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Salado Cave near top of limestone bluff overlooking Salado Creek. Original W. W. Crook, Jr. photograph, 1948.

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Membership in the Society is for the calendar year. Dues are as follows: Individual, $20; Family, $25; Contributing, $30 and above; Student, $10. Meetings are held the third Thursday of every month except June at 7:00 pm in the Carriage House of the Clayton Library Center for Genealogical Research, 5300 Caroline, Houston, TX 77004. All members receive the monthly *Profile* and the yearly *Journal* (student members do not receive the *Journal*). Contributors to future issues of the *Journal* should submit manuscripts to Journal editor Linda L. Swift at the Society address or by e-mail to swiftlinda@sbcglobal.net.

Errata: HAS Journal No. 131 contains an article by Patterson and Hudgins entitled "Artifact Collections from the Coastal Prairie of Eastern Wharton County, Texas." There are two errors in the published version of this article. The last four pages should be numbered 40 to 43 instead of 36 to 39. The Figure 9 caption is incomplete and should include: A-Gary, B-Kent, C-Scallorn, D-Perdiz, E-Ensor, F to H-Ellis. We regret any confusion this might have caused on the part of our readers. – Ed.

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Freshwater Shell Middens in Southeast Texas

Leland W. Patterson

Introduction

Brackish water shell middens on the coastal margin of Southeast Texas are well known (Aten 1983; Patterson 2005), but little attention has been given to freshwater mussel shell middens in the inland part of this region. The growth of freshwater mussels is sporadic in both time and space in streams of inland Southeast Texas, as reflected by the locations and time periods of freshwater shell middens.

Many sites in inland Southeast Texas have a few mussel shells, but only a few sites have large enough accumulations of shells to be classified as shell middens. Most freshwater shell middens of Southeast Texas have been found in the inland part of the western area of this region, along the San Bernard River in Fort Bend County. One freshwater shell midden is located on Peach Creek in Wharton County.

This article gives a summary of freshwater shell midden sites found so far in Southeast Texas. The freshwater shell middens have a time range from the Late Paleoindian period (8000-5000 BC) through the Historic Indian period (AD 1500-1800+). Shell middens have good preservation of faunal remains, and radiocarbon dates can be obtained from the shell.

The Sites

Freshwater shell midden sites in Southeast Texas are summarized in Table 1, with five sites in Fort Bend County along the San Bernard River, and one site in Wharton County on Peach Creek. Freshwater mussels can be found in many streams of inland Southeast Texas, but only a few streams had enough mussels for significant utilization by hunter-gatherers, with resulting formation of shell middens. Some freshwater shell middens here have components in prehistoric time periods from the latter part of the Late Paleoindian period through the Late Prehistoric period. One site (41WH12) also has a Historic Indian component.

Radiocarbon Dates

Mussel shells can be used for radiocarbon dating. A summary of radiocarbon dates from freshwater shell middens in Southeast Texas is given in Table 2. There are six radiocarbon dates ranging from the latter part of the Late Paleoindian period to the Late Prehistoric period. The earliest dates are especially useful in identifying time periods and temporal placement of some projectile point types.

Vertebrate Remains

There is good preservation of vertebrate remains at shell middens because of alkaline conditions caused by carbonates in shell. Bill McClure has analyzed vertebrate remains from five freshwater shell middens (McClure 1986, 1987, 1989, 1991, 1993). These data give a good picture of the wide range of faunal food resources utilized by hunter-gatherers in this region.

Table 3 gives a representative sample of vertebrate remains from the five shell middens studied by McClure. Hunting was a major activity of occupants of these sites.

Molluscan Remains

Shells from two freshwater shell middens have been analyzed. Seven species of freshwater mussels have been recovered from 41FB34 (Neck 1986), and 10 freshwater mussel shell species were recovered from 41FB32 (Neck 1991), as well as 12 species of snails. Shellfish meat is not a high-value food and should be considered as a supplemental food source that was easily available.

Summary

Freshwater shell middens in the western part of inland Southeast Texas are important sources of archeological data, covering a wide time range from the latter part of the Late Paleoindian period through the Historic Indian period. Shell has been used to obtain radiocarbon dates. The good preservation of faunal remains shows the wide range of faunal food resources used by hunter-gatherers in Southeast Texas.

A large number of freshwater mussel species has been found in the shell middens discussed here. Shellfish meat is not a high-value food and should be regarded as a supplemental food resource that was easily available.

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Table 1
Freshwater Shell Midden Sites

Site	County	Time Period(s)*	References
41FB32	Fort Bend	MA, LA	Patterson, Hudgins 1987a
41FB34	Fort Bend	MA, LA	Patterson, Hudgins 1986
41FB35	Fort Bend	LA, EC	Patterson, Hudgins 1992
41FB37	Fort Bend	P, EA	Patterson, Hudgins 1987b
41FB43	Fort Bend	LP	Patterson, Hudgins 1989b
41WH12	Wharton	LP, HI, EC, LA	Patterson, Hudgins 1989a

* P Late Paleoindian, 8000-5000 BC
EA Early Archaic, 5000-3000 BC
MA Middle Archaic, 3000-1500 BC
LA Late Archaic, 1500 BC-AD 100
EC Early Ceramic, AD 100-600
LP Late Prehistoric, AD 600-1500
HI Historic Indian, AD 1500-1800+

Table 2
Radiocarbon Dates

Site	Radiocarbon Date, BP	Calibrated Date*	References
41WH12	960 +/- 80	AD 1040	Patterson 1990
41 WH12	1050 +/- 80	AD 1000	Patterson, Hudgins 1989a
41 WH12	1930 +/- 80	AD 80	Patterson, Hudgins 1989a
41FB34	5210 +/- 110	4060 BC	Patterson 1989
41FB37	6490 +/- 120	5430 BC	Patterson1988
41FB37	6690 +/- 120	5580 BC	Patterson 1988

*Stuiver, M., and B. Becker 1993

Table 3
Vertebrate Remains

Mammals & Birds	Reptiles	Fish
Deer	Turtle	Gar
Rabbit	Frog	Drum
Raccoon	Snakes, various	Catfish
Gopher	Alligator	Bowfin
Bison		Buffalo
Cotton Rat		Bass
Mouse		Misc. fish
Opossum		
Turkey		
Quail		
Beaver		
Coyote		
Misc. birds		

Characteristics of Shell Middens on the Coastal Margins of Southeast Texas

Leland W. Patterson

Introduction

Hundreds of prehistoric shell middens have been found on the coastal margins of Southeast Texas, with a few having historic components (Patterson 2005). The coastal margin of this region is a zone about 18 miles (29 km) wide from the Gulf shoreline, where tidal flow upstream creates brackish water. The coastal margin had a hunter-gather lifeway that emphasized aquatic food resources but also utilized terrestrial food resources (Patterson 1995:Table 2, 1996:Tables 16, 17).

The cultural sequence for the coastal margin of Southeast Texas has been discussed in a separate report (Patterson 2006). This sequence has a known time span from the Early Archaic period (5000-3000 BC) through the Historic Indian period (AD 1500-1800+). Artifact assemblages from the coastal margin shell middens are different from artifact assemblages in inland sites in Southeast Texas. Coastal margin sites usually have much pottery and modest amounts of lithic materials. Inland sites in this region usually have significant amounts of lithic materials, modest amounts of pottery, and no shell tools.

The characteristics and formation processes of shell middens can give significant information regarding the lifeways of hunter-gatherers of this subregion of Southeast Texas. Various characteristics of shell middens are discussed here, and some conclusions are made concerning mobility and social complexity.

Shell Types

Most shell middens on the coastal margins of Southeast Texas are composed of shell from the brackish water clam, *Rangia cuneata.* Some middens also have a small proportion of oyster shell, which probably indicates fluctuations in salinity due to variable freshwater flow rates. Only a few pure oyster shell middens have been found, such as on the north shore of East Bay in the Galveston Bay system. As the effect of tidal flow diminishes farther upstream in streams leading to the Gulf, Rangia shell middens may contain a small proportion of freshwater mussel shell, such as at site 41HR639 (Patterson 1990).

Shell middens on the coastal margin of Southeast Texas can vary from a few meters in diameter to several acres in area. Smaller shell middens tend to be on upstream locations farthest inland, and large shell middens are found within a few kilometers of the Gulf shoreline. Examples of large shell middens are site 41GV53 with an area of about 3 acres (Howard et al. 1991; Patterson et al. 2001), and site 41HR74 with a present area above water of about 10 acres (Duke 1981). Several more acres of 41HR74 are now underwater due to modern coastal subsidence. Some shell middens were large enough to be mined commercially in modern times to obtain material for road stabilization and chemical plant paving.

Gadus (2005:155) has used the terms "dumps" and "piles" to describe shell middens along the Texas coast. These terms are somewhat misleading. Most shell middens on the coastal margin of Southeast Texas can best be described as paved, probably to improve living surfaces. The thickness of a shell midden depends on how many times the area has been repaved. Many shell middens are located on relatively high ground above stream and lake edges.

Population Dynamics

Relative population levels can be determined by the number of sites in each time period. On the coastal margin of Southeast Texas there was a sharp increase in population level from the Late Archaic period (1500 BC-AD 100) into the Early Ceramic period (AD 100-600), as shown by Patterson 1995: Figure 3; 1996: Figure 10; 2006: Figure 3. Population level continued to increase from the Early Ceramic period into the Late Prehistoric period (AD 600-1500), but at a slower rate. The effects of population level on mobility and social complexity are discussed below.

Shell Midden Growth Rates

The intensity of use of a shell midden can be determined by the rate of increase in midden depth, including relative intensity of use in various time periods. At site 41GV53, the rate of midden depth buildup for the period of AD 80-1500 was about twice that of the earlier period of 4220 BC to AD 80. This indicates more intensive use of the site in the Early Ceramic and Late Prehistoric periods (Patterson et al. 2001:13). This corresponds to much higher population levels in the Early Ceramic and Late Prehistoric periods than in previous time periods. As mentioned above, there were also many more shell midden sites with Early Ceramic and Late Prehistoric components than in earlier time periods.

Ceramics

Many large shell middens in this region have large amounts of pottery. For example, excavations at large shell midden site 41GV53 by the Houston Archeological Society yielded 1,802 potsherds from five one-meter-square test pits (Patterson et al. 2001). Comparable amounts of sherds were found in previous excavations at this site (Howard et al. 1991; Hines 1992). Four test pits at large shell midden site 41CH161 yielded about 2,000 potsherds (May 1993).

Much of the pottery found at shell midden sites was probably used for cooking (Patterson 1999). One use of pottery would have been to process shellfish, which open easily in hot water during the cooking process.

Lithics

The coastal margin of Southeast Texas is a lithic-poor area. There are several lithic resources in inland Southeast Texas. The Brazos River is a prime chert source, and there is a limited amount of chert in the San Jacinto River. Petrified wood can be found in the Trinity River basin. Lithic raw materials could have been obtained for the coastal margin by direct procurement from lithic resources, by trade with inland Indians, and by scavenging at inland sites near the edge of the coastal margin.

There is little evidence for much lithic manufacturing at shell midden sites, in the form of significant concentrations of lithic flakes. Lithic flakes from shell middens are usually small, with a high percentage under 15 mm square, such as at site 41GV53 (Patterson et al. 2001: Table 7). For large shell middens, the small number of lithic flakes found by excavations probably reflects the dispersed nature of occupation events over large site areas. During the Late Prehistoric period, only small lithic flakes would be expected from the manufacture of arrow points.

Stone projectile points at shell middens are not equally distributed around the Galveston Bay system. More stone projectile points are found at shell middens on the west side of Galveston

Bay (Patterson 1999a). This may reflect more trade or better access to lithic materials by Indians of the coastal margin on the west side of Galveston Bay. On the east side of Galveston Bay there was probably more use of non-lithic materials for projectile points, as discussed below.

Stone projectile point types found on the coastal margin are the same types as found inland in Southeast Texas.

Non-Lithic Tools and Projectile Points

In the lithic-poor area of the coastal margin of Southeast Texas, non-lithic tools and projectile points have been found at shell middens. Bone dart points and arrow points were used (Aten 1983: Figure 13.3; Patterson and Ebersole 1992: Figure 1). Oyster shell was used for cutting and scraping tools (Aten 1983:264). Many oyster shell scrapers were found at shell midden site 41GV53 (Patterson et al. 2001:8). Bone tools were fairly common at this site (Patterson et al. 2001: Figures 3, 37).

Gar scale arrow points were used in place of stone arrow points (Patterson et al. 2001: Figures 3, 31, 37; 2002: Figure 5). Some gar scale arrow points were used in the Early Ceramic period before the start of standardized types of bifacial stone arrow points in the Late Prehistoric period (Patterson et al. 2001:5).

Faunal Remains

Complete prehistoric diets cannot be reconstructed in Southeast Texas because of little preservation of floral materials. However, there is good preservation of faunal materials in shell middens because of the alkaline conditions caused by carbonates in shell.

Inland and coastal areas of Southeast Texas have similar ranges of types of terrestrial faunal remains, with deer and turtle most common, but there was more emphasis on aquatic food resources on the coastal margin (Patterson 1995: Table 2; 1996: Tables 16, 17). Abundant aquatic food resources on the coastal margin would have given a high carrying capacity to accommodate high population levels in the Early Ceramic and Late Prehistoric time periods.

Rangia shellfish are not a high value food resource (Byrd 1976), but were used extensively on the coastal margin because of good availability. Shellfish in general are not high value food resources. At one site on the southwest coast of Florida, shellfish made up only 9.5% of the total edible meat represented by the total faunal assemblage (Widmer 1988:250).

At some large shell middens, such as 41GV53 (Patterson et al. 2001:9), faunal remains from the Early Ceramic and Late Prehistoric periods are greater than for previous time periods. This indicates more intensive site use after the start of ceramics, which corresponds to high population levels.

Mobility-Settlement Patterns

Data given above indicate a more sedentary lifeway at large shell midden sites in the Early Ceramic and Late Prehistoric periods, compared to earlier time periods. Large amounts of pottery are a good indication of a more sedentary lifeway, because pottery is fragile and heavy, not easily transported by mobile hunter-gatherers. The more intensive use of large shell middens in the Early Ceramic and Late Prehistoric periods indicates longer occupation events, more fre-

quent occupation events, or site use by larger groups. Hunter-gatherer groups on the coastal margin of Southeast Texas were not completely sedentary, however, as many small shell middens here indicate a higher degree of mobility.

Aten (1983: Figure 16.1) has shown distributions of artifact types on the coastal margin of Southeast Texas that indicate the coastal margin was a separate territory from the inland portion of the region. Some artifact types confined to the coastal margin are oyster shell tools, Tchefuncte pottery, bone projectile points, and Baytown Plain pottery with abundant grog temper. As noted above, inland sites have modest amounts of pottery and large amounts of lithic material, while the opposite is found at coastal margin sites with large amounts of ceramics and modest amounts of lithic materials.

Social Complexity

It would be expected that more sedentary lifeways of hunter-gatherers at large shell middens in the Early Ceramic and Late Prehistoric periods would result in some type of greater social complexity. The only apparent change in social complexity during these time periods is a Late Prehistoric mortuary tradition around the Galveston Bay system (Patterson 2006:14; Patterson et al. 2001:2). Burials here have grave goods but no items from long-distance trade, as found in the Late Archaic mortuary tradition of the western part of inland Southeast Texas (Patterson 2000b). The Late Prehistoric mortuary tradition of the coastal margin has a site on Galveston Island where the tradition continues into the Historic Indian (AD 1500-1800+) period (Ricklis 1994). This site is not a Rangia shell midden, but does have an accumulation of shellfish remains.

Conclusions

Characteristics and formation processes of large shell middens on the coastal margin of Southeast Texas give a better picture of the lifeways of hunter-gatherers in this area. Evidence indicates a more sedentary lifeway in the Early Ceramic and Late Prehistoric time periods, when there were high population levels. Abundant aquatic food resources on the coastal margin supplied high population levels compared with earlier time periods. The large amount of pottery at shell middens is a good indication of a more sedentary lifeway. More intense use of large shell middens during the Early Ceramic and Late Prehistoric periods than in earlier time periods is shown by more faunal remains and higher rates of increase in midden depth in these latter periods.

The Late Prehistoric mortuary tradition around the Galveston Bay system represents an increase in social complexity. However, hunter-gatherer groups on the coastal margin of Southeast Texas did not become completely sedentary. No stratified social organization developed, such as the Calusa had on the the Southwest coast of Florida (Widmer 1988).

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Shellfish Processing and Utilization on the Upper Texas Coast

Leland W. Patterson

Introduction

Many shellfish middens are known on the coastal margin of Southeast Texas. Some of these middens are so large that they have been mined commercially in modern times to obtain material for road stabilization and chemical plant paving. Shell middens in this area have been dated (Patterson 2006) from the Early Archaic (5000-3000 BC) to the Historic Indian period (AD 1500-1800). Many of these shell middens have long occupation sequences, especially through the Early Ceramic (AD 100-600) and Late Prehistoric (AD 600-1500) periods.

Most coastal shell middens in Southeast Texas are composed of *Rangia cuneata,* a brackish water shellfish, sometimes with a minor proportion of oyster shells. Rangia meat has a low food value (Byrd 1976), but was easily available and highly utilized. There are numerous shell middens containing oyster shells used as tools such as scrapers (Aten 1983:264, Patterson 1990, Patterson et al 2001). However, there are few examples of Rangia shells being used as tools.

This article discusses how Rangia shellfish were processed to obtain meat, and then how the meat may have been used as a food resource.

Shellfish Processing

Shellfish processing consists of opening the shell halves to obtain meat. Rangia shells are tightly sealed. I broke a knife blade when opening a Rangia shell. Prehistoric hunter-gatherers did not have tools that were appropriate for opening shellfish. Percussion would have been the main method available for mechanically opening shellfish, which would have caused mechanical damage to the shell. However, at shell middens in Southeast Texas, there is little evidence of mechanical damage to the deposits of shell halves. This indicates that heat was used for opening shellfish.

Shellfish are easily opened by use of heat, and the meat is cooked at the same time. I have opened Rangia shells in a few minutes by steaming and by boiling. The large amounts of pottery at shell middens on the coastal margin of Southeast Texas probably indicates that boiling was used to open shellfish after the start of pottery production. Before the use of pottery, shellfish could have been opened by steaming or exposure to heat near a wood fire.

Shellfish Meat Utilization

Shellfish meat could have been consumed directly from the open shell or used in soups and stews after the start of pottery production. There is another interesting possibility for utilization of shellfish meat that involves drying. Henshilwood et al (1994) have shown experimentally that shellfish meat can be easily dried in the open shell with a 75% reduction in weight due to water removal.

There would be two advantages for drying of shellfish meat. The significant reduction in meat bulk by drying would permit more of this low value food to be consumed. This higher consumption of shellfish meat is a possible explanation for the frequent use of shellfish, especially Rangia, on the coastal margin of Southeast Texas, in a concentrated higher-value food

form. Also, dry shellfish meat becomes a portable food, which could be carried by mobile hunter-gatherers on foraging trips.

Summary

Archeological and experimental data show that the use of heat is the best explanation of how shellfish were processed on the coastal margin of Southeast Texas. Use of heat easily opens shellfish and cooks the meat at the same time. Great quantities of shellfish were processed and meat consumed to form the many shell middens on the coastal margin of Southeast Texas with middens mainly composed of Rangia shells.

Drying of shellfish meat is a possible explanation for the very high utilization of shellfish in this region. Drying of shellfish meat gives a significant reduction in bulk that would have enabled a much greater consumption of this low-value food and would have given a higher-value concentrated food form. Also, dried shellfish meat is a portable food that could have been used on hunting and gathering trips. Evidence of drying of shellfish meat would not be preserved in the archeological record, but experimental data show that this procedure would be a good possibility.

Comments on procedures given here might apply to shell middens in other regions around the coasts of North America.

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2001 Additional Investigations at 41GV53, Galveston County, Texas. Houston Archeological Society, Report No. 18

Salado Cave: A Small Late Paleoindian to Archaic Occupation in Bell County, Texas

Wilson W. Crook, III

Introduction

In 1948, the writer's late father and past Texas Archeological Society President, Wilson W. Crook, Jr., began his archeological career by discovering and subsequently excavating a small site in western Bell County, Texas. In association with three former fraternity brothers from Southern Methodist University, he was drawn to the area by local stories of "an old Indian cave" somewhere west of Salado. Hoping to find evidence of early man in Texas akin to the then recent discoveries at Sandia Cave and elsewhere in the West, the cave site was excavated over the course of three, week-long visits. Altogether, 10 artifacts were recovered, including an Angostura-like point, several preforms and four blades, all potentially indicative of Late Paleoindian technology.

Although he kept notes of the excavation, Crook moved on to discoveries in the North Central Texas region without ever publishing the Salado Cave material. In 1982, he briefly renewed his interest in Salado Cave by opening up a discussion on the site's artifacts with Thomas Hester, then of the University of Texas at San Antonio. In addition, he documented the chronology of the site's discovery and its location. However, other projects always seemed to take precedence and a detailed site report was never completed.

Upon Crook's passing in 1995, the writer inherited all of his father's archeological records including the Salado Cave material. Subsequent diligent research through his extensive files has reassembled the artifact collection, the site description, and the original excavation field notes including site photos. Subsequent communication with Tom Hester produced all the correspondence between the two including Hester's 1982 analysis of the artifacts.

While I did not personally participate in the excavation, discussions with Darrell Creel of the Texas Archeological Research Laboratory (TARL) convinced me that there was both sufficient information as well as importance to warrant publication of the site. In addition, I was able to visit the location in 2007 and reconfirm the location from my father's original photos. Therefore this short note serves both to record the Salado Cave site and as a personal memorial to my father's first efforts in archeology.

Site Description

The Salado Cave site (41BL1170) lies approximately 8 km west of the town of Salado along Salado Creek in western Bell County, Texas. The cave itself is located near the top of a major limestone bluff on the east side of the creek (Figure 1). The primary datum of the site is at an elevation of 210 meters (690 feet) above sea level. Both the location and name are on file at the Texas Archeological Research Laboratory.

The Salado Cave site lies in the southern part of the Lampasas Cut Plain, a roughly triangular area of rolling hill country in north-central Texas bounded by the Brazos and Colorado Rivers. The region near the site is basically a limestone upland which has been dissected by the Brazos River and its tributaries including Salado Creek. Land forms are

generally rounded erosional uplands separated by broad, shallow valleys. Soils are thin to absent on the upland heights but are moderately deep in the valley floors where they support a mixed riparian woodland environment. Caves and rock shelters, such as Salado Cave, occur throughout the region. Edwards chert is locally abundant, typically forming as thin veins and/or nodules within the limestone bedrock.

W. W. Crook's excavation notes show Salado Cave to be quite small with a maximum interior depth of a little over 7 meters, of which the front 3 meters lies mostly outside of the current overhang of the cave roof. Interior width of the cave is roughly 2 meters. A prominent 5-7 cm vein of gray chert is present in the west wall. Extensive cave spalling has occurred in the past with ceiling material littering the floor as well as admixed in the cave fill.

Figure 1. Salado Cave near top of limestone bluff overlooking Salado Creek. Original W. W. Crook, Jr. photograph, 1948.

Artifact Assemblage

According to Crook's notes, he and his three colleagues first conducted an extensive surface survey of the general area both below and above the cave. This work yielded a number of dart points and other artifacts characteristic of Central Texas Middle to Late Archaic (Gary, Travis, Pedernales points). Within the cave itself, reportedly several arrow points and a recent bear femur ("green" in Crook's notes) were found on the surface (W. W. Crook, personal communication, 1995), but none of this material is present in the site materials (the location of the bear femur is noted in Crook's excavation map but the arrow points [or their typology] are not).

Excavation of the cave was conducted in a series of 5 x 5 foot (1.7 x 1.7 meter) hand-excavated unit squares, beginning near the mouth of the cave and generally moving toward the rear. Each square was completed to the cave bedrock before moving on to the next location. These are shown in Figure 2, sequentially numbered as they were excavated. Crook's notes were in non-metric units, which have been reproduced here in their original form.

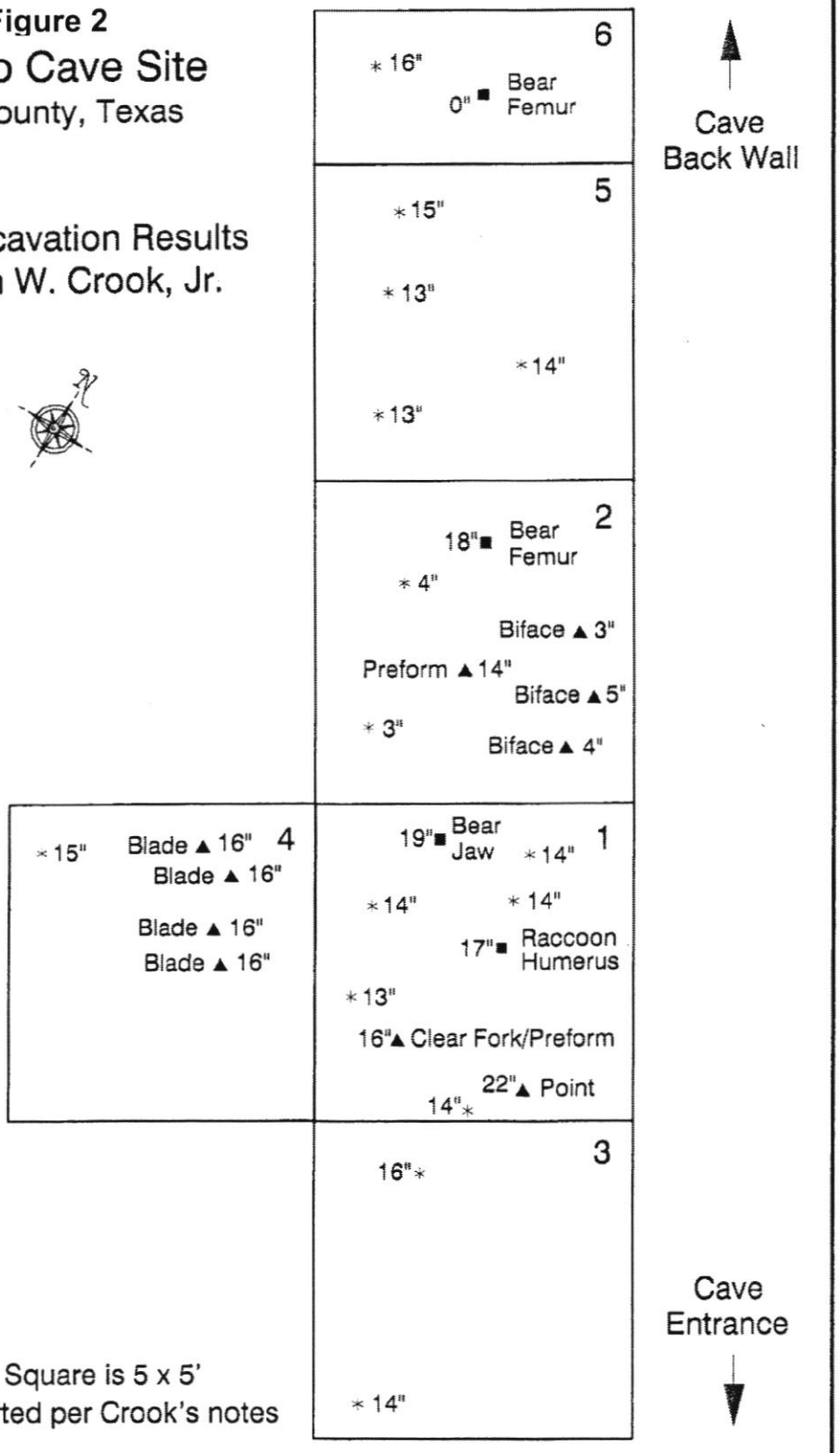
The cave fill was a combination of limestone fall from the ceiling admixed with a fine powdery dust which had been cemented by years of accumulated animal droppings. The result was the formation of an extremely tough substrate that proved resistant to almost all forms of excavation save that of geologist's pick. Evidently screening proved virtually impossible such that all excavated material had to be carefully broken up and sorted by hand. As a result, the group completed only 1-2 unit squares per week.

Figure 2

Salado Cave Site

Bell County, Texas

1948 Excavation Results
Wilson W. Crook, Jr.



▲ Artifact
* Debitage
■ Bone

Scale: Each Square is 5 x 5'
Depths reported per Crook's notes

ADO

The location and depth of all artifacts found below the surface of the cave is noted in Figure 2. Three distinct artifact horizons were found: one on the cave floor surface, one between the 3" and 6" (7-15 cm), and a third from 14-22" (35-55 cm). Three bifaces of gray chert were recovered from the upper horizon in square 2. Crook noted that they were made of identical material as present in the vein in the west wall of the cave and were almost certainly of local manufacture. Both Tom Hester and Darrell Creel, who have viewed the collection, are of the opinion that they are not of the same association as the deeper material and most likely represent a later Archaic occupation of the cave.

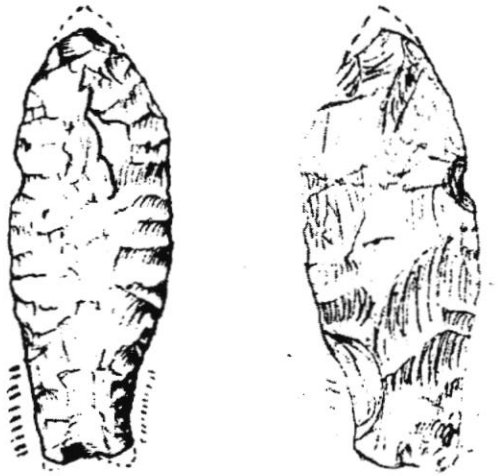


Figure 3. "Texas Angostura"-like point from Salado Cave, Bell County, Texas. Original W. W. Crook, Jr., drawing, 1948.

In the first square, Crook found a lanceolate dart point at a depth of 22" (55 cm), the deepest artifact found in the cave. The point is composed of a fine-grain dark blue-gray chert, very similar to the highly-prized Owl Creek cherts reported from the Georgetown area. The point is 58 mm in length and 22 mm wide with extensive dulling on both sides of the stem up to 20 mm (Figures 3 & 4). There is a substantial flaring above the stem reminiscent of both Hell Gap and/or Thrall points. However, for now, the writer has categorized it as a "Texas Angostura"-like point as defined by Kelly (1983a, 1983b) and Thoms (1993).

Located in the same square at a depth of 16" (41 cm) was an artifact Crook originally described as a "Clear Fork" tool but has since been characterized by the writer as a preform. The artifact displays substantial cross-thinning characteristic of Paleoindian manufacture (Figure 5). Also of note in the same square at a depth of 19" (48 cm) was the lower jaw (single mandible) of a bear. The bone was stained a deep, red-brown color, as were all the faunal remains found in the cave below a depth of 6" (15 cm). Another piece of presumably the same bear (femur) was found in square 2 at the same horizon. The humerus of a small mammal, tentatively identified as raccoon, was also found at the same level in square 1. The distal end of this bone appears to have been partially smoothed as if made into a bone tool. The end, however, is broken, making identification as a flaking tool uncertain. All mammal remains were

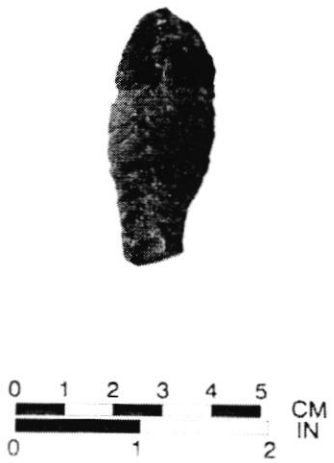


Figure 4. "Texas Angostura" –like point, Salado Cave, Bell County, Texas

later identified by the late Bob Slaughter and represent early Holocene fauna (W. W. Crook, personal communication, 1995).

In square 4, excavation revealed what Crook described as a 2' (60 cm) "pocket" which contained four finely made chert blades or blade fragments at a depth of 16" (41 cm). The blades are triangular in cross-section, show no evidence of retouch, and are relatively small (27-33 mm long, 7-9 mm wide). Three appear to be broken fragments while the fourth retains the hinge produced in manufacture. No cores or percussion flaking tools were found. The blade fragments are shown in Figure 6.

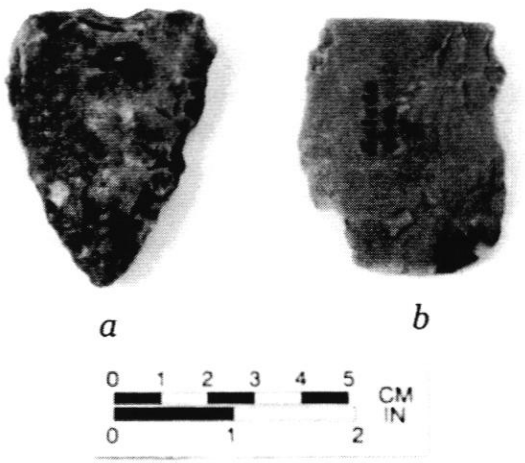


Figure 5. Chipped stone artifacts from Salado Cave, Bell County, Texas. a. Clear Fork-like tool or preform. b. Preform showing prominent cross-thinning.

Cultural Affiliation

As stated above, the artifact assemblage from Salado Cave appears to represent three distinct time horizons showing the shelter was used, albeit not extensively, by the local inhabitants over a long period of time. The arrow points reported by Crook on the surface of the cave floor clearly represent a Late Prehistoric use. It is unknown how extensive any Late Prehistoric occupation may have been. While Crook reported no evidence of subsurface disturbance prior to excavation, the presence of the cave site was apparently well known to local residents, thus opening the possibility that some surface collection had occurred prior to the 1948 excavations described herein.

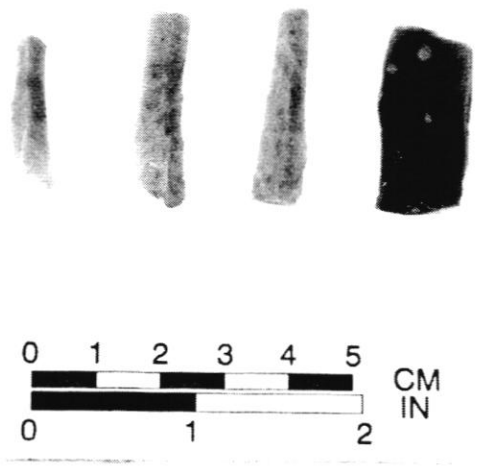


Figure 6. Blade fragments recovered from Salado Cave, Bell County, Texas

The three gray circular chert bifaces found at shallow depth in square 2 are similar to artifacts found by Crook and his colleagues elsewhere along Salado Creek and thus probably belong to the Archaic horizon of Central Texas. If of on-site manufacture as suggested by Crook, then the cave may have provided a small source of high grade Edwards chert. It is unknown why the three bifaces would have been produced and then discarded. It is also interesting to note that Crook reported only two pieces of debitage for this horizon in his excavation and no large animal fauna. There is also no evidence of this Archaic occupation in any place but square 2, the direct center of the cave.

There is apparently a substantial increment of time between the Archaic and the Paleoindian occupation of the cave, which is represented by the lithic and bone assemblage recovered at a depth of 14-22" (35-55 cm). A total of 7 artifacts and 13 pieces of lithic debitage were reported from this horizon. It is significant to note that at least two or more pieces of lithic material were found in every square covering the entire dimensions of the cave. Thus while still a minor site, Salado Cave appears to have been most extensively used during this period.

The artifacts recovered from the lower level of the cave fill are consistent with the Late Paleoindian period for the region. Collins (1998) reported a wide variety of Angostura-like points for both the top of Unit II and the lower part of Unit III at the Wilson-Leonard site, which is located less than 30 km south of Salado Cave. Radiocarbon dates for the Angostura level at Wilson-Leonard placed it between 8,800-9,500 years BP. Shafer (personal communication, 2003) reports that Late Paleoindian artifacts, including Angostura points, have been found along Buttermilk Creek less than 1 km from Salado Cave (the Roden site, 41BL986). Given the rather sparse occupational record of the cave site, it is more than likely that Salado Cave and the Roden site are related.

It is unknown what, if any, is the relationship between the Angostura point and the bear remains found in the cave. The point appears to have been re-sharpened and also contains a prominent flake scar on one side (Figure 2) which could have been the result of use in hunting.

The four blades recovered from square 4 clearly represent advanced core and blade technology. Three of the blades are fragments while the fourth is a hinged specimen. None represent the typical curved appearance of Clovis blade technology as reported from Gault and other nearby Early Paleoindian sites (Collins, 1990). While core and blade technology is known from many time periods throughout Texas, their depth at the Salado Cave site implies association with the other Late Paleoindian material. The writer has found similar material in the Big Bend region directly associated with a large Lerma point, thumbnail end scrapers and other distinctly Paleoindian artifacts. It is unknown why they appeared to be together in the "pocket" as described by Crook, or what, if any, is their relationship to the other artifacts.

Acknowledgements

The writer would like to thank a number of individuals who encouraged me to record the information from Salado Cave as well as provided assistance in putting together my late father's site notes. In particular, I would like to recognize Tom Hester who upon my inquiry, immediately searched his files and produced all of his correspondence and analysis on the Salado Cave artifacts. I would also like to thank Harry Shafer who recalled the location of the Buttermilk Creek material and their probable association with the Salado Cave occupation. Sincere thanks are given to Mr. George H. Davis and Annie Davis for their assistance in photographing the artifacts from the site. Lastly, I would like to thank Darrell Creel of TARL who not only reviewed the site material but pointed me to the cultural affiliation with the Wilson-Leonard site and provided a critical review of this paper. More importantly, during the course of this effort, he has become a good friend and sounding board for my archeological analysis and theories.

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Table 1
Artifact Distribution By Unit and Depth
Salado Cave (41BL1170), Bell County, Texas

Artifact	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6	Total
Surface							
- Debitage	-	-	-	-	-	-	-
- Arrow Points	?	?	?	?	?	?	?
- Unworked Bone	-	-	-	-	-	1	1
Total							1
Horizon B (3-6")							
- Debitage	-	2	-	-	-	-	2
- Biface	-	3	-	-	-	-	3
- Unworked Bone	-	-	-	-	-	-	-
Total							5
Horizon C (13-22")							
- Debitage	5	-	2	1	4	1	13
- Dart Point	1	-	-	-	-	-	1
- Preform	1	1	-	-	-	-	2
- Blade	-	-	-	4	-	-	4
- Worked Bone	1	-	-	-	-	-	1
- Unworked Bone	1	1	-	-	-	-	2
Total							23
TOTAL	**9**	**7**	**2**	**5**	**4**	**2**	**29**

An Unusual Late Prehistoric Projectile Point Concentration from the Upper Farmersville Site (41COL34), Collin County, Texas

Wilson W. Crook, III

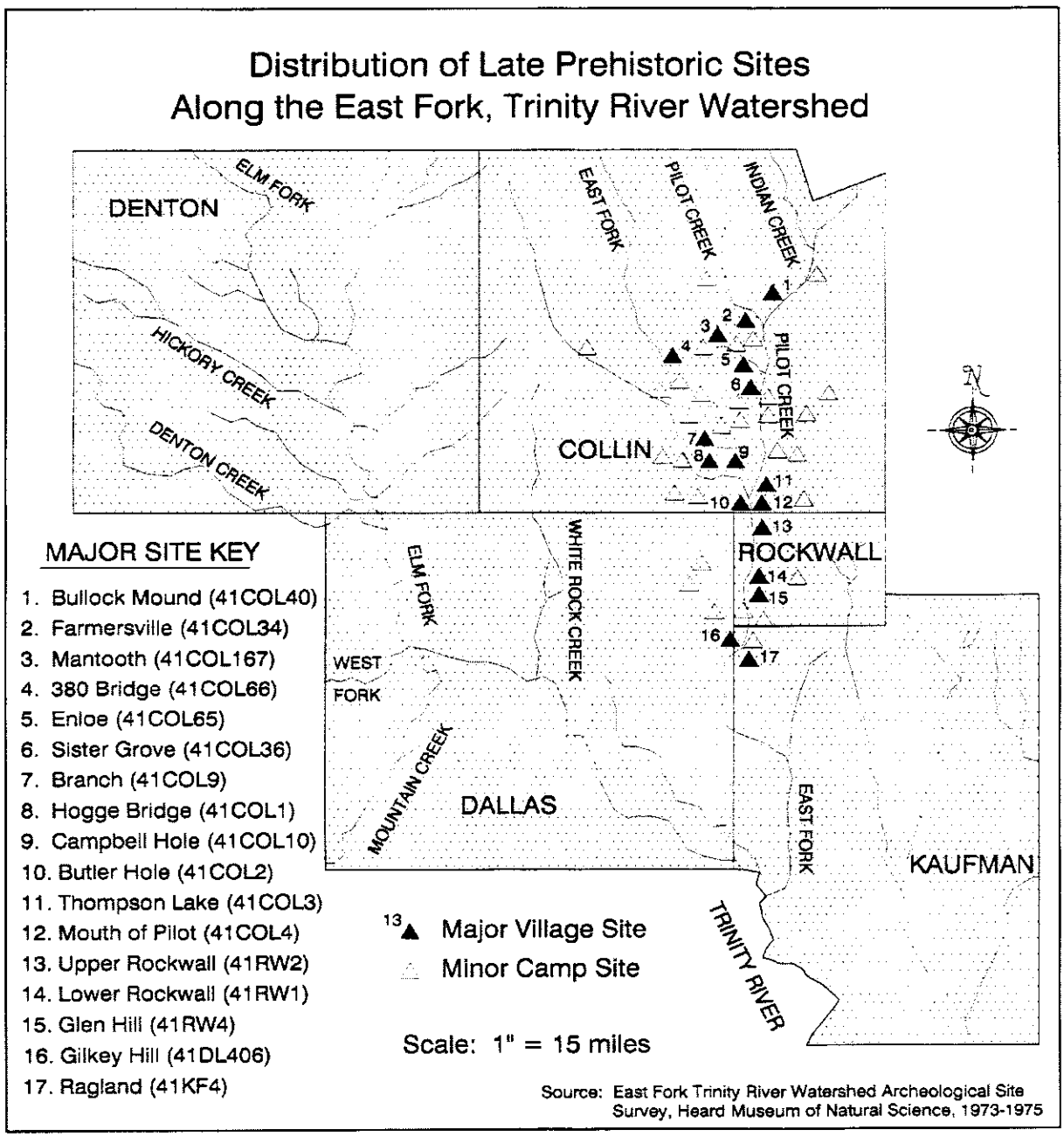
Introduction

During the summer of 1973 the writer conducted an extensive archeological survey of Collin County for the Heard Museum of Natural History. Included in this work was a salvage excavation of part of the Late Prehistoric Upper Farmersville site (41COL34) in northeastern Collin County. Initially described by Harris (1945; 1948), the site is one of the largest Late Prehistoric occupations along the East Fork of the Trinity and its tributaries. Over the course of the 1973 excavations it was determined that while the majority of the area had been subjected to years of cultivation, a small portion of the southern part of the site remained unplowed, including remnants of a "Wylie Focus" rim-and-pit structure. Focused work in this area produced a unique bone harpoon (Crook, 1984a), several burials (Crook, 1984b), and the first direct evidence of locally-manufactured pottery at the site (Crook and Hughston, 1986).

Toward the end of the summer program, a small area adjacent to the southeastern edge of the rim-and-pit structure was noted to have a concentration of chipped stone debitage. A 100 x 75 inch (approximate 2.5 x 2 meter) square was staked and excavated by trowel and brush over a four-day period. Immediately below the surface, the amount of chipped stone debris increased markedly, and several unusual looking projectile points were recovered. The discovery was further complicated by the observation that many pieces of debitage were of material distinctly different from the majority of the points. At this juncture the excavation method was changed, with the location of each piece of chipped stone being marked by a toothpick. When the density became too great to proceed, the locations and descriptions of the artifacts were recorded and then bagged for further study. The resulting scatter pattern depicts an apparent specialized area for the manufacture of lithic artifacts, notably projectile points. However, the presence of so many projectile points made from various types of non-local chert (54 of 59 points recovered), which represent only 15% of the total debitage mapped in the square, makes the interpretation of a chipping station is problematic. Thus the concentration could also represent a projectile point cache.

Description

The Upper Farmersville site is located in northeastern Collin County, about 8 km (5 miles) northwest of the town of Farmersville. The site itself lies on either side of FM 2756 immediately southwest of the confluence of Pilot Grove and Indian Creek (Figure 1, Station 2). This location is at 33°12'46" North Latitude, 96°24'09" West Longitude or Zone 14 742000E/3677917N of the Universal Transverse Mercator Grid. The site covers over 8 Ha (20 acres) on the floodplain several hundred meters to the southwest of the confluence of Pilot Grove and Indian Creeks. The primary datum of the site is at an elevation of approximately 152 meters (500 feet) above sea level. Site records are on file at the Texas Archeological Research Laboratory. With the expansion of Lake Lavon in the 1980's much of the site was destroyed and is no longer available for excavation.



The Upper Farmersville site lies within the Blackland Prairie physiographic province, a narrow north-south zone bounded by the Eastern Cross Timbers to the west and the Post Oak Belt to the east. Soils of the Blackland Prairie are for the most part organic-rich, calcareous clays of the Houston Black-Heiden, Ferris-Heiden and Trinity-Frio soil groups (Coffee, Hill and Ressel, 1980). These soils are characterized by a low permeability, which effectively inhibits the growth of trees except along major waterways. The result is an alternating terrain of open prairie uplands interlaced by a serpentine network of riparian woodlands. The topography is gently rolling with wooded draws and mottes. Microtopographies, namely gilgai, create localized differences in disturbance and hydric regimes that contribute to the plant and animal diversity (Eidson and Smeins, 1999).

Vegetation of the Blackland Prairie consists of a number of grasses, the most common of which is little bluestream, although big bluestream, switch grass, Texas wintergrass, Indiangrass, silver bluestream and others have been reported (Gould, 1969). The riparian belts lining the streams and rivers typically contain sugarberry, cedar elm, bur oak, red oak, pecan, bois d'arc and honey locust. Underbrush is predominantly peppervine, trumpet creeper, greenbriar, hawthorne, honeysuckle, grapevine, Virginia wildrye, Indian currant, poison ivy and various berry-bearing vines.

It is unknown if the local inhabitants of the Upper Farmersville site extensively exploited the local acorn mast crop. Lynott (1977) believes that the local acorns have such a high tannic acid content as to be virtually inedible. Even if not part of the human diet, the presence of abundant acorns in the river bottoms would have played a significant role in sustaining many of the species of animals hunted by man, including whitetail deer, squirrel, raccoon and turkey.

The bottomlands support a varied fauna including whitetail deer, Eastern cottontail, jackrabbit, striped skunk, opossum, raccoon, coyote, bobcat, beaver, turkey and a large number of species of snakes, rats, mice and shrews. The streams also produce various species of fish, turtles, frogs, mussels and snails.

There is some disagreement regarding the presence of bison and antelope in the Blackland Prairie between 8,000 BP and the Late Prehistoric period (Dillehay, 1974; Lynott, 1979). Antelope and bison bones have been found at Upper Farmersville, although the latter only in the form of scapula hoes, and then in a single burial (Harris, 1945). As such, it cannot be definitively determined that bison were part of the Upper Farmersville occupants' diet. However, as pointed out by Dickens and Wiederhold (2003), the lack of bison bone in campsite remains may reflect longer distance hunting strategies that involved smoking and/or jerking meat at the kill site and transportation of deboned meat back to the campsite.

Some bison were present in the area as late as the twentieth century as R. K. Harris' father reportedly killed the last bison in Collin County in 1908 and often told his son that the local river bottoms had always been regarded as a "hunter's paradise" (R. K. Harris, personal communication, 1973). As such, it would only be logical that hunting and the production of projectile points would be a major component of Upper Farmersville site activity.

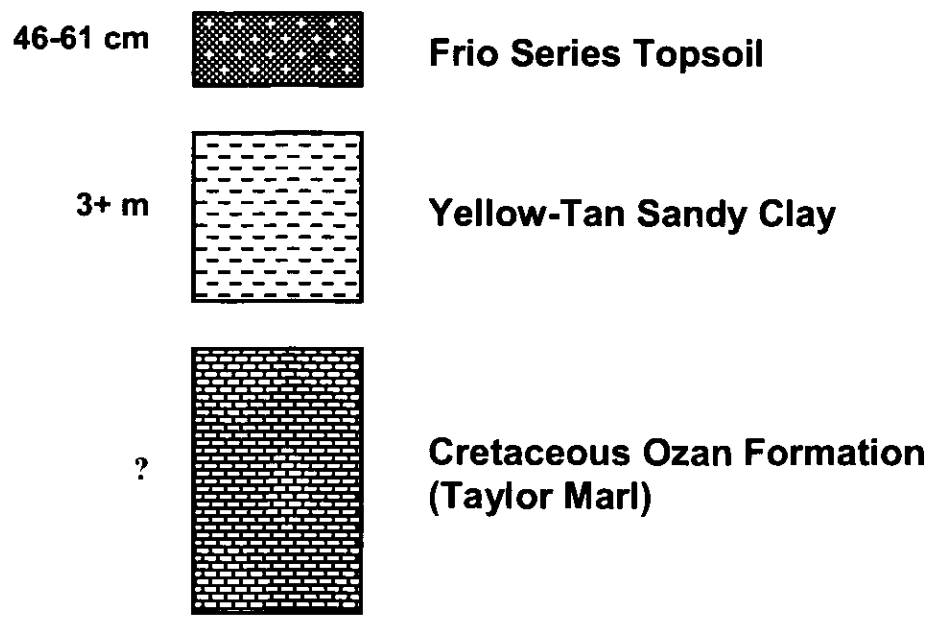
Geology

The Upper Farmersville site lies approximately 200 meters west of Pilot Grove Creek in northeast Collin County. Pilot Grove Creek is a major tributary of the East Fork of the Trinity River, the two joining at what is now the upper end of Lake Lavon reservoir 12 km (7 miles) south of the site. A terrace system is not developed at the site, but the occupational area is on a gentle rise far enough above the creek so as to have avoided inundation during periodic flooding. Enlargement of Lake Lavon has altered the original water system, and Pilot Grove Creek has backed up today so as to cover areas which normally would be above water.

Only two geologic strata are present at the site (Figure 2). Uppermost is a black, organic-rich topsoil of the Frio Series of the Trinity-Frio Association. It is classified as a vertisol due to the presence of abundant swelling clay, notably montmorillonite (Hausenbuiller, 1972). In undisturbed sections of the site, this topsoil is approximately 46-61

cm thick. Thickness of the topsoil layer is slightly greater within the cut of Pilot Grove Creek; maximum thickness observed is 102 cm. Pottery is found from the surface to the base of the alluvium, post-dating the underlying strata. As the soil is a vertisol, it is unclear if the artifact distribution throughout the unit is due to prolonged occupation or to a combination of occupation and downward migration through soil cracks. Based on ceramics, arrow point typology, and reported radiocarbon dates from similar sites in the area (Lynott, 1974), age of the topsoil appears to be no more than 1,000 to 1,200 years.

Figure 2
Idealized Geologic Cross-Section
Upper Farmersville Site (41COL34), Collin County



Below the black topsoil and separated by an erosional unconformity is a yellow-tan sandy clay. This unit does not correlate to any of the known mainstream Upper Trinity terrace deposits but appears to be a major depositional unit along its tributaries, particularly of the East Fork system (W. W. Crook, Jr., personal communication, 1984). The yellow-tan sandy clay is a surface alteration of the Cretaceous bedrock, either the Austin Chalk or the Taylor Marl (Ozan Formation). Thickness of the yellow-tan sandy clay is as much as 3 meters. Occupational material is restricted to the upper few centimeters and is composed of non-ceramic Late Archaic material. Only intrusive materials (burials, trash pits) of Late Prehistoric age are present within the yellow-tan sandy clay. The unit predates the black topsoil by an undetermined age.

Excavation Methodology

Excavation of the 100 x 75 inch square (2.5 x 2 meter) was conducted by trowel, brush and toothpicks. Each lithic artifact found, including debitage, was marked in situ by placing a toothpick in the ground adjacent to its location. When the density of marked artifacts became too great, the location of each item was mapped and then recorded. This process was repeated until the artifact density declined to virtually zero. As the excavation had not yet reached the yellow-tan clay, several small 10 x 10 cm square pits were excavated in the corners of the feature to determine the remaining depth of the topsoil.

Three levels were mapped including (1) the surface, (2) the main artifact-bearing zone from 2 to 10 cm, and (3) a third level from 10-15 cm. While excavation continued below the 15 cm level until the yellow-tan clay was reached, no additional substantive concentrations of chipped stone were encountered. It should be noted that no evidence was observed that the excavated section below the grass root zone had been disturbed by plowing, and all artifacts are assumed to be in situ.

Artifact Assemblage

A total of 76 lithic, bone and ceramic tools were recovered from all excavated levels of the test unit. In addition, 15 pieces of unworked bone, 14 discarded cores and 214 pieces of lithic debitage were recovered (Table 1). Observed lithic material consisted predominantly of fine-grain yellow and red quartzite (71%) with lesser amounts of various types of chert (29%). Examination of the debitage indicated that both percussion and pressure flake reduction had taken place. However, the lack of cortex material suggests that primary core reduction was not carried out at the Upper Farmersville site but at a separate quarry location (Binford and Quimby, 1963). Moreover, the large percentage of smaller chips as opposed to larger flakes indicates that the majority of the debitage was produced by soft hammer methods as opposed to primary core reduction (Kvamme, 1998).

Projectile points appear to have been the principal objective of the chipped stone work, with some 59 arrow points being recovered. As can be seen in Table 2, a number of different arrow point types have been identified, nearly all of which are frequently reported components to Late Prehistoric sites along the East Fork of the Trinity River (Stephenson, 1952; Lynott, 1974; Crook, 1987b; 1989). Scallorn, Alba and Perdiz are the most abundant types with lesser amounts of Washita, Fresno, Catahoula and Steiner. Several of the Washita side-notched triangle points have a prominent concave base and are more reminiscent of projectile points found at Cahokia and elsewhere along the Mississippi than the more standard Washita or Harrell types found in northeast Texas (Figure 3).

Roughly three quarters of the projectile points recovered from the excavation are of the five most commonly found types at the Farmersville site and elsewhere along the East Fork and its tributaries (Scallorn, Alba, Perdiz, Steiner, Catahoula). However, 16 of the 59 points in the unit assemblage represent triangular-shaped arrow point types (Fresno, Washita). Triangular points typically found in sites of the Late Prehistoric period along the East Fork, while present, represent only minor site components. For example, only 7% of the over 300 arrow points recorded by the writer from the Farmersville site are of triangular-shaped varieties.

All of the projectile points recovered from the unit display an unusually high degree of workmanship, noticeably superior to the typical arrow point found in sites long the East Fork. This can, in part, be attributed to the preferential use of chert over quartzite as the preferred lithic material. Beyond physical form and construction skill differences, the points recovered from the test unit are a mixture of material of local and imported origin. The resident cobble fields (one of the closest is near the town of Wylie some 25 km to the southwest) are composed of as much as 80% quartzite with some chert (10-15%) and a minor amount (5%) of petrified wood, ironstone and other material (Crook, 1987a). The chert from these fields tends to be a dark cream to slate gray color, which turns dark red-brown to red-gray upon heat treating. While some local material is present in the arrow point assemblage, cherts of clearly foreign origin comprise two-thirds of the points found in the test unit. These include both typical Edwards Plateau root beer-colored chert as well as more exotic red and red-orange cherts like those found in Arkansas and northeastern Oklahoma. In contradiction, the vast majority (85%) of the debitage found in association with the points is of local origin. Few flakes corresponding to the non-local cherts were recovered, lending support to the supposition that most of the arrow points were made elsewhere and brought into the site.

In addition to the projectile points, other lithic tools recovered include four ovoid side scrapers and one flake graver, all constructed from local quartzite. Two fist-sized quartzite hammerstones were found. Both showed extensive battering from repeated use and had probably been discarded.

Four bone tools were found in association with the lithic material. All appear to have been pressure flaking tools constructed from deer ulnae. Unworked bone recovered from the square is consistent with that scattered over the rest of the site and included fragments of deer, turtle and turkey.

Six pottery sherds were recovered from the unit; four of Sanders Plain and two of Nocona Plain. These are the most abundant pottery types present at the site so their presence is not distinctive.

Scatter Pattern Analysis

The locations of all the material recovered from the test unit are plotted by type in Figures 4-6. As can be seen from the lithic material present on the original surface, a roughly circular pattern of chipped stone debris was apparent (Figure 4).

Excavation revealed that immediately below the grass root zone (2-4 cm), a large amount of lithic material was encountered. As can be seen in Figure 5, a distinct pattern of lithic concentration is present. This pattern is characterized by high concentrations of debitage surrounding a central area that contains a significantly higher artifact-to-debitage ratio (stippled area in Figure 5). Over 90% of all chipped stone debris from the unit was

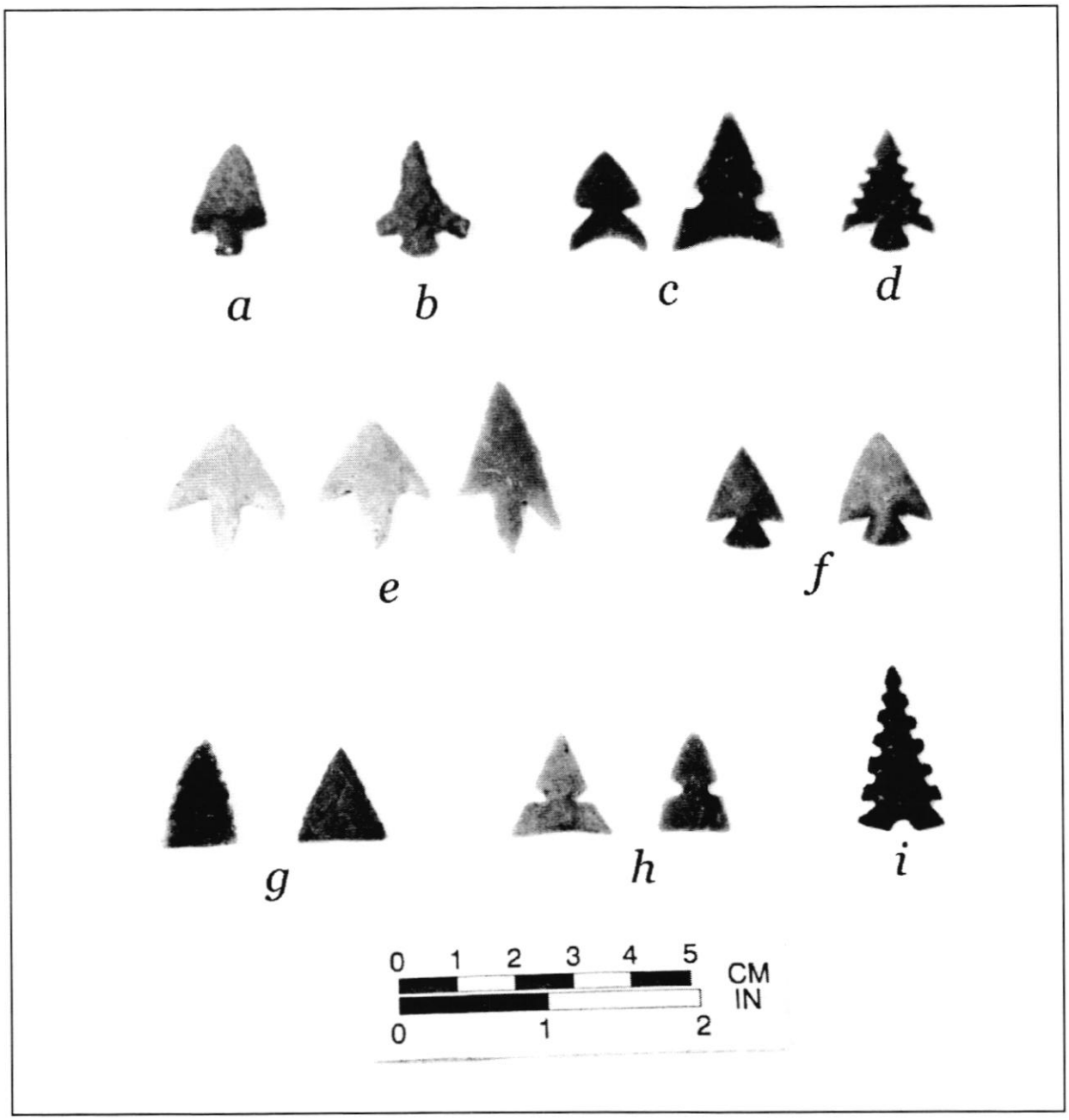


Figure 3. Representative arrow point types from Test Unit, Upper Farmersville Site (41COL34), Collin County, Texas: a. Alba, b. Catahoula, c. Washita with prominent concave base, d. Unidentified Eccentric, e. Perdiz, f. Scallorn, g. Fresno, h. Washita with straight base, i. Unidentified Eccentric.

recorded outside this central area. Moreover, the smaller pieces of chipped stone appear to be concentrated nearer to the artifact-bearing locations, with the larger flakes located more toward the periphery of the square. Discarded cores, hammerstones and bone flaking tools also ring the central artifact zone. This pattern is characteristic of "toss circles" as documented by Binford and Quimby (1963), Kvamme (1997) and others.

While flakes of both quartzite and various types of chert are present in the assemblage, the percentage of chert does not reflect the same concentration of chert seen in the 59 arrow points. Instead, it would appear that the artifacts recovered from the test unit represent two features. First and foremost, a specialized work area largely dedicated to the production of arrow points constructed from local quartzite. However, the majority of the points recovered are made from material that is both uncommon to the Upper Farmersville site and not represented by any significant concentration of the debitage in the test unit. As such, it is unknown if they were manufactured locally and/or represent a trade cache.

Lithic Patterns in Other East Fork Sites

Previous investigations of Late Prehistoric sites along the East Fork have searched with varying degrees of success for patterns of lithic debris. Dawson and Sullivan (1973) reported a concentration of lithic debris within a supposed house structure at the Upper Farmersville site. No other details of the concentration including any patterns were given. Their excavation centered on an area north of FM 2756 in what would have been the northeastern part of the site. This area is 100-150 meters north of the unit excavated by the writer and reported herein.

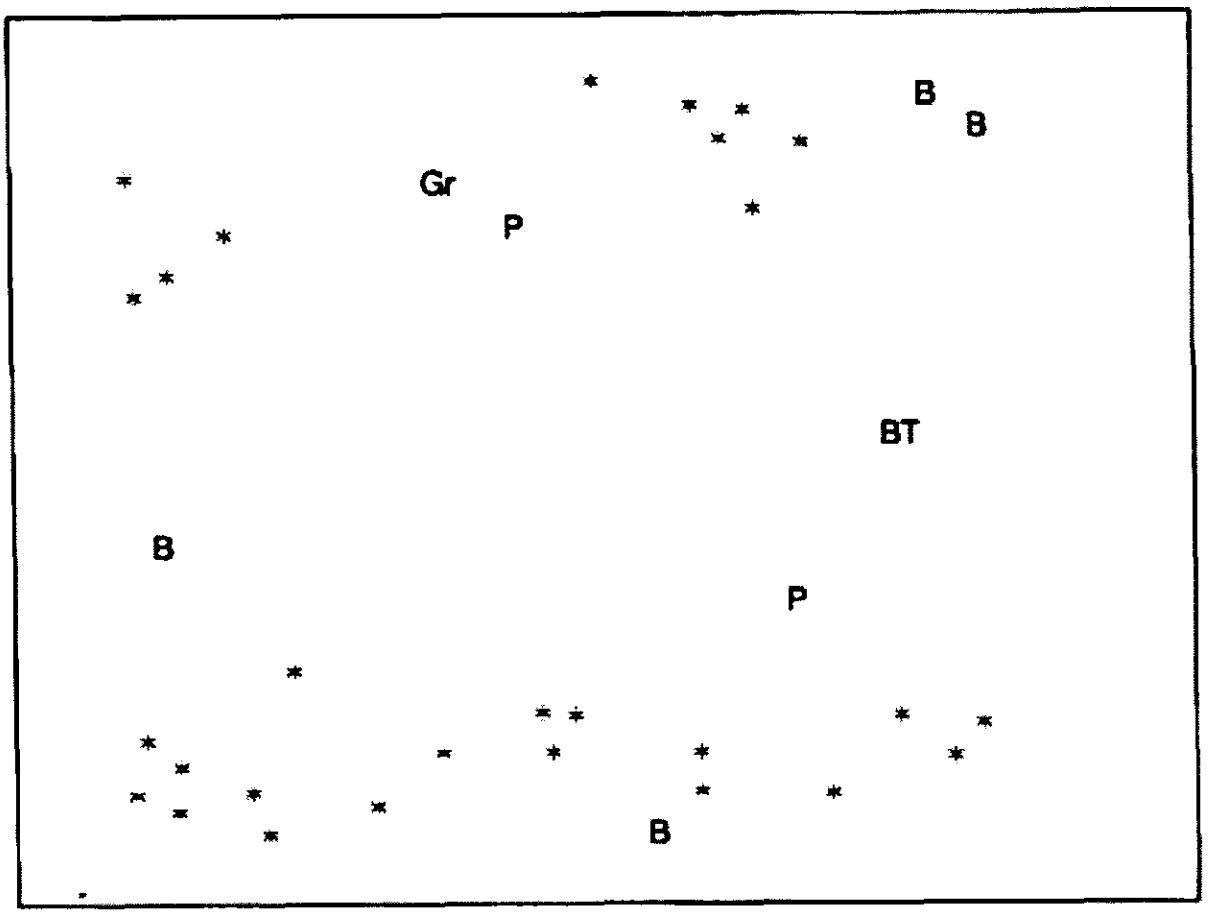
At the Upper Rockwall site (41RW2), Ross (1966) discovered two concentrations of mussel shells which contained some scattered lithics, but no distinct pattern of lithic tool construction was reported.

At the Lower Rockwall site (41RW1), Lorrain and Hoffrichter (1968) conducted a detailed study of lithic debris found at the site. Although no distinct pattern of lithic concentration was reported, they found that 76% of all the lithic material recovered from the site occurred in the uppermost 45 cm of the site (their "Zone I"), with the uppermost 20 cm containing the most amount of material. While noting that chert was the preferred material for many of the site's artifacts, especially in projectile points, local quartzite comprised the majority (58%) of the debitage. However, unlike the test unit excavated at the Upper Farmersville site, chert represented 42% of the recorded debitage. Lorrain and Hoffrichter also noted the presence of substantial amounts of both primary and secondary flakes indicating that both initial core reduction and later tool construction occurred at the site.

Lastly, Lynott (1975) in his excavation of the Sister Grove Creek site (41COL36) noted large concentrations of lithic debitage throughout several areas of the site with the notable exception of the area within the large rim-and-pit structure. More specifically, his work revealed a large area of apparent lithic tool construction in the area immediately adjacent to the pit structure. While he did not report a toss circle pattern analogous to that described above, the location of a specialized work area within the site is similar.

Figure 4

Upper Farmersville Site (41COL34)
Scatter Pattern - Level 1 (Surface)



Legend

▲	Projectile Point	●	Hammerstone
■	Scraper	△	Core
Gr	Graver	*	Debitage
BT	Bone Tool	B	Bone
P	Pottery		

Scale

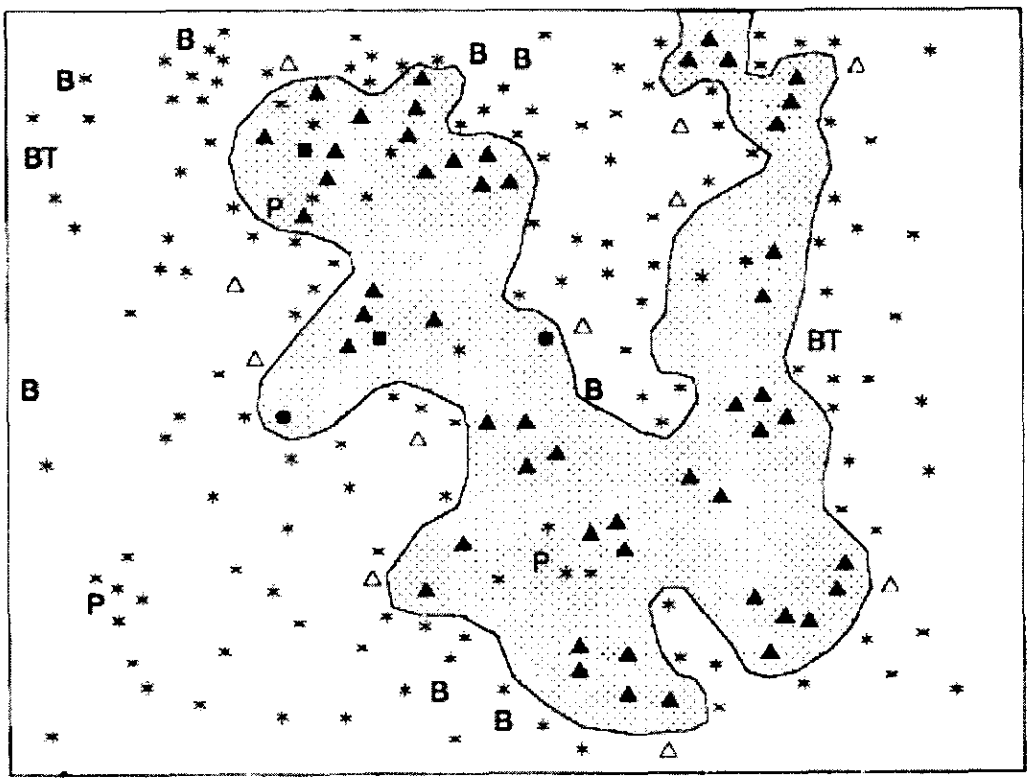
0 — 1

50 cm

Figure 5

Upper Farmersville Site (41COL34)

Scatter Pattern - Level 2 (0-10 cm)



Legend

▲	Projectile Point	●	Hammerstone
■	Scraper	△	Core
Gr	Graver	*	Debitage
BT	Bone Tool	B	Bone
P	Pottery		

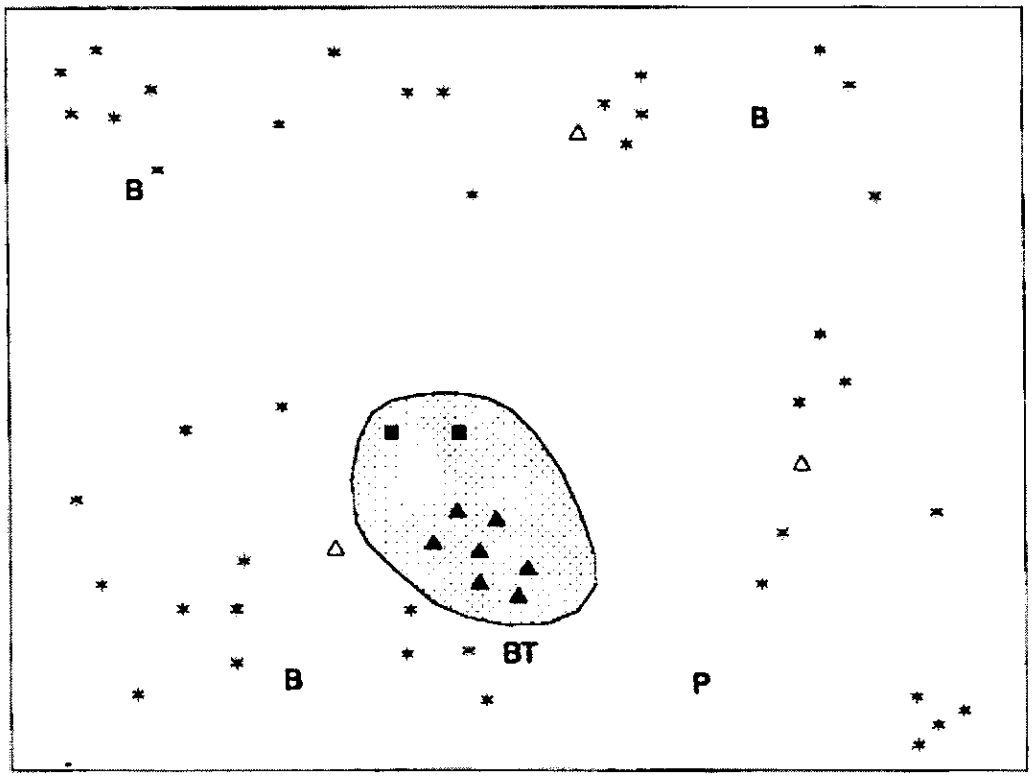
Scale

0 1

50 cm

N

Figure 6
Upper Farmersville Site (41COL34)
Scatter Pattern - Level 3 (10-15 cm)



Legend

▲	Projectile Point	●	Hammerstone
■	Scraper	△	Core
Gr	Graver	*	Debitage
BT	Bone Tool	B	Bone
P	Pottery		

Scale
0 1
50 cm

N

Conclusions

It is the opinion of the writer that the above described excavation unit suggests the presence of an area of specialized lithic tool manufacture at the Upper Farmersville site. The pattern of debitage would indicate individuals (presumably men) sitting in a circle, keeping completed or near completed artifacts nearby, and tossing their debris and discarded tools both in front and behind them in central waste piles.

While a number of purposes for the large rim-and-pit structures common to many of the larger Late Prehistoric sites along the East Fork of the Trinity have been proposed (Stephenson, 1952; Lynott, 1974; Bruseth and Martin, 1987; Crook, 1989), their specific construction and use is still problematical. However, they typically represent the central feature within the site. As such, it can be assumed that essential centralized work activity, such as the manufacture of lithic tools, might take place nearby. The discovery of an apparent chipping station for the production of arrow points and other tools adjacent to one of these structures at both Upper Farmersville and from Sister Grove Creek (Lynott, 1975) would seem to confirm this hypothesis.

It is unknown if the point concentration described above represents trade items or if one or more of the men working in the chipping station was himself a visitor to the site. The lack of debitage corresponding to the material used in the manufacture of many of the points supports their foreign origin. However, it could not be determined with any degree of certainty if the chipping station assemblage reflected a single period in time or a longer period of accumulation. The presence of many diverse points types would suggest the latter but without the presence of age dates, the answer remains problematical.

Acknowledgements

I would like to thank Mr. John Dugger for letting us conduct extensive excavations on his property in the name of advancing knowledge of the original inhabitants of the area. I would also like to thank the Heard Museum of Natural History of McKinney, Texas, for helping to fund part of this work. Special thanks are extended to George H. Davis and Annie Davis for the photography of selected points from the artifact assemblage. Lastly, and most importantly, I would like to thank Ginny Davis (now Crook) for coming out to the field in the hottest part of August and helping me keep track of the scatter patterns and record the results of the excavation.

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Table 1

Total Artifact Assemblage - Test Unit
Upper Farmersville Site (41COL34), Collin County

Horizon/Artifact Type	Chert	Quartzite	Total
Level 1: Surface			
- Projectile Point	-	-	**-**
- Scraper	-	-	**-**
- Graver	-	1	**1**
- Hammerstone	-	-	**-**
- Core	-	-	**-**
- Chipped Stone Debitage	2	26	**28**
- Bone Tool			**1**
- Unworked Bone			**4**
- Pottery			**2**
Total	**2**	**27**	**36**
Level 2: 0-10 cm			
- Projectile Point	47	5	**52**
- Scraper	-	2	**2**
- Graver	-	-	**-**
- Hammerstone	-	2	**2**
- Core	-	11	**11**
- Chipped Stone Debitage	20	125	**145**
- Bone Tool			**2**
- Unworked Bone			**8**
- Pottery			**3**
Total	**67**	**145**	**212**
Level 3: 10-15 cm			
- Projectile Point	7	-	**7**
- Scraper	-	2	**2**
- Graver	-	-	**-**
- Hammerstone	-	-	**-**
- Core	-	3	**3**
- Chipped Stone Debitage	10	31	**41**
- Bone Tool			**1**
- Unworked Bone			**3**
- Pottery			**1**
Total	**17**	**36**	**58**
TOTAL	**86**	**208**	**306**

Table 2

Tool Assemblage - Test Unit
Upper Farmersville Site (41COL34), Collin County

Artifact Type	Chert	Quartzite	Total
Projectile Point			**59**
- Alba	9	3	12
- Cahokia	4	-	4
- Catahoula	-	1	1
- Fresno	3	1	4
- Perdiz	8	-	8
- Scallorn	19	-	19
- Steiner	2	-	2
- Washita	7	-	7
- Eccentric	2	-	2
Scraper	-	4	**4**
Graver	-	1	**1**
Hammerstone	-	2	**2**
Sub-Total Lithics	**54**	**12**	**66**
Bone Flaking Tool			**4**
Pottery Sherds			**6**
Total Tools			**76**

Aboriginal Ceramics from the Boriack Bog Locality, Lee County, Texas

Timothy K. Perttula

Introduction

This paper discusses a small collection of aboriginal ceramic sherds (n=71) from the Boriack Bog locality, along Middle Yegua Creek basin in Lee County, in east central Texas. Middle Yegua Creek flows eastward into the Brazos River valley. The sherds are from the Carol Tallus collection; their specific provenience around the bog is not known.

Characteristics of the Assemblage

The 71 sherds include five rims, 63 body sherds, and three base sherds (Table 1). The majority of the sherds are from bone-tempered or sandy paste vessels made using a coiling technique; the vessel sherds are relatively hard and are from well-joined vessels, probably simple bowls and jars.

Approximately 93% of the Boriack Bog sherds have a bone temper (crushed and burned bone) added to the vessel paste. Less than 3% have either grog (crushed ceramic sherds) or hematite temper inclusions, and in each case, these aplastics were secondary temper agents in vessels with bone tempering. Almost 31% of the sherds are from vessels that also have a naturally sandy paste, being made from a sandy or self-tempered clay, while the others have either a clay or silty paste.

The majority of the sherds are from vessels that have been smoothed on exterior (52%) and interior (36.6%) surfaces. The smoothing was probably done to lower the permeability and increase the heating effectiveness of particular vessels in cooking tasks (Rice 1996:148). In other cases—especially the interior slipped or red washed vessels—the well-smoothed or burnished interior surfaces may have been advantageous in the repeated use of these wares as food serving vessels. The purpose of exterior smoothing and burnishing may have been for stylistic and display purposes, creating a flat and lustrous surface well-suited to highlight the slipped or washed vessel surface. Between 7-16.9% of the vessel sherds from the Boriack Bog locality have either interior or exterior vessel burnishing.

Almost 79% of the sherds are from vessels that were fired in a low oxygen or reducing environment. Most of these vessels in turn were cooled in a high oxygen environment (71.8%), indicating that the vessels were pulled from the fire and allowed to cool in the open air. The remaining sherds from the Boriack Bog locality are from vessels fired in a high oxygen or oxidizing environment (5.6%) or were incompletely oxidized during firing (15.5%). The consistency in how the vessels were fired indicates that the potters who made these vessels were well-versed in regulating firing and cooling temperatures as well as maintaining control over the final finished end product, namely the manufacture of durable and relatively hard vessels.

The Boriack Bog vessels have relatively thin vessel walls, but a relatively thick base. The rims are 6.46 $\pm$ 0.62 mm in mean thickness, compared to 6.54 $\pm$ 0.73 mm in thickness for body sherds, and 9.7 $\pm$ 0.9 mm for the base sherds. The overall thickness of the walls of these vessels, as well as their relative uniformity in thickness from the rim to near the base, would

have been well suited to the cooking and heating of foods and liquids and would have contributed to their ability to withstand heat-related stresses.

Another factor that would influence vessel body wall thickness would be the sequence in which a vessel was constructed (Krause 2007:35). Vessels constructed from the bottom up, as these vessels likely were, would tend to have thinner walls moving up the vessel body towards the rim, with the lower portion of the vessel—especially the base—usually significantly thicker than the upper portions of the vessel.

Decorated Sherds in the Assemblage

Of the sherds from the Boriack Bog locality, 13 are considered to be decorated, including 11 body sherds from at least six different vessels with an interior red slip or red wash, one body sherd from another vessel (with a sandy paste) with faint brushing marks on the exterior surface, and a sherd from an eighth vessel (bone-tempered) with parallel brushing marks overlain with several broad incised lines (Table 1). The few undecorated rims in the assemblage also suggest that some of the vessels in use at the site were left plain, at least on the rim.

Slipped or washed vessels are not a common feature of aboriginal ceramic assemblages from east central Texas sites, but five sherds from 41FY74, described as being bone-tempered sandy paste sherds with a reddish color (Kalter et al. 2005:213; Skelton 1977) may be related to the interior slipped sherds from the Boriack Bog area. Other sites with bone-tempered pottery having a "fugitive red" decoration or a "red wash" include several post-A.D. 1200 Toyah phase sites in central Texas (Ricklis and Collins 1994:Table 47) and other sites along the upper Texas coast (Linda W. Ellis, November 2007 personal communication).

Brushed pottery is also found in east central and central Texas sites, some probably of East Texas Caddo manufacture and occurring on vessels with both grog and bone temper, but with other brushed vessels of local derivation, including Boothe Brushed from several Toyah phase sites in the Brazos and Colorado River basins (Ricklis and Collins 1994:Table 47). Both petrographic and instrumental neutron activation analysis of a sample of east central Texas brushed sherds would need to be conducted to determine which kinds of brushed pottery vessels were of local manufacture and which vessels were likely to have been obtained in trade with East Texas Caddo groups.

Despite these similarities between the Boriack Bog decorated sherds and the range of decorated sherds in selected Toyah phase sites, the Boriack Bog ceramics are not considered to be of Toyah phase affiliation, primarily because of the high incidence of sandy paste sherds at Boriack Bog and other sites in the post oak savannah of east central Texas. Instead, the bone-tempered, bone-tempered/sandy paste, and sandy paste sherds from Boriack Bog are likely part of a local Late Prehistoric ceramic tradition, one that may have been "influenced by contacts with groups outside the area" (Kalter et al. 2005:219), including Caddo groups to the east and Toyah phase groups to the west and southwest.

Conclusions

The aboriginal ceramic sherds from the Boriack Bog locality are part of an indigenous east central Texas ceramic tradition dating from at least ca. A.D. 1200-1700 that is characterized by the manufacture of both well-smoothed bone-tempered and bone-tempered

sandy paste vessels, most of which are plain, along with non-tempered sandy paste vessels. Some of the bone-tempered and sandy paste vessels are decorated, however, including examples at Boriack Bog with an interior red slip or red clay wash or faint brushing. Comparable ceramic assemblages have been reported in the Navasota, Brazos, and Colorado river basins (see Kalter et al. 2005:Figure 5-79), including 41FY74 (Skelton 1977), 41FY135 (Kalter et al. 2005), and 41GM281 (Rogers 1995).

Acknowledgments

I want to thank Wayne Clampitt for the opportunity to study this collection of aboriginal ceramic sherds. Thanks also to Linda W. Ellis for information about red washed sherds on the upper Texas coast.

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Table 1: Detailed Analysis of Ceramic Sherds

Sherd type	Temper*	Paste	ST	FC	Th (mm)	Decoration	Comments
rim, D-Ro	-	SP	I/E SM	F	6.1	plain	+18 cm OD; possible red slip or wash
rim, D-Ro	b	SP	I/E SM	B	6.3	plain	+12 cm OD
rim, _-Ro	b		-	E	6.0	plain	
rim, _-Ro	b		-	F	5.9	plain	
rim, EV-Ro	b		E SM	F	8.0	plain	+19 cm OD
body	g-b	SP	-	A	6.6	plain	
body	b	SP	I/E SM	F	5.0	plain	
body	b		I SM	G	5.8	plain	
body	b	SP	I/E SM	G	6.6	plain	
body	b	SP	I/E SM	G	6.9	plain	
body	b	SP	I/E SM	G	7.5	plain	
body	b		-	I	7.0	plain	
body	b		I/E SM	G	8.2	plain	
body	b		-	J	7.0	plain	
body	b		I SM	G	5.9	plain	
body	b		E SM	B	6.3	plain	
body	b		I/E SM	G	8.8	plain	
body	b		I/E B	H	7.2	plain	
body	b	SP	-	G	7.5	plain	
body	b		E SM	E	5.6	plain	
body	b		E SM	B	6.6	plain	
body	b		-	G	5.7	plain	
body	b	SP	-	G	7.0	plain	
body	b	SP	I/E SM	G	7.3	plain	
body	b		I/E SM	G	5.0	plain	
body	b	SP	-	G	7.9	plain	
body	b		I/E SM	B	6.0	plain	
body	b	SP	I/E B	F	7.1	plain	
body	b		-	G	6.5	plain	
body	b-h	SP	I/E B	F	6.3	plain	
body	b		E SC	F	7.7	plain	
body	b		-	F	6.6	plain	
body	b		E SM	G	7.2	plain	
body	b		E SM	F	7.9	plain	
body	b		-	G	8.3	plain	
body	b		E SM	C	8.1	plain	
body	b		-	G	6.2	plain	
body	b		I/E SM	A	6.5	plain	
body	b	SP	-	G	6.0	plain	
body	b		E SM	F	4.6	plain	
body	b		E SM	F	8.1	plain	
body	b		-	A	6.3	plain	
body	b		E SM	F	6.3	plain	
body	b		E SM	F	7.2	plain	
body	b		-	F	7.2	plain	
body	-	SP	I SM	G	6.9	plain	

Sherd type	Temper*	Paste	ST	FC	Th(mm)	Decoration	Comments
body	b		E B	G	5.9	plain	
body	b	SP	I/E SM	E	6.3	plain	
body	b		I/E SM	F	6.1	plain	
body	b-h		E SM	H	5.0	plain	
body	b		I/E SM	C	8.1	plain	
body	b-g		EM	G	7.1	plain	
body	-	SP	I SM	F	6.5	faint ext. brushing	
body	b	-		H	6.7	parallel brushing with overlapping incised lines	
body	b		I/E SM	G	6.5	plain	redware; int. wiped
body	b	SP	I/E SM	H	6.2	plain	redware
body	b		I/E SM	F	4.9	plain	redware
body	b		I/E B	G	6.4	plain	prob. int. slipped or washed
body	b		I/E B	B	5.2	plain	prob. int. slipped or washed
body			E SM	G	6.2	plain	prob. int. slipped or washed
body	b		E B/I SM	H	5.4	plain	prob. int. slipped or washed
body	b		E B/I SM	C	5.7	plain	prob. int. slipped or washed
body	b		E B	G	5.8	plain	prob. int. slipped or washed
body	b		E B/I SM	G	5.5	plain	prob. int. slipped or washed
body			E SM	A	6.0	plain	prob. int. slipped or washed
body	b	SP	E B	F	6.6	plain	prob. int. slipped or washed
body	b	SP	E SM	G	5.9	plain	prob. int. slipped or washed
body	b	SP	E B/I SM	C	5.9	plain	prob. int. slipped or washed
base	b		E SM	E	10.0	plain	
base	b		E SM	G	10.8	plain	rounded, but stable
base	b		E SM	X	8.3	plain	

*Temper: g=grog; b=bone; h=hematite; SP=sandy paste
ST=surface treatment; I=interior; E=exterior; SM=smoothed; B=burnished; SC=scraped
FC=firing conditions: A=oxidized; B=reducing environment; C-E, I-K=incompletely oxidized; F-H, fired in a reducing environment, cooled in a high oxygen environment; X=multiple oxidized and reduced bands in the paste
OD=orifice diameter (in cm); D=direct rim; Ro=rounded lip