiz-Bassett genre, but I hesitate to classify them as Perdiz due

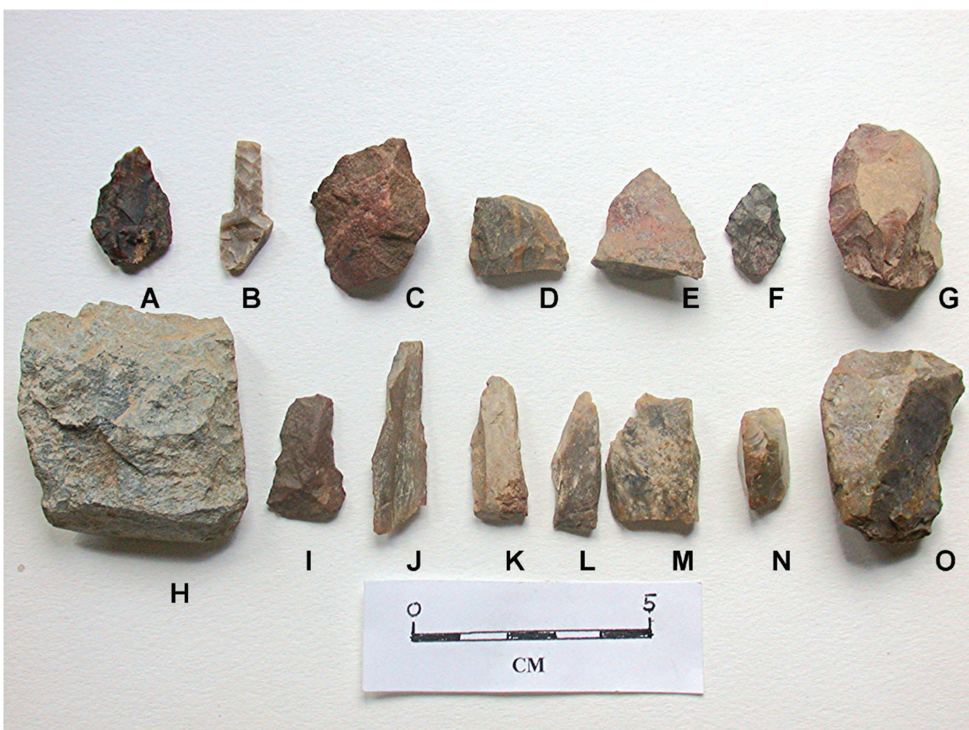

Figure 2. Other Artifacts: A, arrow point perform; B, perforator; C-G, bifaces, H, adze or celt; I-J, Utilized flakes; K-O, battered pieces or wedges.

to the wide regional variation known for this type across the state and will use the term "Perdiz-Bassett" here to signify stylistic variability and the overlap between these two formal types. The variability seen in this small sample is consistent with larger samples of arrow points recovered from Caddo sites of comparable age such as Oak Hill Village (Rogers and Perttula 2004:167-174), and Deshazo (Girard 1995). Also, only two of the Perdiz-Bassett arrow points (see Figure 1A, C) were probably intended for use in hunting or warfare. The one small Perdiz-Bassett specimen (see Figure 1B) may very well have been a novice attempt to pattern an arrow point after those made by their male elders. The material expression of novices is something that is beyond the radar of archaeologists, but should be taken into account when material culture assemblages are analyzed.

Dart Points (n=7)

Seven artifacts are classed as dart points based on their morphology and technology. One is classed as a Big Sandy type (Turner and Hester 1999: 81) and the remainder fall within the Gary type (Suhm et al. 1954; Turner and Hester 1999:123-124).

Big Sandy (n=1)

This complete side-notched point of non-local light to dark tan chert exhibits a reworked tip (see Figure 1E). The reworking of the blade resulted in a slight twist to the left. The base is slightly concave and the blade edges are slight convex on one edge and re-curved on the other; the latter is the result of reworking the tip. The point was a surface find. Big Sandy is associated with Early Archaic components in East Texas (Duffield 1963: Figure 6C-F; Turner and Hester 1999:123; Webb et al. 1971:15-17).

Gary (n=6)

The Gary points are described individually and are shown in Figure 1F-K. The specimen in Figure 1F has a narrow, contracting, slightly asymmetrical stem, weak shoulders, and a triangular blade. The tip has been snapped. The material is a reddish, heat-treated orthoquartzite. Provenience: TU-9, 30-40 cm. Length: 34 mm; Width at shoulders: 16 mm; Thickness: 9 mm.

The second specimen (see Figure 1G), is a very small, contracting stem point with a rounded base. The blade has been so extensively reworked as to create a shoulder-less point. This tiny point is all that remains of an extensively reworked Gary. The material is heat-treated orthoquartzite. Provenience: Block 36, Surface. Length: 25 mm; Width: 13 m; Thickness: 8 mm.

The third specimen (see Figure 1H) exhibits a contracting stem that is tapered to a point, prominent shoulders, and a triangular blade. The tip is broken. The material is a deep red heat-treated orthoquartzite. Provenience: TU-12, Feature 5, 70-80 cm. Length: 26.5 mm; Width: 21.2 mm; Thickness: 7.5 mm.

The fourth specimen (see Figure 1I) has a contracting stem, an un-worked base, and slight shoulders. The blade edges expand, but are convex below the shoulders (similar to Friley arrow points; see Turner and Hester 1999:214) due to extensive reworking of the blade. The material is tan chert. Provenience: Block 51, surface. Length: 26.5 mm; Width: 19 mm; Thickness: 7 mm.

The fifth Gary point (see Figure 1J) has a contracting stem, slight shoulders, and convex blade edges below the shoulders like the fourth specimen mentioned above. The blade is broken by a direct impact. The material is yellow chert. Provenience: TU-11, 30-40 cm. Length 19 mm; Width: 15 mm; Thickness: 6 mm.

The sixth example (see Figure 1K) is a tiny contracting stem point, with weak shoulders, and concave blade edges. It was extensively reworked and evidence of failed further attempts to thin the point can be seen in the form of step flake scars. The material is pink novaculite. Provenience: TU-11, 30-40 cm. Length: 25 mm; Width: 16 mm; Thickness: 9.5 mm.

Comments on Dart Points

The six Gary points form an interesting assemblage. For one thing, they are all diminutive and exhibit the ultimate efforts of repair such that they were reduced to nubbins. Despite the extensive amount of reduction from salvaging efforts and overall morphological variability in the sample, the stems provide the attributes to identify them all as Gary. The raw material varied with heat-treated orthoquartzite being represented by three specimens, chert by two points, and novaculite by one Gary point. Small Gary points are a diagnostic artifact form for the early and middle Woodland components in East Texas (Perttula 2004:376). Their presence in this assemblage is attributed to admixture of early Woodland and Middle Caddo material within the site area.

Other Chipped Stone Artifacts

Several lithic artifacts other than projectile points were identified in the collection from the Leaning Rock site. In some respects these are more revealing in terms of function than are the points. The other lithic artifacts include a perforator, bifaces, battered pieces or wedges, utilized flakes, and a makeshift adze or celt. Debitage is described separately.

Perforator (n=1)

This specimen (Figure 2B) is made on a non-local chert flake. The base is mostly un-worked and the shaft is well fashioned with parallel edges. The tip is broken. Provenience: Block 37 surface. Length: 29 mm; Width: 11 mm; Thickness: 4.5 mm.

Bifaces (n=5)

The biface shown in Figure 2C is a heat-treated orthoquartzite piece. It is probably an aborted attempt to fashion a Gary point. Provenience: Surface. Length: 34.5 mm; Width: 21.5 mm; Thickness: 7 mm.

The specimen in Figure 2D is the medial fragment of a silicified wood biface, probably a dart point. Provenience: TU-1, 10-20 cm. Length: 19 mm; Width: 21.5 mm; Thickness: 7 mm.

The third example (Figure 2E) is the distal portion of an early stage orthoquartzite biface. Provenience: Block 15 surface. Length: 23 mm; Width: 24 mm; Thickness: 11 mm.

The fourth biface (Figure 2F) is the burned distal portion, probably a dart point. It is a thermally discolored chert. Provenience: TU-11, 20-30 cm. Length: 20 mm; Width: 17 mm; Thickness: 4 mm.

The very crude biface shown in Figure 2G is an orthoquartzite pebble exhibiting flake scars bifacially in a failed effort to thin the pebble. Provenience: TU-12, Feature 5, 80-90 cm. Length: 36 mm; Width: 26 mm; Thickness: 20 mm.

Battered pieces or wedges (n=6)

Seven artifacts were identified as battered pieces or wedges based on the observation that they had opposed battered and/or crushed edges, or the remnants thereof. Five are illustrated in Figure 2K-O. These artifacts were subjected to bipolar battering and were most likely the end products of slivers or flakes used as wedges to split wood. When the sharp edge of a flake or nodule is placed in a slot and hit with a hammer, both impact points will display crushing or bi-polar fracture characteristics. In the case of the Leaning Rock specimens, extensive use is indicated by edge crushing, and on one example (see Figure 2O) dulling or smoothing created by repeated wear subsequent to edge fracture. Others are slivers and fragments of silicified wood that were used as wedges; damage and breakage patterns are characteristic of bipolar impact force (see Shafer 1973:112-114; Brewington et al. 1995:78-81).

Provenience: Block 39, surface, silicified wood, Length: 30 mm; Width: 10 mm., Thickness: 6 mm; TU-11, 0-10 cm, Length: 20.5 mm, Width: 15 mm., Thickness: 11.5 mm); TU-11, 10-20 cm (two specimens), recycled polishing stone, material is a orthoquartzite. Length 41 mm., Width: 31 mm, Thickness: 19 mm; smaller specimen: material, chert; Length: 23 mm, Width: 11.5 mm, Thickness: 6 mm; TU-12, Feature 5, 80-90 cm, silicified wood, Length: 28 mm, Width: 23 mm, Thickness: 8 mm; TU-13 20-30 cm, chert, Length: 31 mm, Width: 25 mm, Thickness: 20 mm.

Utilized Flakes (n=2)

Both are flakes that exhibit micro-flaking along one sharp edge created by pressure from use (see Figure 2 I-J). One is a chert cortex flake and the other is a sliver of silicified wood.

Provenience: Chert: TU-6, 20-30 cm. Length: 27 mm, Width, 17 mm, Thickness: 6 mm; silicified wood: TU-12, 20-30 cm. Length: 41 mm; Width: 11.5 mm; Thickness: 6.5 mm.

Chipped Adze or Celt (n=1)

This interesting make-shift adze or celt (see Figure 2H) was made from the recycled fragment of a celt. Part of the ground surface of the original celt is retained on the proximal end. The give-away attributes for the adze or celt classification were the chipped and ground lateral edges and sharp, faintly beveled distal end. The lateral edge grinding was to facilitate hafting. The raw material is an imported igneous rock, possibly a porphyry. The crystalline rock is not conducive to conchoidial fracture, so the flake scares are quite ragged.

Provenience: TU-1, 20-30 cm. Length: 51 mm; Width: 45 mm; Thickness: 21 mm.

Ground and/or Pecked Stone Artifacts

Artifacts that were shaped by pecking and/or abrasion are described under this heading.

Pot Polishing Stones (n=3)

These artifacts are smoothed and highly polished pebbles. Scratches and striations seen under 10X magnification attest to the fact that they are indeed artifacts and not natural gravels. One complete example (Figure 3A) is a natural pebble that was extensively used to the point that a dull polish can be seen on most of its surface; the polish is especially prominent on the flatter surface. The second example (Figure 3B) is made of a red jasper (possibly made red from heat). This polishing stone is damaged from thermal fracture, but the surfaces are very highly polished with visible scratches and striations. The third specimen is a fine-grained quartzite pebble polished around much of its circumference. There is little question as to how these three artifacts were used.

Provenience: TU-11, 10-20 cm.; Material: Orthoquartzite?; Length: 49 mm, Width: 35 mm; Thickness: 30 mm; TU-12, 20-30 cm. Material: jasper; Length: 37 mm; Width: 14 mm; Thickness: 14 mm; TU-11, Feature 3, #1, 51 cm bs. Material: fine-grained quartzite.

Comments

Caddo ceramic technology includes the use of polishing stones during the process of burnishing while the ceramic body is leather hard. Stones used for polishing vessels achieve a very polished surface from abrasion with the gritty clays. Pot polishing stones were often curated and handed down from generation to generation among Native American potters (Rose Gonzales, San Ildefonso Pueblo, personal communication 1974),

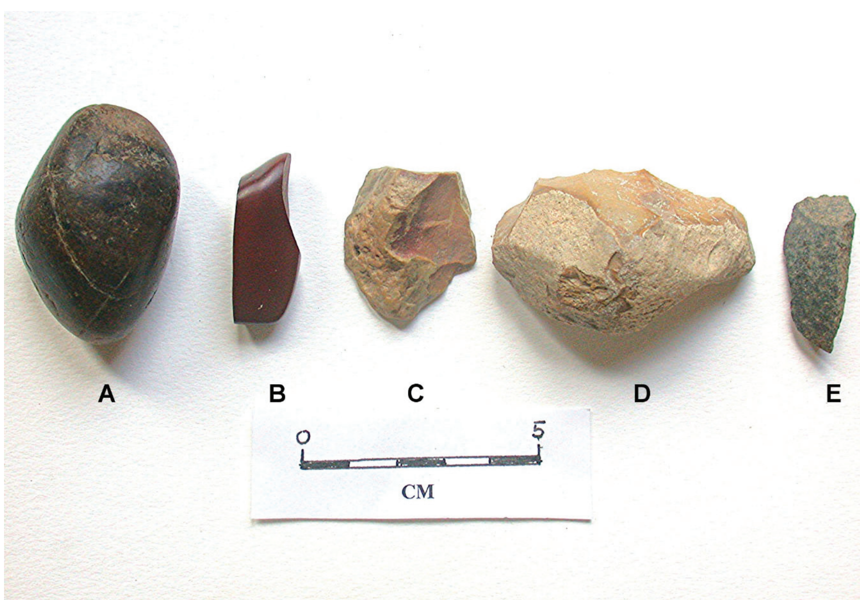

Figure 3. Polishing stones, cores, and spall from a celt: A-B, polishing stones; C-D, cores; E, spall from Ouachita Sandstone celt.

and pot polishing stones were often included in ancient Caddo tombs (Shafer 1973:319-323) and in potter's graves elsewhere (Shafer 1973: 310-323, 1985). The presence of polishing stones in this assemblage provides circumstantial evidence that potters were at work at this site.

Celt Debitage (n=4)

Four flakes (one shown in Figure 3E and another in Figure 4A) were removed from quartzitic sandstone celts, either due to recycling the celt material or from the shattering of the celts. One (Figure 4A) is a long spall removed from near the distal end of a celt, perhaps by impact. It was recovered from Feature 3, 21 cm bs. The fragment measures 90 mm long, 34 mm wide, and 10 mm thick. Another was recovered from TU-10, 10-20 cm. A third came from TU-12, 10-20 cm, and a fourth from TU-3, 0-10 cm.

Celt fragments (n=4)

In addition to the four pieces of debitage from celt recycling described above, four fragments representing three celts were recovered in the testing at the Leaning Rock site.

One specimen (see Figure 4B) is the poll end of a celt that was snapped and shattered. Since the fracture occurred in the haft zone, it was probably broken by impact. Provenience: TU-13, 20-30 cm. It measures 62 mm long, 38 mm wide, and 26 mm thick.

The second celt fragment (see Figure 4C) consists of two fragments that conjoin. They comprise the poll end of a celt shattered by burning. One was recovered from TU-5, 0-10 cm and the other from TU-10, 40-50 cm. The differences in depth and distance from the two fragments may suggest serious bioturbation in the deposits. Together the fragments measure 43 mm long, 32 mm wide, and 29 mm thick.

A third fragment (see Figure 4D) is a medial fragment of a shattered celt recovered from the surface of Block 57. It measures 45 mm long, 40 mm wide, and 15 mm thick.

All of the celt fragments and debitage from celt recycling are of a similar imported quartzitic sandstone, a common material in Caddo celt manufacture. The material has been noted in outcrops throughout the Ouachita Mountains and according to Banks and Winters (1975:27), it is either from the Stanley Shale or Jackfork Formation. Although the debitage sample contains three items of dark green quartzitic sandstone removed from celt fragments (coded Oss in Table 1, see below), there is no evidence that celts were manufactured from blanks brought to the site. The general pattern throughout the Caddoan area in Texas is that completed celts of exotic material were imported into the area (see Banks and Winters 1975: 35; Shafer 1973:299-309).

Hammerstone/Pecking stone (n=1).

This interesting artifact (see Figure 4E) was made from a recycled dark green quartzitic sandstone celt fragment. It is sub-rounded with a bifacially tapered end that does not come to a point. The surface is highly pecked, suggesting intentional shaping. It may have been a hammerstone or a pecking stone, but its real function or functions is unknown.

Provenience: TU-11, 20-30 cm. Length: 44 mm; Width, 42.5 mm; Thickness: 33 mm.

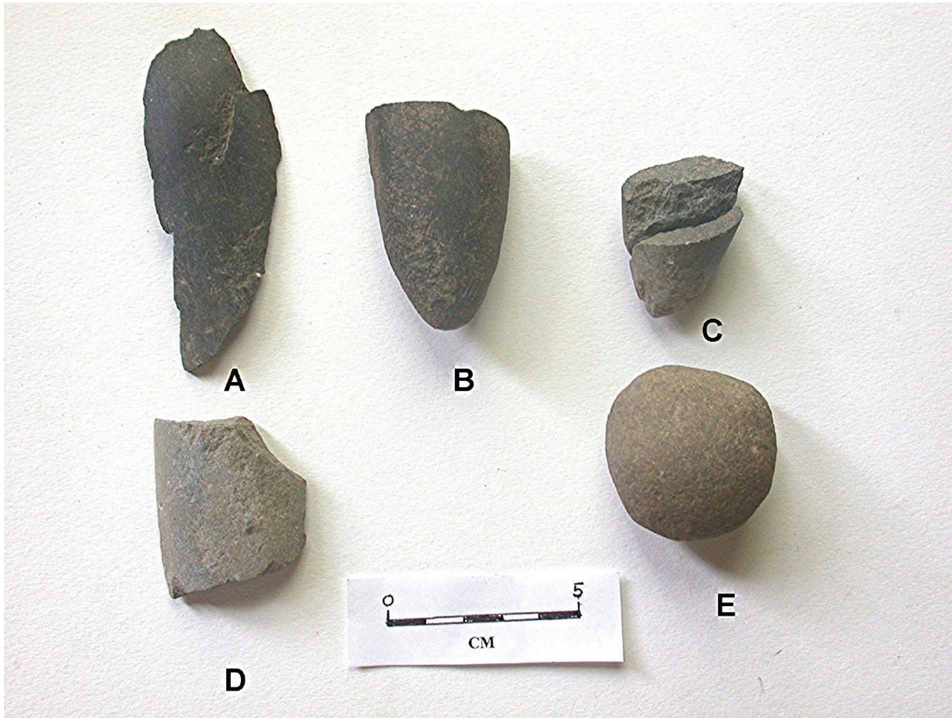

Figure 4. Celt fragments and hammerstone/pecking stone: A, spall from celt; B-C, poll end of celts; D, medial fragment of a celt; E, hammerstone/pecking stone made from a recycled celt fragment.

Chipping Debitage and Miscellaneous Artifacts

Chipping Debitage (n=161)

Chipping waste consists of cores and flakes, the residue from chipped stone manufacture and retouch. The general paucity of local raw material and the need for several classes of chipped stone tools made raw material a prime resource. As a result, masses of material were extensively reduced to very small sizes, and any broken tool, such as celts and pot polishing stones, were recycled for the raw material and put to use.

Three categories of raw material dominated the sample, silicified wood, orthoquartzite, and chert, occurring in about equal percentage. Both silicified wood (54 specimens, or 33.5%) and chert occurred in equal proportions while orthoquartzite (50 specimens or 31%) was slightly less. Quartzitic sandstone, a product of recycling raw material from broken celts, accounted for the remaining three specimens (2%). Also, it should be noted that the size of the debitage was very small (although not measured), probably the product of reducing pebbles rather than larger masses of material. The small size of the debitage and the categories represented are consistent with exploitation of locally available resources rather than importing raw material.

Table 1. Leaning Rock Site (41SM325) Debitage.

Unit/Material	lv. 1	lv. 2	lv. 3	lv. 4	lv. 5	lv. 6	lv. 7	70-75 cm	75+ cm	N
TU 1										
Sw*	1	1	4	-	-	1	1	-	-	8
Oqz	-	-	-	-	-	-	-	1	-	1
Ch	1	1	1	-	1	-	-	-	-	4
TU 2										
Sw	1	-	-	-	-	-	-	-	-	1
Oqz	1	-	1	-	-	-	-	-	-	2
Ch	1	-	-	-	-	-	-	-	-	1
TU 3										
Sw	-	1	1	-	1	-	-	-	-	3
Oqz	1	1	1	-	-	-	-	-	-	3
Ch	-	-	-	-	-	-	-	-	-	0
Oss	1	-	-	-	-	-	-	-	-	1
TU 4										
Sw	-	-	-	-	-	-	-	-	-	0
Oqz	-	1	2	-	1	-	-	-	-	4
Ch	1	-	-	-	-	-	-	-	-	1
TU 5										
Sw	-	-	-	-	-	-	-	-	-	0
Oqz	-	2	-	1	-	-	-	-	-	3
Ch	1	1	1	-	-	-	-	-	-	3
TU 6										
Sw	-	-	-	1	-	-	-	-	-	1
Oqz	-	3	1	1	-	-	-	-	-	5
Ch	-	-	1	1	-	-	-	-	-	2
TU 7										
Sw	1	1	1	-	-	-	-	-	-	3
Oqz	-	1	-	4	-	-	-	-	-	5
Ch	-	-	-	1	-	-	-	-	-	1
TU 8										
Sw	1	-	1	-	-	-	-	-	-	2
Oqz	-	-	-	1	-	-	-	-	-	1
Ch	1	-	-	-	-	-	-	-	-	1
TU 9										
Sw	-	1	2	-	-	-	-	-	-	3
Oqz	-	2	1	1	-	-	-	-	-	4
Ch	-	2	6	-	-	-	-	-	-	8
TU 10										
Sw	-	-	3	-	2	-	-	-	-	5
Oqz	-	-	1	3	-	-	-	-	-	4
Ch	1	2	2	-	-	-	-	-	-	5

Oss	-	1	-	-	-	-	-	-	-	1
TU 11										
Sw	1	3	3	2	-	-	-	-	-	9
Oqz	1	2	-	-	-	-	-	-	-	3
Ch	1	1	1	1	-	-	-	-	-	4
TU 12										
Sw	-	3	5	-	-	-	-	-	-	8
Oqz	-	3	3	-	1	-	-	-	-	7
Ch	3	5	3	2	1	-	-	-	-	14
Oss	-	1	-	-	-	-	-	-	-	1
TU 13										
Sw	-	3	2	3	-	-	-	-	-	8
Oqz	-	1	4	-	-	-	-	-	-	5
Ch	-	2	4	1	-	-	-	-	-	7
Feature 3										
Oqz	-	-	-	-	-	1	-	-	-	1
Feature 5										
Sw	-	-	-	-	-	-	2	1	-	3
Oqz	-	-	-	-	-	-	-	1	1	2
Ch	-	-	-	-	-	-	-	2	1	3
Totals	19	45	55	23	7	2	3	5	2	161

*Sw-silicifed wood; Oqz=orthoquartzite; Ch=chert; OSS=Ouachita sandstone or quartzitic sandstone

Only two cores were in the sample, and both were small pebbles that exhibited two or more tiny flake removals (see Figure 3C-D). Flakes, chips, and other fragments constitute the remainder of the debitage sample. Table 1 provides a listing of these flakes by material and provenience.

No effort was made to systematically sort the flakes with striking platforms according to method of detachment, although two separate reduction methods were recognized in the sample: pressure flakes, and small arched lipped flakes removed by indirect percussion or punches. The latter is a reduction method rarely discussed in Texas archaeology, but is very likely the method used to biface the heat-treated orthoquartzite used in the manufacture of Gary points over much of the East Texas region. No other method such as pressure flaking or use of a billet seems feasible given the small size of raw material, tough material, and naturally occurring thick pebbles and cobbles.

Burned ferruginous sandstone (n=1)

One fragment of burned ferruginous sandstone is in the sample. The fragment has a curved surface that suspiciously looks like it may have come from a celt, but upon close examination revealed surface irregularities inconsistent with those of celt manufacture. If this fragment came from an artifact, the type of artifact is unknown.

Provenience: TU-12, 40-50 cm.

SUMMARY AND DISCUSSION

Chronological and Stylistic Implications of the sample

The lithic sample from the Leaning Rock site (41SM325) indicates a multi-component occupation. Diagnostic point types were Big Sandy, Gary, Perdiz-Bassett, and Friley. The most prominent components are a Woodland assemblage identified by Gary dart points and a Middle Caddo assemblage marked by arrow point types Perdiz/Bassett. A single Friley point may hint of a very brief Early Caddo presence at the site as well. Little emphasis is placed on the Big Sandy point since such items could have been picked up and brought to the site by Woodland or Caddo occupants (Shafer 1973:181-187).

The small sample of projectile points provides some limited stylistic information that is substantiated at other Middle Caddo sites (Rogers and Perttula 2004:167-174). The small sample of dart points also indicates the site was probably a short-term encampment for a small Late Archaic or Woodland group. The sample is dominated by Gary points; this point type can be found on virtually every hill or knoll in proximity to water throughout East Texas, and an admixture of Late Archaic/Early Woodland components can almost always be expected at most Caddo sites. The bow and arrow replacement of the atlatl spear probably took place during the Middle-Late Woodland transition at ca. A.D. 600-800, and may have defined the Late Woodland phase along with changes in ceramic styles (Perttula 2004:376). Projectile points recovered from mortuary contexts provide the best chronological evidence for the chronological separation of dart points and arrow points, however, and very strong evidence that the two did not co-occur is in early Caddo material culture at the George C. Davis site (41CE19). No dart points were recovered from any of the Mound C tombs that yielded over 200 arrow points from multiple clusters and concentrations (Shafer 1973:181-219).

The Big Sandy point would suggest either a thin Early Archaic component was represented at Leaning Rock, or the artifact was picked up and introduced in the site by the Caddo or Late Archaic-Early Woodland groups. Collecting from earlier sites was not uncommon among the Caddo (Shafer 1973:181-187). The admixture of dart points and arrow points at the Leaning Rock site deposits is attributed to mixing due to the nature of the relatively shallow and bioturbated deposits.

Spatial Implications of the sample

Small spatial samples can often result in false patterning. The caveat notwithstanding, the distribution across the excavated area of the lithic material at Leaning Rock (41SM325) does suggest that a concentrated midden deposit, and possibly a structure, was present within the area sampled in the archaeological investigations. A full analysis of the spatial distribution will need to incorporate all of the material culture, including ceramics and faunal material.

Functional Implications of the sample

Weapons for hunting and warfare were obviously maintained by all occupants of the Leaning Rock site as indicated by the presence of projectile points. Woodworking implements are well represented by the bipolar wedges or battered pieces, the small makeshift adze or celt, and celt fragments. Utilized flakes were surprisingly rare, and their rarity may be attributed to the paucity of suitable raw material, and to the historically known fact that the Caddo used the sharp edges of highly silicate native cane as knives.

An interesting discovery in the sample was pot polishing stones. These highly polished and striated pebbles were the products of polishing or burnishing the surfaces of leather-hard ceramics. Their presence in the sample stands as circumstantial evidence that some of the ceramics at the site were locally produced. Future instrumental neutron activation analysis of the ceramics could substantiate the possibility of local production. These tools do not provide useful chronological information because they are associated with ceramic technology, and may occur with any ceramic component.

Finally, the lithic artifact sample from the Leaning Rock site provides some possibly significant, if not vague, hints of resource utilization through time. The resource utilization probably relates to relative degrees of mobility or sedentary lifestyles. For example, the single Big Sandy point is a high quality chert, probably of Edwards formation origin (Banks 1990: 59-62). The Big Sandy is an Early Archaic point style associated with groups who practiced highly mobile lifestyles. The Gary points, arrow points, and debitage, on the other hand, are of materials regarded here as locally available in Northeast Texas, including orthoquartzites, small chert pebbles, and silicified wood (Girard 1995; Studer 1982). Gary points are regarded here as being associated with Woodland period occupations; Woodland groups were probably seasonally mobile, with more restricted mobility compared to the Early Archaic groups. Caddo groups were probably even more restricted in their movements compared to the Woodland groups. With trends toward reduced mobility through time, archeologists might expect more intensive uses of local as opposed to non-local resources, and the importation of non-local resources occurring mostly in the form of finished items (see Shafer 1973:337-364).

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The Organization of Novaculite Tool Production: Quarry-Workshop Debitage Comparisons

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ABSTRACT

Arkansas novaculite, outcropping in the Ouachita Mountains of Arkansas and Oklahoma, has been an important regional lithic resource for thousands of years. Because of the stone's durability, by-products of past novaculite procurement and tool production and use activities litter the landscape in southwest Arkansas. Recent work situates novaculite quarries in the broader context of tool production and exchange systems. This article focuses on the organization of tool production, and explores analytical techniques that can be used to identify spatial separation of the lithic reduction process between quarry, workshop, and habitation sites.

INTRODUCTION

Novaculite is a fine-grained siliceous material with few or no fossils that varies in color and texture; thin pieces are characteristically translucent (Holbrook and Stone 1979; Griswold 1892; Jeter and Jackson 1994). The Arkansas Novaculite formation outcrops along a 50-mile wide, 200-mile long band between Little Rock, Arkansas, and Broken Bow, Oklahoma, in the Ouachita Mountains (Figure 1). Sedimentary deposits were altered through diagenesis and metamorphosis during mountain building (Holbrook and Stone 1979; Keller et al. 1985; Steuart et al. 1984), and erosion has exposed folded and tilted beds of massive novaculite on mountain ridges.

Novaculite was the raw material of choice for stone-tool-using people living in the Ouachita Mountains at least as far back as the Archaic period. People living close to the sources could have procured novaculite directly from bedrock outcrops or in cobble form from river gravels (Waddell et al. 1995). It is a raw material that is ubiquitous on archeological sites in the Ouachita Mountains and is commonly found on sites in the adjacent Gulf Coastal Plain in southwest Arkansas and southeast Oklahoma (e.g., Schambach 1998). Some novaculite stone tools are found on sites as far away as Louisiana, Texas, and Mississippi. Those people living far from outcrop sources could have found novaculite locally as riverbed cobbles or in Pleistocene terrace gravels (e.g., Hemmings 1982; Perttula 1984). Novaculite for toolstone may also have been obtained by traveling directly to the outcrops or through trade (for example, novaculite artifacts are found on Poverty Point culture sites during the Late Archaic, ca. 3000-600 B.C., Jeter and Jackson 1994).

Quarrying novaculite for whetstones became an important industry during the nineteenth century around Hot Springs, Arkansas (Griswold 1892; Whittington 1969), and novaculite is still mined commercially today (Steuart et al. 1984). The nineteenth century exploitation of novaculite led to the first published descriptions of the aboriginal novaculite quarries in this area. In an 1844 publication, G. W. Featherstonhaugh (1968:110-111) described circular pit features at a novaculite quarry near Hot Springs, and connected raw material procurement at quarry sites with debris from tool manufacture seen at habitation sites elsewhere in the area. William H. Holmes (1891) visited a novaculite quarry site near Hot Springs in 1890, and used it (along with another

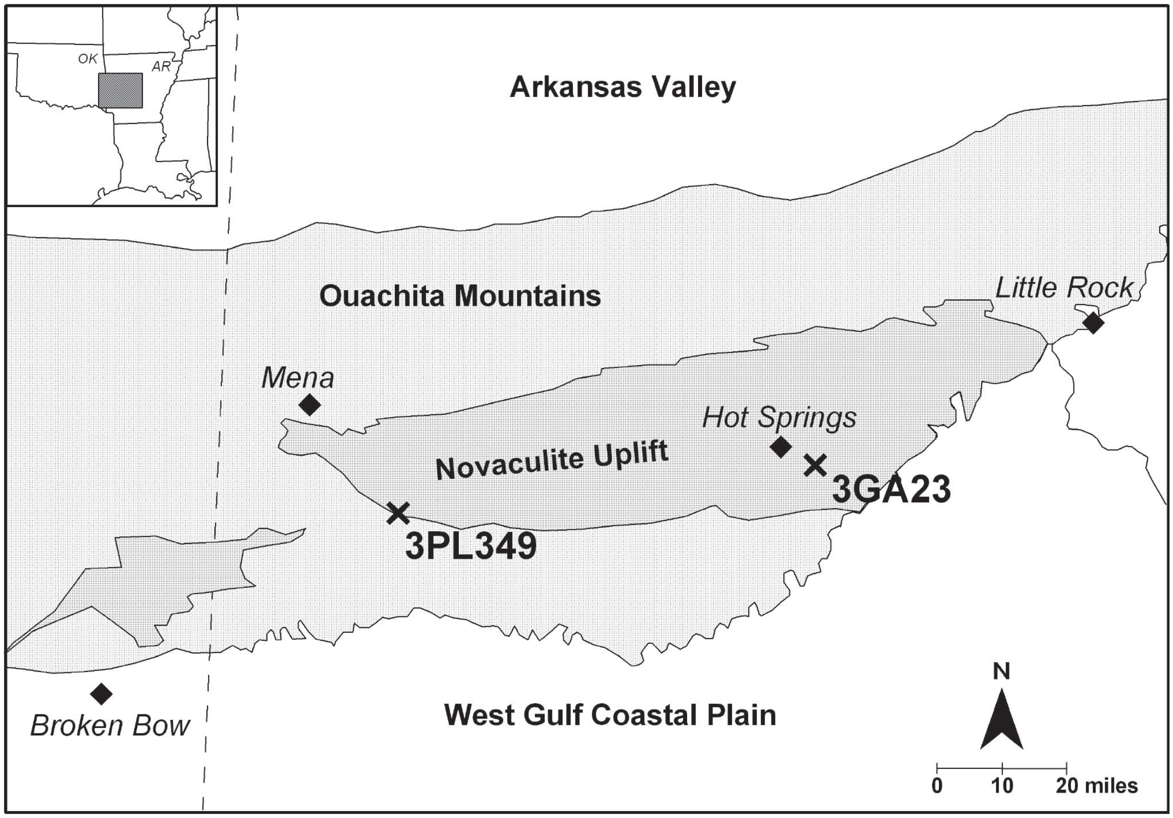

Figure 1. Location of sites 3PL349 and 3GA23 against physiographic provinces.

site visited by W. P. Jenney) as examples in his treatise on aboriginal North American stone quarries (Holmes 1974:196-200). In addition, Holmes (1891:Plate III) illustrated a series of rough bifaces, bifacial preforms, and finished dart points, and suggested that preliminary roughing out of blanks was done at quarries on the mountain ridges while final tool finishing took place at sites in adjacent valleys.

In the decades since the 1970s, research by professional archeologists has added numerous novaculite quarries to the Arkansas site files and produced descriptions of surface features at quarries (e.g., Baker 1974; Etchieson 1997). Research has also expanded on Holmes's basic model of toolstone procurement and tool manufacture. Projects at sites—many in the Ouachita National Forest—show us, for example, that streambed cobbles were a minor source of raw material as compared to bedrock outcrops (Thomas et al. 1982:275; Waddell 1995:106-120; see also Coleman 2002:52-53, 56-57); that lithic reduction and tool manufacturing was a major activity at some sites (e.g., Coleman et al. 1999; Early 2000; Martin 1982:Table 6; Stewart 1995; Thomas et al. 1982:273-276); and that thick bifaces were produced at some workshop sites to be used elsewhere (e.g., Coleman 2003).

I, along with Tom Green and Ann Early, published a research design for investigating novaculite quarry sites that details past work and outlines plans for future work. In it, we situate the quarries in the broader context of novaculite tool production and exchange systems (Trubitt et al. 2004). Increasingly, archeologists are interested not just in manufacturing techniques and technologies, but in understanding the social, economic, and political aspects of tool production, distribution, and use. In the lithics literature, these concerns have been discussed as "organization of technology," as the chaîne opératoire or reconstructing operational sequences, or as the "anthropology of technology." Since I am interested more broadly in craft production and exchange, I approach lithics through the "organization of production" literature. Here, I find Cathy Costin's (2001) discussion of the components of craft "production systems"—the meanings and uses of the crafted objects, the procurement of raw materials and production techniques, the spatial and social organization of production, the organization and mechanisms for distribution, and the crafters or artisans as well as the "consumers" of the objects—to be a helpful framework. While research may concentrate on one or another of these components, viewing tool production, exchange, and consumption as a system gives us the 'big picture' that allows us to relate artifacts, features, and sites across a region with each other and with the people who made and used novaculite tools in the past.

I am concentrating in this article on the organization of novaculite tool production. We have several research possibilities. Were quarrying and tool production spatially separated or were a variety of activities done at quarries and workshops as well as habitation sites? How was production organized in terms of control of production and access to lithic resources? Was quarrying and making stone tools something that every household in the area did for itself or did only certain groups visit quarries? How did toolstone procurement fit into the seasonal round and task schedules? Here I address one question: was preliminary reduction done at quarries and bifacial thinning and tool production done at workshop sites away from the outcrops? To answer this, we can look at tools and at their production debris. Differences in debitage patterning between sites help to characterize the spatial organization of production, an important first step towards understanding the social organization of tool production.

We expect that lithic debris and tools discarded at different kinds of sites should reflect spatial separation of the tool manufacturing and use sequence. For novaculite, we have a working model that places the initial testing of toolstone and perhaps knapping of large bifacial blanks at quarry locations, and further bifacial reduction and finishing of bifacial tools like dart and arrow points at more distant workshop or habitation sites. Reduction at or near quarries is expected to produce larger debitage, more shatter, hard hammer percussion flakes, debitage with cortex, few biface thinning flakes, few indications of heat treatment, and bifaces discarded in earlier stages of reduction (e.g., Ahler and VanNest 1984; Birmingham 1984; Dowd 1998; Hatch 1994; Hatch and Miller 1985; Johnson 1981, 1984, 1989; Stoltman et al. 1984).

Several archeological projects from the southern Ouachita Mountains have used debitage analysis to infer novaculite tool reduction sequences and strategies. Using site survey data from the Ouachita National Forest, David Waddell (1995; Waddell and Waddell 1992; Waddell et al. 1995) employed principal components analysis and cluster analysis to group sites into lithic procurement and manufacturing "activity sets." The activity sets were based on types of tools, cores, and bifaces, and on the debitage analysis (using ratios of decortication to interior flakes and bifacial thinning to interior flakes). Roger Coleman (2002, 2003) used typological analyses of novaculite debitage to identify technological strategies (for example, reduction of unidirectional or bifacial cores, use of freehand or bipolar percussion) and reduction stages present at two Ouachita National Forest sites. Mass analysis of novaculite debitage was employed during the analyses of sites tested during the Shady Lake project in Polk County and the Winding Stair project in Montgomery County. At the Middle Archaic Hill site (3PL343), debitage size-sorting showed that the majority of novaculite debris, by weight, was 2.54 cm or larger, suggesting an earlier stage of reduction was done there (Coleman et al. 1999; Stewart 1995). At the Winding Stair sites (3MN383, 3MN979, and 3MN496), the majority of novaculite debris, by count, was small (1.27 cm or less), suggesting debris mainly from finishing, using, and reworking tools (Coleman and Guendling 2000:53; Guendling 2000:65).

In this article, I develop an analysis protocol that can be used to compare novaculite debris from different sites to interpret their roles in the larger production and exchange system(s). I am interested primarily in changes in lithic reduction strategies across space, what reduction stages (or parts of the reduction continuum) were done closer and further from quarries, and whether bifacial reduction was predominant. While bifaces and finished tools will be important in the analysis and comparison of these sites, the novaculite debitage is my current focus. I need an analysis protocol that can be used with the large debris samples that result from quarry or workshop excavations. Here, I use both individual flake attribute analysis and mass analysis techniques, as combining analytical techniques has been found to produce more valid interpretations than reliance on one technique alone (see discussions and examples in Andrefsky 2001; Bradbury 1998; Carr and Bradbury 2001; Koldehoff and Carr 2001; Odell 2004:118-132; Root 2004; Shott 1994). Recently, Bradbury and Carr (2004) offered a "pragmatic" approach to debitage analysis that combines mass analysis and individual flake analysis techniques. They found that two individual flake attributes (identifying blocky debris or shatter, and counting flake platform facets) as well as counts/weights from debitage mass analysis, could accurately differentiate between core reduction and tool production in experimental and simulated assemblages, and showed good potential for the analysis of archeological assemblages. I use a similar approach to debitage analysis in this project.

THE PROJECT

Two excavated assemblages form the data sets for comparison and discussion. The first is from a novaculite quarry site (3PL349) in the southern Ouachita Mountains (see Figure 1) that was mapped and tested during the annual training program held by the Arkansas Archeological Society and Arkansas Archeological Survey (AAS) in 1993. Quarry features included battered, exposed bedrock, a trench, and large piles of waste flakes and hammerstones. Two 1 x 1 m test units were excavated, and thousands of pieces of debitage were recovered before battered bedrock was hit at 20 cm below surface. While a report on the project has been published (Coleman et al. 1999; Hilliard 1995), a complete artifact analysis was not done at the time. I have begun work on analyzing the assemblage, assisted by Henderson State University (HSU) students and Arkansas Archeological Society volunteers.

In the summer of 2004, I directed the Henderson State University Archeological Field School excavations at a multi-component site near Hot Springs, Arkansas (3GA23). The site is part of a larger site complex first investigated in 1917 by M. R. Harrington, who described residential mounds and associated village debris that he dated to the Caddo period as well as a deep midden deposit in one area that he interpreted as an earlier preceramic (Archaic period) lithic workshop (Harrington 1920:103-117). The site has suffered from years of collecting and looting, as well as flooding from the damming of the Ouachita River and recent residential development, but our testing showed that there are some intact deposits remaining. Stratigraphically, we found evidence of a dense black midden that dates to the Fourche Maline culture of the Woodland period (ca. 650 B.C.-A.D. 950), overlying deposits containing Archaic period diagnostics. Novaculite debitage is very heavy across the site, which appears to be a workshop and habitation located downstream from a major novaculite quarry (3GA22 [Trubitt 2005]). Jeffrey Gaskin (then lab assistant at the AAS/HSU Research Station) was responsible for much of the initial lab processing and cataloguing.

We started with mass analysis of debitage, using size-sorting to identify the reduction in debitage size as novaculite was worked and carried further from its source. Mass analysis has advantages in allowing rapid characterization of large samples of flakes, such as are obtained from quarry or workshop contexts. Stanley Ahler (1989a, 1989b) lays out the rationale and experimental data behind mass analysis of debitage, arguing that different stages in the manufacture or reduction sequence and different flaking techniques result in different size-grade distribution patterns (see also Andrefsky 2001:3-6, 2004; Odell 2004:130-132; Shott 1994:86-100 for discussions of mass analysis). He emphasizes the importance of experimentation in interpreting results (something I have not undertaken for novaculite at this point), and cautions that archeological samples often have mixtures of several technologies and reduction stages, complicating interpretation. Using experimental replication data, Toby Morrow (1997:56-57) found that mass analysis is a good method for distinguishing the debitage produced during the stages of biface reduction and point manufacture, and that proportion of flakes in each size grade by weight (more so than counts) showed the pattern of decreasing flake size with reduction. However, he found that mass analysis was not a robust method for differentiating technological strategies, such as identifying core reduction as opposed to biface reduction.

Following Ahler (1989b), we size-sorted novaculite debitage from 3PL349 and 3GA23 through a series of geological standard test sieves (a 1" with 25 mm or 0.9843" openings, a 1⁄2" with 12.5 mm or 0.50" openings, a 1/4" with 6.3 mm or 0.25" openings, and a No. 7 with 2.8 mm or 0.11" openings), counting and weighing (in grams) each size fraction. The excavated samples from 3PL349 and 3GA23 were screened through 1/4" mesh in the field, but I have begun to collect standard flotation samples from excavated levels to recover the full range of debitage and allow better comparison between deposits and between sites. This article reports results from a sample of artifacts from one level from one of the 3PL349 test units (1/4" mesh dry-screening) and the flotation samples collected and processed from 3GA23 (heavy fractions caught on 1/16" window screen). While raw material type and presence of heat treatment are of interest in the research, this article deals just with novaculite as a unified raw material category.

The size-sorting distributions (Table 1) clearly show that the quarry site 3PL349 has more larger/heavier debitage than does the postulated workshop/habitation site 3GA23. The cumulative frequency charts (Figure 2a-b) use the three larger size grades. The straight frequency chart (Figure 3) uses all four size grades, and graphically shows that the bulk of the debitage by weight is greater than 1" in size for the 3PL349 sample, whereas the 1/4” sieve caught most of the debitage by weight from 3GA23. Assuming decreasing size with later stages of reduction (or the absence of large-sized debris from later reduction), these patterns suggest that earlier reduction took place at 3PL349, the quarry site, while most of the debitage from 3GA23 is from later in the reduction process. The size-sorting distributions can also be compared with other reported site assemblages (e.g., Trubitt et al. 2004:Figure 5).

The presence or absence of cortex is the one attribute that Ahler (1989b:90) records as part of mass analysis (and he notes the presence or absence of cortex rather than quantifying percentage of dorsal cortex or categorizing flakes as primary, secondary, or tertiary decortication flakes). For massive or bedrock outcrop sources of toolstone such as Arkansas Novaculite, cortex typically takes the form of weathered surfaces on blocky pieces (or cobbles from stream gravels). (Differentiating humanly-produced angular or blocky debris or shatter from the natural talus that has weathered and broken from outcrops is often a problem at quarry sites [Andrews et al. 2004:68-71; Funk 2004:54]. For this analysis, any piece that was weathered on all surfaces was discarded as natural.) For these two site samples, I recorded presence/absence of cortex for debris caught in the 1", 1/2", and 1/4" sieves. Higher proportions of debitage (31% by count, 41% by weight, total n=1218, 17,355 g) from 3PL349 have some cortex or weathered surfaces as compared with the 3GA23 debitage sample (5% by count, 19% by weight, total n=3492, 3632 g). Most of the novaculite was brought to 3GA23 with the cortex already removed.

There is a growing literature on the interpretation of mass analysis data using experimental data sets and plotting size and cortex variables using several measures, using logarithmic or Weibull transformations of data, or

Table 1. Size Sorting Comparisons:										
Size sorting using 1”, ½, ¼ size grades.										
	1"		*1/2"*		*1/4"*		*Total:*			
	count	*weight*	*count*	*weight*	*count*	*weight*	*count*	*weight*		
3PL349	288	12112.8	631	4845.4	299	397.0	1218	17355.2		
3GA23	21	614.1	400	1380.0	3071	1637.4	3492	3631.5		
Cumulative frequency distributions.										
	count:					*weight (g):*				
	1"	*1/2"*	*1/4"*			*1"*	*1/2"*	*1/4"*		
3PL349	23.6%	75.5%	100.0%			69.8%	97.7%	100.0%		
3GA23	0.6%	12.1%	100.0%			16.9%	54.9%	100.0%		
Size sorting using 1”, ½, ¼, 1/8” size grades.										
	1"		*1/2"*		*1/4"*		*1/8"*		*Total:*	
	count	*weight*	*count*	*weight*	*count*	*weight*	*count*	*weight*	*count*	*weight*
3PL349	288	12112.8	631	4845.4	299	397.0	26	46.2	1244	17401.4
3GA23	21	614.1	400	1380.0	3071	1637.4	13085	845.5	16577	4477.0
Frequency distributions.										
	count:					*weight (g):*				
	1"	*1/2"*	*1/4"*	*1/8"*		*1"*	*1/2"*	*1/4"*	*1/8"*	
3PL349	23.2%	50.7%	24.0%	2.1%	100.0%	69.6%	27.8%	2.3%	0.3%	100.0%
3GA23	0.1%	2.4%	18.5%	78.9%	100.0%	13.7%	30.8%	36.6%	18.9%	100.0%

employing discriminant analysis (Ahler 1989a, 1989b; Ingbar et al. 1992; Bradbury 1998:273-275; Patterson 1990; Stahle and Dunn 1982, 1984). Computing and plotting data from 3PL349 and 3GA23 highlights the differences between these samples (Table 2 and Figure 4) in terms of earlier versus later in the reduction process, but ‘reading’ reduction stage or technological strategy from placement on a chart generated from other areas might be pushing the data at this point.

At the same time as cortex was recorded on size-sorted debitage from the 1", 1⁄2", and 1/4" sieves, I pulled flakes (distinguished by an intact bulb of percussion and striking platform) for further examination, and quantified shatter (angular chipping debris). More shatter is expected at or near quarries as by-products of earlier stages of reduction, heavy percussion flaking, and core reduction (Bradbury and Carr 2004:69; Hatch 1994:36, 40-41; Johnson 1981:101-114; T. Morrow 1997:62). A higher proportion of the debitage from 3PL349 was identified as shatter (84% by count, 90% by weight) than in the sample from 3GA23 (11% by count, 28% by weight). If shatter is a typical residue of percussion flaking and earlier stages of reduction, then these activities were more common at 3PL349 than at 3GA23. Very high proportions of shatter have been identified for quarry sites elsewhere (e.g., Hatch 1994:36, 40-41).

Attribute analysis of individual flakes is more time-consuming, but can reveal important patterning. Frequently, analysts use a typological analysis and identify bifacial thinning flakes as evidence for biface production or bifacial tool finishing, but definitions of this category vary somewhat from researcher to researcher (Andrews et al. 2004; Parry and Kelly 1987). Here, I focus on several attributes of flake striking platforms. The morphology

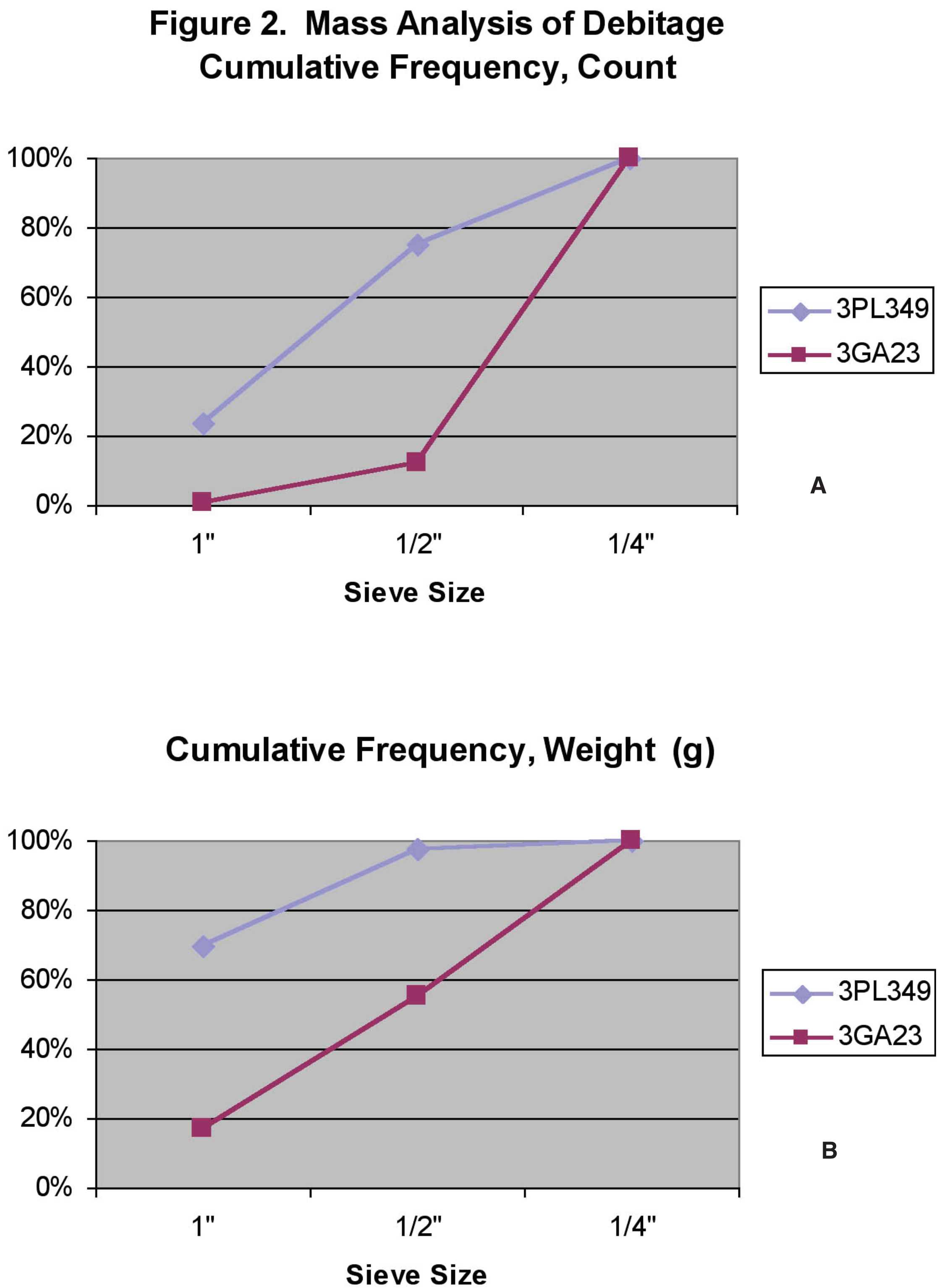

Figure 2. Mass Analysis of Debitage Cumulative Frequency: a, Count; b, weight.

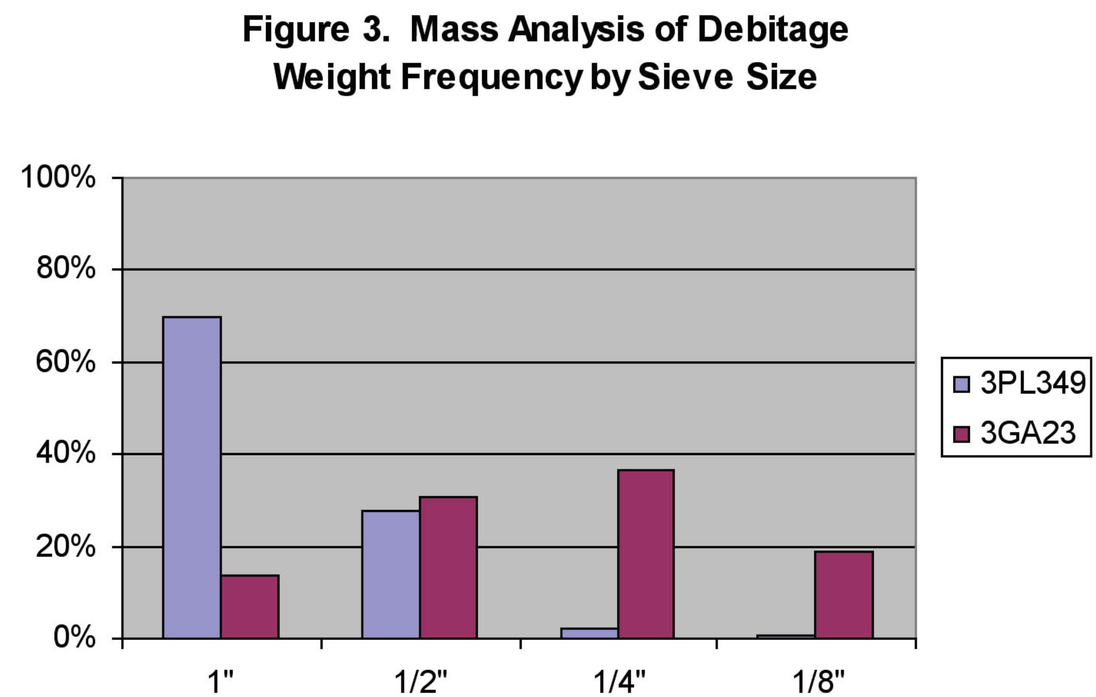

Figure 3. Mass Analysis of Debitage Weight Frequency by Sieve Size.

or configuration of striking platforms has been used to differentiate biface from core production (or bifacial cores from other types of cores), differentiate between hard and soft hammer or pressure flaking, and identify reduction stage (Andrefsky 2001:9; Magne 1985; J. Morrow 1997; T. Morrow 1997:62-63).

Using experimental data, Martin Magne (1985:111-125) found that a set of attributes recorded from individual flakes (weight, dorsal scar count and 'complexity,' platform scar count, dorsal angle of platform, and cortex amount) could be used to correctly predict reduction stage as early, middle, and late (higher accuracy levels were found in predicting debris from early stage reduction and bifacial and bipolar reduction; the byproducts of middle and late stage reduction were often mis-classified). Platform scar count was identified as the most important attribute in differentiating between reduction stages, and a key attribute for identifying bifacial reduction. When he turned to the archeological assemblages, platforms with cortex or one flake scar were linked with early stage reduction, those with two scars with middle stage, and platforms with three or more scars with late stage and with bifacial reduction (Magne 1985:128-129, 160). While different methods of describing/quantifying striking platform flake scars have been used, this attribute seems to be a strong predictor or indicator of reduction stage and of bifacial reduction (Andrews et al. 2004:72-75; Bradbury and Carr 2004; Carr and Bradbury 2001; Johnson 1981:133-134; Magne 1985:111-129, 160-161; J. Morrow 1996:146-147 and Figure 26, 1997; T. Morrow 1997; Odell 2004:126-128; Parry and Kelly 1987:291-292; but see Shott [1996] on the reduction sequence as a continuum rather than stages). Striking platform morphology is included by Shott (1994:77-81) in his suggested "minimum attribute set" for comparative studies that use debitage analysis. Striking platform preparation (indicated by abrasion) has also been linked with bifacial reduction, and with soft hammer percussion, indirect percussion, and pressure flaking techniques (Andrews et al. 2004:74; T. Morrow 1997:62; Parry and Kelly 1987:291-292). Lipping is another attribute associated with soft hammer percussion, wooden billets, and/or pressure flaking (Crabtree 1972:44, 74-75; Dowd 1998:134; Johnson 1981:131-132).

Table 2. Debitage Comparisons.

Comparisons by Size Grades:

	1"		*1/2"*		*1/4"*		*Total:*		*1/8"*		*Total:*	
	ct	*wt*	*ct*	*wt*	*ct*	*wt*	*ct*	*wt*	*ct*	*wt*	*ct*	*wt*
3PL349												
Total:	288	12112.8	631	4845.4	299	397.0	1218	17355.2	26	46.2	1244	17401.4
Cortex:	114	5293.8	200	1721.0	58	93.7	372	7108.5				
	39.6%	43.7%	31.7%	35.5%	19.4%	23.6%	30.5%	41.0%				
Shatter:	251	10990.1	530	4308.3	238	356.1	1019	15654.5				
	87.2%	90.7%	84.0%	88.9%	79.6%	89.7%	83.7%	90.2%				
PRB Flakes:	28	994.7	51	370.8	17	13.2	96	1378.7				
	9.7%	8.2%	8.1%	7.7%	5.7%	3.3%	7.9%	7.9%				
3GA23												
Total:	21	614.1	400	1380.0	3071	1637.4	3492	3631.5	13085	845.5	16577	4477.0
Cortex:	9	407.2	45	177.6	114	97.3	168	682.1				
	42.9%	66.3%	11.3%	12.9%	3.7%	5.9%	4.8%	18.8%				
Shatter:	9	426.2	59	337.0	305	261.9	373	1025.1				
	42.9%	69.4%	14.8%	24.4%	9.9%	16.0%	10.7%	28.2%				
PRB Flakes:	7	122.5	188	635.0	877	523.7	1072	1281.2				
	33.3%	19.9%	47.0%	46.0%	28.6%	32.0%	30.7%	35.3%				

Percentage Cortex by Count, 1", 1/2", 1/4" Size Grades:

	1"	*1/2"*	*1/4"*	*Total*	
3PL349	39.6%	31.7%	19.4%	30.5%	(sample, n=1218)
3GA23	42.9%	11.3%	3.7%	4.8%	(sample, n=3492)

Mean Debitage Weights, 1", 1/2", 1/4" Size Grades (g):

	1"	*1/2"*	*1/4"*	*Total*	
3PL349	42.1	7.7	1.3	14.2	(sample, n=1218)
3GA23	29.2	3.5	0.5	1.0	(sample, n=3492)

Count Ratios, 1", 1/2", 1/4" to 1/8":

	1"	*1/2"*	*1/4"*		*1/8"*	
	count	*count*	*count*	*Total:*	*count*	*Ratio*
3PL349	288	631	299	1218	26	0.02
3GA23	21	400	3071	3492	13085	3.75

Count/Weight Comparisons, 1/2" Size Grade:

	1/2" count		*1/2" weight (g)*		
3PL349	631	51.8%	4845.4	27.9%	(sample, n=1218, 17355.2g)
3GA23	400	11.5%	1380.0	38.0%	(sample, n=3492, 3631.5g)

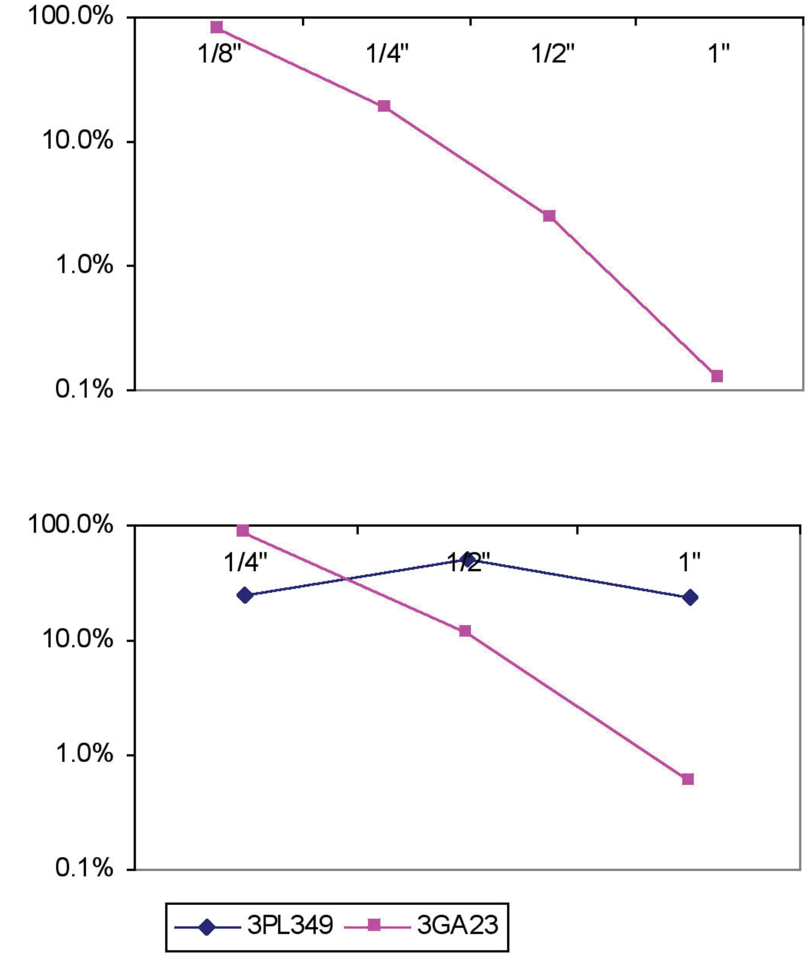

Figure 4. Log-linear Plots of Size-sorting Data.

I examined individual novaculite flakes (with identifiable platforms) caught in the 1" and 1⁄2" sieves from the 3PL349 and 3GA23 samples under magnification to record striking platform morphology (counting flake scars or facets as 0/cortical, 1, 2, and 3 or more), as well as to measure striking platform width and thickness (parallel and perpendicular to the ventral/bulbar surface of the flake) by calipers in millimeters, and to note the presence/absence of lipping on ventral edges of striking platforms and microchipping or abrasion on dorsal edges of striking platforms.

In the sample of flakes greater than 1⁄2" with identifiable platforms, a bare majority of flakes from 3PL349 (38 of 73 or 52%) had cortical (0 scar) or simple/flat (1 scar) platforms. From 3GA23, a majority of flakes (117 of 170 or 69%) had multi-scar (2 or 3/3+ scars) platforms (Figure 5). A relatively large proportion of the 3PL349 sample had 2 or 3 scars recorded on striking platforms, but few of these show platform abrasion/chipping or lipping, compared with the sample from 3GA23 (Table 3). Most of the flakes from 3GA23 have small striking platforms (63% of the sample had measured striking platforms between 1-3 mm thick, Table 4 and Figure 6). Since all flakes examined were from the >1" and >1/2" size grades, this is not necessarily a reflection of the smaller size of the flakes from 3GA23. The smaller platforms are an indication of a later stage in the bifacial reduction sequence (T. Morrow 1997:65; see also Coleman [2002:53 and Figure 13] on striking platform width). Graphically, plots of striking platform metrics comparisons show the concentration of small multi-scar platforms on the flakes from 3GA23 (Figure 7). The individual flake analysis results suggest that earlier reduction (and hard hammer percussion) took place at 3PL349 whereas later reduction, bifacial reduction, and platform preparation (and soft hammer percussion) was done at 3GA23. The results of the mass analysis and the individual flake analysis are complementary.

Table 3. Flake Platform Comparisons.						
Platform Facet Count:						
	0	*1*	*2*	*3/3+*	*Total*	*Indet.*
3PL349	8	30	18	17	73	6
	11.0%	41.1%	24.7%	23.3%	100.0%	
3GA23	9	44	50	67	170	25
	5.3%	25.9%	29.4%	39.4%	100.0%	
Striking Platform Configuration:						
Flakes with 2 or 3/3+ flake scars on striking platform, and…						
				Chipping/Abrasion		*Lipping*
3PL349	n=35			11%		0%
3GA23	n=117			55%		26%

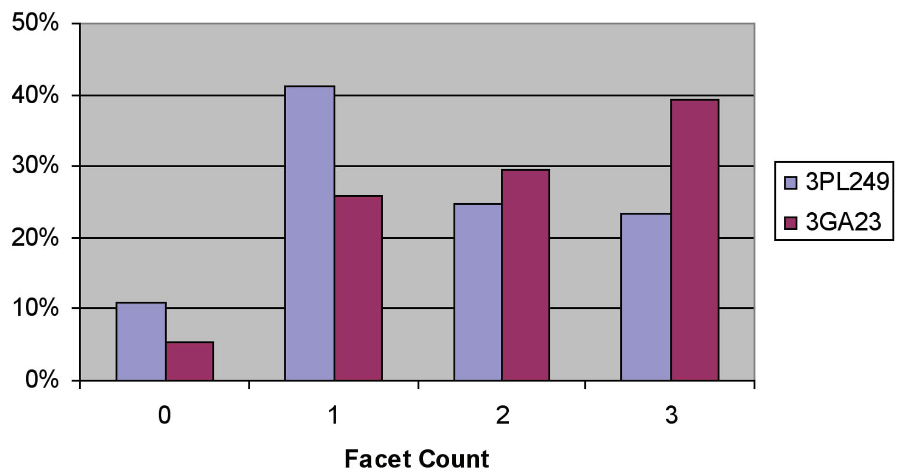

Figure 5. Flake Striking Platform Morphology.

Table 4. Platform Thickness Distribution:				
Platform thickness (mm):				
	3GA23		*3PL349*	
1-3	107	62.9%	1	1.4%
4-6	48	28.2%	26	35.6%
7-9	10	5.9%	17	23.3%
10-12	2	1.2%	12	16.4%
13-15	3	1.8%	9	12.3%
16-18	0	0.0%	5	6.8%
19-21	0	0.0%	3	4.1%
	170	100.0%	73	100.0%

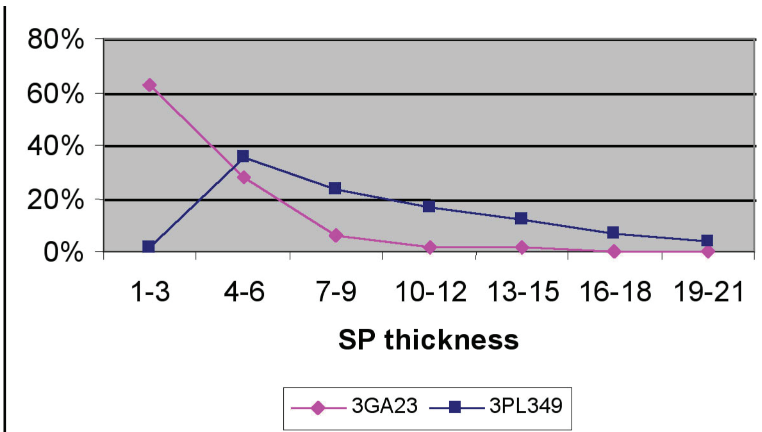

Figure 6. Striking Platform Morphology Frequency Distribution, Thickness.

CONCLUSIONS

This work is preliminary, but encouraging. Looking just at samples of novaculite debitage from two sites, we have the beginnings of an analysis protocol that can be used to answer questions about how lithic reduction activities took place across space as raw material was obtained from quarries, worked into easily-transportable packages, and taken home (or traded away) to be worked into tools. Using efficient and replicable methods like size-sorting debitage, identifying cortex and shatter, and looking at flake striking platform morphology (see also Bradbury and Carr 2004), we can pull patterns from the thousands of pieces of debitage. These patterns can be compared between sites, giving each site a role in our interpretations of the novaculite tool production and exchange systems. Recognizing differences between quarry and workshop/habitation sites allows us to reconstruct the spatial organization, which is a first step towards understanding the social organization of novaculite tool production.

While the analysis presented here compares two site assemblages, there may well be variation within each site that can be explored further. Using both mass analysis and individual flake analysis, different raw materials or debitage from certain features or deposits within a site could be characterized more specifically (see, for example, analyses by Baumler and Davis 2004; Root 2004). The problem of mixed assemblages has been getting more attention with use of regression analysis, resulting in estimates of the proportion of a debitage

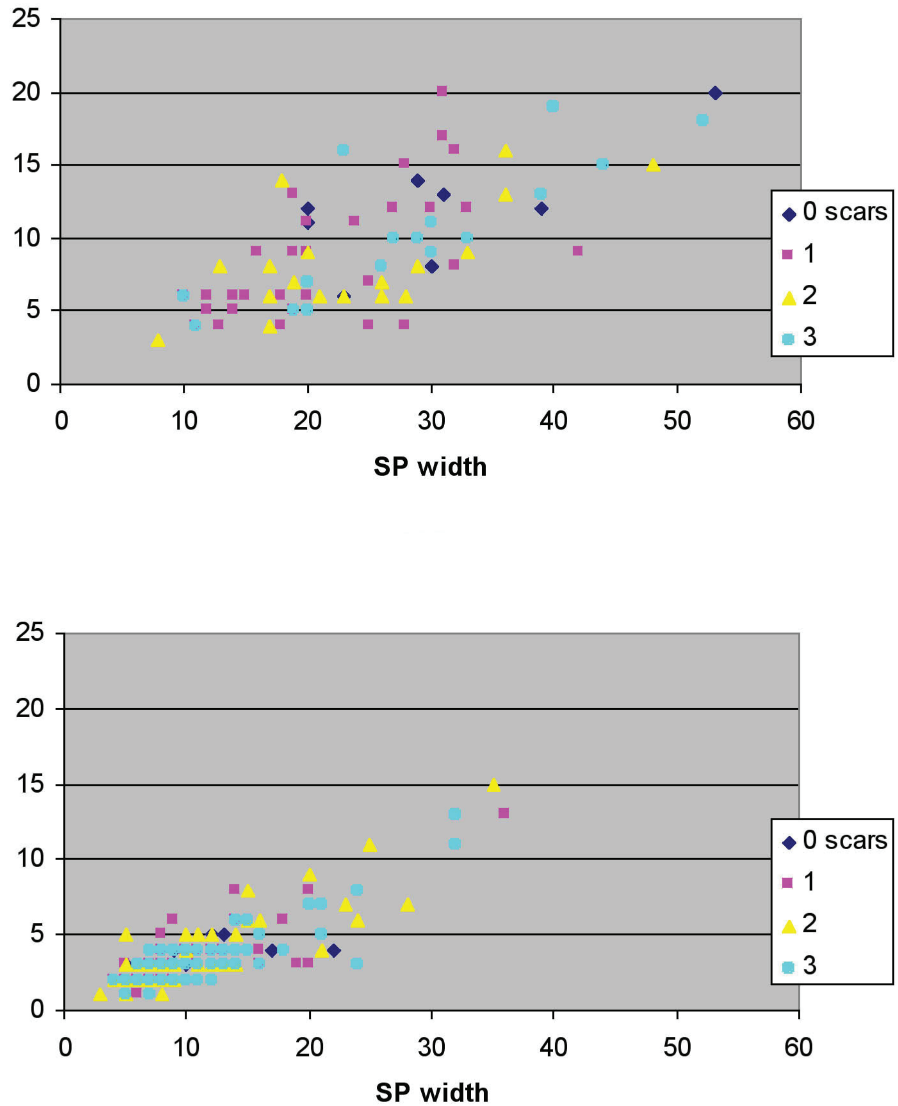

Figure 7. Striking Platform Morphology: top, 3GA23; bottom, 3PL349.

sample that results from core reduction versus biface or tool production (Bradbury and Carr 2004:77-82; Carr and Bradbury 2001:134-141). Certainly examining cores, bifaces, and tools, in addition to the debitage, will help interpret differences between the two sites discussed in this article.

Ideally, we should be comparing contemporaneous sites, and the novaculite used at the workshop or habitation sites should be sourced to specific quarries. We should compare sites that were linked in the past: a habitation site like 3GA23 compared with the quarry site upstream, or a quarry site like 3PL349 compared with a nearby workshop site. Andrews, Murtha, and Scheetz's (2004) recent article on the Hatch jasper quarry and neighboring Houserville habitation site complex in Pennsylvania gives us a model for the potential for this kind of study. There, decortication, heat treatment, and "lithic processing up to the stage immediately preceding formal tool manufacture" took place at the quarry site, while later reduction and tool manufacturing activities were represented by debris at the Houserville site complex (Andrews et al. 2004:83).

Finally, we also need to keep in mind that lithic debitage results not only from tool production but from tool use, rejuvenation, and recycling as well. Consumption is often discussed in terms of stone tool assemblages (e.g., tool morphology and function, use-wear studies), less often in terms of the lithic debitage byproducts (but see Dockall and Shafer 1993; Koldehoff and Carr 2001; McAnany 1989). Differentiating edge damage from platform preparation during tool production from tool edge use-wear is a concern of microwear analysts (e.g., Huckabay 1981) but may also be raised during debitage analysis (e.g., Johnson 1981:134-135). Roger Coleman (2002:53, 2003:37-38) addresses the issue of identifying debris from novaculite tool maintenance specifically when interpreting the presence of late stage reduction debris on workshop sites. The lithic reduction process included not only tool manufacture but use and reuse as well, and debitage assemblages may reflect this.

ACKNOWLEDGEMENTS

An earlier version of this work was presented in the "Lithic Reduction Analysis and Problems in Prehistory" Symposium, organized by Harry Lerner, at the Society for American Archaeology, 70th Annual Meeting, Salt Lake City, April 2, 2005. I appreciate the comments of symposium organizer Harry Lerner and symposium discussants Lucy Lewis Johnson and Michael Shott on that paper.

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