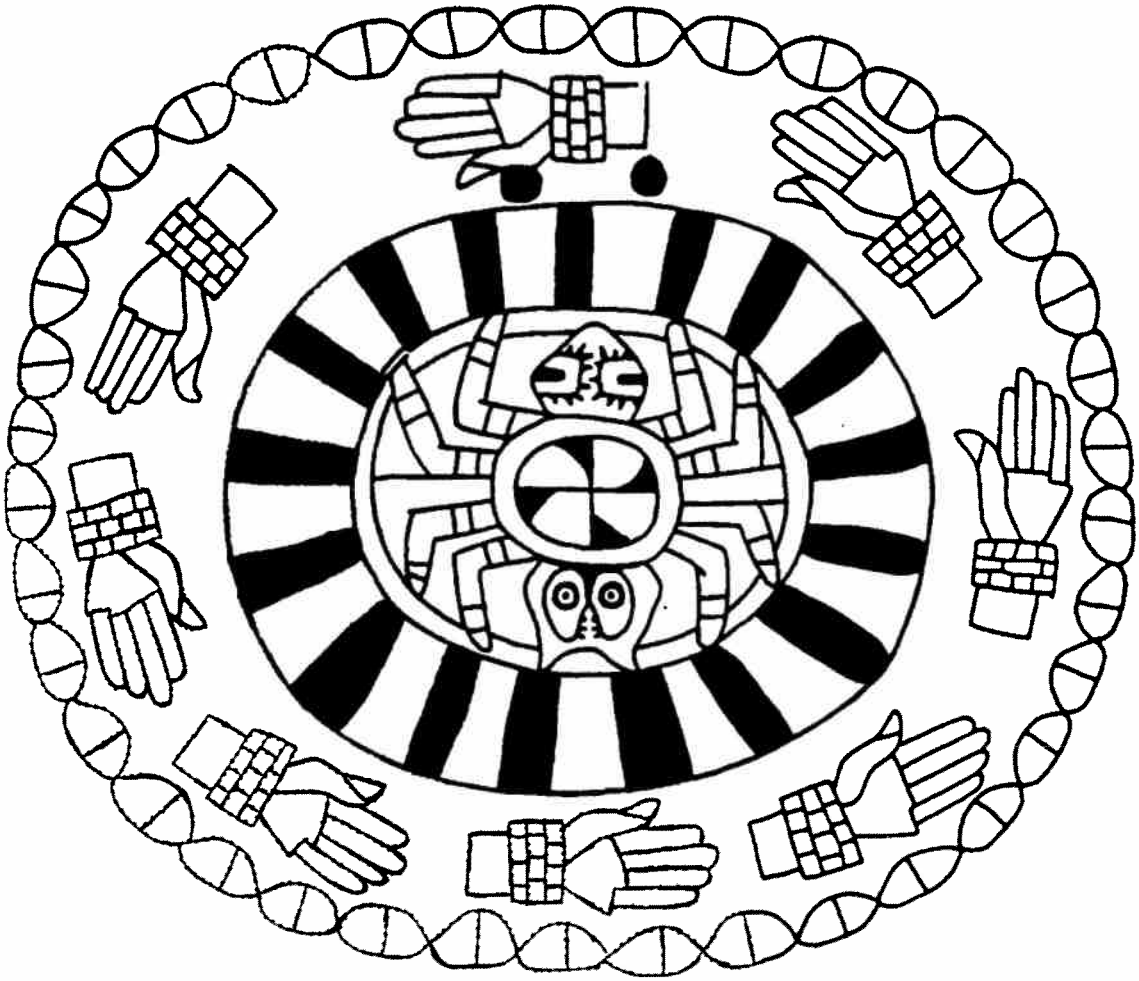
CADDOAN ARCHEOLOGY



Volume 11, Number 3 **October, 2000**

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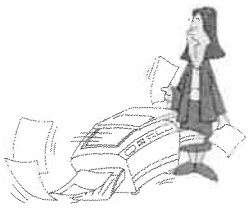
Editor's Page



Once again, I must apologize for this issue being so late. This has been the year of family emergencies, so I'm still trying to get caught up with everything else. Maybe someday we'll get back on schedule.

Plans are underway for this year's Caddo Conference. I am working with Sue Richter, who is a Curatorial Specialist at the almost new Sam Noble Oklahoma Museum of Natural History. We will have a joint meeting with the Flint Hills Conference at the museum on Friday, March 16 and Saturday, March 17. There is a very nice auditorium for our paper sessions, in addition to a museum full of exhibits. Admission to the exhibits is included free-of-charge to those with paid conference registrations. There will be special events, including an opening reception at my house on Thursday evening, with a light buffet meal, for conference attendees. There will be other events, but planning is not complete on these. More information can be found at the conference web site (www.snomnh.ou.edu/caddoflint) or in the second mailing which should be coming out about the same time as this issue. If you do not receive the mailing and would like to have it, please contact Sue Richter (srichter@ou.edu) or Lois Albert (lealbert@ou.edu), and we will send you a copy. Information about Norman lodging places is on the web site and in the mailing. We will update the web site as needed.

The new online issue of *Discovering Archaeology* has several interesting articles, especially for those who like classical archeology. In one of the articles (The Lost City at Giza) there is a link to new popular magazine, *Egypt Revealed.*

The online journal from Sheffield University (England) is still going and had one new issue last year. Its URL is: www.shef.ac.uk/uni/union/susoc/assem/ Although most of the articles are about British archeology, there are topics from other areas. Another online journal from England is *British Archaeology*: www.britarch.ac.uk/ (homepage for the Council on British Archaeology). Click on the link to the journal. There is also a refereed online journal at this site. Click on the link to *Internet Archaeology*.

The Spiro Mounds site has a **very** small web site: www.ok-history.mus.ok.us/mus-sites/masnum28.htm Dennis, are there plans to put information *about* Spiro on the web? To find other sites about mounds, type in archaeology+mounds (I used Exite as a search engine). I picked up sites all over the world, mostly in Europe and North America, although seem to be rather "fanciful". Cahokia and Etowah were well represented.

Upcoming Meeting and Events

March

15-18 *43rd Caddo Conference*, Sam Noble Oklahoma Museum of Natural History, University of Oklahoma, Norman. For more information, see the editors page or go to http://snomnh.ou.edu/caddoflint

23 - 24 *18th Annual visiting Scholar Conference*, Center for Archaeological Investigations, Southern Illinois University, Carbondale. Theme for the conference is *Hunters and Gatherers in Theory and Archaeological Research*. There will be four ½ day sessions focusing on subsistence, settlement, production, and institutions. For additional information, contact George Crothers, Center for Archaeological Investigations, Southern Illinois University, Carbondale IL 62901-4527; telephone 618-435-5032; email: crothers@siu.edu; web: www.siu. edu/~cai/vs.htm

28 - 31 2001 American Association of Physical Anthropologists (AAPA) Meeting, Westin at Crown Center, Kansas City, Missouri. Web site: www.physanth.org, or contact David Frayer, telephone 785-864-2633, frayer@ukans.edu; or Sandra Gray, 785-864-2646, sgray@kuhub.cc.ukans.edu; fax 785-864-5224; both - Department of Anthropology, 622 Fraser Hall, University of Kansas, Kawrence KS 66045-2110.

April

21 Oklahoma Anthropological Society Spring Meeting, Sam Noble Oklahoma Museum of Natural History; for more information, go to http://netnowtechnologies.com/oas/ or contact the Oklahoma Archeological Survey, 111 E. Chesapeake, Norman OK 73019-5111; telephone 405-325-7211; email: rbrooks@ou.edu or lealbert@ou.edu

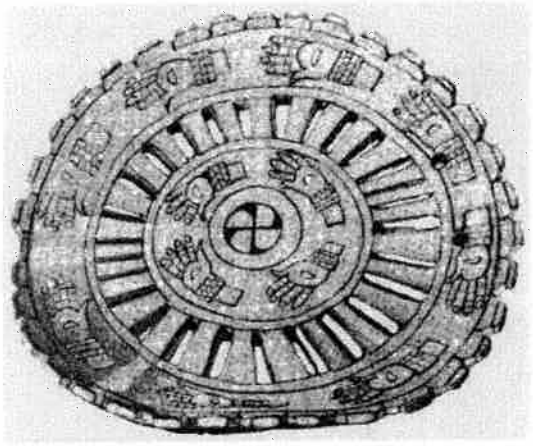
August

26-30 10th Archaeological Chemistry Symposium, American Chemical Society Meeting, Chicago. Papers will be presented in all areas of chemistry applied to the study of archaeological materials, and chemistry used to answer archeological problems. Abstracts may be submitted through April 27, 2001 to the ACS electronic submission system: acs.comfex.com/oasys.htm. Registration information available through *Chemical and Engineering News* or at www.acs.org/meetings. Contact: Kathryn A. Jakes, 1787 Neil Avenue, Columbus OH 43210-1295; telephone 614-292-5518; email: Jakes.1@osu.edu

November

28 - Dec. 2 *100th Annual Meeting of the American Anthropological Association*, Marriott Wardman Park Hotel, Washington DC. Special activities will in presented which explore the history of American anthropology. Submission information can be accessed in the January *Anthropology News* or www.aaanet.org. Contact: AAA Meetings Department, 4350 N Fairfax Drive, Suite 640, Arlington VA 22203-1620; telephone 703-528-1902 ext 2; email: jmeier@aaanet.org.

The Oklahoma Prehistorian
Volume 2(2)



Cover: Spiro Shell Gorget

The shell gorget pictured on the outside cover of this issue of the Oklahoma Prehistorian (ed. note: see above) comes from the large Spiro Mound, near Spiro in LeFlore County, Oklahoma.

The gorget was found in Burial 108 and has been cut from Busycan (sic.) Conch shell of the type native to the Gulf of Mexico. The gorget is approximately eight inches in diameter, roughly circular and showing the natural concave contour of the shell. It consists of a swastika-like design in the center, surrounded by two concentric circles. Outside this are four hands arranged in a circle with one pair wrist to wrist and the other pair finger-tip to finger-tip. These are surrounded by two more concentric circles. These are follow-ed by a border of eight hands. The edges of the gorget are scalloped and it is pierced with two holes for the attachment of the suspension thongs.

Burial 108 consisted of a single primary burial and four secondary partial cremations. In addition to the gorget, these burials had a large number of associations, among which may be mentioned 10 stone ear spools, one copper bodkin, several fragmentary shell gorgets, green paint, three carved wooden beads, fragments of hair, cloth, cane matting, some chipped projectile points, and fragments of several pottery vessels which have not yet been restored.

Permission to use the gorget illustration as a frontispiece was granted by Dr. Forrest E. Clements of the Department of Anthropology and Sociology, University of Oklahoma, who wrote the description.

BIOFILE

Kenneth G. Orr When Kenneth G. Orr came to Oklahoma, he was disappointed at the dearth of buffalo and blanketed Indians here. He had just received his A.B. degree from Columbia University and had finished a year of graduate research work on the Staffanson Eskimo collection at the Museum of Natural History under Doctors Wissler and Nelson. But after working more than a year on the Spiro Mound group in southeastern Oklahoma as a WPA supervisor, Kenneth Orr forgot much of that initial disappointment and is enthused over the wealth of archaeological material in Oklahoma. Previously he accompanied the Smithsonian Institute's expedition into northeastern Kansas to study Indian villages.

He authored the paper "Field Report on the Excavation of Indian Villages in the Vicinity of the Spiro Mound" in this issue of the *Prehistorian*.

FIELD REPORT ON THE EXCAVATION OF INDIAN VILLAGES IN THE VICINITY OF THE SPIRO MOUNDS, LEFLORE COUNTY, OKLAHOMA

Kenneth G. Orr

A wealth of strikingly unusual and beautiful objects of Indian manufacture were excavated from the burials of the Spiro Mound, Leflore *(sic.)* County, Oklahoma during 1936-37. Engraved Gulf Coast conch shells, shell beads of a dozen types, river pearls, effigy pipes, long delicately chipped flint blades, feather and textile cloths and precisely incised pottery vessels were excavated in quantities. So unusual was this material that, at the time, the archaeological science was unable to answer a host of questions which immediately arose concerning the identity of the tribe who had made the artifacts and who were buried with them. How long ago had they occupied the region? From where had they come, and where did they go? The chronological relationship of the Spiro Mound Culture to the known cultures of the United States was of particular concern to the investigators. How and where did this tribe fit into the picture of America's past?

The answer to these important problems, and particularly to discount the theories of exotic origin, it was necessary to further investigate the region. The Works Progress Administration, under the direction of Dr. Forrest E. Clements and sponsored by the Universities of Oklahoma and Tulsa, continued archaeological excavation in the northern portion of Leflore County. Under the supervision of the writer more than 20 Indian villages have been excavated during the past year. A wealth of artifacts and archaeological data was unearthed during this time, and with it a fresh array of problems presented themselves.

As a field report, this paper will not attempt to put forth comprehensive solutions for the many archaeological problems encountered in Leflore County. Its purpose is rather to acquaint the reader with the nature of the features and materials coming from the Indian villages and the manner in which they are excavated and interpreted. Certain facts concerning the Spiro Mound culture, and the other cultures discovered in the region, have emerged from the work. However, since analysis and interpretation is at the present incomplete, the conclusions must be considered tentative and more in the nature of "leads" than of definitely established truths.

FIELD METHODS AND TYPES OF FINDS: Indian villages are found in two

situations — on terraced bottoms and on high bluffs overlooking rivers. An example of the first type of village site was discovered on the land of Spencer Littlefield, Braden, approximately two miles southeast of the Spiro Mound group. Here on a flat terrace, overlooking an extinct stream swale, a village composed of 20 houses was excavated. The site was nicely preserved from plow and erosion destruction by a stratum of river silt deposited by high waters of the Arkansas River. Below this silt blanket, house and burial features were found intact at a depth of from one to three feet. In direct contrast, most bluff sites have undergone considerable destruction due to plowing and sheet-water erosion. At the Bowman site, situated near the site of old Fort Coffee, 1.5 miles northwest of the Spiro Mounds, 12 houses were excavated. These houses occurred just below the plow line (six inches beneath the ground surface) and would have been completely eradicated in a few years. Some bluff sites have been eroded away. Such sites are generally characterized by the presence of considerable quantities of flint artifacts, sherds and burnt stones on the surface.

The finding of Indian village sites may appear to the uninitiated more a matter of "water-witching" than of scientific induction. Unfortunately there is no mysterious "mineral rod" involved in the discovery. At first glance a village site does not appear differentiated from the surrounding plowed fields. In practically all cases, however, there will be some surface indication of the village lying beneath the plowed furrows. Quantities of flint chips, fragments of pottery vessels and stone artifacts on a field surface generally mark a village site. In the bottom land villages, where silt deposits have covered the features, the indications will be less plain. Continuous plowing, nevertheless, exposes material even in bottom land sites. A small crew of specially trained workers, known as the survey crew, locates sites for the project. These men depend primarily on the cooperation of farmers, who report finding "a bucket full of arrow points", for their initial lead. Such information frequently leads to the discovery of a site. The survey crew furthermore knows the bottom land sites usually are to be fond at the junction of two streams and that bluff sites are invariably situated near springs. Likely locations may, with a high degree of accuracy, be plotted from a detailed contour map of the region.

The extent of a village is generally indicated in the area covered by surface debris (flint chips, sherds, etc.). The houses, however, usually lack any surface indications whatsoever. It has been thought the circular "mounds" (average height 2.5 feet, diameter 30 feet), which occur in groups of hundreds in Leflore County[1], represented domiciliary mounds. The project's findings fail to support this theory. Many such mounds have been tested by trenching, but thus far, no trace of house-earth mixture or artifacts have been found. Houses must then be located

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[1] *[Ed. note: These are natural formations, perhaps erosional, and are termed by soil scientists as pimple, prairie, or mima mounds.*

by testing. Small test pits, two feet square and dug to the subsoil, are placed at 10 foot intervals over the entire village area. When a house-earth mixture is struck the indications are unmistakable.

Wood ordinarily decays away in the course of time, leaving no trace recognizable to the eye. Burned wood or charcoal, on the other hand, is as indestructible as stone. The majority of Indian houses had fortunately been burned. A house-earth mixture is impregnated with charcoal lumps and fallen posts, intermixed with wattle (the Indian wall and roof "plaster" of burnt clay), artifacts, animal bones and debris. Such earth mixtures vary in thickness from a few inches to 1.5 feet. The area covered by the house-earth mixture corresponds to the outline of the house. Since houses burn only down to the floor level, a good segment of the upright post, embedded in undisturbed subsoil, will not have charred. The embedded post will have decayed away and the post mould refilled with house-mixture. This important fact allows excavators to plot out post pattern or foundation plan of structure.

The post patterns of houses excavated by the Spiro Mound Project have been remarkably symmetric; all houses have straight rows of outside posts marking the walls of the structures (Plate 1). Outside posts are placed approximately a foot apart and vary in depth from six inches to 1.5 feet. Similarly, all houses have large internally situated posts, main roof supports and small secondary posts for the roof. Wattle has been found associated with the house sites, indicating by the grooves in the clay that the roofs were composed of rafters, twigs and reeds — the inner surface of which had been coated with clay (wattle). The majority of the houses have a central fireplace. This is a circular or rectangular area of burnt clay on which is found white wood ash, split animal bones and charred vegetable debris. Occasionally, small caches or garbage pits are to be found in the corners. Common features of Leflore County houses indicate a basic relation-ship in house types. The small brush shelters of early Woodland phases found in Kansas and Nebraska, and the stone slab or adobe houses typical of the Southwest, are lacking in Leflore County. Though basically similar in materials used and technic (*sic.*) of construction, the house types are distinct in post pattern. Thus far, three well-defined house types and one sub-type have been excavated.

The importance of house types as an instrument for cultural diagnosis is clearly seen. It has been noted that houses of any village representing a single culture period are all of the same type. The architectural style of a culture at any time period

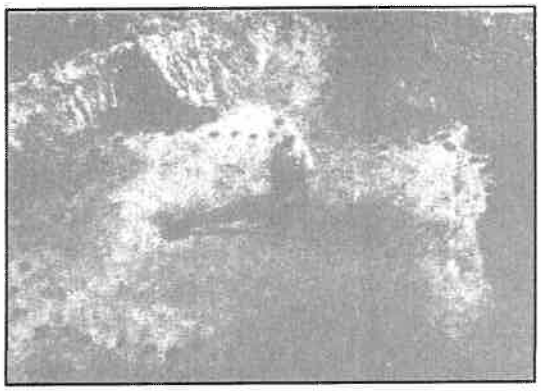

Plate 1. Plan of House Type I.

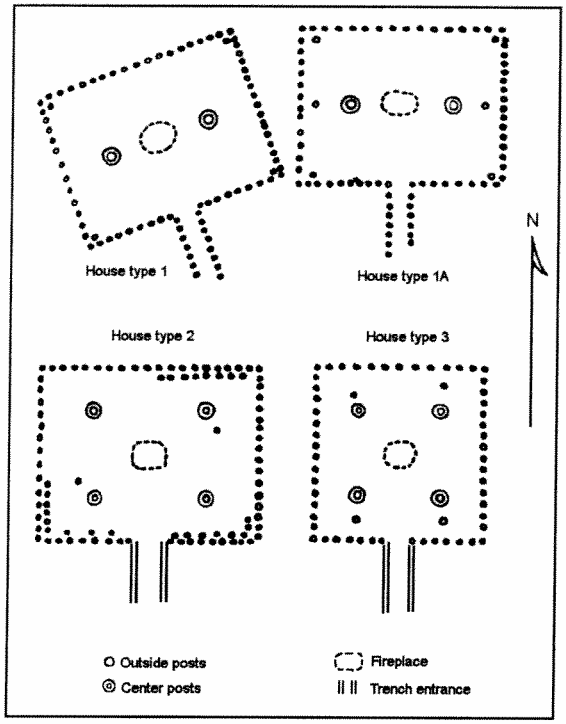

Plate 2. House types from LeFlore County, Oklahoma.

appears as distinct and well-defined as its ceramic decorative motifs. It would be well to briefly describe the house types (Plate 2) and indicated the correlation between house and artifact types:

***HOUSE TYPE 1**: A rectangular, two center post house, whose average dimensions are 18 x 24 feet. An entrance passage of parallel posts usually extends to the South. Type 1 is oriented with long axis either Northeast-Southwest or Northwest-Southeast, but never in the cardinal directions.*

Pottery Associations: Shell tempered, porous brown and red slipped wares predominate. The average thickness is 0.2 inches. Vessel forms include: small and large mouthed ollas; small-necked water bottles; curved, straight and carinated bowls. Designs on this ware are elaborate, but in most cases have been scratched on after the vessel was fired. The motifs employed include: ladder, scroll, spur, negative circle, line-filled chevron, and punctated (Plate 3). The following structural elements are used as decoration: hollow protuberations filled with clay pellets (rattles), verticle (sic.) and horizontal rim tabs, ridge cameo designs, nodes, and scalloped rims. The incised ware is rare except in burials. The burials are of the flat type located near the village.

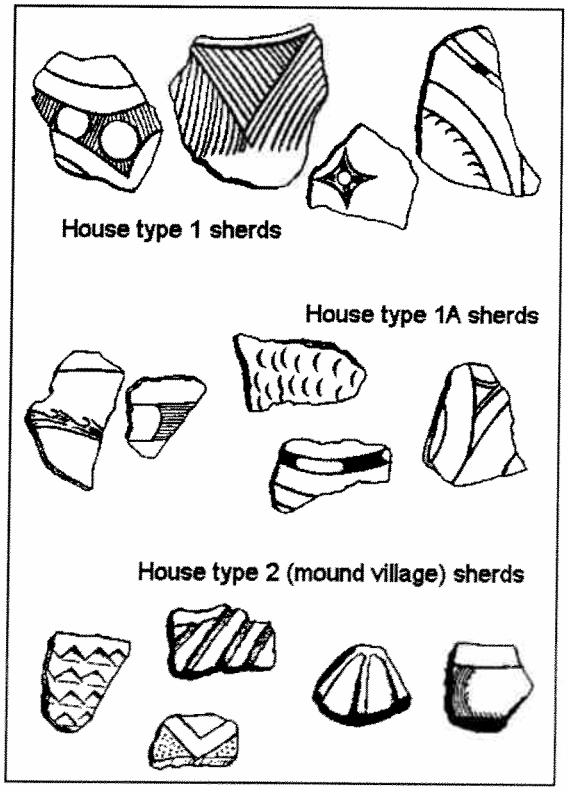

Plate 3. Decorative motif on sherds from LeFlore County, Oklahoma.

Other Artifacts: Tubular, limestone elbow pipes; long leaf-shaped knives; small, triangular, notched points; straight flint drills; sandstone metates and thin, rectangular manos are foufnd in the house-earth mixture.

Most of the villages thus far excavated were composed of type 1 houses. They have without exception been bluff site villages. The houses occur from 10 to 50 feet apart, but no definite "village plan" has been found.

***HOUSE TYPE 1A**: Similar to Type 1 except the houses are oriented in the cardinal directions. The long axis is oriented East-West, the short axis North-South.*

Pottery Associations: Shell tempered, hard, brown ware predominates. The surface of this ware is mainly polished. Smooth, red-slipped ware occurs. Sherd and grit tempering is found in small percentages. Though the decorative motifs used on the pottery are with few exceptions those of House Type 1, a real difference is noticed in the technic of incising. The majority of designs are neatly executed, haing been incised when the clay was firm. Bands of closely incised, parallel lines interrupted at intervals by negative ovals are found on poished black ware. These finely executed motifs are often filled with red pigment.

Other Artifacts: Stemless, tubular, limestone pipes; small triangular, notched points; ground-stone celts; sandstone shaft polishers; thin, ovoid manos and metates are found in the house-earth mixture.

One bottom-land village containing 20 houses of Type 1A has been excavated. Similar pottery has been found in other bottom-land village sites, but permission to excavate these for houses has not yet been secured.

***HOUSE TYPE 2**: This type is a rectangular, four center post house with an entrance passage to the South. The entrance consists of two parallel trenches. The type varies in size from 18 x 24 feet to 30 x 40 feet. Orientation is in the cardinal directions — long axis East-West. Baked, clay floors are common.*

Pottery Associations: The pottery associated with House Type 2 is distinct from that associated with Types 1 and 1A. It is thick (average 0.5 inch), natural, dun-orange ware tempered primarily with sherd, bone and sherd, or sherd and quartz grit. Vessels are extremely large, mouth diameters of 1.5 feet being not uncommon. This ware is mainly undecorated.

Other Artifacts: Small "bird" points, with plain or serrated edges; ear spool fragments; black stone beads; chipped stone hoes; polished stone celts; "T"-shaped, large, tubular, limestone pipes; fragments of pottery platform pipes.

The one village containing houses of type 2 surrounds the Spiro Mound group, and is referred to as the Mound Village. Six houses have been excavated and 12

more located. The village is approximately 0.75 mile long and 0.5 mile wide.

***HOUSE TYPE 3**: A square, four center post house, with entrance passage to the South. Similar to Type 2, the entrance consists of parallel trenches.*

Pottery Associations: Bone and sherd tempered, smooth, brown ware has been found in association with Type 3.

Although house type 3 is a definitely established type, unique from types 1, 1A, and 2, so few have been found that the artifact characteristics of the culture phase represented is not clear. Only a few fragments of pottery vessels have been found in association. House of this type have all been found in bluff villages in close proximity with type 1 houses. Instances of house superposition make it clear the two types are not contemporaneous. Unfortunately, it has to date been impossible to determine which type originally occupied the site. The sherds found with type 3 are distinctly different from those of house type 1, but closely resemble those of house type 2 (bone and sherd tempering).

It is possible that yet another type of house, a circular type, will be defined as a result of further work. A village site located at the north end of the Spiro Mound Village had produced two circular structures of 30 feet in diameter. No trace of center or secondary posts were found. The structure foundation had almost eroded away at the time of excavation, but the post circle was well-defined. This problematical structure was associated with shell hoes, pottery tubular elbow pipes, and a considerable amount of galena fragments. The pottery was of coarse shell-tempered hard ware of 0.3 inch average thickness. Diagonal dash incisings, cut in when the clay was soft, were located around a slightly collared rim. Dr. S.C. Dellinger, Archaeologist of the University of Arkansas, has noted a similarity between this ware and that of the Nodine Culture located in northeastern Arkansas.

A rectangular house with a hard-baked clay floor and red clay walls has been located on the river bluffs 4 miles southwest of the Spiro Mound site. A deplorable lack of cooperation on the part of the owner makes this unusual type unavailable for complete excavation and analysis. Superstition, cupidity and a firm belief that the true aim of the Project is to dig up "buried gold treasure" are the causes of such isolated cases of non-cooperation. Altho (*sic.*) understandable, it is regrettable that scientifically valuable material should thus lie dormant — to be eventually demolished by plowing and erosion. It is probable, however, that more house types will be located in the course of the Project's work.

The confines of this paper do not allow a discussion of the burial grounds found associated with villages of house types 1 and 1A. From the burial grounds come the majority of the complete and restorable artifacts. Pottery found in house sites is, with rare exceptions, fragmentary. Flint and stone artifacts are also fragmentary. Each, however, is individually analyzed

for traits of form, technic of manufacture and decoration. The statistical analysis of fragments as well as of complete specimens is of utmost importance in defining a culture and in determining its relation to other known cultures.

INTERPRETATION OF ARTIFACT TYPES: The Chipped Stone artifact classification chart devised by Dr. W.D. Strong of Columbia University (Strong 1935) and widely employed in the Northern Plains region, is with minor modifications applicable to the points and other chipped artifacts found in Leflore County. A statistical count of flint projectile points by the use of the Strong classification system has led to interesting results. The small "bird" point (type SCa1), for example, appears confined almost entirely to the Mound Village. Similar points have been found in abundance in the Main Mound ("Great Temple") burials in association with the elaborate effigy pipes and incised conch shells. The triangular notched point (type NBa1) appears restricted to villages containing house types 1 or 1A. The large shoulder point with receding tang stem (type SAa) is found associated with varying percentages with all villages. While the main burden in cultural diagnosis must fall on ceramic types, the importance of chipped flints maybe seen in the above brief example.

The form of pottery vessels, complete or fragmentary, is another important diagnostic study. This is particularly true since in Leflore County village sites incised ware is rare (though abundant in burials). Even fragmentary rim sherds possess three form features which lend themselves well to statistical treatment; namely, lip form, rim form and shoulder or body form. By a comparison of the morphological traits in the sherds of two distinct villages it is possible to determine the relationship between the villages. The Mound Village (house type 2), for example, is clearly not of the same culture phase as the Fort Coffee site (house type 1). Fully 60% of the Mound Village rim sherds are of the 5Vb type, i.e., olla forms possessing a rounded lip, vertical rim and gradually flaring shoulder. The Fort Coffee site is deficient in rim sherds of the 5Vb type; the largest percentage falling in the 10R4b type. This symbolically describes an olla form having a rounded roll (overhanging) lip, outflaring rim and gradually sloping shoulder. The relatively larger size of Mound Village vessels as compared with those of Fort Coffee further bears out this distinction.

All sherds (base, rim or body) may be counted for two traits; type of temper and type of ware. The statistical study of temper types has revealed interesting and highly significant results. The Mound Village, again, is clearly differentiated from the Fort Coffee site. Whereas the Mound Village (house type 2) temper is 80% ground up sherds, pottery from the Ft. Coffee site (house type 1) contains no sherd temper. Fully 65% of the sherds from the Ft. Coffee site are tempered with shell. The Littlefield site (house type 1A), however, contains a large percentage of shell and a small percentage of sherd temper.

Other traits of ware, form, texture, thickness, and decorative motif indicate that the Littlefield site bears a relationship both to the Ft. Coffee site and to the Mound Village. In degree, the relation is considerably closer between the Littlefield and Ft. Coffee sites than between the Littlefield site and the Mound Village.

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CONCLUSIONS: The statistical approach not only allows a comparison of local sites, one with the other, but also allows a precise method of comparing local site material with that from other excavations. Such a comparison has been made with the cultures of Louisiana, excavated by James A. Ford in 1936 (Ford 1936). The pottery types excavated by Ford from historical Caddo villages bear a striking resemblance to those from house type 1 villages. Ford's Caddoan artifacts, however, are found in association with white trade material and are plainly historical, but no trace of historical material (such as glass beads, iron, etc.) Have been found in the villages. The lack of Caucasian trade material is felt to be due to lack of contact with white influence rather than incomplete excavation. This would suggest that the villages of house type 1 are probably associated with some phase of the Caddoan culture, possibly earlier than the historical tribes described Ford. A comparison of the Project specimens from house type 1 villages with those of Dr. Dellinger's Arkansas University collection further bears out the similarity between this pottery and that commonly called "Caddoan". Caution, however, must be used in employing the linguistic term "Caddoan" to sites on which documentary evidence is lacking. The non-historic house type 1 villages, however, plainly belong to a late phase of the lower Mississippi pattern. House type 1A villages also appear related to a late phase of the Lower Mississippi pattern of perhaps an earlier period than the house type 1 villages. The relation of the Mound Villages to the features of the Main Mound ("Great Temple") is being determined at the present time by statistical analysis. It is felt that chronological problems of the Mound Village (house type 2) and the more elaborate features of the Main Spiro Mound are one and the same.

Whereas the pottery traits from house type 1 villages closely resemble what Ford has called Historic Caddo (see also Walker, 1935), the house type 2 or Mound Village pottery has some characteristics identical with the Cole's Creek pre-historic complex — an intermediate phase between the later phase and the basic Marksville complex of the Lower Mississippi pattern. Square base vessels, the presence of sherd and grit temper and typical Cole's Creek ceramic motifs (Plate 3, a and b) indicate this relationship. Unfortunately, no house types associated with the Marksville-Cole's Creek-Caddo pattern have been published for comparative purposes.

A follow-up of the chronological leads arrived at through a comparative study, by statistical analysis, of artifact and house types will lead to scientifically correct

facts concerning the cultures of Leflore County. Further excavation will, it is hoped, unearth stratified kitchen middens thus far singularly absent. Superposition of cultures ordinarily found in middens leaves no question as to the chronological position of the cultures. The problem of the roots and origin of the Main Mound culture has still to be answered. Though the roots of this culture are clearly seen to be in the Southeast, as a phase of the Lower Mississippi Pattern, no clear traces of an antecedent culture have been found by our Project thus far. Continued work may reveal an ancestral culture. Perhaps the square 4 center post houses represent an earlier and closely related peoples. The sequence of house types strongly suggest this, though the artifact contents of type 3 houses have been too meager to say more. Whatever the answer to the problems pointed out in this paper, and to those problems which will inevitably arise as the result of further work, it is felt a firm foundation has been established to cope with them, and to present the correct picture of Man's past in Eastern Oklahoma.

REFERENCES CITED

Ford, J.A.
1936 An Analysis of Potter Complexes in Louisiana. *Anthropological Study #2, Louisiana State Geological Survey.*

Strong, W.D.
1935 An Introduction to Nebraska Archaeology. *Smithsonian Institute Miscellaneous Collection.*

Walker, W.M.
1935 A Caddo Burial Site at Natchitoches, Louisiana. *Smithsonian Institute Miscellaneous Collection* 94(14).

Archeological Investigations at the Harrison Bayou Site (41HS240) in Harrison County, Texas

Timothy K. Perttula and Bo Nelson

Introduction

We recently completed archeological investigations on approximately 1400 acres of land on Harrison Bayou, Longhorn Army Ammunition Plant, Harrison County, Texas, leased by the Caddo Lake Institute, Inc. (Perttula and Nelson 1999). The Caddo Lake Institute, Inc. leased this portion of the Longhorn Army Ammunition Plant (LHAAP) for 30 years under a September 1996 Memorandum of Agreement (MOA) with the Department of the Army. These archeological investigations were completed under Archeological Resources Protection Permit DACA63-4-97-0580 issued September 1, 1997, by the Real Estate Division of the Department of the Army, Fort Worth District, Corps of Engineers to the Caddo Lake Institute, Inc.

During these investigations, intensive shovel testing and a limited amount of hand excavations were completed at the Harrison Bayou site (41HS240), one of the earliest reported Caddoan sites in Northeast Texas (Ford 1936), but still one of the more poorly known sites in the region. In this paper, we discuss the work we conducted at the Harrison Bayou site, and summarize the archeological findings from this important Middle Caddoan period occupation at Caddo Lake.

Environmental Setting

The Caddo lake bioregion is in the Western Gulf Coastal Plain, in the Big Cypress Bayou basin of Northeast Texas and northwestern Louisiana. The Caddo Lake watershed includes all of Camp and Marion counties, and portions of Cass, Franklin, Gregg, Harrison, Hopkins, Morris, Titus, Upshur, and Wood counties, in Northeast Texas, and parts of Caddo Parish in northwestern Louisiana. This is an area of more than 2350 square miles. The modern climate is humid subtropical, with warm summers and mild winters, with 43 - 50 inches of precipitation a year, principally falling in the spring and winter. The average growing season is more than 240 days (Ingold and Hardy 1996).

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While now mainly second growth pines and hardwoods, this general region was an area of mixed oak woodlands and mixed pine-hardwood forests (Brown et al 1998; Diamond et al. 1987) referred to as the Pineywoods or the Southeastern Deciduous and Evergreen Forest, with hardwoods, cypress, tupelo, and sweetgum in bottomland riverine, marsh, and swamp habitats (Hardy 1995; Ingold 1995; Ingold and Hardy 1996; Sheffield 1995). The unique habitats around Caddo Lake, a natural lake formed in the late 1700s due to flooding and natural levee breaks along the Red River caused by the Great Raft and increased water levels along distributary channels (Pearson et al. 1994), includes cypress swamps, marshes, grasslands, bottomland hardwood forests (particularly along Harrison Bayou), and pine forests.

Caddo Lake at its maximum extent may have reached elevations (although fluctuating) between 173 and 180 feet, based on historic maps, studies of lacustrine deposits on the lake bed, and relict shorelines (U.S. Department of the Interior 1914; Albertson and Dunbar 1993). Albertson and Dunbar (1993:41) characterize Caddo Lake as "a shallow, 3- to 5-mile-wide (4.83- to 8.05-km), drainage basin lake with a narrow valley at its confluence to the Red River. The entrance into Caddo Lake from Twelvemile Bayou is a natural setting for the location of Caddo Dam [constructed in 1914], since the valley is so narrow at this location ... formation of Caddo Lake would have flooded the existing floodplain of Big Cypress Bayou."

The Harrison Bayou lease lands are comprised of alluvial bottomlands along Harrison Bayou, a major tributary to Caddo Lake and Big Cypress Bayou, Martin's Bayou, and Saunders Branch, a small area of upland flats between Goose Prairie and Martin's Bayou, and eroded uplands across the remainder of the 1400 acre lease area (environmental/topographic zones follow Cliff et al. [1996:Figure E-1]). The lease lands range between 168 and 200 feet amsl, and are generally characterized by shallow sandy loam sediments in upland settings (Golden et al. 1994; Van Duyne and Byers 1913), silt loam alluvial sediments, and sandy loam natural mounds in certain floodplain settings along Harrison Bayou.

At its estimated water level of 173.09 feet amsl in historic times, the waters of Caddo Lake in the Harrison Bayou lease lands would have inundated Rag Island, and extended at least 0.5 - 2 km up Martin's Bayou, Saunders Branch, and Harrison Bayou, respectively. A lacustrine delta and point bar deposits probably began to form above the Harrison Bayou embayment with the formation of Caddo Lake, and these deposits are marked by distinctive mounded alluvial deposits (i.e., pimple mounds) and deep sandy loam sediments of the Metcalf-Cart and Guyton-Cart complexes (Albertson and Dunbar 1993; Golden et al. 1994). This embayment area is just to the north of the Harrison Bayou site.

Archeological Investigations at the Harrison Bayou Site (41HS240) at Caddo Lake

The Harrison Bayou site has been of archeological interest since the early 1930s, and has been the subject of several studies and archeological survey investigations from the 1930s to the present time (Ford 1936; Webb 1948; Gibson 1970; Peter and Stiles-Hanson 1990; Cliff et al. 1995; Cliff et al. 1996; Gadus et al. 1998). The 1998 Caddo Lake Institute, Inc. archeological investigations at the Harrison Bayou site, however, are the first to systematically examine the entire site area and gather comprehensive information on the extent and depth of the archeological deposits, the density of archeological materials, and the potential for the site to contain features and/or midden deposits.

The Harrison Bayou site is situated on a prominent upland ridge (180 feet amsl) overlooking the Harrison Bayou floodplain and the current channel of the bayou is about 100 meters to the west (Figure 1). The ridge is primarily covered in pines and hardwoods, with a surface visibility of less than five percent except along two dirt two-track roads, and in the far northwestern part of the site, where early 1990s bulldozing (Cliff et al. 1995; Gadus et al. 1998) had created an open grassy area. The ridge has Eastwood very

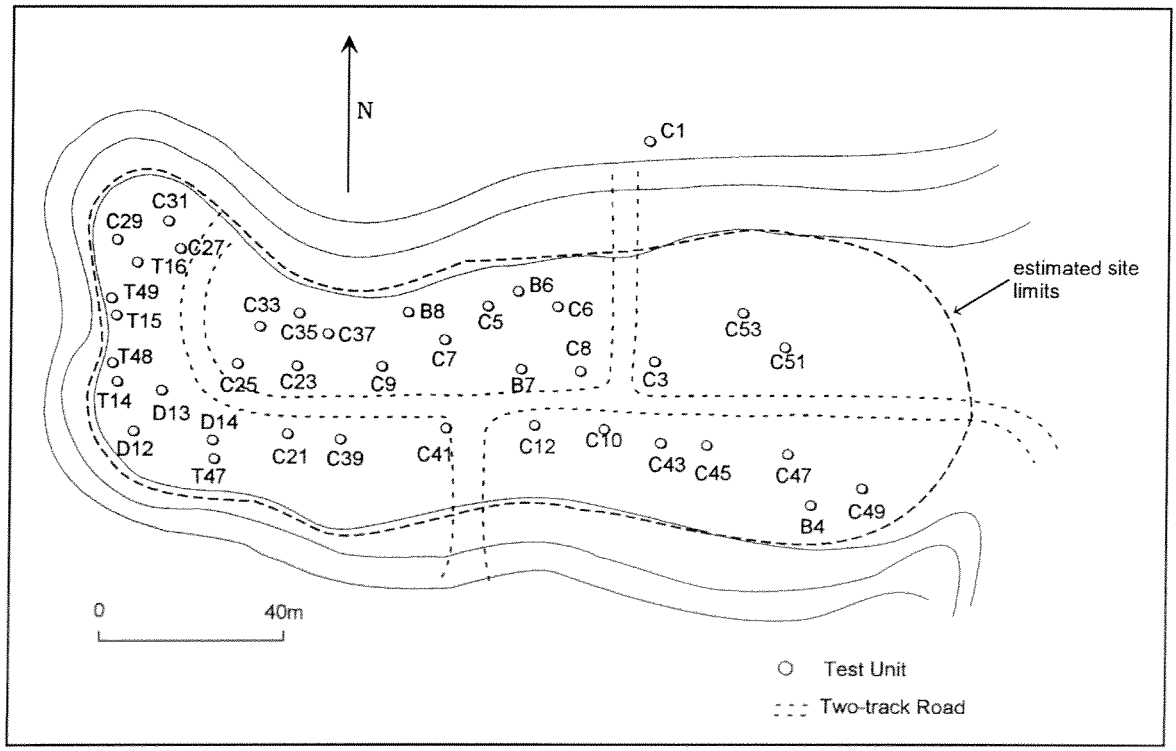

Figure 1. Map of the Harrison Bayou site (41HS240).

fine sandy loam sediments, with 40 - 80 cm of sandy loam overlying a B-horizon clay.

Gadus et al. (1998) provide the most recent summary of the history of archeological investigations at the Harrison Bayou site. Ford's (1936) and Webb's (1948) analyses of ceramic sherd collections from the site indicated that the site was occupied by Caddoan groups during Early, Middle (Bossier phase), and Late Caddoan times, and the presence of a variety of dart points, stone gorgets, beads, and boatstones (Ford 1936:Figure 15) also suggested the site had been used during late Paleoindian, Middle Archaic, and Late Archaic times (see also Gibson 1970). Gibson's (1970) investigations indicated that the site contained as much as 70 cm of cultural midden deposits.

Roemer and Newman (1988) visited the site as part of an archeological assessment of LHAAP test area expansion, and excavated one shovel test that had burned rocks and a ceramic sherd, but they located no midden deposits. They did report that the site had been disturbed by a fire lane, road maintenance, and artifact collecting activities. A later visit in 1988 by Peter and Stiles-Hanson (1990:32) appeared to confirm the findings of Roemer and Newman (1988), in that "limited shovel testing yielded no evidence of a midden and only one Caddoan grog-tempered body sherd ... it is also apparent that the 'midden' area was extremely limited spatially. Further evaluation of the site is needed; however, the present potential of the site for NRHP eligibility is low ....."

In 1993, Geo-Marine, Inc. returned to the Harrison Bayou site (Cliff et al. 1995). During these investigations, they estimated that "85 percent of the site has had 30 to 60 cm of topsoil removed, presumably by bulldozer, with the original ground surface being present only along the edges of the terrace" (Cliff et al. 1995:29). Three of the five shovel tests excavated on the upland ridge (all at what is now known to be the western end of the site, see below) contained only a low density of prehistoric and ceramic artifacts (3.0 artifacts per positive shovel test), and no midden deposits were identified over the 0.4 ha (3500 square meters) area. Cliff et al. (1995:37) concluded that the Harrison Bayou site has been extensively disturbed by bulldozing, but that "some subsurface deposits may remain at the base of trees and on the periphery of the bulldozed area ... [but] it is possible that subsoil features .... may remain below the level of disturbance at the site ... it is recommended that the Harrison Bayou site (41HS240) be considered of unknown eligibility for inclusion in the NRHP".

Further investigations by Gadus et al. (1998) in 1997, including an additional six shovel tests in the western part of the Harrison Bayou site, did identify preserved midden deposits between 14 - 40 cm bs in one shovel test in the southwestern part of the upland ridge (Gadus et al. 1998:Figure 3), with the upper 14 cm of sediments in that shovel test definitely disturbed by previous bulldozing. No other midden deposits were present within the apparent site boundaries – now estimated at 4300 square meters – and the density of

prehistoric ceramic and lithic artifacts in two positive shovel tests was 2.50. They concluded that "no extensive submidden artifact concentrations that might be associated with the early [pre-Caddoan] occupations of the site were encountered ... [but] that submidden soils are undisturbed" (Gadus et al. 1998:28-29). They also supported Cliff et al.'s (1995) finding that the Harrison Bayou site had the potential to contain preserved cultural features.

The Cliff et al. (1995) and Gadus et al. (1998) shovel test investigations together included 11 shovel tests. Only 45 percent of the shovel tests were reported to contain prehistoric archeological materials, with a density of 2.80 artifacts per positive shovel test. The site was estimated to cover between 0.88 and 1.1 acres. The 1998 Caddo Lake Institute, Inc. archeological investigations discussed in this article paint a different picture of the extent and character of the archeological deposits at the Harrison Bayou site. The distribution of shovel tests containing prehistoric lithic and/or ceramic artifacts indicates that the Harrison Bayou site is approximately 8500 square meters (2.1 acres) in size (Figure 1), about twice as large as the earlier work had estimated. Of the 33 shovel tests excavated during the course of the 1998 project, 28 or 85 percent contained prehistoric artifacts, and the density of artifacts in the positive shovel tests is 4.80 artifacts per positive shovel test; this is 70 percent higher in density than the Cliff et al. (1995) and Gadus et al. (1998) work.

During our 1998 investigations, one shovel test (ST T-15) and two 50 x 50 cm units in the western part of the site appear to contain preserved midden deposits (marked by a dark brown sandy loam between 23 - 37 cm in depth), suggesting that the midden remnants detected by Gadus et al. (1998) are larger than they had previously estimated (Figure 2). In ST T-47 and ST T-49, the possible midden deposits began at the surface, while the midden was between 16 - 37 cm bs in ST T-15, suggesting that overlying sandy loam deposits have been removed in the former two areas. An additional 35 excavation units were completed during the 1998 work besides the three that may have midden deposits, including 32 shovel tests and three 50 x 50 cm units (Figure 1).

A substantial prehistoric archeological assemblage was obtained from the Harrison Bayou site from 28 positive shovel tests and five 50 x 50 cm units placed across the site. The assemblage includes 117 pieces of lithic debris, two lithic cores, seven chipped stone tools, one groundstone tool, five fire-cracked rocks, one animal bone, seven pieces of daub and burned clay, and 131 ceramic sherds (Perttula and Nelson 1999:Appendix II, III, VI). The archeological deposits at the Harrison Bayou site are a maximum of 80 cm in thickness, although more than 94 percent of the artifacts are found from 0 - 40 cm bs; 5.6 percent of the artifacts are found between 40 - 60 cm bs. Within the upper 40 cm of the sandy loam sediments at the site that contain archeological materials, approximately 59 percent of the artifacts occur between 0 - 20 cm; both lithic (59.4 percent of the lithic artifacts are in the 0 - 20 cm level) and ceramic

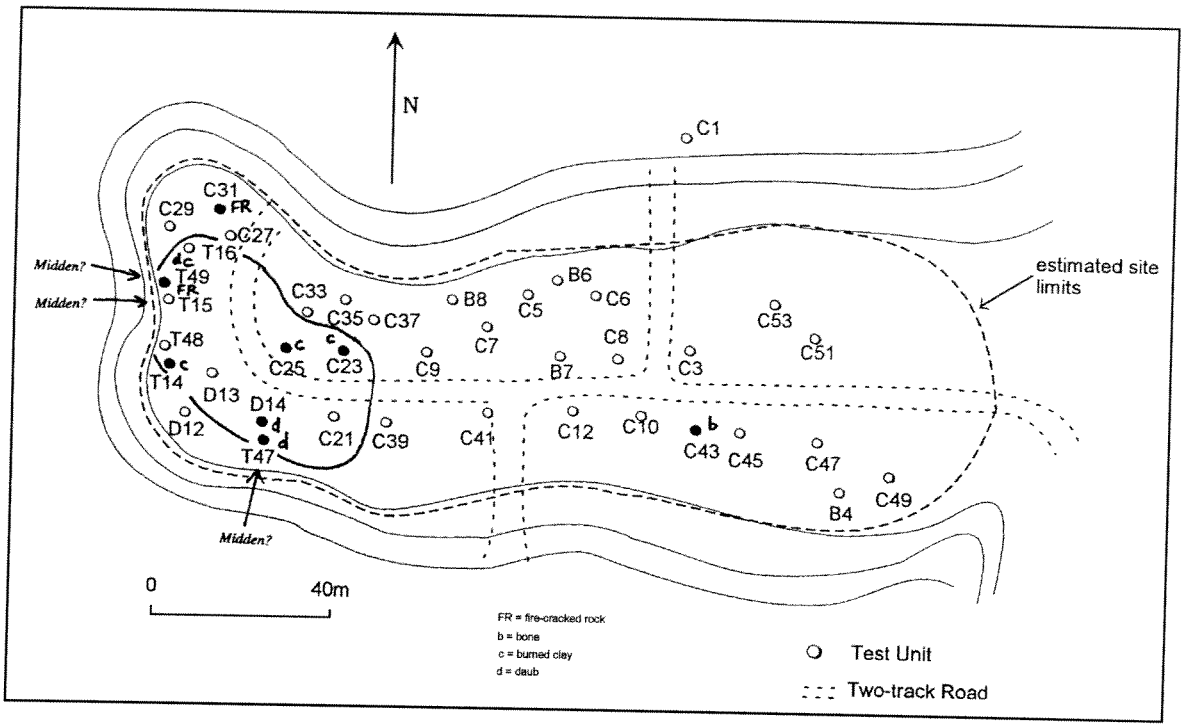

Figure 2. Distribution of bone, daub, burned clay, fire-cracked rock, and shovel tests with preserved midden deposits at the Harrison Bayou site.

(57.5 percent of the ceramic artifacts are in the 0 - 20 cm level, including daub and burned clay) artifacts have comparable frequencies within the upper 40 cm, and the single piece of burned animal bone (ST C-43, 0 - 20 cm; Figure 2) is within the upper 20 cm. The daub, burned clay, and fire-cracked rock are concentrated at the western end of the site, in the same area as the midden deposits (Figure 2).

Lithic debris at Harrison Bayou occurs in densities ranging between 9 - 192 artifacts per cubic meter across the site. The highest densities (120 - 192 artifacts per cubic meter) occurred in ST T-47, ST T-48, ST T-49, ST D-12, ST C-12, and ST C-8 at the western and central parts of the ridge landform (Figure 3). The high density of lithic debris at the site's western end is associated with the area of preserved midden deposits, the areas with daub and burned clay, and the large cluster of prehistoric ceramics. The spatial extent of lithic debris at the Harrison Bayou site is about twice as large as the ceramics, and with the exception of three shovel tests (see below), it is accurate to characterize the eastern part of the site as a lithic scatter.

There is a wide diversity in the lithic raw materials represented in the lithic debris from the Harrison Bayou site. In addition to 13 different colors of chert raw materials (principally red, yellow, and brown) that comprise 49.5 percent of the lithic debris, there are Ogallala (fine-

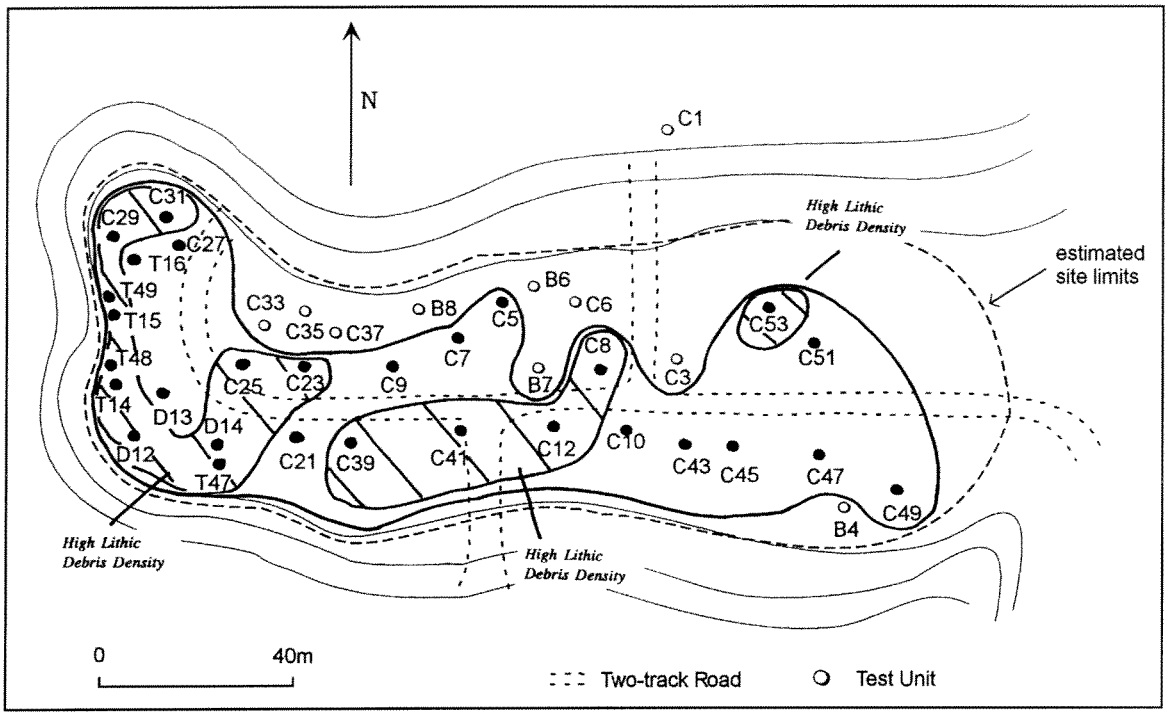

Figure 3. Distribution of lithic debris at the Harrison Bayou site.

grained) and coarse-grained quartzite (2.6 percent), hematite (0.9 percent), petrified wood (36.8 percent), and novaculite (10.3 percent). With the exception of the novaculite and a distinctive black chert, which may represent non-local lithic raw materials, the remainder of the lithic debris appears to be from locally available pebbles and cobbles. More than 55 percent of the lithic debris has cortical remnants (ranging from 33 - 100 percent for the chert, petrified wood, quartzite, and hematite pieces), and one brown chert piece is a bipolar flake; there also is a bipolar core in the lithic assemblage (see below). This evidence in the lithic debris suggests that not only were the great majority of these raw materials available in local gravel sources, but that the initial reduction of these various raw materials (to remove the cortex and obtain flakes or pebble masses for further shaping) for the manufacture of stone tools was a principal focus of the lithic technological activities at Harrison Bayou. Novaculite may be an exception, in that there are no cortical flakes in the Harrison Bayou sample (n = 12); three pieces of novaculite lithic debris have also been heat-treated. The one hematite flake has a polished outer surface, and may have been knapped from a polished ground-stone axe; hematite was frequently employed in the manufacture of polished and grooved axes during the Late Archaic period in Northeast Texas (Story 1990: Figure 32).

Compared to lithic debris samples from 41HS407 and Starr Ranch (41HS408), also investigated in 1998 in the Harrison

Bayou lease lands (Perttula and Nelson 1999), the Harrison Bayou assemblage has a much higher proportion of petrified wood lithic debris (36.8 percent compared to 12.5 - 14.6 percent), and lower percentages of chert (49.5 percent to 53.6 - 75.0 percent) and novaculite (10.3 percent compared to 12.5 to 19.5 percent). These differences may reflect a diversity in the gravel composition across the Harrison Bayou basin from north (i.e., 41HS407 and Starr Ranch) to south (i.e., the Harrison Bayou site) – or perhaps differences in procurement needs and raw material preferences over time – but additional lithic raw material information from upland and stream gravels would be needed to address this issue, as would other large lithic debris samples from other well-dated prehistoric sites within the Harrison Bayou basin. The very high amounts of petrified wood lithic debris at the Harrison Bayou suggests there may be a source of the raw material in proximity, and it may also indicate that a substantial Late Archaic component is present at the site, since that period was the time when the use of this material for tools appears to have been most common in several locales in Northeast Texas.

A bipolar core and a core fragment were found in ST B-8 (0 - 20 cm) and ST T-47 (0 - 20 cm), respectively, in the western part of the Harrison Bayou site (Figure 4). The bipolar core was on a local yellowish-brown chert, and measured 25 x 15 x 7 mm in length, width, and thickness. The

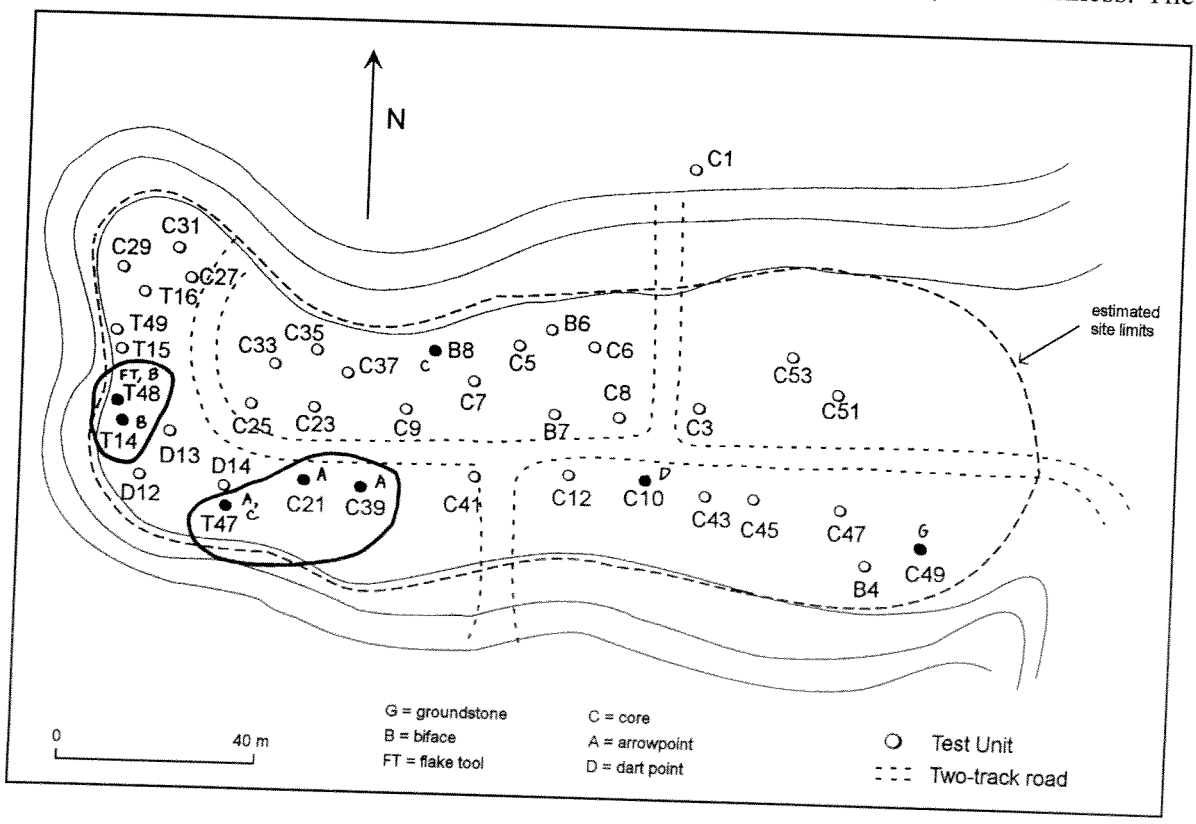

Figure 4. Distribution of lithic tools at the Harrison Bayou site.

core fragment (35 x 10 x 6 mm in length, width, and thickness) was on a local red chert.

The seven chipped stone tools from the Harrison Bayou site include three arrowpoints, one dart point, an expedient flake scraping tool, a thin biface, and a bifacial preform. The three chert arrowpoints were from ST C-21 (0 - 20 cm), ST C-39 (0 - 24 cm), and ST T-47 (0 - 20 cm) in the southwestern part of the site (Figure 4), and at depths associated with the preserved Caddoan midden deposits. The first two have narrow contracting stems and bifacially retouched blades, and range between 16 mm in length, 10 - 11 mm in width, and 2.0 - 2.4 mm in thickness; stem widths are 3.4 and 6.2 mm, respectively. The third is a blade fragment made of a local red chert. The other arrowpoints are made of a local brown chert and a non-local piece of black chert (also heat-pocked from exposure to fire), probably originating in the Red River gravels. These forms of contracting stem arrowpoints are comparable to the Perdiz type, a common arrowpoint type in ca. A.D. 1300 - 1600 Caddoan sites in Northeast Texas.

The dart point is a straight-stemmed fragment, probably of Late Archaic or Woodland period age, from ST C-10 (0 - 20cm) in the eastern part of the site (Figure 4). Its association with a primarily non-ceramic lithic scatter in that area suggests that the archeological deposits there primarily date to the Archaic (Late Archaic?) period. It is made from a heat-treated and coarse-grained quartzite. The blade has an impact fracture from its use as a projectile, and the stem has a snap fracture. It is 22 mm in width and 7 mm in thickness, with an 18 mm stem width.

The flake tool is a expedient end scraper-side scraper (ST T-48, 0 - 20 cm) made on a local red chert with cortical remnants. It probably was used by the prehistoric Caddoan occupants of the Harrison Bayou site to scrape animal hides, bone, and wood. The tool has a steep and 16 mm long used edge marked by micro-step fractures caused by the tool edge being worked on hard and durable objects. The flake tool measures 26 x 17 x 3 mm in length, width, and thickness.

A completed thin bifacial tool with well-formed and pressure-flaked bifacial edges, probably a knife, made of a heat-treated novaculite, is from ST T-48 (20 - 40 cm), apparently below the preserved midden deposits in this part of the site. The thin biface was likely broken by a snap fracture either after it was completed, or else during its use. The broken fragment measures 33 mm in width and 8 mm in thickness; the large size of this tool, compared to the typically small size of available pebbles and cobbles in the Caddo Lake bioregion, strongly suggests that this novaculite tool was manufactured outside the Caddo Lake bioregion (perhaps in southwestern Arkansas, where novaculite raw materials are abundant) and brought or traded to the site occupants. Saunders and Allen (1997:18-20) have pointed out that the trade in novaculite from the Ouachita Mountains was particularly common during the Late Archaic period.

The one groundstone tool was a fragment of a mano or small grinding slab of ferruginous sandstone found in ST C-49 (20 - 40 cm bs). This is in the far southeastern end of the Harrison Bayou site (Figure 4). Such tools are particularly abundant in Archaic and Woodland period contexts in Northeast Texas, and probably were used to grind and crush plant seeds and nut shells.

The five pieces of ferruginous sandstone fire-cracked rock (0.5 kg) were found in ST C-31 (20 - 40 cm) and ST T-49 (0 - 20 cm). Their occurrence suggests that small burned rock features are present at the site in shallow Caddoan and probable Archaic archeological contexts.

Of the 131 sherds from the Harrison Bayou site, there are eight plain rim sherds (including two that may be part of a pipe bowl), 45 decorated rim and body sherds, and 78 plain sherds. The sherds are concentrated in a ca. 4000 square meter area at the western tip of the upland ridge, particularly in ST D-13, ST D-14, ST T-14, ST T-15, ST T-47, ST T-48, and ST T-49 (Figure 5). Because midden deposits were identified in ST T-15, ST T-47, and ST T-49, these seven excavation units clustered in a ca. 35 x 15 m stretch on the ridge may be used to approximate the extent of the preserved Caddoan midden at Harrison Bayou. Three widely scattered shovel tests in the eastern part of the site also contained prehistoric grog-tempered Caddoan pottery (Figure 5), documenting

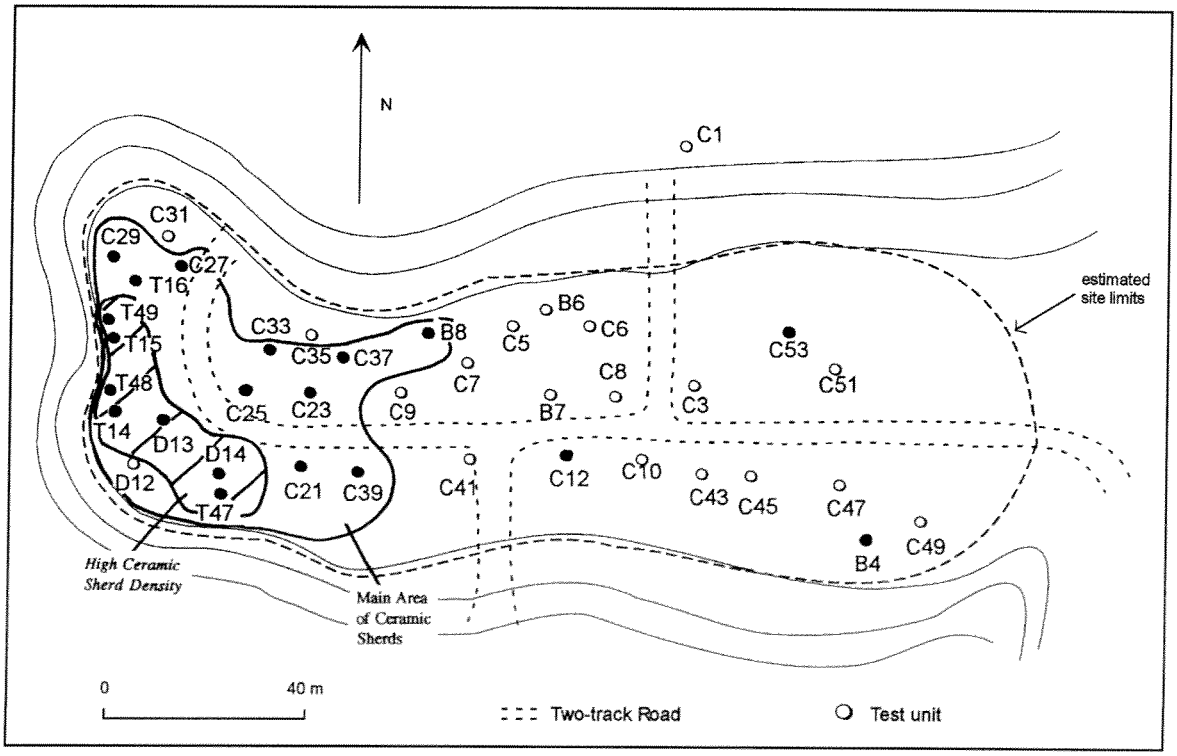

Figure 5. Distribution of Caddoan ceramics at the Harrison Bayou site.

Caddoan pottery (Figure 5), documenting use of that part of the Harrison Bayou site in Middle Caddoan times.

Not counting the two possible bowl sherds, the plain/decorated sherd ratio is 1.87. There is an interesting temporal trend in the Caddoan ceramics from parts of the Red River valley (in northwestern Louisiana) below the Great Bend, the middle Sabine River basin, and the Neches-Angelina River basins for larger portions of vessel surfaces to be decorated, particularly with the introduction of brushing on the bodies of utility jars. Consequently, through time, ceramic assemblages have lower proportions of undecorated sherds (Girard 1996:24). Analyses of the ceramics from several different contexts in the Red, middle Sabine, and Neches-Angelina river basins in Northeast Texas and northwestern Louisiana document this trend nicely, with pre-A.D. 1200 Caddoan sites such as Festervan (16BO327), 41SY81 (Robinson 1997), and Bison (McClurkan et al. 1966) having plain/decorated sherd ratios that range between 2.97 - 4.80. Thirteenth and 14th century sites, including Vanceville (16BO7, sub-mound midden and residential areas) and Tyson (41SY92; Middlebrook 1994), have plain/decorated sherd ratios of 1.30 - 1.61. Late Caddoan sites at McGee Bend Reservoir (including Walter Bell, Etoile, and Wylie Price; Jelks 1965), Toledo Bend Reservoir (Salt Lick, Goode, and Bison, Area B; McClurkan et al. 1966; Woodall 1969), and Vanceville (on the Red River) dating between ca. A.D. 1450 - 1650 have ratios of 0.56 - 1.03. If this plain/decorated sherd ratio is applicable to the Caddo Lake bioregion – and we believe that it is given the ceramic and cultural affinities of the Caddoan groups along the Red River in northwestern Louisiana and in the Caddo Lake area (Thurmond 1990) – the plain/decorated sherd ratio at the Harrison Bayou site indicates the principal Caddoan component dates between the 14th and mid-15th centuries.

The ceramics from the Harrison Bayou site are principally tempered with grog, grog-bone, and bone (Table 1); four of the sherds have either a fine sandy paste or no apparent temper added to the clay paste. They are from vessels that were decorated, either on the rim or on the rim and body of the vessels. With the exception of the temper classes with less than three sherds (i.e., grog-grit, grit, sandy paste, and no temper), the other temper classes are well represented by decorated sherds.

The 45 decorated sherds are dominated by parallel brushing elements, as this decoration accounts for 73 percent of the decorated sherds from the Harrison Bayou site (Table 2). Only one of the decorated sherds, a horizontal engraved rim, is from a fine ware bowl or carinated bowl; the remainder of the decorated sherds are from utility ware jars. The horizontal engraved rim (direct with an everted and folded lip) from ST T-14 (20 - 40 cm) consists of a single engraved line below the lip.

Table 1. Ceramic Temper Classes at the Harrison Bayou Site.

Temper class	plain body sherd	plain rim sherd	decorated rim and body sherds
Grog	42	4	18
Grog-bone	20	-	14
Bone	7	-	10
Grog-Sandy Paste	5	2	3
Grog-Grit	1	-	-
Grit	1	-	-
Sandy Paste	1	2*	-
None Apparent	1	-	-
Totals	**78**	**8**	**45**

* Probable pipe bowl sherds from ST T-49 (20 - 40 cm bs)

Table 2. Ceramic Decorative Elements and Temper Classes.

Temper Class	PB*	PB-A	HB	OB	A	I-P	DI	SLI	OLI	HE
Grog	13	1	-	-	1	1	-	2	-	-
Grog-Bone	10	-	1	1	-	-	1	-	-	1
Bone	8	1	-	-	-	-	-	-	1	-
Grog- Sandy Paste	2	-	-	-	-	-	-	1	-	-
Grit	-	-	-	-	-	-	-	-	-	-
Grog-Grit	-	-	-	-	-	-	-	-	-	-
Sandy Paste	-	-	-	-	-	-	-	-	-	-
No temper	-	-	-	-	-	-	-	-	-	-
Totals	**33**	**2**	**1**	**1**	**1**	**1**	**1**	**3**	**1**	**1**

* PB = parallel brushed; PB-A = parallel brushed-appliqued; HB = horizontal brushed; OB = opposed brushed; A = appliqued; I-P = incised-punctated; DI = diagonal incised; SLI = single line incised; OLI = opposed line incised; HE = horizontal engraved

The parallel brushed sherds are from the bodies of jars that may have had incised, brushed, and/or punctated rim decorations (i.e., Pease Brushed-Incised). The two parallel-brushed and appliqued body sherds are a common decorative variety on Pease Brushed-Incised jars, as is the horizontal brushed rim sherd from ST T-48 (20 - 40 cm). The one incised-punctated rim (ST T-49, 0 - 20 cm) has a single horizontal incised line below the lip and at least one row of tool punctations, and may also be from a Pease Brushed-Incised jar. The rim is direct, with a rounded lip, and the vessel was fired in a reducing environment (cf. Teltser 1993). Another jar rim (ST T-49, 20 - 40 cm) has a set of diagonal incised lines, while a body sherd (ST T-49, 0 - 20 cm) has opposed incised line, probably on the vessel body. The body decoration, if any, that accompanies the diagonal incised rim is unknown. This vessel was also fired and cooled in a reducing environment.

The dominance of parallel brushed sherds, and sherds with parallel brush-appliqued, diagonal incised, and opposed incised decorative elements on vessel bodies are consistent with a Caddoan ceramic assemblage that dates from ca. A.D. 1200 - 1400. Girard's (1998) seriation of Caddoan utilitarian jar forms from the Red River basin in northwestern Louisiana – not far from the Caddo Lake bioregion – indicates that the utilitarian jars made between ca. A.D. 1200 - 1400 included: 1) vessels with vertical (or parallel) brushed and appliqued bodies, and horizontal brushed or incised rims with horizontal rows of punctates, and 2) vessels with horizontal incised rims and vertical and opposed incised lines on vessel bodies. More than 84 percent of the Harrison Bayou site decorated sherds from the 1998 archeological investigations belong to the former kind of decorated utilitarian jar, and 4.5 percent of the decorated sherds likely belong with the latter utilitarian jar form.

The grog and grog-sandy paste sherds appear to be from vessels (almost exclusively utilitarian jars decorated with parallel or vertical brushing) that were fired in a similar manner, as 80 - 81 percent of the sherds in these two temper classes were fired in a reducing environ-ment; half of the sherds were then cooled in a high oxygen environment (Table 3). Conversely, the grog-bone tempered wares have a higher percentage of sherds fired in an oxidizing environment (21 percent, compared to 8 - 10 percent among the grog and grog-sandy paste sherds), a much lower percentage of sherds from vessels fired and cooled strictly in a reducing environment, but the highest proportion of sherds (64 percent) fired in a reducing environment and cooled in a high oxygen environment. This temper class also has parallel brushed sherds among the decorated sherds, along with four types of decorative motifs not represented among the other temper classes: horizontal engraved, horizontal brushed, opposed brushing, and diagonal incised. The bone-tempered class has comparable proportions of sherds that are from vessels that were fired in oxidized, incompletely oxidized, and reduced environments (Table 3). Again, the most

Table 3. Temper Classes and Firing Environments.

Temper Classes	Oxidized	Incompletely Oxidized	Reduced	Reduced, Cooled in High Oxygen
Grog - Sandy Paste	1	1	4	4
Grog	5	7	26	25
Grog- Bone	7	2	3	22
Bone	5	3	4	5
Other*	4	-	-	2
Totals	**22**	**13**	**37**	**58**

* No apparent temper, grit-tempered, grog-grit-tempered, and sandy paste

common decorative element represented in the bone-tempered sherds is parallel brushed (Table 2).

The significant differences between the temper classes in firing conditions, but the similarities between them in the types of vessels being made and the kinds of decorative elements represented in the vessels, indicate that utilitarian vessels of similar design and form were being made at the Harrison Bayou site that were fired and cooled in open fires under a variety of circumstances. The wide sharing of design elements among the jars, but the technological differences between them suggest the following: a) that several different potters lived at the site, who fired vessels differently, and b) that different clay sources may have been used by these potters, and depending upon their composition and plasticity, different tempers had to be added to them to insure that sturdy and durable vessels could be successfully made and fired.

The six plain rims are from ST D-14 (n=1), ST T-47 (n=1), ST T-48 (n=1), ST T-49 (n=1), and ST C-29 (n=2), all in or near the estimated Middle Caddoan midden deposits at the western end of the Harrison Bayou site (Figure 5). All have direct or vertical rim profiles, and five have rounded lips; the lip profile on the rim from ST D-14 is indeterminate. Also, one rim from ST C-29, tempered with grog, has an exterior thickened lip. The two small plain sandy paste rims from ST T-49 are quite thin (3.6 - 3.8 mm) and were fired in a reducing environment, but cooled in a high oxygen environment. The curvature on one rim (which has a rounded lip) suggests it has a small orifice diameter, possibly the bowl to a long-stemmed or elbow pipe.

Three pieces of daub and four pieces of burned clay were recovered in six shovel

tests and/or 50 x 50 cm units (Perttula and Nelson 1999:Appendix III), particularly between 0 - 20 cm bs (Figure 2). They probably represent preserved remnants of clay-plastered wall and thatch from Caddoan structures built on the Harrison Bayou site, although the low density of these materials may indicate that the structures had not been burned down before they were abandoned.

Summary

The Harrison Bayou site is located on a high ridge along the east side of Harrison Bayou, and appears to principally contain prehistoric Caddoan midden deposits and/or features. It has high densities (ca. 100 - 200 sherds per cubic meter) of Middle Caddoan ceramics that are estimated to date between ca. A.D. 1200 - 1400, mainly brushed and parallel incised sherds from cooking jars and bowls, lithic debris and tools (including contracting stem arrow-points), burned animal bone, burned clay and daub, and small amounts of fire-cracked rock. All of these attributes suggest that the site is a habitation site (small hamlet and/or farmstead) with preserved Caddoan structures (houses, arbors, and ramadas), associated trash midden deposits, and outdoor cooking and heating features. This archeological site clearly has the potential to contribute new and important information on a variety of research issues developed by the Texas State Historic Preservation Office (Kenmotsu and Perttula 1993:69-187) concerning the prehistoric Caddoan settlement of the Caddo Lake bioregion. Specifically, it has the research potential to contribute important archeological information relevant to addressing many of the study units posed in the Historic Context "The Development of Agriculture in Northeast Texas Before A.D. 1600" (Perttula 1993).

Of particular significance is the presence of prehistoric Caddoan pottery in good contexts at the site, and the abundance of archeological deposits from residential contexts which should permit research focusing on "the hierarchical arrangement of community mound centers, villages, hamlets, and farmsteads in the Cypress ... basin prior to A.D. 1400" (Perttula 1993: 138). Furthermore, the material culture present at this Middle Caddoan site can directly contribute to a better understanding of the following research questions: a) ceramic indicators of Caddoan group boundaries in the Big Cypress drainage; b) the incidence of utility vessel forms and other ceramic forms from Caddoan household contexts and how this relates to the intensification of agriculture and the processing and cooking of plant foods; and c) stylistic and cultural affiliations between Caddoan groups living in the Caddo Lake bioregion and their Caddoan neighbors in the Red River basin, and the implications of these affiliations with respect to the development and internal social organization of local and regional Caddoan communities before and after ca. A.D. 1400 (Perttula 1993:140-141).

Because the site has a residential occupation that would have been settled for

several generations, it is to be expected that, in addition to preserved house structures, the site may also contain burials from small family cemeteries. From archeological research conducted throughout Northeast Texas for a number of years (e.g., Perttula 1995, 1999), it has been well established that prehistoric Caddo residential settlements contain such features.

Acknowledgments

We would like to thank Don Henley, Dwight Shellman, Sara Kneipp, and Barbara Ornitz of the Caddo Lake Institute, Inc. for their willingness to consider cultural resources as part of their Scholar's Program, and for financially supporting the archeological investigations in the lease lands along Harrison Bayou. We also want to thank Stacey Halfmoon, Bobby Gonzalez, and Brien Haumpo of the Caddo Indian Tribe of Oklahoma for working with us during the March 1998 archeological investigations. The archeological work also could not have been accomplished without the hard work of students and teachers at Wiley College in Marshall, Texas, and Louisiana State University at Shreveport (LSU-Shreveport). We thank the following: from Wiley College - Raymond Fogg, Michael Pearson, Marlo Anderson, Renee Pleasant, Murline Ingram, Kenneth Alford, Bianca Knighten, Quintence Mays, Nateasel Lataye Hinton, Mavis Mahnayarare, Joe Davis, and Wesley Connor; from LSU-Shreveport - Alan Thompson, Chuck Lederner, Susan Kuhn, and Cynthia Morvan.

References Cited

Albertson, Paul E., and Joseph B. Dunbar
1993 *Geomorphic Investigation of Shreveport to Daingerfield Navigation Project.* Technical Report GL-93-31. U.S. Army Engineer Waterways Experiment Station, Geotechnical Laboratory, Vicksburg.

Brown, David E., Frank Reichenbacher, and Susan E. Franson
1998 *A Classification of North American Biotic Communities.* University of Utah Press, Salt Lake City.

Cliff, Maynard B., Duane E. Peter, Floyd B. Largent, Jr., and Philip R. Waite
1996 *Longhorn Army Ammunition Plant Cultural Resources Management Plan.* Geo-Marine, Inc., Plano.

Cliff, Maynard B., Steve M. Hunt, Floyd Kent, Melissa M. Green, and Duane E. Peter
1995 *Archeological Survey of 1993-1994 Timber Harvesting Areas, Longhorn Army Ammunition Plant, Harrison County, Texas.* Miscellaneous Report of Investigations Number 71. Geo-Marine, Inc., Plano.

Diamond, D.D., David H. Riskind, and S.L. Orzell
1987 A Framework for Plant Community Classification and Conservation in Texas. *The Texas Journal of Science* 39:203-221.

Ford, James A.
1936 *Analysis of Indian Village Site Collections from Louisiana and Mississippi.* Anthropological Study No. 2. Department of Conservation, Louisiana Geological Survey, Baton Rouge.

Gadus, E. Frances, Martha Doty Freeman, and Ross C. Fields
1998 *Archeological Survey of 319 Hectares at the Longhorn Army Ammunition Plant, Harrison County, Texas.* Reports of Investigations No. 119. Prewitt and Associates, Inc., Austin.

Gibson, Jon L.
1970 *Archaeological Survey at Caddo Lake, Louisiana and Texas.* Contributions in Anthropology, Number 6. Department of Anthropology, Southern Methodist University, Dallas.

Girard, Jeffrey S.
1996 *Regional Archaeology Program, Management Unit 1, Seventh Annual Report.* Northwestern State University, Natchitoches, Louisiana.

1998 Ceramic Seriation and the Spatial Development of a Prehistoric Caddoan Community in Northwest Louisiana. Paper presented at the 40th Caddo Conference, Arkadelphia, Arkansas.

Golden, Michael L., Alan C. Peer, and Samuel E. Brown, Jr.
1994 *Soil Survey of Harrison County, Texas.* United States Department of Agriculture, Soil Conservation Service, Washington, D.C.

Hardy, Laurence M.
1995 *Checklist of the Amphibians and Reptiles of the Caddo Lake Watershed in Texas and Louisiana.* Bulletin of the Museum of Life Sciences No. 10. Museum of Life Sciences, Louisiana State University in Shreveport, Shreveport.

Ingold, James L.
1995 *Checklist of the Birds of the Caddo Lake Watershed in Texas and Louisiana.* Bulletin of the Museum of Life Science No. 11. Louisiana State University in Shreveport, Shreveport.

Ingold, James L., and Laurence M. Hardy
1996 *Web of Life: The Ecology and Biodiversity of Caddo Lake.* Louisiana State University in Shreveport, Shreveport.

Jelks, Edward B.
1965 The Archeology of McGee Bend Reservoir, Texas. Ph.D. dissertation, Department of Anthropology, The University of Texas at Austin.

Kenmotsu, Nancy A., and Timothy K. Perttula (editors)
1993 *Archeology in the Eastern Planning Region, Texas: A Planning Document.* Cultural Resource Management

Report 3. Texas Historical Commission, Department of Antiquities Protection, Austin.

McClurkan, Burney B., William T. Field, and J. Ned Woodall
1966 *Excavations in Toledo Bend Reservoir, 1964-85.* Papers of the Texas Archeological Salvage Project, No. 8. Texas Archeological Salvage Project, The University of Texas at Austin.

Middlebrook, Tom
1994 An Update of Archaeological Investigations at the Tyson Site (41SY92). *Journal of Northeast Texas Archaeology* 3:1-36.

Pearson, Charles E., Jacques Bagur, and James Duff
1994 *Identification and Analysis of Historic Watercraft in the Shreveport, Louisiana, to Daingerfield, Texas, Navigation Project.* Coastal Environments, Inc., Baton Rouge.

Perttula, Timothy K.
1993 The Development of Agriculture in Northeast Texas Before A.D. 1600. In: *Archeology in the Eastern Planning Region, Texas: A Planning Document*, edited by Nancy A. Kenmotsu and Timothy K. Perttula, pp. 121-146. Cultural Resource Management Report 3. Texas Historical Commission, Department of Antiquities Protection, Austin.

1995 The Archeology of the Pineywoods and Post Oak Savanna of Northeast Texas. *Bulletin of the Texas Archeological Society* 66:331-359.

1999 The Prehistoric and Caddoan Archeology of the Pineywoods and Post Oak Savanna of Northeast Texas. In: *The Prehistoric Archeology of Texas*, edited by Timothy K. Perttula. Ms. under review by Texas A&M University Press, College Station.

Perttula, Timothy K., and Bo Nelson
1999 *An Archeological Survey of Harrison Bayou Lease Lands at the Longhorn Army Ammunition Plant, Harrison County, Texas.* Report of Investigations No. 12. Archeological and Environmental Consultants, Austin.

Peter, Duane E., and Cynthia Stiles-Hanson
1990 *An Assessment of the Cultural Resources Within the Longhorn Army Ammunition Plant, Harrison County, Texas.* Miscellaneous Report of Investigations No. 3. Geo-Marine, Inc., Plano.

Robinson, David G.
1997 *Cultural Resource Investigations at the Ducks Unlimited Marsh (DUM) Project, North Toledo Bend Reservoir, Shelby County, Texas.* Report 97-3. Cultural Resource Program, Texas Parks and Wildlife Department, Austin.

Roemer, Erwin, and Jay R. Newman
1988 *A Cultural Resources Survey of Proposed Actions Related to Test Area Expansion, LHAAP, Harrison County,*

Texas. U.S. Army Corps of Engineers, Fort Worth District, Fort Worth.

Saunders, Joe, and Thurman Allen
1997 The Archaic Period. *Louisiana Archaeology* 22:1-30.

Sheffield, William J.
1995 *A Summer-Fall Ecological Reconnaissance of the Big Cypress Bayou Watershed, Texas and Louisiana*. Texas Parks and Wildlife Department, Austin.

Story, Dee Ann
1990 Culture History of the Native Americans. In: *The Archeology and Bioarcheology of the Gulf Coastal Plain*, by Dee Ann Story, Janice A. Guy, Barbara A. Burnett, Jerome C. Rose, Martha D. Freeman, D. Gentry Steele, Karl J. Reinhard, and Ben W. Olive, pp. 163-366. 2 Vols. Research Series No. 38. Arkansas Archeological Survey, Fayetteville.

Teltser, Patrice A.
1993 An Analytic Strategy for Studying Asemblage-Scale Ceramic Variation: A Case Study from Southeast Missouri. *American Antiquity* 58(3): 530-543.

Thurmond, J. Peter
1990 *Archeology of the Cypress Creek Drainage Basin, Northeast Texas and Northwestern Louisiana*. Studies in Archeology 5. Texas Archeological Research Laboratory, The University of Texas at Austin.

U.S. Department of the Interior, General Land Office
1914 *Examination of Ferry (Caddo) Lake*. 3 Vols. U.S. Department of the Interior, Supervisory of Surveys, Commissioner of the General Land Office, Washington, D.C.

Van Duyne, Cornelius, and W.C. Byers
1913 *Soil Survey of Harrison County, Texas*. U.S. Department of Agriculture, Bureau of Soils. Government Printing Office, Washington, D.C.

Webb, Clarence H.
1948 Caddoan Prehistory: The Bossier Focus. *Bulletin of the Texas Archeological and Paleontological Society* 19:100-147.

Woodall, J. Ned
1969 *Archaeological Excavations in the Toledo Bend Reservoir, 1966*. Contributions in Anthropology No. 3. Department of Anthropology, Southern Methodist University, Dallas.

NOTES ON THE MOLLUSCA FROM SITE 41DT59, COOPER LAKE, DELTA COUNTY, TEXAS

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This paper focuses on the information about the mollusca from site 41DT59. The author takes the information from Dr. Fullington, the noted malacologist, and illustrates how the archeologist can take the information and apply it to site analysis. This information derived from the analysis mainly supports what the authors have concluded about site 41DT59, but does discuss material not covered in the original text. The analysis is divided into two sections. The information derived from the gastropods is discussed first, and the information derived from the mussels second.

The Gastropods

In their interpretation of the soils for site 41DT59, Shanabrook, Hunt, and Cliff (1955:F-7) state that they believe the sediments from Unit 25 were probably alluvial floodplain deposits. Based on the gastropod shells found in the excavation, they are correct. The species *Anguispira strongylodes* was recovered from the upper 10 cm, species *Rabdotus dealbatus*, *Gastropta contracta*, *Strobilops texasiana*, *Hawaiia minuscula*, *Zontoides arboreus*, and *Glyphyalinia indentata* were recovered from the 10 - 20 cm level, and species *Gastrocopta contracta*, *Glyphyalinia indentata*, *Rabdotus dealbatus*, *Strobilops texasiana*, and *Mesodon thyroidus* were recovered from 20 - 30 cm below datum (Fullington 1995:H-3). Fullington (1995:H-3) states that *A. strongylodes* prefers exposed knolls surrounded by trees or shrubs. The remaining gastropod fauna, however, prefer an oak-savannah environment that may be slightly moister than that for *A. strongylodes*.

All of the species in Level 2 can be found on floodplains in oak-savannah environments. Both *G. indentata* and *S. texasiana* can be found under leaves and rotting logs in moist areas in a floodplain, but *S. texasiana* prefers to be adjacent to streams or water. *G. contracta* prefers to be on rocks adjacent to the floodplain, although it can be found in the floodplain. *H. minuscula* lives under rocks and logs on a floodplain. *Z. arboreus* is always associated with trees, and *R. dealbatus*

prefers mixed, drier grasslands and woods, even though it can be found on floodplains where there is standing water (Fullington and Pratt 1974).

Level 3 contained all of the gastropods in Level 2, which still indicates a floodplain, except for *H. minuscula* and *Z. arboreus* and contained *M. thyroidus* which Level 2 did not. *M. thyroidus* prefers mixed, drier grassland and woods similar to *R. dealbatus*. There may have been a grassier and drier environment during Level 3 times than Level 2 times.

The Mussels

Cliff and others (1995:100) list the species and percentages of the identified species in Table 1. Current scientific name are used instead of those used in 1995.

As is shown in Table 1, *P. purpuratus* is the most common mussel present in the sample. A. plicata is the second most common mussel present, but this is true only if one looks at the fragments. If one looks at the number of umbos/hinges recovered from the site, *P. purpuratus* is still the most common mussel with 18 umbos/hinges present of 36, or 50 percent. The next most common mussel represented by the umbos/hinges is *L. hydiana* with seven umbos/hinges (18% of the sample) with *A. plicata* being represented by only one umbo (3% of the sample). Fullington (1995:H-3) stated that the site inhabitants use of *P. purpuratus* was unusual because *A. plicata* is usually the

Table 1. Common Name, Scientific Name, and Percentage of Fragments from Site 41DT59.

Common Name	Scientific Name	Number of Fragments	Percentage
Bluefer	Potamilus purpuratus	52	54.2
Threeridge	Amblema plicata	17	17.7
Louisiana Fatmucket	Lampsilis hydiana	12	12.5
Pink Papershell	Potamilus ohioensis	5	5.2
Yellow Sandshell	Lampsilis teres	5	5.2
Texas Fatmucket	Lampsilis bracteata	2	2.1
Mapleleaf	Quadrula quadrula	2	2.1
Washboard	Megalonaias nervosa	1	1.0

dominant food mussel found on prehistoric Native American sites.

By looking at the scatter of fragments, there were probably four *A. plicata* shells recovered from the site. Four is the MNI for *L. hydiana* based on the valve/umbo count also, meaning that the two species are about even in their popularity at the site. It appears that the three major mussel species eaten or used by the site inhabitants were *P. purpuratus*, *A. plicata*, and *L. hydiana*.

Because six of the eight species of mussels recovered from the site inhabit deeper streams or river waters (Cliff et al. 1995:100), they may have been gathered in the summer or fall when the water was low. The mussels such as *L. teres* which inhabit shallow water could have been gathered at any time. It is interesting that there were only two fragments of *Q. quadrula* and one fragment of *M. nervosa* recovered. *Q. quadrula* inhabits shallow water, oxygen rich riffles and runs (Howell et al. 1996:125), but *M. nervosa* inhabits deep water and suggests again that these mussels were gathered when the water was low.

Cliff and others (1995:52) suggest that the southeastern area of the site contained a kitchen midden and was not a primary occupational area based on the bone, shell and charcoal recovered from Unit 25. This conclusion is supported by the amount of shell recovered from Unit 25. It contained 32 percent of the shell recovered from the site by itself. In addition, the mussels collected from Unit 25 show the greatest diversity of any other unit of the site.

Of the shell collected from 41DT59, 11 percent was burned. This percentage appears high to me. Ethnographic accounts and experiments suggest that roasting or boiling the mussels was the fastest way of cooking them [Henshilwood et al (1994:107); Parmalee and Klippell (1974:421); Waselkov (1987:169)]. The shell being burned, however, does not necessarily mean that it was intentional. It merely could have been incorporated into a fire accidentally.

It appears that the use of mussels increased over time at 41DT59, just like the use of other animals. Although mussels were not a major subsistence base, their importance can not be overlooked. For one thing, the amount of energy return for gathering time is greater. Brown (1988: 229), in his discussion of the subsistence practices of the prehistoric inhabitants of what is now Aquilla Lake, stated that mussels may have been an important source of calcium. Lintz (1996:T-14) pointed out that mussels recovered from two Early Archaic sites in the Concho River Terraces in Tom Green County provided fat and vitamin A as well as calcium.

One interesting aspect of mussels that has not been utilized much is their use to determine what fish were present in the stream that the mussels were recovered from. Since different mussel species may use the same fish for hosts for their glochidia, there has been no attempt to specify which fish were hosts to which mussel. Although no fish bones were identified at 41DT59, fish recovered from the Spike site (41DT16) included bowfin,

catfish, drum, gar, and sunfish (Yates 1993:23). These fish could have been utilized for food at 41DT59 and other possibilities include white bass, rock bass, largemouth bass, bluegill, warmouth, white crappie, black crappie, and yellow perch. Other fish include northern pike, pumpkinseed, and sauger (Howells et al. 1996).

Conclusions

It appears that Shanabrook, Hunt, and Cliff's conclusion about Unit 25 is correct based on the gastropods present. Unit 25 was probably within a midden also based on the percentage of shell fragments present. The amount of burned shell seems high, especially when roasting was probably the most common form of cooking mussels. The mussels were probably gathered when the Sulphur River was low. In addition, potential fish species that might be found in the Sulphur River may be identified by which fish were used as hosts by the mussels' glochidia. Based on the locations of shell fragments and number of umbos/hinges present, the percentage of fragments may yield a false picture of the dominance of a species present at a site. Both *A. plicata* and *L. hydiana* are probably represented equally in the archeological record instead of *A. plicata* being more common as the percentages of shell fragments indicate.

References Cited

Brown, David O.
1988 Prehistoric Subsistence Strategies in Northeastern Central Texas. *Bulletin of the Texas Archeological Society* 59:201-244.

Cliff, Maynard B., Melissa Green, Steven H. Hunt, and David Shanabrook
1995 *Archeological Test Excavations at Two Prehistoric Sites (41DT59 and 41DT247) at Cooper Lake, Delta County, Texas*. Miscellaneous Reports of Investigations No. 90:49-198. Geo-Marine, Inc., Plano.

Fullington, Richard W.
1995 Appendix H: Molluscan Remains Recovered from Site 41DT59, Cooper Lake, Texas. In: *Archeological Test Excavations at Two Prehistoric Sites (41DT59 and 41DT247) at Cooper Lake, Delta County, Texas*, by Maynard B. Cliff, Melissa M. Green, Steven H. Hunt, and David Shanabrook. Miscellaneous Reports of Investigations No. 90:H1-H7 Geo-Marine, Inc., Plano.

Fullington, Richard W., and William Lloyd Pratt, Jr.
1974 *The "Helicinidae, Carychidiidae, Achatinidae, Bradybaenidae, Bulimulidae, Cionellidae, Haplotrematidae, Helicidae,*

Oreohelicidae, Spiraxidea, Streptaxidae, Stropolopsidae, Thysanophoridae, Valloniidae' (Gastropoda) in Texas. *The Aquatic and Land Mollusca of Texas* Bulletin 1 (Part 3). Dallas Museum of Natural History.

Henshilwood, Christopher, Peter Nilssen, and John Parkington
1994 Mussel Drying and Food Storage in the Late Holocene, SW Cape, South Africa. *Journal of Field Archaeology* 21:103-109.

Howells, Robert G., Raymond W. Neck, and Harold D. Murray
1996 *Freshwater Mussels of Texas*. Texas Parks and Wildlife Department, Inland Fisheries Division, Austin.

Lintz, Christopher
1996 Appendix T: Dietary Data of Mussel Shell Assemblages. In: *Early Archaic Use of the Concho River Terraces: Cultural Resource Investigations at 41TG307 and 41TG309, Tom Green County, San Angelo, Texas*, by J. Michael Quigg, Jay Peck, Christopher Lintz, Abby C. Treece, Charles D. Frederick, Roman Clem, G. Lain Ellis, Paul Schuchert, and James T. Abbott, pp. T1 - T19. Technical Report 11058. TRC Mariah Associates, Inc., Austin.

Parmalee, Paul W., and Walter E. Klippell
1974 Freshwater Mussels as a Prehistoric Food Source. *American Antiquity* 39(3):421-434.

Shanabrook, David, Steven M. Hunt, and Maynard B. Cliff
1995 Appendix F: Test Unit and Backhoe Trench Profile Descriptions, Sites 41DT59 and 41DT427, Cooper Lake, Texas. In: *Archeological Test Excavations at Two Prehistoric Sites (41DT59 and 41DT427) at Cooper Lake, Delta County, Texas*, by Maynard B. Cliff, Melissa M. Green, Steven M. Hunt, and David Shanabrook. Miscellaneous Report of Investigations No. 90:F1-F15. Geo-Marine, Inc., Plano.

Waselkov, Gregory A.
1987 Shellfish Gathering and Shell Midden Archaeology. In: *Advances in Archaeological Method and Theory, Volume 10*, by Michael B. Schiffer (editor), pp. 93-210. Academic Press, New York.

Yates, Bonnie C.
1993 Appendix E: Zooarcheology of Four Woodland/Caddoan Sites at Cooper Lake. In: *Excavations at the Tick, Spike, Johns Creek, and Peerless Bottom Sites, Cooper Lake Project, Delta and Hopkins Counties, Texas*, by Ross C. Fields, Eloise F. Gadus, L. Wayne Klement, C. Britt Bousman, and Jerrilyn B. McLerran, pp. 310-335. Reports of Investigations No. 91. Prewitt and Associates, Inc., Austin.

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Caddoan Archeology Newsletter
Oklahoma Archeological Survey
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ISSN 1522-0427