Caddo Archeology Journal

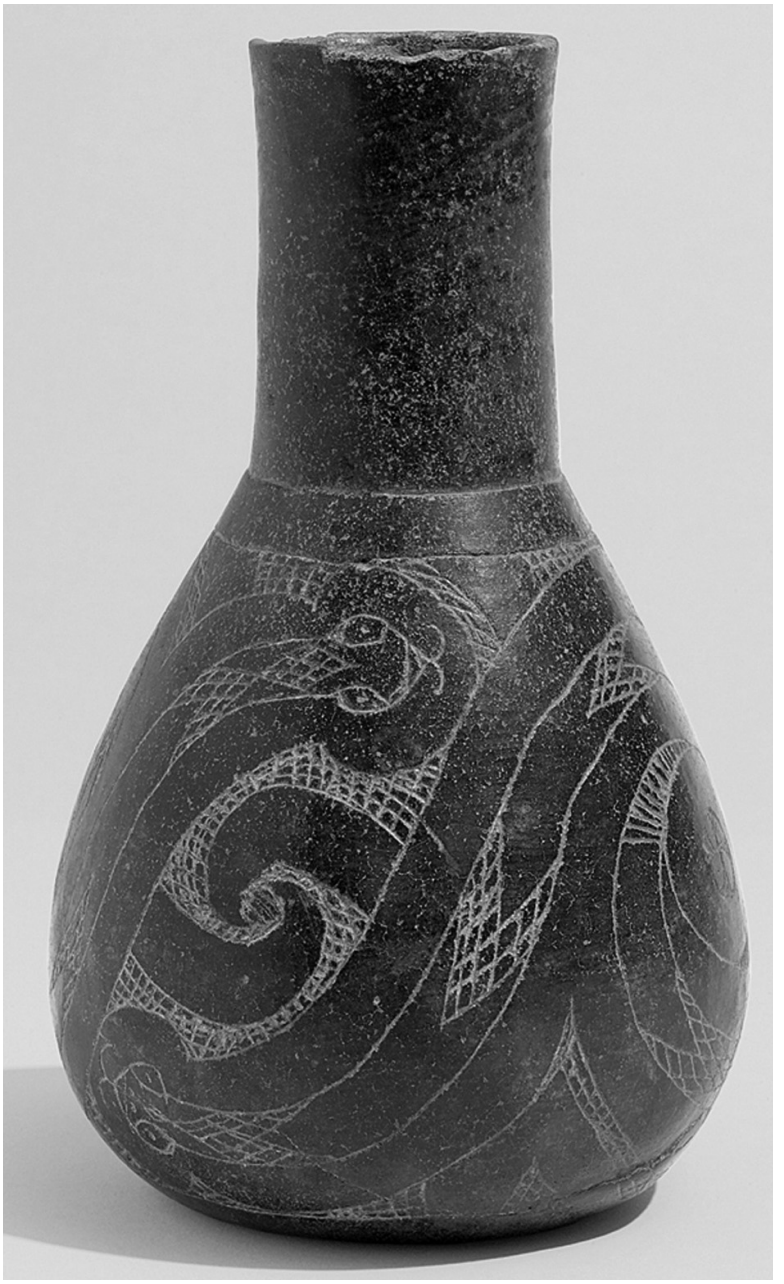

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Table of Contents

Articles

The Lake Clear (41SM243) Site and *Crotalus horridus atricaudatus*

Mark Walters

INTRODUCTION

I fell heir to a collection of prehistoric Caddo sherds from my late Uncle Sam Whiteside and a location on a 7.5' topographic map labeled Lake Clear. Sam Whiteside during the period from the mid-1950s to the late 1960s was very active in the East Texas area working through the old East Texas Archeological Society headquartered in Tyler, Texas (Walters 2005).

The name Lake Clear was vaguely familiar but a check of local maps failed to reveal its location. However, an older map jolted my memory. The lake had been built on east Mill Creek west of Winona, Texas, as a club lake. For some reason, the project was abandoned after a short period of time and the lake was drained and turned into pasture. Although I have never even visited the site location, but did record it in 2000, I felt that writing this article was justified in order to (1) describe this interesting collection of Caddo sherds and (2) compare one aspect of the sherds—the engraved rattlesnake motif found on several Lake Clear sherds—to other known examples in the Caddo archeological area. This was not a new idea but had been hashed around in prior years by Tim Perttula, Tom Middlebrook, and the late Jim Corbin (1997), among others (see Galan 1994). Tim Perttula was especially helpful in sharing his notes. Perhaps the most important part of research is knowing when to stop. I realize that other examples of the rattlesnake motif in Caddo pottery will appear in the future, hopefully spurred on by this article, and if someone else would like to take up the subject where I have left off, I would be pleased.

LOCALITY

The Lake Clear site (41SM243) is located on East Mill Creek in northern Smith County, Texas. East Mill Creek drains into the Sabine River 2.5 km to the north. East Mill Creek heads around the Red Springs community (7.5 km west of the Lake Clear site) in an area characterized by steep slopes and gravelly Redsprings-Cuthbert-Elrose soils with glauconitic materials. Soils in the Lake Clear site area are Oakwood-Cuthbert loamy soils with a loamy or clayey subsoil (see Hatherly 1993: Map 9). The Jamestown site (41SM54), a probable Middle Caddoan period (ca. A.D. 1200-1400) mound center with seven mounds, is located some 40 km to the northwest on Village Creek and approximately the same distance south of the Sabine River. The Boxed Springs site (41UR30), thought to date to the Early Caddoan time period (ca. A.D. 900-1200), is located approximately 15 km to the east, on the north bank of the Sabine River (Perttula et al. 2000). It is interesting to note that later Caddo groups choose to live on small tributaries off of main streams, usually in an upland setting (see Walters and Haskins 1998, 2000).

Artifact Inventory from the Lake Clear Site (41SM243)

A total of 119 artifacts are in the collections from the Lake Clear site (Table 1). All are made of clay. They include 117 ceramic sherds, a clay figurine, and one clay pipe stem.

No written record remains of the type or extent of excavations that were carried out at the Lake Clear site, so it is assumed that all excavations were uncontrolled. Since only decorated sherds or plain rims from ceramic vessels were collected (see Table 1), nothing is known about the abundance of plain sherds, nor can we compute the plain to decorated sherd ratio (which has been shown to have some chronological significance in Caddo ceramic assemblages in parts of northeastern Texas). The following analysis of the artifacts collected reflects this lack of chronological control for the Caddo occupation at the Lake Clear site, though it is thought to have been occupied sometime during the Middle Caddoan period.

Table 1. Artifacts from the Lake Clear site.

Artifact Class	No. of Specimens
Decorated sherds	111
Plain rims	6
Clay figurine	1
Clay pipe stem	1
Total artifacts	119

DECORATED SHERDS

The 111 decorated sherds primarily include sherds from vessels with incised, brushed, engraved, and punctated decorative elements (Table 2). These four decorative elements comprise more than 85% of all the decorated sherds from the Lake Clear site.

There are minor amounts of brushed, brushed-punctated, and pinched-ridged sherds in the assemblage, but these represent less than 15% of the decorated sherds (see Table 2). Combining the brushed and brushed-punctated sherds, more than 30% of all the decorated sherds from the Lake Clear site have brushing on them. The relative frequency of brushed-punctated sherds is interesting, given the findings from the Oak Hill Village site that brushed-punctated sherds were most common in the post-A.D. 1350 Late Vilage occupation there (Rogers and Perttula 2004).

More than 94% of the sherds from the site are tempered with grog, but in many cases, the grog temper was supplemented with the addition of burned bone pieces (Table 3). Only a few sherds have pieces of grit deliberately added to the paste of the Lake Clear vessels.

Table 2. Decorated sherds from the Lake Clear site.

Decoration	No.	Percentage
Incised	31	27.9
Brushed	29	26.1
Engraved	20	18.0
Punctated/incised	15	13.5
Punctated	9	8.1
Brushed/punctated	5	4.5
Pinched/ridged	2	1.8
Totals	111	99.9

Table 3. Temper in the Lake Clear ceramics.

Decoration	Bone	Bone/grog	Bone/grog/ grit	Grog	Grog/grit
Incised	1	16	-	14	-
Brushed	5	15	-	9	-
Engraved	-	9	-	9	-
Punctated/incised	-	4	2	9	-
Punctated	-	3	-	5	1
Brushed/punctated	1	2	-	2	-
Pinched/ridged	-	1	-	1	-
Plain rims	-	4	-	2	-
Totals	7	54	2	53	1
Percentage	5.9	46.2	1.7	44.9	0.8

Bone was present as a temper in 53.8% of the sherds, but only 5.9% of the Lake Clear sherds were tempered solely with bone (see Table 3). The incised, brushed, and brushed-punctated sherds tended to be from vessels that were more frequently tempered with bone, either by itself as the sole temper, or with grog.

The vessels made and used at the Lake Clear site are relatively thick, as the mean thickness of all the sherds is 7.9 mm (Table 4). The utility ware sherds are thicker on average (ranging from 7.2-9.1 mm) than either the engraved fine wares or the plain rims.

More than 76% of the sherds from the Lake Clear site are from vessels that were fired in a low oxygen or reducing environment (Table 5), and the remainder were fired in a high oxygen or oxidizing environment. This is the case for the fine wares, the utility wares, and the plain rims, but the engraved vessels tend to have higher frequencies of reduced-firing vessels than the utility wares (with the exception of the brushed-punctated and pinched-ridged sherds).

Among the vessels sherds from vessels fired in a reducing environment, most of them were fired and then also cooled in a low oxygen environment (see Table 5). However, 37% are from vessels that were fired in a low oxygen environment, but then pulled from the fire to cool in the open air. Proportionally, most of these sherds are from engraved vessels, punctated-incised vessels, and incised vessels (see Table 5).

Incised Sherds

There were 31 incised sherds (19 body and 12 rim) in the Lake Clear collection. Fourteen of the 31 sherds had one or more straight parallel lines, some of these with very broad incised marks. Eleven sherds had opposing straight lines and six others had some form of cross-hatching (Figure 1a-b). None had obvious curvilinear designs. Of the 12 rims, eight had rounded lips and four were flattened. There were two everted rims and the remainder were straight or vertical in profile. The average thickness of the incised sherds was 7.2 mm (see Table 4), which is slightly thinner than the average thickness of all the sherds from the site (7.9 mm). Incised sherds, along with those with brushed decorations, had a higher percentage of bone temper than the other kinds of decorated sherds (see Table 3).

Engraved Sherds

There were 20 engraved sherds, including eight rims. Among the 20 engraved sherds are four body sherds and a rim sherd that have rattlesnake designs. These will be discussed separately below.

Looking at the other engraved body sherds, engraved sherd #1 is from a large bottle represented by several large and relatively thick sherds (7.9 mm thick) (Figure 2). The design on this vessel is comprised of straight opposing lines with branching curvilinear ladders. There is a white kaolin clay pigment in the lines.

Engraved sherd #2 is also from a bottle (Figure 3). There is a horizontal line at the juncture of the bottle neck and body, and from this line there are concentric circular designs (filled with hatched lines). Part of the design forms a starburst. There is evidence of red pigment in the lines. This sherd strongly resembles a sherd found at the Middle Caddoan period Langford site (41SM197), located approximately 12 km away, but also on the south side of the Sabine River (Walters 1997).

Engraved sherd #3 is from a carinated bowl. Beginning at the carination point, there are concentric engraved lines forming incomplete circles as well as diagonal lines with lines connecting them and also extending perpendicular from them. Engraved sherd #4 has a circle formed by rough parallel lines, and engraved sherd #5

Table 4. Sherd Thickness.

Sherd Decoration	mean thickness (mm)
Engraved	6.9
Plain rims	7.1
Incised	7.2
Pinched/ridged	7.8
Punctated/incised	8.1
Punctated	8.2
Brushed	8.4
Brushed/punctated	9.1
Average Thickness, all sherds	7.9

Table 5. Firing Conditions in the Lake Clear sherds.

Decoration	Reduced	Oxidized	Reduced but cooled in:	
			Low Oxygen	High Oxygen
Incised	21	10	12	9
Brushed	24	5	21	3
Engraved	17	3	8	9
Punctated/incised	12	3	6	6
Punctated	4	5	2	2
Brushed/punctated	5	-	3	2
Pinched/ridged	2	-	1	1
Plain rims	4	2	3	1
Totals	89	28	56	33
Percentage	76.1	23.9	62.9	37.1

Figure 1. Incised sherds: a. Incised rims; b. Incised body sherds.

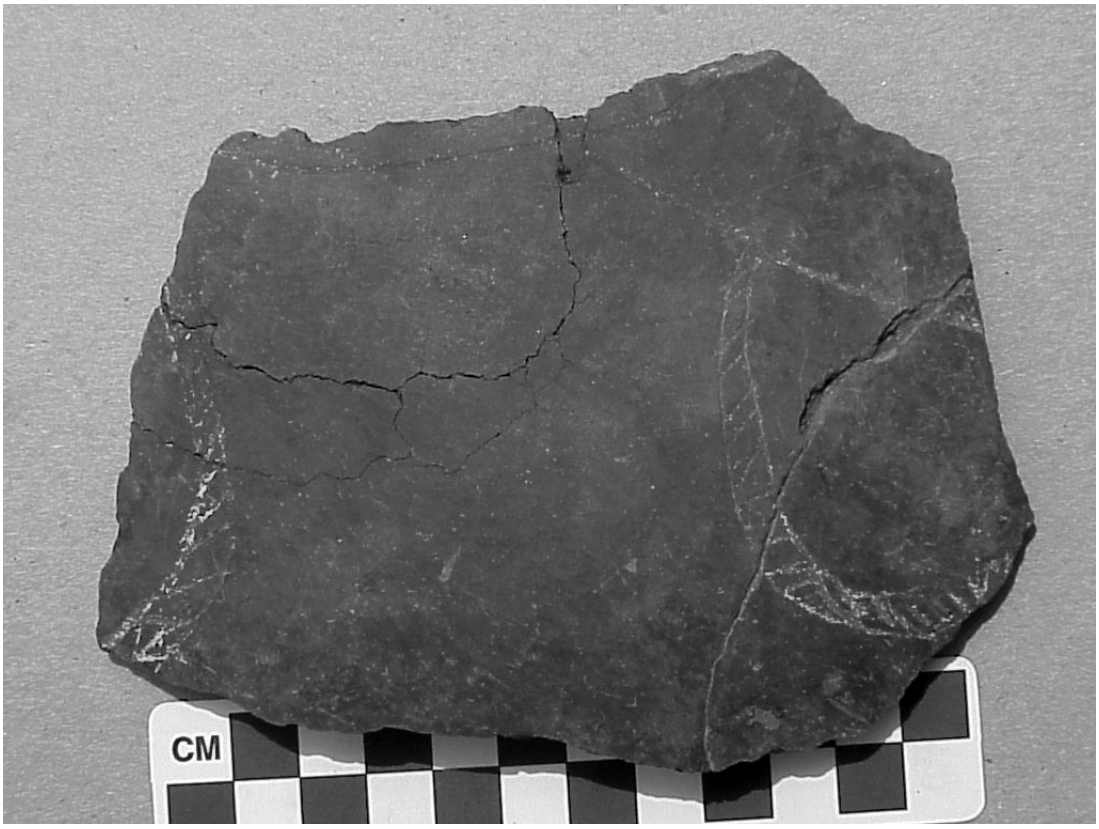


Figure 2. Engraved bottle sherd.


Figure 3. Engraved bottle with starburst design.

has faint parallel and straight lines. Sherd #6 also has parallel lines, and one of the lines has triangular-shaped bursts pendant from it. Engraved sherd #7 is red-slipped and has parallel lines with pendant triangles. Engraved sherd #8 has a single line with an attached opposed ladder design.

Looking at the engraved rims, the first rim (#1) (Figure 4) has a top and bottom line containing panels with triangles that are defined by lines in all the corners. Vertical lines that have alternating concentric circles separate these panels. This design is very similar to Poynor Engraved "PO" decorative styles defined by Kleinschmidt (1982). This sherd has a straight rim with a rounded lip.

Engraved rim #2 has a circle on it that is enclosing a crossed-arm design (Figure 5). Rim # 3 has thin parallel horizontal engraved lines, while engraved rim #4 is from a carinated bowl with a straight 4 cm high rim and round lip. There are a series of opposing straight lines running from the lip. Engraved rim #5 is a carinated bowl with a 1.5 cm high straight rim and with a single curved line running horizontally around the vessel. Rim #6 has a direct rim with a flattened lip. The design consists of two horizontal lines with diagonal lines running between and opposing vertical lines. Engraved rim #7 has a straight profile with a rounded lip, thinned on the inside. It is decorated with opposing straight lines.

Brushed Sherds

There were 29 brushed sherds, including three rims. The three rims had rounded lips, and one has been slightly rolled out. Another rim was everted, with a horizontal brushed decoration.

Punctated/incised Sherds

There were 15 punctated/incised sherds at Lake Clear, including two rims (Figures 6 and 7). Most of the designs consist of straight parallel incised lines with zones of punctates in the voids between the lines. Some of these incised lines were broad with drag marks, suggesting a broken stem was used to make the marks. The punctates were tear-dropped (tn=9), finger-nail or crescent (n=3), or triangular (n=3). One interesting sherd (see Figure 6a) had a row of small triangular punctates encased inside horizontal incised lines at the body juncture of a vessel with diagonal rows of incised ladders. Another example had a wide incised line with drag marks and a row of small triangular punctuates inside the line. The thickness of the punctated/incised sherds ranged from 5.8 mm to 10.2 mm with an average thickness of 8.07 mm (see Table 4).

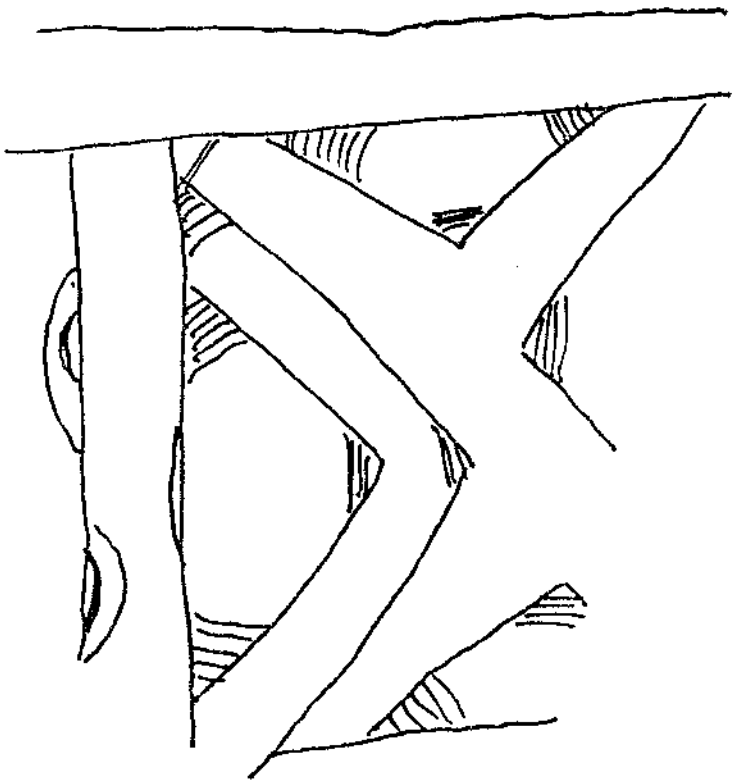


Figure 4. Poynor Engraved rim.

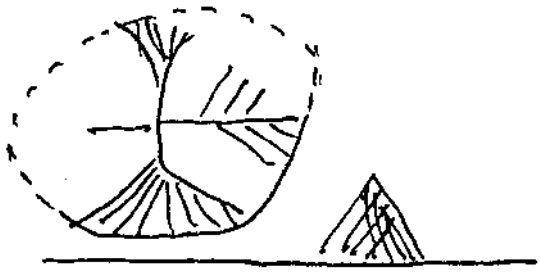


Figure 5. Engraved sherd with cross-arm design.

Punctated Sherds

There were nine punctated sherds, including four punctated rims in the Lake Clear ceramic assemblage (Figure 8). Sherd thickness ranged from 6.5 mm-10.1 mm with an average thickness of 8.24 mm, slightly thicker than the overall average sherd thickness of 7.9 mm (see Table 3). There were four examples of sherds with oval-shaped punctates. Three of the sherds had fingernail/crescent punctates, and one had two rows of fingernail punctates with a small dash through each punctate. One sherd had tear-dropped punctates, while another had large gouge punctates arranged in vertical rows.

Of the four rims, three had flattened lips and one was rounded; three were straight in profile and one was everted. Of the nine punctated sherds found at the site, two had punctates arranged in rows and the rest were randomly placed across vessel rims and bodies.

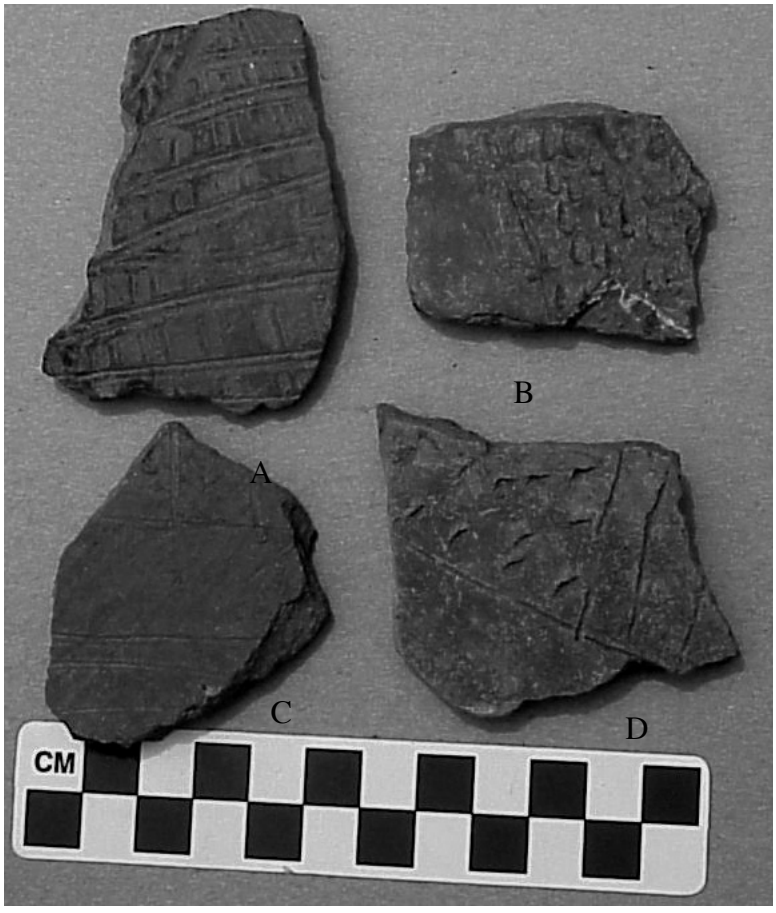


Figure 6. Punctated/incised body sherds.

Figure 7. Puncatated/incised sherds.

Feature 8. Punctated sherds.

Brushed/punctated Sherds

There were five examples of brushed/punctated sherds in the collection, and they range from 8-10.5 mm (average of 9.1 mm) in thickness (see Table 4). Two examples had straight or parallel brush marks with large gouge punctates; and another had opposing brush marks with large gouge punctated marks. The fourth example had opposing brush marks with random fingernail punctates. The last brushed-punctated sherd had two rows of tear-dropped punctates separating straight or parallel brush marks.

Pinched/ridged Sherds

There were two examples of pinched/ridged sherds in the Lake Clear collection. One large sherd (Figure 9) had rows of ridges formed by pushing up the surface with parallel rows of punctates to form a spiral design. The other example had straight ridges formed by deep crescent-shaped punctates on either side of the ridge. Similar examples have been found in the Middle Caddoan period components at the Redwine (41SM193) and Langford (41SM197) sites in Smith County (see Walters 1997; Walters and Haskins 1998), as well as at the Oak Hill Village (Rogers and Perttula 2004) in Rusk County. Evidently this design element has a long history as there is also an example from the Early Caddoan period Boxed Spring site (41UR30) (see Perttula et al. 2000: Figure 18).

Plain Rims

There were six plain rims included in the Lake Clear collection (see Table 1). Four had rounded lips and one was flattened. The flattened example had a slightly rolled out or flaring lip, and was also thinned and burnished. Four had straight rims and two were everted in profile. One example was everted with a rounded lip and had a large circular lug protruding out from the vessel wall.

Clay figurine

A clay figurine (5 cm long and 2.8 cm in diameter) was in the collection (Figure 10). One end was broken and it is not known if it was originally attached to a vessel. The unbroken end had two smoothed, rounded protuberances, one longer than the other. Someone with a better imagination than I can speculate as to what it is represented by the figurine. It was made from a sandy clay paste.

Drilled Base Sherd

There is one example of a drilled base, or spindle whorl as they are sometimes called. This example, 10.6 mm thick, was broken through the perforation or dilled hole, and is 11.9 mm in diameter. Temper was bone/grog inclusions with large quartz grains visible in the paste (Figure 11a).

Figure 9 Pinched/ridged body sherd.


Figure 10. Clay figurine.

Figure 11. Miscellaneous ceramic objects from the Lake Clear site: a, Drilled base sherd; b, Pipe stem.

Pipe Stem

A small section, 7.3 cm long, of a probable Red River variety pipe stem was also found in the Lake Clear site collection. The outer diameter of the stem was 13.7 mm, with a 6.4 mm diameter hole (see Figure 11b). Red River style pipes (Graves Chapel and Haley varieties) of similar size and thickness were recovered in Middle Caddoan period components at the Oak Hill Village (Rogers and Perttula 2004:Table 77).

Temper was grog with possible vegetative material. A depression on the outside of the pipe stem was first thought to be a punctated decoration but was probably instead a burned-out piece of vegetative material.

Rattlesnake motifs in the Lake Clear Site Collection and other Caddo Sites

The Canebrake rattlesnake (*Crotalus horridus atricaudatus*) is a native of East Texas as well as across most of the southeastern United States (Figure 12) It is different enough from the Timber Rattler (*Crotalus horridus*, crotalus being Latin for "rattle" and horridus is Latin for "dreadful") that it is considered to be a subspecies. (see Dixon 2000) It is also known in the South as the "velvet-tail," because a portion of the body and the tail are velvety black, or "canebrake," because of its preference for the dense canebrakes that covered large portions of the region's floodplains.

The canebrake is a large-bodied snake with adults ranging from 36 to 60 inches in length. The record is 74.5 inches in length. It is distinguished by a reddish-brown stripe running down the center of the back, disrupted by

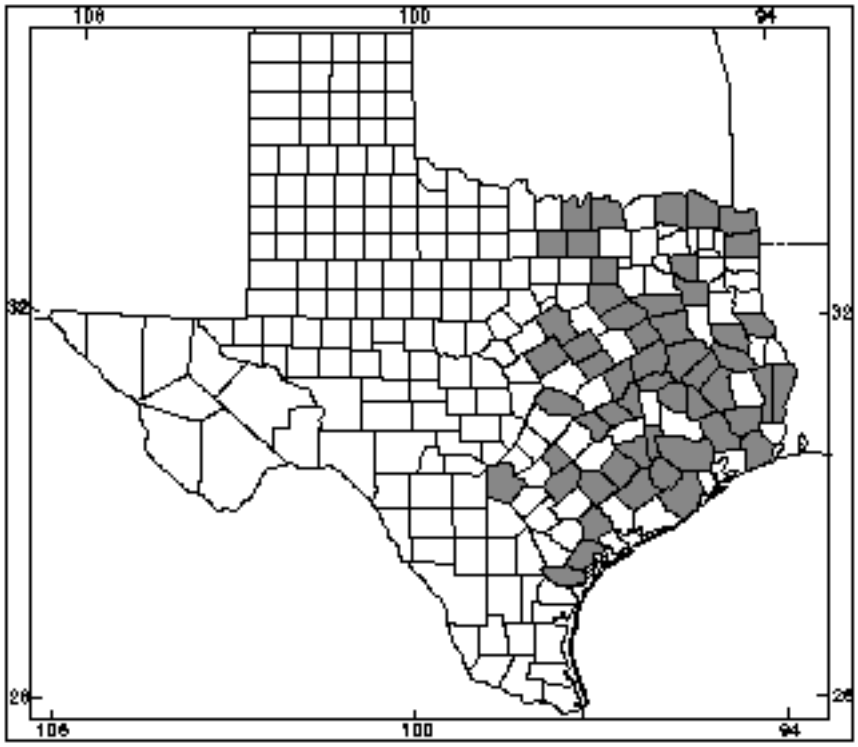


Figure 12. The distribution in Texas of Crotalus horridus atricaudatus, Canebrake Rattlesnake.

a series of large, black, chevron-like cross bands. The head is large and sometimes has a diagonal line through the eye or just behind the eye. Like other pit vipers it has a facial pit, a sense organ that detects heat, located between the nostril and the eye. The canebrake favors densely vegetated riparian habitats. Its early distribution and population size is unknown but at present its numbers are limited and its range is confined to riparian settings in East Texas such as the Sabine River.

My only personal experience with the canebrake rattlesnake was near Longview, Texas, while walking along a dry slough adjacent to the Sabine River. This was in old timber and the ground was clean except for limited amounts of leaf clutter. In my path was a small overturned tree that I could have stepped over but being loaded with fishing poles I veered to walk around. At that point something caught my eye that seemed out of place—something black and linear—that didn't seem right. As I paused to look closer, I realized what I was looking at: the black tail of a canebrake rattler. Only then was I able to make out the rest of the body camouflaged in the leaves, and he was looking straight at me. Throughout my youth there were tales told about the canebrake or velvet-tail, such as the one about a cousin who while squirrel hunting stepped over a log and onto one's head; or the tale where my daddy and his friends found one in a hollow stump, all in the Sabine River bottoms. Even today this magnificent snake still has the power to awe people.

Snake mythology is the most widespread mythology known to man and can lead down many paths. The Old World basilisk, usually considered a serpent (although it was hard to confirm since anyone who looked at one died), may have been recreated in the New World in the form of the rattlesnake (see Sax 1990). What transferred in the mythology to the New World may have been a cluster of motifs that were identified in the rattlesnake.

In the Old World as well as the New World, the myth involves a trail of devastation, often even the destruction of vegetation. Tied to this myth is the idea of fascination or charming that gives the snake powers over other animals, and that led to the belief in the "evil eye." I cannot help but inject an idea suggested by Garrison and Arensberg (see Maloney 1976) that the belief in the evil eye is characteristic of cultures that are stratified but not yet bureaucratized; and these beliefs are expressions of envy, often directed across barriers of status and position. In reference to the belief in the evil eye, I am thinking of the forked eye motif found in the Southeastern Ceremonial Complex artifacts in Mississippian sites in the southeastern United States.

Snake motifs are common across the southeastern United States in archeological sites. Seventy-five examples, the most popular animal motif there, occur at the Spiro site in eastern Oklahoma, although all of these are stylized and occur on shell (see Duffield 1964). Similar stylized examples occur on pottery at the Moundville site in Alabama and on Walls-Pecan phase pottery in the lower Mississippi valley, but they are also stylized, often depicting the "feathered serpent" image. These snake motifs are not realistic portrayals like the canebrake rattler motifs present on Caddo ceramics.

Could the rattlesnake motif be a part of a horizon style as defined by Willey and Phillips (1958: 33, 166)? According to Willey and Phillips (1958), a horizon style has "a primary spatial continuity represented by cultural traits and assemblages whose nature and mode of occurrence permit the assumption of a broad and rapid spread." In other words, a ceramic style horizon marker occupies a great deal of space but very little time. Horizon markers are then assumed to be contemporaneous when they occur on different sites, but few sites with snake designs are dated by absolute methods (i.e., radiocarbon dates) so we do not know how rapid was the spread of this motif among northeastern Texas Caddo groups, although its association with other pottery styles would indicate that the origin of the engraved rattlesnake motifs took place in the middle Caddoan time period (ca. A.D. 1200-1400).

I have chosen in this article to limit the discussion of engraved rattlesnake vessels to only those examples that clearly illustrate the rattlesnake motif. Most recordings of engraved rattlesnakes on Caddo sites are limited to single vessel examples—Lake Clear with five different examples, being the exception. It would be interesting to determine if there is a central distribution point for the snake vessels and if they are trade goods when found outside a central distribution area; or given the wide variation in the known examples, perhaps the diffusion of an idea from a central location can be documented in the known archaeological examples. Perhaps an instrumental neutron activation analysis study of a number of engraved rattlesnake sherds could lend some insight to this problem (but see below), but these analyses have yet to be done on a wide-scale across the Caddoan area.

After a long tradition of stylized geometric forms on pottery vessels, why would the Caddo start to depict actual objects on their pottery? Perhaps the snake has been represented all along in the scroll design so common in Caddo pottery (see Hart 1982)?

One study suggests that in times of social or economic upheaval there is an increase in stylistic variability. An increase in the diversity of pottery motifs could also reflect a change that took place in the Middle Caddoan period to the development of stronger regional identities characterized by more localized pottery traditions. Serpent mythology often casts the snake as a symbol of chaos. Hints that this suggestion of chaos and snake mythology are linked is the fact that after the Middle Caddoan period in several parts of East Texas—notably the middle Sabine River basin-- the area is virtually abandoned by Caddo peoples.

The question of what the snake meant to the Caddo can only be inferred through Caddo myths. One example is the myth "Snake-Woman Distributes Seeds" noted by Dorsey (1905:18):

> As Snake-Woman gave each person the seeds she told him that he must plant them, and must care for the plants that grew from them, but must allow no one, especially children, to touch them or even point to them as they grew. She said that until the seeds were ripe they belonged to her, and if any one gathered them too soon she would send a poisonous snake to bite him.

Henri Joutel noted that among the Hasinai Caddo: "women brought in the animals their husbands had killed after they reached the neighborhood of their homes, and they had complete command of the cooking and food supply" (Swanton 1942:163). Joutel also said that "...some one woman in each house had entire supervision of the latter. The fields were cultivated by men and women working together but planting was all done by women, and the heaviest part of farming seems to have fallen upon them" (Swanton 1942:129).

Swanton (1942:225) has written that "if anyone should cut a single cob of corn unless it were preceded by the prayers of the minister, he would be infallibly bitten by a snake." Correspondence with present day Caddo Indian peoples indicate they have no surviving notions about the role of the rattlesnake in Caddo beliefs.

Lake Clear Site rattlesnake motifs on sherds

There are five sherds—four body sherds and one rim—from the Lake Clear site that depict canebrake rattlesnake designs. The five sherds range from 4.9-6.1 mm in thickness (average 5.4 mm), which is a good bit thinner than the average for all the engraved sherds (6.9 mm) (see Table 4). Three of them had bone/grog temper and two had grog temper. All five were fired in a reduced atmosphere and three were subsequently cooled in a low oxygen setting and two in a high or open-air setting. Two of the sherds were from bottles.

The first sherd is made up of three matching sherds from a bottle (Figure 13). Tthere is a horizontal line at the bottom of the vessel that defined the design panel.

There are two snake heads with portions of the bodies and two tails depicted on the bottle sherd. Hatch-marked triangles form a diamond design on the body. This is the only example in the study that clearly show the diamond design rather than the predominant chevron design, and it is possible that they may depict the diamond-back rattler rather than the canebrake. The tails or rattles are 2.5 cm long on one rattlesnake and 4 cm long on the other, and they are filled with cross-hatched engraved lines. A rounding of the body segment represents both heads, although one is more blunt than the other. Both heads have eyes drawn as evenly spaced circles (Figure 14). There is red pigment in the engraved lines. Another interesting feature of this Lake Clear sherd is the presence of a faint engraved ladder design that is partially superimposed across one of the snake heads.

The second rattlesnake sherd (Figure 15d) is a rim sherd with an everted rim and flat lip. This sherd is polished on interior and exterior vessel surfaces and is very hard with bone/grog temper. There is a horizontal line at the point where the rim begins flaring out and above the line to the lip are diagonal engraved lines, thicker on alternate ends. Below that line, on the vessel body, are two of what appears to be rattlesnake bodies but no heads are present. There is a portion of what appears to be a rattle similar to that seem on the first engraved rattlesnake sherd.

The third rattlesnake sherd (see Figure 15b) is a grog-tempered body sherd with a design element similar to the second engraved rattlesnake sherd (see Figure 15d), although it is a more stylized. One of the snake bodies is more tightly coiled and has an excised circle in the middle of the design. The fourth sherd (see Figure 15a) has portions of two snake bodies similar to the second and third engraved rattkesnake sherds. There is white pigment in the engraved lines.

Figure 13. Engraved bottle sherd with Rattlesnake designs.


Figure 14. Close-up of Figure 13.

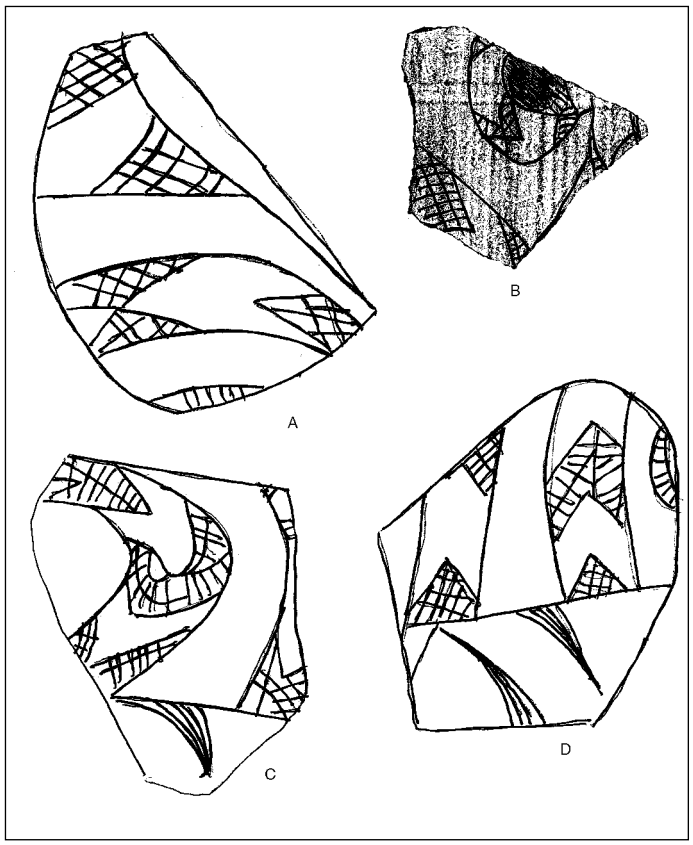


Figure 15. Engraved body sherds with snake designs.

The fifth engraved rattlesnake sherd at the Lake Clear site (see Figure 15c) is from a bottle and has a lower horizontal engraved line defining the design area. A portion of one snake body is depicted along with a cross-hatched triangle.

Portions of one of the engraved rattlesnake sherds (INAA Sample No. TKP313) from the Lake Clear site was submitted for instrumental neutron activation analysis (INAA) to the Missouri University Research Reactor (MURR) as part of a mini-NSF Grant (Perttula 1999) with MURR. They were part of a much larger sample of more than 700 sherds from many Caddo sites in Northeast Texas and northwestern Louisiana that have been subjected to INAA.

The INAA was conducted by MURR following standard procedures of sample preparation and data analysis summarized in Neff and Glascock (2000). The determination of chemical compositional groups for the Caddo sample as a whole is based on a data base of more than 700 samples from northeastern Texas and northwestern Louisiana obtained from Early (A.D. 1000-1200), Middle (A.D. 1200-1400), and Late Caddo (A.D. 1400-1680) sites, as well as a few Woodland (ca. 200 B.C.-A.D. 800), Formative Caddo (ca. A.D. 800-1000), and historic Caddo (post-A.D. 1680) sherds.

The INAA results indicate that the Lake Clear engraved rattlesnake sherd can be assigned to the Rusk chemical group. Mahalanobis distances from the centroids of the three largest chemical groups—Titus, Red River, and Rusk—indicate that this particular sherd exceeds the 1% probability level for membership in the Rusk chemical group:

Sherd sample no.	Site	Titus	Red River	Rusk	Best Group
TKP 313	Lake Clear	0.000	0.000	5.785	Rusk

The Rusk chemical group of clays is currently known almost exclusively from Early to Late Caddoan period ceramics from sites found on the south side of the Sabine River, but in the middle reaches of the Sabine River basin, including Oak Hill Village (41RK214), as well as in numerous sites in the Angelina River and Attoyac Bayou basins. About 53% of the INAA sherds from Oak Hill Village are assigned to the Rusk group, with the other 47% assigned to the Titus group (Rogers and Perttula 2004). The Rusk chemical groups sherd from the Lake Clear site appears to have been from a locally manufactured vessel using local clays.

Known Examples of Canebrake Rattler Motifs at Other Caddo Sites

Archeological sites were created in a regional context. Using the canebrake rattlesnake motif to better understand this context we can: (1) determine the distribution of the snake motif both in time and space and (2) use the snake motif to explore interaction between different Caddo groups and regions.

Of the 14 examples discussed in this article, eight are from the Big Cypress Creek drainage, three are from the Sabine River basin (all on the south side), two are from sites in the Red River basin, and one is from a site in the Angelina River basin. Figure 16 shows the overall area of known examples, with two smaller areas or clusters showing the main concentrations. There seems to be no stylistic similarities of the engraved rattlesnakes either within individual drainages or between them. Also, there are two bottles from two different sites that are almost identical, except for how the tail/rattle is depicted, that are from opposite ends of the distribution area, namely the Red River and the Angelina river basins. Perhaps this indicates that the idea of the snake spread through the region and individual groups made their own determination of how the snake was to be illustrated. Based on the few sites with dates and associated artifacts, the snake motif seems to have originated in a particular time period, the Middle Caddoan period (ca. A.D. 1200-1400), and continued to be made and used in the Late Caddoan period in Titus phase sites in the Big Cypress Creek basin. Whether there were changes in the engraved rattlesnake design through this period of time is difficult to determine because of the lack of dates from most of these sites.

In summary, (1) most of the engraved rattlesnake motif examples on pottery vessels came from a concentrated area in the Big Cypress Creek drainage in northeastern Texas; (2) most were on bottles; (3) the majority of the examples were on vessels from burials; (4) there were very limited numbers of specimens from each site; (5) the known examples fall in the Middle and Late Caddoan periods; but apparently originated in the Middle Caddoan period, and (6) each site seemed to have had its own interpretation of what the rattlesnake should look like or how it should be depicted. In most instances the engraved decoration was a realistic representation of the canebrake rattlesnake.

Discussion of known sites

In an effort to look for stylistic similarities, the known examples are discussed by drainages and when possible by when they appear to date in local Caddo chronological sequences. Briefly, I will describe each example, the kind of site and available dates, presence of mounds, structures, cemeteries, and the context in which the engraved rattlesnake example was from at the site.

Sabine River Drainage

In the Sabine River drainage one of the better-dated sites is the Oak Hill Village (41RK214) (see Rogers and Perttula 2004) a large habitation site on a tributary of the Sabine River that has been dated to ca. AD 1150-1400. The snake example came from the southern part of the habitation area, Area A (Figure 17). This area was used by Caddo peoples as a residential area through all parts of the village occupation.

Lake Clear (41SM243) has not been dated by radiocarbon dating, but it has decorated ceramics—including engraved ladders, scrolls, and starbursts—and an example of a Red River long-stemmed pipe that indicate that

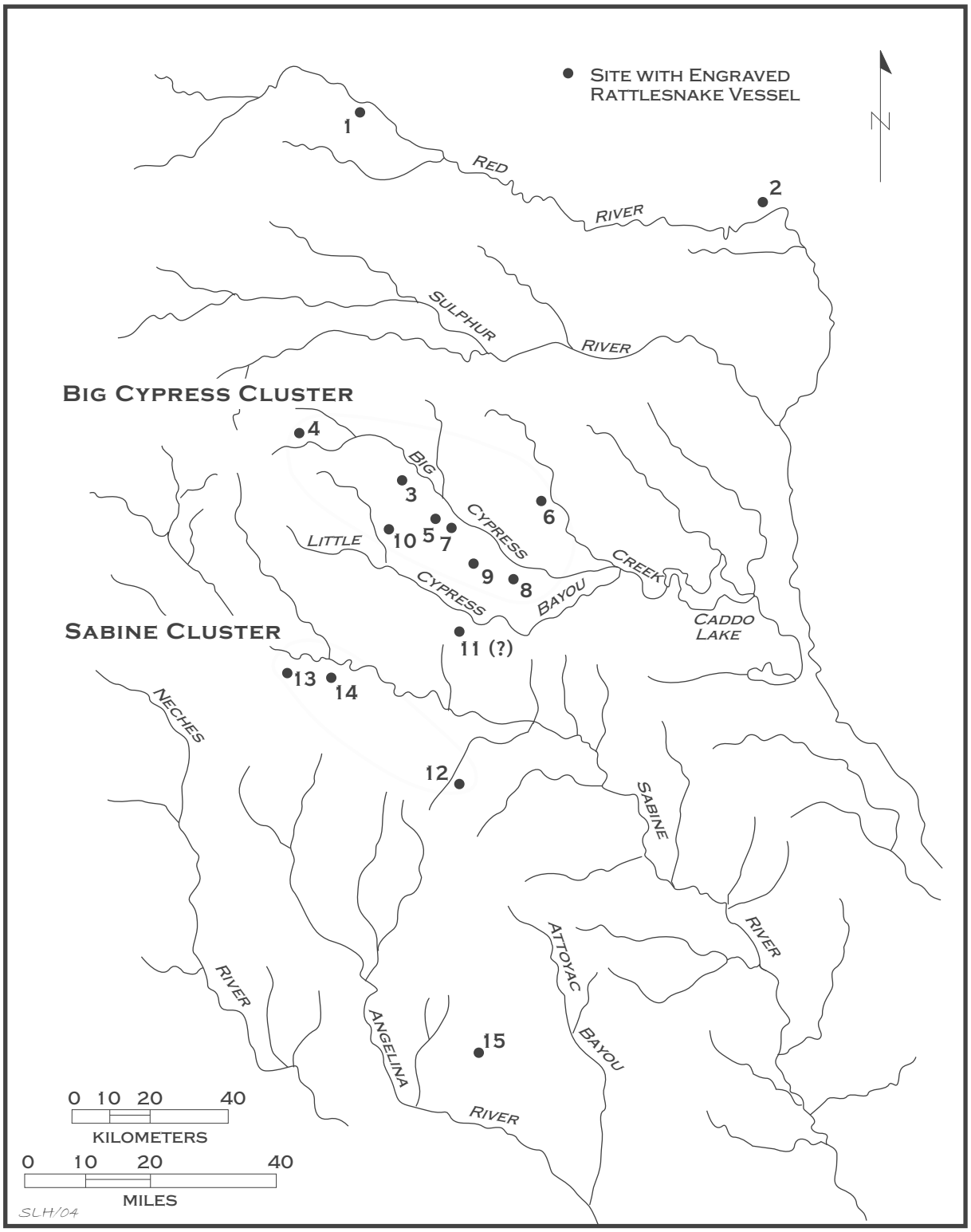


Figure 16. Distribution map of known rattlesnake motif examples: 1. Holdeman (41RR11); 2., Miller County, Arkansas (Museum of the Red River); 3., Harold Williams (41CP10); 4., Benson's Crossing (41TT110); 5., Graydon Adkins (41UR21); 6., Avinger Rest Stop (41CS132); 7., Shelby (41CP71); 8., Pine Grove (41HS826); 9., Henderson-Southall (41UR3); 10., D. Head; 11., Kennedy Collection; 12., Oak Hill Village (41RK214); 13., Lake Clear (41RK243); 14., Langford (41SM197); 15., Washington Square Mound (41NA49).

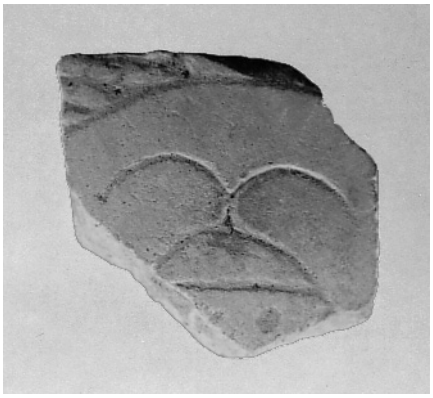


Figure 17. Engraved rattlesnake example from the Oak Hill Village site (41RK214).

its occupation falls somewhere in the Middle Caddoan period. Since there were no whole vessels the rattlesnake sherds are assumed to be from the habitation area.

The Langford site (41SM197) has also not been dated but decorated styles in the ceramics include engraved ladders, circles, and a variant of Foster-Trailed Incised, all which have been associated with the Middle Caddoan period (see Walters 1997). The snake example was on a beaker from a burial (Figure 18).

Big Cypress Creek Drainage

The Pine Grove site (41HS826), not dated, had ceramics that indicate a Late Caddoan Titus Phase occupation (ca. A.D. 1430-1680). The ceramics found there include Ripley Engraved, Harleton Appliquéd, and Belcher Ridged. There were two examples of engraved rattlesnakes at this site, one a cut-down bottle with snakes circling the vessel (Figure 19a-b) and another example from a carinated bowl that only depicted the tails and rattles (Figure 20). Both examples were from burials in a small cemetery that was separate from the habitation area, as is common on Titus phase sites.

The Avinger Rest Stop site (41CS132) is located on the Black Cypress drainage. It has not been dated by radiocarbon analysis, but is thought to date to the Middle Caddoan period according to Nelson and Turner (1997). This example was on a bottle found in a burial (Figure 21 a-b).

The Harold Williams site (41CP10) is located on Dry Creek, a tributary of Big Cypress Creek. It was the location of the 1967 Texas Archeological Society Field School. (see Turner et al. 2003). Radiocarbon and Oxidizable Carbon Ratio dates from work done at the site in 2000 suggest the Middle Caddoan period component at the site dates from A.D. 1191-1372 (see Turner et al. 2003: 22-26). The snake example was from a bottle from a Middle Caddo burial (Figure 22).

The Shelby Site (41CP71), formally known as the Tracy site, is a major Titus phase settlement and community center on Greasy Creek; this is also a tributary of Big Cypress Creek. Available radiocarbon dates from the mound range at 2 sigma from AD 1255-1650 (Perttula and Nelson 2004: Table 1), while four radiocarbon dates from the village range also from AD 1255-1650 (at 2 sigma) (Perttula and Nelson 2004:Table 4). OCR dates in the village suggest that the occupation took place between ca. A.D. 1436-1506.

In addition to a small mound, and a substantial habitation area, a large number of Titus Phase burials have been dug there over the years, and they have yielded Ripley Engraved, Taylor Engraved, Hodges Engraved, and Bailey Engraved wares in addition to Harleton Appliquéd (see Thurmond 1990; Perttula and Nelson 2004). There are reports of mid- to late 17th century archaeological deposits on the site. It is unknown what the context of the engraved rattlesnake pot was at the Shelby site (Mitchell 2000), although it is likely from a burial. This example consisted of engraved snakes on a bottle.

The Henderson-Southall Site (41UR3) in the Lake O' the Pines area was recorded by A.T. Jackson in 1931. No radiocarbon dates are available from the site. Later testing indicated a Titus phase component with Ripley

Figure 18. Langford Site (41SM197) engraved rattlesnake beaker.

Engraved, Keno Trailed, and examples of brushed, pinched, and incised utility wares (see Thurmond 1990:203-204). Many Titus phase burials have been excavated here in more recent years This engraved rattlesnake example was from a bottle (Figure 23).

The Benson's Crossing (41TT110) site was the location of the 1978 University of Texas Field school. Described by Thurmond (1990:196-200) as a Titus phase occupation with Ripley Engraved and Avery Engraved, others (see Nelson and Turner 1997) believe that the ceramics from the site are more consistent with a Middle Caddoan period occupation, and that the supposed Titus phase ceramics are really an earlier stylistic manifestation. From the Field school collection there was a crudely executed and highly stylized feathered serpent motif on a red-slipped bowl sherd.

The D Head Site (site number pending) is located on a small tributary of Big Cypress Creek. There was one example of a rattlesnake head and portion of the body from a bottle that has red pigment in the lines (Figure 24). There may be a portion of a rattle shown and there are other triangular cross-hatched elements that may be filler zones between the snake designs. The eyes of the snake are drawn as semi-circles on each side of the head with small dots for the eyes. In addition, there are two small dots toward the back of the head. At the mouth end of the head there are two small-etched 5 mm long lines that may represent fangs.

A small collection of 25 decorated sherds from this site indicate a Middle Caddo occupation. In addition to the engraved snake sherd there were seven brushed sherds, five punctated sherds, including one rim (four had punctates in rows and three had random punctates), three Pease Brushed Incised sherds with vertical appliqued fillets and brushing in between, two pinched-ridged sherds, two brushed/punctated sherds, and five other engraved sherds, including one rim. The engraved examples include two with pendant triangles, one with a circle and cross design, and one with crude cross-hatching. There were reports of burials from this site but no other information is available.

The Graydon Adkins site (41UR21) had a bowl with engraved snakes. According to Robert L. Turner (1997), this example, which he describes as "eared" and also as a compound bowl, was from a Middle Caddoan period cemetery in the Big Cypress Creek valley. While the body and tail of these snakes are similar to other examples, the heads are very stylized, completely unlike any other known examples (Figure 25).

There is one example from the Carson Kennedy collection. It is from an unknown location in the Big Cypress Creek basin, although the bulk of this collection was from Upshur County, Texas. It was hastily drawn some

Figures 19. Two views of the engraved bottle from the Pine Grove site (41HS826).

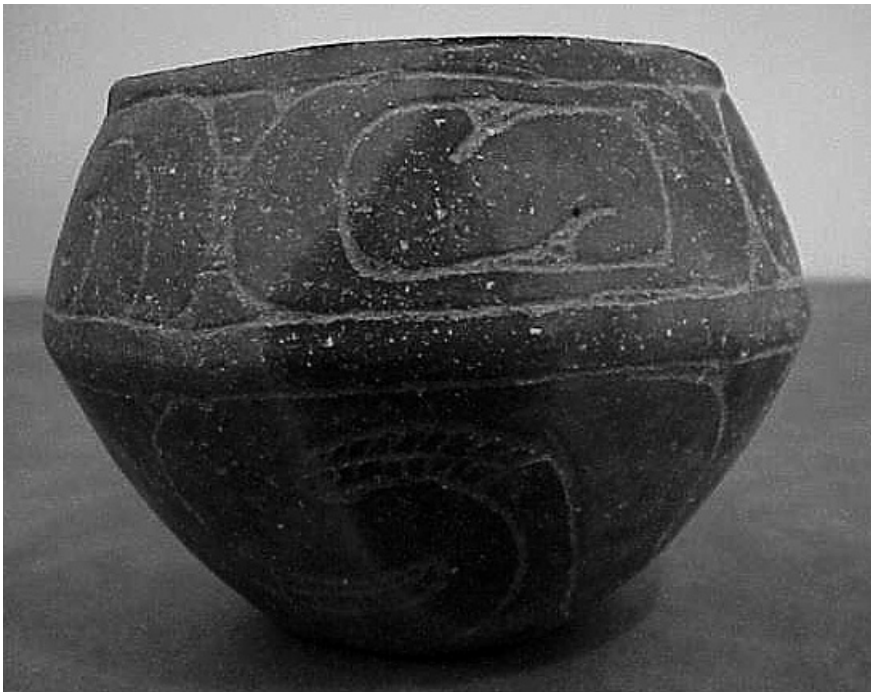
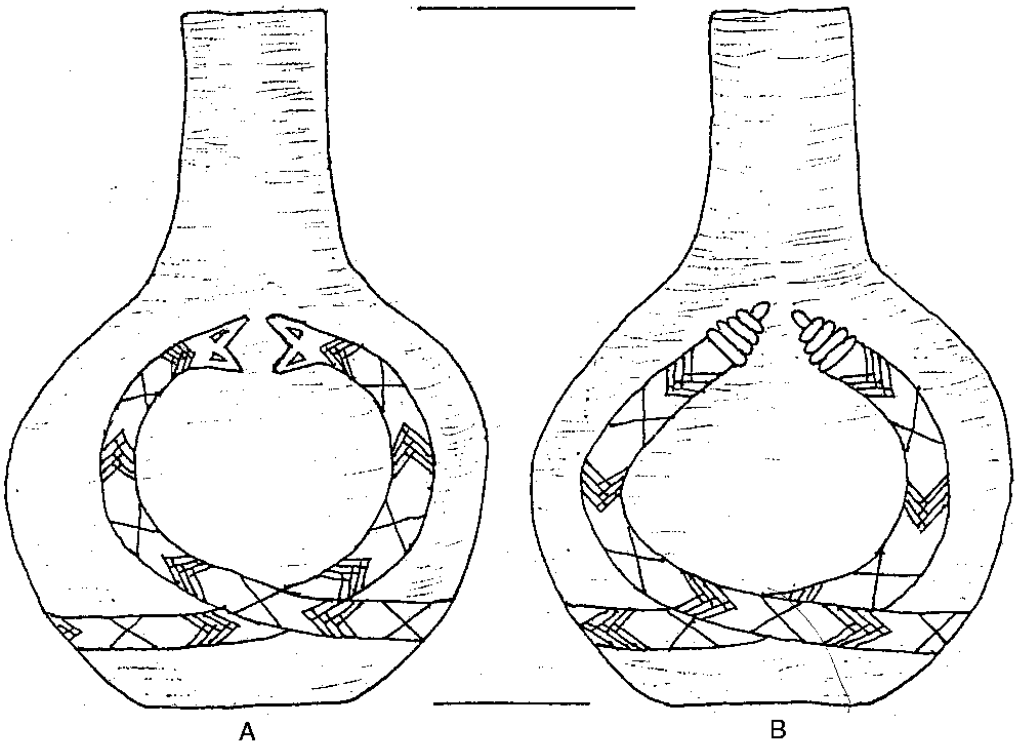
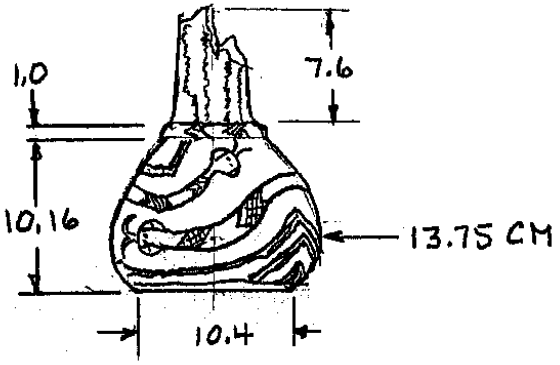


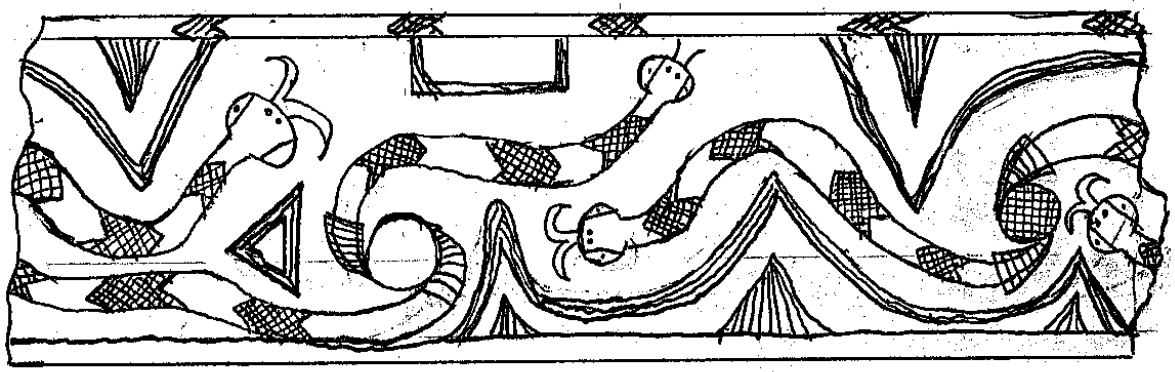
Figure 20. Engraved carinated bowl, from the Pine Grove site (41HS826).



Figures 21. Vessel drawings of an engraved bottle from the Avinger Rest Stop site (41CS132), from Nelson and Turner (1997).



NOTES:
1. LIGHT CHOCOLATE BROWN
2. WELL FIRED - NO TEMPER
3. (4) ROCKER LIKE LINES ON NECK
4. HEMATITE IN ENGRAVING



41 CP 10
HAROLD WILLIAMS SITE
CAMP CO. TX.

POT FROM NORTH GRAVE
"AREA A" OF 1967 T.A.S.
FIELD SCHOOL

Figure 22. Engraved rattlesnake bottle from the Harold Williams Site (41CP10).

R.L. TURNER
10-16-96

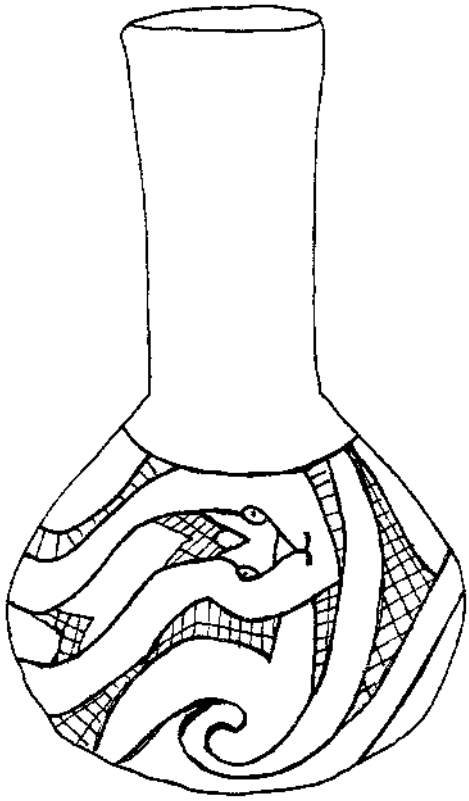


Figure 23. Henderson-Southall site (41UR3) engraved rattlesnake bottle

years ago, with not a lot of attention to detail other than it was an engraved rattlesnake vessel. Unfortunately this collection has been sold and is no longer available for study.

Angelina River Drainage

In the Angelina River drainage in East Texas, extensive investigations at the Washington Square Mound (41NA49) (see Hart 1982; Corbin and Hart 1998) place that occupation at A.D.1268-1302 on the basis of the averaging of several calibrated radiocarbon dates. There was one bottle from a shaft burial with engraved snakes (Figure 26). Except for the rattles, this bottle is almost identical to the example from the Museum of the Red River that was reported to be from Miller County, Arkansas (see below). This vessel was included in the tentative Nacogdoches Engraved type by Hart (1982), but the key attributes for the type are apparently the fill elements and not the actual snake motif.

Red River Drainage

The engraved rattlesnake vessel example from the Museum of the Red River, according to personnel from the museum, was from Miller County, in southwestern Arkansas (Figure 27). No radiocarbon dates or associated pottery examples are

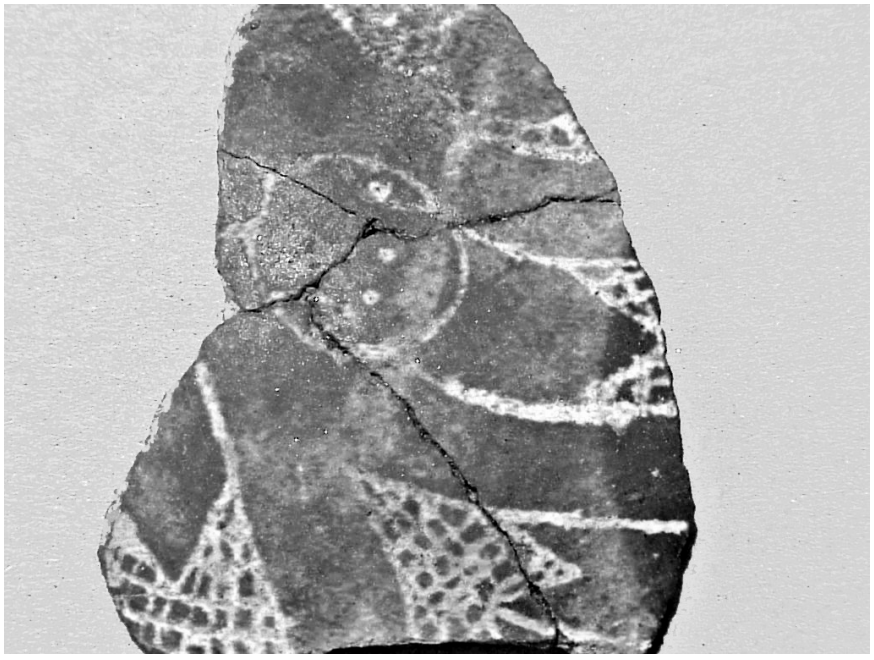


Figure 24. Engraved body sherd from the D Head site with rattlesnake head and red pigment.

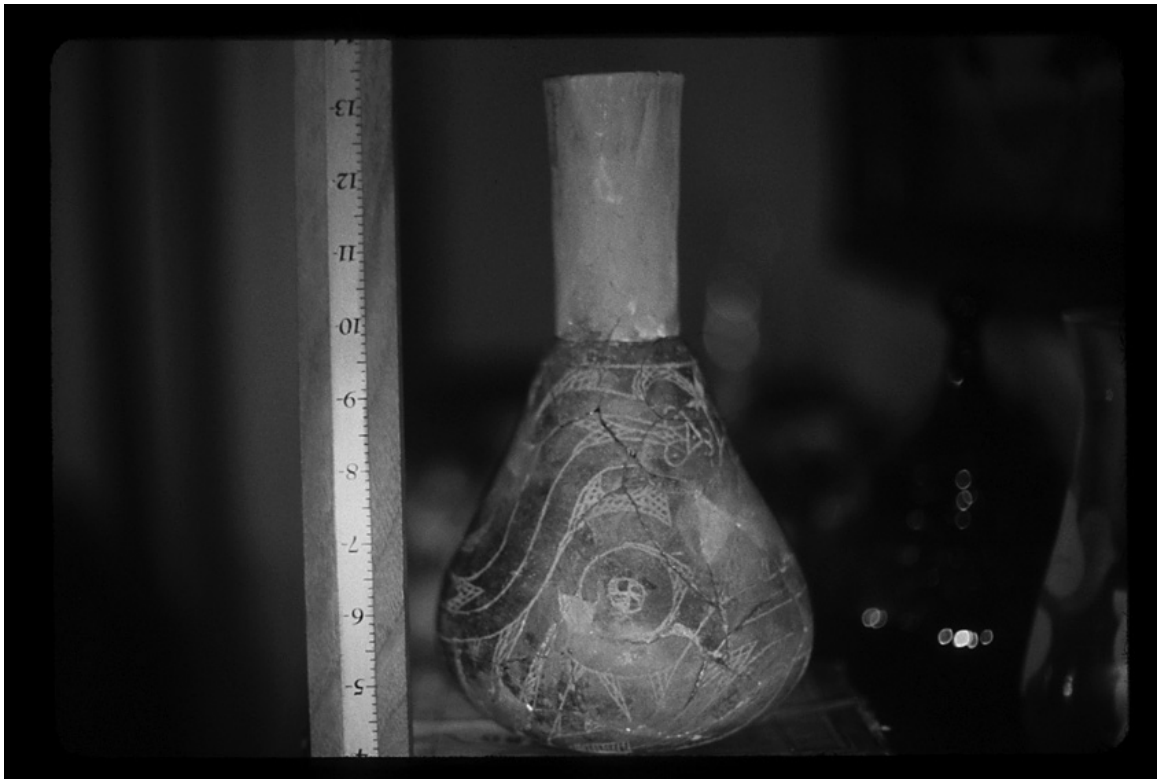


Figure 25. Graydon Adkins site (41UR21) vessel with engraved rattlesnake motif.

known, which is unfortunate, since this piece so closely resembles the example from the Washington Square Mound site in East Texas (see Figure 26).

The other example from the Red River is the stylized version (Figure 28) from the Holdeman site (41RR11) that is described by Perino (1995) as being Middle Caddoan in age. This particular vessel was found in Burial 17 in Cemetery No. 3. It was a shallow carinated bowl (see Perino 1995: Figure 10c).

Finally, in *Hero, Hawk, and Open Hand, American Indian Art of the Ancient Midwest and South*, an engraved bottle with interlocking serpent designs is part of a collection that is reported to be from southwestern Arkansas Caddo sites dating to ca. A.D. 1200-1500.(see Townsend 2004:248) The bottle shape, rattlesnake head, and chevron markings on the body (Figure 29) are very similar to the example from the Museum of the Red River (see Figure 27).

Examples of Variation in Heads

There are 15 different sites with engraved rattlesnake heads on ceramic vessels and/or sherds (Figure 30a-b). Ten examples have the "forked" tongue, although even the two heads at the Harold Williams site (41CP10) have the forked tongue drawn in two different ways. Seven examples have the eyes depicted in separate semi-circles on the side of the head. Five have the head as a separate circle from the body. Two curious examples are from the Graydon Adkins site (41UR21), one dubbed the "king" snake because of its simulated "crown," and curved elements described by Bob Turner as "ice-tongs." Two of the more stylized versions are from Holdeman (41RR11), which seems to be an open mouth with a possible fang, and from Benson's Crossing (41TT110),

Figure 26. Bottle with canebrake rattlesnake motif, Feature 95 at the Washington Square Mound site (41NA49).

Figure 27. Museum of the Red River example of an engraved rattlesnake bottle.

which only has the forked tongue element. And of course the folks at the Langford site (41SM197) had the forked tongue right but only had a single eye inside the body with the other two outside.

Examples of Bodies

Figure 31 illustrates 12 different examples of the body portion of the snake. The most common (n=9) is the chevron design. The example from the Lake Clear site (41SM243) was the only engraved rattlesnake sherd with a diamond design. Other variations were the stylized example from the Holdeman site (41RR11) that had bands of straight lines and the example from the Langford site (41SM197) with a jointed body and cross-hatched panels.

Examples of Tails/Rattles

Figure 32 illustrates nine good examples of tails/rattles on the engraved rattlesnake designs. The vessel from the Avinger Rest Stop site (41CS132) was the only example that clearly showed the individual rattles and pear-shaped "button" of the rattler section of the tail. The example from the Washington Square Mound (41NA49) had overly developed rattles and to a lesser extent so did the example from the Harold Williams site (41CP10).

The other examples showed the tail/rattles as simply the end section as depicted by parallel opposing lines or cross-hatching, although one example from the Pine Grove site (41HS826) had a chevron design. The example from the Museum of the Red River has two tails forming a circle,

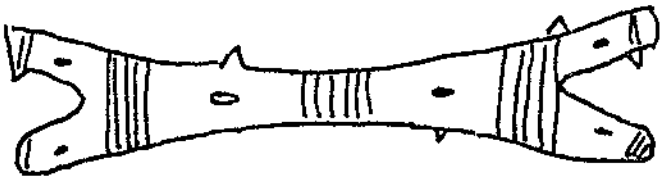


Figure 28. Holdeman site (41RR11) stylized rattlesnake motif.

Figure 29. Engraved bottle with rattlesnake designs from Kinker collection, from Townsend and Walker (2004).

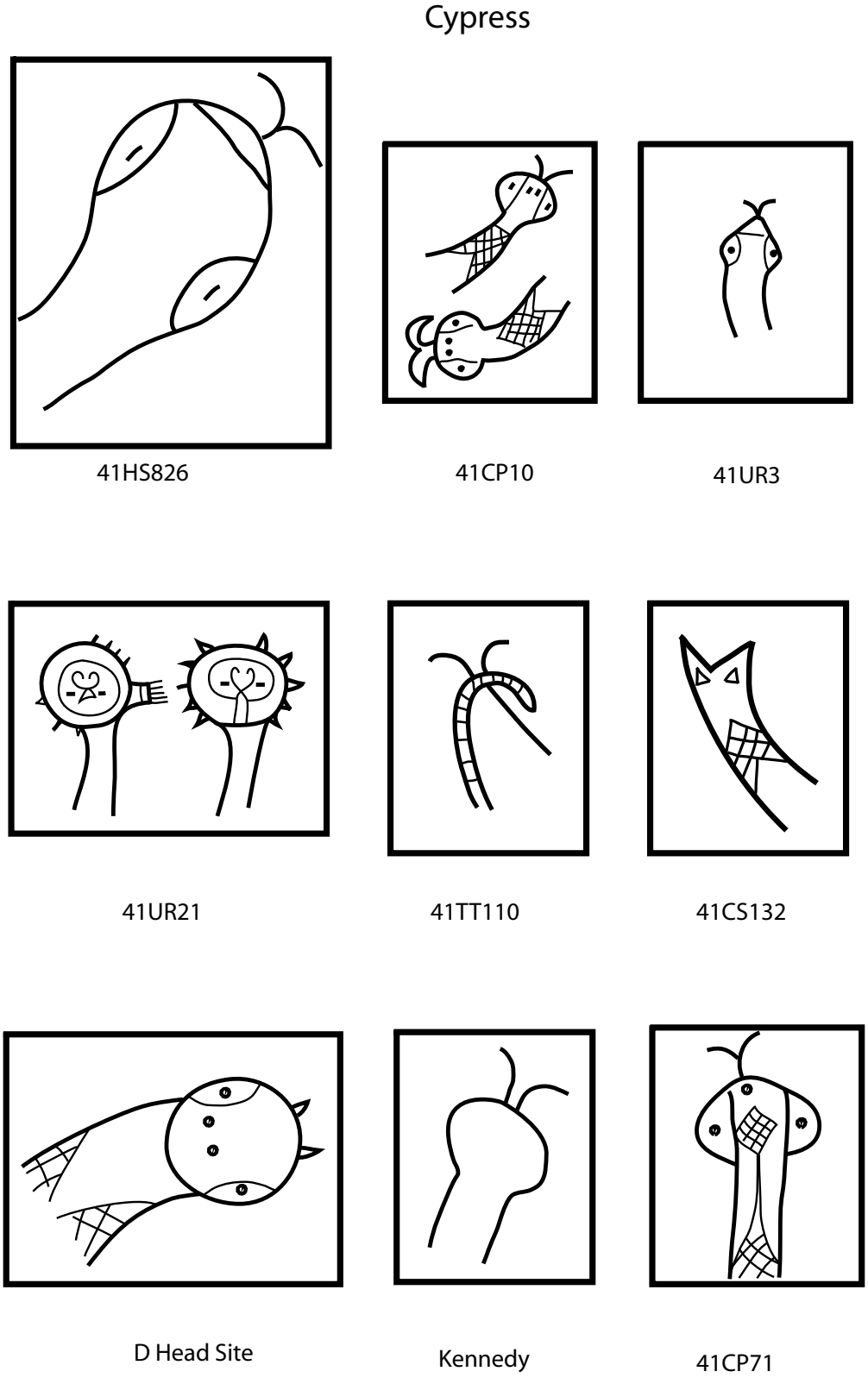
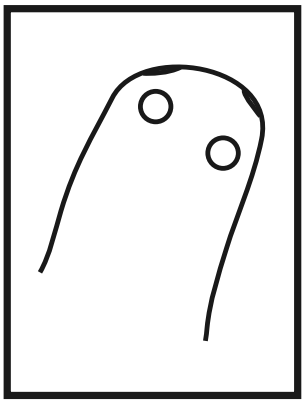
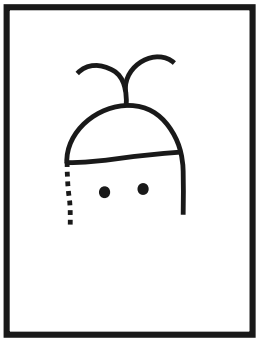


Figure 30a. Illustrations of rattlesnake heads by drainage: a, Big Cypress Creek sites; b, Sabine and Angelina River basin sites.

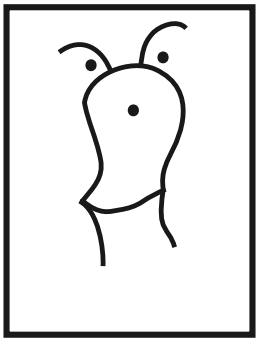
Sabine



41SM243

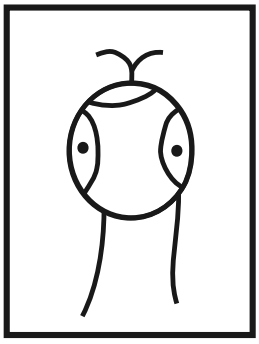


41RK214



41SM197

Angelina



41NA219

Figure 30b. Illustrations of rattlesnake heads by drainage: a, Big Cypress Creek sites; b, Sabine and Angelina River basin sites.

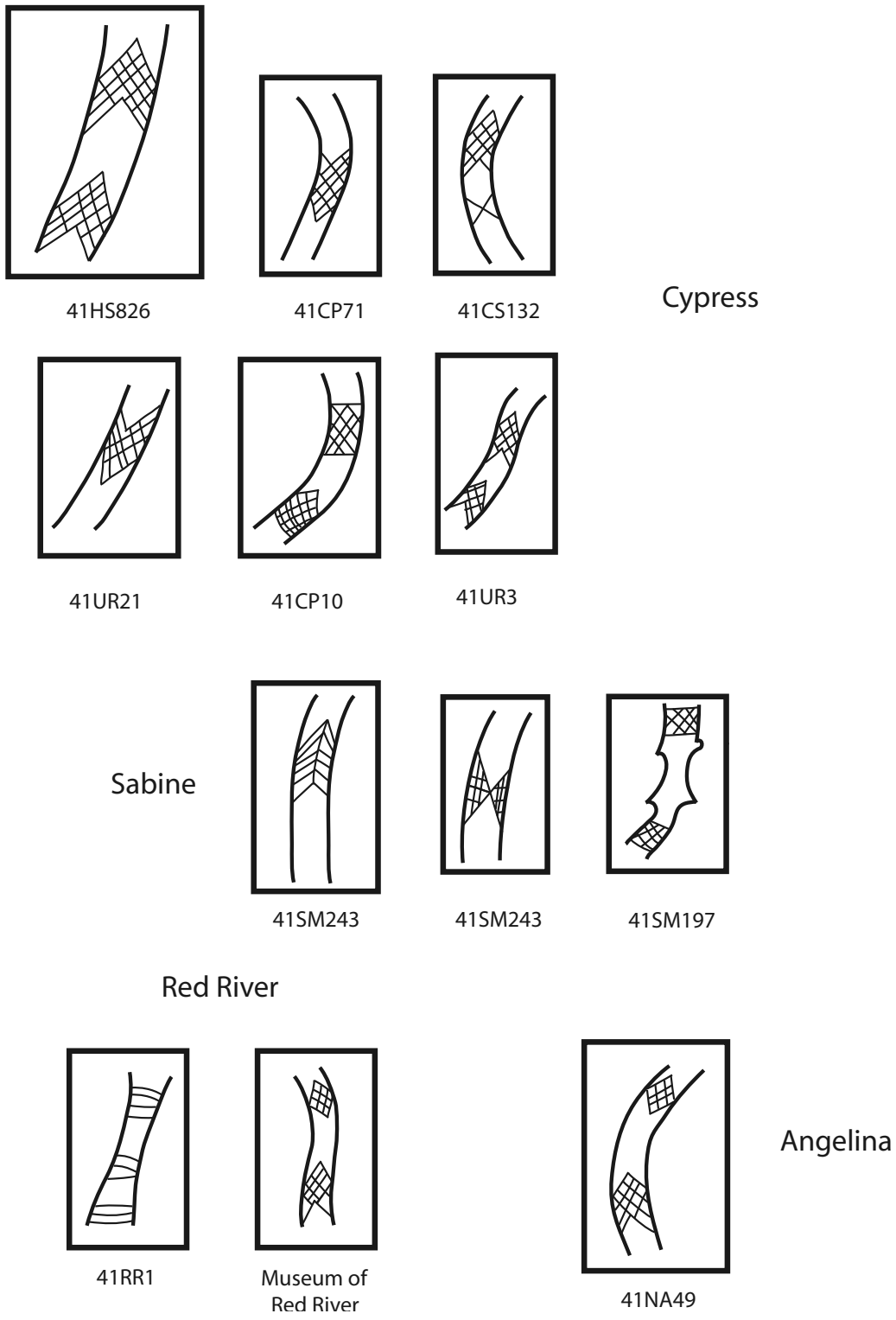


Figure 31. Illustrations of rattlesnake bodies by drainage.

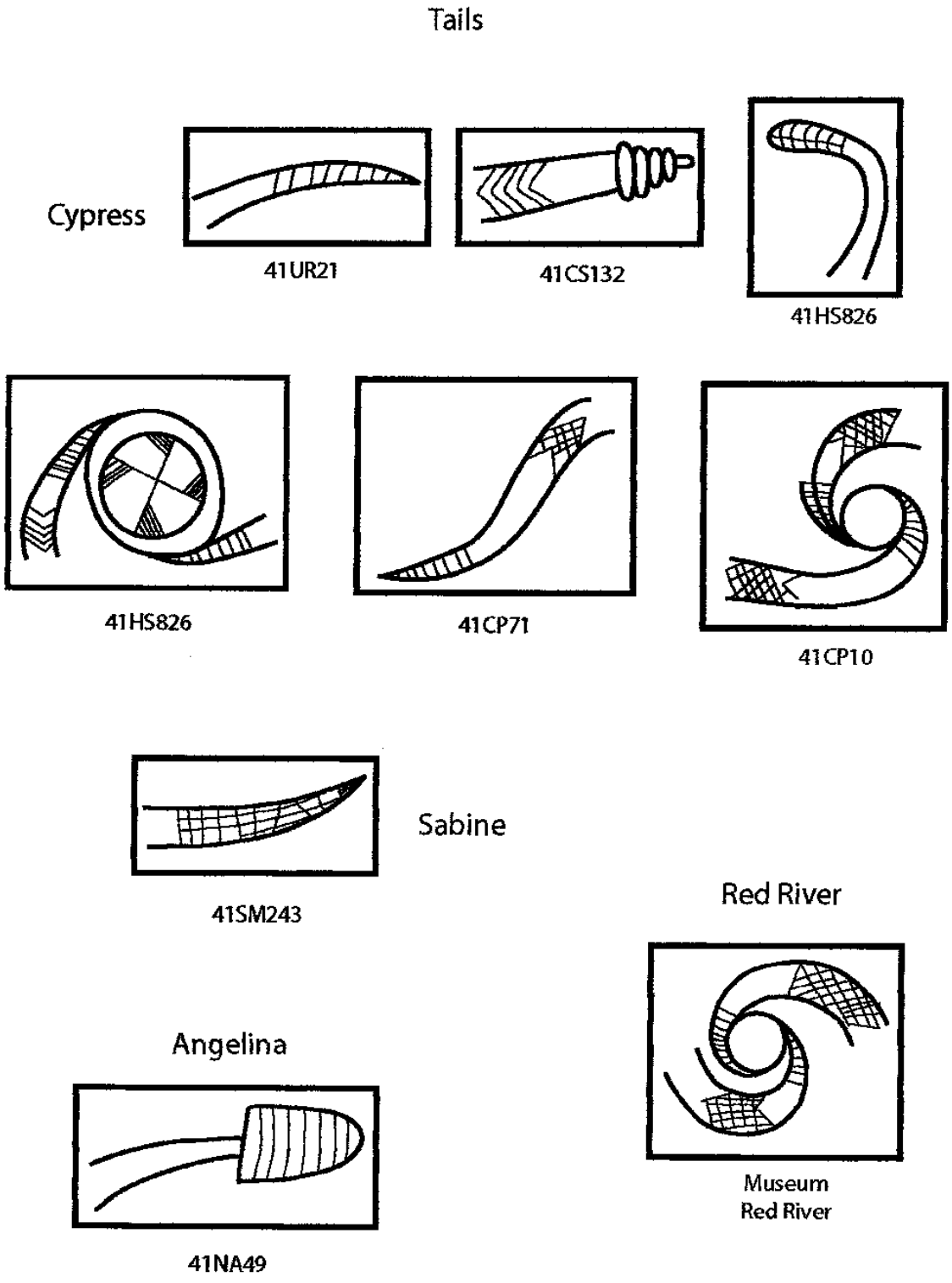


Figure 32. Illustrations of rattlesnake tails by drainage.

part of an overall scroll effect, as did the example from the Harold Williams site (41CP10). The example from Harold Williams also shows two different ways of depicting the rattle section, one with parallel opposing lines, and its mate slightly enlarged and superimposed over the tail section.

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From Mounds to Monasteries:

A Look at Spiro and Other Centers Through The Use of Metaphor

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ABSTRACT

Previous study of the extensive and elaborate funerary offerings at the Spiro site have explained their presence by an exchange system with Spiro functioning as a gateway center. More recently, Schambach has argued extensively and passionately for Spiro's role as an entrepôt redistributive center. However, this argument fails to account for much of the accumulation of funerary items present at Spiro. As an alternative, I propose that some ceremonial centers such as Spiro functioned solely as religious centers, much like the monasteries of medieval Europe with parallels in the use of architecture, economic support, relics, and the treatment of individuals at death. A model based on the metaphor of monastic life provides greater explanatory potential than that of the economically-driven entepôt.

INTRODUCTION

The Spiro (Le Flore County), Harlan (Cherokee County), and Norman (Wagoner County) sites residing in the Arkansas River valley system of eastern Oklahoma represent some of the most western of the complex ceremonial centers of the Mississippian world. The three Oklahoma centers contain conjoined burial mounds, temple mounds, as well as numerous smaller charnel house mounds. All offer elaborate evidence of Mississippian mortuary and funerary practices within the context of an Arkansas River Caddoan society. Because of the extensive and exotic funerary inventory and the spectacular mortuary events at Spiro, as well as the occurrence of archeological investigations in the mid- to late 1930s, this center has received the bulk of the attention by archaeologists. Harlan (Bell 1972) and Norman (Finkelstein 1940), however, may be equally deserving. The architecture of Spiro as a ceremonial center, and the richness of the material record, were documented early on by Bell (1947), Orr (1952), and Hamilton (1952).

Later work by Brown (1966a, 1966b, 1971, 1975) examined the complex developmental history of Spiro (including comprehensive description of the material culture), whereas other studies focused on stylistic aspects of the engraved shell (Duffield 1964), and societal complexity (Rogers 1983, 1996). The exotic and non-local origin for many of the funerary offerings at Spiro and their ties to the Southeastern Ceremonial Complex prompted extensive discussion of trade networks (cf., Bell 1947; Brown 1966a, 1966b, 1983; Wyckoff 2001). More recently Brown (1996) addressed the issue of trade in his two volumes on Spiro, while numerous researchers have worked to refine the origin of non-local materials from Spiro (e.g., Brown and Rogers 1989).

Frank Schambach (1993a, 1993b, 1994, 1999, 2000) has argued extensively and passionately for Spiro serving as a redistributive trade center. Schambach proposed that Spiro, occupied by ancestral Tunica, functioned as an entrepôt with Spiroan traders redistributing goods from the Plains (e.g., bison meat and hides) in exchange for Osage orange wood and goods with ceremonial histories from the Southeast and Midwest. In this fashion, Spiro would have functioned as a gateway community between the Mississippian world and that of the Plains societies to the west (cf. Hirth 1978). He further argues for outposts of the Spiro entrepôt at the Sanders site in northeastern Texas and the Nagle site in central Oklahoma (Schambach 1999, 2000; see Bruseth, Wilson, and Perttula [1995] and Brooks [1996] for a response to this argument).

Redistributive economies figured prominently in the early discussions of chiefdom-level society (Sahlins 1972) and have been applied to Mississippian society, including centers such as Cahokia, Moundville, and Spiro. Subsequent critical reexamination by Earle (1997) and Peebles and Kus (1977) documented considerable variation in how redistribution was applied by chiefdom-level societies, and in some instances, there was little evidence for a redistributive system present. However, the use of trade and redistributive models continues to be applied to Mississippian societies using multiple and/or alternative models (e.g., Welch 1991; Peregrine 1992). The application and study of redistributive potential within Mississippian chiefdom societies undoubtedly has merit for the understanding of the complex relationships that existed on the cultural landscape, within communities and societies where class inequality was present, and even between ceremonial centers of differing prestige and power. There is not a consensus, though, as to the role of trade and redistribution. Others, notably Pauketat (1997) and Emerson (2004), argue that too much reliance has been placed on trade and redistribution as an explanation for the dynamics of interaction between (for example) Cahokia and the regions and ethnicities that comprise the Mississippian world.

THE ENTREPOT AS METAPHOR

While Schambach's suggestion of a Tunican presence at Spiro and its outposts is provocative, arguing for ethnicity in a prehistoric context remains an elusive undertaking. Schambach (1999) has a valid argument in that the annular fronto-vertico-occipatal cranial deformation practiced by Arkansas River valley (and Sanders in Texas) elites is significantly different from the tabular frontal-occipital style in the Caddoan region. This is best expressed in the distinction between elites at the Sanders site and those at surrounding Caddoan centers (Derrick and Wilson 1997). However, it is unclear whether this reflects a stylistic difference related to participation in the Mississippian World or to an ethnic/cultural or even biological population difference. There are means at our disposal to critically examine this hypothesis, however, such as refined craniometrics (Owsley and Jantz 1999) as well as the examination of comparative DNA sampling. Opportunities to resolve this critical issue must await future collaboration with the concerned tribes (e.g., the Wichita, the Caddo, and the Tunica). It should also be pointed out that the "Big Bang" theory of Cahokian expansion proposed movement of Middle Mississippian populations from Cahokia to the north, Midwest, and Southeast (cf. Pauketat 2005) and thus, immigrant populations are a possibility throughout much of the Mississippian world. However, attention here is turned to the portion of the entrepôt model that deals with the redistribution of goods. There are two goals in examining the entrepôt model. The first is to look at the theoretical implications of this system: how does it function and what are the outcomes? The second goal is to examine what can be documented as the products of the proposed entrepôt system in the context of redistribution at Spiro and other Arkansas River valley Caddoan centers.

In examining the entrepôt model, one of the initial steps is to define what is meant by the term. Entrepôt is defined by Webster's (1979:608) as "a warehouse or place for the storage of goods or (2) the distributing point

for goods." Goods in the entrepôt system would be warehoused at a given location or depot. From here, the goods would flow to external distribution or redistribution points. In this system, there are also examples where there is a backflow from these other point to the warehouse and back-up the linkage to the origin point. The warehouse or entrepôt would be administered by elites, nobles, or merchants who dealt with their trading partners in the external group. In some ways the entrepôt model corresponds to a world systems approach (cf. Wallerstein 1979) where a developed economic system interacts with less complex societies. Here, the relationship between the entrepôt and the exogenous culture would be hierarchical. It is unclear whether interaction between Spiroan society and the less complex Plains groups would have functioned in this fashion.

From this perspective, it is appropriate to examine the storage and/or distribution aspect of the Sanders and Nagle sites. The Nagle site, located in northeast Oklahoma County, Oklahoma, was initially identified as a cemetery location for Spiro phase people (Brues 1957). No village site has been documented, however, and thus, there is no location from which to examine the issue of warehousing or redistribution of goods. While Schambach proposes this as an entrepôt location, there is no evidence to support this assertion. There are individuals within a cemetery context exhibiting attributes of a Spiroan population (Owsley 1989), but there is no support for a residential population.

Examining the issue of redistribution of Spiroan/Mississippian goods within the broader perspective, there is insufficient evidence to point to some site functioning as a redistributive center for the Southern Plains area. There are some Spiro phase items that occur at Plains Village settlements in south-central and west-central Oklahoma (Carney 1993). In some cases though, such as the Zwiginclose site in Pawnee County, it is unclear whether we are dealing with another Spiroan "outpost" or Spiroan goods at a Plains Village settlement. Typically, these goods have been ear spools or ceramics. There are none of the more exotic materials common to Spiro. The engraved shell gorget initially attributed to a Washita River phase site near Chickasha (Drass and Peterson 1985) was later rumored to have been found at Lake Eufaula, perhaps from the inundated Eufaula Mound. There is only one platform pipe for all of western Oklahoma and this item lacks similarity to the Spiroan T-shaped pipes as well as a context to demonstrate it functioned as a prestige good. Additionally, petrographic analysis of Caddoan style ceramics on the Southern Plains has revealed many of them to be replicas (Ferring and Perttula 1987). If goods are being redistributed through Nagle or some other Spiroan outpost on the Plains of Oklahoma, they were remarkably poor "traders." The backflow of Plains goods to Spiro or other center is equally sparse. There are high quality chipped stone blades of Florence A chert at Spiro. But, these could have been acquired by any number of means, including direct procurement by Spiroan traveling up the Arkansas River to the source. Bison meat and hides have been proposed by Schambach as a likely material to have been exchanged with Arkansas River Caddoan populations, but as noted by Brown (1996), aside from the use of some bison hair in weaving and a few etchings on the engraved shell, there is not a bison presence at Spiro or at other Arkansas River ceremonial centers. Bison remains are found in relative abundance at Fort Coffee phase villages around Spiro, but their appearance in these villages does not take place until after the demise of Spiro and the other mound centers in the Arkansas River valley. It is also likely that these bison were a consequence of direct procurement by Fort Coffee phase populations rather than through trade/exchange. This point was stressed in an earlier article treating the role of bison in such an exchange system (Brooks 1996). There is an equal absence of data to support a hide production "economy" for Plains Village settlements contemporaneous with Spiro. In fact, there has been no argument from archeologists studying southern Plains Village sites in recent years for the presence of such trade in bison hides or meat. Such evidence is available for the ensuing Protohistoric period (ca., A.D. 1450-1600), when extensive trading takes place between people on the Plains and southwestern Puebloan societies (Spielman 1991). If such trade in bison hides and meat was also moving to the east in Protohistoric times, it would have been without the presence of the gateway of Spiro.

Two cases of long distance movement of goods to Spiro also merit attention, especially as they have not been previously discussed in the context of the entrepôt metaphor. There is evidence for *Olivella dama* shell originating from the Gulf of California present at Spiro in substantial quantities (Kozuch 2002). But it is unclear as to how these items are being delivered. Are they delivered as a consequence of a Southwest Pueblos-Plains-Arkansas River valley interaction or is it more of a direct connection to the California coast area? Kozuch is skeptical that Spiroans would have had sufficient knowledge of the California landscape to locate areas where the *Olivella dama* shell could be found. It is perhaps significant that 93% of the Olivella shell at Spiro is found with Burial 145. If Olivella shell represents a redistributed item within an entrepôt system, presumably, it would be more widely represented among the elites at Spiro. There is one remaining item from Spiro that merits some discussion. This is the single piece of obsidian (a scraper) found at the site and that has been sourced to near Pachuca, Mexico (Barker et al. 2002). This represents the only item of Mesoamerican origin from all of the southeastern ceremonial centers and cannot at this time be articulated to a Mesoamerican entepôt moving goods to Spiro.

At the Sanders site in Lamar County, Texas (Krieger 1946; Jackson et al. 2000), a different situation exists. Unquestionably, a resident population is present that differs significantly from neighboring villagers. But, can it be clearly established that this resident population was involved in a redistributive network? There were 21 conch shell dippers, gorgets, and pendants as well as 5500 beads from conch shell found within burial contexts at Sanders. These items were also noted as stylistically resembling those found at Spiro (Krieger 1946:177). However, there is a question as to the origin of the engraved shell at Spiro (Brown 1996) and a similar issue exists for the Sanders shell as well. There is no way to establish that it originated at Spiro. Without evidence to support these goods coming from Spiro, the entrepôt argument lacks substance. The other issue, of course, is that these and other items were not maintained in the system but were deposited as mortuary furniture.

Additionally, 18 bison scapula hoes were found within burial contexts at Sanders (Krieger 1946:183). There appears to be some confusion, however, as to the context of some of these specimens (Bruseth et al.1995). There are numerous references as to the long distance hunts of the Caddo for bison in historic times. Joutel also noted that bison scapula were used as mattocks by the Caddo of Louisiana (in Swanton 1942:127). Are the Sanders burials with scapula hoes, prehistoric or historic? Assuming that these hoes are indeed part of the mortuary furniture for the prehistoric Sanders' elites, there remains a significant problem. If the purpose of the Sanders site entrepôt is to redistribute Plains goods, why were these scapula hoes placed in burial contexts rather than being directed back up the line to Spiro? Considering the scarcity of such items at Spiro, they should have been highly prestigious and merited backflow to the principal center in the system. Yet, there are no data to support such a redistributive system for the bison tools.

Similar questions arise for Spiro and its role as the central "entrepôt." Spiro is a center where ceremonial goods or relics are found within the archeological context as funerary offerings. Thus, most goods are not re-distributed elsewhere but are deposited as the funerary offerings with or for high status individuals within the mortuary system. From this perspective, Spiro does not function to redistribute prestige items/goods. A similar argument has been made for Cahokia by Pauketat (1997). He argues that many of the goods at Cahokia are not from a Mississippian World redistributive system but originated in close proximity to Cahokia (within 150 km). From Cahokia, they subsequently were redistributed but possibly not as part of some system that precipitated a reciprocity in goods coming back to the originating center. This perspective does not discount redistribution functioning in Cahokian society, the Mississippian World, or at Spiro in a more general sense, but perhaps without villages or settlements solely established to regulate the flow of such goods, or that the redistribution, as such, played a prominent role in the function of mortuary/religious practices at the ceremonial centers. The goods may have been valued for the prestige or value they were embodied with and the nature of their acquisition was of secondary importance.

THE MONASTERY AS METAPHOR

While questions have been raised on the use of the entrepôt as a metaphor to explain the presence of prestige goods in a funerary context and associated aspects of ceremonial centers and their practices, is there a more plausible alternative explanation, through use of metaphor or otherwise? Emerson and Hughes' (2000) study of flint clay figurines and pipes originating from Cahokia provide an intriguing base from which to begin this examination. Numerous large stone figurines and pipes have been described from mortuary contexts at Spiro. Study of these specimens as well as others by Emerson and Hughes using x-ray diffraction identified them as being made of flint clay originating in the Ozarks area adjacent to Cahokia. They further argue that these pipes with Cahokian stylistic features were resident at Cahokia and later transported to Spiro, possibly after their use-life had ended for Cahokia priestly elites. More recent analysis of flint clay objects at the Gahagan site in Louisiana attest to delivery of the figurines from Cahokia somewhere between A.D. 1021 and 1160 (Emerson and Girard 2004). In earlier studies, Phillips and Brown (1984:170-174) established a relationship between engraved conch shell of the Braden style at Spiro to similar stylistic elements at Cahokia. Thus, we have two fundamentally different materials, flint clay and Florida Keys/Gulf Coast shell being linked at Spiro to Cahokia, with the figurines originating from Cahokia. There are numerous other exotic goods in a mortuary context at Spiro that are from analogous long-distance origins (e.g., copper, stone, mica, and the previously discussed Olivella shell and obsidian). As noted above, these items are not redistributed; they enter the mortuary/ceremonial context with little evidence to suggest existence as a functional item in society. What kind of system can account for this type of distribution? An economic redistributive system has not provided a satisfactory explanation.

While any number of world examples could potentially be applied for its parallels or metaphorical comparisons, it is argued here that the example of monasteries in medieval European societies functions as a metaphor that better accounts for much of the behavior witnessed in the ceremonial/symbolic life of the Mississippian world, including Cahokia and the movement of material to Spiro. There are obviously, significant differences between life in medieval Europe and that of contemporaneous village farming societies in the Midwestern and Southeastern United States. It would be presumptuous to argue that the priestly elites of the Mississippian world and the elites of the intermeshed secular and sacred political states of Europe are equivalent. Yet, there are intriguing parallels if we isolate the monastic patterns of the Catholic Church during this time and deconstruct their economic, social, and religious ways-of-life and also examine basic patterns in architecture.

The Catholic Church during medieval times was highly embedded within the feudal states of Europe. Secular rulers of these feudal states sought to sanctify their position through the church. Religious practices of the church functioned at various levels within society. There were highly ranked church officials seated at basilicas in cities such as Paris, Rome, Madrid, Munich, etc. While lacking the prominence of the basilicas and major cathedrals, there were lesser cathedrals in secondary cities throughout western Europe, usually administered by a bishop. Most towns also had their local church and priest. Functioning outside this hierarchy was the monastery. Monasteries, while sponsored by the leaders of feudal states, typically functioned apart from urban centers and their church structures, and were more focused on religious teachings and philosophy than their counterparts in the towns and cities.

HISTORY OF MONASTIC LIFE

Monastic life was an attempt on the part of monks to come closer to God. This tradition began during the fourth century in Egypt as monks traveled into the desert in their search for a greater sense of worthiness (Brooke 2003). In ca. A.D. 530 Saint Benedict wrote the rules of monastic life. This marked the beginning of the movement of monks to monasteries in search of enlightenment. Monasteries continued to increase in numbers and power until the eighth to ninth centuries when their numbers decreased as a result of an increase in secular society. However, monasticism returned to favor in the tenth century with establishment of the monastery at Cluny and the beginning of the "Cluniac" order (Lawrence 1984). By the twelfth century there were 75 houses under the House of Cluny and following the principles of the Cluniac order in France. Others, advocates of the House of Gorze, were present in Germany. In the thirteenth century, an order that thought the Benedictines and Cluniacs had not disavowed themselves thoroughly enough of wealth was established, the Cistercians. The Cistercians were the most rigid of the monastic orders in their vows of poverty and in their efforts to come closer to God through sacrifices on earth. These various orders spread throughout Europe during the Middle Ages, extending into Great Britain and northern Europe. The presence of monks and monasteries continue in most European countries today, although without the power and prestige that they held some 1000 years in the past.

PARALLELS OF MONASTIC LIFE AND THE MISSISSIPPIAN WORLD

A fundamental aspect of monastic life was that of privilege. The nobility was responsible for the founding of monasteries and its members were their inhabitants (Milis 1992:44). This is further accentuated by the presence of a hierarchical structure among most monastic orders that only persons of noble birth could be monks or have priestly functions. The illiterate or commoners became the "conversi" or lay brothers who performed domestic functions for the noble/ascribed status monks (Milis 1992:18). Within the order of monks, there was a rigid hierarchy with the abbot as the principal for a particular house or series of houses. This is not unlike what we think to be the situation at the Arkansas River valley centers and in the Mississippian World where priests represent the nobles or elites of society. The structure of the Mississippian World also suggests that there existed a structure in the hierarchy of priests and individuals associated with priestly functions. Within the context of Mississippian ceremonial centers (places such as Spiro), undoubtedly, there were also the equivalents of "conversi" who performed domestic tasks for the priestly elites as attendants.

There was a formalized daily ritual of activities within the monastery. Most of these dealt with prayer or work activities (tied to sacred functions rather than secular ones). This daily liturgy served as the basic scheduling for monastic life and religious behavior. Obviously, such details of daily activity cannot be extracted at prehistoric sites. However, it is logical that the priestly elites residing at Spiro, Cahokia, and other centers would perform the equivalent of the daily liturgy. While some religious functions operated on a calendar schedule undetectable by archeologists, other activities, undoubtedly, required daily attention. Associated with daily religious activities is the use of incense for highly ritualized purification ceremonies. Similar actions are documented for Southeastern societies except that the medium used in such ceremonies was tobacco (Swanton 1942).

Another parallel lies in the composition of residents at ceremonial centers and monasteries. The residents at monasteries were the monks, the conversi who functioned as their attendants or who provided basic support tasks, and a few other lay individuals who provided logistical support for the existence of the monastery. There were few if any individuals not associated with the function of the monastery in residence (Lawrence 2001).

This pattern is very similar to that found at a number of Mississippian ceremonial centers where there was not a resident domestic population. This is certainly true at Spiro and other Arkansas River valley centers where there were no residents other than the priestly elites (and their presumed attendants). This suggests that there is a sacred nature to the space of the ceremonial center and the monastery that cannot be supplanted by domestic concerns. In the case of the monastery, there is sacredness to the physical space of the monastery such that village populations were not encouraged to take up residence. Perhaps a similar atmosphere prevailed in the Mississippian World.

A corollary to this also existed in the role of the local village. In medieval Europe, the village residents performed many domestic tasks for the monastery. They provided the food for the occupants as well as other goods such as clothing, tools, furniture, and masonry. Thus, the monastery was dependent on the local village community for much of their needs. A similar scene is replayed in the surroundings of Spiro and other centers. The nearby village residents provided most of their needs. Obviously, Spiro elites would not be contributing to production of food and other goods as the priestly elites of Caddoan society. However, it is somewhat less clear whether the nearby villages were also the suppliers for many of the non-food items that we find in a mortuary context at Spiro and other centers.

Residents of surrounding villages also routinely visited the monastery during times of feasts and rituals. There are numerous accounts of an inflow of local "lay" people that experienced and/or were participants in feasts and celebrations at local monasteries (Brooke 2003). It is likely that at least some of these celebrations dealt with the death of significant members of the religious community. These contexts would not be unlike those experienced by the Mississippian community that visited the ceremonial center at specific times and would also take place upon the death of individuals within the priestly elites of Mississippian society. There would be little to document the presence of the "lay" people at these events except for the occasional need for their labor or as in the case of Cahokia, as sacrifices.

A major function of the Mississippian ceremonial center was to serve as a repository for deceased priestly elites within the society. Typically, they were interred in burial mounds after residing for some time in charnel houses. Both types of structures were present at the ceremonial centers. It might be assumed that this is significantly different from the practices of monasteries in medieval Europe, yet that is not the case. Many of the monks, abbots, and other religious functionaries of monastic life died at the monastery and were buried within the facilities. Often, the tombs were dug as deep chambers within structures of the monastery and are recognized as the catacombs (Brooke 2003). These burial plots became points of worship for subsequent generations of monks and lay visitors. Even the bone pickers of the historic Caddo society documented as cleaning priestly elites remains have their counterparts in medieval Europe. There are also bone pickers in Europe at this time. What is less clear is the remains that they were treating. However, it is assumed that the Caddo bone pickers would be most concerned with the remains of the nobles and elite, especially the religious elite. This practice may also have a corollary in the contemporaneous societies of medieval Europe.

There are also a series of parallels in treatment of the dead and the holdings of sacred items between monasteries and ceremonial centers such as Spiro. Abbots and monks who died while in residence were sometimes buried with sacred items associated with their lives. Today, one can visit monasteries across Europe and see the burial vaults of these prior monastic residents. There was also considerable ceremony associated with the death of the monks and higher order religious figures in the monastery. There would be celebratory masses conducted in the cloister. The remains of the deceased were often attended to in medieval times by the bone pickers. Significantly, neither lay people nor secular people of nobility were entombed within the monastery. It was restricted solely for the priestly residents. If this is compared to the Mississippian ceremonial centers of

the twelfth to fifteenth centuries, there are marked similarities. Ceremonial centers only entombed the ranking priestly elites (and possible lay sacrifices). While perhaps not all of these religious figures were resident at that center, they were functioning within the religious area of influence of that center. What is less apparent is why some priestly elites were buried at secondary mound centers and others at the principal center. For example, there are secondary centers to Spiro such as Brackett, Horton, and Norman. What rules dictated which individuals were entombed at these locations rather than being transported to Spiro? While it may simply be a function of their prominence within the realm of Spiroan priestly elites, there could be other explanations embedded within the manner in which the ceremonial system operated (e.g., time of death, priestly order, etc.). One of the more striking features of Spiro as well as other Mississippian ceremonial centers is the large quantity of funerary objects placed with the deceased. Many of these items are thought to be associated with an individual's position or office, others are viewed as apparel restricted to the ranking elites/nobles within the society, and some are viewed as goods symbolically placed with individual at their death. All of these may be correct interpretations. However, it is unclear whether the priestly elites "owned" these items or if they were sacred items that were passed from individual to individual, perhaps along lineage lines, or through the particular religious rank that was held in society. If this was the case, then the items would function much as relics. Items brought from Cahokia to Spiro would certainly fall under this category. They were presumably intended for use by certain individuals or the rank of priestly elites. Ultimately, they were entombed along with the religious leaders at Spiro. Thus, many of the goods take on the role of "relics" rather than personal effects.

Religious relics also held prominence at European monasteries. Relics were generally brought to the monasteries by monks or abbots who acquired them on their journeys (pilgrimages). Some of these came from Rome as items blessed by the pope, others of greater antiquity, were venerated objects. The relics were attended to, ceremonies were held surrounding their presence, and they too, sometimes were buried with prominent leaders of the monastery, especially those who acquired sainthood. There was also considerable competition among monasteries for relics (Milis 1992:83), although this apparently never escalated to physical conflict. Considering the apparently greater emphasis placed on relics in the Mississippian ceremonial centers, would competition for such prestige items have escalated into conflict between neighboring ceremonial centers? There is evidence for conflict documented on engraved shell found at Spiro. Is this detailing typical socio-economic warfare, or is this conflict restricted to a religious level? It would be logical to assume that conflict depicted on items that can be identified as relics and that were ultimately entombed with religious leaders might be depicting scenes of religious conflict. Such depictions have a long history in religious iconography on a global scale.

The issue of violence or conflict also bears examination. There are a number of scenes of conflict depicted on the engraved shell at Spiro as well as examples from other centers. It has been argued that these depict the actions of "warrior" classes within Mississippian society (Phillips and Brown 1984). The presence of such groups was documented by early explorers (cf. Swanton 1942). However, it is possible that the early Spanish and French accounts overlooked some subtle aspects of these conflicts. For example, could these warriors be priestly warriors? Was the conflict one of a secular or sacred nature? We do not typically think of the monastic life in medieval Europe as containing militaristic elements. They are present, however. The Knights Templar and the Knights Hospitallers were essentially warrior societies of monks that evolved to protect pilgrims, especially those traveling to Jerusalem, from attacks by Muslims. The Knights Templar is the better known of these societies and has a long history as a rigidly stratified militaristic society (Lawrence 2001).

Another intriguing aspect of monastic life was the travels of the monks and abbots. While much of their life was a highly structured sequence of liturgical duties, they also traveled widely, to other monasteries as well as to Rome and other sacred places. Groups of lay people also traveled widely, making pilgrimages to monasteries where relics were held or to special "holy places." The number of pilgrims was never a significant

percentage of the population, but they were sufficient to spread new religious practices as well as relics around central Europe and even to England. For example, the spread of Cluniacs as an order was the consequence of Saint Robert, one of their founders, traveling widely through Europe and to Rome. Items such as the flint clay pipes that originated at Cahokia and were transported to Spiro and Gahagan and other centers hint of potential pilgrimage-like functions within Mississippian society. Considering the high prestige of these figures/pipes, they undoubtedly were not moved from Cahokia to other centers by "lay" individuals. Whether they were transported by Spiroans visiting Cahokia or by Cahokian traveling to Spiro (for example), it would entail priestly elites making this journey. Such a journey takes on the appearance of a pilgrimage. Many other non-local prestige items (or relics) found at Spiro and other ceremonial centers may have found their way to these locations in a similar fashion. It did not require an elaborate or sophisticated redistributive trade network, only a limited number of priestly elites on a journey to a religious center. Such a system of pilgrimages to explain the movement of non-local prestige goods does not exist only during the relatively late Mississippian times; Sassaman (2005) has advocated such pilgrimages for the occurrence of many of the exotic goods present at Poverty Point some 4500 years ago.

Architectural Elements

In the previous section, the social aspects of monastic life have been compared to that of Spiro and other ceremonial centers to establish a metaphorical model. There are also a number of architectural parallels that can be drawn between the two religious systems.

There are obvious similarities in the landscape placement of monasteries with those of Mississippian ceremonial centers. Medieval Europe during the eleventh to fifteenth centuries remained quite isolated in many areas and transportation routes were limited. Monasteries, in need of arteries of movement, were typically placed adjacent to large streams or rivers. This provided for travel by boat as well as for pedestrian and horse paths along the waterways. Examination of Mississippian ceremonial center locations reveals essentially an identical pattern. They are typically along major streams and rivers. While traffic here was limited to boat (canoe) and pedestrian travel, it probably functioned much like that between medieval monasteries.

Monasteries were typically placed away from major urban areas. However, there were usually smaller towns nearby to provide the logistical support needed by the residents of the monasteries. In other cases, towns would evolve in the area surrounding the monastery as an economic response to the needs of the monastery. Similar patterns may have evolved at Mississippian ceremonial centers. It is difficult to determine whether centers were intentionally placed away from larger residential populations or that this pattern simply evolved in this fashion. However, it is clear, with the exception of Cahokia and some other centers, that many centers featured an isolated center of priestly elites with surrounding village communities.

There are also a number of parallels in the structure of monasteries and ceremonial centers. Mississippian ceremonial centers typically present a series of temple and burial mounds organized around a plaza or open space. While variation exists in this layout, a central theme remains present. The same can be said for the layout of monasteries. To some extent, they vary in design, but there remains a basic structure. The typical monastery of the Middle Ages consisted of a large church, a cloister nestled against it, a dormitory for the monks, chapter house, kitchen, refectory, offices, and storehouses in the central group (Brooke 2003). On the periphery would be found guest house(s), the abbot's lodgings, the infirmary, and a secondary cloister. There was a basic directional orientation to many of these facilities. For example, the cloister was located to the south of the church, the chapter house and the dormitories on the east walk, and the kitchen, refectory, and offices

to the west. However, this architecture was frequently modified to conform to local preferences or landscape characteristics. The cloister though, was always central to the monastery layout.

The cloister of the monastery also appears to have functioned much in the same fashion as the plaza of the ceremonial center. It should be noted here that plaza is probably a misnomer in respect to Mississippian ceremonial centers. Plaza connotes a public space where the activities around the mounds were obviously of a sacred nature. It would perhaps be more appropriate to speak of a ceremonial field. Archeological investigations in these areas reveal a number of activities taking place in these open areas. The cloister within the monastery functioned in a like manner. The cloister was used for processionals as well as for ceremonies, and served as the symbolic referent for the clerics (Brooke 2003). Thus, ceremonial fields at centers may have a central function in the ritual use of space for most activities.

The remaining comparison is that of long term redefinition of the ritual space. Most Mississippian centers show indications of significant remodeling and/or expansion during their use life. This occurs at Spiro where Craig Mound and Brown Mound were both extensively remodeled (Brown 1996). This is especially true of Craig Mound which underwent numerous modifications until they were terminated with the building of the Great Mortuary between A.D. 1400-1450. Monasteries were also constantly in a state of change. Many of the monasteries were under construction or renovation for centuries. Much of this can be attributed to expansion but there are also cases of architectural change brought about by new religious practices or by what was viewed as architecturally acceptable. It is unclear whether symbolic referents were equally responsible for changes in Mississippian centers.

Thus far, social and architectural parallels have been established through comparison to monastic life in medieval Europe. Another critical aspect of such a religious system is the nature of the linkage that held it together. It has been demonstrated that monastic life functioned across Europe with a high degree of uniformity among the different orders. How was this uniformity maintained and are there parallels within the Mississippian World? The day to day life of monks was highly structured through practice of the liturgy; these rituals were highly ingrained into Catholicism. Considering that monasteries existed in many countries across Europe speaking diverse languages (e.g., French, Spanish, Italian, German, English, etc.), a logistical problem was maintenance of these frames of reference while also providing a mechanism for change when needed. This was accomplished through the use of Latin within the religious practice (when monks were permitted to speak). Thus, a common linguistic base was provided—perhaps specifically for such a purpose – to integrate the monastic communities and restrict nationalistic (secular) influence. If the use of the monastic life is a reasonable metaphor for the religious practices at ceremonial centers spread across the Southeast, then there would have been need of a similar overarching linking mechanism – and one may have existed.

Emanuel Drechsel has extensively studied the Mobilian jargon and believes it may have functioned as the lingua franca in the late prehistoric Southeastern United States. In considering the origins for Mobilian, he suggests that it existed in Mississippian society for inter-lingual communication among the diverse language communities that comprised the Mississippian World (Drechsel 1997:286-294) It is intriguing that Drechsels' (1997:286-288) mapping of the spatial extent of historical Mobilean jargon corresponds nicely with the archeologically defined boundaries of Mississippian societies. Mobilian would have functioned as the common liturgical base that served as the common thread for the Mississippian religious system. The use of a lingua franca that extends through the Mississippian World perhaps also provides a basis for the Southeastern Ceremonial Complex as well. If there is a religious system that extends throughout the Southeast, then its expression in the material world can be conveyed though a language that is spoken by the priestly elites among the various cultures that comprise "Mississippian." When the Frenchman Antoine Le Page Du Pratz visited the Natchez in the mid-eighteenth

century, he questioned the Superior of the temple guardians about their beliefs and God. This conversation was conducted in the pidgeon or Mobilian jargon (Dreschel 1997:221). While commonly labeled as a "trade language," it is clear that the Mobilian language also served to convey the information of their religious world. Mobilian language was on the decline by the time of European contact and this may also parallel the overall decline in the Mississippian World by the mid-fifteenth century.

A MODEL FOR MISSISSIPPIAN PRIESTLY ELITES

These metaphorical examples demonstrate that there are alternate pathways to the archeological contexts of prestige goods observed at ceremonial centers in Mississippian societies, including Spiro and others found on the periphery of the Mississippian World. Can an alternative explanation to that of the redistributive economic system be presented from what has been learned from examining medieval monastic life in Europe? With the metaphorical comparisons and parallels presented here, there are numerous explanations that can be posed in terms of religious practices at Spiro as well as at some other Mississippian ceremonial centers

Visualize a Mississippian society where the religious system overarches but does not subsume the basic economic necessities. Priestly elites dominate society from ceremonial centers where they function as the principal residents with support from non-elites functioning as their attendants. Nearby villages support the ceremonial centers through supply of food and other needed material goods. The villages also frequently have resident priestly elites who maintain the link between sacred and secular worlds. This system appears much like that previously identified for Mississippian centers. However, there are some significant differences when prestige goods (relics) are added to the system.

Priestly elites travel often between centers, both within the region and outside of their ethnic territory. The purpose of such travel is to visit other centers where priestly elites reside. These pilgrimages result in visits to the sacred areas of the ceremonial centers, including facilities where religious leaders and their funerary offerings await further treatment and to repositories where religious leaders are buried with these offerings. Such visits for relics were frequent among the ceremonial centers and led to some relics being transported to other select centers. Here, Spiro must have had a particularly prominent role. The use of these goods and how they were portrayed in the religious system was partially a function of the specialized language utilized within the ceremonial context. Priestly elites could be highly protective of their relics and deceased religious leaders and had military societies to protect these interests. At specific times within the life of the relics, they were scheduled (destined?) to be buried with their priestly elite users at specific centers in the Mississippian World. Sites such as Nagle can be explained in the context of religious pilgrimages or perhaps even as a group of missionaries who would not be last to fall victim in their efforts to "spread the gospel." A similar explanation can also be proposed for the Sanders site. The Sanders site very well might have been an outpost, but not an economic one. If they are indeed representatives of Mississippian society as present at Spiro, perhaps they were the more successful missionaries who successfully inhabited the area alongside their Caddo neighbors.

Sometimes, this religious system lost credibility and a less structured polity controlled society. By the latter part of the fifteenth century, increasingly deleterious climatic conditions brought about the demise of the overarching religious order, with only vestiges of the religious order remaining. This is evidenced by warfare between neighboring Mississippian chiefdoms where there is desecration of other societies' temples and destruction of sacred objects (Dye 1994:45). Thus, the religious system encountered by Europeans in their early contacts with

Southeastern tribes was undoubtedly diminished in respect to the religious/ceremonial system that flourished in late prehistoric times.

Here, there is a religious system that provides for the movement of prestige items (relics) for specific purposes within the religious order. The movement of prestige items has little to do with economic purpose and also has little bearing on the secular nature of settlements as redistributive centers. The religious order also functions to reinforce certain sacred practices within the society by maintaining them in separate sacred places administered by the priestly elite. More significantly, a special language exists to reinforce the dogma associated with religious practice through symbolic artistic design on the prestige items. Thus, the religious order through control of the access to prestige items (relics) and the use of a language specific to their "religious properties" controls how people interact with the religious/sacred aspects of life. Such religious practice can be found in many agricultural societies throughout the world with many existing until contact with Europeans and their capitalist economic order in the sixteenth century and later.

Such a model holds promise for explaining the structure and functionality of ceremonial centers on the western periphery of the Mississippian world such as Spiro, Harlan, and Norman in the Arkansas River valley of Oklahoma. The potential practices embodied within a religious context as explained through use of a monastic metaphor supports the accumulation of "relics" at ceremonial centers without the need for explaining their presence in an economic/trade-based system. As alluded to in the introduction, this is not to argue that trading/redistributive practices did not take place in these western Mississippian (Caddoan) cultures, but that it was perhaps less religious in nature and that the sacred aspect of religious life functioned apart from this. This explanation would account for the failure to find backflow goods to the redistributive center, because the ceremonial centers did not have such a function. They were resident only for their religious purpose and for the practitioners of their rituals and ceremonies.

With all that said, it is not the intent of this article to replace one western world metaphorical model with another. The above scenario will hopefully serve as a base from which to more critically examine notions of economic and religious practices in the Arkansas River Caddoan and perhaps elsewhere in the Mississippian World. Such a suggestion is neither novel nor unique. Pauketat (2005:204-205) has pursued the allegorical legends of Red Horn among Siouan-speaking groups in the upper Midwest, tracing the relationship of a mythological figure with long red-painted braids and human head earrings to a legendary history in the Cahokian heartland. It is perhaps no coincidence that the Resting Warrior flint clay pipe that was ultimately deposited at Spiro bears striking resemblances to this legendary figure. With sacred histories of this nature bonded to concepts such as pilgrimages, relics, and priestly functions at monasteries, alternative explanation will hopefully serve to generate comparative testing of the two metaphorical models and their value in understanding the nature of ceremonial centers in the Arkansas River valley Caddoan region as well as elsewhere in the Mississippian World.

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Archeological Investigations at the Hudnall-Pirtle Site (41RK4)
An Early Caddo Mound Center in Northeast Texas

James E. Bruseth and Timothy K. Perttula,
with Contributions by Gayle J. Fritz and Bonnie C. Yates

INTRODUCTION

The Hudnall-Pirtle site (41RK4) is situated on a large T-1 alluvial terrace of the Sabine River in northern Rusk County in Texas (Figure 1). This area of the state, commonly called Northeast Texas, is part of the Southern Gulf Coastal Plain, a relatively level, sloping plain formed by the pre-Pleistocene embayment of the Gulf of Mexico.

From a biogeographical perspective, the site is located in the Oak-Hickory-Pine forest of eastern Texas, otherwise known as the Pineywoods. This area represents the western extension of the southern coniferous forests and is dominated by shortleaf and loblolly pine trees (Jordan et al. 1984:28). Hardwood trees, including various oaks, hickory, elm, and gum, are the dominant vegetation in the floodplains of rivers and major creeks in Northeast Texas.

Soils consist of light-colored to dark-colored sands and sandy loams, with denser clays in the floodplains of major rivers and creeks (see Griffith 2001). The soils have been heavily leached by relatively high rainfall that ranges from 40–50 inches per year (Bomar 1983). Soils are generally acid, causing poor preservation of faunal remains in archeological deposits.

The first written description of the Hudnall-Pirtle site is contained in an unpublished manuscript by amateur historian William Woldert from Tyler, Texas. In a section of the manuscript about old Indian trails, Woldert (1932) describes a "Mound Trail" that crossed the Sabine River in northern Rusk County and passed near a mound that is almost certainly part of the Hudnall-Pirtle site. Woldert provides directions and distances to the mound from several surrounding towns, and when plotted, these measurements correspond almost exactly to the location of the Hudnall-Pirtle site.

The Hudnall-Pirtle site was officially recorded in the 1930s during a University of Texas (UT) archeological survey sponsored by the Works Progress Administration (WPA). A.M. Woosley of the WPA-UT program located the site on the basis of information supplied by surrounding landowners and recorded it as consisting of a "medium sized earth mound" (Woosley 1939). Noting only a single mound is perhaps understandable given the heavy vegetation that likely covered the site at the time, but if Woosley had spent any time walking over the area he almost certainly would have noted the presence of several other earthen mounds. In many respects, though, it is fortunate the site was recorded as having only one mound because this placed it in a class of sites with numerous examples in eastern Texas. If the site's true size and significance had been properly understood, almost certainly the WPA-UT archeologists would have wanted to excavate it. Because of the relatively rudimentary techniques of the time, the Hudnall-Pirtle site would likely have been excavated with little attention

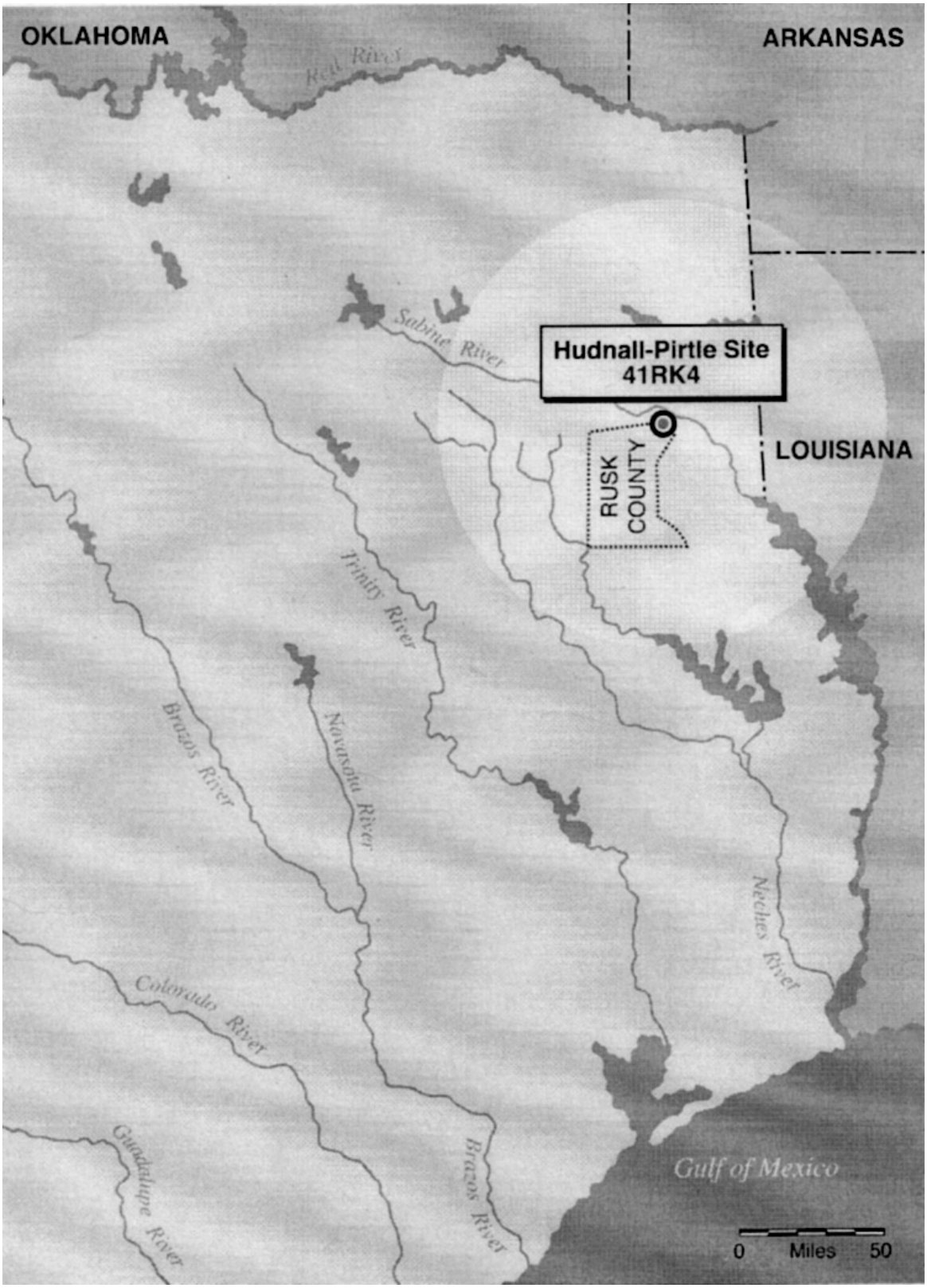

Figure 1. Location of the Hudnall-Pirtle site in Rusk County in Northeast Texas.

to note taking and with great emphasis on obtaining display-quality artifacts.

The next mention of the site appears in the published transcripts of the Seventh Caddo Conference, held in 1963 (Davis et al.1971). During a transcribed and published discussion of diagnostic artifact traits from early Caddoan period sites, then-amateur archeologist Calvin Jones presented the following information about the site:

> [T]here is one big mound site (Bivins farm) located in the Sabine bottomlands of northeastern Rusk County. It is composed of five mounds arranged around a plaza; they consist of two large rectangular temple mounds and three large circular mounds. I would guess this site to be primarily of Alto origin although tests in the village area revealed Alto and Coles Creek sherds (Davis et al. 1971:101).

Surprisingly, none of the other archeologists attending the conference followed up with questions or comments about this previously unknown and obviously major Caddo mound center.

Jones conducted archeological investigations at the site during the mid-1960s. Although none of these investigations have been reported (and it is believed that ceramic sherds collected during that work are in the Jones collection at the Gregg County Museum in Longview, Texas), limited details about this effort could be gleaned from discussions with his mother, a long-time resident of Longview, now deceased. Jones appears to have spent much of his time working on what is labeled Mound C in Figure 2. He dug an east-west trench across the entire mound. The width of the trench is not known, but judging by the appearance of the mound today (the trenches were not backfilled), this trench must have been at least 1 m (about 3 feet) in width. A perpendicular trench oriented from the center of the mound to the south was also dug and appears to have been of equivalent width. According to Jones' mother, both trenches were dug to the bottom of the mound. The only artifact found was a "ceramic vessel with nodes on the exterior." Otherwise the mound, as described by Mrs. Jones, consisted of sterile "sugar sand."

Calvin Jones apparently concluded that the mound capped a sub-mound pit, likely a burial chamber, and decided to continue excavating deeper. However, the unconsolidated sands of the mound caused the trench walls to cave in, and he decided it was not safe to continue deepening the existing trenches. At this point, he enlisted Sam Whiteside of Tyler, Texas (see Walters 2005), to assist in the excavations. Whiteside later told James Bruseth that he had use of a front-end loader and had volunteered its use to help remove the mound fill and expose the subsurface pit. The front-end loader was transported to within a mile of the site before it began to rain. The rain was sufficiently heavy that the front-end loader could not continue to the site and was returned to Whiteside's house; this effort was never repeated. The rain, therefore, prevented the total excavation of Mound C.

The site was rediscovered by James Bruseth and Bob Skiles in the early 1980s by using the description in the Seventh Caddo Conference transcripts. The site was located, visited, and re-recorded. A one-meter-square unit was excavated in a large rectilinear mound (labeled as Unit A in Mound B in Figure 2). A tan sandy soil zone was present in this unit down to a depth of approximately 70 cm below surface (bs), where a reddish sandy clay zone was found. The unit was abandoned at about 1 m in depth. No artifacts were encountered.

A short time later Bruseth contacted The Archaeological Conservancy and explained the importance of the site and the need to permanently preserve it. Under the guidance of Jim Walker, the Conservancy's Southwest Regional Director, the site was acquired in 1986 and is today an archeological preserve.

The Texas Historical Commission (THC) conducted a series of short-term field projects at the site in 1989 and 1990. This work was carried out for two reasons. First, unknown to the Conservancy, a gas well and associated

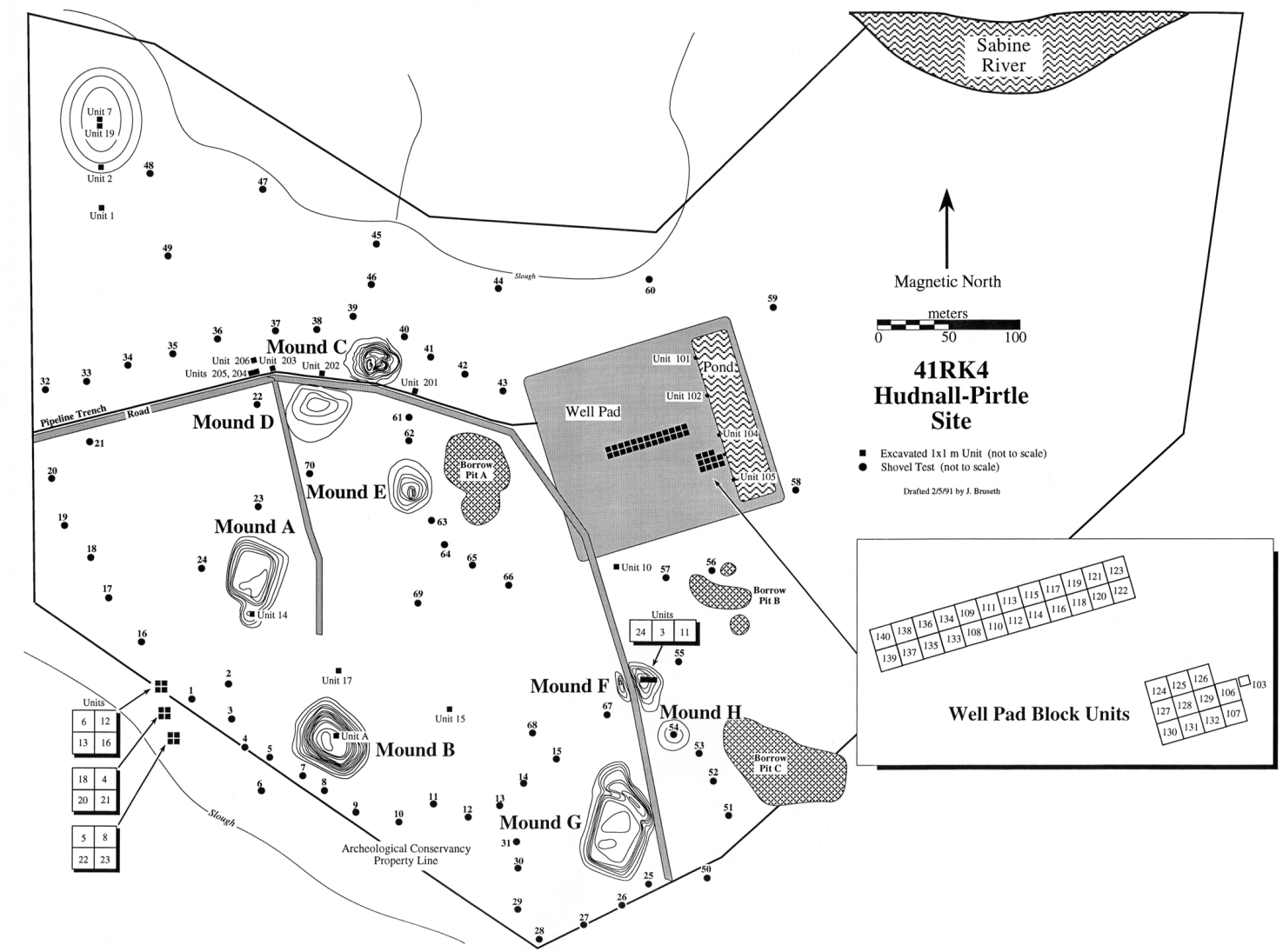

Figure 2. Map of the Hudnall-Pirtle site.

drilling sludge pit had been constructed on part of the site (see Figure 2), which had impacted some archeological deposits. A pipeline to connect the newly drilled well to an older line was planned for later in 1989. Fieldwork was therefore necessary to assess the drilling activity's impacts to the site.

Second, fieldwork at Hudnall-Pirtle was considered desirable in order to gain a better understanding of the site's size and the time periods it was used by Caddo people. The THC planned to nominate the site to the National Register of Historic Places, and the nomination form required additional information. The nomination was completed and accepted by the National Park Service, Keeper of the National Register in 1991. The fieldwork at the site resulted in the excavation of 65 1 x 1 m square units and 70 shovel tests. Information about the fieldwork, by field season, is presented below.

March 20–25, 1989

This work focused primarily on mapping the site, showing the locations of mounds, borrow pits, modern roads, and well-exploration impacts (see Figure 2). Some limited testing was also undertaken on the edge of the gas well's sludge pit and along the pipeline trench to the gas well (Figure 3). to better understand the nature of the impacts to the archeological deposits. This fieldwork also focused on a very large mound (located in the northwest corner of the site (as shown in Figure 2) to determine if this elevation was natural or created by humans. A final goal was to search for other mounds that may exist in the wooded area around the central plaza. Contour maps were prepared of the existing mounds A-G (Figures 4-10).

Figure 3. Digging of the pipeline trench to the gas well.

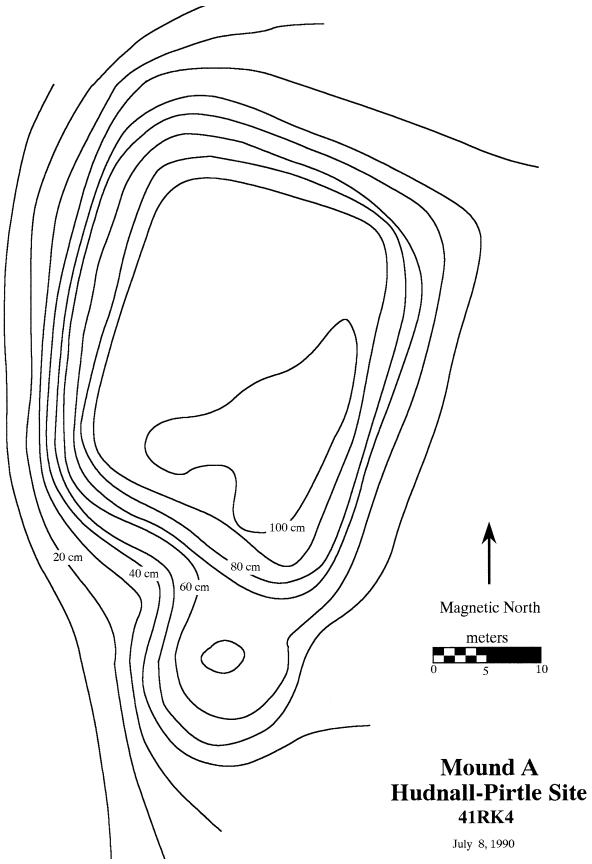

Figure 4. Contour map of Mound A.

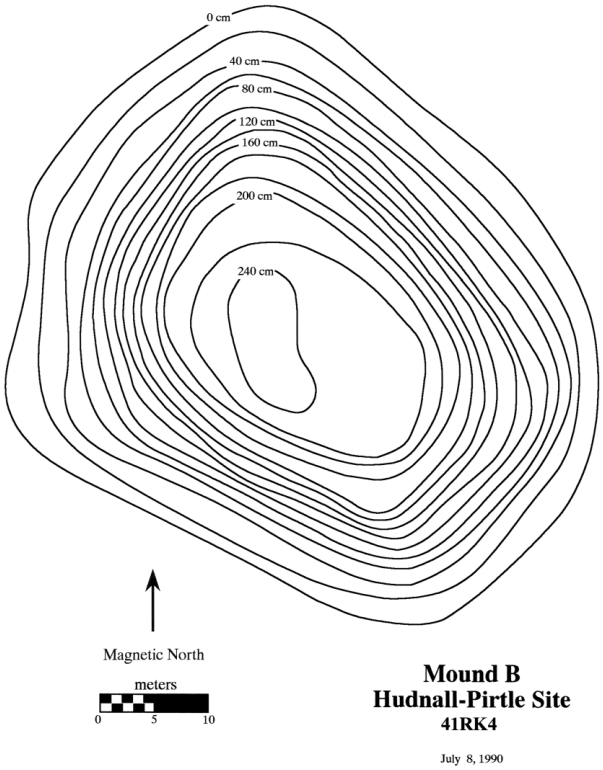

Figure 5. Contour map of Mound B

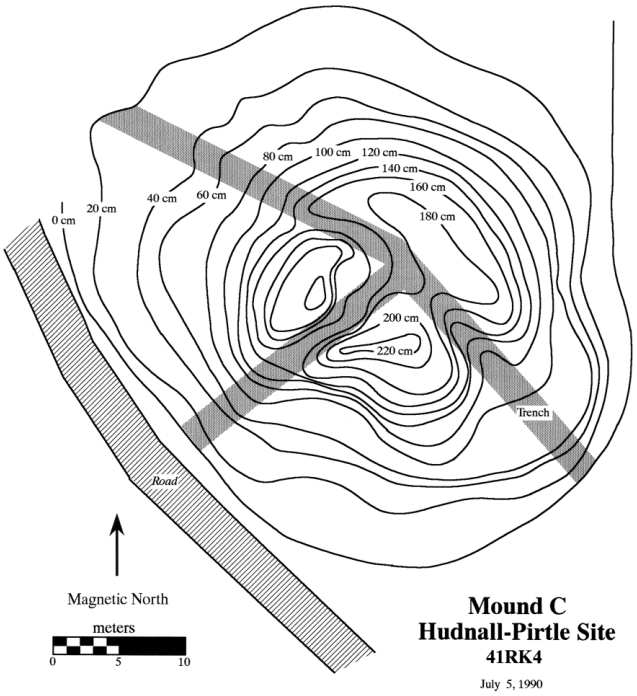

Figure 6. Contour map of Mound C; note trenches excavated by Calvin Jones in the early 1960s.

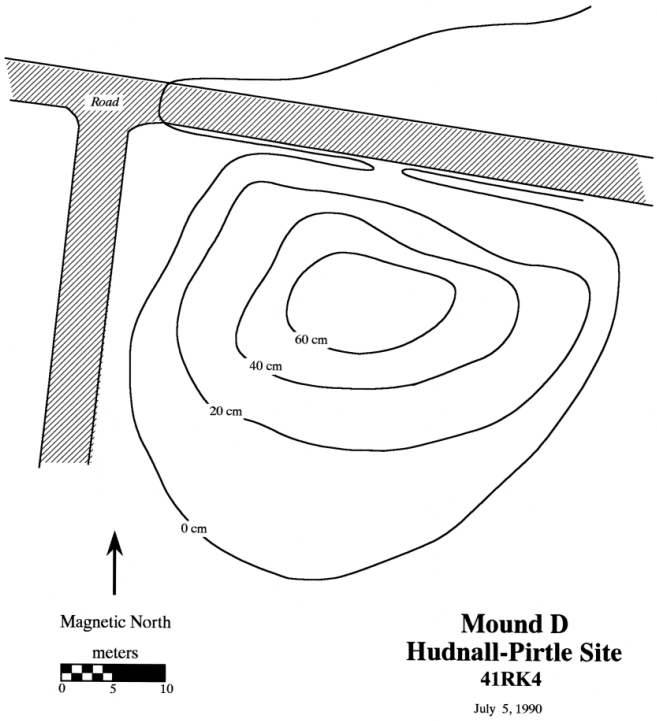

Figure 7. Contour map of Mound D.

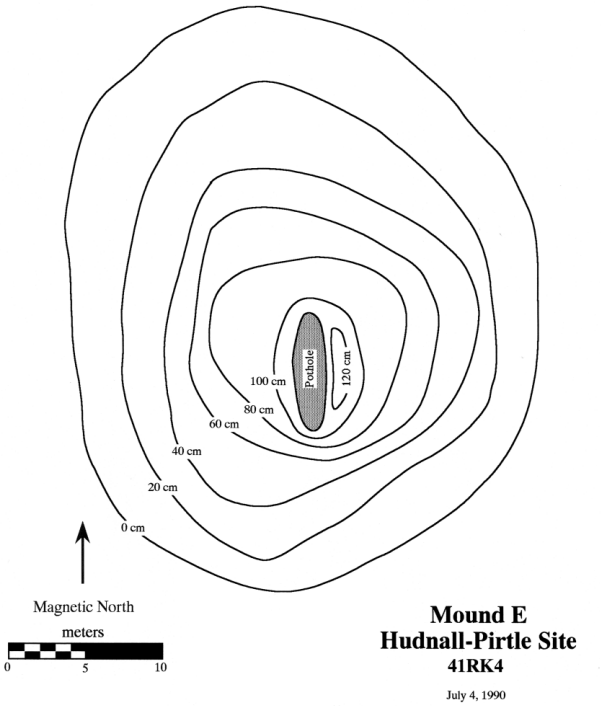

Figure 8. Contour map of Mound E.

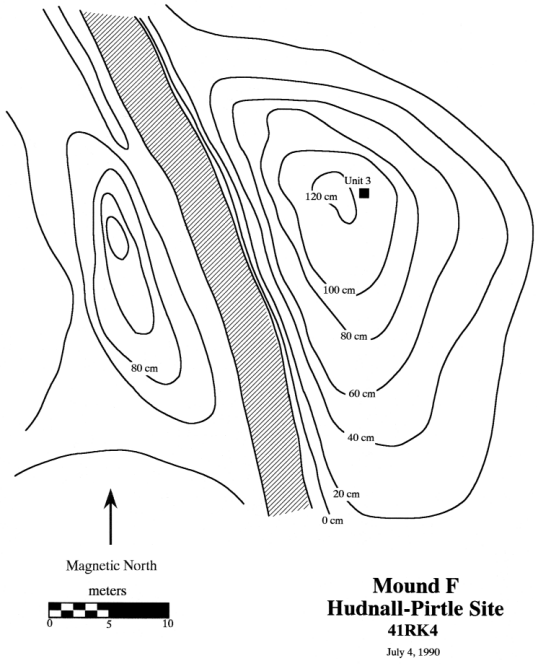

Figure 9. Contour map of Mound F; note Unit 3 location from 1989 excavations

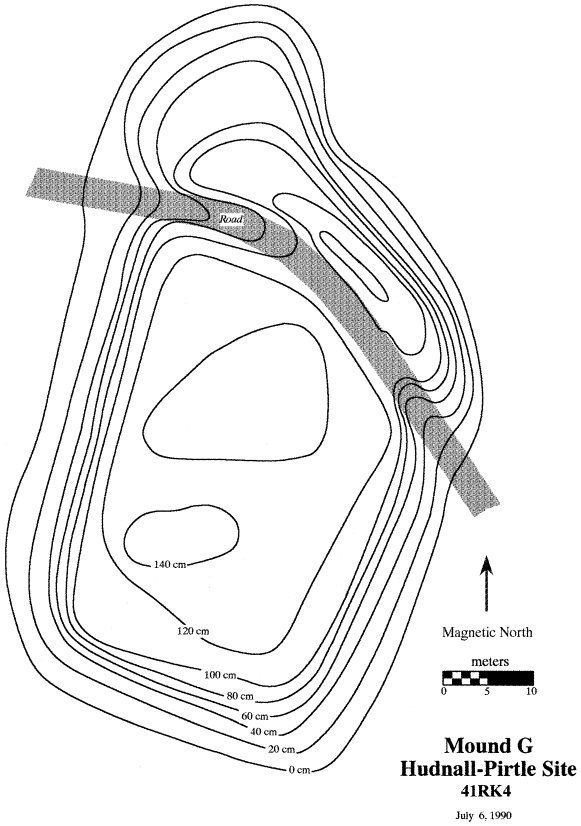

Figure 10. Contour map of Mound G

November 13–17, 1989

This work consisted of examining a trench, about 50 cm in width and 1.2 m in depth, that had been cut through the site to connect the new gas well to an older pipeline in the northwest of the site (see Figures 2-3). The agreement between The Archaeological Conservancy and Union Pacific, the oil exploration company doing the drilling, provided that the gas-line trench would be dug by following the northern edge of a road through the site. Afterward, THC archeologists would walk the trench and examine and record any features that might be impacted. A 1 x 1 m unit was also started in the southwestern portion of the site during this time.

July 16–27, 1990

This work, the largest field effort conducted at the site, was performed to accomplish a number of tasks. The limited testing in the well pad during 1989 demonstrated that village debris existed in this area of the site. Block excavations were undertaken during 1990 (Figure 11) to obtain a larger sample of artifacts from the archeological deposits and recover information on the kinds of features that were present in different areas of the site.

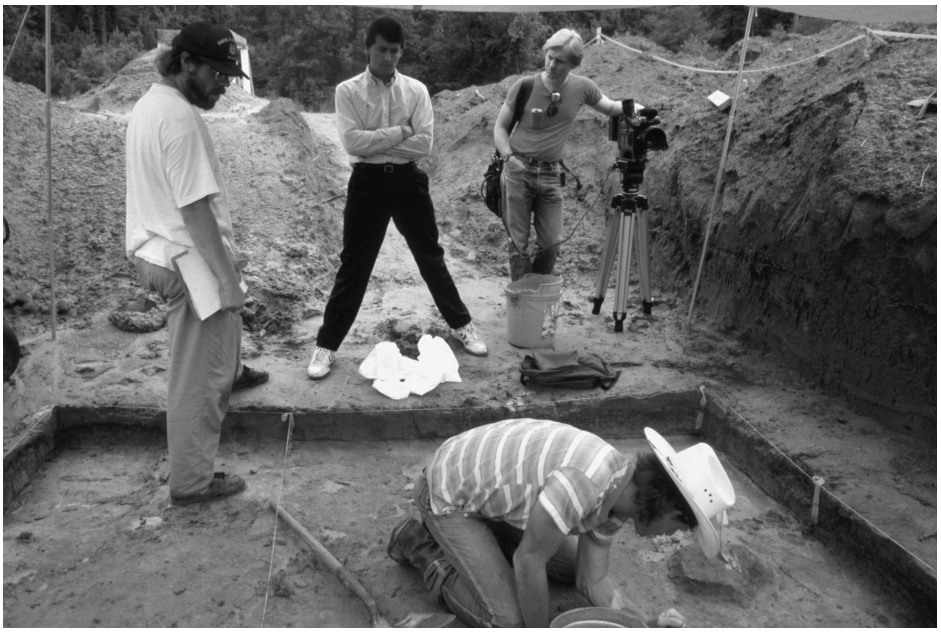

Figure 11. Excavations of the Well Pad area.

During March 1989, a 1 x 1 m test pit had been started in the center of Mound F (see Figure 9) to determine if this low rise was a natural or human-made mound. The unit had been excavated to Level 13 (120–130 cm bs), where a mass of charcoal and dark-colored soil was encountered (Figure 12), likely the remains of a burned house. Excavation stopped at this level, but was resumed in 1990.

Figure 12. Profile of Mound F. Note the burned structure layer near the bottom of the profile.

Also during this time, two 1 x 1 m units (Units 1 and 2) were excavated on the southern slope of the mound in the northwestern area of the site (see Figure 2) to determine if the mound was natural or cultural in character. The location of the mound away from the rest of the other mounds at Hudnall-Pirtle suggested that it might be a natural rise. The results of the test units were equivocal, necessitating additional test excavations to assess the mound. A 1 x 2 m pit was then excavated on the mound's crest to see if cultural strata or other cultural features were present.

Since the Archaeological Conservancy owned a hundred acres of land, with the mounds themselves occupying about half that area (see Figure 2), shovel testing was conducted to determine which areas had village deposits and which did not. The purpose was to identify areas where timber could be harvested without impacting archeological deposits.

As discussed above, Calvin Jones of Longview had dug a network of trenches through Mound C in the 1960s but, according to his mother, did not find much. Jones had not filled his trenches. Our goal in 1990 was to clean a profile of the trench and record the mound stratigraphy. Soil would be screened during cleaning of the trench and any artifacts found were to be collected.

During a brief visit in the fall of 1989, a test pit had been started in the southwest corner of the site where village deposits were encountered. This pit was taken down only one level (0–10 cm). One goal of the 1990 fieldwork was to complete this unit and excavate several others to further sample the village deposits (Figure 13).

Other tasks in 1990 were to investigate small rises at the site to see if they were human-made mounds. We

Figure 13. Excavation of a 1 x 1 m unit in the Southwest area.

investigated one slight rise on the southern edge of the well pad (Unit 10) where the field road cuts south, which had been largely destroyed by the road and the well pad. The remaining portions, however, exhibited the general shape of some of the small cultural mounds at the site. One goal in 1990 was to place units in the rise, look for stratigraphy and artifacts, and see if the rise represented a human-made mound. In other parts of the site, small rises are attached to one side of a mound. Another goal in 1990 was to investigate the small rise attached to Mound G (see Figure 10) to see if it was a cultural mound conjoined to the larger mound. It was possible that the rise represented bulldozer work associated with building a nearby road.

August 25–27, 1990

In the final phase of fieldwork at the Hudnall-Pirtle site, shovel testing that began in July of 1990 was completed, with shovel tests placed across much of the site (see Figure 2). These shovel tests showed that village archeological deposits cover a large area around the various mounds

SITE AREAS USED FOR ANALYSIS

Six areas of the Hudnall-Pirtle site have been delineated to assess the spatial distribution of artifacts. These areas are a subjective division of the site and largely represent locations where substantial field effort took place. The areas and units that comprise each are listed in Table 1. The shovel tests, are listed separately in Table 1, since they are distributed throughout much of the site and do not cluster in any area.

Table 1. Excavation Units by Site Area.

Area	Units
Mound A	14
Mound F	3, 11, 24
Northwest	1, 2, 7, 19
Pipeline	201, 202, 203, 204, 205, 206
Southwest	4–6, 8, 12, 13, 16, 18, 20–23
Shovel Tests	1–70
Well Pad	101–140

ARCHEOLOGICAL DEPOSITS AT THE HUDNALL-PIRTLE SITE

The archeological deposits at the Hudnall-Pirtle site occur in sandy loam to sand A- and E-horizon zones that occur on the T-1 landform, except for archeological deposits and features in Mound A and Mound F (see Table 1). The soils are part of the Laneville-Mattex soil association (Griffith 2001:23), with sandy Bienville soils on the alluvial terraces of the Sabine River.

In the northwest area, the archeological deposits occur in sandy loam to loamy sand deposits more than 150 cm in thickness (Figures 14 and 15). The lowermost E-horizon deposits reached in Unit 7 have thin (<1 mm) clay lamellae. Archeological materials were found throughout these sediments, but were concentrated in the upper 70 cm.

Similar thick sandy deposits were uncovered in Unit 202 near Mound C (see Figure 10). In the plaza area between the mounds (see Figure 2), units excavated there uncovered almost no evidence of occupational debris, and what little there was occurred primarily below 50 cm bs. The sediments in the plaza (see Figure 14) consist of a thick plow zone overlying light-colored sands and sandy loams.

In the Southwest Village area, the sandy loam sediments with archeological materials are about 40-60 cm thick, with the shallowest deposits in the area of Unit 5/8/22/23 at the southern part of the area (see Figure 2). In Unit 5/8, the archeological deposits have an Ao-horizon overlying tan to red to white sandy loam and sand (Figure 16). In Units 18 and 20, however, the archeological deposits occur in dark grayish-brown to dark brownish-gray sandy loam sediment zones (features appear to originate from these deposits), and these overlie a mottled light gray sand and a yellowish-brown clay. The dark grayish-brown to dark brownish-gray sediments may be midden deposits. The units in this apparent midden deposit in the Southwest Village contain high densities of sherds (between 285-302 sherds per square meter) and some preserved animal bone (6.5-7 pieces per square meter). Outside the midden deposits in Units 4/8/22/23, sherd densities are only 68 per square meter, and the density of animal bone is 2 pieces per square meter.

Unit 10 was excavated in what was thought to be a aboriginal mound remnant just south of the well pad (see Figure 2). The excavations, however, demonstrated that it was not a mound, but instead an area of natural sandy loam sediments capped with overburden from well pad construction (Figure 17). The sandy loam sediments contained a low density of prehistoric ceramic sherds and lithic artifacts (see below).

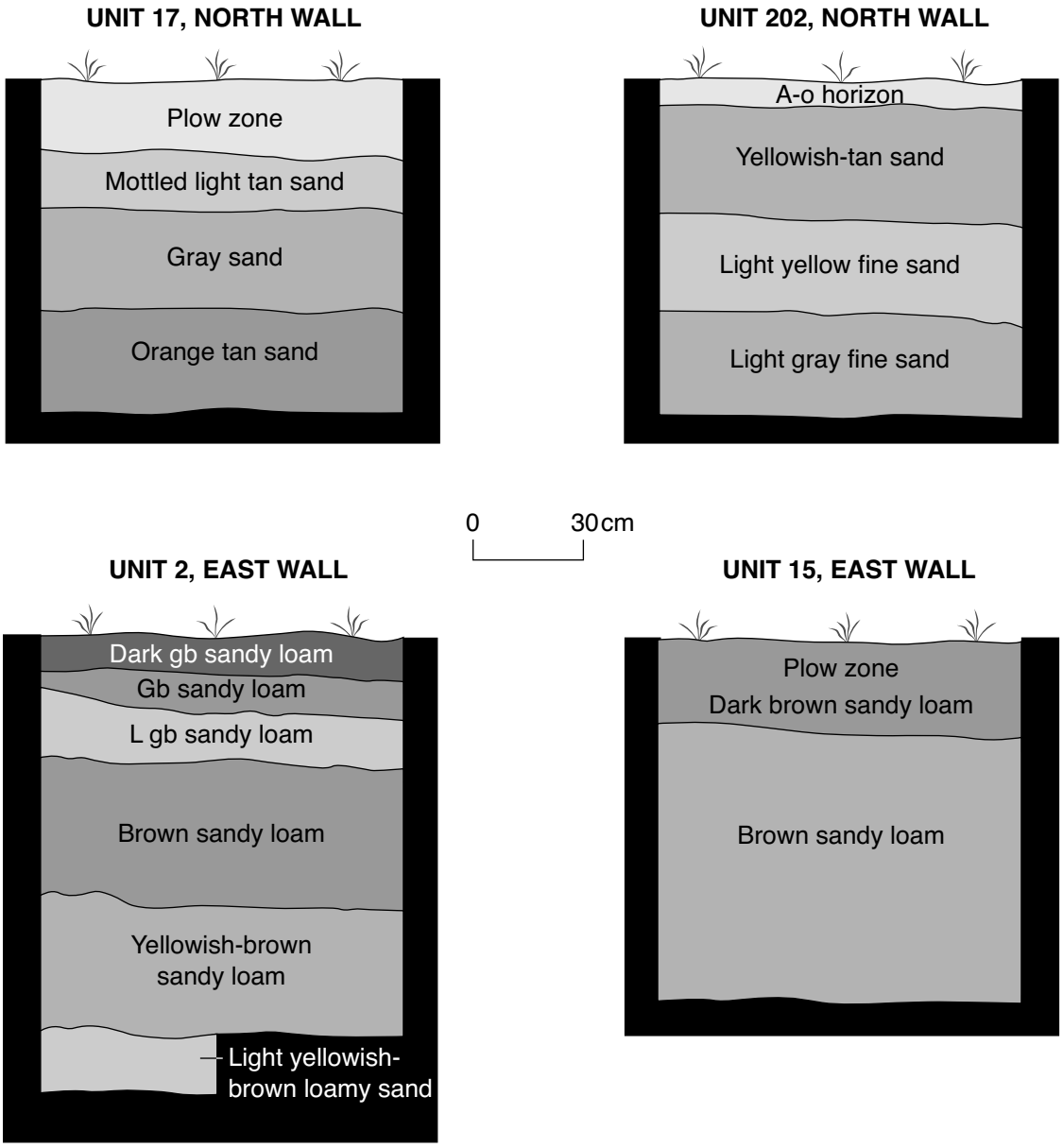

Figure 14. Profiles of units in the plaza (Units 15 and 17), the northwest area (Unit 2), and near Mound C (Unit 202).

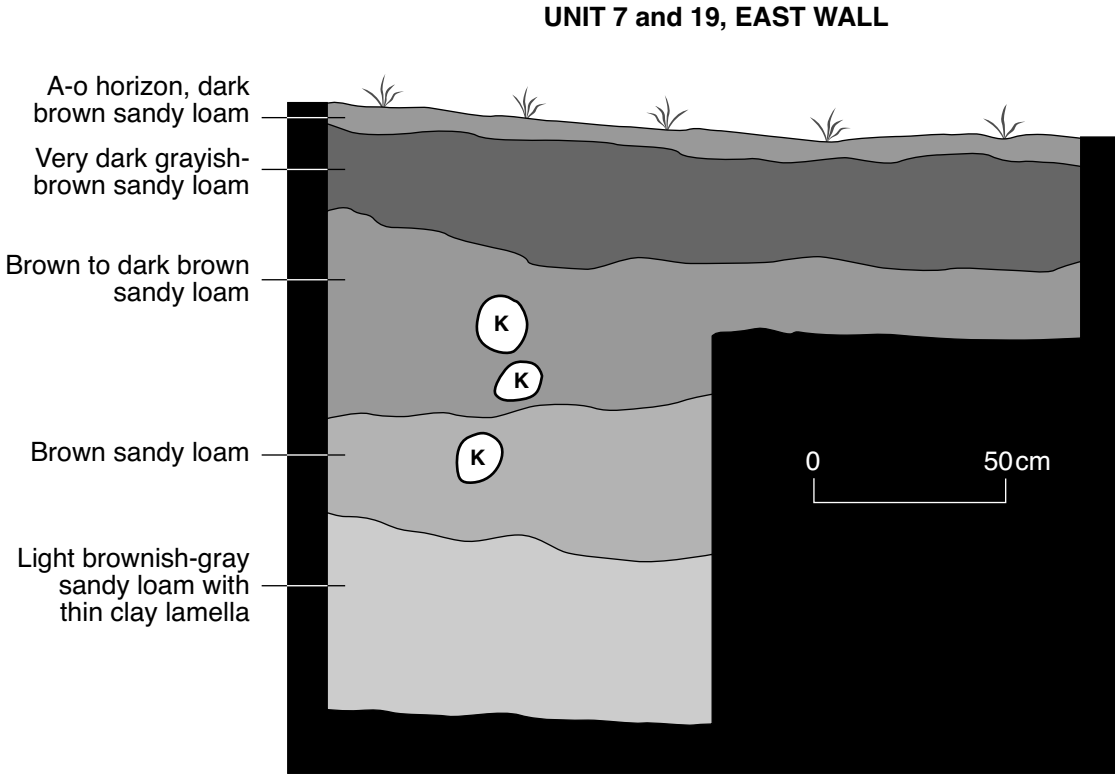

Figure 15. Unit 7 and 19, east wall profile, northwest area.

In the well pad area, the archeological deposits had been recently covered with a thick red clay cap from construction of the well pad atop the deposits. Below the clay cap was a dark brown sandy loam plow zone and A-E-horizon sandy loams and sand that ranged from brown to yellowish-brown in color (Figure 18).

The majority of the archeological materials were recovered from the plow zone and the A1 brown sandy loam sediments. These materials were much more common in the Well Pad north units than in those in the Well Pad south units, especially the lithic debris (50 pieces per square meter vs. 14 pieces per square meter) and ceramic sherds (86 sherds per square meter vs. 76 sherds per square meter). Animal bone was also better represented in the north units (n=26) compared to the Well Pad south units (n=6), as was the density of features (see below). The Well Pad north area excavations appear to have been placed in a well-preserved domestic habitation area.

Mound F Stratigraphy

Initially a single 1 x 1 m unit was excavated in the approximate center of the mound. This unit (labeled Unit 3) encountered five soil zones (see Figure 19). Two additional units were excavated to further investigate the mound, one to the east (Unit 11) and another to the west (Unit 24) of Unit 3. From this additional work, a sixth zone (labeled #1 on Figure 19) was encountered consisting of the normal sub-mound or natural soil profile under the mound.

The sequence of events that led to mound construction began with the building of a structure on the original ground surface. This structure was burned, based on calibrated radiocarbon mid-ranges (see Feature 12 description below),

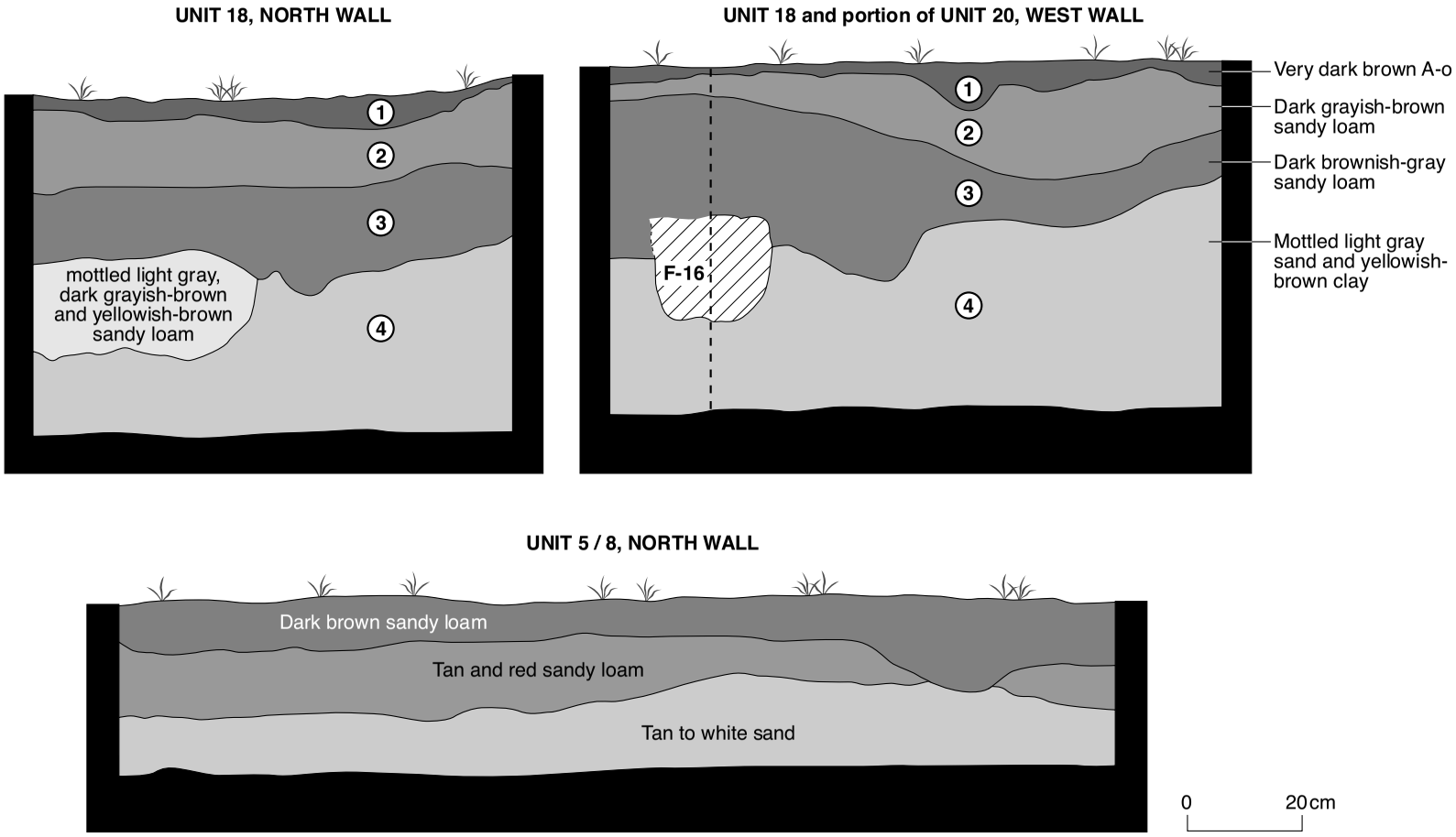

Figure 16. Profiles of selected units in the Southwest Village area.

at some point between A.D. 1045-1048. This created a dark brown sandy loam zone (labeled #2 on Figure 19) from 8 to 15 cm thick with large quantities of charcoal; this zone was also given the designation as Feature 12. Next, a yellow clay soil was brought in and placed over the remains of the structure to form Zone #3, measuring between 35 and 60 cm in thickness. This activity occurred while the charred remains of the structure were still hot, as seen by orange oxidized soil in areas where the fill contacted the structure remains. Over this, three additional layers of soil were added: Zone #4 is a light red color sandy clay between 20 and 62 cm thick; Zone #5 is an orange sandy clay with a maximum thickness of 50 cm that lenses out at the juncture of Units 3 and 11; and Zone #6 which is a organically stained sandy loam that is similar to the soil found at the surface across much of the site.

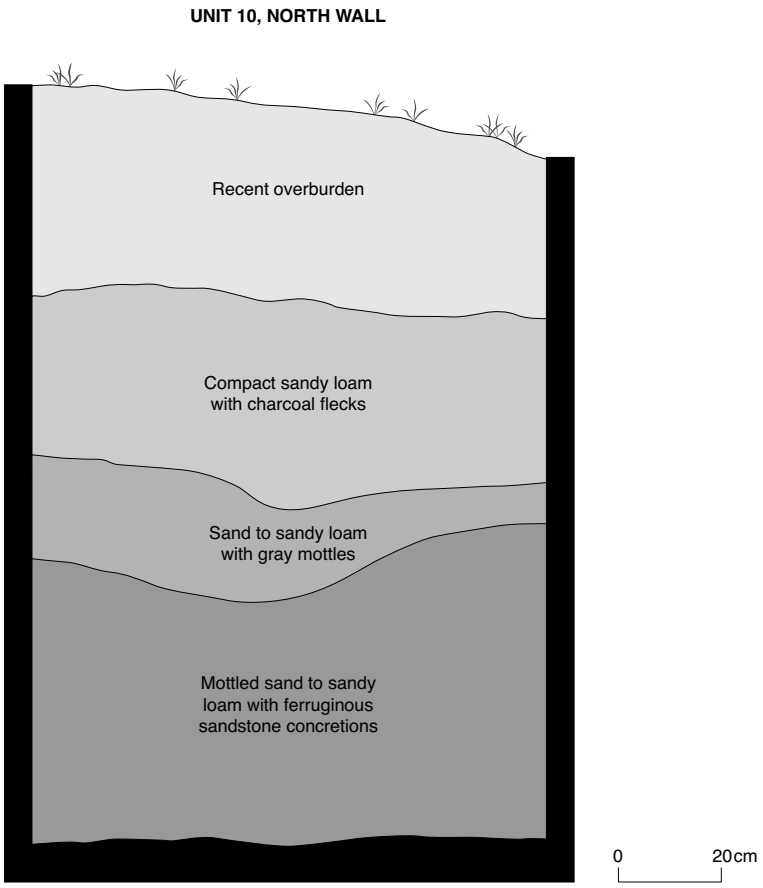

Figure 17. Profile of Unit 10.

In plan view, Feature 12 extended across all of Unit 24, most of Unit 3, and over about one-third of Unit 11. In Units 3 and 11, Feature 12 forms an arc that apparently corresponds with the exterior wall of the structure capped by the mound. One definite (labeled Feature 10) and three possible post holes were found along the arc and likely represent posts from the initial construction and later rebuilding of the structure. Few artifacts were found during excavation, and this plus the building of a mound over Feature 12 argues for a specialized, non-domiciliary use for the structure. No evidence of other structures at higher levels in the mound fill was observed. However, further field investigation of Mound F is necessary to confirm this preliminary observation.

Features at the Hudnall-Pirtle Site (41RK4), 1990 Excavations

A variety of cultural features were documented in the 1990 excavations at the Hudnall-Pirtle site (41RK4), including post hole stains and pit features. The pit features probably were used for storage, cooking activities, and eventually for trash disposal. Included among the 25 features was remnants of a burned house floor in the Mound F excavations. Most of the features were found in the Well Pad North and Southwest Village areas (see Figure 2). Radiocarbon samples were obtained on charred plant remains from several of the Hudnall-Pirtle features, and the calibrated age ranges (at 2 sigma) on these from the habitation areas and Mound F range from AD 980-1265, consistent with an Early Caddoan period occupation, and from AD 1410-1950 in Feature 17 in the Southwest Village (see below).

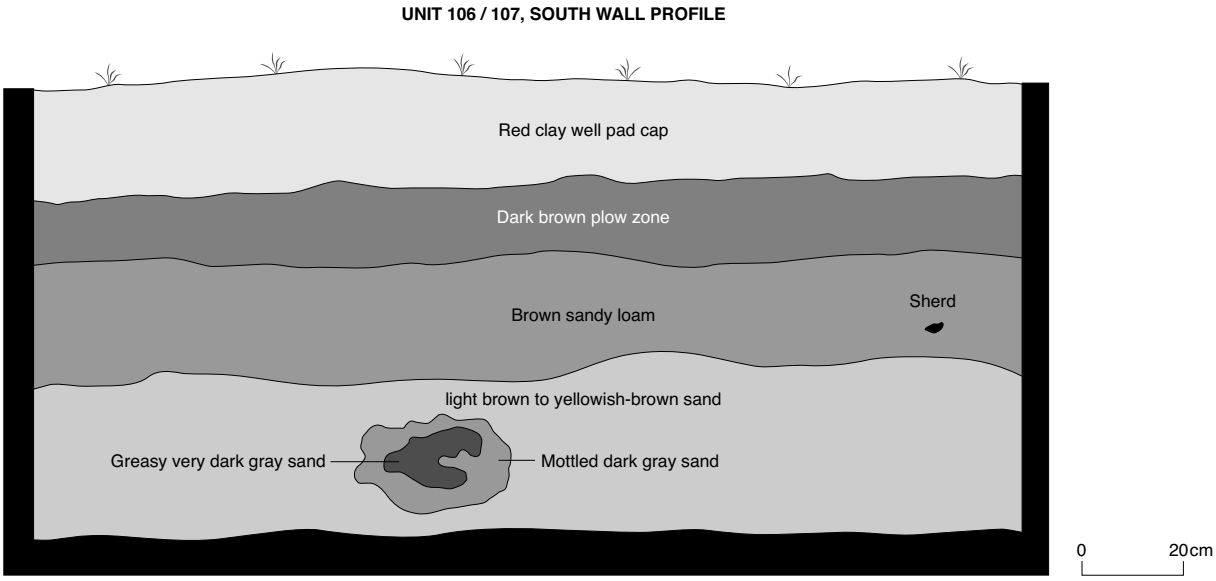

Figure 18. Profile of Unit 106 and 107, south wall.

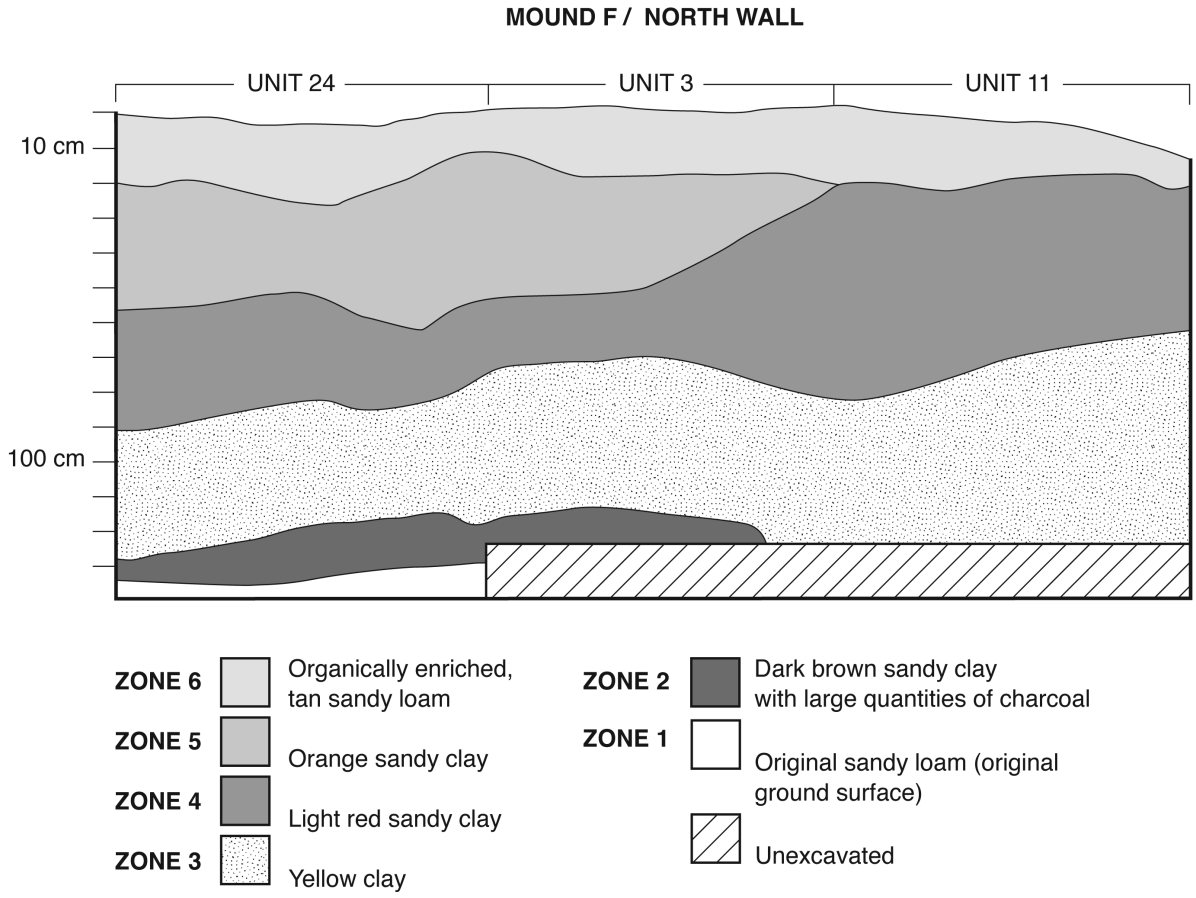

Figure 19. Mound F profile, Hudnall-Pirtle site.

Well Pad North

Fourteen cultural features were excavated in the 2 x 12 m trench (Figure 20) in this part of the Hudnall-Pirtle site (see Figure 2). The features comprise several post holes and a variety of pits of different sizes and contents. One to 20 liter flotation samples were collected from all but one feature (Feature 110) in the Well Pad North area. In general, the features are concentrated at the eastern end of the trench, and most range in depth from 45 to 78 cm bsd (below the surface datum); two pit features extended to 90 and 92 cm bsd.

Feature 103

Defined at 51 cm bsd, Feature 103 is a 48 cm diameter stain with a dark brown-black sandy loam fill. In profile, it is 23 cm thick (74 cm bsd) with straight sides and a flat bottom. Contents: 1 Form 11 arrowpoint; 5 lithic debris; 1 incised sherd, and 0.21 g of charred plant remains. These remains include wood charcoal, cane stem, thick hickory nutshell, acorn shell, and maize cupules and glumes.

Feature 104

This is a well-preserved pit with undercut sides and two fill zones (Figure 21); it is immediately adjacent to Feature 111, another pit with undercut sides, and a shallow stain incorporates both features. Feature 104 is about 40 cm in diameter at the surface but is undercut to form a pit 60 cm in diameter about 80 cm bsd. It is 36 cm thick (56-92 cm bsd), with rounded sides and a flat bottom. The upper fill (16 cm thick) is a dark brown sandy loam with charcoal and bone flecks, while the lower fill (20 cm) in the undercut portion of the pit has a moist, black, greasy, sandy loam indicative of high organic content; all the charred maize is from the upper fill, while the lower fill is dominated by wood charcoal, thick hickory nutshell, and acorn shell and meat.

A radiocarbon sample of 4.7 g of charred maize (C13/C12 value of –9.4 o/oo) was submitted for dating, and the 2 sigma calibrated age range is AD 980-1235. The one sigma age range of the sample is AD 1010-1175, with a calibrated intercept of AD 1040 (Beta-129983) (see Appendix 1).

Contents: 12 pieces of animal bone in the upper fill (including one deer metapodial), and 2 animal bones in the lower fill (see Figure 21); 1 core fragment; 18 lithic debris in flotation sample, and 2 lithic debris in upper fill, 2 in lower fill. Charred plant remains in the feature fill include 7.50 g of wood charcoal, thick hickory nutshell, acorn shell and meat, and maize kernels, cupules, and glumes. This feature also had 162 sherds (137 sherdlets), 22 plain sherds, and three decorated sherds (1 incised, 2 engraved)

Feature 105

Feature 105 is a small pit exposed in the north wall profile of the trench, and at 51 cm bsd it extends only about 17 cm into Unit 113 (see Figure 20). Based on the general oblong shape of the feature, it is probably about 30-35 cm in diameter. The pit is 11 cm in thickness, with rounded sides and bottom, and the feature fill consists of a dark brown to black sandy loam with charcoal flecks. Contents: 2 lithic debris and 1 plain sherd.

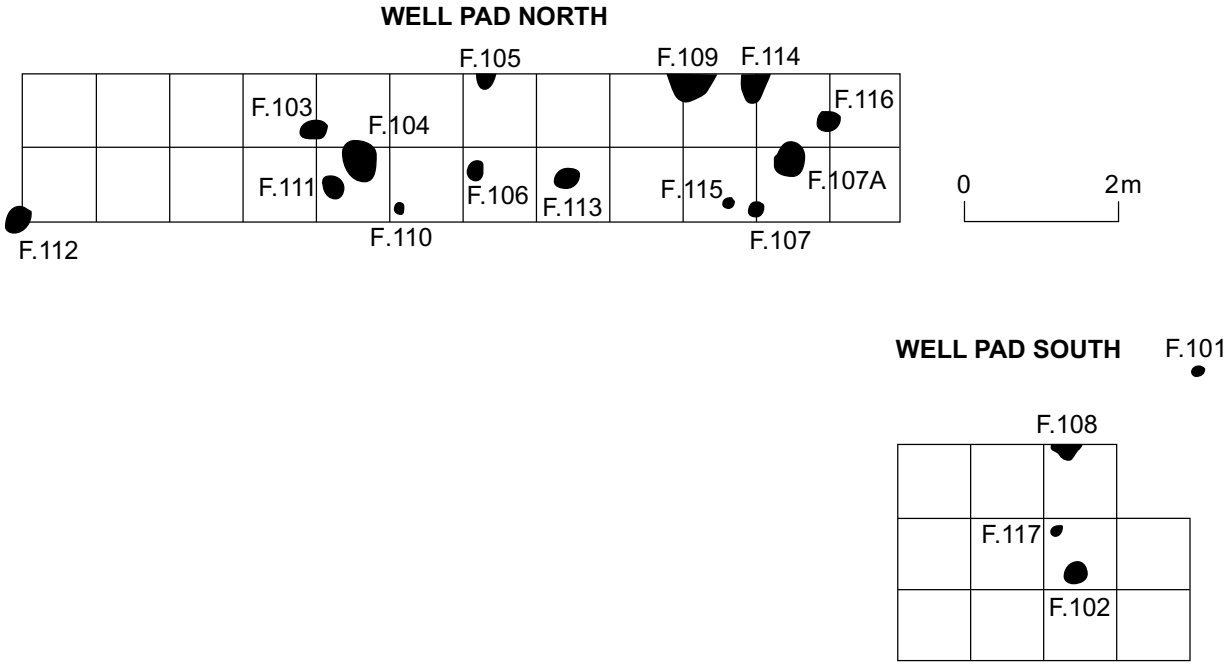

Figure 20. Distribution of features in the Well Pad excavations.

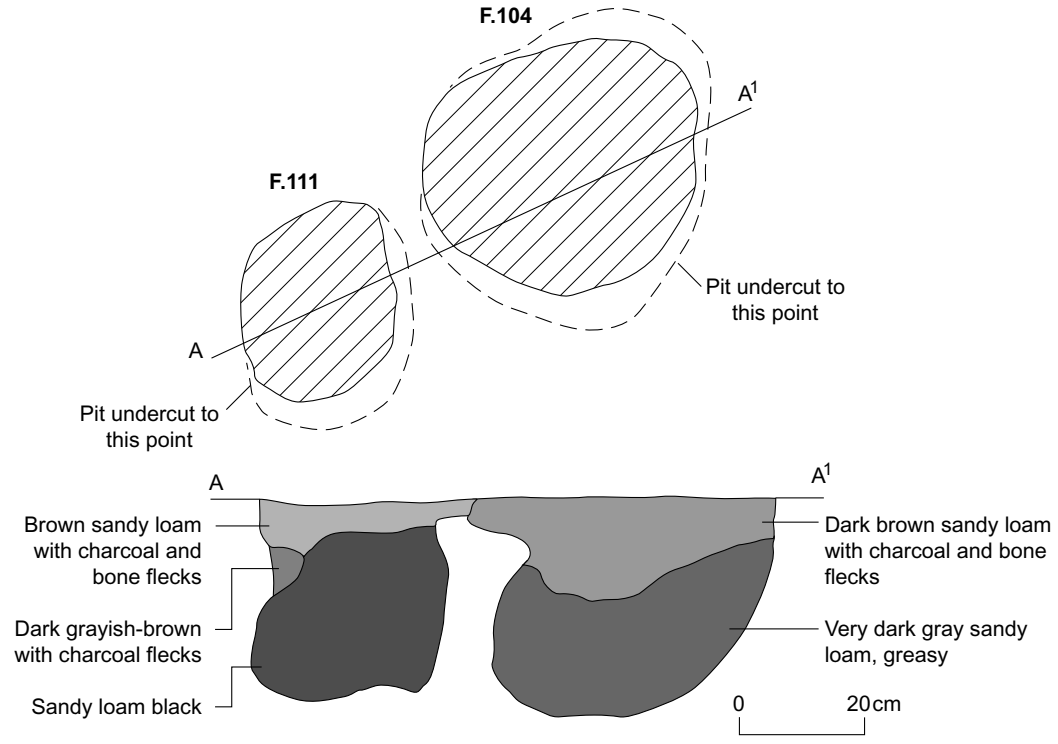

Figure 21. Plan and profile of Features 104 and 111.

Feature 106

The feature represents a pit with undercut sides and a distinctive black, greasy fill (Figure 22). Feature 106, about 35 cm in diameter at the pit opening, was exposed at 56 cm bsd, and it is 22 cm thick. Its maximum diameter is 40 cm near the base of the pit. The pit has two fill zones: the upper fill (ca. 7 cm thick) is a dark brown to black sandy loam with a greasy texture, while the lower fill (ca. 15 cm) is a black, greasy, sandy loam with a few dark brown and brown mottles. Contents: 3 lithic debris; 1 plain sherd; 2.47 g of charred plant remains, including wood charcoal, acorn shell, and maize kernels, cupules, and glumes.

Feature 107

Feature 107 is an amorphous dark brown sandy loam stain (with tiny charcoal flecks) defined at 45 cm bsd that ranges from 5-21 cm in thickness; it thickens in a grid east direction. At its deepest, the feature is about 20 cm in diameter, with rounded sides and a flat bottom, and probably represents a post hole stain. The shallower stain to the west may represent the disturbance caused by setting the post in the ground. An arrow point tip was recovered 5 cm north of the feature. Contents: 2 burned animal bones and 7 plain body sherds.

Feature 107A

This feature is about a 70 cm diameter pit that extends from 50-69 cm bsd. The pit is undercut in profile, with straight sides and a rounded bottom, with two different fills (see Figure 22). The uppermost fill (about 8 cm in thickness) contains the majority of the cultural materials, and it is a dark brown sandy loam with charcoal streaks. The lower fill (11 cm in thickness) is within the undercut portion of the pit. It is a mottled dark brown sandy loam, no charcoal streaks, and the fill has an extremely high organic content. Several other features in Well Pad North have this distinctive organic matrix. Contents: 2 pieces of animal bone; 11 lithic debris.

Feature 109

Feature 109 appears to be comprised of two different features: a shallow basin-shaped pit between ca. 46-58 cm bsd, and a post hole at one side of the pit that extends to 73 cm bsd (see Figure 22). The pit is exposed in the floor of the trench, as well as in the trench profile, and covers a 55 x 30 cm area. Its matrix is a dark brown sandy loam with gray mottles and charcoal flecks. The probable post is about 20 cm in diameter, and has a similar fill, except for manganese and hematite concretions near the base of the post hole where it terminates at the iron-rich B-horizon. Contents: 1 piece of animal bone; 8 lithic debris; 4 sherds, including 2 plain body sherds and 2 free punctated sherds; 0.06 g of charred plant remains, including wood charcoal and thick hickory nutshell.

Feature 110

This is a post hole stain exposed from 50-58 cm bsd. It is 20 cm in diameter, has a dark brown sandy loam fill with charcoal flecks, with rounded sides and a flat bottom (see Figure 22). The posthole may overlie another feature, albeit one that is poorly defined, since a major concentration of sherds was exposed about 90 cm bsd,

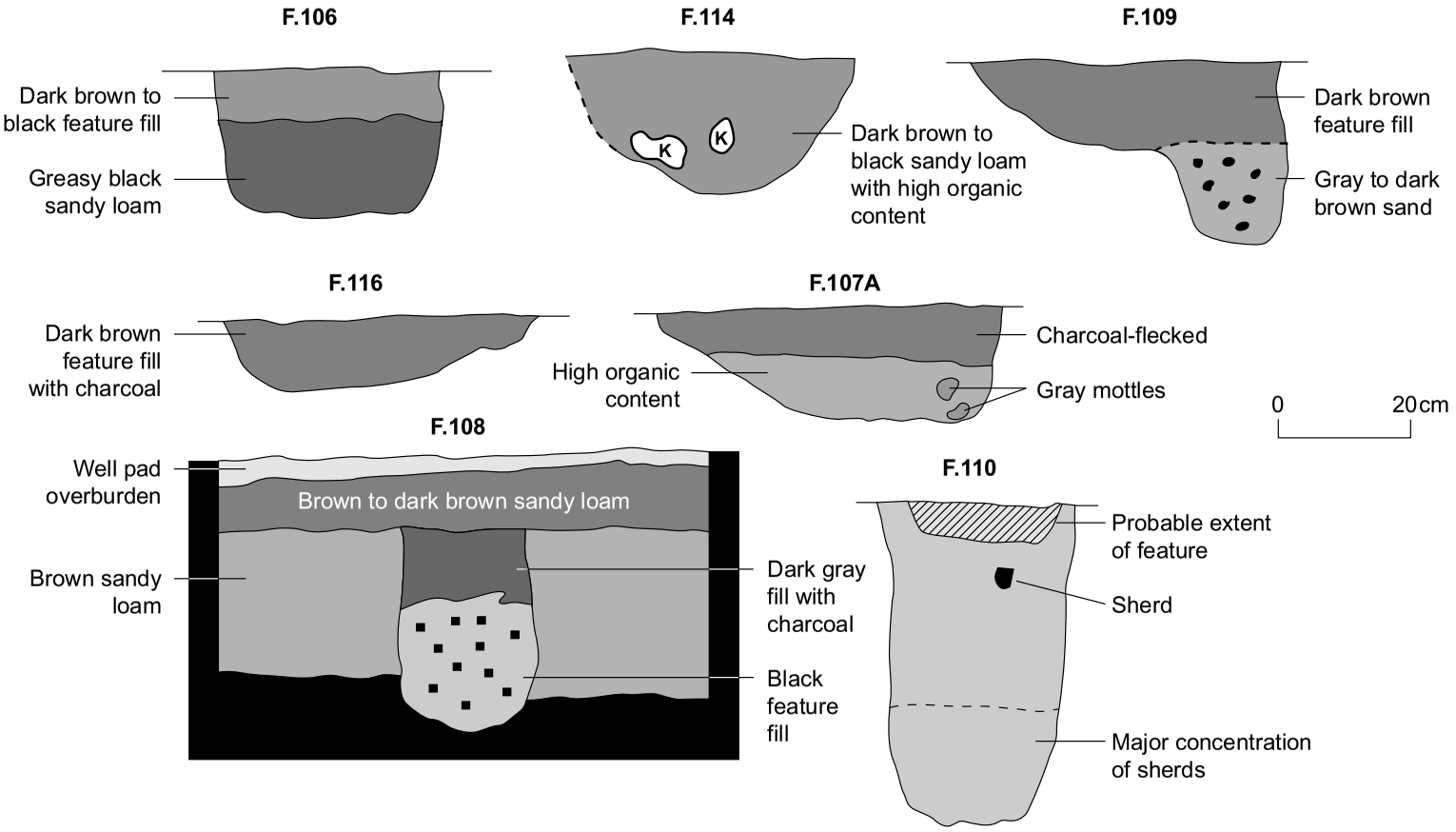

Figure 22. Profiles of selected features in the Well Pad excavations.

directly below the shallow post hole. Feature 110 contents: 1 multiple-platform flake core, 1 core fragment; 2 lithic debris, and 28 sherds. Twenty of the sherds are plain, and eight are decorated (2 incised, 4 free punctate, 1 Coles Creek Incised, *var. Coles Creek*, and one with circular punctates with linear incised lines).

Feature 111

At the level of exposure (56 cm bsd), Feature 111 is a 30 cm diameter pit, but it is undercut to about 40 cm in diameter midway down the pit basin. The pit is 34 cm thick. It has an undulating bottom with concave sides, and the pit contains three distinct fill zones (see Figure 21).

The uppermost fill (ca. 8 cm thick) is a dark brown sandy loam with charcoal flecks and small amounts of burned bone, and the second fill is a small wedge (about 7 cm thick) at the western part of the pit that is a slightly darker brown sandy loam with charcoal flecks. The third and thickest fill (ca. 28 cm) is a black sandy loam.

A radiocarbon sample of 7.3 g of charred maize (C13/C12 value of –10.1 o/oo) from the upper feature fill yielded a 2 sigma calibrated age of AD 1015-1265, with a calibrated intercept of AD 1170. The 1 sigma age range is AD 1040-1220 (Beta-129984).

Contents: 1 piece of animal bone from the third and lowermost fill; 15 lithic debris; 3 plain body sherds, 16.18 g of charred plant remains. The plant remains include one charred seed, wood charcoal, thick hickory nutshell, acorn shell, and 14.59 g of maize kernels, cupules, and glumes.

Feature 112

Feature 112 is a post hole that was exposed in profile (from 48-59 cm bsd) at the far southwest corner of the 2 x 12 m trench (see Figure 20). It appears as a dark brown sandy loam stain (estimated 20 cm diameter) with charcoal flecks; charcoal is most frequent along the flat bottom of the stain. The feature also has straight sides. Contents: 3 lithic debris, 2 plain body sherds, and 3.64 g of charred plant remains. These remains include wood charcoal, bark, and 0.59 g of maize cupules and glumes.

Feature 113

This is a thin (51-56 cm bsd) and amorphous stain with a charcoal-streaked dark brown to gray sandy loam fill. The oblong stain is about 45 cm in diameter, and in profile has rounded sides and a flat bottom. A small sherd cluster (at 55 cm bsd) is about 40 cm to the southwest of Feature 113. Contents: 1 lithic debris.

Feature 114

This feature is exposed between 52-74 cm bsd along the north wall of the trench, and it extends 35 cm into Units 119 and 121. It is an oblong stain, estimated at 50 cm in diameter, with rounded sides and a rounded bottom (see Figure 22). The pit fill is a dark brown-black sandy loam with charcoal, burned bone, and it has a high organic content. Several small rodent krotovina are present near the base of the pit, and it has also been disturbed by a tree root in Unit 119. Contents: 3 pieces of burned animal bone; 12 lithic debris.; and 5 plain body sherds.

Feature 115

Feature 115 is a post hole stain exposed at 52 cm bsd in Unit 118. It is roughly 18 cm in diameter, has gently rounded sides and a flat bottom; the feature fill is a dark brown sandy loam. The post hole bottomed out at 57 cm bsd, indicating only a small remnant portion of the feature was preserved below the scraped level of the trench. Contents: 2 lithic debris and 0.10 g of wood charcoal and thick hickory nutshell.

Feature 116

Exposed at 50 cm bsd, this feature is a small (30 cm in diameter), shallow (11 cm) pit with a dark brown sandy loam fill with charcoal streaks; one quadrant is only about 5 cm in thickness. It has rounded sides with a relatively flat bottom (see Figure 22). Feature 107A is about 60 cm south of this feature (see Figure 20). Contents: 1 lithic debris, 1 incised sherd, 1 sherdlet, and 1 plain sherd, and 0.10 g of wood charcoal, thick hickory nutshell, and acorn shell.

Well Pad South

Three features were recorded in the 3 x 3 m block on the Well Pad South area (Units 124-132): Features 102, 108, and 117 (see Figure 20). Two to seven liter flotation samples were collected from each of these features. At the base of level 3, a large and amorphous charcoal-mottled stain (110 x 160 cm in length and width) was also noted between features 108 and 117 at the northern end of the block (in Units 125, 126, 128, and 129), but it proved to be a natural soil disturbance rather than a cultural feature.

Feature 102 (Unit 129)

Extending from 39-47 cm bsd, Feature 102 is a 19 cm diameter stain of post hole size. In profile, the stain has straight walls and a flat bottom. The matrix is a black (10YR 2/1) sandy loam without charcoal flecks; the surrounding matrix is a mottled dark brown-gray sandy loam A-horizon. A small root runs adjacent to the feature, and root disturbances were apparent at the upper depths of the stain. Contents: 2 lithic debris and 0.11 g of charred plant remains. This includes wood charcoal and cane stems.

Feature 108 (Unit 126)

This feature was exposed in the north wall of the block. Feature 108 is a 22 cm diameter wide stain with rounded sides and a flat bottom, and we presume it is a large post hole. It originates at the contact between soil zones I and II (at 42 cm bsd), and extended to 62 cm bsd. Matrix in the post hole ranged from a dark gray sandy loam with charcoal flecks at the top of the feature to a black sandy loam at the bottom (see Figure 22).

Feature 117 (Unit 129)

Feature 117 is a 20 cm diameter stain that is 43-80 cm in depth bsd. Its slightly rounded sides and flat bottom suggest it is also a post hole. The post hole fill is a dark brown to gray sandy loam without charcoal flecks. Contents: 1 lithic debris and 0.09 g of wood charcoal.

Feature 101 (between Well Pad North and South)

This feature was exposed in a backhoe trench about 56-60 cm bsd and 1.4 m northeast of Feature 108 (see Figure 20). It consists of a circular stain (ca. 40 cm in diameter) with a charcoal-streaked and mottled brown-gray sandy loam fill. In profile, the stain has straight sides and a relatively flat bottom. The maximum depth of the feature is only 4 cm, suggesting that most of the feature had been removed by scraping before it was identified. If it is a post, it may represent a large interior support rather than one of the smaller posts (ca. 20 cm in diameter) forming the exterior walls of a structure. Contents: 0.62 g of charred plant remains, including wood charcoal and thick hickory nutshell.

Southwest Village Area

Six cultural features, and several possible post hole stains (not assigned feature numbers, however, or recognized in the field as such) were excavated in the Southwest Village area. Features were found in each of the dispersed 2 x 2 m unit excavations, suggesting that features are quite common throughout this part of the site. Flotation samples (3-8 liters in size) were collected from features 13, 14, 16, and 17 in this village area.

Feature 11

This post hole was recorded between 40-50+ cm bs in Unit 13. It is about 20 cm in diameter, with a black sandy loam fill. Feature 11 was exposed near the base of the A-horizon, but it was not cross-sectioned or profiled before the unit was back-filled.

Feature 13

Feature 13 is a shallow pit (40-52 cm bs) in units 4 and 18 in the village area. The circular feature is ca. 50 cm in diameter, with a dark gray-black sandy loam fill that has charcoal flecks. The top of a possible post hole was detected at 40 cm bs only 10 cm west of Feature 13. Contents: 3.27 g of charred plant remains, including wood charcoal, thick hickory nutshell, acorn shell, and a single maize kernel; 11 plain body sherds, 3 fingernail punctated sherds with horizontal incised lines; 1 hematite rock.

Feature 14

Exposed in Unit 16, Feature 14 is a small pit, with rounded sides and bottom, that contains charcoal and bone. It is about 35 cm in diameter, and extends from 40-69 cm bs. Feature matrix is a black sandy loam. Contents: 41 pieces of animal bone, including two identifiable deer elements; 1 battered core; 14 lithic debris; 5 fire-cracked rocks; 14 plain body sherds, and 2 fingernail punctated sherds with horizontal incised lines; 13.45 g of charred plant remains, including wood charcoal, pitch, thick hickory nutshell, acorn shell and meat, maize kernels, cupules, and glumes, and several charred seeds. Three possible posthole stains were also detected in Unit 16; these were noted at 40 cm bs, the same depth as the top of the pit.

Feature 15

Feature 15 is an irregularly-shaped pit that extends from 33 cm bs to a maximum of 55 cm bs along the eastern side of the pit; it is only 9 cm thick in the western half of the feature. The pit is ca. 68 x 40 cm in size, and has a dark brown sandy loam matrix with charcoal flecking. Contents: 1 lithic debris.

Feature 16

In profile, this feature appears to be a post hole about 23 cm in diameter (see Figure 16), which is within the range for post holes along structure walls. It has rounded sides and a flat bottom, and extends from 30-52 cm bs. The plan map for units 18 and 20, however, suggests the feature may actually be about 30 cm in diameter; thus, it may be from a larger post, perhaps the stain from an interior support post. It contains a very dark gray to black sandy loam fill. Contents: 1.73 g of charred plant remains, including wood charcoal, thick hickory nutshell, and acorn shell; 2 lithic debris; and 3 plain body sherds and 1 horizontal engraved sherd.

Feature 17

This feature, probably a pit, was exposed in the southeastern corner of Unit 23 between 33-46 cm bs. It has a dark brown sandy loam fill, and covers a 24 x 12 cm area within the unit; the total size of the feature is unknown. A radiocarbon sample of 2.9 g of charred maize (C13/C12 value of –8.7 o/oo) was submitted for dating purposes, and a calibrated radiocarbon date range of AD 1445-1660 (1 sigma) and AD 1410-1950 (2 sigma) was obtained from Beta Analytic, Inc. (Beta-129982). The intercepts of the radiocarbon age with the calibration curve are AD 1520, 1575, and 1625. The calibrated age ranges for the charred maize in Feature 17 seem unlikely given the context of the feature in the Southwest Village archeological deposits, the age of other radiocarbon dates from the Hudnall-Pirtle site, and the kinds of artifacts found in this habitation area; it appears, unfortunately, to have been contaminated by more modern charred plant materials. Contents: 3.28 g of charred plant remains, including the aforementioned maize cupules and glumes, and wood charcoal.

Mound F

Two features were excavated in the Mound F house mound. Small flotation samples (0.76-2.6 liters) were collected from both of the features in the mound.

Feature 10

This is a post hole that originates about 92 cm bs in the mound fill. It is about 20 cm in diameter, extends to 110 cm bs, has rounded sides and a flat bottom, with a dark brown charcoal-flecked fill. Based on profiles of the mound deposits (see Figure 19), and plan maps at various levels, this post appears to be possibly associated with part of an upper structure in the mound. At this depth, three other possible post holes (about 20-24 cm in diameter, but not formally recorded as features while the field work was underway) were noted to the west of

Feature 10, along with a dark gray charcoal-flecked area covering all of Unit 3 and 25% of adjoining Unit 11. This dark gray fill in profile is about 20-30 cm in thickness. Contents: 0.27 g of wood charcoal, thick hickory nut shell, and acorn shells; 2 plain body sherds.

Feature 12

Feature 12 refers to the burned house floor exposed near the bottom of the Mound F trench. Depending upon unit location in the mound trench, this feature originates between 112-126 cm bs (sloping to the west), and averages about 9 cm in thickness (bottom elevations between 129-136 cm bs); in some areas, however, it is as much as 16 cm in thickness. The house floor is characterized by a dark stain with considerable charcoal and ash, as well as charred cane. Calibrated radiocarbon age ranges of A.D. 1045-1223 (Beta-43539) and A.D. 1048-1250 (Beta-43540) were obtained from charcoal associated with the house floor (see Perttula 1998: Table 1). Contents: 0.44 g of charred cane stem, 1.40 g of wood charcoal, and two charred seeds.

THE CERAMIC ASSEMBLAGE

The ceramic assemblage from the 1989 and 1990 excavations at the Hudnall-Pirtle site includes vessel sherds, clay pipe sherds, ceramic ear-spool fragments, and clay daub (including amorphous burned clay pieces). The vast majority of the ceramics are vessel sherds, numbering 7,013 (see Appendix 2).

Vessel Sherds

Sherds from ceramic vessels are the most common artifacts from the 1989-1990 excavations at the site. Despite their high relative frequency (especially in parts of the Southwest Village and Well Pad areas), the sherds provide only basic information about the site, due largely to two factors. First, most of the sherds are small, measuring less than 6 cm in greatest dimension, and this hampers efforts to identify vessel shapes and to make typological assignments. The second factor limiting interpretation of the ceramic assemblage is the very small sample the sherds represent relative to the entire site. While 65 1 x 1 m units and 70 shovel tests were excavated (see Figure 2), these represent but a tiny fraction of 1% of the site's archeological deposits. These limitations notwithstanding, the sherd assemblage — together with the other artifacts from Hudnall-Pirtle — provides at present the only insight into the use of the mound complex by Caddo people.

To provide basic descriptive information about the sherds, this section is broken into three basic groupings: wet-paste decorations on sherds; engraving (or "leather" hard-paste decorations) on sherds; and no decoration on plain sherds. Within the decorated groups, sherds are further sorted by basic design elements and, in some instances, motif. More detailed descriptions are provided for the decorated sherds than for the plain sherds. The reason for this, obviously, is that decorated sherds provide more temporal information about the site than do the plain body sherds. In reality, many of the plain body sherds are likely from the undecorated portions of the same vessels represented by the decorated sherds.

An additional basic grouping was used for analysis: very small sherds (or sherdlets) that measure less than 1 cm in diameter. These number 3,597 and represent about half of the total sherd count. Because of their small size and limited utility for understanding the ceramics found on the site, no observations are made other than to note them in this paragraph. The plain/decorated sherd ratio at the Hudnall-Pirtle site is 4.02 (2735/681).

Wet-Paste Decorations

The sherds in this basic group, accounting for 78% of all sherds larger than 1 cm in diameter, are those decorated during the formation of the vessel when the clay body was wet. Simple decorations tend to occur, with incised lines and punctations common. Wall thickness in these sherds ranges from 3.5-12.75 cm, and wall thickness is relatively uniform among the categories. The wet-paste decoration sherds are almost all utilitarian wares and are here classed as coarse wares.

We have subdivided the group into categories based on design elements and, in some instances, motifs. While ideally our division of these sherds would correspond to existing Caddo ceramic types (e.g., Suhm and Jelks 1962), the small size of the vast majority of the ceramics precludes this from being done reliably. However, once the sherds are sorted into basic design categories, comparisons with formal types can be made. The specific proveniences of these sherds are presented in Appendix 2.

Incised Lines (Figure 23)

A total of 213 sherds make up this category and represent 31% of all decorated sherds. On all but nine, the incised lines are parallel to each other. The width between the lines varies from about 4 mm to slightly more than 1 cm (Figure 23a–e). Both point-end and flat-end tools were used to make the incisions. On four sherds, the incisions were made by holding the cutting tool at a downward angle, creating overhanging lines. On the majority of the sherds (63%), the orientation of the lines relative to the rim cannot be determined. But when the rim is present, the incisions are parallel to the rim 8% of the time, and I assume that most of the incised sherds with no observable orientation are also from vessels with lines oriented parallel to the rim. Of the nine sherds with lines that are clearly not parallel to the rim, seven have cross-hatched incised lines (Figure 23g), one has diagonal incised lines (Figure 23f), and one has perpendicular incised lines that do not overlap.

The majority (68%) are tempered with grog, with lesser frequencies of bone (24%) and a unidentified carbonized organic material (5%). Observations about temper were made by visual inspection, occasionally aided by a magnifying glass. Three percent of the sherds have no observable temper. Paste textures range from coarse (largest grog particle size between 0.5 and 1 mm) to fine (particle size between 0.15 and 0.25 mm), with medium texture (particle size between 0.25 and 0.5 mm) occurring 80% of the time.

All the vessels represented by these sherds are utility coarse wares and show little evidence of surface smoothing. Colors are most often very dark gray to dark brown and occasionally reddish-brown, with core colors usually darker than the exterior vessel surface (suggesting most of the vessels were fired in a reducing or low oxygen environment). Forms are most commonly simple bowls, and less frequently carinated or compound bowls. However, the small size of the sherds severely limits the number of instances in which vessel form can be determined.

Thirty-six percent of these sherds are parts of vessel rims. The rims are split about evenly between direct (uniform thickness to the lip) and thinned (tapering to the lip). Many of the rim sherds are from everted-wall vessels, while standing walls are less frequent. Lips are mostly flattened or rounded.

Many of the incised decorated sherds from Hudnall-Pirtle represent vessels similar to the type Davis Incised (Newell and Krieger 1949:116–118; Suhm and Jelks 1962:35–36; Brown 1996:356–357), although some may

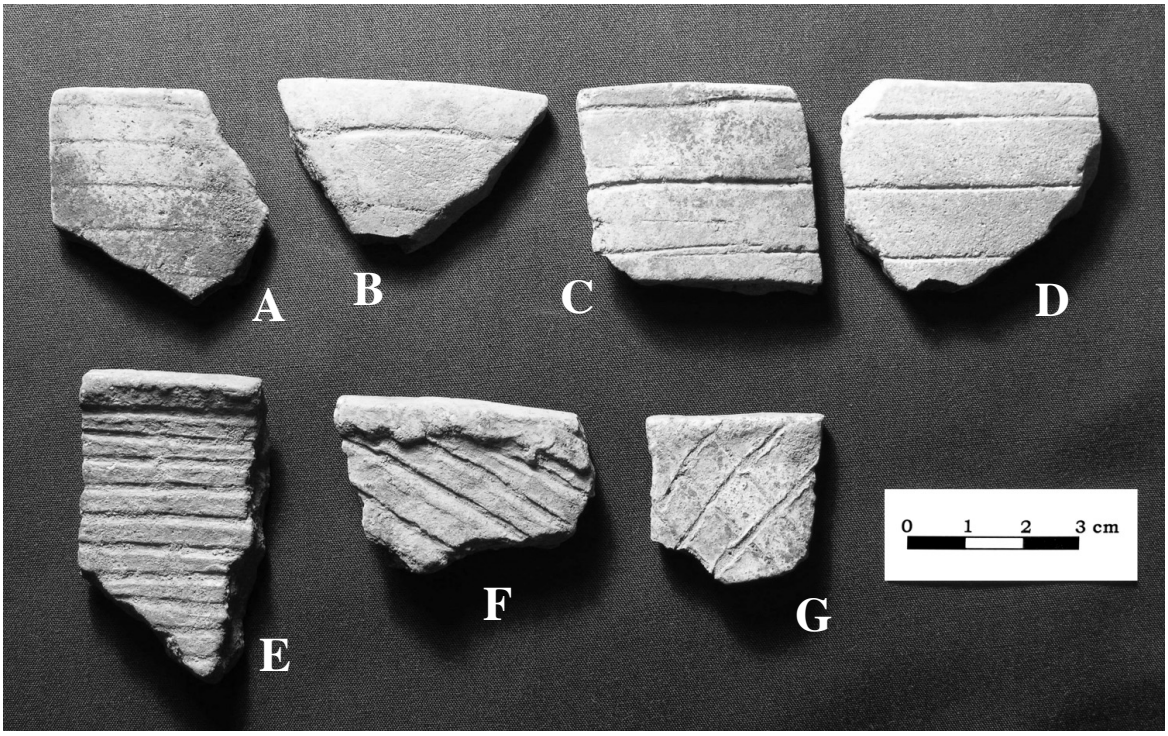

Figure 23. Incised rim sherds: (a–e) horizontal incised; (f) diagonal incised; (g) cross-hatched incised.

represent East Incised (Brown 1996:357–358; Suhm and Jelks 1962:41–42). The principal difference between the two is that the type East Incised does not include carinated bowls and bottles, has thinner walls and finer paste, and sometimes possesses rims with peaks and effigies. The Hudnall-Pirtle sample did include some carinated bowls and sherds with thinner walls and finer paste, but no peaked rims or effigy rims were observed.

Some of the sherds also quite possibly represent the rim portions of Kiam Incised vessels (Suhm and Jelks 1962:89–90). This type is defined as having horizontal incising surrounding the rim, often with vertically incised lines or punctations on the body. Since we have only the rim portions, this type cannot be conclusively identified among the incised sherds. Some sherds, especially those with parallel incised lines but without rims, may be portions of Dunkin Incised vessels (Newell and Krieger 1949:116–118; Suhm and Jelks 1962:35–36; Brown 1996:356–357). This type consists of parallel lines in a wide variety of patterns along the rim and body. Again, the small size of the sherds makes identification of this type difficult, although two small sherds — one with cross-hatched lines and another with perpendicular lines that do not overlap — are quite possibly of this type.

Free Punctated Sherds (Figure 24)

Free Punctated sherds are those sherds with punctations but without bordering incised lines, There is a total of 249 free punctated sherds in the Hudnall-Pirtle ceramic assemblage and they account for 47% of the decorated

ceramics. They have been divided into six sub-categories based on type of punctation (Table 2). The most frequent type, accounting for about half the sherds, is termed "dragged fingernail punctation," and was made by inserting the end of a fingernail into the vessel body while the clay was wet and slightly dragging the fingernail downward (Figure 24a–d). The next most common type is termed "simple punctation" and is made the same as above, except that the fingernail is not pushed downward in the wet clay (Figure 24e–h). This technique was used on 37% of the punctated sherds.

In some cases an arch-shaped tool end, such as a reed held at an oblique angle, may have been used to make the decoration instead of a fingernail (see Figure 24h). Other, infrequent, decorative techniques include the use of triangular-end (see Figure 24d-e, h) and pointed-end tools (Figure 24g); circular reeds (Figure 24f); and pinched rows (Figure 24a–c), made by pressing the thumb and index fingernails into the clay at the same time, with the fingernail impressions placed end-to-end to form spiral lines or ridges. The pinched row punctations also tend to be mostly dragged, as described above.

The majority of these sherds are tempered with grog (75%), followed by bone (19%), carbonized organic material (3%), and hematite (1%). Temper appeared to be absent in 2% of these sherds. Paste textures are most frequently medium (87%), followed by coarse (9%) and fine (4%). As with the incised sherds, all the vessels

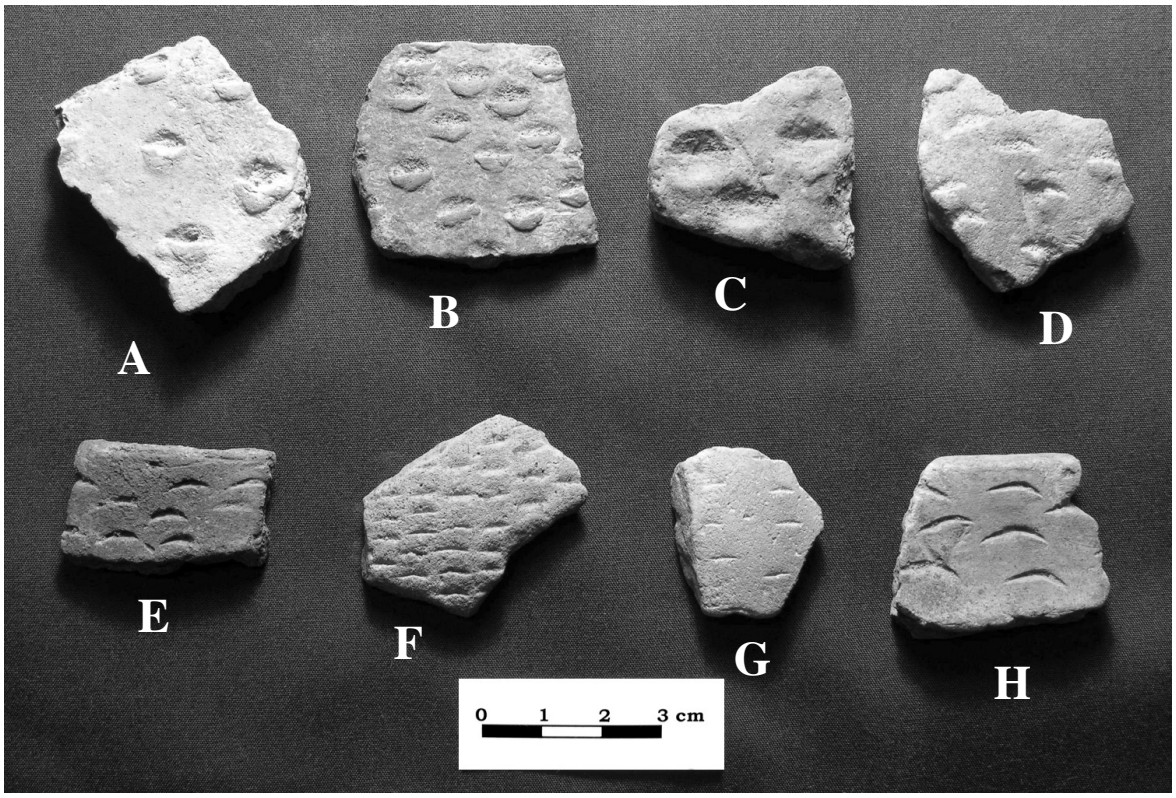

Figure 24. Punctated sherds: a–d, dragged fingernail punctation; e–h, simple fingernail punctation.

represent utility coarse wares, and are likely from similar, and in some instances the same, utility vessels as the incised sherds.

Sherds colors range from dark gray to dark brown to tan. A few reddish-brown sherd colors are also seen. Vessel forms, when identifiable, are simple bowls and, less commonly, carinated and compound bowls. Seven

percent of the sherds are from vessel rims, and the rest are from bodies. Rims are evenly split between direct and thinned, and vessel wall orientation is mostly standing and less frequently everted or inverted. Lips are mostly flattened or rounded.

Many of the punctated sherds, especially those with fingernail or arched tool impressions (see Figure 24), undoubtedly represent vessels of Weches Fingernail Impressed (Newell and Krieger 1949:118–120; Suhm and Jelks 1962:153–154).

Table 2. Punctation design elements.

Technique	Frequency	Percentage
Dragged Fingernail	117	73.6
Simple Fingernail	2	1.3
Pinched Row	16	10.1
Triangular-end Tool	11	6.9
Pointed-end Tool	7	4.4
Spiral Punctated Lines	4	2.5
Circular Reed	2	1.3
Total	159	100.0

Others, such as those shown in Figure 25a–c, could be from the bodies of Kiam Incised or Dunkin Incised vessels. The triangular punctations could represent minor decorative variations of the punctated types mentioned above, or may be parts of other, untyped vessels. The circular reed punctations, such as shown in Figure 25f, likely represent small sherds from Crockett Curvilinear Incised vessels (Suhm and Jelks 1962:31–34).

The four sherds that have fingernail impressions placed end-to-end to form spiral lines or ridges are very similar to those observed on the body of a vessel of Weches Fingernail Impressed illustrated by Suhm and Jelks (1962:Plate 77i).

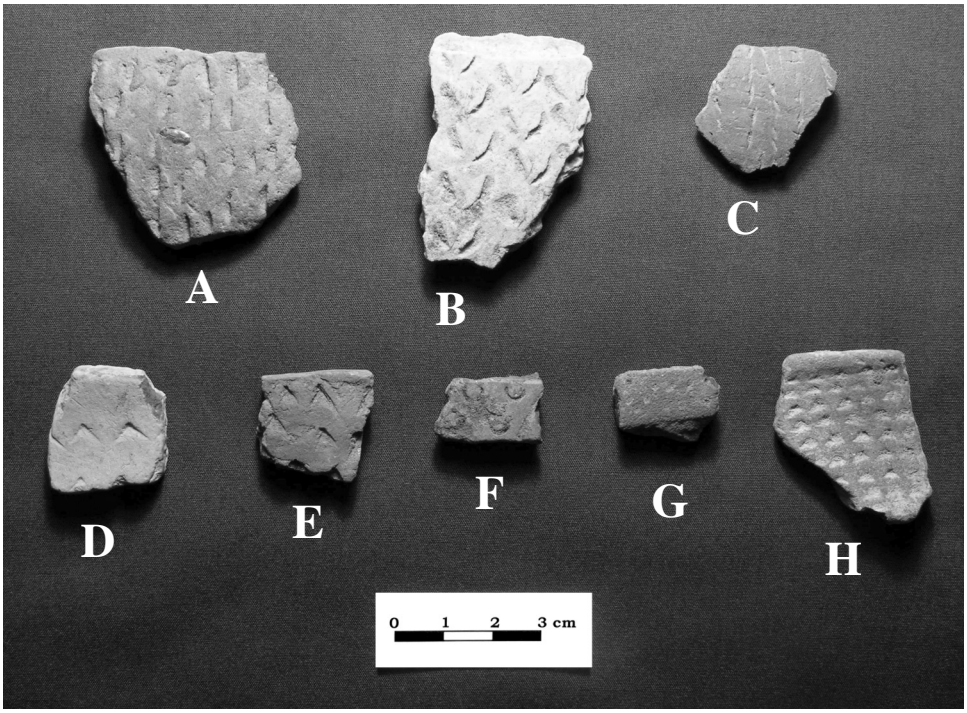

Figure 25. Punctated sherds: (a–c) pinched fingernail punctation; (d, e, h) triangular-end tool punctation; (f) circular reed punctation; (g) pointed-end tool punctation.

Fingernail Punctations with Horizontal Incised Lines (Figure 26a-c)

This design category consists of incised lines parallel to the rim, with semi-circular punctations in single rows between the lines. In most instances the punctations are made with fingernails, but in a few cases an arch-shaped tool end, such as the end of a large reed, may have been used (Figure 26a). All but one of the 29 sherds that make up this group have simple punctations, as defined above; the remaining sherd has dragged punctations. This design element is typically found on the rim, but on one sherd the body below is decorated with pinched punctations. Sherd colors vary from dark gray to reddish-brown to tan, with lighter colors more frequent. Sixty-eight percent are tempered with grog, and the remaining 32% are tempered with both grog and bone. Paste textures are mostly medium to coarse, and all of these sherds appear to have come from utility wares. The rim sherds are split between direct and thinned, and nearly all are from simple bowls with slightly everted rims. Lips are flat to round. All of these sherds fall into the type Weches Fingernail Impressed.

Triangular-end Tool Punctations with Horizontal Incised lines (Figure 26d)

The motif for these sherds is similar to Fingernail Punctations With Horizontal Incised Lines, with one major exception: the punctations are made by triangular-end tools. In some cases the punctations are made by solid tools and in others by hollow tools that represent an upside-down "V" when impressed into the clay. The 14 sherds that make up this sub-category range in color from dark gray to reddish-brown to tan. Half are tempered with grog, and half are tempered with both grog and bone. Among the four rim sherds, both thinned and direct rims are observed. Although the rim sherds are quite small (less than 4 cm in greatest dimension), they appear to be from simple bowls. Lips are rounded and pointed.

Circular Punctations Within Linear Incised Lines (Figure 26f, h)

This motif consists of flanked incised lines containing punctations. In the case of the three rim sherds in the sample, the incised flanked lines are diagonal to the rim. Thirteen sherds fall into this category, and the punctations on eight are made with a pointed-end tool, and three sherds have punctations made with hollow reeds. Colors range from dark gray to tan, with lighter colors most common. One sherd has no observable temper, six have grog, and four have a combination of grog and bone. The three rim sherds are too small to provide much reliable information about vessel shape. Both thinned and direct rims are present, and lips are both rounded and flattened. All these sherds fall within the type Pennington Punctated-Incised.

Circular Punctations Within Curvilinear Incised Lines (Figure 26e, g)

Three sherds have a design motif similar to Circular Punctations Within Linear Flanked Incised Lines described above, except that the incised lines are curvilinear instead of linear. The division of these two motifs based on the linearity of the incised lines follows the division made by Suhm and Jelks (1962:121) for sorting vessels between Pennington Punctated-Incised and Crockett Curvilinear Incised. All three sherds from Hudnall-Pirtle clearly fall within the type Crockett Curvilinear Incised (Suhm and Jelks 1962:31–32).

The single rim sherd in the sample shows an incised line about 2 cm below and parallel to the lip; triangular-end tool punctations occur between the line and the lip. Another sherd appears to be part of a scroll motif of

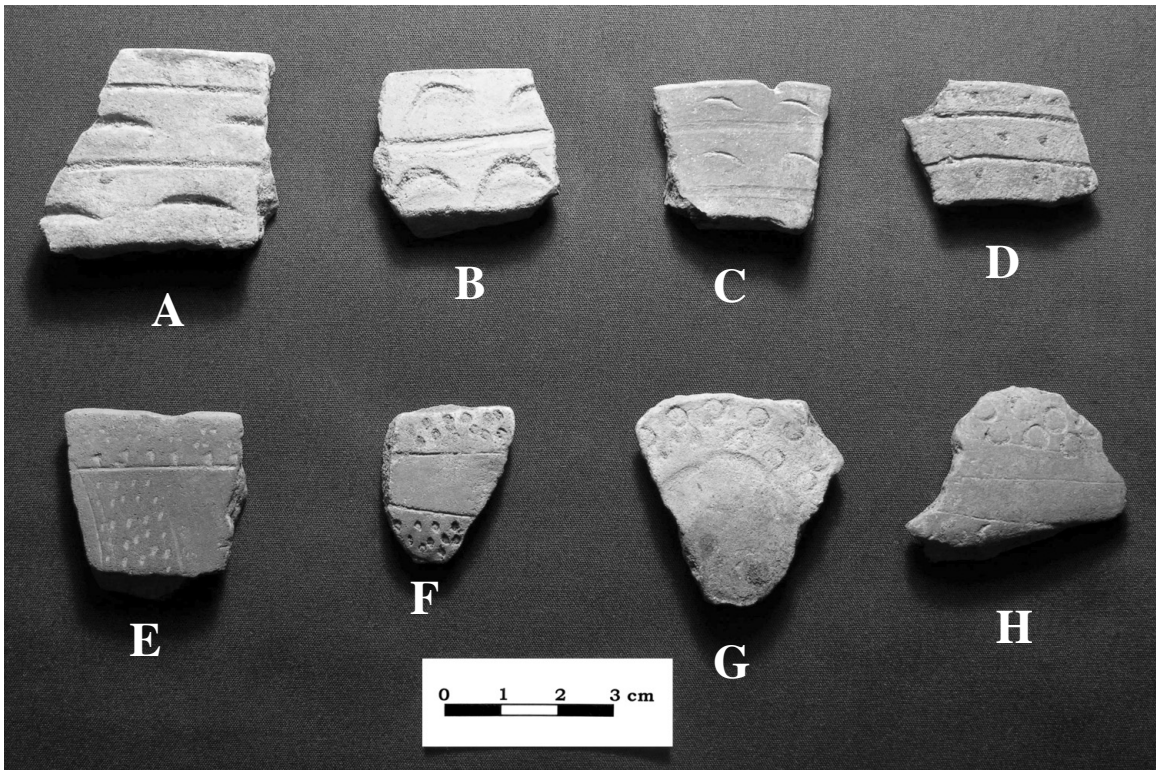

Figure 26. Incised/punctated sherds: (a–c) fingernail punctations with horizontal incised lines; (d) triangular-end tool punctations with horizontal incised lines; (e, f) circular punctations with linear incised lines; (g, h); circular punctations with curvilinear incised lines.

flanked curvilinear lines enclosing circular reed punctations, and the design on the last sherd is basically the same, but it forms a circle.

The sherds are dark brown to tan in color. Two are tempered with bone and grog and the other with hematite. The rim is thinned and slightly everted, and is probably from a simple bowl.

Horizontal Incised Rim Lines with Body Punctations

Two sherds make up this decorative category. The incised lines are identical to those on the other linear incised-line sherds from the site. However, these sherds are large enough to also contain portions of the vessel body, which are decorated with punctations. The body of one is decorated with free simple punctations and the other with pinching, forming rows running down the vessel. Colors are dark brown and gray. Both are tempered with grog and bone, and both have medium texture paste. These sherds are probably from vessels of Kiam Incised.

Horizontal Incised Rim Lines with Single-Row Triangular-end Tool Punctations (Figure 27)

Nine sherds exhibit the typical horizontal incised lines on the rim, but have enough of the body present to show that a single row of triangular-end tool punctations occurs below the last incised line. The incised triangles on all but two of the sherds were made with the right-angle corner of a hollow tool (Figure 27a, c). The other two sherds' triangular punctations were made with a solid tool with a triangular-shaped end (Figure 27b). Other

than the decorations, these sherds are similar to the others from the incised/punctated category, with colors ranging from dark gray to dark brown to tan, and are mostly tempered with grog or both grog and bone. The tempers are grog (n=5), bone and grog (n=2), and lignite or carbonized organic material (n=1). None of the sherds include the lip, so it is difficult to determine vessel shape, although simple bowls or jars seem most likely from the limited sherd sample. The sherds all represent examples of Coles Creek Incised (Phillips 1970:70–76); eight appear to be examples of Coles Creek Incised, *var. Coles Creek*, and one looks similar to Coles Creek Incised, *var. Hardy*.

Engraved Decorations

This major sherd category, with 149 examples representing 22% of all decorated sherds, consists of the engraved sherds from the Hudnall-Pirtle site. The distinction between these sherds and those in the wet-paste category is that the decorations on the engraved group were made after the clay body had dried and was in a "leather"-hard stage. On the vessels decorated in this manner, lines are finer in width and not cut as deeply into the vessel body. This method of decoration requires an additional step in the overall process of making ceramic vessels, namely having to wait for the clay to dry before decorating the pot. Consequently, engraved vessels often represent finer wares, with better executed and more elaborate decorations. Specific proveniences of these sherds are presented in Appendix 2.

The engraved vessels are divided into four categories based on the orientation of the engraved lines. We have chosen this method of division because the categories best facilitate comparison with established Caddo ceramic types from Texas.

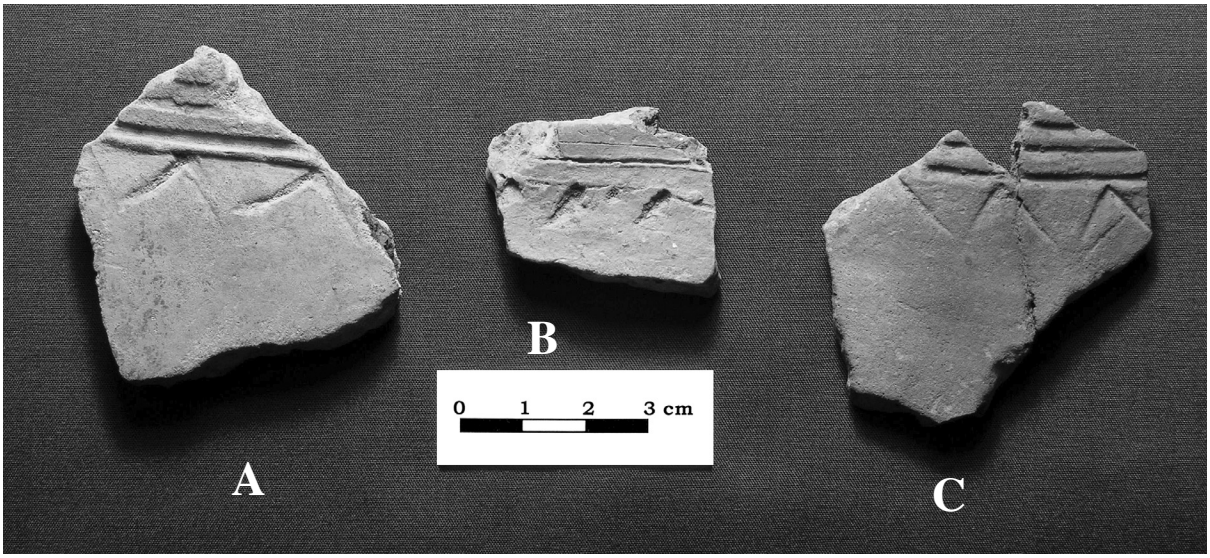

Figure 27. Horizontal incised rim lines with single-row triangular-end tool punctations (Coles Creek Incised).

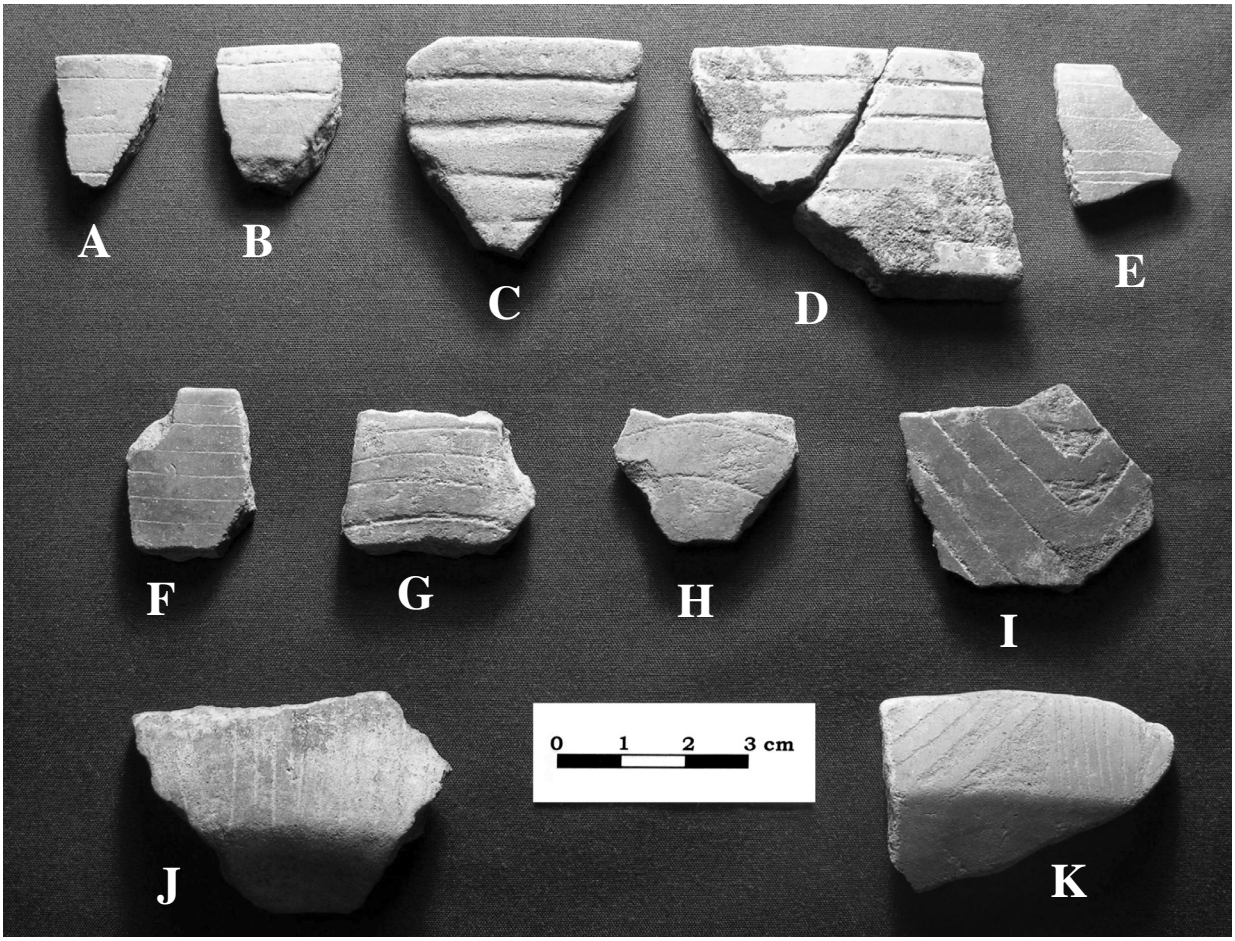

Figure 28. Engraved sherds: (a–f) horizontal lines; (g, h) concentric lines; (i) V-shaped lines with excised triangles; (j, k) vertical and diagonal lines.

Horizontal Engraved Lines (Figure 28a–f)

Thirty-one sherds make up this category and they are rims with one or more horizontal engraved lines parallel to the rim. On 28 specimens the lines are very finely made, less than 0.5 mm or less in width and depth. The remainder have slightly wider and deeper lines. The sherds are small and therefore the number of lines per vessel cannot be consistently determined, but up to seven are noted. Colors range from dark gray to brown to tan, and interior colors are usually darker than the exteriors.

The most common temper is bone and grog (45%), followed by grog (40%), and lignite or some other organic material (11%). Two sherds had no observable temper. Pastes tend to be fine to medium, and wall thickness ranges from 4.0 to 7.6 mm. Rims are usually thinned, and lips are pointed, rounded, and less commonly, flat. The sherds are all quite small, and thus vessel forms are difficult to determine accurately, but simple bowls are likely, and at least three bottles are present. Many of the sherds are likely from Hickory Fine Engraved vessels (Newell and Krieger 1949:90–91; Suhm and Jelks 1962:71–77; Brown 1996:373–374). It should be noted that although the ceramics are attributed to vessels of Hickory Fine Engraved, not all of the engraved decorations represent "fine engraved" lines. Rather, the Hudnall-Pirtle sherd sample contains many examples of design elements/motifs that are very similar, if not the same, as the fine engraved types, but the lines are thicker and generally coarser.

Concentric Engraved Lines (Figure 28g- h)

Seventeen sherds comprise this category of engraved ceramics. All have one or more curving lines on the vessel body. In cases in which there is more than one line, the lines are parallel. In sherds with only one line, other parallel lines might have been present, but the sherds are too small to make this determination. The engraved lines on 13 specimens are finely made, while the others are wider and generally coarser. Colors range from dark gray to brown to tan, and interior colors are often darker than the exteriors. Temper is most commonly grog (54%), followed by grog and bone (27%) and carbonized material (13%). No temper was observed in 7% of the sherds. Paste texture is fine to medium, and thicknesses range from a remarkably thin 2.5 to 5.2 mm. Six sherds are polished on the exterior.

Only two rims are represented, and both are thinned with rounded lips. Vessel shapes are difficult to discern, but bowls, either simple or carinated, can be said to be a major part of the assemblage. These sherds are likely parts of Spiro Engraved and Holly Fine Engraved vessels (Newell and Krieger 1949:81–90; Suhm and Jelks 1962:77–7, 147–148; Brown 1996:374–376).

Vertical Engraved Lines (Figure 28j, k)

Fourteen sherds have vertical engraved fine lines. In one case the lines are separated by an excised triangle and then diagonal lines (see Figure 28k). In two other cases the rows of vertical lines are flanked by excised triangles. Colors range from dark gray to brown to tan, with interior color usually being darker. The temper is grog in all cases. Pastes are fine to medium, and one sherd has exterior polishing. Sherd thickness ranges from 4.5 to 9.9 mm. Three of the sherds are rims: one is direct with a flat lip, and two are thinned rims with rounded lips. Four of the five sherds are from carinated bowls. The sherds are undoubtedly part of Holly Fine Engraved vessels (Suhm and Jelks 1962:77–79).

Miscellaneous Engraved

A total of 80 sherds fall into this sub-category, which is essentially a catchall for engraved sherds that lack rims or other diagnostic features such as rim carinations, to orient the decorations. Fifty sherds have two or more parallel lines, and of this number six are fine engraved. Fifteen sherds have a single engraved line, although the sherds are small enough that they may be parts of vessel decorations with multiple parallel lines. Eight sherds have engraved lines in a combination of orientations. Five of these have fine lines. Colors are the typical dark gray, brown, and tan. Sherd tempers include grog (48%), bone and grog (35%), and carbonized material (12%). No temper was visible in 5% of the sherds.

One unique sherd has a series of V-shaped lines, some with excised triangles as part of the V-shaped lines (see Figure 28i). There is evidence that white pigment was rubbed into the lines. This vessel is likely a variation of Spiro Engraved. No vessel shapes could definitively be identified in the sample, and the decorations — other than the Spiro Engraved sherd — are most likely from Holly Fine Engraved and less likely from Hickory Fine Engraved vessels.

Undecorated Sherds

Included in this category are plain body and rim sherds. As noted above, many of the plain body sherds are quite likely from the undecorated portions of vessels with rim decorations. The plain rims represent vessels that were undecorated.

Undecorated Body Sherds

A total of 2,636 plain body sherds were recovered; seven of these represent vessel bases. Colors span the range of dark gray, brown, and tan that is typical for ceramics from the site. Temper is predominantly grog (71%), with less commonly bone and grog (12%), grog and grit (5%), grit or sandy paste (3%), and carbonized organics (1%). Thirty-six (1%) of the undecorated sherds had no observable temper. Paste textures are mostly medium (73%), coarse (19%), and fine (8%). Sherd thickness ranges from 3 to 12 mm. Twenty-two of the sherds had polished surfaces, and five had red slipping on the exterior.

Sixty-seven sherds were large enough to allow identification of the vessel forms they represented, as follows: carinated bowls (48%), bottles (21%), simple bowls (16%), compound vessels (10%), and jars (5%). However, as carinated bowls and jars tend to be easier to identify in small sherds, these figures represent only approximate percentages of the relative frequency of vessel forms.

Undecorated Rim Sherds

Among the undecorated vessel ceramics are 117 plain rim sherds. Their colors are in the same range as described above for the undecorated body sherds. Seventy-one percent of the rim sherds are tempered with grog, followed by 25% with grog and bone, and 1% with carbonized organic material. Temper was not observed in 3.2% of these sherds. Paste textures are mostly medium (90%), followed by fine (7%) and coarse (2%). One rim sherd had a red slip on the exterior surface. Twenty-one sherds provide information about vessel form: 76% were simple bowls, 14% bottles, 4% carinated bowls, and 4% jars.

Rims are mostly thinned (58%), with 33% direct and 3% rolled outward at the lip. Rim orientations were 37% inverted, 27% standing, and 4% everted. Lips were most often flat or rounded.

Summary of Vessel Sherds

The distribution of basic decoration techniques among the areas of the Hudnall-Pirtle site that were investigated is shown in Table 3. Many areas of the site yielded too few sherds for statistically valid comparisons. But taking the two areas with the largest samples — Southwest and Well Pad — some differences can be observed that may indicate temporal trends in the vessel ceramics. The Southwest area has relatively more sherds with engraving and fewer with incisions. Both areas have similar frequencies of punctations and combined incised/punctated sherds.

To better understand what this might indicate, Table 4 displays the basic decoration techniques broken down into element/motif categories and their distributions across the site areas. The correspondence between ele-

Table 3. Decoration Techniques

Area	Incised	Punctation	Incised/ Punctated	Engraved	Total	Percent
Mound A	2	3	2	4	11	1.6
Mound F	2	1		1	4	.6
Northwest	3	6		6	15	2.3
Pipeline		1	2		3	.5
Southwest	136	163	46	88	433	65.3
Shovel Tests	4	7	2	8	21	3.2
Well Pad	58	54	15	25	152	22.
No Area	8	14	3	1	26	3.8
Total	213	249	70	131	663	100.0
Percent	32.1	37.6	10.6	1.7	100.0	

Table 4. Distribution of Vessel Ceramics by Site Area

Decoration Method	Element/Motif Category	Mound A	Mound F	Northwest	Pipeline	Southwest	Shovel Tests	Well Pad	No Area	Total
Wet Paste										
	Incised Lines	2	2	3		136	4	58	8	213
	Free Punctates	3	1	6	1	163	7	54	14	24
	Fingernail Punctations with Horizontal Lines	1			1	1	2	5	1	2
	Triangular-end Tool Punctations with Horizontal Incised lines					10		3	1	14
	Circular Punctations with Linear Incised lines	1				8		3	1	13
	Circular Punctations Within Curvilinear Incised Lines					2		1		3
	Horizontal Incised lines with Body Punctations					2				2
	Horizontal Incised Rim Lines with Single-Row Triangular-end Tool Punctations				1	5		3		
Total Wet-Paste	Decorated Sherds	7	3		3	345	13	127	25	532
Engraved										
	Horizontal Engraved Lines			2		24	3			38
	Concentric Engraved Lines	1		1		10		5		17
	Vertical Engraved Lines	3		1		8	2			14
	Misc. Engraved		1	3		56	4	14	2	80
Total Engraved Sherds		4	1	7	0	8		28	2	14
Total Decorated Sherds		11	4	16	3	443	22	155	27	681
Undecorated Sherds										
	Undecorated Body Sherds	41	20	3	4	1,650	4	818	15	2,636
	Undecorated Rim Sherds			3		87		27		117
Total Undecorated Sherds		41	20	42	4	1,737	4	845	15	2,753
Total Non-Small Sherds (greater than 1 cm)		52	24	58	7	2,180	71	1,000	42	3,434
Small Sherds (less than 1 cm)		30	1	121	2	848	171	2,387	1	3,57
Total Vessel Sherds		82	43	17		3,028	242	3,387	61	7,031

Table 5. Comparison of Design Element/Motif Categories with Published Ceramic Types

Decoration Method	Design Element/Motif Category	Similar Published Ceramic Types	Frequency	Percent
Wet Paste (Coarsewares)				
	Incised Lines	Davis Incised and less likely East Incised, Kiam Incised, and Dunkin In	213	31.28
	Free Punctates	Weches Fingernail Impressed, less commonly Kiam Incised, Dunkin Incised, and Crockett Curvilinear Incised	24	3.5
	Fingernail Punctations with Horizontal Lines	Weches Fingernail Impressed	2	0.2
	Triangular-end Tool Punctations with Horizontal Incised lines	Variant of Weches Fingernail Impressed?	14	2.06
	Circular Punctations with Linear Incised lines	Pennington Punctated-Incised	13	1.2
	Circular Punctations Within Curvilinear Incised Lines	Crockett Curvilinear Incised	3	.44
		Kiam Incised	2	.2
	Horizontal Incised lines with Body Punctations Horizontal Incised Rim Lines with Single-Row Triangular-end Tool Punctations	Coles Creek Incised, *var. Coles Creek and Hardy*	9	1.32
Total Wet-Paste Decorated Sherds			532	78.12
Engraved (Fine wares)				
	Horizontal Engraved Lines	Hickory Fine Engraved	38	5.58
	Concentric Engraved Lines	Holey Fine Engraved, Spiro Engraved	17	2.50
	Vertical Engraved Lines	Holey Fine Engraved	14	2.06
	Misc. Engraved	Holey Fine Engraved and less so Hickory Fine Engraved	80	11.75
Total Engraved Sherds			149	21.8
Total Decorated Sherds			**681**	**100.0**

ments/motifs and published Texas Caddo types is presented in Table 5. The results show that many categories occur in most areas of the site, but some subtle differences are apparent in the distribution.

Again using the Southwest and Well Pad areas, where sample sizes are largest, the Southwest area can be seen to have more Free Punctation sherds, indicative of Weches Fingernail Impressed. Newell and Krieger (1949:119) have argued that there was a trend from zoned punctates to free punctates over time at George C. Davis. Although not everyone has agreed with this observation (Stokes and Woodring 1981:181), if we assume that there is validity to Newell and Krieger's observation, the Southwest area seems to have been occupied somewhat later than the Well Pad area. Adding additional support to this observation is the distribution of Horizontal Incised Rim Lines with Single-Row Triangular-end Tool Punctations, or Coles Creek Incised. This type occurs slightly more frequently in the Well Pad area. As Coles Creek Incised is believed to be very early occurrence in the Caddo ceramic sequence (ca. A.D. 950-1050), it too suggests that the Well Pad occupation is earlier than the Southwest village area.

Of likely statistical significance is the relative occurrence of the element/motif category Vertical Engraved Lines, present in seven sherds from the Southwest area and entirely missing from the Well Pad. If the proposal of temporal differences between the two areas is true, this suggests that this element/motif, part of the Holly Fine Engraved type, occurs slightly later in the overall Caddo sequence at the Hudnall-Pirtle site.

A final observation from Table 4 is that engraving is overall slightly less frequent in the Well Pad area. At the Davis site, engraving is much more common than at Hudnall-Pirtle (Newell and Krieger 1949:Table 13; Stokes and Woodring 1981). The argument can be made that this again supports a somewhat earlier occupation at the Well Pad area, when engraving was less commonly used as a decorative technique. As time progressed, it increased in frequency of use and reached a zenith during the subsequent occupation of the Davis site.

In terms of a more general comparison, the Hudnall-Pirtle sample compares quite well to the ceramic from the George C. Davis site. While the relative frequencies of some types occur in different proportions, all the major ceramic types are found at both places, with the exception of Duran Neck Banding, which is lacking in the Hudnall-Pirtle ceramic assemblage.

Burned Clay and Daub

A total of 434.1 g of burned clay and daub was found during the excavations at the Hudnall-Pirtle site. The distinction between the two is that burned clay does not have surface stick or thatch impressions, while daub does. Burned clay can be from hearths, from the clay applied to the exterior of structures but without preserved stick or thatch impressions, and from other sources where clay came into contact with high heat. Daub, on the other hand, is almost exclusively from wattle and daub-covered structures, and the impressions on the exterior covering of the structures allow this identification. The vast majority (79%) of the fired clay from the site is burned clay, mostly tan in color, with lesser amounts of dark brown, fired sandy clay. The specimens come mainly from the Southwest and Well Pad areas (Table 6). A small amount comes from Shovel Test 3, located 35 m east of the Southwest village units (Table 7; see Figure 2).

Table 6. Burned Clay and Daub by Area

	Burned Clay		Daub	
Area	**# (g)**	**%**	**# (g)**	**%**
Northwest			1.2	25
Southwest	316.7	73.6	2.0	43
Shovel Tests	3.7	0.9	1.5	32
Well Pad	109	25.5		
Total	429.4	100.0	4.7	100.0

The small amount of daub, indicating structures, consists of small pieces with stick impressions of about 3-8 mm in diameter. The pieces are tan in color and made of fired sandy clay. They come from three locations: a unit in the Southwest, a unit in the natural mound of the Northwest, and Shovel Test 8, located 150 m to the east of the Southwest units (see Figure 2).

When the proportion of burned clay is compared with that of vessel ceramics, burned clay is more prevalent in the Southwest area than in the Well Pad area. As little daub was found in these two areas, it is not clear what the higher proportion of burned clay from the Southwest area represents. Perhaps the clay is from hearths, proportionally more of which were excavated during the 1989–1990 fieldwork. It should be noted that the site soils have been extensively bioturbated, making field identification of hearths difficult, so the true source of the burned clay will never be known. The low frequency or absence of daub from these two areas does strongly suggest that the structures built here were not daubed with clay.

There is evidence from the distribution of daub that a daubed structure might have existed around Unit 6 in the Southwest area (see Figure 2), around Shovel Test 8 to the east of the Southwest units, and along the southern slope of the natural mound in the Northwest.

Other Fired Clay Artifacts

Pipe Fragments (Figure 29a–c)

One possible and six definite pipe fragments were recovered in the excavations. The definite pipe fragments are all from long-stemmed Red River variety pipes (Figure 29a-b; Hoffman 1967; Brown 1996:512). Three of them are from the pipe stem and three from the pipe bowl. The diameters of the stems are 2.6 mm, 2.9 mm, and 1.6 mm. Colors are tan and gray. The paste textures are fine to medium; bone was added to four of them, while two have no visible temper. Four of the Red River–style pipe fragments are from the Well Pad (Unit-Levels 103-7, 106-4, 106-7, and 116-1), and two from the Southwest (Unit-Levels 4-1 and 20/21-6).

One sherd, tentatively identified as part of a platform pipe, is illustrated in Figure 29c. It consists of a fragment of fired clay with three smooth faces and it has been broken along the other edge. The smooth faces suggest that the pipe platform had a flat base, an everted side, and a convex top, with a hole in the center that formed the pipe's bowl. The color of the sherd is tan with some areas of black smudging. The temper is bone and grit, and the texture is medium to coarse. The pipe fragment is from Unit-Level 21-3 in the Southwest area.

Ear Spools (Figure 29d–f)

Four ear-spool sherds were recovered from the site. Three are clay rings with pronounced flanges along both exterior edges. The other example is a ring with a concave exterior. The sherds range in color from tan to gray. The paste textures are fine, and there is no visible temper in the clay. The rings with flanged edges average 2 mm in wall thickness; the non-flanged specimen is 5.7 mm in wall thickness at the thinnest part. Two ear-spool fragments are from the Well Pad (Unit-Levels 112-2 and 123-2). One is from the Southwest (Unit-Level 20-3), and one is from Shovel Test 9 south of Mound B (see Figure 2).

Table 7. Burned Clay and Daub by Provenience.

Provenience (Unit-Level)	Burned Clay (g)	Daub (g)
2-8		1.2
4-4	6.2	
4-4	2.7	
4-5	12.4	
5-3	1.6	
6-3	2.	
6-5	1.6	
8-1	1.3	
12-3	18.5	
12-5	7.8	
12-5	1.8	
13-5	7.4	
16-2	3.1	
16-4	.5	
18-3	2.6	
18-6	2.1	
18-7	3.5	
18/20-5	13.2	
18/20-5	11.6	
20-3	4.5	
20-4	1.0	
20-6	41.3	
21-0	7.3	
21-3	3.2	
21-4	3.1	
21-5	8.6	
21-5	18.1	
22-2		2.0
103-7	5.5	
112-2	3.7	
118-2	3.1	
11-2	2.8	
122-1	7.3	
125-4	.	
128-2	6.0	
138-2	4.6	
13-4	87.0	
Feature 13	30.1	
Feature 14	5.7	
Feature 14	5.1	
Feature 104	17.0	
Feature 110	61.8	
Shovel Test 3	3.7	
Shovel Test 8		1.5
Total	429.4	4.7

Vessel Legs (Figure 29g, h)

Two small conical legs from vessels are part of the ceramic assemblage. Both appear to have been made separately and then pressed onto the vessels. One is tempered with grog and bone; the other has no visible temper. Both legs show evidence of post-firing burning, apparently from the direct contact of utilitarian cooking vessels with a hearth fire. They are tan in color, except for dark brown to black burned areas, and are from the Southwest (Unit-Levels 4-5 and 21-2).

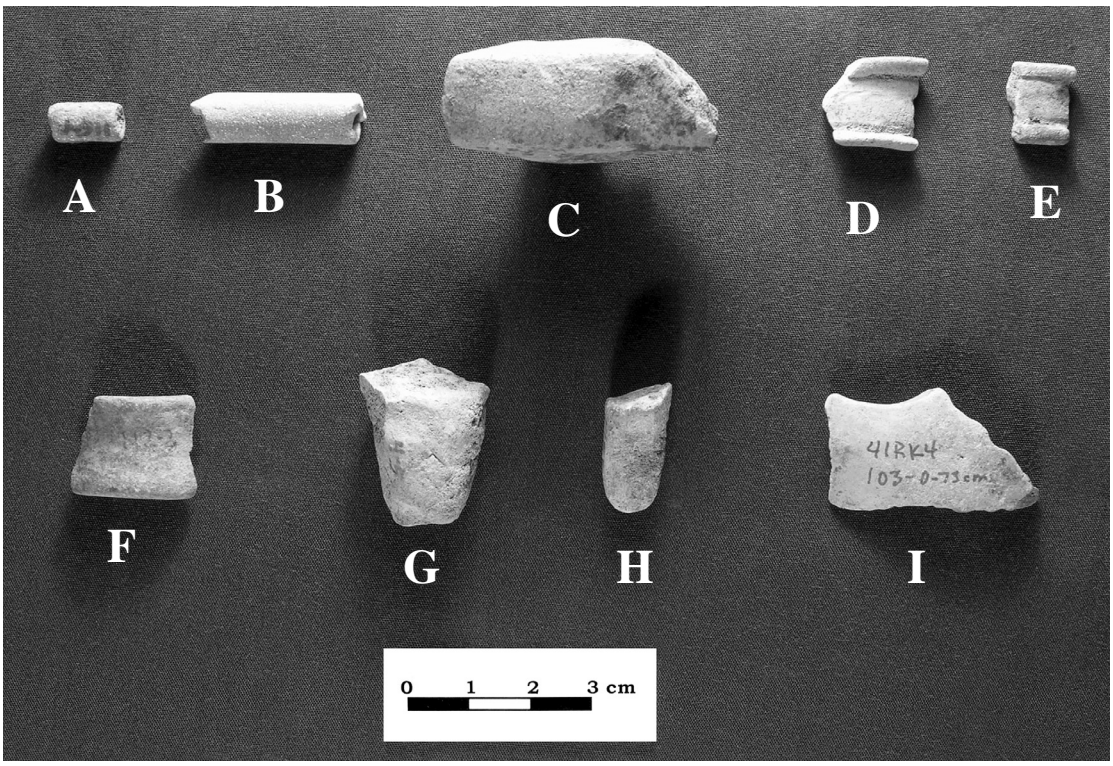

Figure 29. Other fired clay artifacts: (a–c) pipe fragments; (d–f) ear spools; (g, h) vessel legs; (i) unknown.

Unknown Fired Clay Fragment (Figure 29i)

One piece of fired clay has a flat convex and smoothed exterior surface and a broken underside. A smoothed, and presumably central, hole is present along one edge of the surface. The color is tan on the exterior with a dark gray core. The paste is medium, and no visible temper is present. The object is from the Well Pad (Unit-Level 103-7) and is remarkably similar to artifacts described as "fragments of clay disks cut from sherds, smoothed central hole; spindle whorls(?)" by Newell and Krieger (1949), who include an illustration of one in their Figure 53F. The purpose of the Hudnall-Pirtle example is unknown.

THE LITHIC ARTIFACTS FROM THE HUDNALL-PIRTLE SITE (41RK4)

It is rare in prehistoric Northeast Texas archeological investigations—given the cultural preference by aboriginal peoples over thousands of years to reoccupy and use the same favorable landforms and topographic settings—to

retrieve large samples of material culture remains from clear single component contexts (see Story 1990; Collins and Bousman 1993). In most cases, the artifacts recovered from prehistoric archeological sites represent a palimpsest of multiple, recurrent, and overlapping occupations that had no cultural association in the past, and certainly possess little obvious cultural integrity in the present.

Consequently, analysis of the archeological remains from sites in these types of settings typically are extremely descriptive (usually in the absence of any stated and potentially testable research problems of more than passing interest). They focus on shared characteristics of the artifact groupings as a whole since more discrete groupings (either temporal or spatial in nature) are difficult to justify and even harder to isolate, and end up contributing little new information on the character of prehistoric material culture or the human behavior that produced it. The relatively large lithic artifact assemblage from the Hudnall-Pirtle site is thus of more than passing interest in the study of the Northeast Texas archeological record because it clearly seems to derive from a major prehistoric Caddo ceremonial center of discrete and well-preserved Early Caddoan period context (ca. A.D. 1000-1200).

The study of the lithic artifacts recovered in the 1989-1990 excavations at Hudnall-Pirtle foremost provide an excellent opportunity to characterize the nature of certain kinds of chipped and groundstone tools being manufactured and used at that time along the Sabine River by Caddo peoples. Assemblage-wide comparisons with other contemporaneous sites in the Sabine River drainage (such as James Pace; see Girard 1994) and Boxed Springs (see Perttula et al. 2000) in northwestern Louisiana and Northeast Texas, and in Northeast Texas generally, should also provide useful insights on tool diversity and the functional nature of the Hudnall-Pirtle tool assemblage, and whether there is any significant intra-site differences along these dimensions. Finally, examination of the lithic raw materials present in the collection will provide some measure of the acquisition and use of non-local raw materials by the Caddo peoples at Hudnall-Pirtle; archeological evidence from the Sabine River drainage suggests that the use of non-local lithic raw materials was extensive during Early Caddo times (cf. Bruseth and Perttula 1981; Perttula 1984), and it is expected that the use of non-local lithic raw materials would be relatively extensive in an important site used for civic and ceremonial activities.

THE LITHIC ASSEMBLAGE

The lithic artifact sample from the 1989-1990 excavations at the Hudnall-Pirtle site includes 309 chipped and ground stone tools, 91 cores, and 2770 pieces of lithic debris. The largest numbers of tools, cores, and debris are from, not too surprisingly, the areas of the site where excavations were most intensive: the Well Pad and the Southwest area (Figure 30), modified from the site base map in Bruseth [1991]). About 86% of the site's tools and cores, and 84% of the lithic debris, were recovered in these two excavation areas. The Northwest area contributed about another 7% of the tools and cores and 8% of the lithic debris. The remainder of the lithic assemblage comes from general site shovel testing, limited investigations in Mounds A and F, the monitoring of the pipeline trench between the Well Pad and Mound C, and the Plaza. Plotting the distribution of shovel tests with lithic debris, tools, and cores (see Figure 30) from the site reveal a broad and large circular area with such remains, marking the general extent of the extensive habitation areas outside of the plaza and the ring of mounds. There are apparently more localized areas of habitation deposits amidst Mounds F and H in the southeastern part of the civic-ceremonial center; immediately north of Mound A; and southeast of Mound E.

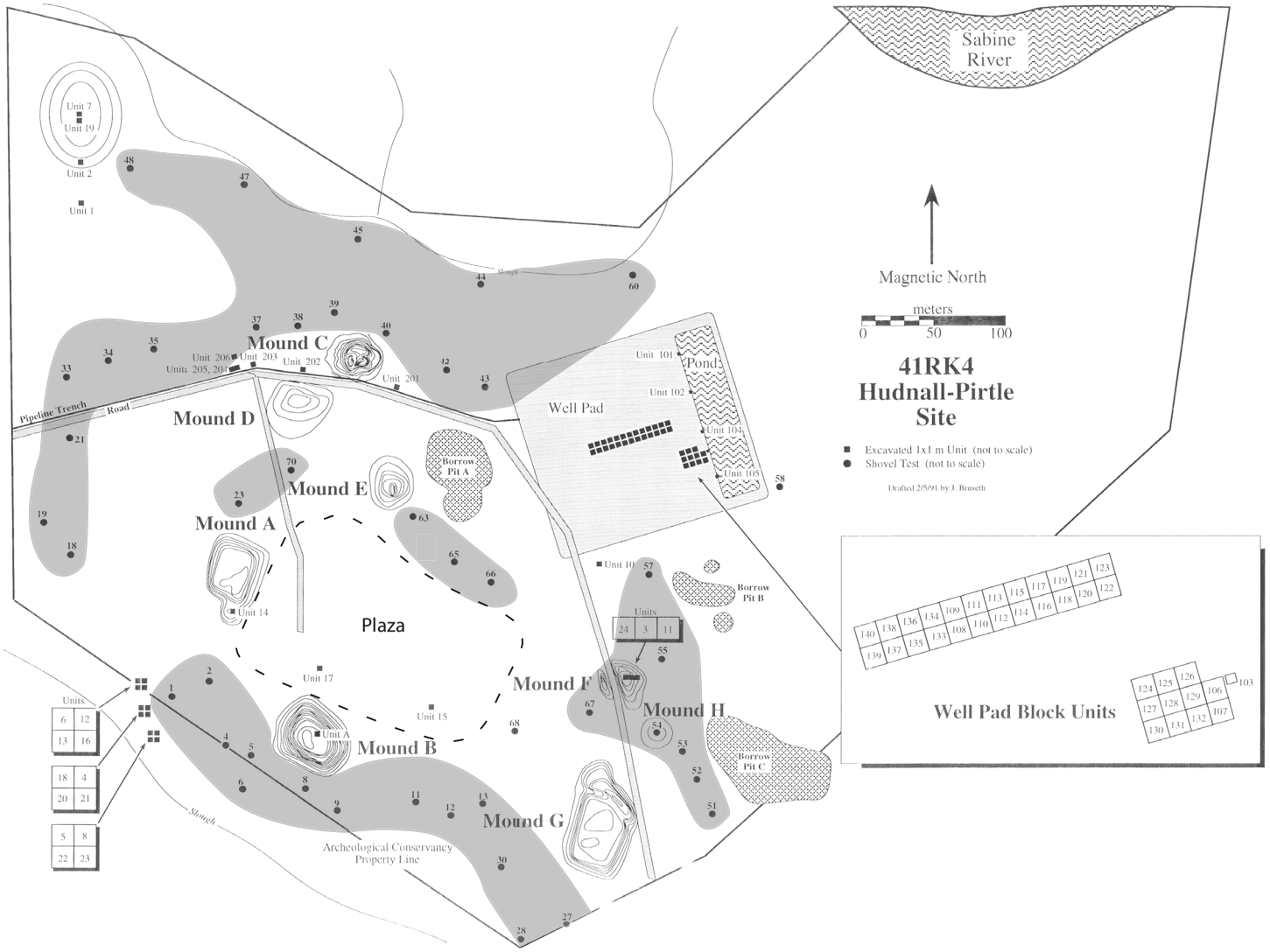

Figure 30. The distribution of shovel tests with lithic debris, cores, and chipped stone tools at the Hudnall-Pirtle site.

Projectile Points

A total of 93 projectile points were recovered from the 1989-1990 test excavations at the Hudnall-Pirtle site. Of the 93 points, only one is identified as a dart projectile point; the others have the size and shape consistent with their use as stone tips for a bow and arrow. Projectile points are common across the site, and were found in all proveniences except Mound F, where archeological materials were rather sparse in any case. They are particularly well represented in the Well Pad excavations, and in the Northwest Area of the site, where they account for between 25% and 38% of the stone tools from those areas, respectively. Almost 48% of the arrow points are fragmentary pieces (i.e., tips, blade mid-section, and stem fragments), apparently the broken fragments of once usable stone tips that were discarded in habitation areas, or were pieces that had become embedded in game animals that were returned to the site for butchering and processing.

Complete and/or near-complete projectile points were grouped into one dart point form class and 13 arrow point form classes. Important characteristics employed to segregate the projectile points includes hafting element (expanding, parallel, contracting, narrow-pointed, and bulbar), basal element (straight, convex, concave), body element (excurvate, incurvate, straight, and recurvate), margin element (none, serrated, upward pointing barbs), and shoulder element (none, barbed, squared, flared).

Dart Point Form 1 (n=1)

Provenience: WELL PAD, Surface

The one dart point is a Woodland period style Kent point (Figure 31a). It has a parallel hafting element and a slightly convex basal element, along with short and square shoulders. Kent points are generally found in Woodland period contexts in northeastern Texas (ca. 500 B.C. to A.D. 700), although not nearly to the same extent as contracting stem Gary dart points (see Rogers et al. 2001).

Arrow point Form 1 (n=1)

Provenience: PIPELINE TRENCH: 201-1

The one arrow point form 1 piece is from an excavation unit along the pipeline trench near Mound. C (see Figure 2). It is a Hayes point, made and used after ca. A.D. 1200 in prehistoric Caddo sites, of a non-local chert. The point has a bulbar hafting element with a convex base and square shoulders.

Arrow point Form 2 (n=6)

Provenience: WELL PAD: 108-1, 109-2, 119-1; SOUTHWEST AREA: 13-3, 18/20-5; NORTHWEST AREA: Shovel Test 34

This arrow point form is present in each of the three habitation areas investigated in 1990 at the Hudnall-Pirtle site. These points belong to the Early Caddoan period Catahoula type, and have broad parallel to expanding stems with distinctive flaring barbed shoulders (see Figure 31b-e and Figure 32n) and resharpened blades. Thirty-three percent of the Catahoula points are made from non-local chert, 50% are on local cherts, and one is made of a fine-grained Ogallala quartzite. Catahoula points are found widely in northeastern Texas Caddo sites (see Prewitt 1995:96).

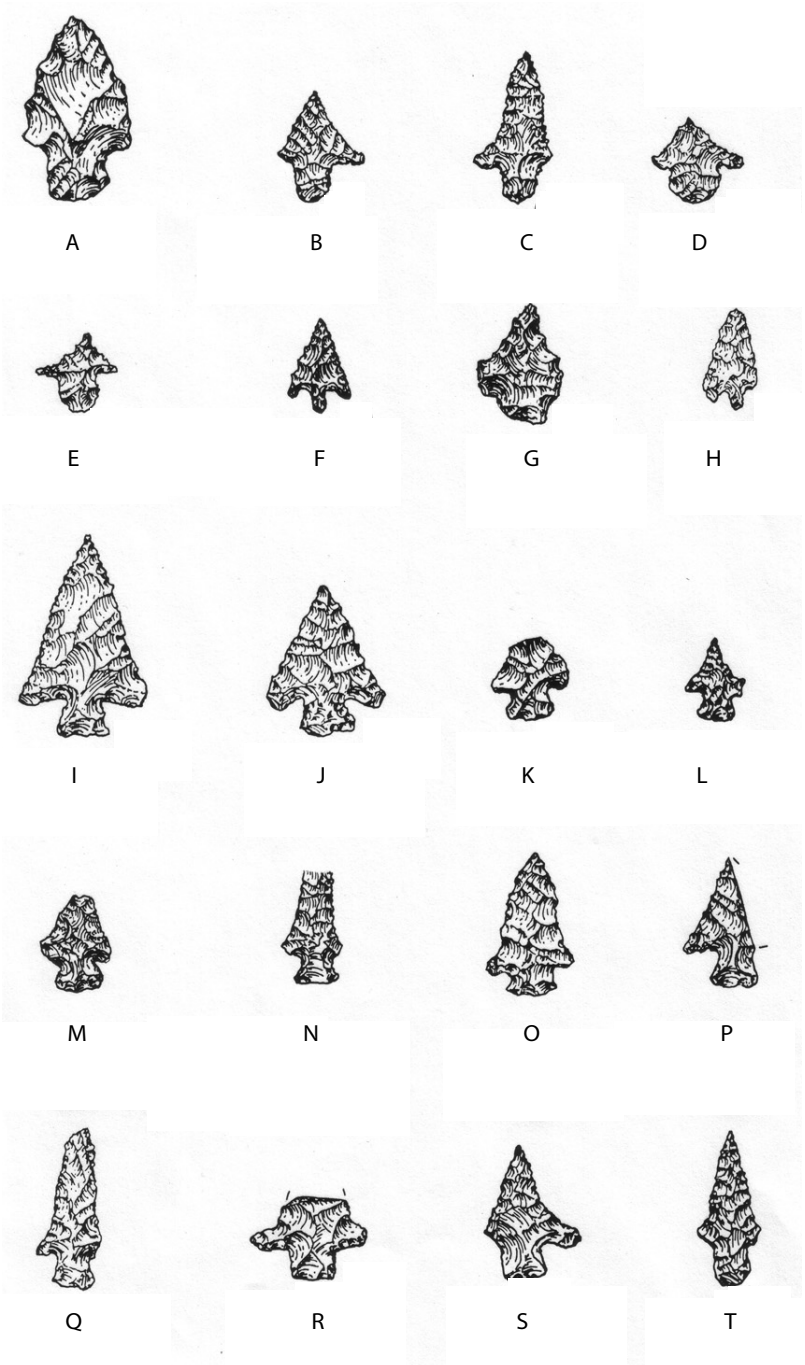

Figure 31. Dart Point Form 1 and Arrow Point Forms 1-9 at the Hudnall-Pirtle site: a, Kent point; b-e, arrow point form 2; f, h, arrow point form 3; g, arrow point form 4; i-j, arrow point form 5; k-m, arrow point form 6; n-q, arrow point form 7; r-s, arrow point form 8; t, arrow point form 9. Provenience: a, Well Pad surface; b, Unit 13, lv. 3; c, ST 34; d, Unit 119, lv. 1; e, Unit 108, lv. 1; f, Unit 101, surface; g, Unit 13, lv. 2; h, Unit 116, lv. 2; i, Unit 13, lv. 3; j, Unit 21, lv. 3; k, Unit 106, lv. 2; l, Unit 134, lv. 3; m, Unit 133, lv. 2; n, Unit 23, lv. 2; o, Unit 107, lv. 2; p, Unit 107, lv. 3; q, Unit 131, lv. 2; r, Unit 5, lv. 2; s, Unit 21, lv. 4; t, Unit 117, lv. 2 .

Arrow point Form 3 (n=2)

Provenience: WELL PAD: 101-0, 116-2

The two arrow point form 3 points have narrow stems with flat bases, and small downward-pointing barbs. One with a parallel stem (see Figure 31f) may be an early version of a Perdiz point, although narrow-stemmed arrow points have been recovered in both Early and Middle Caddoan period sites in the Sabine and Angelina River basins in northeastern Texas (see Perttula and Nelson 2004). This point was made from a non-local chert. The other arrow point form 3 has a narrow contracting stem with small barbs, and may be a Bassett point (see Figure 31h); it is made of local chert. The Bassett point type has been documented in numerous Middle and Late Caddo sites in the general region of the Hudnall-Pirtle site. Thus, the recovery of the two arrow point form 3 points that resemble Perdiz and Bassett points suggests some use of the site after ca. A.D. 1200.

Arrow point Form 4 (n=2)

Provenience: SOUTHWEST AREA: 13-2; PIPELINE TRENCH: 205-5

This arrow point form at the Hudnall-Pirtle site is comparable to the Friley type (see Figure 31g). These have broad contracting stems with a straight base, resharpened blades, and upward-projecting barbs or serrations on the blade. One of the Friley points is made of local chert, and the other is on a non-local chert. Friley arrow points appear to be one of the earliest arrow point styles in northeastern Texas and northwestern Louisiana, and their occurrence at Hudnall-Pirtle is further evidence (along with the recovery of the one Kent dart point) for use of some parts of the site in the latter part of the Woodland period. Such arrow points are believed to have been introduced around ca. A.D. 600/700. At the Browning site (41SM195A), for instance, Friley points were the only form recovered from a midden deposit that has a calibrated (2 sigma) radiocarbon date of AD 625-880 (Walters 2004).

Arrow point Form 5 (n=2)

Provenience: SOUTHWEST AREA: 13-3, 21-3

The arrow point form 5 points are corner-notched points with broad expanding stems and rectangular barbs (Figure 31i-j), and they are identified as Scallorn points. Both are made from local cherts, and are the largest of the several different arrow point forms at the Hudnall-Pirtle site: 29.5 x 21 x 4 mm in mean length, width, and thickness. Scallorn arrow points are one of the earlier arrow point forms in use in northeastern Texas (ca. A.D. 700), and it continued to be used until ca. A.D. 1200. The occurrence of both the Friley and Scallorn points only in the Southwest Village area suggests that the earliest use, probably in Woodland period times, of the site took place in that part of the site.

Arrow point Form 6 (n=4)

Provenience: WELL PAD: 106-2, 133-2, 134-3; NORTHWEST AREA: 19-4

This arrow point form is a small-corner notched point, with a convex base and an expanding stem (see Figure 31k-m). These are Homan points, an Early Caddo arrow point type, found in some quantity at other important

Early Caddoan period mound centers (see Webb and McKinney 1975). Three of the four Homan points are made from local cherts, and the other is on a fine-grained quartzite. In northeastern Texas, Homan arrow points are not apparently common on Caddo sites (cf. Prewitt 1995:111), but Turner and Smith (2003:65) note the recovery of Homan points in an Early Caddoan period component at the Harold Williams site (41CP10) in Camp County, Texas, and Homan points are present in large caches of arrow points in a Early Caddoan period shaft tomb at the Boxed Springs (41UR30) mound center on Big Sandy Creek in the Sabine River basin (Perttula et al. 2000:Figures 13-16).

Arrow point Form 7 (n=5)

Provenience: WELL PAD: 107-2, 107-3, 131-2; SOUTHWEST AREA: 12-5, 13-2

The arrow point form 7 points are Colbert points, which are related morphologically and chronologically to Homan points (see Webb 1963:180), another small expanding stem arrow point type that was made and used in the Early Caddoan period. The Colbert points at the Hudnall-Pirtle site have expanding stems, corner-notches with small barbs, and recurved blades (see Figure 31n-p). Sixty percent are made of local cherts, 20% from a fine-grained quartzite, and one of the Colbert points from the Well Pad area was made of a non-local novaculite.

Arrow point Form 8 (n=3)

Provenience: WELL PAD: 109-2; SOUTHWEST AREA: 5-2, 21-4; NORTHWEST AREA: 7-5

This arrow point form is the first of four slightly different parallel-stemmed arrow points that are considered Alba, including arrow point forms 8-11. This Alba form has a parallel hafting element, a straight base, and flared barbs (see Figure 31r-s). The Alba point is the principal arrow point type in the Early Caddoan period occupation at the George C. Davis mound center (41CE19), where the type was first recognized and defined (Newell and Krieger 1949:161 and Figure 56a-h). It has a wide distribution on prehistoric Caddo sites in northeastern Texas (see Prewitt 1995:89), among them the Boxed Springs mound center in Upshur County, Texas. All three of the arrow point form 8 Alba points are made from local materials: local chert (67%) and fine-grained quartzite (33%).

Arrow point Form 9 (n=7)

Provenience: WELL PAD: 117-2, 118-1, 126-2; SOUTHWEST AREA: 4-1 (2), 20-3; NORTHWEST AREA: Uint 7-6

These Alba arrow points have parallel stems, flat to slightly convex bases, and shorter and rectangular-shaped barbs (see Figure 32a-b, see also Figure 31t). As with arrow point form 8, the blades on both forms have been recurved and resharpened through regular and repeated blade serrations. Shafer (2005:19) has noted that the Alba points at the George C. Davis site often have recurved blades and are often serrated.

About 57% of these Alba points are made on local chert, compared to 14% fine-grained quartzite and 14% petrified wood. One of the arrow point form 9 Alba points from the Well Pad area is made from novaculite.

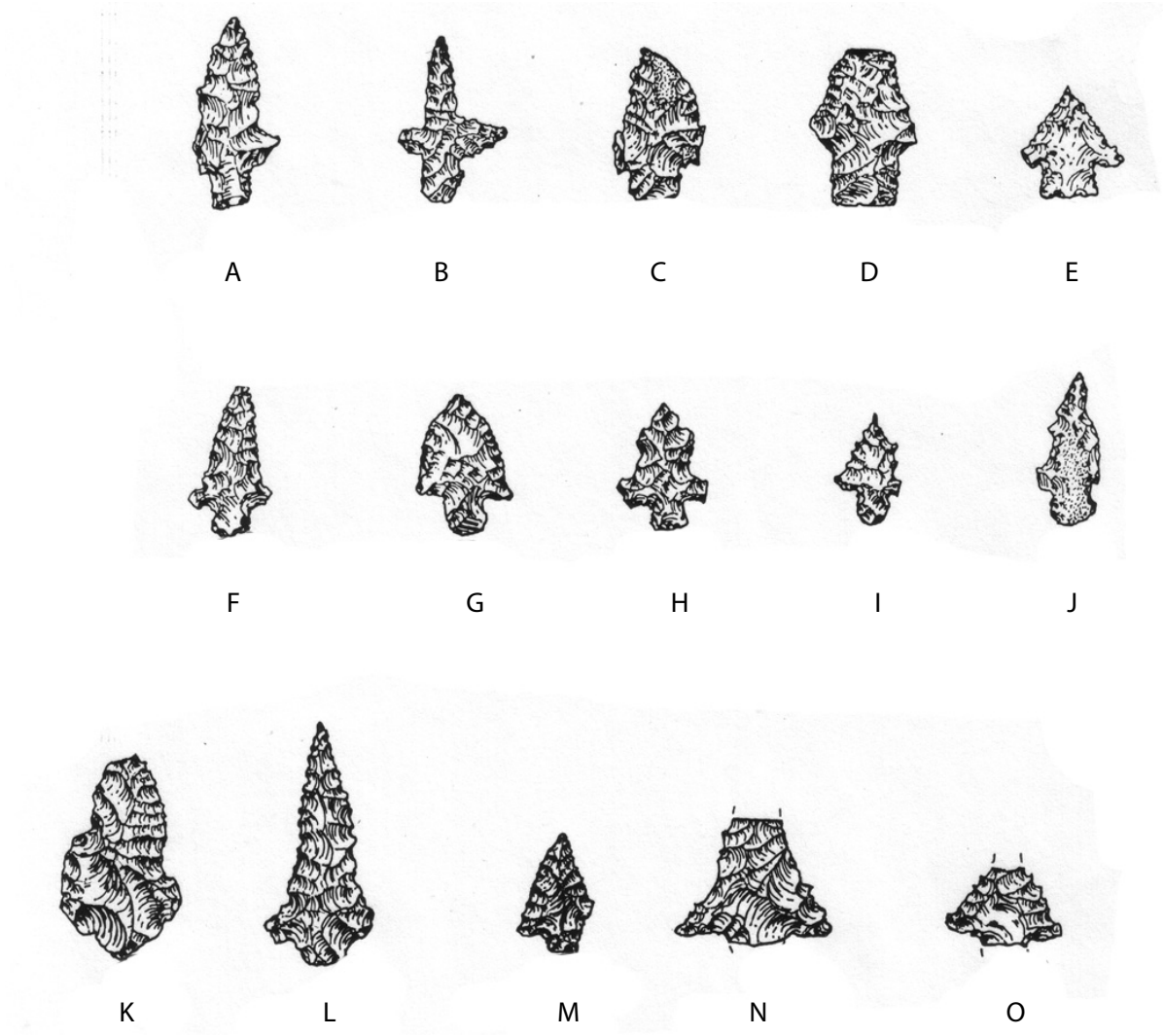

Figure 32. Arrow point forms 2, 9-13 and unidentified forms: a-b, arrow point form 9; c-e, arrow point form 10; f-h, arrow point form 11; i-j, o, arrow point form 12; k-m, unidentified arrow point forms; l, arrow point form 13; n, arrow point form 2. Provenience: a, Unit 118, lv. 1; b, Unit 20, lv. 3; c, Unit 20, lv. 4; d, Unit 6, lv. 3; e, Unit 122, lv. 2; f, Unit 134, Fea. 103; g, Unit 12, lv. 3; h, Unit 119, lv. 2; i, Unit 138, lv. 2; j, Unit 118, lv. 1; k, Unit 18, lv. 4; l, Unit 10, lv. 6; m, Unit 20, lv. 2;

Arrow point Form 10 (n=4)

Provenience: WELL PAD: 122-2, 138-2; SOUTHWEST AREA: 6-3, 20-4

The arrow point form 10 points have broader stems and blades than the other Alba point varieties at the Hudnall-Pirtle site (see Figure 32c-e). They also have smaller rectangular barbs than arrow point forms 8 and 9. Three of the four arrow point form 10 Alba points are made of quartzite—which is very different compositionally than all the other arrow point forms at the site—while one from the Well Pad area was made of novaculite.

Arrow point Form 11 (n=6)

Provenience: WELL PAD: 113-2, 119-2, 134-Feature 103; SOUTHWEST AREA: 12-3; NORTHWEST AREA: 7-4, 19-4

This arrow point form of the Alba type has a squarish-stem with a flat base, recurved blades, and rectangular barbs (see Figure 32f-h). These points are made exclusively from local lithic raw materials, including local chert (67%) and fine-grained Ogallala quartzite (33%).

Arrow point Form 12 (n=5)

Provenience: WELL PAD: 118-1, 138-2; SOUTHWEST AREA: 6-2, 6-8, 7-5

Arrow point form 12 points belong to the Steiner type. They have rectangular to slightly expanding stems, small and upward-projecting barbs, and projecting spurs or barbs on the arrow point blade (see Figure 32i-j, o). A few Steiner points made from petrified wood were recognized in the Early Caddoan period component at the George C. Davis site (Newell and Krieger 1949:162, 164 and Figure 56o-q), and since then, they have been widely recovered in ca. A.D. 800-1200 Caddo components in northeastern Texas and farther west on non-Caddo sites in east central and north central Texas (see Prewitt 1995:131).

The Steiner arrow points from the Hudnall-Pirtle site are made from local lithic raw materials. This includes local chert (60%) and fine-grained Ogallala quartzite (20%); one of the points is made from a chert of unknown source.

Arrow point Form 13 (n=1)

Provenience: NEAR WELL PAD: 10-6

The one arrow point form 13 specimen has a broad contracting stem and broad-rectangular shoulders and barbs (see Figure 32l); it is made from a non-local chert. The long blade has been resharpened. This particular form, were it not for the contracting stem, could well be assigned to the Catahoula type simply on the basis of the broad and somewhat flaring barbs. It is found in Unit 10 near the Well Pad (see Figure 2), and arrow point form 2 Catahoula points are also relatively common in this area of the Hudnall-Pirtle site.

Unidentified Form (n=3)

Provenience: SOUTHWEST AREA: 18-4, 20-2, 20-3

All three of the arrow points of unidentified form are from the Southwest Village area. They have contracting stems of various widths, with a convex base, and squared shoulders (see Figure 32k, m). One has a long and recurved blade (see Figure 32k), but with fractures along the basal margin. One other has a short stem with small barbs, and resembles other small contracting stem arrow points from Early Caddoan context (ca. A.D. 900-1000) at the Broadway site (41SM273) in the Angelina River basin (see Perttula and Nelson 2004:Figure 61d and Figure 62h).

Two of the unidentified arrow point forms are made on local chert, and the third is made from petrified wood.

Arrow point Base Fragments (n=9)

Provenience: WELL PAD: 123-2, Surface; SOUTHWEST AREA: 6-2, 13-2, 16-1; NORTHWEST AREA: 7-5, 7-7, 19-4; PIPELINE TRENCH: 202-1

The arrow point base fragments are found in various habitation areas at the Hudnall-Pirtle site, and each was presumably discarded in domestic contexts after an arrow point had been broken during use. One of the base fragments was made of a non-local chert, and others are made from fine-grained quartzite (44%) and local chert (33%); one other was made of a chert from an unknown source.

Arrow point Mid-section/Blade (n=12)

Provenience: WELL PAD: 113-2, 120-2; SOUTHWEST AREA: 4-1, 4-3, 6-4, 6-7, 13-3, 18-1, 23-1, 23-2; NORTHWEST AREA: 19-4; NEAR MD. G: Shovel Test 30

The 12 arrow point mid-section/blade fragments are found predominately in the Southwest Village area (67%), and all are made of apparently local lithic raw materials, including local chert (33%) and fine-grained quartzite (33%); the remainder are on cherts from unknown sources.

Arrow point Tip (n=20)

Provenience: WELL PAD: 10-8, 107-3, 107-4, 112-1 (2), 120-2, 122-2, 126-2, 133-1, 133-2, 136-2, 139-1; SOUTHWEST AREA: 6-2, 6-4, 8-1, 13-3; NORTHWEST AREA: 19-1, 19-3; MD. A: 14-9; MD. H: Shovel Test 54

Arrow point tips are particularly common in the Well Pad excavations (60%). Only two (10%) are made from non-local lithic raw materials (non-local chert in the Md. A specimen and novaculite in the arrow point tip from Unit 136 in the Well Pad area), while most of the remainder are on local cherts and quartzite.

Summary of the Arrow points

There is a good bit of formal diversity in the arrow point styles at the Hudnall-Pirtle site, and 10 different arrow point types are recognized in the chipped stone tool assemblage. About 13% of the arrow points and arrow point fragments are made from non-local lithic raw materials, including novaculite and various non-local cherts; no Manning Formation lithic materials (i.e., baked tuff and Manning Fused Glass) were represented in the arrow point assemblage from the site.

The three main habitation areas (Well Pad, Southwest Village, and Northwest area) each have examples of the main arrow point types—Catahoula, Alba, and Steiner—and it seems to be the case that these habitation areas were occupied contemporaneously in the Early Caddoan period (ca. A.D. 1000-1200, and perhaps slightly earlier). Alba points comprise almost 42% of the typeable arrow points, followed by Catahoula (12.5%), Steiner (10.4%), and Colbert (10.4%) types; the Colbert points are absent from the Northwest area. An earlier use of the Hudnall-Pirtle site (i.e., before A.D. 900) may be marked by the

recovery of a few Friley and Scallorn arrow points from the Southwest Village area, while single possible examples of Perdiz and Bassett points from the Well Pad area hint of limited use of the site sometime after ca. A.D. 1200.

Other Bifacial Tools

There are 39 other bifacial tools in the stone tool assemblage from the Hudnall-Pirtle site. Included in the other bifacial tools are bifacial tool fragments, unidentified bifacial fragments from pieces that appear to have been completed, thick bifaces or preforms, arrow point preforms, and large hafted bifaces.

Bifacial Tool Fragments (n=10)

Provenience: WELL PAD: 10-15, 106-7, 118-2, 135-2, 138-2; SOUTHWEST AREA: 4-5, 5-2, 12-5, 16-2, 18-3

The bifacial tool fragments are the remnants of various-sized completed bifacial tools (Figure 33e and Figure 34a). Only one of the tool fragments has cortical remnants and 60% have obvious signs of either unifacial or bifacial use wear. These tools are probably broken pieces of formal hafted tools of different sorts. Thirty percent of the bifacial tool fragments are made from a fine-grained quartzite, and a similar percentage is on local cherts. Other lithic raw materials include petrified wood (10%) and novaculite (10%); 20% are on cherts from unknown sources.

The bifacial tool fragments average 21.2 mm in width and 5.1 mm in thickness, although two of them (both with use-wear) are slightly larger and thicker hafted tools, with a mean thickness of 7.5 mm.

Unidentified Bifacial Fragments (n=9)

Provenience: WELL PAD: Surface, 119-2, 121-2; SOUTHWEST AREA: 8-1, 12-5, 16-6, 18-6; NORTHWEST AREA: 7-6; PIPELINE TRENCH: 0-0-377 (trench monitoring)

The unidentified bifacial fragments are not from completed tools, as none of them have any evidence of use-wear and 33 percent still have cortical remnants on one or both faces. They are an average of 20.1 mm in width and 5.9 mm in thickness, not much different than the hafted bifacial tools, but 3.5 mm thinner than the thick bifaces or bifacial preforms. The unidentified bifacial fragments apparently represent broken and discarded bifaces that were being manufactured on site, and were nearing completion when they were broken.

More than 55% of the unidentified bifacial fragments are on local quartzites, particularly the fine-grained Ogallala quartzite (n=4 pieces). Two other fragments are on local cherts, a third is made from hematite, and one other is on chert from an unknown source.

Thick Bifaces or Preforms (n=8)

Provenience: WELL PAD: 108-1, 136-1 , Surface; SOUTHWEST AREA: 6-5, 8-1, 16-4 (2); NORTHWEST AREA: 7-5; PIPELINE TRENCH: 202-9

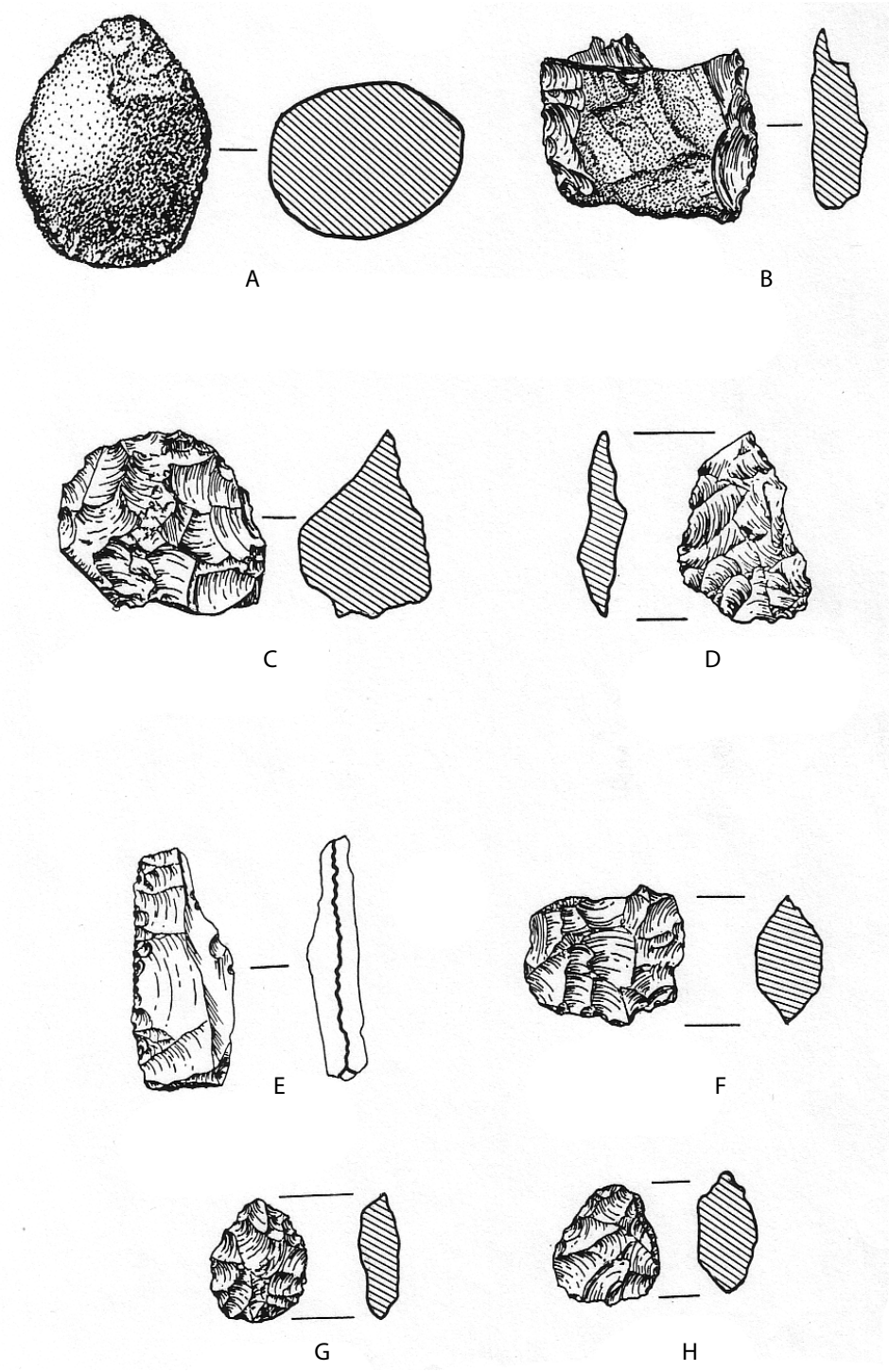

Figure 33. Bifacial tools and preforms and other lithic artifacts: a, hammerstone; b, f, h, biface preform; c, bifacial core; d, g, arrow point preform; e, bifacial tool fragment. Provenience: a, Unit 20, lv. 4; b, Unit 108, lv. 1; c, Unit 135, lv. 2; d, Unit 18/20, lv. 5; e, Unit 12, lv. 5; f, Unit 7, lv. 5; g, Unit 106, lv. 4; h, Unit 6, lv. 5.

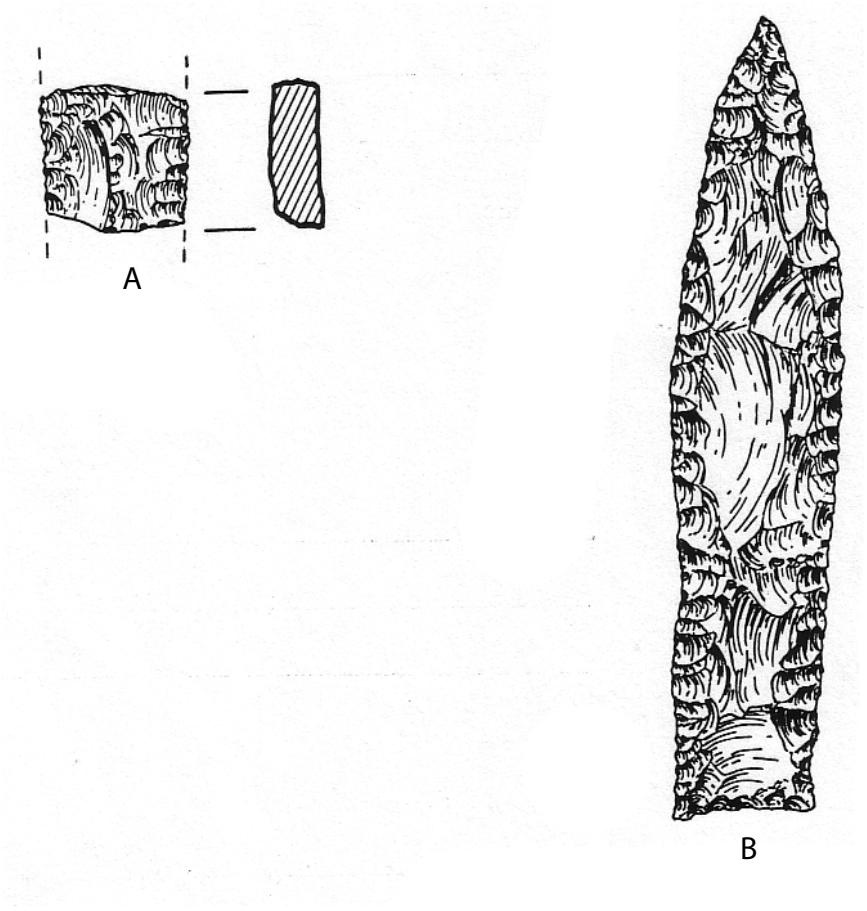

Figure 34. Hafted bifacial tools: a, bifacial tool fragment; b, hafted biface, Gahagan biface. Provenience: a, Unit 16, lv. 2; b, Pipeline trench near Md. C.

The eight thick bifaces (mean thickness of 9.4 mm) from the Hudnall-Pirtle site are preforms rather than finished tools, and were shaped using a combination of hard hammer and soft hammer flaking (see Figure 33b, f, and h). Fifty percent of the preforms still have cortical remnants, and only 22% have not been broken during manufacture. The two complete preforms are oval-shaped, and small in size (24-28 mm in length and 20-22 mm in thickness), but still rather thick in cross-section (see Figure 33f, h), suggesting they may have been intended for use as arrow points but could not be further thinned before they were discarded.

Half of the preforms were made from petrified wood. Another 25% were made of local quartzite, one other was made of local chert, and the final thick biface was made of a Manning Formation chert with a pink-colored cortex.

Arrow point Preforms (n=10)

Provenience: WELL PAD: 106-4, 113-2, 123-2, 135-2; SOUTHWEST AREA: 4-1, 4-5, 18/20-5; NORTHWEST AREA: 7-8, 19-4; MD. A: 14-1

The arrow point preforms are bifacially-chipped ovoid-shaped tools (see Figure 33d, g) that were eventually meant, upon the shaping of a stem, for use on stone-tipped bow and arrows. Their recovery in various contexts at the Hudnall-Pirtle site indicates that arrow points were commonly manufactured by the Caddo inhabitants.

Only 40% of the arrow point preforms are not broken, and these average 23.5 mm in length, 14.3 mm in width, and 3.8 mm in thickness; none have any signs of use-wear. The broken arrow point preforms (including one with cortical remnants) are considerably wider (18.3 mm) and thicker (5.2 mm) than the completed preforms, suggesting they were broken during their attempted thinning and shaping.

Forty percent of the arrow point preforms are made from a fine-grained Ogallala quartzite, and 30% are of local cherts. Two others are made from petrified wood and a chert from an unknown source. One of the preforms is made of novaculite.

Hafted Bifaces (n=2)

Provenience: PIPELINE TRENCH: 0-0-263, 0-0-380

The two hafted bifaces were found during the monitoring of the pipeline trench near Md. C. Both are large and expertly-chipped hafted tools (see Figure 34b) made from non-local chert, in this case a dark brown Edwards chert from the Central Texas region; the hafted bifaces were likely made in the Central Texas region and traded to the Caddo. The blade on the one complete hafted biface is slightly re-curved, perhaps to facilitate hafting, and the base is also only slightly concave (see Figure 34b); there is use-wear on the blade, probably from use in cutting/sawing fairly durable materials. It is 103 mm in length, 23 mm in width, and only 5 mm thick.

The two hafted bifaces from the Hudnall-Pirtle site are probably Gahagan bifaces (see Shafer 1973:224-231 and Figure 19a-v). The one complete specimen is about the same mean length and thickness as the Gahagan bifaces from the George C. Davis site, but considerably narrower in width; the mean blade width on the George C. Davis Gahagan bifaces is 36 mm (Shafer 1973:229).

Unifacial Tools

Unifacial chipped stone tools are the most common type of stone tools at the Hudnall-Pirtle site. The 164 unifacial stone tools from the site comprise approximately 41% of the total tool assemblage. The well pad excavations recovered the largest proportional sample, as 50% of the 154 stone tools from this area were identified as unifacial tools.

The edge-modified piece is the dominant unifacial tool in the assemblage (n=109), accounting for 66.5% of the sample. Retouched or shaped pieces (11.6%), and edge-modified piece/gravers (6.1%) are also well represented at the Hudnall-Pirtle site. About 20% of the unifacial tools are made on non-local lithic raw materials, including novaculite (4.3%), Manning Formation cherts and baked tuff (2.4%), and various non-local cherts (14.0%). Of the different unifacial tool types with more than one specimen, the edge-modified pieces have the highest proportion of non-local lithic raw materials at 24.8%, followed by 15.8% for retouched pieces.

Edge-modified piece (n=109)

Provenience: WELL PAD: 10-6, 10-11, 101-ALL, 102-0-6 (2), 103-0-7, 106-2, 107-2, 108-1, 108-2B, 109-2, 110-1, 110-2, 112-2, 113-1 (2), 114-1, 114-2, 115-2 (3), 116-1, 116-2 (3), 118-1, 118-2, 119-1, 119-2 (2), 120-1, 120-2, 121-1, 122-1, 123-2 (2), 124-2, 125-2, 125-4 (2), 126-2, 126-3, 127-2, 129-2, 133-2, 135-1, 135-2, 136-2, 137-2 (3), 138-2 (3), 139-3 (2), 140-2; SOUTHWEST AREA: 4-6, 4/18/20/21-6, 5-3, 6-2, 6-4, 8-1 (2), 12-1 (2), 12-3 (2), 12-5 (3), 13-1, 13-3 (4), 16-2 (3), 16-4, 16-6 (2), 18-3, 18/20-5 (2), 20-2, 20-3 (2), 20-4, 21-0, 21-2 (3), 21-4, 21-5, 22-2/3, 23-1 (2), 23-2 (2); NORTHWEST AREA: 7-6, 7-11; MD. A: 14-9, 14-11, 14-12; NEAR MD. B: Shovel Test 7, Shovel Test 8; PIPELINE MONITORING: 0-0-372

The edge-modified piece is a lithic flake or chip with an overlapping set of small flake removals or step fractures (Figure 35d, f, k-l, n) caused by use rather than intentional modification through shaping by retouch. Seven of the edge-modified pieces are on expediently produced blades (see Figure 35d-e, l). The most common locations for use wear on these flake tools is either on one lateral edge (45%, see Figure 35e) or on the distal flake edge (22%). Another 12% have bilateral use-wear (see Figure 35k), and 11% are edge-modified on distal and lateral edges. About 5.5% have alternate retouch (see Figure 35d), and the remainder (4.6%) have both distal and bilateral use-worn areas (see Figure 35n).

Almost 46% (n=50) of the edge-modified pieces are on local cherts, and 11% are on local quartzite raw materials; 3.7% are on petrified wood, and 0.9% are on hematite. Other common local lithic materials among the edge-modified pieces include chalcedony (11%). Edge-modified pieces on non-local raw materials are relatively abundant, and include novaculite (6.4%), various non-local cherts (15.6%), and various materials from the Manning Formation (including Manning Fused Glass, baked tuff, and a chert with a thick pink cortex); the latter comprise 2.7% of the edge-modified pieces. Finally, 2.7% are on cherts from unknown sources.

Edge-modified piece/graver (n=10)

Provenience: WELL PAD: 120-2, 128-2, 134-2, 135-2, 139-2, 140-1; SOUTHWEST AREA: 5-2, 13-1; NORTHWEST AREA: Shovel Test 34; MD. F: 11-2

Ten edge-modified pieces also have a graver tip (see Figure 35c, i); the graver tip is along the terminus of the area of edge modification/use-wear. These are along the lateral edges of the flake tool (20%), as well as distal/bilateral (30%, see Figure 35c), distal/lateral (20%, see Figure 35i), bilateral (20%), and alternate/distal (10%). Sixty percent of the edge-modified/graver tools are on local cherts and 20% are on quartzite; the others are made from cherts from an unknown source.

Edge-modified piece/perforator (n=1)

Provenience: WELL PAD: 133-2

One edge-modified flake tool also has a unifacially flaked perforator on its distal edge. The tool (20 x 7 x 3 mm in length, width, and thickness) is made from a non-local chert. The edge-modified portion of the piece has bilateral use-worn areas.

Retouched or shaped piece (n=19)

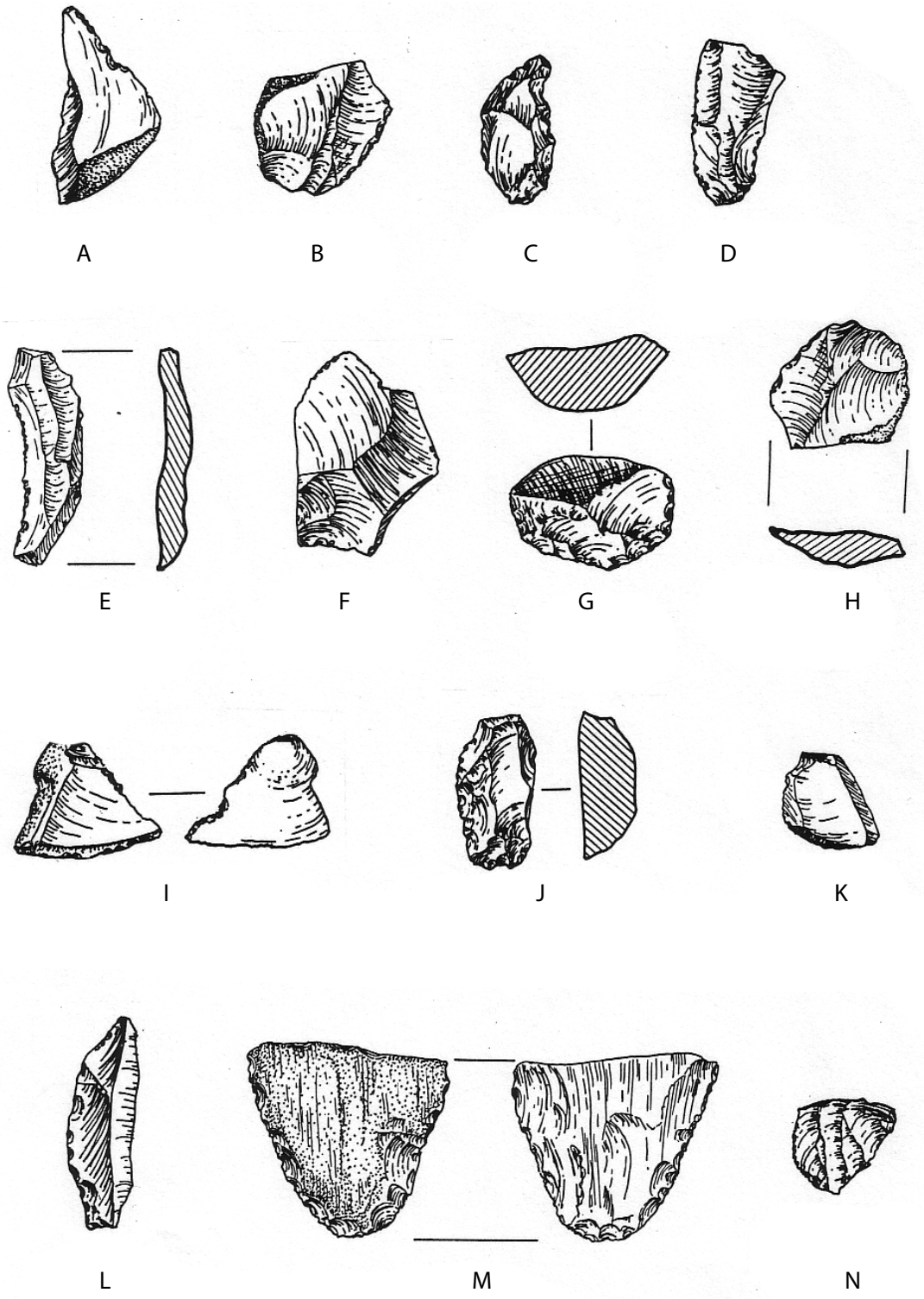

Figure 35. Unifacial tools from the Hudnall-Pirtle site: a, perforator; c, i, edge-modified piece/graver; d, f, k-l, n edge-modified piece; e, edge-modified piece/blade; g-h, j, retouched piece; m, side scraper. Provenience: a, Unit 6, lv. 2; c, Unit 128, lv. 2; d, Unit 21, lv. 2; e, Unit 13, lv. 3; f, Unit 21 surface; g, Unit 13, lv. 5; h, Unit 20, lv. 4; i, Unit 13, lv. 1; j, Unit 135, lv. 1; k, Unit 16, lv. 2; l, Unit 21, lv. 5; m, Unit 4, lv. 5; n, Unit 136, lv. 2.

Provenience: WELL PAD: 106-2, 109-2, 114-1, 115-2, 118-2, 120-1, 137-2; SOUTHWEST AREA: 4-4, 4-5, 6-4, 8-1, 18-3, 20-3, 20-4 (2), 21-5; NORTHWEST AREA: 7-13; NEAR MD. G: Shovel Test 28; PIPELINE MONITORING: 0-0-376

The retouched pieces are flake tools with deliberately shaped working edges; the edges are shaped by careful unifacial pressure flaking (see Figure 35g-h, j). Most of the retouched pieces have distal retouch (37%, see Figure 35h), suggesting use in scraping/shaving tasks, along with lateral (26%), bilateral (16%, see Figure 35g, j), distal and lateral (11%), and alternate retouch (5%); the latter tool was on a blade.

More than 10% of the retouched pieces are on non-local chert, and one other is on a Manning Formation chert with a thick pink cortex. Almost 32% are made from local chert; 16% are on quartzite; 11% are on petrified wood; 21% are on chalcedony; and one retouched piece is made from a chert of unknown source. The retouched pieces range in size from 16-48 mm in length, 11-40 mm in width, and 2-10 mm in thickness. Four of the retouched pieces are distinctly larger in size than the others (i.e., mean length of 34.8 mm, mean width of 25.0 mm, and 8.5 mm thick), and have more effective retouched and use-worn areas than the much smaller retouched pieces.

Perforator (n=3)

Provenience: WELL PAD: 118-2; SOUTHWEST AREA: 6-2, 18-3

The unhafted perforating tools have unifacially chipped projections or bits (Figure 36b; see also Figure 35a), on flakes, that would have been useful in piercing and punching various durable materials, such as hides or wood. They are made on local cherts, and range from 21-32 mm in length, 10-22 mm in width, and 2-6 mm in thickness along the unifacial bit.

Graver (n=2)

Provenience: SOUTHWEST AREA: 6-4, 18-4

The graving tools have small projections on either lateral or distal edges of otherwise unmodified flakes. Both of the gravers from the Hudnall-Pirtle site are made on local cherts. The tools are 16-18 mm in length, 10-11 mm in width, and 2-3 mm in thickness.

Drill (n=2)

Provenience: WELL PAD: 138-2; SOUTHWEST AREA: 20-4

The two bifacially-chipped drills (see Figure 36a) are from habitation areas at the Hudnall-Pirtle site. Both drills have use-wear along distal and bi-lateral edges of the flake tools, and they are made on a coarse-grained quartzite and a local chert. They range from 13-27 mm in length, 13-16 mm in width, and they are 4 mm thick along the drill bit.

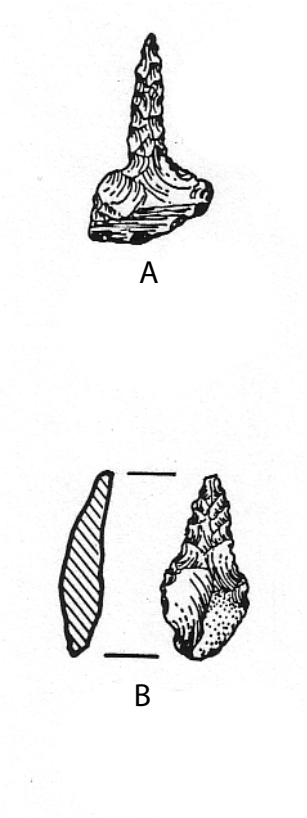

Figure 36. Drill and perforator from the Hudnall-Pirtle site: a, drill; b, perforator. Provenience: a, Unit 20, lv. 4; b, Unit 118, lv. 2.

Denticulate (n=5)

Provenience: WELL PAD: 114-1; SOUTHWEST AREA: 4-6, 6-4, 8-1, 12-5

Five flake tools—mostly from habitation contexts in the Southwest Village area—have an irregular serrated or denticulated working edge. The area(s) of modification includes lateral (40%), bilateral (20%), distal (20%), and distal/bilateral (20%). The distally worked denticulate is made from a non-local chert, while the others are all made from local cherts. In size, the denticulates range from 10-21 mm long, 6-13 mm wide, and 2-5 mm thick.

End Scraper (n=6)

Provenience: WELL PAD: 111-2 (3), 114-2; SOUTHWEST AREA: 4-3, 21-5

The end scrapers have steep chipped working edges along the distal edges of the tool; the working edge is unifacial and the remainder of the flake tool is only marginally retouched, probably because these tools were not hafted. The end scrapers were made of fine-grained quartzite (n=2), local chert (n=1), non-local chert (n=1), Manning Formation chert (n=1), and a chert from an unknown source. These tools are 16-30 mm in length, 13-28 mm in width, and 3-8 mm in thickness; the range in size and thickness suggests that the Caddo peoples at Hudnall-Pirtle may have been using two different sizes of end scrapers in various scraping tasks.

Side Scraper (n=5)

Provenience: WELL PAD: 137-2; SOUTHWEST AREA: 6-5, 12-3, 21-2; NORTHWEST AREA: 7-7

The side scraping tools have retouched edges with evidence of use-wear along one or more lateral edges of variously-shaped flakes (see Figure 35m); none are obviously hafted tools. Sixty percent are made on either fine-grained Ogallala quartzite or coarse-grained quartzite, another is on chalcedony, and one is on a non-local chert; the more durable nature of the quartzite raw material would be well-suited to heavy-duty scraping of hides. The side scrapers range from 18-23 mm in length, 10-17 mm in width, and 2-6 mm thick.

End/Side Scraper (n=1)

Provenience: SOUTHWEST AREA: 13-5

The one end-side scraping tool has steeply retouched and use-worn areas along both distal and lateral edges of a medium-sized and otherwise unmodified flake of coarse-grained quartzite. The tool is 24 x 21 x 9 mm in length, width, and thickness.

End Scraper/Graver (n=1)

Provenience: SOUTHWEST AREA: 18/20-5

One of the end scrapers from the site also has a graver spur on the distal working edge of the tool. It is made from a local chert, and measures 14 x 18 x 5 mm in length, width, and thickness.

Ground stone Tools

The majority of the 14 ground stone tools from the Hudnall-Pirtle site were recovered in the test excavations in the Well Pad (n=5) and Southwest Village areas (n=6). Single ground stone tools were also found in the Northwest area of the site, in Mound A, and in the vicinity of Mound C during trench monitoring. Eight different types of ground stone implements have been identified in the small assemblage, including (in the order of their frequency): grinding slabs, mano/pitted stones (single pitted facet), mano/pitted stones (multiple pitted facets), hammerstone, celts, paint palette, pitted stone (multiple facets), and an abrader.

Grinding Slabs (n=4)

Provenience: WELL PAD: 103-1, 132-2; SOUTHWEST AREA: 12-3; Trench Monitoring in vicinity of Md. C

Grinding slabs are flat slabs of locally available ferruginous sandstone or hematite that have been worn on one or both sides of the slab during the grinding and/or pulverizing of plant materials (including seeds) to create a smooth surface that ranges from flat to dish-shaped across the majority of the slab surface. Only one of the grinding slabs is complete (from the Southwest Village area), and it is 119 mm in length, 62 mm in width, and 12 mm in thickness. With the exception of the 36 mm thick grinding slab from Unit 103 at the Well pad (103-1-266), the other fragmentary slabs range between 6 and 12 mm in thickness.

Mano/Pitted Stone (single pitted facet) (n=2)

Provenience: SOUTHWEST AREA: 8-1, 12-2

These ground stone tools were multi-functional implements shaped by pecking from cobble-sized pieces of ferruginous sandstone. Both tools have flat and well-worn facets on both sides of the cobble where they had been worn down from grinding abrasive materials (i.e., seeds and other plant materials) on a larger slab, and the edges appear to have also been used for pounding actions. A single small circular depression or pit occurs on one facet of the manos.

Mano/Pitted Stone (multiple facets with pits) (n=2)

Provenience: WELL PAD: Surface; SOUTHWEST AREA: Shovel Test 1

Two ferruginous sandstone manos have small circular depressions or pits on both faces of the tool (Figure 37b). Both faces had also been well-ground from use on a larger slab. The two mano/pitted stone tools range from 75-127 mm in length, 69-113 mm in width, and 42-49 mm in thickness, and are quite a bit larger than the mano/single pitted stone (i.e., 41-71 mm in length, 40-62 mm in width, and 16-39 mm in thickness), suggesting the mano/pitted stone tool classes were put to different uses by the Caddo peoples at the Hudnall-Pirtle site. Perhaps the small mano/pitted stone tools were used to more frequently grind seeds, while the larger mano/pitted stones with multiple pits were used to grind seeds, other plant materials such as maize, and also repeatedly crush hickory and pecan nutshells.

Hammerstone (n=1)

Provenience: SOUTHWEST AREA: 20-4

The hammerstone is made from a piece of coarse-grained quartzite (see Figure 33a). It has crushing marks and irregular flake removals on both end of the cobble, the result of striking resistant lithic materials in the process of core and tool reduction activities. Most of the surface of the 43 mm long hammerstone is covered with cortex.

Celt (n=2)

Provenience: MD. A: 14-10; WELL PAD, no provenience

The first celt came from occupational deposits in lv. 10 (90-100 cm bs), immediately beneath Mound A mound fill. The celt fragment (23 mm thick) was made from hematite and had been well polished on all surfaces (see Figure 37c). It apparently was broken during use rather than manufacture—given the finished appearance of the tool—and discarded in a habitation area that was eventually covered by the construction of the Mound A platform.

The second celt is a large hematite celt recovered from the Well Pad area, although its specific provenience is not known. This celt (Figure 38) was smoothed to polished on both surfaces (although the surface is cortex), and there are hard hammer flake scars on both faces, evidence of the shaping of the hematite cobble.

The bit on the celt is polished and bifacial, with a bit width of 69.0 mm, and a bit length (i.e., the extent of polishing on the tool's surface at the bit itself) ranges from 11.8-25.1 mm. There is discontinuous polish on both surfaces that extend a few mm farther down the tool's face. The celt is 140.0 mm in length, 73.6 mm wide, and 35.8 mm thick.

Paint Palette (n=1)

Provenience: WELL PAD: 118-1

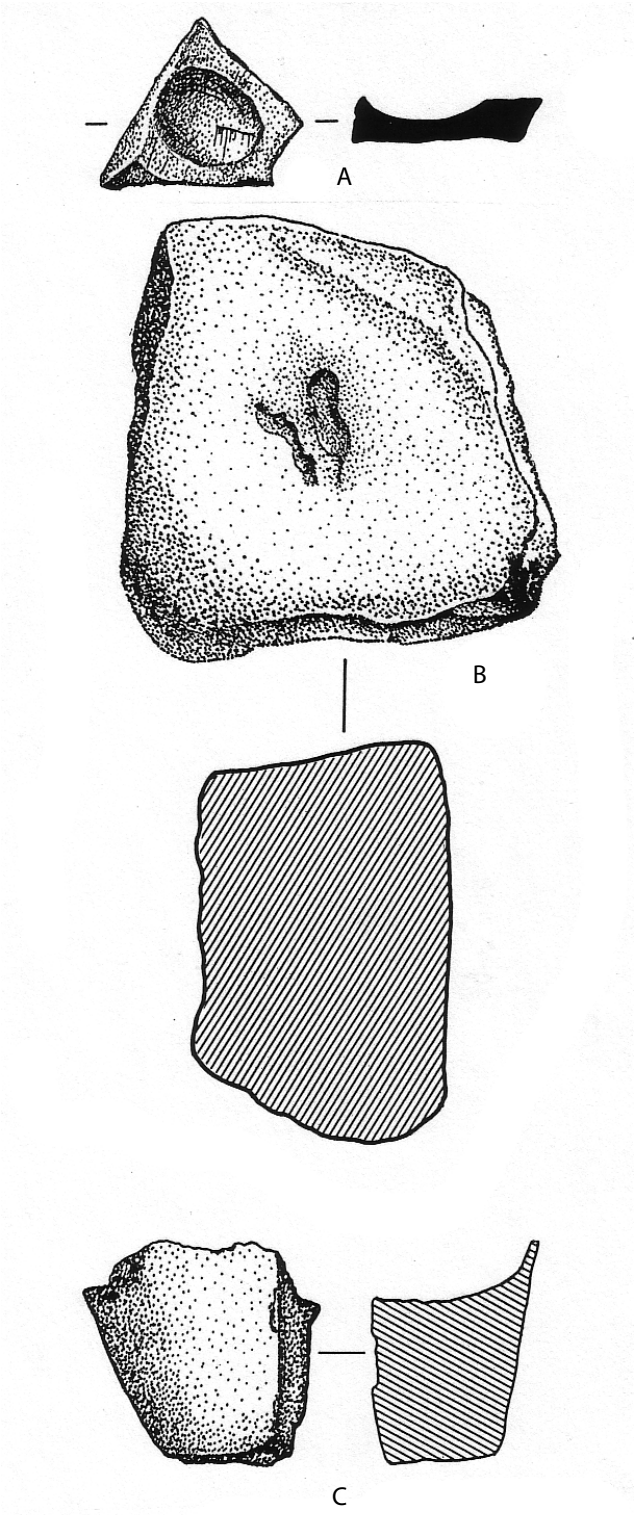

Figure 37. Ground stone tools from the Hudnall-Pirtle site: a, paint palette; b, mano/pitted stone; c, celt fragment. Provenience: a, Unit 118, lv. 1; b, ST 1; c, Unit 14, lv. 10.

The small paint palette is made from a piece of red ochre or hematite (see Figure 37a). The palette is 33 x 20 x 7 mm in length, width, and thickness. It had been scraped and smoothed on both sides of the cube-shaped piece, with a shallow circular depression on one side of the palette. This depression is an area where pieces of red ochre were scraped and removed for use as pigments and paints.

Pitted Stone (n=1)

Provenience: SOUTHWEST AREA: 18-3

The ferruginous sandstone pitted stone is an otherwise unmodified piece of coarse-grained stone that has a central pit or depression on one face of the tool. The pitted stone is 69 x 55 x 45 mm in length, width, and thickness.

Abrader (n=1)

Provenience: NORTHWEST AREA: 2-8

The one hematite or red ochre abrader fragment has several grooves or abraded lines on one side of the tool. The abrading marks may be the result of the use of the piece to smooth and abrade other tools, or, probably more likely, the abraded lines are the remnants of scraping and removal of pieces of red ochre for pigments and paints.

Cores

A total of 91 cores were recovered from the Hudnall-Pirtle site, primarily from the Southwest area, the Well Pad, and the Northwest area excavations. Proportionally, cores were most frequent in the Southwest area (30.8% of the tools) and the Northwest area (26.9% of the tools). These areas typically also have the highest densities of lithic debris and bifacial tools (especially broken tools and thick bifaces/preforms), which appears to indicate that the on-site production of chipped stone

Figure 38. Large hematite celt from the Well Pad area.

tools through core reduction was one of the more common activities which occurred in those areas during the Early Caddoan period occupation of the site.

Eight core types were defined from the Hudnall-Pirtle site, including: tested cobbles, split cobble, single-platform flake, multiple-platform flake, bifacial, bipolar, core fragments, and battered. Core fragments, single-platform flake cores, and split cobble cores are the three most common core types at the site, although core fragments were most common in the Southwest area, tested cobbles were predominant in the Northwest area, and a variety of core types were present in the Well Pad excavations.

Tested Cobbles (n=10)

Provenience: WELL PAD: 113-2, 117-1, 123-2, 124-1; SOUTHWEST AREA: 4-4, 18-4, Shovel Test 2; NORTHWEST AREA: 2-6, 7-13 (2)

The tested cobbles are small cobbles of local raw materials that have had one to a few flakes removed by hard hammer flaking, presumably to determine the worthiness of the raw material for further knapping/reduction. Sixty percent of the tested cobbles are of local chert, followed by quartzite (30%) and chalcedony (10%).

Split Cobbles (n=13)

Provenience: WELL PAD: 106-2, 111-1, 0-0-318; SOUTHWEST AREA: 4-5, 8-1, 13-2, 18-6, 21-0, 21-4, 21-5; NORTHWEST AREA: 7-7, 7-13; NEAR BORROW PIT B: Shovel Test 56

The split cobbles are also generally small pieces (ranging from 25-55 mm in length) of raw material that were split during initial hard hammer flaking; these cobbles may have been split by breaking them on an anvil or resistant surface, although no bipolar flakes were driven off the pieces before they broke. Local cherts comprise about 46% of the raw material in this core class, along with coarse-grained quartzite (15%), Manning Formation chert with a pink cortex (15%), hematite (8%), petrified wood (8%), and a chert from an unknown source (8%).

Single-platform Flake Core (n=19)

Provenience: WELL PAD: 111-2, 129-2, 135-1, 137-2; SOUTHWEST AREA: 4-3, 4-4, 6-1, 6-4, 12-3, 13-1, 12-5, 13-5, 16-5, 16-6, 18-6, 18/20-5 (3); PIPELINE MONITORING: 0-0-375

Single-platform flake cores are cores that have had a series of flakes removed in one direction from a usable platform (Figure 39g, i and Figure 40a). On these cores, only a few flakes were removed before either the cores were discarded (because no more usable flakes could be removed) or were broken.

Almost 53% of the single-platform flake cores are on local cherts, and 26% are on local fine-grained and coarse-grained quartzite raw materials. Other local raw materials represented in the single-platform flake cores are petrified wood (5%), chalcedony (5%) and chert from unknown sources (10.5%).

Multiple-platform Flake Core (n=9)

Provenience: WELL PAD: 106-2, 123-2, 137-1, Feature 110; SOUTHWEST AREA: 4-4, 13-5, 18-1, 18-2, 21-4

Multiple-platform flake cores from the Well Pad and Southwest Village areas have had flake removals from multiple platforms on pebbles and cobbles of raw material, as flakes were successfully removed from various sides of the piece (see Figure 39a). One of these cores, a small fragment 8.0 mm thick, was on a piece of novaculite, a non-local raw material that must have been brought to the site after only initial reduction knapping. Other multiple-platform cores are on coarse-grained quartzite (11%), local chert (33%), chalcedony (11%), Manning Formation chert (11%), and chert from unknown sources (22%).

Bifacial Core (n=9)

Provenience: WELL PAD: 10-8, 135-2; SOUTHWEST AREA: 13-0, 18-1, 21-4 (2), 21-5, 23-2; NORTHWEST AREA: 7-1

Most of the bifacial cores (see Figure 33c and Figure 39b, d, h) are from the Southwest Village area, with additional examples from the Well Pad and Northwest area excavations. These cores have been thoroughly reduced on both sides of pebbles and small cobbles, with bifacial flake removals in various directions on the cores. These cores are an average of 26.4 mm in length, 22.3 mm in width, and 12.6 mm in thickness. Their primary purpose was to serve as a source of usable flakes, and the bifacial cores essentially represent depleted masses of lithic raw material.

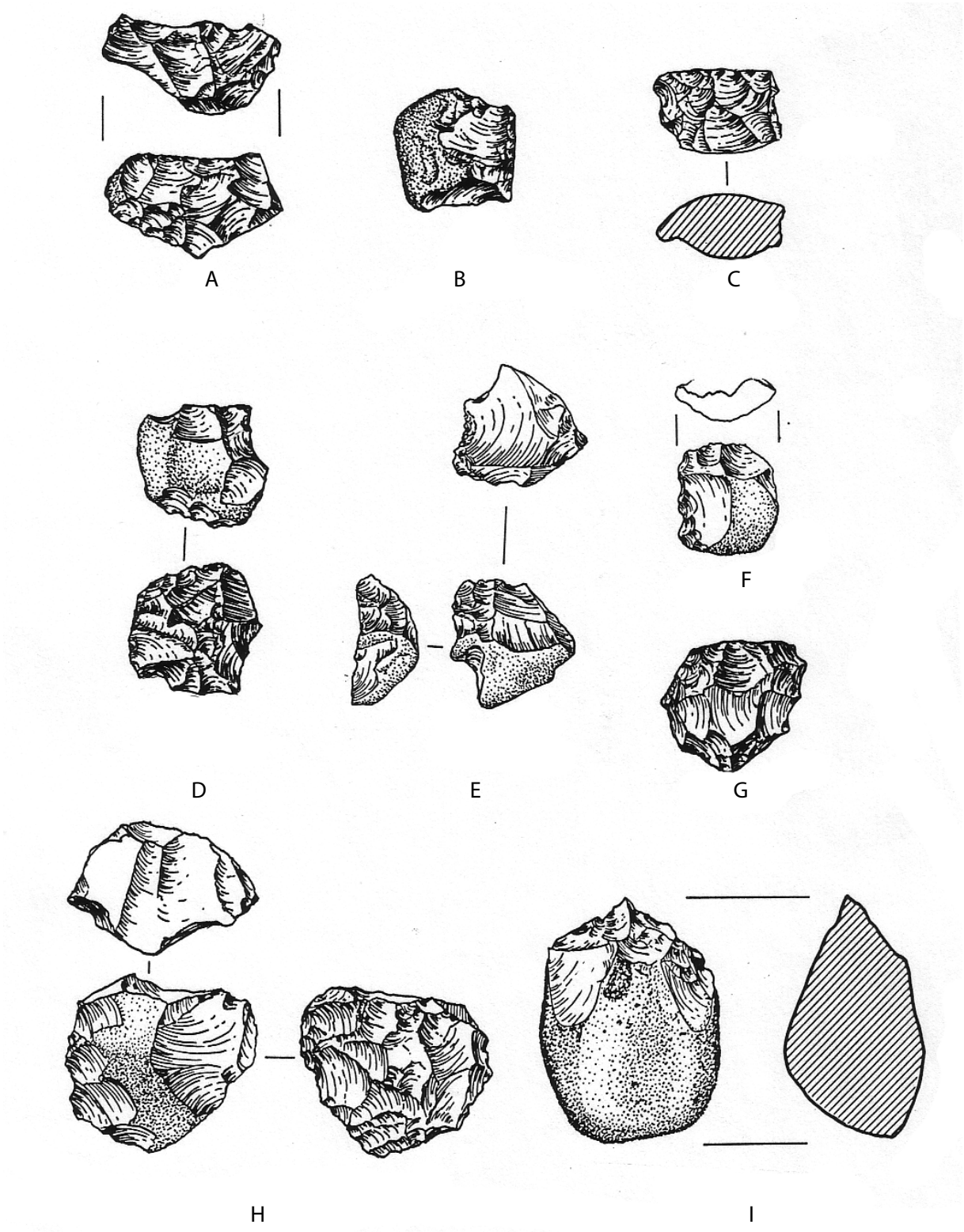

Figure 39. Cores from the Hudnall-Pirtle site: a, multiple-platform flake; b, d, h, bifacial core; c, e-f, bipolar core; g, i, single-platform core. Provenience: a, g, Unit 13, lv. 5; b, Unit 18, lv. 1; c, Unit 18, lv. 6; d, Unit 13, surface; e, h, Unit 21, lv. 5; f, Unit 16, lv. 5; i, Unit 4, lv. 3.

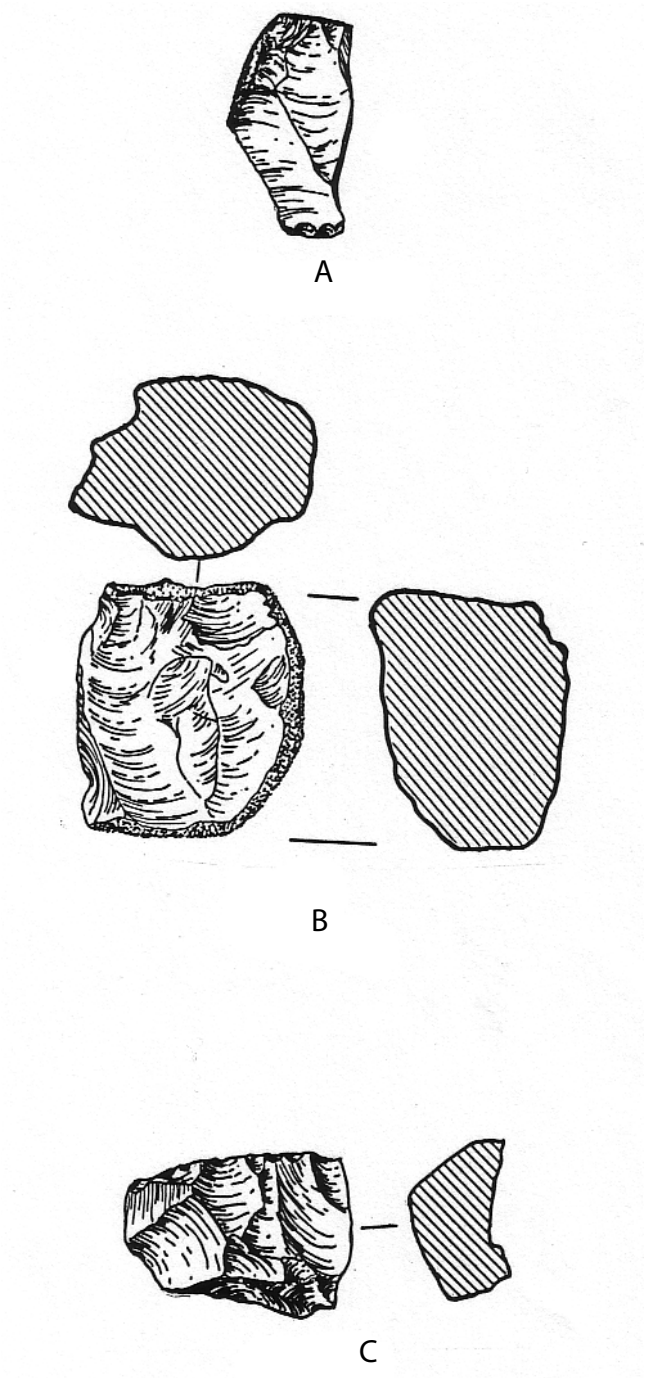

Figure 40. Cores from the Southwest Village and Well Pad excavations: a, single platform flake core; b, bipolar core; c, core fragment. Provenience: a, Unit 16, lv. 5; b, Unit 6, lv. 5; c, Unit 140, lv. 2).

Bipolar Core (n=7)

Provenience: WELL PAD: 113-2, 134-2; SOUTHWEST AREA: 6-5, 13-5, 16-5, 18-6, 21-5

Bipolar cores are small cobbles of raw material that were broken with a hammerstone on an anvil or resistant raw material, leading to flake removals from opposing surfaces of a core (see Figure 39c, e-f and Figure 40b). The primary purpose of bipolar knapping was apparently to efficiently reduce small cobbles and pebbles of available raw material for the production of flakes for use as tools (see Shafer 1973). Most of the bipolar cores are from the Southwest Village area.

More than 57% of the bipolar cores are on local cherts, while almost 29% are on chalcedony. The final bipolar core is on a piece of Manning Formation chert with a pink cortex (see Figure 39e).

Core Fragments (n=23)

Provenience: WELL PAD: 107-4, 140-2, Feature 104, Feature 110; SOUTHWEST AREA: 4-1, 4-5 (3), 5-3, 6-3, 6-4, 6-6, 6-8, 12-5, 13-2, 13-4, 20-3, 20-6, 21-4, 21-5; NORTHWEST AREA: 7-5; NEAR MD. G: Shovel Test 28; PIPELINE MONITORING: 202-4

The core fragments are small pieces from broken cores (see Figure 40c). The small size of the available raw materials for the Hudnall-Pirtle knappers led to the extensive use of pieces of raw material, regardless of the size, leading to frequent breakage during reduction activities. Almost 40% of the core fragments are either quartzite or local cherts, as well as petrified wood (4%), baked tuff (4%), chert with a pink cortex, perhaps a piece of baked tuff (4%), and unknown cherts (8.7%). The occurrence of Manning Formation raw materials among the cores in the Southwest Village suggests that this non-local raw material was brought to the site as either a small cobble or partially reduced core mass.

Battered Core (n=1)

Provenience: SOUTHWEST AREA: Unit 16-Feature 14

The battered core has evidence of flake removals on all surfaces, as well as abraded and crushed platform surfaces, suggesting either core rejuvenation or the use of the Feature 14 core for other crushing and battering activities (perhaps as a hammerstone). The core is on a coarse-grained quartzite, and measures 28 mm in length, 21 mm in width, and 16 mm in thickness.

Lithic Debris

The majority of the lithic debris from the Hudnall-Pirtle site investigations came from the Well Pad (51.5%) area, followed by the archeological deposits in the Southwest Village areas (25.9%); 105 pieces of lithic debris was recovered in features from these two main village deposits, and Unit 10 (near the Well Pad) had 79 pieces of lithic debris (Table 8). Only 8.2% of the lithic debris came from the Northwest area excavations, with 2.1% found in the Mound A and Mound F work. Fifty-six pieces of lithic debris were recovered in units excavated along a pipeline right-of-way near Md. C (see Figure 2), and seven pieces came from two excavation units (Units 15 and 17) placed in the large plaza.

In the main village areas (Well Pad and Southwest Village), the lithic debris was recovered between levels 1 through lv. 4-6, and appear to be from a single archeological component. In the Northwest area, however, the lithic debris came from as deep as 140 cm bs (see Table 8). Here, the lithic debris was concentrated between 10-40 cm bs and 50-70 cm bs, possibly suggesting two different periods of occupation on this natural rise. In the Plaza, the few pieces of lithic debris that were recovered came almost exclusively from 50-100 cm bs, probably as part of a limited use of the alluvial terrace at the Hudnall-Pirtle site before the establishment of the Plaza as a formal part of the mound center in Early Caddoan period times. Similarly, most of the lithic debris from Unit 10 came from deeper archeological deposits (i.e., 40-90 cm bs). In Mound A excavations, the lithic debris is sparsely represented throughout the mound fill and the occupational deposits buried by the mound, with no particular concentration of lithic artifacts. By contrast, most of the lithic debris in Mound F came from 70-90 cm bs (see Table 8), probably associated with the possible upper structural deposits in the mound.

A wide variety of lithic raw materials are represented in the lithic debris from the Hudnall-Pirtle site (Table 9). Not including cherts from unknown sources (but probably from a non-local source), there are 13 different categories of lithic raw materials in the lithic debris assemblage. The most common category is “local chert,” consisting of earthen-toned cherts (i.e., brown, red, and yellow cherts). These cherts comprise between 38.7-79.5% of the lithic debris from the different areas of the site; the local cherts are most abundant in the Well Pad excavations and the southernmost excavation units in the Southwest Village, where it represents more than 65% of all the lithic debris.

Other important local lithic debris raw materials are quartzite and petrified wood. In the case of the quartzite, it is most abundant in Mound A, the Northwest area, and all three parts of the Southwest Village. In these archeological deposits, quartzite comprises between 17.4-24.2% of the lithic debris (see Table 9). Petrified wood lithic debris is more common in the Northwest Area, Unit 10 south of the Well Pad, the Plaza, Mound

Table 8. Lithic debris from the Hudnall-Pirtle Site (41RK4).

Unit	Lv. 1	Lv. 2	Lv. 3	Lv. 4	Lv. 5	Lv. 6	Lv. 7	Lv. 8	Lv. 9	Lv. 10	Lv. 11
SOUTHWEST (units 5, 8, 22, 23)											
5	9	21	15	6							
8	15	11									
22	33	43									
23	25	35									
	82	110	15	6							
SOUTHWEST (units 4, 18, 20, 21)											
4	14	30	10	16	13	6					
18	3	28	9	22	-	5					
20	1	10	14	-	-	8					
21	2	6	12	15	11						
18/20	-	-	-	-	18						
4/18/ 20/21	-	-	-	-	-	3					
	20	74	45	53	42	22					
SOUTHWEST (units 6, 12, 13, 16)											
6	12	25	13	4	18	8	1				
12	4	4	17	8	11						
13	10	21	12	13	21						
16	4	23	2	10	-	6					
	30	73	44	35	50	14	1				
NORTHWEST AREA											
1	2	2	1	6	1	3					
2	-	5	4	1	1	3	2	3	2	1	1*
7	7	9	14	7	15	18	24	1	6	4	3**
19	5	9	16	27							
	14	25	35	41	17	24	26	4	8	5	4
WELL PAD NORTH (units 101-123, 133-140)											
101	(24 from all levels)										
102	(9 from all levels)										
103	(19 from all levels)										
104	(21 from all levels)										
105	(4 from all levels)										
106	5	32	31	33	14	5	2				
107	3	25	14	32	15	6	9				
108	14	13									
109	-	29									
110	11	17									

*6 pieces of lithic debris were also found in lv. 12-14; **17 pieces of lithic debris were recovered in lv. 12-13

Table 8. Lithic debris from the Hudnall-Pirtle Site (41RK4) Continued.

Unit	Lv. 1	Lv. 2	Lv. 3	Lv. 4	Lv. 5	Lv. 6	Lv. 7	Lv. 8	Lv. 9	Lv. 10	Lv. 11
111	7	31									
112	15	23									
113	27	41									
114	25	26	-	-	-	1					
115	15	32									
116	23	10									
117	10	40									
118	16	21									
119	10	35									
120	14	22									
121	22	23									
122	32	15									
123	15	21									
133	7	24									
134	4	26									
135	10	41									
136	20	38									
137	8	33									
138	8	31									
139	13	14	10	1							
140	5	30									
	340	693	55	66	29	12	11				
					WELL PAD SOUTH (units 124-132)						
124	16	4									
125	-	23	2	5							
126	3	20	6								
127	5	1									
128	-	7	6								
129	-	6	5								
130	-	13	6								
131	-	10	7								
132	-	2	4								
	24	86	36	5							
					MOUND A						
14	3	-	3	6	1	4	3	3	5	2	2
	3	0	3	6	1	4	3	3	5	2	2*

*lv. 12 also had one piece of lithic debris

					MOUND F						
3	-	-	-	-	-	-	1	-	1	-	1
11	-	1	-	-	-	1	-	4	11	2	-
24	2	-	-	-	-	-	-	-	-	-	-*
	2	1	0	0	0	1	1	4	12	2	1

*two flakes were recovered from lv. 14 in Unit 24

					UNIT 10						
	-	-	2	2	8	10	15	14	9	2	7

Table 8. Lithic debris from the Hudnall-Pirtle Site (41RK4), Continued.

Unit	Lv. 1	Lv. 2	Lv. 3	Lv. 4	Lv. 5	Lv. 6	Lv. 7	Lv. 8	Lv. 9	Lv. 10	Lv. 11
	0	0	2	2	8	10	15	14	9	2	7*

*seven pieces of lithic debris were also recovered in lv. 12, and 3 more pieces came from lv. 15

UNITS BY MD. C. PIPELINE

201	1	-	2	-	1	1					
202	5	5	3	3	-	1	4	-	3		
203	-	2									
204	-	2	-	2							
205	-	-	-	-	-	1					
Trench	(18 from all levels)										
A	(2 from all levels)										
	6	9	5	5	1	3	4	0	3		

PLAZA

15	-	-	-	-	-	-	2	-	1		
17	2	-	-	-	-	1	-	-	-	1	
	2	0	0	0	0	1	2	0	1	1	

F, units along the pipeline trench by Mound C, and the Well Pad South excavations; petrified wood represents 9.3-17.9% of the lithic debris samples in those areas. Petrified wood is relatively uncommon in the Southwest Village archeological deposits (see Table 9).

Ferruginous sandstone, hematite, and red ochre pieces comprise only a minor part of the lithic debris assemblage at the Hudnall-Pirtle site. Only in the Northwest, the Mound C pipeline trench, and the northernmost part of the Southwest Village (especially in features in the latter area) do these raw materials represent more than 4% of the total lithic debris samples. In other areas, these materials account for less than 2% of the samples (see Table 9).

Chalcedony is apparently present in local gravels (see Bruseth and Perttula 1981: Table 6-7), but not in large quantities. At the Hudnall-Pirtle site, it makes up less than 6% in any one area at the site, with frequencies ranging from 0.4-3.7% in habitation areas and 3% in Mound A deposits; it is generally more frequent in the Well Pad archeological deposits.

There are two different categories of non-local lithic raw materials: (1) the Ouachita Mountains cherts and novaculite found in Red River gravels, and (2) baked and fused cherts from the Manning Formation in East Texas (see Brown 1976: Figure 3). The Ouachita Mountains raw materials are rare. Novaculite was found only in Mound A and the Well Pad excavations (see Table 9), but represents only 0.1-3.0% of the lithic debris in those areas. The Ouachita Mountains cherts are slightly more common, especially in mound contexts: 3.0-3.8% of the lithic debris in Mound A and Mound F excavations; they also account for 3.6% of the lithic debris from units in proximity to Mound C. In habitation areas, the non-local Ouachita Mountains cherts comprise between 1.0-2.3% of the lithic debris sample, with slightly higher frequencies in the Southwest Village than in either the Well Pad or Northwest areas (see Table 9).

Table 9. Lithic Debris Raw Materials at the Hudnall-Pirtle Site (41RK4).

Area	Raw Materials								
	1	2	3	4	5	6	7	8	9
SW (U5, 8, 22, 23)	14.6	2.8	0.5	-	1.4	-	72.2	1.0	-
SW (U4, 18, 20-21)	16.0	3.8	1.1	0.4	2.7	2.3	59.2	2.3	-
SW (U6, 12, 13, 16)	13.2	6.0	2.4	2.0	6.4	2.4	59.0	1.6	-
SW Features	11.8	5.9	35.3	5.9	-	5.9	17.6	-	-
Unit 10	12.7	7.6	1.3	-	10.0	-	64.6	-	-
Well Pad North	6.2	4.3	0.6	0.6	9.3	-	69.6	-	-
Well Pad South	8.3	2.7	1.9	0.3	4.5	Trace	75.0	1.6	0.1
Well Pad Features	4.5	1.1	-	1.1	2.3	-	79.5	1.1	-
Northwest area	14.5	6.2	4.4	0.4	12.8	1.3	51.5	1.3	0.4
Plaza	14.3	-	-	-	14.3	-	57.1	-	-
Pipeline by Md. C	8.9	1.8	5.4	-	17.9	-	55.4	3.6	-
Md. A	15.2	9.0	-	-	3.0	-	48.5	3.0	3.0
Md. F	15.4	-	-	-	15.4	-	57.7	3.8	-
Shovel tests	17.2	11.8	2.2	-	16.1	-	38.7	2.2	1.1

*= percentage; Key for Raw Materials: 1= fine-grained quartzite; 2= coarse-grained quartzite; 3= hematite; 4= ferruginous sandstone; 5= petrified wood; 6= Manning Fused Glass; 7= local chert, earthen-toned colors; 8= non-local cherts, Red River gravels; 9= baked tuff; 10= chalcedony; 11= novaculite; 12= red ochre; 13= chert with thick pink cortex; 14= cherts from unknown sources

The baked and fused cherts, including the very distinctive Manning Fused Glass material, is somewhat more common in habitation contexts at Hudnall-Pirtle than is the Ouachita Mountains cherts and novaculite. The baked and fused cherts have been found primarily in Early Caddoan period contexts in sites in the Sabine River drainage, and a number of sites in the Neches, Trinity, and Angelina river drainages; nowhere is it abundant. At the George C. Davis mound site (41CE19) on the Neches River, for example, Manning Fused Glass accounts for only 2.3% of the flakes and cores (Brown 1976:196). In the Southwest Village at Hudnall-Pirtle, the baked and fused materials comprise 1.4-6.1% of the lithic debris, compared to 0.8-2.5% in the Well Pad excavations; the highest frequency is in Units 4, 18, 20-21 in the Southwest Village (see Table 9). About 2.4% of the Northwest area lithic debris is baked and fused cherts, as are 3.6% of the lithic debris sample in the units along the trench near Mound C. There are no baked or fused cherts in the Mound F lithic debris, but 3.0% in Mound A (see Table 9).

There are distinctive differences across the Hudnall-Pirtle site in the prehistoric Caddo use of lithic raw materials, principally in the use of local cherts and the relative abundance of non-local lithic raw materials. The Well Pad area and the southernmost units in the Southwest Village have the highest proportions of local cherts (69.6-75.0%), more petrified wood and chalcedony, and the lowest frequencies of non-local raw materials (1.2-2.6%) and quartzites. Conversely, habitation areas in the Northwest and other Southwest Village areas have much

Table 9. Lithic Debris Raw Materials, cont.

Area	Raw Materials					
	10	11	12	13	14	N
SW (U5, 8, 22, 23)	1.4	-	-	1.4	4.7	212
SW (U4, 18, 20-21)	1.1	-	-	3.8	7.2	262
SW (U6, 12, 13, 16)	1.6	-	0.4	1.6	3.6	251
SW Features	5.9	-	-	-	11.8	17
Unit 10	-	1.3	-	2.5	-	79
Well Pad North	3.7	-	-	1.2	4.3	161
Well Pad South	2.0	0.1	0.1	0.8	2.7	1277
Well Pad Features	-	-	-	1.1	11.4	88
Northwest area	0.4	-	0.4	0.9	5.3	227
Plaza	-	-	-	-	14.3	7
Pipeline by Md. C	-	-	-	3.6	3.6	56
Md. A	3.0	3.0	-	-	12.1	33
Md. F	-	-	-	-	7.7	26
Shovel tests	4.3	-	-	1.1	5.4	93

*= percentage; Key for Raw Materials: 1= fine-grained quartzite; 2= coarse-grained quartzite; 3= hematite; 4= ferruginous sandstone; 5= petrified wood; 6= Manning Fused Glass; 7= local chert, earthen-toned colors; 8= non-local cherts, Red River gravels; 9= baked tuff; 10= chalcedony; 11= novaculite; 12= red ochre; 13= chert with thick pink cortex; 14= cherts from unknown sources

lower frequencies of local cherts (51.5-59.2%), more hematite and ferruginous sandstone as well as quartzite, and greater amounts of non-local cherts (3.9-8.4%). Unit 10 is more like the Well Pad area in lithic debris raw materials, while Mound A, Mound F, and pipeline trench deposits near Mound C more closely resemble the Northwest and other Southwest Village areas.

These basic differences in raw material use at the Hudnall-Pirtle site continue in other aspects of the lithic debris. For instance, only 15.8-20% of the lithic debris in the Well Pad area and the southernmost part of the Southwest Village are heat-treated, compared to 22.9-30.9% of the lithic debris in the Northwest area and the other Southwest Village areas. This is closely related to areal (and temporal?) differences in the use of quartzite, as this material was commonly heated to improve its knappability. Biface thinning flakes are more abundant in the Well Pad/ southernmost Southwest Village areas (3.8-4.2%), compared to 0.2-1.3% in the Northwest and other Southwest Village areas. This difference obviously is related to diverse knapping strategies between these two main habitation areas, suggesting that final stage knapping of larger bifacial tools did not occur with regularity across the site, but was concentrated in the Well Pad archeological deposits.

Bipolar flaking was also more common in the Well Pad and southernmost Southwest Village areas, with 1.2-3.8% of the lithic debris sample representing flakes from bipolar cores; they were most abundant in the Well

Pad South excavations. Their relative frequency is probably a product of the heightened emphasis on local cherts in these areas, since the local chert raw materials are rather small in size, and bipolar reduction would have been a very suitable knapping technique to produce usable flakes for tools. In the Northwest and other Southwest Village areas, between 0.3-2.6% of the lithic debris is bipolar; the lowest proportions (0.3%) occur in the other Southwest Village areas.

Fire-Cracked Rock

There were 45 pieces of fire-cracked rock recovered in the excavation of habitation areas at the Hudnall-Pirtle site. Most of these were from the Southwest Village (n=21) and the Well Pad (n=21), along with one piece in a shovel test south of Md. H and west of Borrow Pit C, and two pieces in the pipeline trench near Mound C. These fire-cracked rocks were found between 0-70 cm bs. The overall scarcity of fire-cracked rock at the site suggests that the Early Caddoan period occupants did not rely on indirect methods of cooking using heated rocks, but instead principally cooked and boiled foods in ceramic vessels placed directly over fires.

Summary of the Lithic Artifacts and Regional Comparisons

In this section are first summarized the findings of the Hudnall-Pirtle lithic artifact analysis with respect to the research problems posed in the introduction to this section, specifically (1) the characterization of the nature of the Early Caddo lithic tool assemblage at the site, (2) tool diversity and its relationship to the site's function, and (3) the acquisition and use of non-local lithic raw materials. Following the discussion of these issues, we turn to assemblage-wide comparisons with selected other Early Caddoan period sites in the northeastern Texas and northwestern Louisiana region. The purpose of these comparisons is to place the Hudnall-Pirtle lithic artifact assemblage, from various parameters, within its broader cultural context and attempt to discuss how the lithic artifacts are informative about Early Caddo lifeways.

The Early Caddo lithic assemblage from the Hudnall-Pirtle site is dominated by expedient unifacial tools and bifacially chipped arrow points of various stemmed forms, and numerous small cores. By expedient, I follow Tomka's (2001:209) definition, namely that "expedient tools represent flake/blade blanks that have not been altered prior to their use in the performance of a task (e.g., the use of an unmodified flake as a knife or scraper)." Other than the arrow points, there are only a few formal tools (i.e., hafted tools) in the chipped or ground stone tool assemblage, including fragments of large bifacial tools (such as Gahagan bifaces), bifacially chipped drills, and two ground stone celts.

There are significant differences from one part of the site to another in the kinds of chipped and ground stone tools found in Early Caddo domestic contexts (Table 10), as well as in the frequency of discarded cores. For the site as a whole, unifacial tools comprise 41% of the tools and cores, and they are most abundant in the Well Pad area and Mound A, followed by the Southwest Village area. Projectile points—in this case a number of varieties of stemmed arrow points, dominated by Alba points—are very common in the Northwest area, followed by the Well Pad excavations (see Table 10).

The differing frequencies of arrow points between the various areas at the Hudnall-Pirtle site probably reflect

the intensity at which hunting large game animals were emphasized from area to area, or at least the locations of steady processing of large game animals. The overall low frequency of formal tools in the Hudnall-Pirtle tool assemblage may be indicative of a general decreased reliance by the Caddo inhabitants in the procurement of hunted resources, and those that were procured could be readily processed with expedient tools (cf. Tomka 2001:222). The decreased reliance on game animals may be a product of the increased production in an agricultural economy of cultivated plant foods, such as maize, by the Caddo (see Fritz, next section), and large surpluses of meat were not consistently needed (see Abbott et al. 1998). In that case, "hunting patterns may have shifted away from the procurement of large quantities of surplus to smaller quantities of meat on a steady basis" (Tomka 2001:222-223).

Bifacial tools (including preforms and indeterminate fragments) only account for 10% of the tools and cores from the site (see Table 10), and many of those (see above) are fragments of arrow point preforms and bifacial tools that appear to have been broken during use. They are only common in the Northwest area and in archeological deposits in the vicinity of Mound C (the pipeline trench), and much less abundant proportionally in the Southwest and Well Pad village areas. However, the bifacial tools that actually have evidence of use (including bifacial tool fragments and large hafted bifaces) are found only in three areas at the Hudnall-Pirtle site: the Well Pad (3.2%), the Southwest Village (2.7%), and along the pipeline trench (16.7%). It is in these areas where more intensive but occasional processing of game animals probably took place during the Early Caddoan period occupation.

Ground stone tools are generally rare across the site, comprising only 3.3% of the 399 lithic tools and cores in the site assemblage (see Table 10). In the three main habitation areas investigated by the Texas Historical

Table 10. Tools and Cores from different parts of the Hudnall-Pirtle site.

Areas	Ground Stone tools	Unifacial tools	Projectile points	Bifacial tools	Cores	N
Southwest	2.7*	39.0	18.7	8.8	30.8	182
Well Pad	2.6	50.0	24.7	8.4	14.3	154
Northwest	3.8	15.4	38.5	15.4	26.9	26
Pipeline	8.3	16.7	25.0	33.3	16.7	12
Mound A	16.7	50.0	16.7	16.7	--	6
Unit 10	--	33.3	33.3	16.7	16.7	6
Shovel tests	8.3	33.3	33.3	--	25.0	12
Mound F	--	100.0	--	--	--	1
Totals	3.3	41.0	22.2	9.8	22.8	399

*percentage

Commission, ground stone tools account for 2.6-3.8% of the tools and cores, strongly implying that plant food grinding activities were conducted to the same extent. These were used for the grinding and processing of plant foods, including seeds and maize kernels, as well as wood working.

Cores are particularly abundant in the Northwest and Southwest Village areas at the Hudnall-Pirtle site, accounting for 26.9-30.8% of all the tools and cores in those two Early Caddoan period habitation areas. It is suspected that relatively intensive tool manufacturing activities using multi-directional core reduction knapping strategies took place in these parts of the site. Core reduction is an efficient knapping strategy in the manufacture of flake tools and smaller flake blanks (for arrow points) from locally available raw materials that occur primarily as pebbles and small cobbles in local gravels. The few larger bifacial tools must have been made using bifacial reduction strategies, relying on larger pieces of lithic raw material as well as the acquisition of bifacial tools from non-local sources (i.e., the Gahagan biface made from Edwards Plateau chert).

Although there are differences in the proportion of unifacial tools from the Well Pad and Southwest Village areas (see Table 10), the composition of the tools are very much the same from both areas. That is, the most frequent unifacial tool in both areas is the expedient edge-modified piece (62-71%), followed by retouched pieces (9.1-12.7%). More specialized tools such as gravers and drills/perforators are equally abundant in the two areas (7.0-7.8% and 3.9-4.2%, respectively), as are flake scraping tools (6.5-9.8%).

The overall similarity in the range of chipped and ground stone tools across the different habitation areas at the Hudnall-Pirtle site suggest that a wide variety of domestic tasks took place in each part of the site, including hunting, game animal processing, the processing of gathered and cultivated plant foods, and tool production. It seems likely that many parts of the Hudnall-Pirtle site had a number of domestic compounds of extended families, each of which generally engaged in the same range of domestic tasks. Some of these tasks were done to support the activities of the social and political elite that also lived at the site, but most of which were really part of the same domestic economy that could be found among Caddo families living elsewhere in the larger Early Caddoan period community.

The lithic tools and debris from the Hudnall-Pirtle site are dominated by the use of pebbles and small cobbles of local raw materials, especially local earth-toned cherts, fine-grained and coarse-grained quartzite, and petrified wood. Nevertheless, non-local lithic raw materials are relatively abundant in all investigated contexts at the site, especially in the arrow points, unifacial tools, and the large hafted bifaces. The latter are from Edwards Plateau cherts in Central Texas (see Frederick et al. 1994), and the two from Hudnall-Pirtle are both from these chert sources. About 13% of the arrow points are made from non-local lithic materials, including Ouachita Mountain cherts and novaculite, while 20% of the unifacial tools are made from the same non-local materials, and some are also made from Manning Formation sources in the southern part of northeastern Texas (see K. Brown 1976: Figure 3); these materials include Manning Fused Glass, baked tuff, and cherts with a thick pink cortex.

All these non-local lithic raw materials must have been obtained by the Caddo at the Hudnall-Pirtle as substantially reduced cores, flake blanks, or nearly-completed form because the proportion of non-local lithics in the lithic debris is a good bit less than it is for the finished tools. Novaculite lithic debris was found only in the Well Pad excavations, while non-local cherts and Manning Formation materials came from all habitation areas; the Manning Formation materials were most common in these contexts, and there were also some small flake cores of these materials in the lithic assemblages. This suggests stronger trade and exchange relationships with the aboriginal peoples that lived in the southern part of northeastern Texas than with Caddo groups living north of the Hudnall-Pirtle site (probably on the Red River in northeastern Texas) who would have had ready access to Ouachita Mountains cherts and novaculite.

How do the lithic assemblages from other Early Caddoan sites, including mound centers and sedentary domestic sites not associated with mound-building activities? Selected examples are discussed in the following paragraphs, beginning with the James Pace site in northwestern Louisiana.

The James Pace mound site (16DS268) on the Sabine River in De Soto Parish was apparently occupied between ca. A.D. 650-1000 (see Girard 1994; McGimsey and van der Koogh 2001), abandoned just about the time the Hudnall-Pirtle site was first occupied by Caddo peoples. Most of the chipped stone tools found there in the excavations reported by Jensen (1968) include unifacial tools (n=213) and arrow points (n=143), in similar proportions to the Hudnall-Pirtle tool assemblage, with a small number of more specialized flake tools, including gravers (n=18), drills (n=1), denticulates (n=1), as well as several bifacial (n=6) and unifacial flake knives (n=11), and 31 knive fragments. Thus, there may have been periodic intensive game processing at the James Pace site during its lengthy occupation. Cores were especially abundant, with 720 fragments, including single platform, opposed, and bipolar cores. Jensen (1968) identified only very low amounts of non-local lithic raw materials at the site, greatly contrasting to the situation at the Hudnall-Pirtle site, as only about 3% of the arrow points, 5% of the unifacial tools, and 0.6% of the lithic debris were from non-local sources, including non-local cherts, novaculite, and Catahoula sandstone.

The George C. Davis mound center (41CE19) and village has a large Early Caddoan period lithic assemblage (see Shafer 1973; Story 1981:239-345). The arrow points (more than 1140 in number) are predominately stemmed Alba points, and only about 1.5% were apparently made from non-local lithic materials, including novaculite and Manning Fused Glass (this percentage may be higher, however, because no non-local cherts were identified or quantified in the Shafer [1973] and Story [1981] analyses). Only about 1% of the lithic debris and unifacial tools in Story's (1981) investigations have been reported from village contexts at the George C. Davis to be of non-local materials (i.e., Manning Fused Glass), although Shafer (1973:259) noted that most of the smaller sample (n=31) of expedient unifacial tools from the 1940s and 1960s excavations were made from non-local materials "and may not represent artifacts made at the site." In general, however, it does appear to be the case that the Caddo group living at the Hudnall-Pirtle mound center had a wider access to non-local lithic raw materials than did the Caddo community at the contemporaneous George C. Davis site.

In Story's (1981) lithic tool assemblage from George C. Davis, arrow points are slightly more abundant than unifacial tools (282:234, or a ratio of 1.2:1), but specialized perforating tools are common (n=40) among the flake tools, as they are at Hudnall-Pirtle; Shafer (1973) had another 31 perforators (or awls) in the earlier assemblage studied from the site. The George C. Davis site lithic tools are notable for the common occurrence of large hafted bifaces made from non-local Edwards Plateau chert, and they are found in both mortuary and domestic contexts; these are large formal tools that may have been employed in the intensive processing of game animals, and their inclusion in mortuary assemblages (along with large caches of arrow points) testify to their importance in some Early Caddoan lithic tool kits.

The ground stone tool assemblage at George C. Davis includes many polished celts (n=55 in the Shafer [1973] and Story [1981] samples) made from non-local raw materials. There is also a wide variety of other kinds of ground stone tools (n=91) that were used in plant processing and tool sharpening, including abraders, grinding slabs, sandstone saws, milling stones or metates, hones, anvils, battered stones, and polishing stones. Ground stone tools are much more common in the George C. Davis tool assemblage, accounting, for almost 10% of the tools tabulated in Story (1981), compared to only 3.3% at the Hudnall-Pirtle site. Similarly, the ratio of arrow points to ground stone tools at George C. Davis is 3.2:1, while the ratio at Hudnall-Pirtle is 7.1:1. Hunting of large game animals was apparently a more important subsistence pursuit at the Hudnall-Pirtle site in Early Caddoan period times than it was at the George C. Davis mound center.

At the Boxed Springs mound center (41UR30), occupied during the Early Caddoan period (perhaps the earlier part of the period since there are numerous Spiro Engraved vessels in the ceramic assemblage), the many stemmed arrow points were made from fine-grained and coarse-grained quartzite, local cherts of brown and yellow hue, and high quality cherts that probably originated in the Ouachita Mountains and/or Red River gravels (Perttula et al. 2000:48). Several Gahagan bifaces were recovered in a shaft tomb in Mound A, and these were made from Edwards chert. Small celts of different shapes were relatively abundant, here as well at least in mortuary contexts, and these were made from metamorphic or igneous rocks available in the Ouachita Mountains, and probably brought to the site in completed form. There was a single ferruginous sandstone sawing tool (see Perttula et al. 2000:Figure 10) at the Boxed Springs site that closely resembles the tabular sandstone saws recovered in Early Caddoan period contexts at the George C. Davis site (Shafer 1973:317 and Figure 25h-i). Other ground stone tools from the site include two polishing stones and one mano.

At the Taddlock site (41WD482) on Lake Fork Creek, a domestic Early Caddoan settlement dated between cal AD 974-1160 (Perttula 1998:Table 1), stemmed arrow points outnumbered expedient flake tools almost 2: 1 (82 vs. 47) (Bruseth and Perttula 1981:101-116), whereas flake tools were much more common in the Hudnall-Pirtle assemblage. These differences may highlight different functional emphases of the domestic compounds in a mound center to independent dispersed and self-sustaining domestic settlements found some distance from Early Caddoan period mound centers. There were a number of drills and perforators at Taddlock, as there were at Hudnall-Pirtle (and other Early Caddoan period sites such as George C. Davis), but almost no gravers or other more specialized flake tools. Large hafted bifaces were also absent. Manos and pitted stones were infrequent (n=9), but celts were relatively numerous (n=5) at Taddlock. It is interesting that the Early Caddoan period inhabitants at the Taddlock site apparently had better access to non-local lithic raw materials than did the people in domestic areas at Hudnall-Pirtle, since almost 40% of the tools (especially celts, perforators/drills, scrapers, and flake tools) were made from non-local raw materials (much of it from the Ouachita Mountains) (Bruseth and Perttula 1981; Perttula 1984). Similarly, the local materials preferred at the Taddlock site were quartzite and petrified wood, not local cherts.

The Early Caddoan period domestic component at the Smithport Landing site in De Soto Parish has a lithic assemblage also dominated by arrow points (n=67), with only a few flake tools, including flake scrapers (n=16), knives (n=2), and drills (n=4) (Webb 1963). The ratio of arrow points to flake tools here is 3:1, while at Hudnall-Pirtle it is 1:1.8. Only about 6% of the arrow points are made from non-local cherts and novaculite, compared to 13% at Hudnall-Pirtle; the lithic debris is not discussed by Webb (1963). The rare ground stone implements found at the site are one polished celt, one pitted stone, and a single whetstone.

Copper Bead

A small copper bead was found in level 4 (30-40 cm) of Unit 4 in the Southwestern part of the site (see Figure 2). The bead is formed of cold hammered copper and appears to have been spherical in shape. There is some uncertainty about the overall shape of the bead because about one-third of one side including one of the two holes is missing, and some deformation of the bead shape occurred as a result. The bead is 13 mm in diameter, and the remaining hole has a diameter of 5 mm.

ARCHEOBOTANICAL REMAINS FROM THE HUDNALL-PIRTLE SITE (41RK4),

RUSK COUNTY, TEXAS,

by Gayle J. Fritz

Eighteen flotation samples from the Hudnall-Pirtle site were analyzed at the Paleoethnobotany Laboratory at Washington University in St. Louis. The samples came from 17 features, with two samples from Feature 14 having such different contents that they are treated separately. Soil volume prior to flotation varied from 0.38 liters to 7.57 liters, for a total of 56.6 liters. The flotation system used was a modified SMAP-type machine. Light fraction mesh size was 0.5 mm, whereas 1.0 mm mesh was used for recovery of heavy fractions. Results are summarized in Table 11, and presented in detail in Table 12. Sorting was carried out by Steve Rhee, Kimberly Schaefer, and Gayle Fritz, and Fritz checked all the identifications.

Recovery of archeobotanical remains was difficult due to the heavy clay matrix and the presence of many small stones. Charred materials are virtually absent from light fractions, even from those samples where heavy fractions are rich in wood charcoal, nutshell, and/or maize. Fifty toasted, but not charred, poppy seeds were added to the soil sample from Feature 109 prior to flotation to test for effectiveness of recovery. Only 14 poppy seeds were retrieved. Furthermore, archeobotanical remains were typically coated by and saturated with hardened clay, slowing analysis and making it necessary to deviate from standard laboratory procedures, as described below.

Laboratory Methods

Each light fraction and each heavy fraction was weighed on an Ohaus electrical balance and passed through a set of brass geological sieves with openings varying from 4.0 mm to 0.425 mm. Particles larger than 2.0 mm were sorted into constituent categories as presented in Table 11. Wood charcoal, bark, stone, and uncarbonized plant remains were weighed to the nearest 0.01 g, but not counted. Fragments of pitch, hickory nutshell, acorn shell, acorn nutmeat, maize, seeds, and unknown items were counted and also weighed to the nearest 0.01 g.

Acorn shell, maize, and seeds normally would have been pulled from all 1.4 mm and possibly also 1.0 mm sieve fractions. This was not done for six of the largest heavy fractions from Hudnall-Pirtle due to the excessive amount of time necessary to distinguish clay-encrusted plant fragments from the thousands of tiny pebbles and clay particles in the same fractions. Heavy fractions from both of the Feature 14 samples were unsorted below 2.0 mm, and the same was true of heavy fractions from Features 17, 104, 106, and 111. Counts, weights, and densities of maize and acorn nutshell are considerably lower than if smaller-sized pieces had been pulled, and the Hudnall-Pirtle values, therefore, are not directly comparable to those of assemblages from sites where tables include counts and/or weights of these items down to 1.4 mm or smaller. However, it is unlikely that the Hudnall-Pirtle seed count would increase significantly with more complete sorting of small sieve sizes. Seeds were pulled from the 1.4 and 1.0 mm-sized groups from most (n=12) of the heavy fractions and from all 18 of the light fractions, and smaller-than-2.0 mm particles from unsorted heavy fractions were scanned briefly, with negative results, to see if small seeds were present. Seeds are remarkably rare in this assemblage. The heavy clays and resulting poor recovery of light fraction material may be a factor contributing to the low seed counts, but full sorting of smaller-than-2.0 mm particles in all heavy fractions would probably not change the current situation.

Table 11. Summary of Archeobotanical Remains from the Hudnall-Pirtle site (41RK4).

	Count	Weight (g)	Ubiquity (% of 18)	Density * by count	Density * by weight	% Food plants, by weight
Wood and Bark	-	23.55	100	-	0.416	-
Pine Pitch	6	0.10	5.6	-	0.002	-
Cane Stem	25	0.46	16.7	0.442	0.008	-
Hickory nutshell	113	2.16	61.1	1.996	0.038	6.8
Acorn shell	158	0.85	55.6	3.268	0.044	7.9
Acorn nutmeat	27	1.66				
Total Nut	298	4.67	72.2	5.264	0.082	
Total Maize	3074	26.98	44.4	54.301	0.477	84.8
Kernel fragment	18					
Cupule	2810					
Glume	246					
Seeds	5	0.15	16.7	0.088	0.003	0.5
Persimmon	2					
Purslane	1					
Unid. Frag.	2					
Unknown	1085	7.90	88.9	19.166	0.140	-

* Density is the amount divided by the number of liters of soil floated (56.61)

Contents of the Samples

Wood charcoal is the most ubiquitous type of archeobotanical material at Hudnall-Pirtle, being present in all 18 samples (100% ubiquity), with a total weight of 23.55 g when combined with bark. Cane stem (*Arundinaria gigantea*) occurs in three samples (ubiquity is 16.7%) but is most abundant in Feature 12 in Mound F, probably reflecting combustion of building material or utilitarian objects such as mats or baskets. Food plants are represented by thick hickory nutshell (*Carya* spp.), acorn nutshell and acorn nutmeat (*Quercus* spp.), maize kernel and cob fragments (*Zea mays* ssp. Mays), persimmon seed (*Diospyros virginiana*), and purslane seed *(Portulaca oleracea*).

A total of 113 fragments of hickory nutshell weigh 2.16 g. The Hudnall-Pirtle archeobotanical assemblage includes 158 pieces of acorn shell weighing 0.85 g and 27 recognizable fragments of acorn nutmeat weighing

Table 12. Contents of the Flotation Samples from the Hudnall-Pirtle Site.

		LF/ HF	Soil Vol. (l)	Wood wt. (g) >2mm	Bark wt. >2mm	Pitch ct. > 2mm	Pitch wt. (g)	Cane Stem ct. >2mm	Cane Stem wt. (g)	Thick Hickory ct. >2mm	Thick Hickory wt. (g)	Acorn Shell ct. >1 mm	Acorn Shell wt. (g)	Acorn Meat ct. >2 mm	Acorn Meat wt. (g)	Maize wt. >2mm	Kernel ct. >1mm	Cupule ct. >1mm	Glume ct. >1mm	Seed ct. >1mm	Seed wt. >1mm	Un-known ct. >2mm	Un-known wt. (g)	Bone wt. >2mm	Stone/ sherd wt. >2 mm	Uncarb-onized wt. >2 mm	Residue wt., 1.0-2.0 mm
	Fea. 10	LF	0.76	0.01																						0.02	0.05
		HF		0.20						2	0.01	5	0.01									10	0.04		2.68	0.07	3.26
	Fea. 12	LF	2.65	0.01																2	0.01	1	0.01			0.01	0.01
		HF		1.39				23	0.44													11	0.07		5.3	0.09	1.88
	Fea. 13	LF	3.79	0.01								1	0.01													0.07	0.01
		HF		2.99						17	0.25					0.01	1							0.10	59.7	0.23	14.02
*	Fea. 14-1	LF	3.79	0.01																						0.04	0.10
		HF		0.87								1	0.01			1.81	1	188	33			90	0.66		2.35	0.30	5.03
*	Fea. 14-2	LF	4.16	0.01		6	0.10																			0.37	0.20
		HF		8.30						15	0.14	60	0.46	26	1.61					2	0.13	200	1.97	3.53	100.61	0.13	37.10
	Fea. 16	LF	4.16	0.01																						0.04	0.10
		HF		1.54						8	0.16	6	0.02									20	0.18		22.05	0.24	12.06
*	Fea. 17	LF	2.84													0.01		1								0.02	0.04
		HF		0.34												2.93		262	31			114	0.95	0.01	1.09	0.26	1.36
	F. 101	LF	0.38	0.01																							0.01
		HF		0.60						1	0.01											4	0.01		0.77	0.01	1.19
	F. 102-1	LF	2.84	0.01				1	0.01																	0.01	0.11
		HF		0.09																		1	0.02		2.01	0.04	2.99
	F. 103-1	LF	3.79					1	0.01																	0.02	0.02
		HF		0.07						6	0.07	23	0.04			0.02		1	2			40	0.23	0.05	8.47	0.06	7.01
*	F. 104-1	LF	6.44	0.01												0.01		2								0.01	0.04
		HF		2.45						30	1.02	35	0.20	1	0.05	4.77	6	425	40			320	2.06	0.59	135.7	0.22	40.78
*	F. 106	LF	1.89																								0.03
		HF		0.17								22	0.07			2.23	3	259	19			97	0.58		7.40		7.56
*	F. 109	LF	0.38																							0.01	0.01
		HF		0.02						3	0.04											4	0.02		2.12		2.09
*	F. 111-1	LF	7.57													0.01		3	1	1	0.01					0.08	0.04
		HF		1.18						20	0.38	4	0.02			14.59	7	1605	91			165	1.04	0.93	54.22	0.02	47.51
	F. 112	LF	0.57	0.01																							0.03
		HF		0.37	2.67											0.59		64	29			4	0.04		1.47		3.64
	F. 115	LF	0.76	0.01																						0.01	0.01
		HF		0.03						9	0.06														0.79		2.19
	F. 116	LF	2.27																							0.02	0.02
		HF		0.07						2	0.02	1	0.01									2	0.01		6.16	0.03	8.41
	F. 117	LF	7.57	0.01																							0.20
		HF		0.08																		2	0.01	0.01	36.57	0.54	19.58
	TOTALS		56.61	20.88	2.67	6	0.10	25	0.46	113	2.16	158	0.85	27	1.66	26.98	18	2810	246	5	0.15	1085	7.90	5.22	449.46	2.97	218.69

* Unsorted below 2mm

1.66 g. Maize is represented by 3074 fragments. The total weight of maize, 26.98 g, exceeds the weight of wood charcoal in spite of the fact that very little maize smaller than 2.0 mm is included. The counts and weights of nut remains (hickory and acorn), even when combined, are far lower than those of maize. The weight of maize exceeds that of nuts by a factor greater than 5.0. However, hickory nutshell is present in 61.1% of the samples, and acorn in 55.6%, compared with the lower ubiquity value of 44.4% for maize. By site area, the two samples from Mound F had no maize remains, compared with 60% of the Southwest Village area samples, and 45.5% of the flotation samples from the Well Pad excavations.

Most of the maize consists of cob fragments: 2810 cupules or fragments thereof, some with glumes attached, and 246 separate glumes. In a few samples, several cupules along a row remain attached to each other, indicating that the archeological features originally contained whole cobs or at least more complete cob segments. No attempt was made to determine row number or "racial" characteristics. The shapes of these cupules vary from relatively wide and closed to narrow and open. Most of the glumes are impressively strong and durable. Although this assemblage is dominated by cob parts, it includes 18 kernel fragments.

Seeds were present in only three of the samples (16.7% ubiquity), with a total weight of 0.15 g. Two relatively large persimmon seed fragments came from a heavy fraction of Feature 14. It is not impossible that these two fragments originally constituted one seed, but their condition is too poor to say for sure. One black, seemingly charred purslane seed was recovered from the light fraction of Feature 111. This seed might be a modern, uncarbonized contaminant, but without breaking it, its status remains in doubt. A few uncarbonized carpetweed seeds (*Mollugo verticillata*) were observed in other light fractions but this was the only purslane seed. Two unidentifiable charred seed fragments were found in the light fraction of Feature 12.

Unknowns make up a larger than usual part of the Hudnall-Pirtle archeobotanical assemblage, totaling 1085 fragments weighing 7.90 g. The vast majority are probably pieces of wood, nutshell, and maize that are so heavily clay-encrusted or so badly damaged by the pebble-filled heavy fractions that recognition was unduly challenging, if not impossible. Animal bone occurred in seven (39.9%) of the samples, with a total weight of 5.22 g. Pieces of unworked stone, dried clay, and tiny pottery sherds and chert chips formed the bulk of all heavy fractions, with those larger than 2.0 mm weighing a total of 449.46 g.

Discussion

Although the gravelly, clayey soils in the feature flotation samples impeded flotation recovery and probably lowered the diversity of the archeobotanical assemblage, it is nevertheless clear that Caddos at Hudnall-Pirtle practiced a mixed subsistence strategy combining maize agriculture with the harvesting of hickory nuts, acorn, and native fruits. The abundance of maize makes it unwise to minimize the economic significance of agriculture at this site, even though a less maize-dependent economy was expected for the relatively early Caddoan component (ca. A.D. 1000-1200). Maize comprises 84.8% of the weight of all food plants represented, although it is present in only 44.4% of the analyzed samples. Acorn shell and acorn meat contribute 7.9% of the total weight of food plants, and hickory nutshell comprises 6.8%. This is very different from the nutshell-dominated assemblage from the Early Caddoan period Spoonbill site (41WD109), where hickory nutshell constituted 99.1% of the plant food remains by weight and where even acorn outweighed maize (Crane 1982; Perttula et al. 1982). It appears that either a far more agriculturally-oriented subsistence strategy was practiced at the Hudnall-Pirtle site, or else that there was a different seasonal or functional dimension to the occupation there.

Due to the problematic flotation recovery that resulted in virtually sterile light fractions, little can be said about use of small seeds at Hudnall-Pirtle. Because 1.0 mm mesh rather than window screen (1.6 mm mesh) was used for heavy fraction recovery, numerous taxa of edible native seeds could have been retrieved, including sunflower (*Helianthus annuus*), sumpweed (*Iva annua*), various knotweeds and smartweeds (*Polygonum spp*.), and even the larger chenopods (*Chenopodium* spp.), had they been commonly used. To date, however, there is no evidence for serious use of starchy temperate seed crops such as *Chenopodium berlanderi* ssp. Jonesianum in northeastern Texas at any point in time. This distinguishes the southern Caddos from societies in the Arkansas River valley, such as those at Spiro and Toltec (Fritz 1989; Smith 1996), from groups in the Ozarks (Fritz 1986, 1994), and from peoples in the central Mississippi River valley (Fritz 1990; Johannessen 1993; Lopinot 1994).

THE FAUNAL REMAINS FROM THE HUDNALL-PIRTLE SITE (41RK4),

by Bonnie C. Yates

Only a small amount of faunal remains were recovered from the 1989-1990 excavations at the Hudnall-Pirtle site by the Texas Historical Commission. A total of 208 animal bones were recovered, primarily from the Southwest village area, along with a single possible human ulna from Unit 202 near Mound C (Table 13).

Of the faunal remains submitted for analysis, only deer (*Odocoileus* sp.) and indeterminate turtle were identified, while bison (*Bison* sp.) and human remains are suspected. At least two different turtles are represented, however, because of the presence of a large, thick-shelled specimen in the same provenience in the Southwest Village area (Unit 4, level 5) as a small, thin-shelled specimen. Referent taxa would be Chelydridae, or snapping turtles (large), and Kinosternidae, or mud turtles (small).

In Unit 16, level 4 (in the Southwest village area), elements of a right hind foot of a deer indicate a discarded ankle joint. It was probably articulated at the time of disposal. The pattern of calcination is consistent with bone that is burned while still fresh. No skinning or butchering cuts are apparent on these elements.

A carpal bone (right scaphoid) from a mammal larger than deer was recovered from Unit 201, level 4 (near Mound C, see Figure 2). The thin cortical bone of this specimen suggests that it is from an immature individual. It compares well with bison or elk in size and morphology.

The percentage of calcined bone in the sample is 73.5%, which is extremely high. This indicates that the bone refuse was exposed to long periods of intense heat or direct fire. This probably resulted in total incineration of much of the faunal remains originally deposited by the site's occupants.

Two pieces of calcined long bone shaft fragments were found in Unit 202, level 4 (in a unit along the pipeline trench near Mound C) that resemble human ulna. They exhibit the typical u-shape cracks that result from intense firing of mammal long bones with flesh. No diagnostic features for Homo sapiens are present on the fragments, however, the surface texture and cracking is consistent for human remains that have been cremated.

The only other animals that could be present in this assemblage are medium-size mammals. Fragments of some of the long bone shafts are too small in diameter and bone wall thickness to be from deer. Unfortunately, no diagnostic morphology survived to indicate species for these specimens.

Table 13. Inventory of Faunal Remains from the Hudnall-Pirtle site.

Unit and Level	Count	Comments
ST2	1	crushed long bone fragment (B)
ST4	3	1 deer petrous, 2 other B
ST8	1	tooth fragment, cf. deer
ST19	7	LM fragments
4-5	3	all B; 1 large and small turtle
4-6	3	all B; 1 crushed LM, 2 turtle plastron fragments
6-3	1	tool fragment (B)
7-8	1	deer-size fragment; 4 UID mussel shell fragments
7-9	1	UID fragment (B)
7-10	2	UID fragments (B)
7-13	1	deer-size long bone epiphysis fragment (B)
13-0	1	MM long bone fragment (B)
13-2	6	1 deer tarsal, 5 deer-size naviculocuboid, tarsal) and miscellaneous deer-size fragments (all B) fragments (all B)
13-4	1	turtle carapace fragment (B)
14-10	3	1 deer-size vertebral epiphysis, 2 LM fragments
14-12	1	UID fragment (B)
16-2	1	UID crushed fragment (B)
16-3	1	UID crushed fragment (B)
16-4	15	pieces of 1 rt hind foot of deer (talus, calcaneum,
18-2	1	deer-size tibia (proximal fragment)
18-3	1	UID fragment (B)
18-4	1	deer-size long bone fragment (B)
19-4	8	1 deer-size atlas, 7 UID fragments
18/20-5	11	UID fragments (B)
20-4	2	UID fragments (B)
20-6	1	deer radius (rt proximal, B)
21-3	5	UID fragments (B)
22-1	2	1 deer naviculocuboid (lf fragment), and 1 UID fragment
23-1	4	UID fragments (B)
23-2	2	UID fragments (B)
107-6	3	UID fragments (B)
108-1	1	UID fragment (B)

Table 13. Inventory of Faunal Remains from the Hudnall-Pirtle site Continued.

Unit and Level	Count	Comments
108-2	1	UID fragment (B)
112-2	1	UID fragment (B)
113-2	1	UID fragment (B)
117-1	2	UID fragments (B)
118-1	1	UID fragment (B)
119-2	5	UID fragments (B)
121-2	3	UID fragments (B)
123-1	1	UID fragment (B)
123-2	1	UID fragment (B)
125-4	1	UID fragment (B)
129-3	1	UID fragment (B)
130-2	1	UID fragment (B)
133-2	1	possible worked bone with striae and abrasion (B)
137-2	4	UID fragments (B)
138-2	2	UID fragments (B)
140-2	1	UID fragment (B)
201-2	3	UID fragments
201-4	1	cf. bison scaphoid (rt immature)
201-6	12	deer-size fragments
202-4	1	cf. human ulna (shaft pieces, B)
Feature 14	41	1 deer phalanx I (proximal fragment), 1 deer metapodial condyle, and 39 UID fragments (all B)
Feature 104, Zone 1	12	1 deer metapodial condyle, 11 UID fragments (B)
Feature 104, Zone 2	2	UID fragments (B)
Feature 107	2	UID fragments (B)
Feature 109	1	UID fragment
Feature 111, Zone 5	1	UID fragment (B)
Feature 114	3	UID fragments (B)
Mound C, monitoring	5	deer-size long bone shaft fragments

Key to abbreviations: B= burned bone; rt = right; lf = left; LM= large mammal; MM= medium mammal; UID= unidentified

Summary and Discussion

The Hudnall-Pirtle site (41RK4)—owned by The Archaeological Conservancy—is a major Early Caddoan period mound center on the Sabine River in the Pineywoods of northeastern Texas. The site has eight mounds of different sizes and shapes, three known borrow pits, and a large plaza around which the mounds are arranged (Figure 41). There are extensive habitation deposits associated with the use of the mounds and plaza, as they occur in a broad and large circular area outside of the plaza and away from the mounds. The habitation areas are marked by midden deposits as well as well-preserved features (pits and post holes), probably associated with domestic structures.

In 1989 and 1990, the Texas Historical Commission (THC) conducted archeological investigations at the Hudnall-Pirtle site to assess the impact of oil development activities to the site, and also to gather information to support a National Register of Historic Places nomination. The work was concentrated in habitation deposits in different parts of the site—especially in the recently constructed Well Pad and in a habitation area called the Southwest Village—as well as in two of the mounds (Md. A and Md. F) (see Figure 2). The work documented the existence of midden deposits in the Southwest Village, and domestic habitation deposits and features now buried below the Well Pad. In the Md. F work, we documented that the small mound had been built over a burned structure, and the small southern extension to Md. A (see Figure 4) had been built over occupational deposits. The THC work also resulted in a topographic map of the site wchich depicted all of the site's earthen mounds. One activity was not accomplished from the THC planned work, as outlined in the "Introduction" to this article. This was the proposed Unit 9 to be placed in a large pothole in the center of Mound C. This unit is not shown on Figure 2, and was not completed due to the unconsolidated nature of the sands of the mound that kept collapsing during excavation. From the limited work in this area of the site, the entire fill of Mound C appears to be made up of yellow coarse sandy soil. However, more work in the mound is needed to verify this observation.

Over the course of the fieldwork and analysis we obtained four radiocarbon dates from Md. F and two features in the Well Pad. As a group, at 1 sigma, the calibrated age range of the four dates range from A.D. 980-1250, indicating an Early Caddoan period age for habitation and mound deposits at the eastern end of the Hudnall-Pirtle site. Hopefully during future work at the site, more radiocarbon dates can be obtained from multiple contexts to reliably determine not only how long the prehistoric Caddo occupation lasted, as well as when it began and ended.

The recovered archeological materials from the village areas at the Hudnall-Pirtle site are consistent with the fact that a major Early Caddoan period occupation is present. The ceramics are dominated by sherds from vessels decorated with wet paste designs (78%). Among these are vessels decorated with horizontal incised lines, free punctation, and zoned incised-punctated elements. These are from Davis Incised, Kiam Incised, Weches Fingernail Impressed, Crockett Curvilinear Incised, and Pennington Punctated-Incised types, all part of an Alto phase ceramic assemblage (cf. Story 2000:14). The wet paste decorated sherds include a few vessel sherds from Coles Creek, *var. Coles Creek* and *var. Hardy vessels*. These distinctive sherds are probably from vessels made in the lower Mississippi Valley (LMV), and are indicative of some form of contact and interaction between the Caddo living at Hudnall-Pirtle and contemporaneous Coles Creek populations in the LMV. These particular sherds may be the product of trade and exchange at a time of dynamic changes in Caddo and Coles Creek societies between ca. A.D. 900-1050.

The ceramic assemblage at Hudnall-Pirtle also has engraved fine wares from Hickory Engraved, Spiro Engraved, and Holly Fine Engraved types; sherds from these types comprise 22% of the decorated sherds. There are also a number of plain rims from many undecorated vessels in the ceramic assemblage.

Based on differences in proportions of decorative methods represented in the decorated sherds, especially the percentage of incised sherds and the number of Coles Creek Incised sherds, it is possible that the earliest Caddo occupation took place in the Well Pad area, with later Caddo settlement better represented in the Southwest Village area. Whether there was a continuous occupation in all parts of the Hudnall-Pirtle site is still an open question, but the ceramic decorated sherd assemblage is suggestive of different occupational episodes at the site. It might also indicate that the construction and use of the mounds and plaza may be the result of a lengthy, but not necessarily continuous Caddo occupation throughout the early Caddoan period.

The lithic tool assemblage is dominated by unifacial expedient flake tools and arrow points, as well as grinding slabs and manos of moderate size. The different proportions of arrow point forms in the excavated areas suggest that the earliest use of the site took place in the Southwest Village area—the exact opposite of the decorated ceramic sherd evidence—as the Scallorn and Friley forms are found exclusively in the Southwest Village area.

From the recovered tools, cores, and lithic debris in village areas at Hudnall-Pirtle, the lithic technological strategy of the Caddo knappers was to reduce small pieces of local lithic raw materials to manufacture flake tools and smaller flake blanks for arrow points. Local cherts were the most common raw material in all the habitation areas, but non-local lithic raw materials are best represented in the Southwest Village area. These materials included novaculite and baked/fused cherts from the Manning Formation.

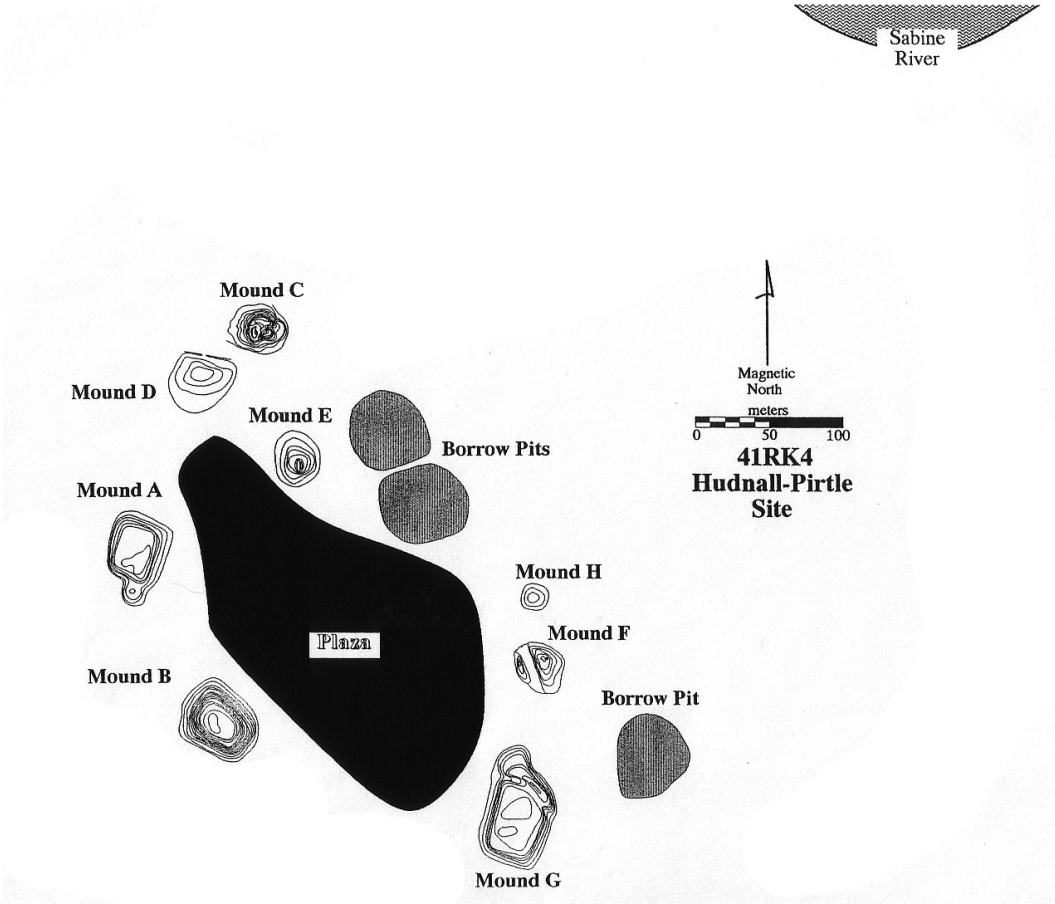

Figure 41. Plan of mounds, plaza, and borrow pits at the Hudnall-Pirtle site.

The wide variety of chipped and ground stone tools recovered in habitation areas at Hudnall-Pirtle indicates that a diverse range of domestic tasks took place in each part of the site during the early Caddo occupation. These tasks apparently included hunting, game animal processing, stone tool production, and the processing of gathered and cultivated plant foods.

Subsistence remains recovered in the habitation archeological deposits include large game animals (deer and bison) and turtles, as well as various plant remains. The plant remains are dominated by maize, a tropical cultigen, ands nutshells (from the gathering of hardwood mast), and a few seeds (of persimmon and purslane). The maize ubiquity in the flotation samples from features is 44%, suggesting that the cultivation of maize was part of a low-level food-producing society (cf. Smith 2001).

The Hudnall-Pirtle site during the Early Caddoan period occupation was clearly an important civic-ceremonial center, certainly the premier mound complex in the Sabine River basin of northeastern Texas. Story (2000:23) suggests it may have been a Caddo center of great regional importance. This may well be the case, but its full importance during the ca. A.D. 1000-1200 period will not be recognized or understood until further studies of the major mounds and extensive village deposits can be conducted. When was the early Caddo settlement established at Hudnall-Pirtle, and how did the mound center develop through time with respect to community organization and inter-relationships, mortuary behavior, and material culture changes? These questions are just the tip of the iceberg in terms of what it will be important to know about the origins and development of Caddo native history at this important place. Until such time as concerted and detailed archeological investigations can take place at the Hudnall-Pirtle site, it is good to realize that the site is being effectively protected and preserved by The Archaeological Conservancy.

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Appendix 1,

Radiocarbon Data Forms from the Hudnall-Pirtle Site (41RK4)

CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-8.7:lab. mult=1)

Laboratory number: **Beta-129982**

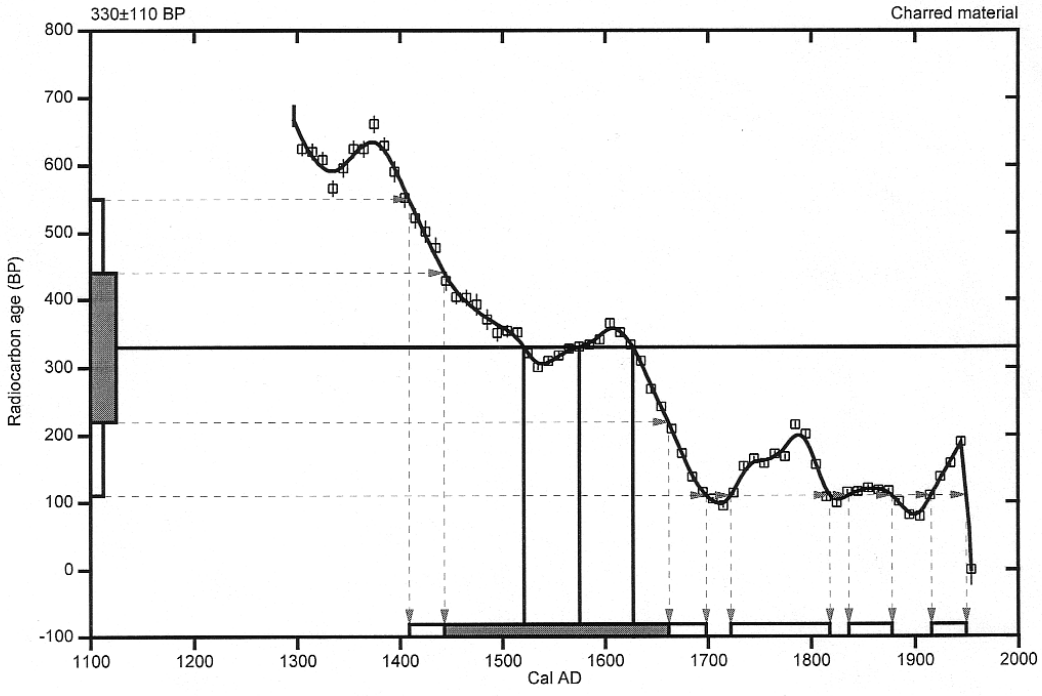
Conventional radiocarbon age: **330±110 BP**

2 Sigma calibrated results: (95% probability) **Cal AD 1410 to 1700 (Cal BP 540 to 250) and Cal AD 1720 to 1820 (Cal BP 230 to 130) and Cal AD 1835 to 1880 (Cal BP 115 to 70) and Cal AD 1915 to 1950 (Cal BP 35 to 0)**

Intercept data

Intercepts of radiocarbon age with calibration curve: Cal AD 1520 (Cal BP 430) and Cal AD 1575 (Cal BP 375) and Cal AD 1625 (Cal BP 325)

1 Sigma calibrated results: (68% probability) Cal AD 1445 to 1660 (Cal BP 505 to 290)



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Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2), p317-322

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-9.4:lab. mult=1)

Laboratory number: **Beta-129983**

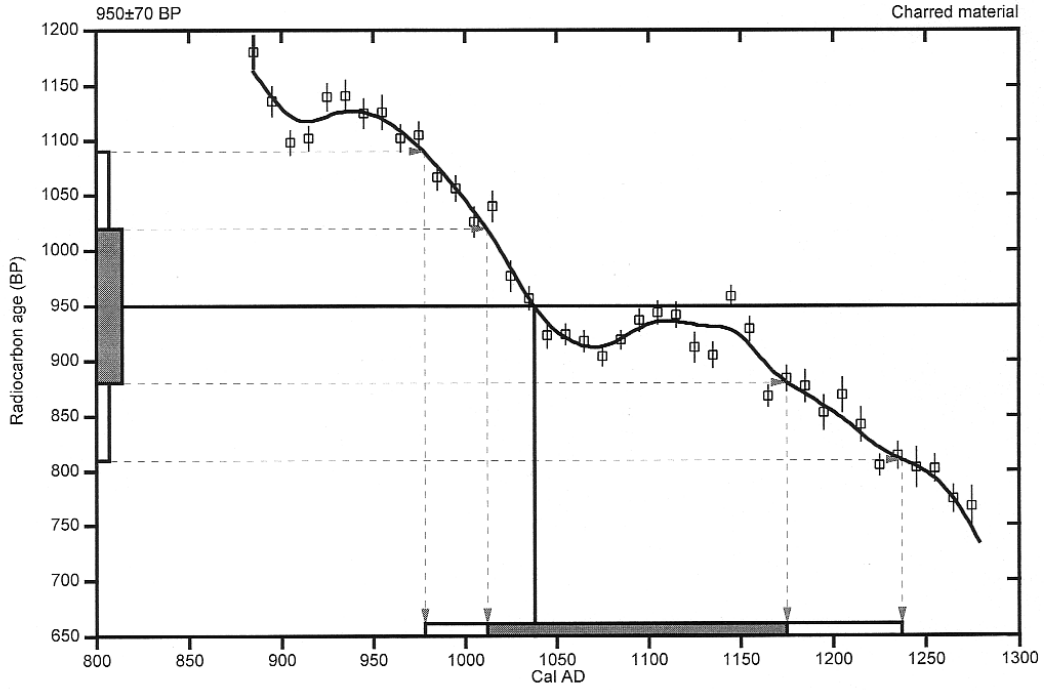
Conventional radiocarbon age: **950±70 BP**

2 Sigma calibrated result: (95% probability) **Cal AD 980 to 1235 (Cal BP 970 to 715)**

Intercept data

Intercept of radiocarbon age with calibration curve: Cal AD 1040 (Cal BP 910)

1 Sigma calibrated result: (68% probability) Cal AD 1010 to 1175 (Cal BP 940 to 775)



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INTCAL98 Radiocarbon Age Calibration
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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-10.1:lab. mult=1)

Laboratory number: **Beta-129984**

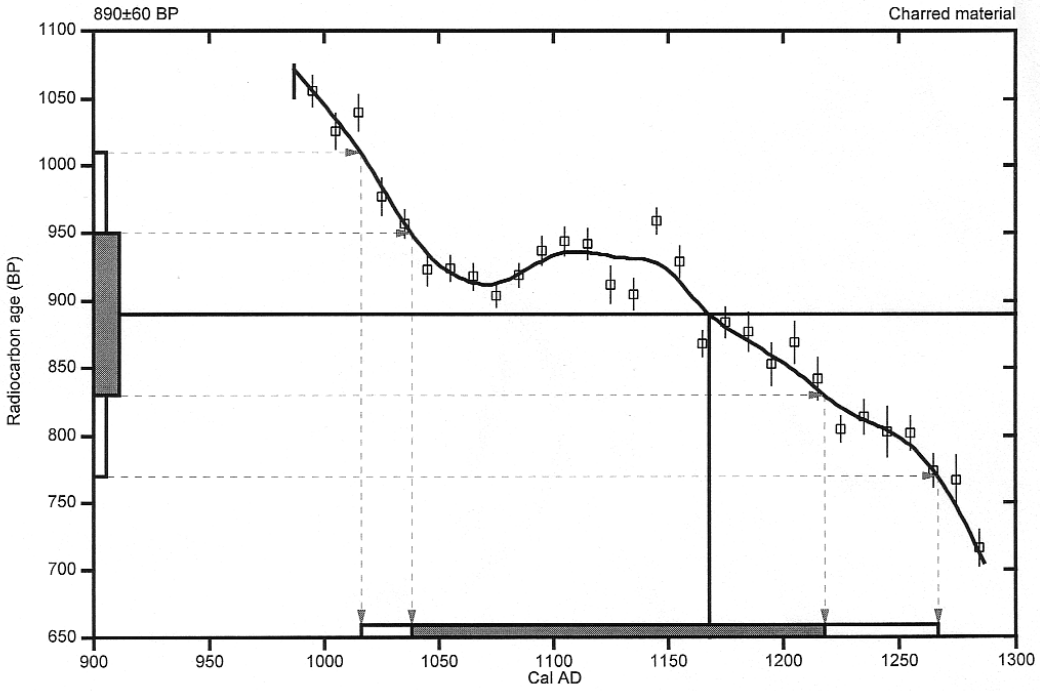
Conventional radiocarbon age: **890±60 BP**

2 Sigma calibrated result: (95% probability) **Cal AD 1015 to 1265 (Cal BP 935 to 685)**

Intercept data

Intercept of radiocarbon age with calibration curve: Cal AD 1170 (Cal BP 780)

1 Sigma calibrated result: (68% probability) Cal AD 1040 to 1220 (Cal BP 910 to 730)



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Mathematics

A Simplified Approach to Calibrating C14 Dates

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Appendix 2,

Vessel Sherds from the Hudnall-Pirtle Site, by James E. Bruseth

Appendix: Vessel Sherds

Provenience (Unit/Shovel Test [ST]/Feature)	0	1	2	3	4	5	6	7	8	10	11	12	13	14
Site Area		NW	NW	MF	SW	SW	SW	NW	SW	WP	MF	SW	SW	MA
Wet Paste														
Incised Lines	8	1	1		26	6	25		1	2	1	6	8	2
Free Punctates	14	2	2	1	32	1	30	1				17	11	3
Fingernail Punctations with Horizontal Lines	1				4		1					1	2	1
Triangular-end Tool Punctations with Horizontal Incised lines	1					1						2		
Circular Punctations with Linear Incised lines	1												2	1
Circular Punctations within Curvilinear-Incised Lines														
Horizontal-Incised lines with Body Punctations							1							
Horizontal-Incised Rim Lines with Single Row Triangular-end Tool Punctations					2							1		
Total Wet Paste Decorated Sherds	25	3	3	1	64	8	57	1	1	2	1	27	23	7
Engraved														
Horizontal Engraved Lines			1		4		7	1		1		2	2	
Concentric Engraved Lines			1		3	1						2		1
Vertical Engraved Lines		1			4		1							3
Misc. Engraved	2	1	1	1	6	1	9					8	9	
Total Engraved Sherds	2	2	3	1	17	2	17	1	0	1	0	12	11	4
Total Decorated Sherds	27	5	6	2	81	10	74	2	1	3	1	39	34	11
Undecorated Sherds														
Undecorated Body Sherds	15	4	12	9	303	43	210	16	19	7	6	155	122	41
Undecorated Rim Sherds		1	1		11	1	11	1	2	1		13	5	
Total Undecorated Sherds	15	5	13	9	314	44	221	17	21	8	6	168	127	41
Total Large Small Sherds (greater than one cm)	42	10	19	11	395	54	295	19	22	11	7	207	161	52
Small Sherds (less than one cm)	19	12	36	15	68	15	85	70	7	15		53	90	30
Total Vessel Sherds	61	22	55	26	463	69	380	89	29	26	7	260	251	82

Appendix: Vessel Sherds

Provenience (Unit/Shovel Test [ST]/Feature)	16	18	18/20	4/18/20/21	19	20	21	22	23	24	101	102	103	104
Site Area	SW	SW	SW	SW	NW	SW	SW	SW	SW	MF	WP	WP	WP	WP
Wet Paste														
Incised Lines	18	4	5		1	15	18	2	2	1	3		1	1
Free Punctates	11	13	5		1	19	21	1	2			5	2	1
Fingernail Punctations with Horizontal Lines		1	1			1	2		1					
Triangular-end Tool Punctations with Horizontal Incised lines	4					2	1							
Circular Punctations with Linear Incised lines						2	4							
Circular Punctations within Curvilinear-Incised Lines						2								
Horizontal-Incised lines with Body Punctations						1								
Horizontal-Incised Rim Lines with Single Row Triangular-end Tool Punctations							1	1				1	1	
Total Wet Paste Decorated Sherds	33	18	11	0	2	42	47	4	5	1	3	6	4	2
Engraved														
Horizontal Engraved Lines	2		1			1	4							
Concentric Engraved Lines	1					1	1	1			1			
Vertical Engraved Lines	1	1				1								
Misc. Engraved	3	3	3		1	2	9	3						
Total Engraved Sherds	7	4	4	0	1	5	14	4	0	0	1	0	0	0
Total Decorated Sherds	40	22	15	0	3	47	61	8	5	1	4	6	4	2
Undecorated Sherds														
Undecorated Body Sherds	140	150	49	10	7	119	242	40	20	3	17	11	27	4
Undecorated Rim Sherds	6	5	1			7	21	3	1					1
Total Undecorated Sherds	146	155	50	10	7	126	263	43	21	3	17	11	27	5
Total Large Small Sherds (greater than one cm)	186	177	65	10	10	173	324	51	26	4	21	17	31	7
Small Sherds (less than one cm)	64	193	70	0	3	61	44	47	51	4	33	20	40	19
Total Vessel Sherds	250	370	135	10	13	234	368	98	77	8	54	37	71	26

Appendix: Vessel Sherds

Provenience (Unit/Shovel Test [ST]/Feature)	105	106	107	108	109	110	111	112	113	114	115	116	117	118
Site Area	WP	WP	WP	WP	WP	WP	WP	WP	WP	WP	WP	WP	WP	WP
Wet Paste														
Incised Lines		7	4	1	2	1	1			3	1	2	3	1
Free Punctates		7	2		1			2		1		1	2	2
Fingernail Punctations with Horizontal Lines		1	2		1									
Triangular-end Tool Punctations with Horizontal Incised lines		1								1				
Circular Punctations with Linear Incised lines		1												
Circular Punctations within Curvilinear-Incised Lines		1												
Horizontal-Incised lines with Body Punctations														
Horizontal-Incised Rim Lines with Single Row Triangular-end Tool Punctations									1					
Total Wet Paste Decorated Sherds	0	18	8	1	4	1	1	2	1	5	1	3	5	3
Engraved														
Horizontal Engraved Lines		2							1					
Concentric Engraved Lines			1											
Vertical Engraved Lines														
Misc. Engraved	2	1	3			2					1	1		
Total Engraved Sherds	2	3	4	0	0	2	0	0	1	0	1	1	0	0
Total Decorated Sherds	2	21	12	1	4	3	1	2	2	5	2	4	5	3
Undecorated Sherds														
Undecorated Body Sherds	7	69	76	16	15	19	4	13	21	12	22	17	22	25
Undecorated Rim Sherds		4	2	2			1	2					1	
Total Undecorated Sherds	7	73	78	18	15	19	5	15	21	12	22	17	23	25
Total Large Small Sherds (greater than one cm)	9	94	90	19	19	22	6	17	23	17	24	21	28	28
Small Sherds (less than one cm)	14	134	139	36	25	39	10	34	110	71	43	79	21	97
Total Vessel Sherds	23	228	229	55	44	61	16	51	133	88	67	100	49	125

Appendix: Vessel Sherds

Provenience (Unit/Shovel Test [ST]/Feature)	119	120	121	122	123	124	125	126	127	128	129	130	131	132
Site Area	WP	WP	WP	WP	WP	WP	WP	WP	WP	WP	WP	WP	WP	WP
Wet Paste														
Incised Lines	3	2	1	1				1		1		1		1
Free Punctates			3	2				3				1	1	
Fingernail Punctations with Horizontal Lines		1												
Triangular-end Tool Punctations with Horizontal Incised lines														
Circular Punctations with Linear Incised lines														
Circular Punctations within Curvilinear-Incised Lines														
Horizontal-Incised lines with Body Punctations														
Horizontal-Incised Rim Lines with Single Row Triangular-end Tool Punctations														
Total Wet Paste Decorated Sherds	3	3	4	3	0	0	0	4	0	1	0	2	1	1
Engraved														
Horizontal Engraved Lines			1				1							
Concentric Engraved Lines	2											1		
Vertical Engraved Lines														
Misc. Engraved		1			1									
Total Engraved Sherds	2	1	1	0	1	0	1	0	0	0	0	1	0	0
Total Decorated Sherds	5	4	5	3	1	0	1	4	0	1	0	3	1	1
Undecorated Sherds														
Undecorated Body Sherds	29	27	35	23	16	10	10	20	5	8	10	7	7	3
Undecorated Rim Sherds	4		1		1		1		1					
Total Undecorated Sherds	33	27	36	23	17	10	11	20	6	8	10	7	7	3
Total Large Small Sherds (greater than one cm)	38	31	41	26	18	10	12	24	6	9	10	10	8	4
Small Sherds (less than one cm)	103	113	30	96	52	6	27	59	32	48	37	36	40	3
Total Vessel Sherds	141	144	71	122	70	16	39	83	38	57	47	46	48	7

Appendix: Vessel Sherds

Provenience (Unit/Shovel Test [ST]/Feature)	133	134	135	136	137	138	139	140	201	202	204	205	Pipeline Monitoring	ST 02
Site Area	WP	WP	WP	WP	WP	WP	WP	WP	WP	WP	WP	WP	PIPELINE	ST
Wet Paste														
Incised Lines	1				1		5	2				1		
Free Punctates				3	4	4	1						1	1
Fingernail Punctations with Horizontal Lines														
Triangular-end Tool Punctations with Horizontal Incised lines														
Circular Punctations with Linear Incised lines				1										
Circular Punctations within Curvilinear-Incised Lines														
Horizontal-Incised lines with Body Punctations														
Horizontal-Incised Rim Lines with Single Row Triangular-end Tool Punctations													1	
Total Wet Paste Decorated Sherds	1	0	0	4	5	4	6	2	0	0	0	1	2	1
Engraved														
Horizontal Engraved Lines								2						1
Concentric Engraved Lines														
Vertical Engraved Lines														
Misc. Engraved				1										1
Total Engraved Sherds	0	0	0	1	0	0	0	2	0	0	0	0	0	2
Total Decorated Sherds	1	0	0	5	5	4	6	4	0	0	0	1	2	3
Undecorated Sherds														
Undecorated Body Sherds	16	19	21	16	20	3	18	13		11	1	2	4	2
Undecorated Rim Sherds	2		1					1				1		
Total Undecorated Sherds	18	19	22	16	20	3	18	14	0	11	1	3	4	2
Total Large Small Sherds (greater than one cm)	19	19	22	21	25	7	24	18	0	11	1	4	6	5
Small Sherds (less than one cm)	67	50	83	72	91	14	67	123	1	8	3	6	2	14
Total Vessel Sherds	86	69	105	93	116	21	91	141	1	19	4	10	8	19

Appendix: Vessel Sherds

Provenience (Unit/Shovel Test [ST]/Feature)	ST 03	ST 04	ST 05	ST 06	ST 07	ST 08	ST 09	ST 10	ST 16	ST 19	ST 20	ST 21	ST 22	ST 23
Site Area	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST
Wet Paste														
Incised Lines										1		1		
Free Punctates							1		2					
Fingernail Punctations with Horizontal Lines		1					1							
Triangular-end Tool Punctations with Horizontal Incised lines														
Circular Punctations with Linear Incised lines														
Circular Punctations within Curvilinear-Incised Lines														
Horizontal-Incised lines with Body Punctations														
Horizontal-Incised Rim Lines with Single Row Triangular-end Tool Punctations														
Total Wet Paste Decorated Sherds	0	1	0	0	0	0	2	0	2	1	0	1	0	0
Engraved														
Horizontal Engraved Lines								1						
Concentric Engraved Lines														
Vertical Engraved Lines					1									
Misc. Engraved		1												
Total Engraved Sherds	0	1	0	0	1	0	0	1	0	0	0	0	0	0
Total Decorated Sherds	0	2	0	0	1	0	2	1	2	1	0	1	0	0
Undecorated Sherds														
Undecorated Body Sherds	2	4				3	1		1	1	1		1	2
Undecorated Rim Sherds														
Total Undecorated Sherds	2	4	0	0	0	3	1	0	1	1	1	0	1	2
Total Large Small Sherds (greater than one cm)	2	6	0	0	1	3	3	1	3	2	1	1	1	2
Small Sherds (less than one cm)		15	1	5	4	8	4	5	3	6	10	4	2	2
Total Vessel Sherds	2	21	1	5	5	11	7	6	6	8	11	5	3	4

Appendix: Vessel Sherds

Provenience (Unit/Shovel Test [ST]/Feature)	ST 24	ST 25	ST 26	ST 27	ST 28	ST 30	ST 34	ST 35	ST 36	ST 37	ST 38	ST 39	ST 41	ST 42
Site Area	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST
Wet Paste														
Incised Lines														
Free Punctates												1		
Fingernail Punctations with Horizontal Lines														
Triangular-end Tool Punctations with Horizontal Incised lines														
Circular Punctations with Linear Incised lines														
Circular Punctations within Curvilinear-Incised Lines														
Horizontal-Incised lines with Body Punctations														
Horizontal-Incised Rim Lines with Single Row Triangular-end Tool Punctations														
Total Wet Paste Decorated Sherds	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Engraved														
Horizontal Engraved Lines														
Concentric Engraved Lines														
Vertical Engraved Lines														
Misc. Engraved									1					
Total Engraved Sherds	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Total Decorated Sherds	0	0	0	0	0	0	0	0	1	0	0	1	0	0
Undecorated Sherds														
Undecorated Body Sherds					3	1			2			1	5	
Undecorated Rim Sherds														
Total Undecorated Sherds	0	0	0	0	3	1	0	0	2	0	0	1	5	0
Total Large Small Sherds (greater than one cm)	0	0	0	0	3	1	0	0	3	0	0	2	5	0
Small Sherds (less than one cm)		2	1	1	1	5	3	3		1	2	5	5	4
Total Vessel Sherds	0	2	1	1	4	6	3	3	3	1	2	7	10	4

Appendix: Vessel Sherds

Provenience (Unit/Shovel Test [ST]/Feature)	ST 44	ST 45	ST 46	ST 47	ST 48	ST 51	ST 52	ST 53	ST 54	ST 55	ST 56	ST 57	ST 58	ST 66
Site Area	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST	ST
Wet Paste														
Incised Lines						1			1					
Free Punctates							2							
Fingernail Punctations with Horizontal Lines														
Triangular-end Tool Punctations with Horizontal Incised lines														
Circular Punctations with Linear Incised lines														
Circular Punctations within Curvilinear-Incised Lines														
Horizontal-Incised lines with Body Punctations														
Horizontal-Incised Rim Lines with Single Row Triangular-end Tool Punctations														
Total Wet Paste Decorated Sherds	0	0	0	0	0	1	2	0	1	0	0	0	0	0
Engraved														
Horizontal Engraved Lines								1						
Concentric Engraved Lines														
Vertical Engraved Lines						1								
Misc. Engraved								1						
Total Engraved Sherds	0	0	0	0	0	1	0	2	0	0	0	0	0	0
Total Decorated Sherds	0	0	0	0	0	2	2	2	1	0	0	0	0	0
Undecorated Sherds														
Undecorated Body Sherds						1	1	5	3	5	2	1		1
Undecorated Rim Sherds														
Total Undecorated Sherds	0	0	0	0	0	1	1	5	3	5	2	1	0	1
Total Large Small Sherds (greater than one cm)	0	0	0	0	0	3	3	7	4	5	2	1	0	1
Small Sherds (less than one cm)	1	10	1	1	1	4	1	14	2	11	2	5	2	
Total Vessel Sherds	1	10	1	1	1	7	4	21	6	16	4	6	2	1

Appendix: Vessel Sherds

Provenience (Unit/Shovel Test [ST]/Feature)	Feature 8	Feature 10	Feature 13	Feature 14	Feature 16	Feature 104	Feature 105	Feature 106	Feature 107	Feature 108	Feature 109	Feature 110
Site Area	PIPELINE	MF	SW	SW	SW	WP	WP	WP	WP	WP	WP	WP
Wet Paste												
Incised Lines						1						2
Free Punctates											2	4
Fingernail Punctations with Horizontal Lines	1		3	2								
Triangular-end Tool Punctations with Horizontal Incised lines												1
Circular Punctations with Linear Incised lines												1
Circular Punctations within Curvilinear-Incised Lines												
Horizontal-Incised lines with Body Punctations												
Horizontal-Incised Rim Lines with Single Row Triangular-end Tool Punctations												
Total Wet Paste Decorated Sherds	1	0	3	2	0	1	0	0	0	0	2	8
Engraved												
Horizontal Engraved Lines					1	1						
Concentric Engraved Lines												
Vertical Engraved Lines												
Misc. Engraved						1						
Total Engraved Sherds	0	0	0	0	1	2	0	0	0	0	0	0
Total Decorated Sherds	1	0	3	2	1	3	0	0	0	0	2	8
Undecorated Sherds												
Undecorated Body Sherds		2	11	14	3	22	1	1	7		2	20
Undecorated Rim Sherds												
Total Undecorated Sherds	0	2	11	14	3	22	1	1	7	0	2	20
Total Large Small Sherds (greater than one cm)	1	2	14	16	4	25	1	1	7	0	4	28
Small Sherds (less than one cm)						137				1		
Total Vessel Sherds	1	2	14	16	4	162	1	1	7	1	4	28

Appendix: Vessel Sherds

Provenience (Unit/Shovel Test [ST]/Feature)	Feature 111	Feature 112	Feature 114	Feature 116	Total
Site Area	WP	WP	WP	WP	
Wet Paste					
Incised Lines				1	213
Free Punctates					249
Fingernail Punctations with Horizontal Lines					29
Triangular-end Tool Punctations with Horizontal Incised lines					14
Circular Punctations with Linear Incised lines					13
Circular Punctations within Curvilinear-Incised Lines					3
Horizontal-Incised lines with Body Punctations					2
Horizontal-Incised Rim Lines with Single Row Triangular-end Tool Punctations					9
Total Wet Paste Decorated Sherds	0	0	0	1	532
Engraved					
Horizontal Engraved Lines					38
Concentric Engraved Lines					17
Vertical Engraved Lines					14
Misc. Engraved					80
Total Engraved Sherds	0	0	0	0	149
Total Decorated Sherds	0	0	0	1	681
Undecorated Sherds					
Undecorated Body Sherds	3	2	5	1	2,636
Undecorated Rim Sherds					117
Total Undecorated Sherds	3	2	5	1	2,753
Total Large Small Sherds (greater than one cm)	3	2	5	2	3,434
Small Sherds (less than one cm)	2			1	3,597
Total Vessel Sherds	5	2	5	3	7,031

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