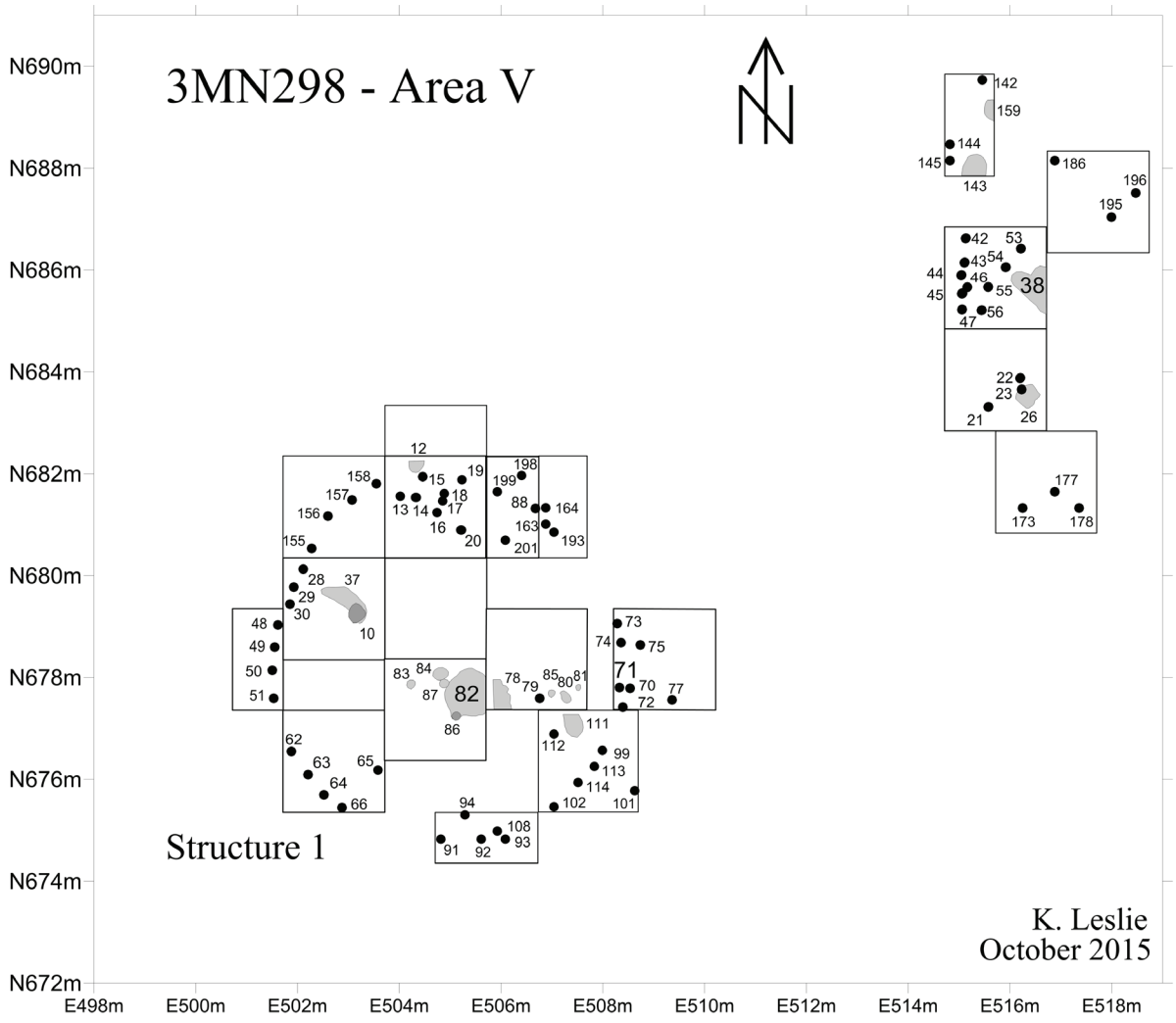
Caddo Archeology Journal



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Caddo Archeology Journal

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Editor's Note:
The Caddo Archeology Journal is devoted to the anthropology, history, geography, and current activities of the Caddo Nation, an American Indian group with a historical range covering the four-state area of Texas, Louisiana, Arkansas, and Oklahoma. The Caddo Archeology Journal began as the Caddoan Archeology Newsletter in 1989 and in 1996 the name changed to simply Caddoan Archeology. Tim Perttula was founder and editor from 1989 until 1993 when Lois Albert became editor. Tim Perttula again resumed his editorial role in 2002. In 2003 the name was changed to Caddoan Archeology Journal, and in 2006 the name was changed again to Caddo Archeology Journal. Stephen F. Austin State University is now publishing the journal and along with archeology, articles related to the ethnography, language, history, geography, and current activities of the Caddo Nation will be encouraged. Book reviews are also included in the journal.

The Caddo Archeology Journal is published once a year. Papers need not have been presented at an annual Caddo Conference Organization meeting in order to be considered for publication.

The Caddo Archaeology Journal publishes:

- Articles directly related to the interpretation and evaluation of Caddo archeology and history that provide relevant consideration of an issue or theoretical position
- Preliminary, review, and updated regional summaries of anthropological and historical work conducted within the Caddo region or has linkages to Caddo studies
- Technical and methodological reports that are comprehensible to most readers and provide new insights into evaluating Caddo archeology
- Book reviews related to Caddo publications on history, geography, ethnography, anthropology, and current activities of Caddo Nation

Information for Authors:

Articles should not normally exceed 10,000 words in length, including references. Reports should not exceed 5,000 words including references.

Please submit the following to *dmckinnon@uca.edu*

- a PDF file of the complete submission (following American Antiquity style)
- OR a Word file containing the complete paper (i.e., including abstract, tables and figures)
- OR a Word file containing the text, references, table and figure captions, plus an individual file of each figure (600 dpi) and/or table. Excel file of tables is preferred.

After submission, papers will be sent out to a minimum of two reviewers. Reviewer comments are requested within 30-days. We are grateful to the anonymous reviewers who gave of their time and effort to review the articles of this journal.

Syntheses of the Caddo Archaeological Record

Timothy K. Perttula

The pursuit of Caddo archaeological research over the last 100+ years has led to considerable gains during that time in the understanding of such research issues as settlement patterning, subsistence change and diet, health and adaptive efficiency, sociopolitical organization, ceremony and ritual, iconography, and exchange networks among the Caddo peoples and their past communities (see Girard et al. 2014). Much of this has been the result of intensive cultural resource management investigations in southwestern Arkansas, northwestern Louisiana, eastern Oklahoma, and East Texas, along with focused archaeological research projects conducted by university archaeological programs and state and regional archaeological societies. The years ahead promise to continue to shed new light on the character and understanding of the ca. A.D. 850-1850s Caddo archaeological record.

Despite these hard-won gains in our understanding and explanation of the Caddo archaeological record, Caddo archaeological research investigations remain almost exclusively parochial and state-bound (i.e., based on the detailed analyses of particular sites or groups of sites in a regional locality). Large scale syntheses (i.e., macro-regional in scope and crossing state lines) and grand challenges (e.g., Kintigh et al. 2014) of the Caddo archaeological data are needed if we are to ever fully appreciate, detail, and refine the character of the native histories of Caddo peoples. As in the Southwestern United States and the study of ancestral Pueblo communities through successful large scale and multi-year synthetic research and accompanying creation of databases—as in the Chaco Research Archive, the Southwest Social Networks databases, and the Village Ecodynamics Project—the "ability of scholars to pursue synthetic research depends on the commitment of the… archaeological community to make project data available in state archaeological record files, museums, and burgeoning digital repositories" (Schachner 2015:56, 84).

While considerable steps have been made by the Caddo archaeological community in creating databases of archaeological data, more efforts along these lines are still needed. There are large and specialized digital Caddo databases being cumulatively developed concerning such things as radiocarbon dating of features and archaeological deposits, vessel documentation and digitization, ceramic sherd databases, databases of the instrumental neutron activation analysis and petrographic analysis of Caddo ceramic vessels and sherds, as well as the distribution of novaculite artifacts—and there are surely others—but these efforts need to be expanded to reach across state lines and individual researchers to extend their full use and capabilities for Caddo archaeologists. Just as importantly, we also need the collaboration of scholars working in all parts of the Caddo archaeological area on large-scale and major research questions, so as to be able to actively engage in the comparison of the variable regional character of the Caddo archaeological record in material culture expressions, social and political practices, use of landscapes, subsistence strategies and use of cultivated plants, interaction with neighbors, and the tempo of cultural changes. The synthesis of the stylistically diverse Caddo ceramic wares across the Caddo area would seem to be tailor-made for studies of ancestral Caddo social networks and social identities that rely on large regional ceramic datasets (see Collar et al. 2015; Mills et al. 2015), but such social network syntheses wait to be done.

If large-scale syntheses of the Caddo archaeological record are important to undertake, how can the collaboration of Caddo archaeologists be encouraged? How can databases of specific sets of information be created, designed, and shared between Caddo archaeologists working on common research problems? I think the Caddo Conference Organization (CCO), the CCO's website (www.caddoconference.org), and the annual Caddo Conference have very important roles to play in fostering a research climate where "big" syntheses can be developed through both short-term and long-term project collaborations and database (spatial and

analytical) compilations. As a non-profit organization, the CCO can and should develop research projects of varying scopes that would rely on the collaboration of CCO members working in different regions on research questions and problems of mutual interest and making such information and datasets accessible on their website or other platforms; the CCO should represent the broader shared interests of its members, most of whom are archaeologists. The Caddo Conference could and should be a venue where such research goals, questions, problems, and projects of interest can be identified and developed, perhaps in discussion and roundtable forums, or in more informal discussions. To my mind, the Caddo Conference should be much more than simply 20 minute presentations and Caddo dances. What I would suggest is now needed is a much stronger thematic or topical component to the Conference, one where related archaeological papers can be organized that focus on themes or topics of broad and mutual interest (i.e., ancestral Caddo social networks), and also focus on the publication of the papers, perhaps in the *Caddo Archeology Journal* or other publication venues.

Who knows what the future of Caddo archaeology will hold, or what kinds of new and improved understandings of the Caddo archaeological record will come in the years ahead. Without expending effort in large-scale syntheses of ancestral Caddo archaeology, we will not be taking full advantage of the richness of our knowledge of Caddo native history.

Acknowledgments

I appreciate the comments received by Ross C. Fields, Jeff Girard, Robert Z. Selden, Jr., and Mary Beth Trubitt on this MS.

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Comparing Caddo and Coles Creek Pottery Using Petrographic Analysis

Jeffrey S. Girard and Leslie G. Cecil

Abstract

Pottery classified as "Coles Creek Incised" is common both to the earliest Caddo sites along the Red River and to contemporary sites in the Lower Mississippi Valley. Although it often is suggested that Coles Creek pottery from the two regions can be distinguished by differences in paste, no detailed comparative studies have been carried out. An initial attempt to identify variation through the use of petrographic analysis was carried out by comparing 50 samples drawn from sites in northwest and central Louisiana. Although no sharp dichotomy was noted between the regions, the study identified distinctions that support the notion that most Coles Creek pottery was made locally and different technological traditions may be represented.

Our study addresses a long-standing issue in Caddo-Lower Mississippi Valley relationships. Pottery classified as Coles Creek Incised is common both to early Caddo sites along the Red River and to contemporary sites in the Lower Mississippi Valley. Although differences in percentages of specific types are present, between the ninth and early eleventh centuries both regions participated in a widespread ceramic decorative tradition. However, it is less clear how alike ceramic technologies were during this period. It has been suggested that much of the Red River Coles Creek pottery has different past characteristics from that to the east and that most probably was made locally. Unfortunately, the hypothesized dissimilarities have only been noted in informal terms and more rigorous technical studies are lacking.

This project is an initial attempt to determine whether significant technological differences are evident between the Coles Creek pottery of the two regions through the use of petrographic analysis. Petrographic analysis allows the identification of minerals present in the clays as well as purposely added inclusions or temper. We are interested in identifying possible distinctions in manufacturing technologies, especially the types and amounts of tempering materials added to the clays. The regions also differ geologically to the extent that, if vessels were manufactured and broken locally, clear variation should be apparent in natural mineral inclusions in the clays. A significant problem, however, is that both regions have complex geologic histories with clays available in multiple contexts. Our understanding of variability at local and regional spatial scales is limited.

We chose samples from two regions (Figure 1). In the Caddo Area, 26 sherds were selected from eight sites, primarily in the Red River drainage of Northwest Louisiana. All of these sites have significant numbers of Coles Creek Incised sherds and likely were occupied sometime in the tenth or early eleventh centuries.

For comparison we selected 24 samples from nine sites located in central Louisiana, a complex region in its fluvial configuration encompassing the Catahoula basin, as well as the lower Ouachita and lower Tensas river basins. We included samples from the Wiley site at Larto Lake, and the well-known Greenhouse site adjacent to the Avoyelles plateau in the lower Red River drainage. In addition, we included one sherd apiece from the Hoover and Bayou Grand Chenier sites located far to the south near the Gulf coast.

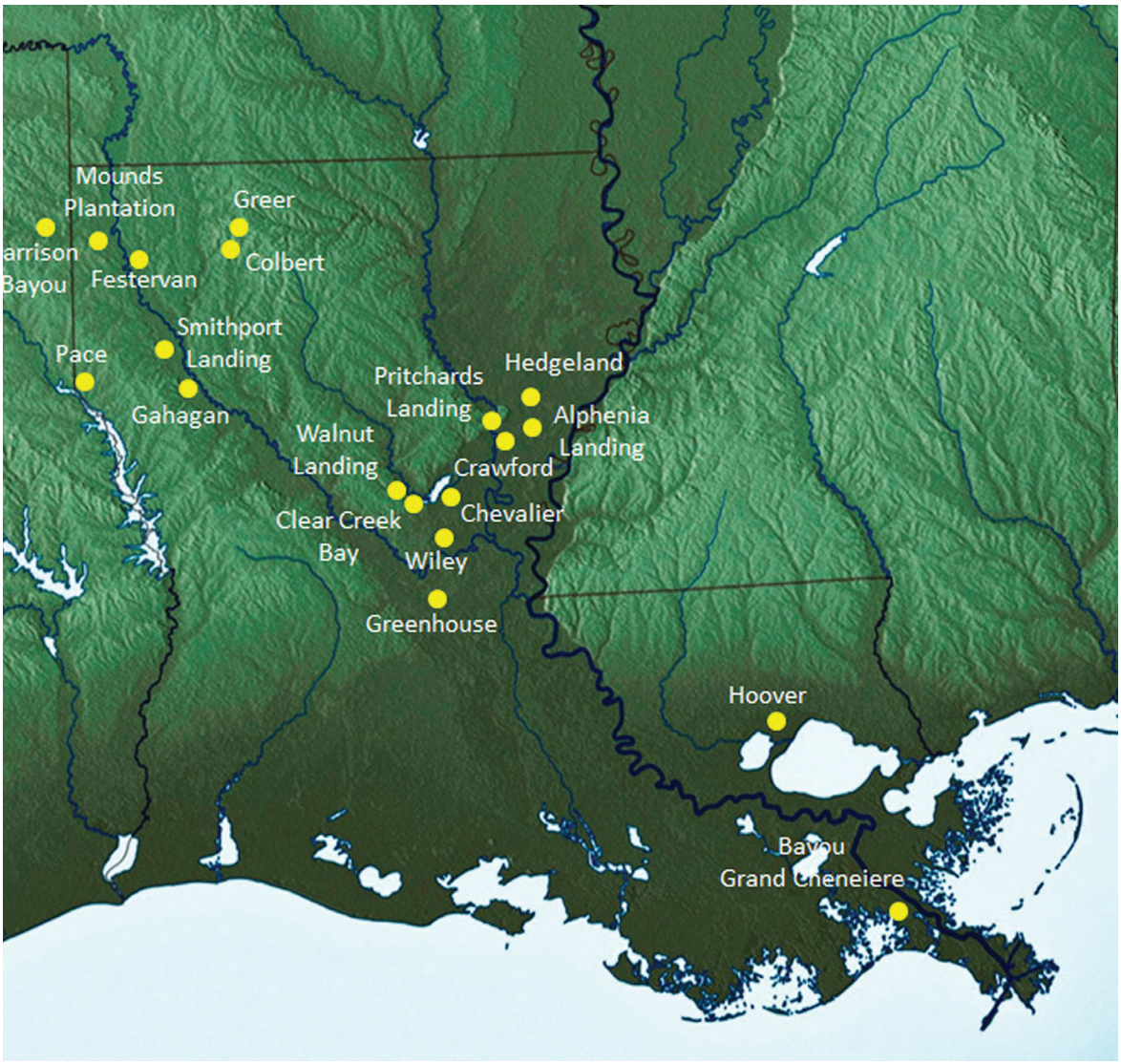

Figure 1. Sites sampled for the petrographic study.

In his report on the Greenhouse Site, James Ford (1951) presented the first detailed definition of the two types we used for this project: Coles Creek Incised and Greenhouse Incised. Philip Phillips (1970) later incorporated Greenhouse Incised into the former type as a variety. For the Caddo Area, Alex Krieger (Newell and Krieger 1949) defined the similar type Davis Incised in his analysis of pottery from the George C. Davis site. In the lower Ouachita River region, Kidder (1990:59) relates var. *Coles Creek* to the Crawford phase (ca. A.D. 800-900) and var. *Greenhouse* to the Pritchard's Landing phase (ca. A.D. 900-1050). The few dated contexts where similar pottery dominates in the Caddo Area also fall between A.D. 800 and 1050 (Girard et al. 2014:38-41).

Both types or varieties are present on the sites sampled for this study (Figure 2). We identified *var. Coles Creek* specimens by either the presence of close-spaced, overhanging horizontal lines or by a row of triangular punctations beneath a field of horizontal lines. The *var. Greenhouse* sherds have multiple horizontal lines that do not overhang, spaced at intervals of 5 mm or more. Ford described the paste of Coles Creek Incised as being tempered predominantly by clay with small amounts of sand and occasional small particles of carbonized vegetal matter as well as white stone fragments interpreted as "probably volcanic tufa." He

described the paste of Greenhouse Incised as being similar, but did not mention sand and noted that "The paste is of somewhat finer texture than is usual for Coles Creek Plain" (Ford 1951:77). Most of the Coles Creek and Greenhouse Incised vessels were simple bowls and jars. Krieger (Newell and Krieger 1949:116-118) noted that Davis Incised consisted mostly of simple bowls, but a few carinated bowls, bottles, and jars were represented as well. He suggested that the type became thicker and coarser through time and contained clay and carbon temper. In the northwest Louisiana collections, Greenhouse or Davis Incised (Coles Creek *var. Greenhouse*) is more numerous than Coles Creek Incised (Coles Creek *var. Coles Creek*); the opposite is true in the Lower Mississippi Valley sites, and our samples reflect this—14 of the 26 sherds from the Caddo Area sites are *var. Greenhouse*; 20 of the 24 samples from the east are *var. Coles Creek*.

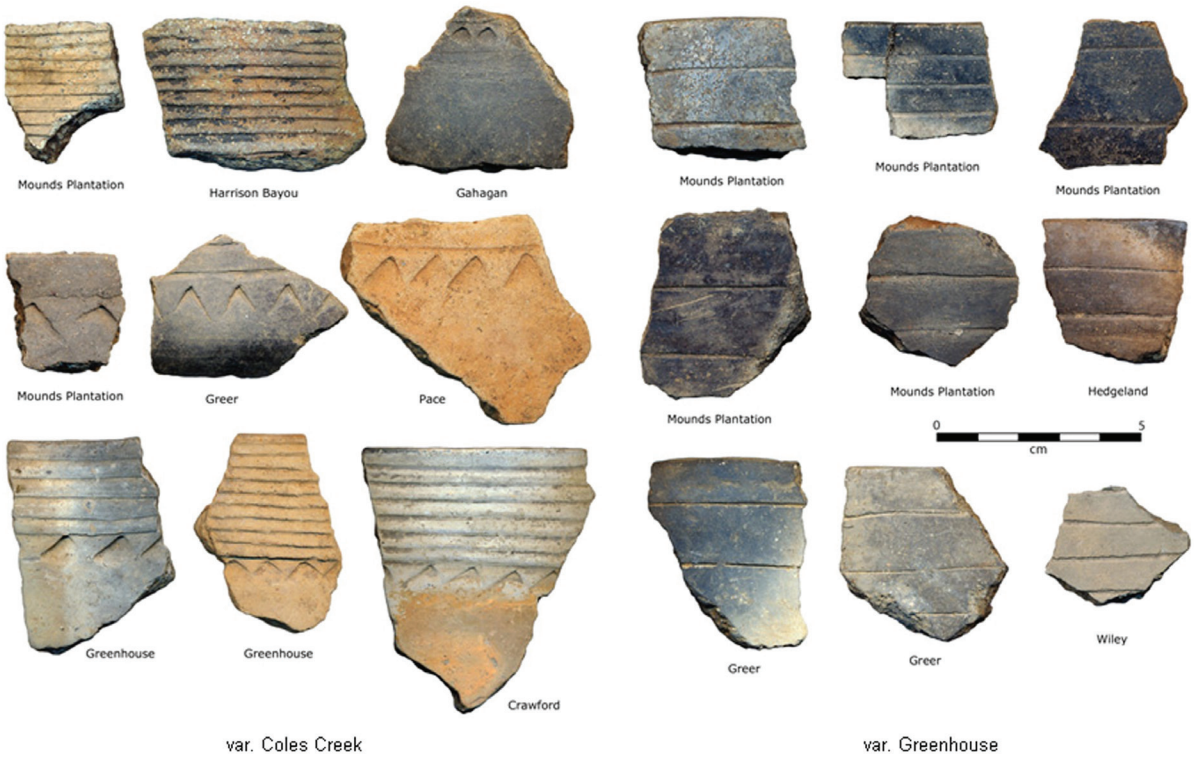

Figure 2. Examples of Coles Creek variety Coles Creek and variety Greenhouse used in the petrographic study.

Methodology

The petrographic analysis was conducted by Leslie Cecil at Stephen F. Austin State University. The 50 samples were sent to Spectrum Petrographics where they were cut with a wet saw and embedded in an epoxy block. Petrographic analysis allows the analyst to identify minerals that are present in the clay pastes of different pottery vessels. Petrography allows analysis of many clay materials and inclusions at one time. One can study "the clay itself, natural inclusions in the clay, purposefully added inclusions, and glazes or slips on the clay surface" (Childs 1989:24). In order to conduct a petrographic analysis of pottery sherds/vessels, one must take a sample of the pottery to be analyzed and sand it down to a width of .03 microns (thin-sectioning. This allows the analysts to determine the kinds of minerals present based on the known optical principles of minerals seen through a polarizing microscope.

Thin-sectioning provides one objective means of classifying pottery pastes through the analysis of mineral size, shape, roundness, and frequency. Mineral size, shape, and roundness are established through a comparison of various graphs and tables (Shackley 1975:44-51). The most common geological method

of determining the quantity of minerals in a thin section is point counting. Point counting determines the number of different minerals along a predetermined area (for example, 10 mm) of the length and width of the section (Chayes 1956). Various studies have employed different methods for counting the frequency of inclusions: Peacock (1973) uses a random grain selection; Middleton, Freestone, and Leese (1985) use a variation of systematic sampling along linear transects with tests of accuracy for different thin-section samples; and Dickenson and Shutler (1979) use an area point count (all minerals, inclusions, and voids are counted in the field of view). Middleton et al. (1985) compared area counting to standard geological point counting and determined that the number of minerals counted was equal and the only difference was that area counting resulted in a smaller mean mineral diameter. Because mean diameter of minerals was not critical and Cecil obtained similar point counts with standard point counts and area point counts (tested on 10 sherds of different matrices), she implemented area counting for a field of view with 4X magnification (all thin section images were taken at 5X magnification—due to the 1x magnification of the digital camera and pole mount).

Although petrographic analysis is important to the research goals, there are some limitations. Thin-sectioning may not produce the full mineralogical composition of a pottery sample due to sampling error and because the method of producing thin-section slides involves grinding and polishing of the sample (Orton et al. 1993). In addition to problems with sample preparation, petrographic analysis alone cannot determine the type of clay mineral in the sherd because of the refractive characteristics of clay minerals.

Results

Four paste variants (Sandy Paste, Sandy Paste with Grog, Sandy Paste with bimodal Quartz, and Sandy Paste with Iron) were detected. All samples had sandy pastes, with quartz sand ranging from 5 to 30 percent of the volume (10-20 percent for most sherds). Only one specimen was classified in the category of Sandy Paste without other materials.

The Sandy Paste with Grog paste group was subdivided because of inclusion variations. In addition to the differences in pastes, Cecil recognized two general clay paste categories: a dense, silty, homogenous clay fabric and a sandy, coarser sand clay fabric. These differences could be the result of use of both a silt-based clay and a sand-based clay and/or the potters sieving the clays to obtain different fabrics. In general, small quartz minerals, biotite, iron, and organics most likely occur because they were part of the clay body. They are also not too angular suggesting that they resulted from weathering from the parent material. K-feldspar in a few of the samples probably resulted from igneous rock that weathered into the clay bed. Obvious culturally-added inclusions include angular, larger quartz particles, bone, and grog.

By far, the most numerous category (40 of the 50 samples) was Sandy Paste with grog (Figure 3). Variations within this group were identified however. Half of the samples contained simple quartz sand lacking other minerals. In all but two, the quartz particles were angular suggesting that either they were crushed during the processing of raw materials (most likely sandy clay) and included as temper, or they were natural inclusions in sandy clays from upland contexts. It was noted that several samples had distinctly silty pastes; most of these were from Hedgeland, Wiley, and Alphenia Landing—all located in the Lower Mississippi Valley. However, a few samples from Mounds Plantation and the Colbert and Greer sites also had silty pastes. The silty clays also tended to have high birefringence colors suggesting that they were weathered from a mica-rich parent material.

Two specimens, both from central Louisiana, have distinctly rounded quartz particles indicating that that they are extensively weathered (Figure 4). It is likely that potters were intentionally selecting river sand to add to the clay paste for tempering. If the quartz was not a cultural addition, it came from clay in an alluvial setting.

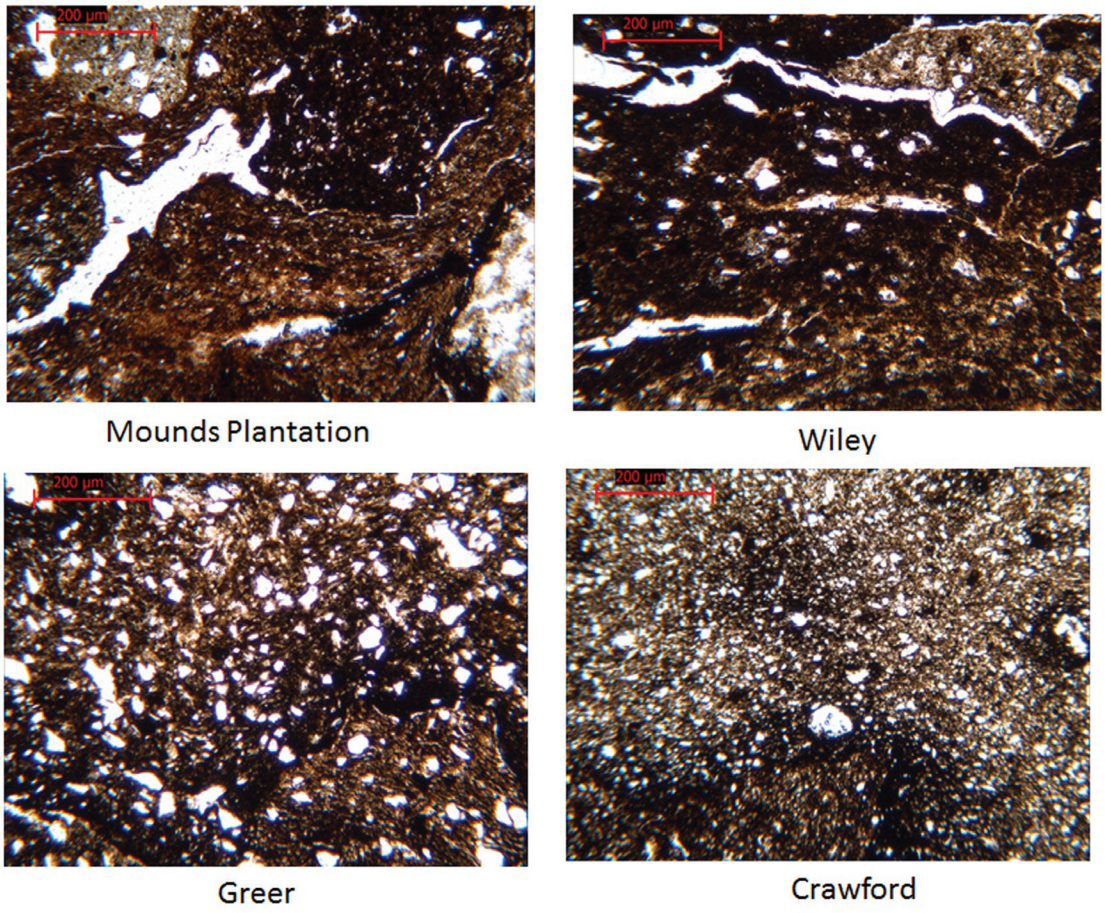

Figure 3. Thin sections of selected sherds with sandy paste and grog only (plane, polarized light, 5x magnification).

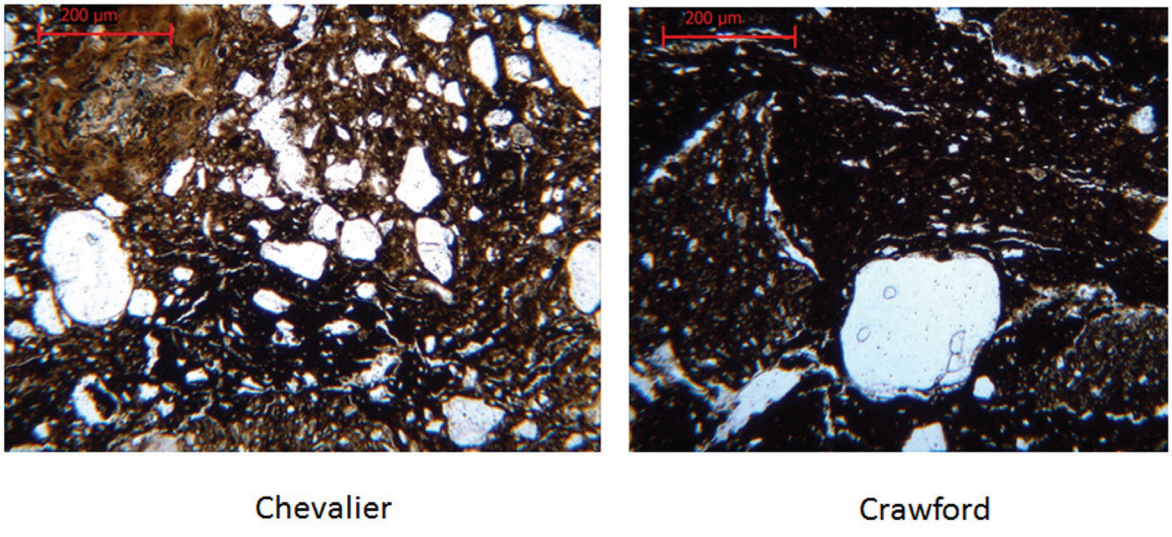

Figure 4. Thin sections of selected sherds with sandy paste, grog and rounded quartz (plane, polarized light, 5x magnification).

Seven samples contained grog and chert (Figure 5). The chert likely was part of sand intentionally added as temper. All of these samples had sandy rather than silty pastes. Five samples had grog with biotite. Not surprisingly, the clays of these sherds have high birefringence colors suggesting that the parent material may be mica related. Three samples have both chert and biotite, and one specimen, from Mounds Plantation, has chert, biotite, and potassium feldspar. Because the potassium feldspar inclusions are angular and fairly large in size, it is likely that these minerals were included in the sand in the clay and crushed during the processing of the clay before pottery manufacture.

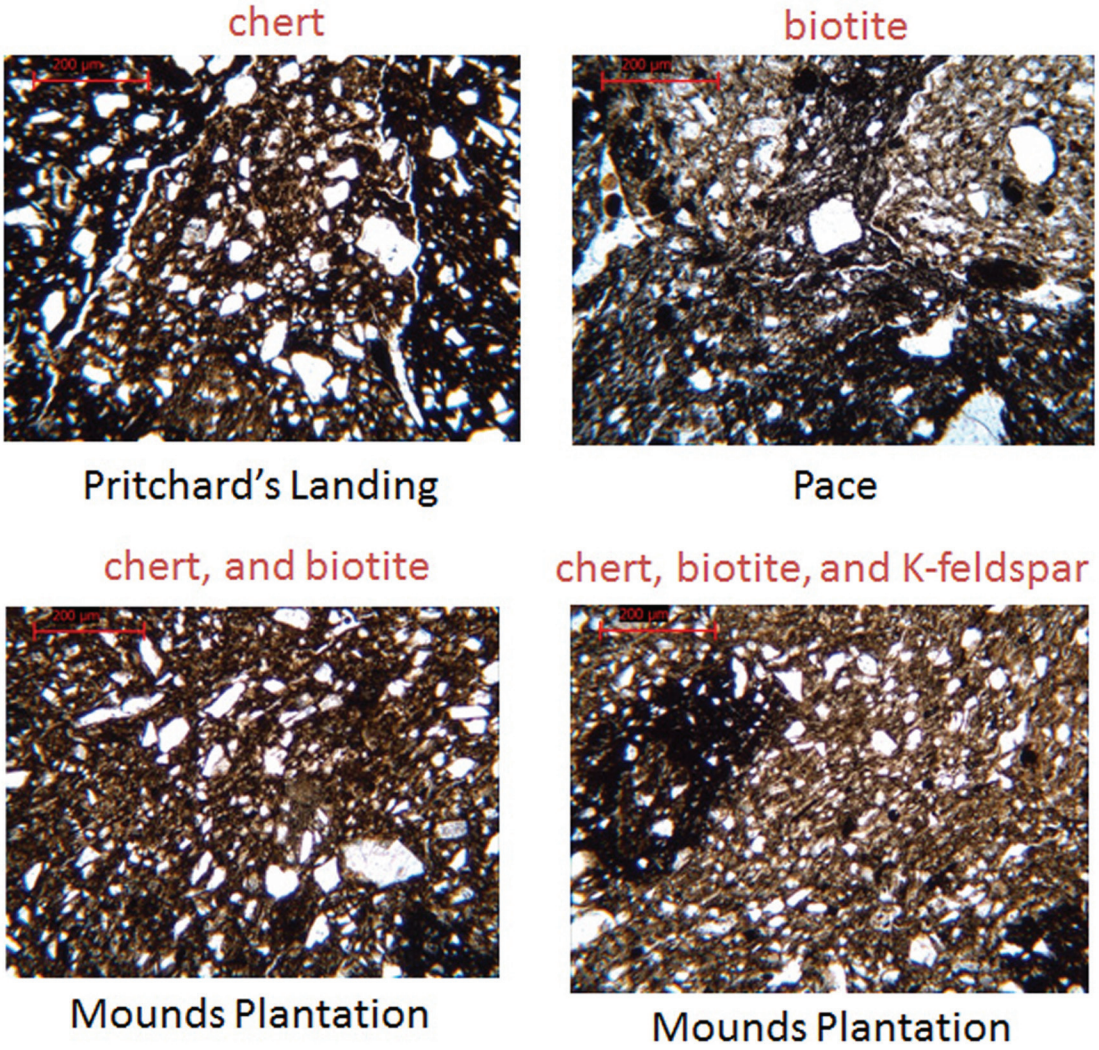

Figure 5. Thin sections of selected sherds with sandy paste, grog and other minerals (plane, polarized light, 5x magnification).

Three sherds have the usual combination of sandy paste and grog, but also have crushed bone inclusions (Figure 6). All are from the Caddo Area. Interestingly, it is only in this subgroup that the grog also includes both bone and quartz. The sample from the Mounds Plantation site has five different kinds of grog in the sherd paste (the greatest variety detected in this analysis).

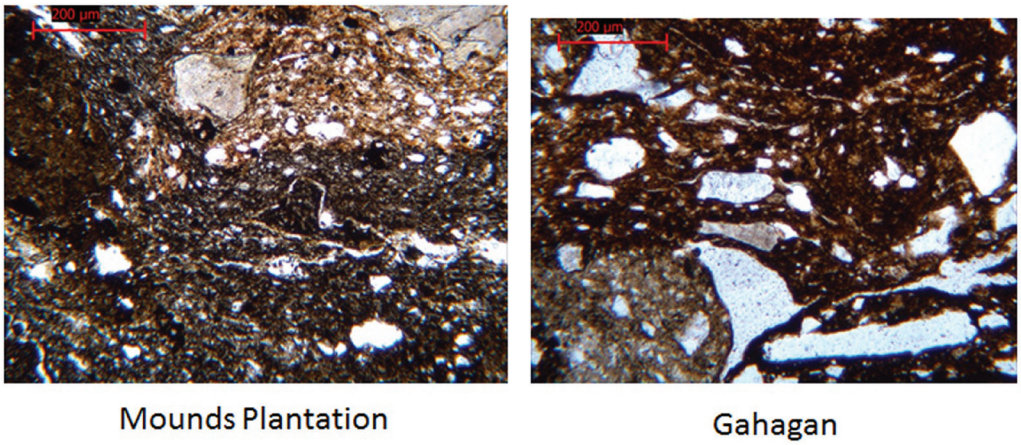

Figure 6. Thin sections of selected sherds with sandy paste and bone (plane, polarized light, 5x magnification).

Another paste group was distinguished by the presence of bi-modal (large and small) quartz and other inclusions (Figure 7). Eight specimens had these characteristics. The fine quartz that is less angular resulted from weathering into or with the clay, and the larger angular quartz likely is temper. Thus, the angular quartz may have resulted from crushing the sandy clay needed for pottery manufacture.

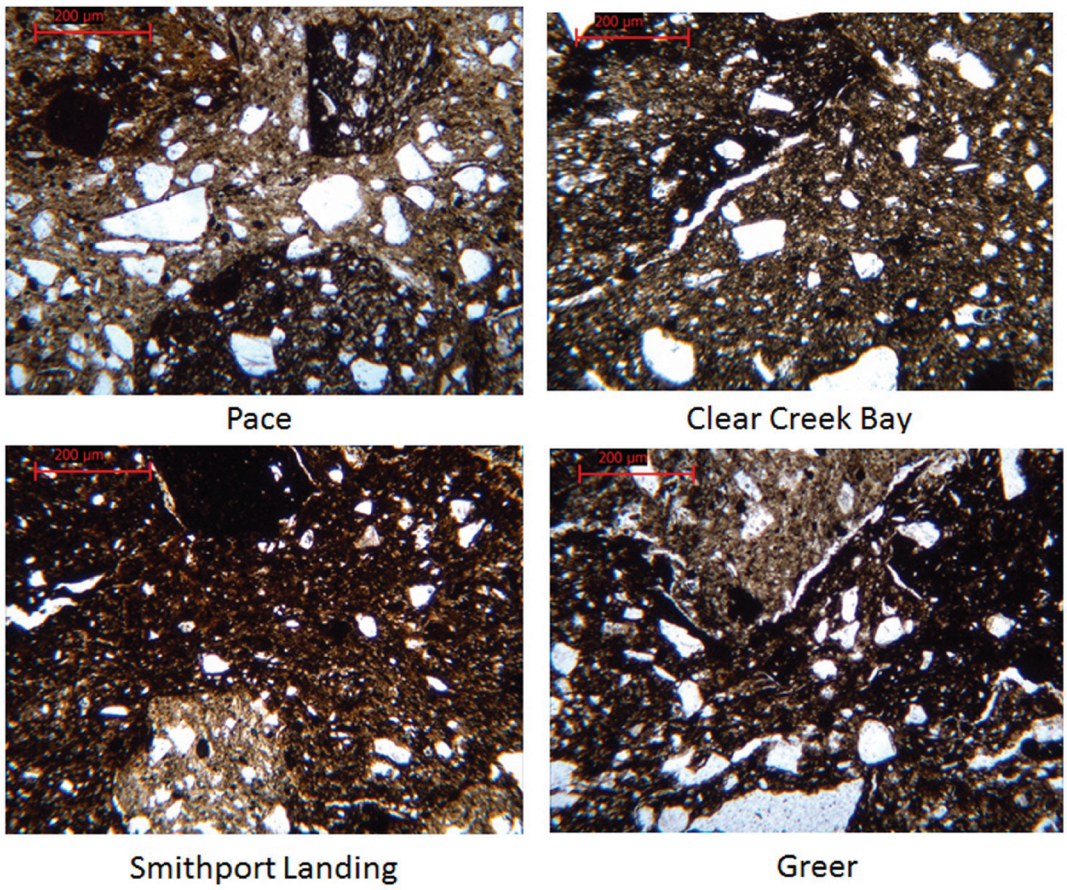

Figure 7. Thin sections of selected sherds with sandy paste and bi-modal quartz (plane, polarized light, 5x magnification).

Finally, one sample from the Crawford Site had no grog, but did include crushed iron ore particles in addition to quartz sand (Figure 8). The presence of iron is most likely due to a high iron content clay (the ribbons of iron suggest that the clay was iron-rich and the iron is not a cultural inclusion).

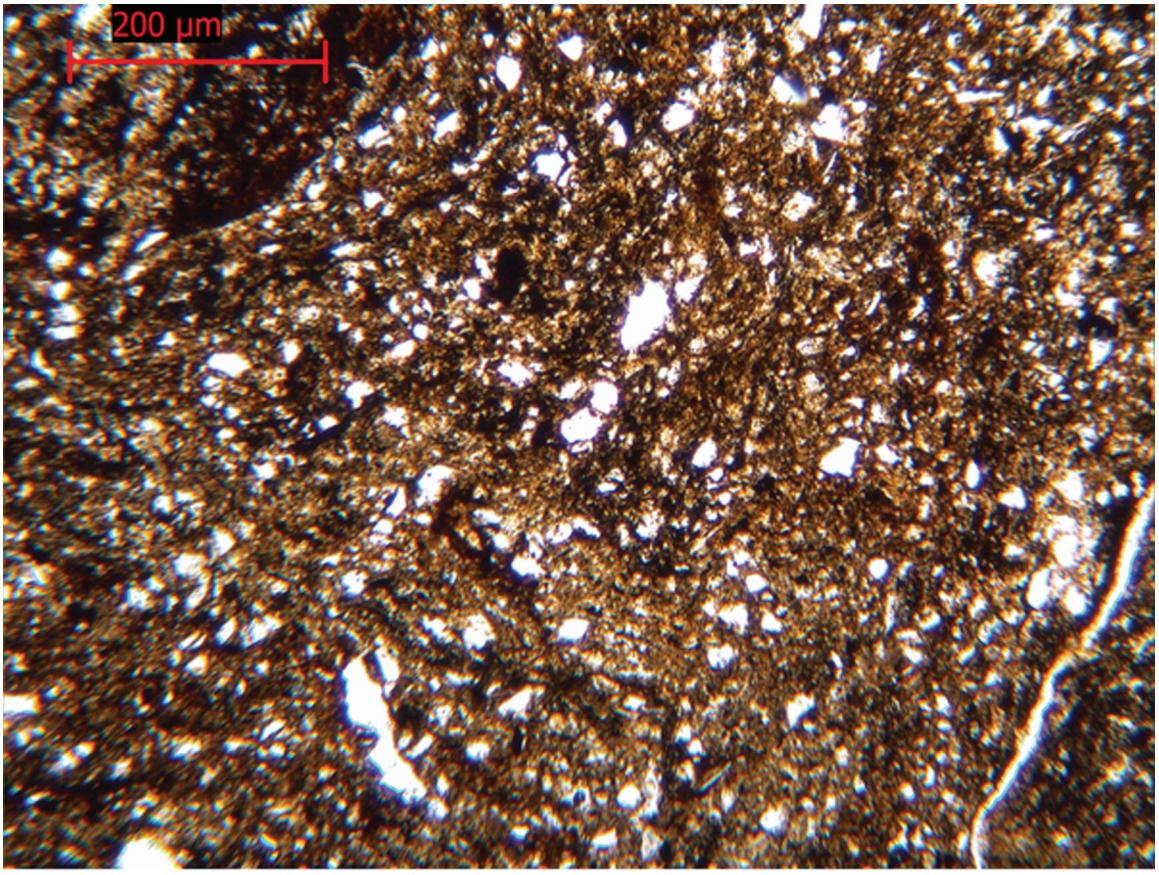

Figure 8. Thin section of sherd with sandy paste and iron (plane, polarized light, 5x magnification).

Discussion

Figure 9 is a graphic representation of the various paste groups as defined by Cecil. The chart shows that the simple combination of grog with a sandy paste (represented by the blue color) occurs throughout the regions, but is more dominant in the samples to the east. The overall impression, however, is that considerable diversity exists within the regions, indeed, even within individual sites for which multiple samples were examined. For example, we used ten samples from Mounds Plantation and, as evident in the chart, there was much variety in the paste groups represented. Comparisons between regions will be tentative until we obtain a better idea of variation within regions.

That said, there are a some general differences between the Caddo Area and Lower Mississippi Valley that can be discerned by simplifying the original paste categories. The trends correspond well with our existing knowledge of ceramic technologies and regional geologies.

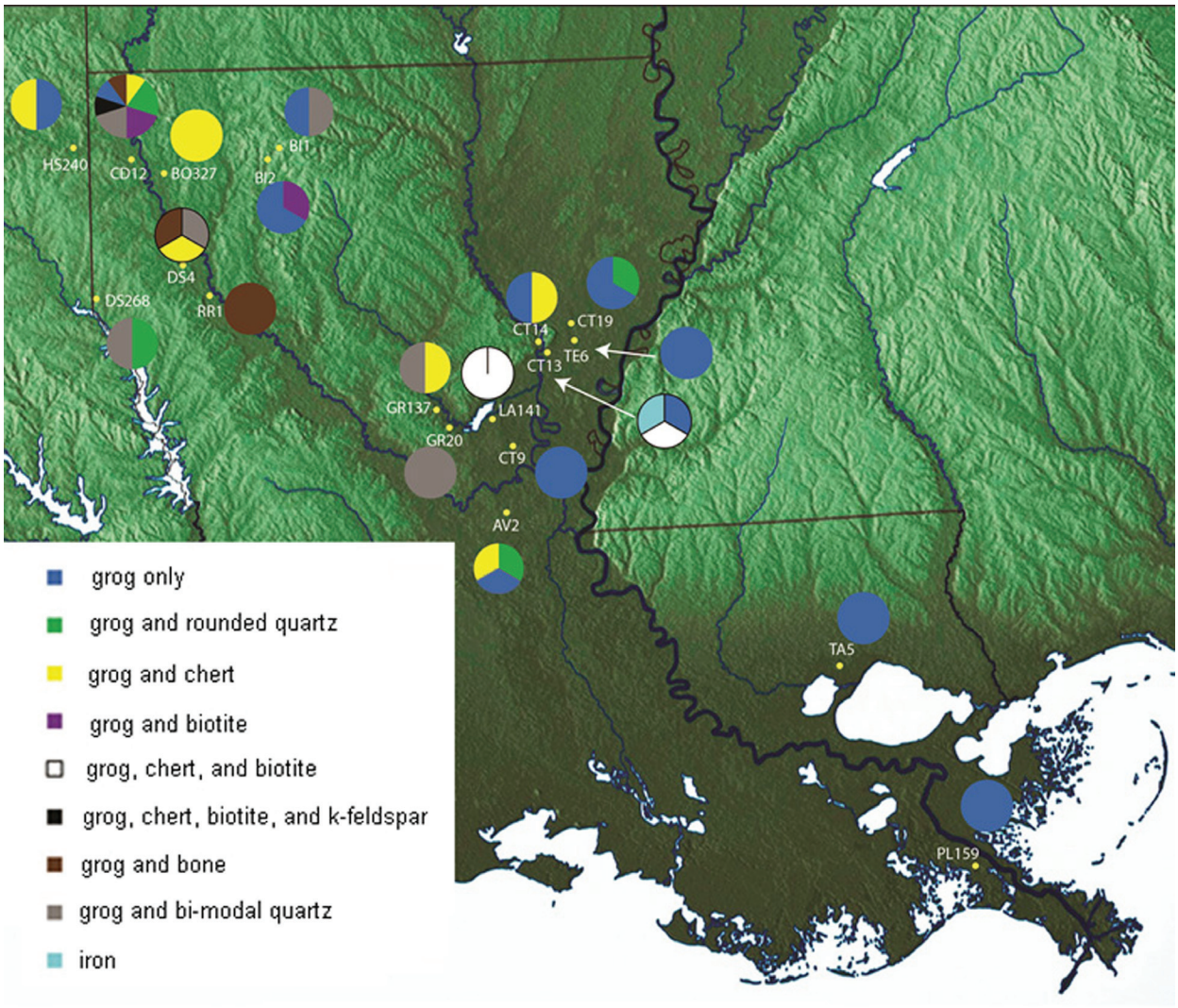

Figure 9. Distribution of paste categories in sampled sites.

Figure 10 shows percentages of samples by paste category for each region. The upper three paste categories are better represented in the Lower Mississippi Valley relative to the Caddo area; the lower three display the opposite tendency. The presence of minerals other than quartz occurs most frequently in the Caddo area. This tendency might be due to the use of clays from upland drainages and Tertiary marine deposits in the immediately surrounding uplands of northwest Louisiana.

The deliberate addition of sand as temper as suggested by the specimens with bi-modal quartz also is more common in the Caddo Area, as is the use of crushed bone as temper. The use of bone temper has long been recognized as a common trait in the Caddo area, a characteristic that extends back into the Woodland period indicating considerable local temporal continuity in ceramic technology.

The silty nature of many samples from the Lower Mississippi Valley was noted earlier. We do not know whether this is a natural characteristic of the clays, or related to preparation methods in the Lower Mississippi Valley that involved removal of coarse sand particles. However, these characteristics might be responsible for the traditional impression that pottery from the Caddo area is more "coarse."

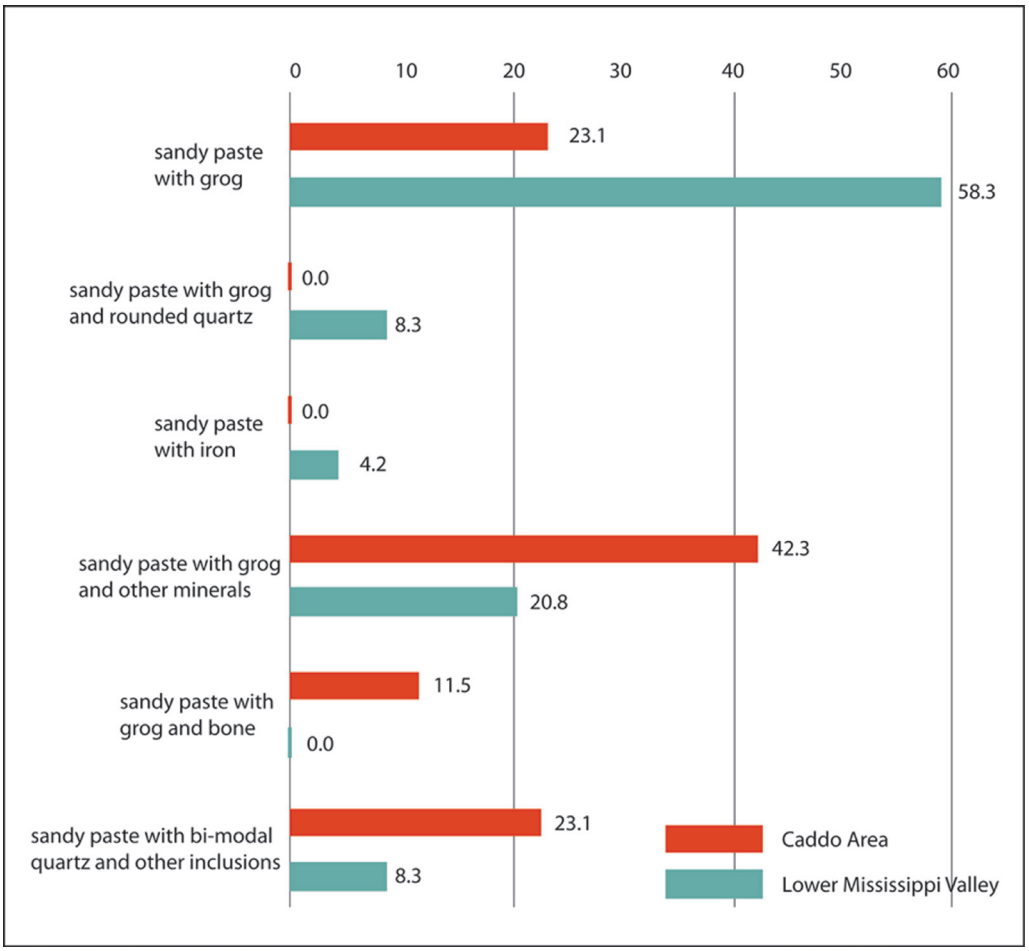

Figure 10. Regional differences in paste categories.

Despite this impression, the amount of sand as measured by number of quartz particles per sample is greater in the Lower Mississippi Valley samples, as are numbers of voids (Table 1). Grog inclusions tend to be slightly more prevalent in the Caddo Area samples. The standard deviations on these statistics are so high however, that we cannot conclude that any clear patterns are present.

	Quartz	Grog[1]	Voids
Caddo Area	1180.5	32.8	132.2
Lower Mississippi Valley	1833.8	24.7	143.6

Table 1. Number of inclusions in thin sections by region

[1] The grog counts for this study do not reflect the volume that the grog occupies in the sherd. While the counts may represent 2-3 percent of all counted inclusions, by volume, the grog inclusions represent approximately 25 percent of the paste. Most grog inclusions measured over 2mm in size.

The two varieties appear to have temporal significance (*var. Coles Creek* seems to occur earlier than *var. Greenhouse* in the Lower Mississippi Valley) and thus, differences between them might be useful for identifying technological trends. However, because samples for the two varieties were uneven between the regions in this study, it is difficult to assess if they differ in terms of the paste categories (Figure 11). A larger sample of *var. Greenhouse* sherds is needed from the Lower Mississippi Valley sites.

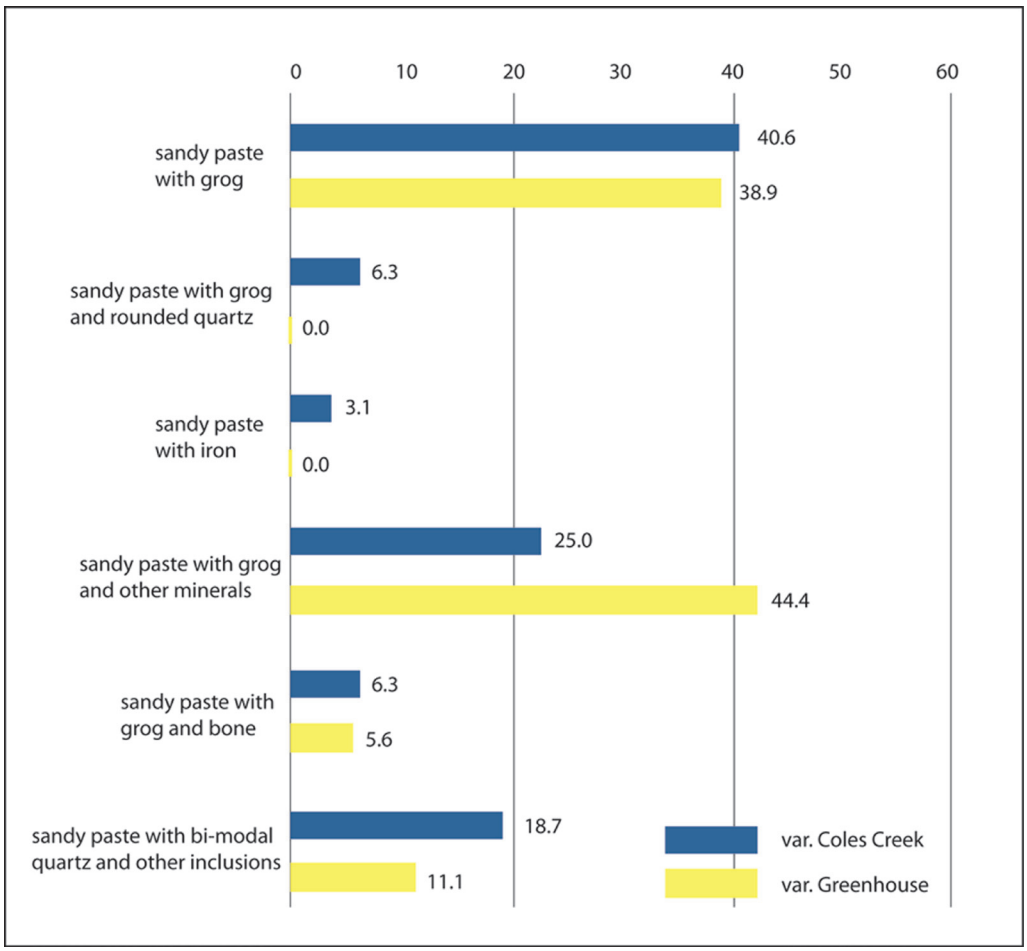

Figure 11. Paste categories for vars. Coles Creek and Greenhouse.

The samples that we utilized as representing the Lower Mississippi Valley came from sites in central Louisiana, a culturally dynamic region during the Coles Creek period that was in close proximity to the Red River sites sampled in the Caddo area. If pottery technologies, or actual pots, were conveyed between early Caddo and Coles Creek societies, central and northwest Louisiana are likely to have been regions of primary importance in this interaction. This study suggests that it is unlikely that the Coles Creek pottery in the Caddo Area resulted from Lower Mississippi Valley immigrants who either brought ceramic vessels with them, or who rigorously maintained their traditional pottery manufacturing technologies. Population movement between the two areas might have taken place, but most pots were made locally and traditionally distinct technologies were maintained. The diversity of paste characteristics at sites such as Mounds Plantation, a particularly large settlement that eventually developed into a ceremonial center during the late eleventh century, suggests that a few places might have served as nodes of interaction. Greater differences between the regions might be seen through comparison of smaller, strictly residential contexts.

We suspect that samples from sites farther east, such as the Natchez Bluffs region and upper Tensas and Yazoo Basins, also would exhibit even sharper differences with those from the Caddo Area, both because of their greater geographical distance and because utilized clays are less likely to be derived from or influenced by the Tertiary uplands of northwest Louisiana.

In conclusion, although there does not appear to be a sharp dichotomy in paste characteristics that enables us to differentiate pottery between the Caddo and central Louisiana Coles Creek areas into sortable types, variation across space can be discerned through detailed paste analysis as demonstrated here. We need additional studies from broader geographical regions and more diverse site types.

Acknowledgements

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Copper Artifacts from Caddo Sites in the Southern Caddo Area

Jeffrey S. Girard and Timothy K. Perttula

Abstract

Copper artifacts have been found at only 18 Caddo sites in the southern Caddo area of Southwest Arkansas, Northwest Louisiana, southeastern Oklahoma, and East Texas. Most of these exotic copper artifacts are found in burial mound context in important civic-ceremonial centers, or in burials in non-mound cemeteries. About 80 percent of the known copper artifacts occur in contexts in sites that date to the Early Caddo period (ca. A.D. 1000-1200). These copper items likely are linked to the Cahokia exchange system, and represent prestige goods with ritual status acquired and displayed by leaders in different Caddo communities. By Late Caddo period times (ca. A.D. 1400-1680), copper items tend to be ear spools, especially copper-covered stone ear spools. Copper continued to be used as personal ornaments linked to specific Caddo individuals, but they no longer served for objects that may have been involved in public ritual, as there are no effigies, sheet copper hand cutouts, or maskettes from Late Caddo contexts as there were in Early or Middle Caddo period contexts.

Introduction

Copper artifacts are amongst the rarest of items found on ancestral Caddo sites in the southern Caddo area. In over 100 years of archaeological investigations they have been documented from only18 different sites in Southwest Arkansas, Northwest Louisiana, southeastern Oklahoma, and East Texas (Figure 1). Although a few have been recovered from habitation contexts at Caddo mound sites, most copper artifacts have been found in burial mound contexts, or in burials in non-mound cemeteries.

There are no local sources of copper in the southern Caddo area, and the copper artifacts must have been obtained in exchange or trade with groups in the Midwest (particularly Cahokia) or Southeastern regions of North America with access to workable Lake Superior copper and with the artisans that could manufacture the copper objects (see Girard et al. 2008). The copper artifacts on Caddo sites represent prestige goods with ritual status, "items widely recognized as imparting power or wealth" (Girard et al. 2014:32) that were acquired and displayed by leaders in different Caddo communities. These same artifacts were then placed in close association with individuals in single graves or with groups of individuals in large tombs.

Figure 1. Caddo sites in the southern Caddo area with copper artifacts. Red dots are sites that date between ca. A.D. 900 to ca. A.D. 1200; green dots are sites that date from ca. A.D. 1200-1400; and the blue dots are sites that have components that date from ca. A.D. 1400 to the early 18th century A.D.

Copper Artifact Finds

The 18 ancestral Caddo sites with copper artifacts occur primarily in East Texas (56 percent), followed by sites in Southwest Arkansas (28 percent), Northwest Louisiana (11 percent), and southeastern Oklahoma (6 percent) (Table 1). Most of these sites are in the Red River drainage basin in all four states, but other Caddo sites with copper artifacts are known in the Ouachita River basin in Southwest Arkansas, and the Big Cypress, Neches, and Sabine River basins in East Texas.

There is a wide range of copper artifacts on ancestral Caddo sites (see Table 1). Included are ear spools of stone, wood, or shell with a copper covering; effigy hairpins; effigies; sheet copper cutouts; celts; copper needles and pins; bangles; beads and copper-covered beads; a copper cylinder; long nose god maskettes (see Girard et al. 2014:Figure 2.3); copper-covered wood rattles; and perforated or embossed copper strips (Figure 2).

Site	Period	General Context	Item	Class	Reference
41SA13	late	surface	copper-plated hematite ear spools	ear ornaments (stone)	Perttula 2015b:50 and Figure 6
Bentsen Clark	early	Feature 1	2 shale ear spools with copper sheet covering	ear ornaments (stone)	Banks and Winters 1975
Bentsen-Clark	early	Feature 1	1 bone ear spool with copper overlay	ear ornaments (bone)	Banks and Winters 1975
Bentsen-Clark	early	Feature 1	1 limestone ear spool with copper sheet covering	ear ornaments (stone)	Banks and Winters 1975
Bentsen-Clark	early	Feature 1	2 snake effigy hairpins with copper overlays	effigy	Banks and Winters 1975
Bentsen-Clark	early	Feature 6	1 tapered piece of copper, possible hairpin covering	fragments	Banks and Winters 1975
Bentsen-Clark	early	Feature 6	1 rolled copper piece, possible overlay fragment	fragments	Banks and Winters 1975
Bowman	early	not known	copper celt	celt	AAS records, Chance Collection
Bowman	early	not known	2 stone ear spools covered with sheet copper	ear ornaments (stone)	AAS records, Spenser Collection
Bowman	early	Mound 2	2 stone ear spools covered with sheet copper	ear ornaments (stone)	AAS records, Shirtleff Collection
Bowman	early	not known	copper pin	needle or pin	AAS records, Chance Collection
Boxed Springs	early	burial in non-mound cemetery	shell ear spools with an exterior spool copper covering	ear ornaments (shell)	Perttula 2011:210 and Figure A4.7
Clement	late	burial in temple mound	2 stone ear spools covered with sheet copper	ear ornaments (stone)	Bell and Baerreis 1951:59
Crenshaw	early	Feature 6	14 small copper bangles	bangles/studs	AAS collections
Crenshaw	early	Md. B, Burial 2	copper covering to a shell ear spool; 9.0 mm in diameter	ear ornaments (shell)	Perttula et al. 2014:295
Crenshaw	early	Mound C	2 copper ear ornaments, probably attached to wood	ear ornaments (wood)	Durham and Davis 1975:42
Crenshaw	early	Md. D, 1 ft. bs	sphere-shaped with drilled suspension hole, 17.5 mm diameter	fragments	Perttula et al. 2014:295
Crenshaw	early	Mound C	copper needle	needle or pin	Durham and Davis 1975:42
Foster Place	late	Burial 10	2 limestone ear ornaments with sheet copper on obverse sides	ear ornaments (stone)	Moore 1912:599
Foster Place	late	Burial 11	2 limestone ear ornaments with sheet copper on both sides	ear ornaments (stone)	Moore 1912:601
Gahagan	early	Mound A, Burial Pit 1	tubular bead, presumably copper covered	bead	Moore 1912:514
Gahagan	early	Mound A, Burial Pit 1	copper covered bead	bead	Moore 1912:514
Gahagan	early	Mound A, Burial Pit 1	copper covered beads, possibly whole string	bead	Moore 1912:514
Gahagan	early	Mound A, Burial Pit 2	copper beads	bead	Webb and Dodd 1939:96
Gahagan	early	Mound A, Burial Pit 2	leather covered copper object	copper/leather ornament	Webb and Dodd 1939:96
Gahagan	early	Mound A, Burial Pit 1	circular copper-covered wood ornament, 1.5" dia.	copper/wood ornament	Moore 1912:514
Gahagan	early	Mound A, Burial Pit 1	decayed sheet copper and wood	copper/wood ornament	Moore 1912:514
Gahagan	early	Mound A, Burial Pit 1	2" long cylinder of elm, 0.5" dia., copper coated	cylinder	Moore 1912:513
Gahagan	early	Mound A, Burial Pit 2	2 copper covered stone ear ornaments	ear ornaments (stone)	Webb and Dodd 1939:95
Gahagan	early	Mound A, Burial Pit 2	2 copper covered stone ear ornaments	ear ornaments (stone)	Webb and Dodd 1939:95
Gahagan	early	Mound A, Burial Pit 2	2 square copper covered cypress wood ear ornaments	ear ornaments (wood)	Webb and Dodd 1939:96
Gahagan	early	Mound A, Burial Pit 3	2 small copper covered ear ornaments of wood	ear ornaments (wood)	Webb and Dodd 1939:100
Gahagan	early	Mound A, Burial Pit 2	"five copper-covered wood pendants which have the shape of animal claws"	effigy	Webb and Dodd 1939:99
Gahagan	early	Mound A, Burial Pit 1	sheet copper represented only by small fragments	fragments	Moore 1912:512
Gahagan	early	Mound A, Burial Pit 1	two decayed small ornaments of sheet copper	fragments	Moore 1912:513
Gahagan	early	Mound A, Burial Pit 1	badly decayed ornament of sheet-copper and wood	fragments	Moore 1912:514
Gahagan	early	Mound A, Burial Pit 1	traces of sheet copper	fragments	Moore 1912:514
Gahagan	early	Mound A, Burial Pit 2	"several unrecognizable copper forms"	fragments	Webb and Dodd 1939:99
Gahagan	early	Mound A, Burial Pit 2	2 long nose god maskettes	maskettes	Webb and Dodd 1939:96
Gahagan	early	Mound A, Burial Pit 1	copper covered wood rattle	rattle	Moore 1912:514
Gahagan	early	Mound A, Burial Pit 1	crushed copper-covered wood ornaments, possibly rattles	rattle	Moore 1912:514
Gahagan	early	Mound A, Burial Pit 2	2 copper hands	sheet copper cutouts	Webb and Dodd 1939:96
Gahagan	early	Mound A, Burial Pit 2	"square plaque of sheet copper, centrally perforated and embossed"	sheet copper cutouts	Webb and Dodd 1939:99
Gahagan	early	Mound A, Burial Pit 3	square plaque of sheet copper, perforated and embossed	sheet copper cutouts	Webb and Dodd 1939:100
Gahagan	early	Mound A, Burial Pit 2	copper strips	strips	Webb and Dodd 1939:96
George C. Davis	early	Mound C, Feature 119	fragment of tanned hide or skin with bark cloth and copper staining	copper/leather ornament	Story 1997
George C. Davis	early	Mound C, Feature 134	wood object with copper covering	copper/wood ornament	Story 1997
George C. Davis	early	Mound C, Feature 119	thin sheet copper over disc-shaped wooden object	copper/wood ornament	Story 1997
George C. Davis	early	Mound C, Feature 119	disc-shaped object of shell, wood, and copper	copper/wood ornament	Story 1997
George C. Davis	early	Mound C, Feature 119	2 copper-covered stone ear spools	ear ornaments (stone)	Story 1997
George C. Davis	early	Mound C, Feature 118	2 copper-covered stone ear spools	ear ornaments (stone)	Story 1997
George C. Davis	early	Mound C, Feature 155	2 copper-covered ear spools	ear ornaments (unknown)	Story 1997
George C. Davis	early	Mound C, Feature 161	2 copper-covered ear spools	ear ornaments (unknown)	Story 1997
George C. Davis	early	Mound C, Feature 119	1 copper-covered wooden ear spool	ear ornaments (wood)	Story 1997
George C. Davis	early	Mound C, Feature 155	wood object with cut mussel shell and copper overlays; shape of canine tooth	effigy	Story 1997
George C. Davis	early	Mound C, Feature 119	1 disc-shaped piece of copper	fragments	Story 1997
George C. Davis	early	Mound C, Feature 119	copper pieces adhering to turtle shells	fragments	Story 1997
George C. Davis	early	Mound C, Feature 119	unidentified copper-covered object	fragments	Story 1997
George C. Davis	early	Mound C, Feature 119	unidentified copper ornament in hair or on hairdress	fragments	Story 1997
George C. Davis	early	Mound C, Feature 118	copper fragments around the skull	fragments	Story 1997
George C. Davis	early	Mound C, Feature 119	bone pin with sheet copper overlay	needle or pin	Story 1997
George C. Davis	early	Mound C, Feature 155	1 copper-covered bone pin	needle or pin	Story 1997
Hatchel	late	Zone H, Platform Mound	2 perforated copper strips	strips	Perttula 2014:33 and Figure 35
Hudnall-Pirtle	early	Unit 4	small copper bead, possibly spherical in shape	bead	Bruseth and Perttula 2006:132
Mineral Springs	middle	Mound 6	bits of copper stained wood	copper/wood ornament	Bohannon 1973:60
Mineral Springs	middle	Mound 6	2 stone ear spools covered with sheet copper	ear ornaments (stone)	Bohannon 1973:25
Mineral Springs	middle	not known	2 embossed copper ear pendants	ear ornaments (unknown)	Harrington 1920:224
Mineral Springs	middle	Mound 2	wood parrot head with copper scales	effigy	Harrington 1920:90,220
Mounds Plantation	early	Mound 5, Burial Pit 1	2 copper plated leather/wood ear ornaments	ear ornaments (wood)	Webb and McKinney 1975:103
Mounds Plantation	early	Mound 5, Burial Pit 2	2 copper plated wood ear ornaments	ear ornaments (wood)	Webb and McKinney 1975:103
Mounds Plantation	early	Mound 5, Burial Pit 1	traces of copper	fragments	Webb and McKinney 1975:103
Mounds Plantation	early	Mound 5, Burial Pit 5	traces of wood and copper	fragments	Webb and McKinney 1975:103
Mounds Plantation	early	Mound 5, Burial Pit 3	traces of copper sheet, 8-10 cm across	fragments	Webb and McKinney 1975:104
Mounds Plantation	early	Mound 5, Burial Pit 6	traces of copper	fragments	Webb and McKinney 1975:104
Mounds Plantation	early	Mound 5, Burial Pit 6	traces of copper	fragments	Webb and McKinney 1975:104
Ozan	middle	Mound 5, Site 1	circular copper ornaments on flattened circular object of wood	copper/wood ornament	Harrington 1920:224
Ozan	middle	Mound 5, Site 1	embossed copper band or headress	sheet copper cutouts	Harrington 1920:224
Peterson Ranch	late	Burial 13	2 copper-covered ear spools with a cypress wood backing	ear ornaments (wood)	Perttula 2015a:3
Sam Kaufman	late	East Mound, shaft burial	2 stone ear spools with copper overlay remnants	ear ornaments (stone)	Skinner et al. 1969:191
Sanders	middle	Burial B-20	2 spool shaped stone ear ornaments, copper on outside	ear ornaments (stone)	Jackson et al. 2000:32,48,87
Sanders	middle	NMNH Coll., surface	12 x 7 x 4 mm copper fragment	fragments	Perttula et al. 2015
Tuck Carpenter	late	Burial 40	2 wooden disc-shaped objects covered with copper sheet	copper/wood ornament	Turner 1978:45
Tuck Carpenter	late	Burial 34	1 stone ear spool covered with sheet copper	ear ornaments (stone)	Turner 1978:42

Table 1. Inventory of copper artifacts from Caddo sites in the southern Caddo area.

Figure 2. Examples of copper items from the Gahagan Site. A. copper strips; B. copper ear ornaments; C. copper ear ornament on wood; D. copper and leather item; E. copper cylinder; F. copper stained bone awl.

In terms of the temporal context, copper artifacts have been recovered from ancestral Caddo sites dating as early as the tenth century A.D. to as late as the late seventeenth -early eighteenth century A.D. About 44 percent of the sites with copper artifacts were occupied during the Early Caddo period, including Bentsen-Clark, Bowman, Crenshaw, Gahagan, George C. Davis, Hudnall-Pirtle, Boxed Springs, and Mounds Plantation (see Table 1). With the exception of the Bentsen-Clark site, where copper artifacts were found in non-mound shaft tombs (Banks and Winters 1975), the other Early Caddo sites are large mound complexes in the Red, Neches, and Sabine river basins (Webb and Dodd 1939; Durham and Davis 1975; Webb and McKinney 1975; Story 1997; Bruseth and Perttula 2006; Perttula 2011). One of the few non-mortuary contexts yielding copper is at the Crenshaw site in the Great Bend region of the Red River in Southwest Arkansas. Small copper bangles or studs, likely part of a head dress, were recovered from the ash-laden floor of a large house, probably a ceremonial or priest's house. This house has been radiocarbon-dated to ca. A.D. 1190 (Samuelsen 2014).

Copper items are by far most abundant in sites that date to the Early Caddo period (Table 2), and their presence likely is linked to participation in the Cahokia exchange system. Regarding Cahokia, Girard et al. (2014:60) note—"Although it is not likely that interactions with Cahokia involved tribute, military threats, or

direct economic influence, the presence of this massive place undoubtedly was known by Caddo Area peoples, and visitations, pilgrimages, and kinship connections with emigrants likely took place on a regular basis." A diverse array of objects occur in Early Caddo period contexts, but Late Caddo period copper items tend to be ear spools, especially copper-covered stone (see Tables 1 and 2). It appears that copper continued to be used as personal ornaments linked to specific individuals, but no longer had the same ritual significance, as there are no effigies, sheet copper hand cutouts, or maskettes from Late Caddo contexts.

Object Class	Number of Contexts			
	Early	Middle	Late	Total
bangles/studs	3			3
beads/cylinders	6			6
celt	1			1
sheet copper on wood	5	2	1	8
ear ornaments, copper on bone	1			1
ear ornaments, copper on shell	2			2
ear ornaments, copper on stone	8	2	6	16
ear ornaments, copper on wood	6		1	7
ear ornaments, copper on unknown material	2	1		3
effigies	3	1		4
needles or pins	4			4
rattles	2			2
sheet copper cutouts or strips	4	1	1	6
unidentified fragments	21	1		22
Totals	68	8	9	85

Table 2. Context of copper artifacts in Caddo sites of Early, Middle, and Late Caddo periods.

The Gahagan Site

Within the southern Caddo area, copper items from the Gahagan site in Red River Parish, Louisiana, appear to be especially numerous and of exceptionally high quality. Among the recovered specimens are two long nose god maskettes, a cut sheet copper human hand symbol, and embossed copper ear ornaments pressed onto both cypress wood and stone. Other items include copper-covered wood and stone ear spools, a second sheet copper hand symbol, copper-covered wood beads, copper-plated marine shell fragments, cut strips of sheet copper, rolled copper cylinder fragments, and polished bone ornaments with copper staining.

All of these items were recovered in deep shaft graves sunk into a single burial mound (designated Mound A) that was destroyed during the 1940s by a shift in the Red River. The Gahagan site was first described by C. B. Moore in 1912, who stated that large numbers of mound remnants were scattered throughout the fields in the area (Moore 1912). However, in 1938, Clarence Webb and Monroe Dodd noted only one substantial mound (Mound A), two low rises (Mounds B and C), and numerous circular sandy areas that contained pottery (Webb and Dodd 1939). Mound A had been cut in half at the time a visit to the site was made by Webb and Alex Krieger in 1947, and subsequently the mound was completely destroyed by the river. It is not certain that the two low rises were constructed earthworks. One rise apparently was taken by the river and the fate of the other is unknown.

C. B. Moore excavated Burial Pit 1 in the center of the mound. The pit contained the remains of four individuals, one of which with arms and legs splayed out in a distinct position that is replicated in several other Early Caddo period shaft graves. This is the only individual with clearly associated grave goods. Other grave goods were placed along the northwest side of the burial pit. Several copper-covered wood and cut sheet copper ornaments were included among the grave goods, most of which were in too poor condition to identify as to form. The presence of Holly Fine Engraved and Hickory Engraved ceramic vessels indicates an Early Caddo period date for the grave.

In 1938, Webb and Dodd excavated two more burial pits in Mound A before its destruction by the river. The largest was Burial Pit No. 2, which extended down ca. 2.4 m from the summit and had a level floor of white and yellow sand. Across the center of the pit was a row of six individuals, with a seventh skeleton laying perpendicular to the row. The central figure in the main row appeared to have been interred later than the others and was in the distinctive bow-legged position. Artifacts associated with the individuals were sparse, consisting only of copper-covered stone or wood ear ornaments and two caches of arrow points. As in Burial Pit No. 1, however, the northwest edge of the pit contained multiple clusters of items, including many of the distinctive stone bifaces now known as Gahagan bifaces. Among the burial goods were a human effigy pipe carved from distinctive CBP Missouri flint clay (Emerson et al. 2003; Emerson and Girard 2004), two human hand effigies of sheet copper, and two copper long nose god maskettes.

Burial Pit No. 3 contained a row of three individuals. Although most artifacts were placed along the northwest margin of the pit, found on the south side were a large Gahagan biface and a stone effigy pipe (a frog holding a rattle) also made of CBP Missouri flint clay, a likely import from the Cahokia area. The eastern portion of the grave was empty, apparently intended for persons not yet deceased who never were placed there.

Although excavations at Gahagan were conducted prior to the development of radiocarbon analyses, Emerson and Girard (2004) obtained permission from the Caddo Nation of Oklahoma to submit for dating small pieces of charred wood and leather that had become detached from three specimens recovered from Burial Pit No. 2. The results indicate that the items date to the late eleventh or early twelfth enturies A.D., suggesting direct contact between the southern Caddos and American Bottom populations during the Lohman or Sterling phases when Missouri flint clay figures were manufactured and in use at Cahokia.

George C. Davis Site

Mound C at the George C. Davis site is a special mortuary where the social, political, and religious elite of the Caddo community were buried in large and elaborate shaft tombs (Story 1997:64-65). Some of these burials had grave offerings of copper artifacts (see Table 1).

Six stages (I-VI) of tombs were found within the mound. The first stage (Feature 134) is a sub-mound burial, and Stages II-VI represent mound surfaces from which different shaft tombs originated. Although the burial features and construction of Mound C are not well dated by radiocarbon assays, the six stages of burials and mound surfaces may have been in use for ca. 250 or more years, from perhaps as early as 1010 $\pm$ 80 years B.P. (cal. A.D. 903-1157 at 2 sigma) to at least 770 $\pm$ 80 years B.P. (cal. A.D. 1163-1299, 2 sigma).

Copper artifacts were found as grave goods in Stage I-IV burials; most are from the Stage II burials: Feature 119 and Feature 155. The Stage I burial feature (Feature 134, with eight individuals) had a wood artifact with a copper covering. Both Stage III and IV burial features (Features 161 and 118, each with one individual) had two copper-covered earspools, and small fragments of copper were found around the skull of Feature 118, suggesting that a copper ornament had been in the hair of the deceased.

Feature 119 (with four individuals) in Stage II of the mound had two layers of burial offerings (Story 1997:29-38), both with copper artifacts. In the first or upper layer of offerings were a disc-shaped wooden object covered in thin sheet copper, fragments of thin sheet copper, and a small disc-shaped piece of copper. The second or lower layer of offerings in Feature 119 included small pieces of copper adhering to turtle shells, possibly part of a turtle shell rattle, an unidentified copper-covered object, two copper-covered earspools, sheet copper associated with a bone pin, a disc-shaped ornament made of shell, wood, and copper, and a possible copper-covered wooden earspool. Copper salts identified around the skull of one of the individuals in this tomb suggests that this individual had a hair ornament containing copper.

Feature 155 (with one individual) in Stage II had several copper artifacts placed in the tomb as funerary offerings (Story 1997:41-42). These included two copper-covered earspools, a bone pin with a copper-covered bone ornament fitted over one end, and a small wood object overlain with a mosaic of cut mussel shells and copper pieces.

Three pieces of copper were also recovered in the platform mound (Mound A) at the George C. Davis site (see Table 1). Two came from the floor of Feature 31, a large (15.2 m in diameter) and likely special purpose circular structure that lay under the south end of the first mound platform in Mound A (Newell and Krieger 1949:32-35). This structure in turn was constructed over two smaller oval to round houses built and then burned in a ca. 0.6 m deep depression. The other piece of copper came from floor deposits of Feature 9, another special purpose structure that was built along the north side of Mound A (Newell and Krieger 1949:179). This unique structure, 11.3 m in diameter, was built in a ca. 35 cm pit and had post-filled trenches and a clay floor as well as a clay-filled extended entranceway (Newell and Krieger 1949:Figure 11) pointing towards the central crest of Mound A.

Also at George C. Davis, four small fragments of copper were recovered during excavations in domestic areas in Units 65 and 109 between Mounds B and C. Baskin (1981:250) suggests they may be fragments of manufacturing debris.

Later Contexts

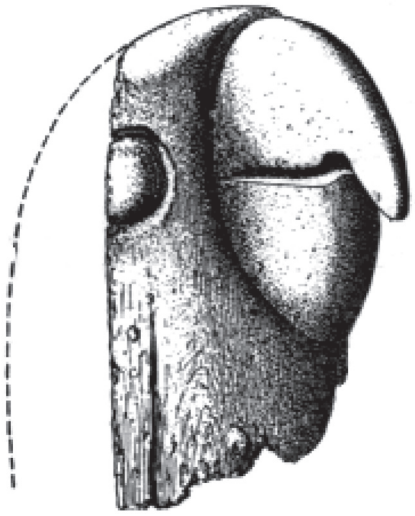

Figure 3. Copper-coated wood parrot or parakeet head from Mound 2 at the Mineral Springs site (Harrington 1920:Figure 32).

Only about 17 percent of the Caddo sites with copper artifacts were occupied primarily in the Middle Caddo period (ca. A.D. 1200-1400). These are the Mineral Springs, Ozan Site 1, and Sanders sites in the Red and Ouachita River basins (Harrington 1920; Bohannon 1973; Jackson et al. 2000). All are multiple mound sites. Objects from these sites include circular copper ornaments and an embossed copper band or headdress from Ozan Site 1, copper-covered stone earspools at the Sanders site, and copper ear pendants, covered-covered stone earspools, and a wood parrot or parakeet head coated with copper (Figure 3) from the Mineral Springs site.

Six sites with copper artifacts were occupied in the Late Caddo period (ca. A.D. 1400-1680), including the Clement, Foster, Sam Kaufman, Tuck Carpenter, Hatchel, and 41SA13 in the Red, Big Cypress, and Neches drainage basins. These sites include both mound centers (Moore 1912; Bell and Baerreis 1951; Skinner et al. 1969; Regnier et al. 2013) as well as non-mound cemeteries (Turner 1978; Perttula 2015b).

Finally, the Peterson Ranch site (41HS253) in the Little Cypress stream basin in East Texas is a large non-mound cemetery (Perttula 2015a) that was used by ancestral Caddo peoples in the early historic period, from ca. A.D. 1680-1720. One of the burials at the site was accompanied by two copper-covered ear spools with cypress wood backing.

Summary and Conclusions

Copper artifacts of various forms and types have been found at only 18 Caddo sites in the southern Caddo area of Southwest Arkansas, Northwest Louisiana, southeastern Oklahoma, and East Texas. Items include copper long nose god maskettes, cut sheet copper symbols in the form of human hands, copper ear ornaments, copper-covered bone needles or hairpins, embossed copper head ornaments, beads and bangles, a small copper celt, copper-covered wood and turtle shell rattles, a wood parrot or parakeet plated with copper, copper-covered wood and shell items in the shape of animal claws and teeth, and fragments of rolled copper tubes or cylinders. By far the most common kind of copper artifacts on Caddo sites, regardless of age, are copper-covered ear ornaments or ear spools.

Most of these exotic copper artifacts are found in burial mound context in important civic-ceremonial centers such as the Gahagan site on the Red River in Northwest Louisiana and the George C. Davis site on the Neches River in East Texas, or in burials in non-mound cemeteries like that excavated at the Bentsen-Clark site on the Red River in East Texas. There are only a few instances where copper artifacts have been found in non-mortuary contexts, most notably in the ca. A.D. 1190 ash bed of a possible ceremonial or priest's house at the Crenshaw site on the Red River in Southwest Arkansas and in post-A.D. 1500 contexts in the large Nasoni Caddo platform mound at the Hatchel site on the Red River in East Texas.

About 80 percent of the known copper artifacts in the southern Caddo area occur in contexts in sites that date to the Early Caddo period (ca. A.D. 1000-1200). These copper items likely are linked to the Cahokia exchange system, and thus they represent prestige goods with ritual status acquired and displayed by leaders in a number of different Caddo communities. By Late Caddo period times (ca. A.D. 1400-1680) and in post-A.D. 1680 Historic Caddo period times, copper items tend to be ear spools, especially copper-covered stone ear spools, recovered in mortuary contexts associated with individuals.

Although the role of copper in the Caddo world may have changed through time as a result of shifting relationships of Caddo Area groups with those in surrounding regions, as well as from transformations in connections between, and leadership roles within, Caddo societies, copper appears to have continued as a symbol of the elite status of a limited number of individuals into historic times. The demise of the Cahokia exchange system may have resulted in declining access to copper ornaments for Caddo Area communities and their leaders. Symbolically laden items probably displayed in public ritual such as the long nose god maskettes and cutouts of sheet copper no longer were available after the thirteenth century. However, these items never were abundant and most have been recovered from only a few sites, particularly the Gahagan site located along the southern margin of the Caddo Area. It is interesting that Gahagan does not appear to have been a particularly large or important regional center, and the reasons for burial of multiple exotic ritual items at that location remain mysterious.

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Distribution of Design: The Rayed Circle

Duncan P. McKinnon

The importance of the use of a Geographic Information System (GIS) in archaeological applications has been demonstrated previously (Allen et al. 1990; Hodder and Orton 1976; Kvamme 1999, 2007; Neubauer 2004; Wheatley and Gillings 2002). The value of using a GIS approach is an ability to conduct multivariate spatial analyses in order to visualize complex social relationships, interactions, and distributions across a broad cultural landscape (Anselin 2005; Maguire 2005). Within Caddo archaeology, the utilization of GIS functionality to explore spatial phenomenon has been employed in a variety of ways, such as site organization and interaction (Brooks 2012; Lockhart 2010, 2012; Vogel 2012), material distribution and exchange (McKinnon 2011, 2015), and environmental modeling and landscape reconstruction (Lockhart 2007; Williams 2007), to name a few. The following report adds to the growing list of GIS-based case studies in Caddo archaeology with preliminary results of an on-going project evaluating the distribution of visual imagery depicted on a select corpus of whole Caddo ceramic vessels.

Broadly, this project provides a foundational framework containing a variable series of attributes from over 4,000 Caddo ceramic vessels that can be compared to a variety of cultural and environmental datasets (Figure 1). While 4,000 vessels are certainly numerous, this is far from a complete sample. However, the 4,000 Caddo vessels that define the current database provide a structure for evaluating the distribution of stylistic and formalized attributes, fully acknowledging that sampling and documentation biases do exist. The voluminous amount of site publications, inventories, and regional summaries has yet to be fully inventoried, and there will never be a complete set of data. In other words, the database is, and will always be, a fragmented representation of the full extent of ceramic expressions across time and space (Hodder and Orton 1976:20-29; Jones 2002:41-46). As such, this project is a continuous work in progress and a start toward a larger goal of capturing and recording attributes associated with thousands of vessels from Caddo and neighboring archaeological sites. This developing effort offers an opportunity to visualize the spatial relationships of select attributes across the landscape and facilitate a forum for expanding, as well as refining, questions related to Caddo trade, interaction, and distribution of material expressions associated with prehistoric occupants of the Caddo Archaeological Area (see Perttula 1992; Girard et al. 2014).

The origin of this larger project began as an exploration in the efficacy of using a GIS to map the distribution and spatial relationship of 284 vessels of a specific Caddo vessel type, Foster Trailed-Incised (McKinnon 2011). The study proved to be informative in the mapping and identification of suggested cluster areas containing high occurrences of the Foster Trailed-Incised type and possible spatial outliers (using spatial statistics) that met the criteria for inclusion in the type (see Suhm et al. 1954; Schambach and Miller 1984). While the initial examination was not a complete representation of Foster Trailed-Incised vessels, results demonstrate that a GIS-based distributional approach is a productive method to visualize areas of cultural influence across a landscape using specific artifact attributes to identify possible statistical outliers. Outliers to a spatial pattern can then be examined and re-examined as additional ceramics are added to the database and the spatial pattern is expanded or modified (Genton 2001; Shekhar et al. 2003). In this context, outliers are important in that they offer consideration for potential cultural and economic interaction and exchange with neighboring groups that can be evaluated further as additional data are included and the analysis expanded (see also Girard et al. 2014).

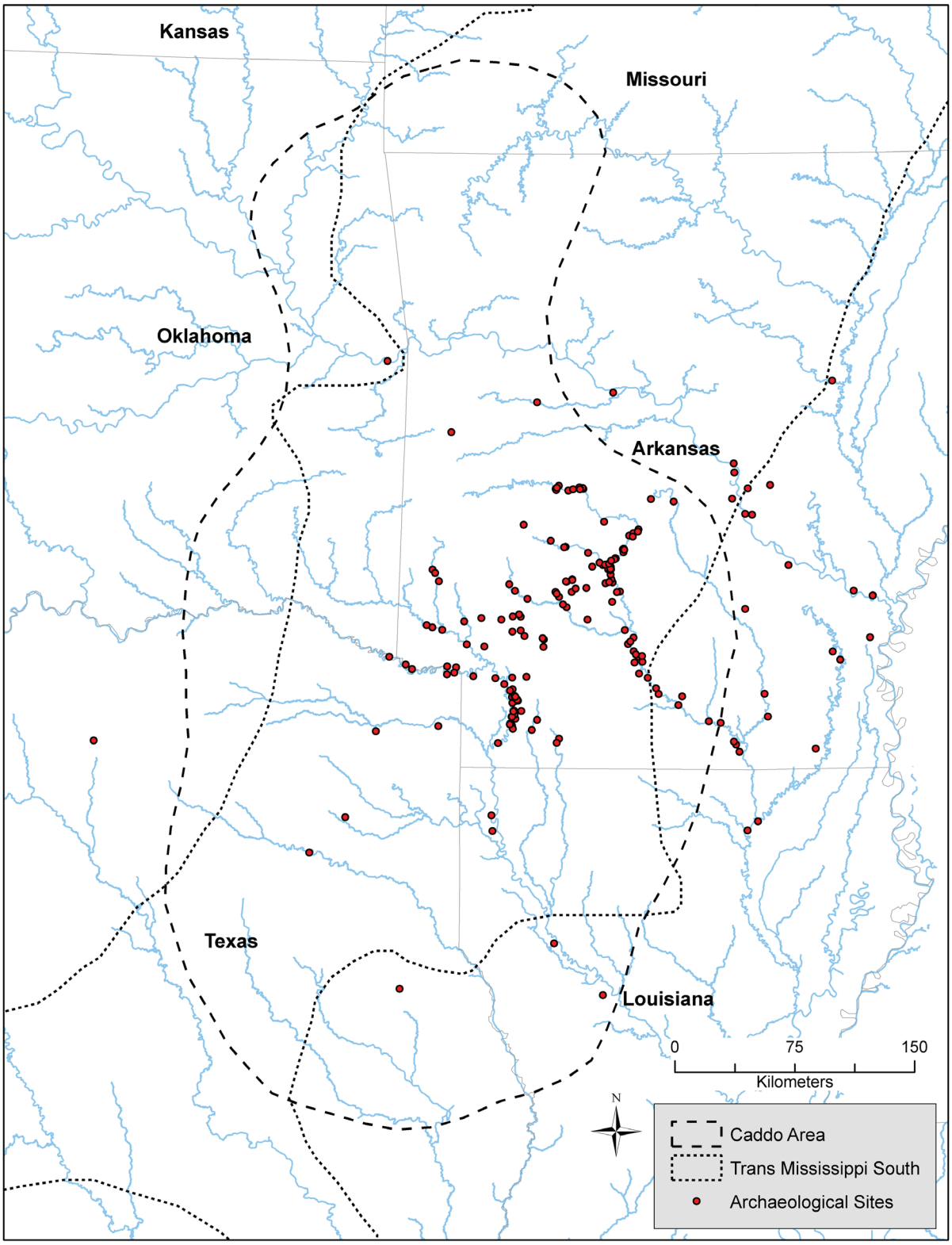

Figure 1. The distribution of archaeological sites within the current GIS ceramic distribution database.

As a first case study, the initial Foster Trailed-Incised examination provided the necessary methodology to enlarge the GIS database in terms of the overall number of whole Caddo ceramic vessels and to expand the analysis to examine additional attributes that can be evaluated spatially. What follows is a presentation of a motif-based distribution analysis, a summary of initial findings and implications, and important considerations as this project proceeds.

Methodology

At present, the GIS database contains 4199 whole vessels from sites in Arkansas, Louisiana, Oklahoma, and Texas, although the database is currently biased toward Arkansas sites and locales (see Figure 1). This is because most of the vessels in the current database were originally photographed from numerous private collections around Arkansas in the 1960s, 70s, and 80s by several Arkansas Archeological Survey (AAS) station archaeologists, station assistants, and students. Several important collections are included, such as those of Mark R. Harrington (National Museum of American Indian; see also Harrington 1920), Thomas L. Hodges (Joint Educational Consortium; see also Early 1986), Vere Huddleston (Henderson State University), Judge Henry J. Lemley (Gilcrease Museum), and numerous others (Combs, Barnes, Birch, Blackwell, Blevins, Bryant, Jones, Chance, Durham, Figley, Franks, Franz, Furr, Kitchens, McClendon, McVay, Phillips, Redmond, Short, Shurtleff, Sibert, Sullivan, and White-Franco, to name a few). Also included are some vessels documented from a few seminal publications (for example, Bohannon 1973; Moore 1912; Webb 1959; see also Gregory 1980; Weinstein et al. 2003), although many publications are yet to be included. The vessel photographs were attached to orange index cards that have been referred to colloquially as the "analog database". Where information is available and noted, cards contain a black and white photograph of the vessel, site trinomial, collector information, ceramic attributes and observations (such as temper), and intrasite provenience information (burial numbers, etc.). Dr. Frank F. Schambach originally organized the photo cards during his tenure as station archaeologist at the AAS station in Magnolia, Arkansas. Recently, Dr. Schambach and student workers at Southern Arkansas University (SAU) in Magnolia scanned the cards into digitized form and I entered the attributes into a GIS database.

As stated, many of the ceramics in the current database are situated within Arkansas (see Figure 1). Of the current total, 580 (13 percent) have no provenience information and 220 (5 percent) contain site names with no accompanying trinomial where corresponding site names are not listed in the Automated Management of Archeological Site Data in Arkansas (AMASDA) database. Many of these unknown sites are likely regional vernacular names or perhaps previous landowner names not associated with current landowners. In some instances, a site trinomial provides county information but the specific site geographic location (UTM coordinate) is not recorded in AMASDA. This is primarily because numerous sites have been destroyed as a result of river meandering prior to their addition into the statewide repository. The exact locations of these former sites are unknown.

Removing these vessels from the corpus (given that they cannot be evaluated spatially), the database includes 3399 whole ceramic vessels. The current database contains ceramics from 187 archaeological sites in 36 counties (Arkansas, Oklahoma, and Texas) and 5 parishes (Louisiana). Sites containing the highest representation of ceramics include some recognizable sites in southwest Arkansas, such as Battle Mound (3LA1; McKinnon 2013), Mineral Springs (3HO1; Bohannon 1973), Washington Mounds (3HE35; Harrington 1920), Flowers (3HE37; Harrington 1920), Bowman (3LR50; Hoffman 1970), East (3CL21; Early 2002), Hayes (3CL6; Weber 1971), and Haley (3MI1; Hoffman 1970), and many other smaller sites. These larger sites are familiar and recognizable because of the research (although limited with some) and publications associated with them. Certainly, these do not represent the full suite of sites across the Caddo landscape and, as such, adds another level of biases that is inherent in archaeological survey methods, history of explorations and site accessibility, sampling selection, and issues with bounded areas as "sites" in contrast to a fully utilized landscape (Banning 2002; Dunnell and Dancy 1983; Hodder and Orton 1976). Furthermore, as this is a preliminary report of a second case study, the accuracy of metadata recorded on the cards and ceramic-site associations is ongoing.

Rayed Circle Motif

In this second GIS ceramic database case study, the rayed circle motif was selected to examine spatial distributions and possible relationships. The rayed circle motif is defined in the Phillips and Brown Glossary of Motifs as a type of motif present on Spiro engraved shell cups (Phillips and Brown 1978:155). The motif is considered an elaboration on the barred oval motif where "rays or scallops" are added to a half oval containing two or more concentric lines (Phillips and Brown: Plate 36). In the context of this analysis, the rayed circle motif is used to apply to similar representations on ceramic vessels containing a series of concentric circles with one or more containing ray-like tics emanating from the center of the motif. The application is both engraved and incised. Some Caddo ceramic equivalents are Belcher Engraved vessels, where a series of concentric circles surrounds a "flower or star-like" element in the center (Suhm et al. 1954:244), Avery Engraved, where concentric semicircles contain ticked lines (Suhm et al. 1954:236), and Ripley Engraved, where concentric circles have "ticking or pendant triangles on lines" (Suhm et al. 1954:346). A more abstract representation is with Hempstead Engraved vessels where concentric circles are situated around the rim of bowls or the neck of bottles and contain "hatched or cross-hatched triangles" that point downward (Suhm et al. 1954:292).

Here, I introduce and distinguish two varieties of the rayed circle motif by first defining their parameters and criteria for inclusion in each variety. This is followed by an evaluation of the spatial distribution of each motif variety independently, and concluding with an observation on the distributional relationship between the two varieties.

Rayed Circle Burst Motif

What I define as the rayed circle "burst" variety is the most definitive of the rayed circle motifs. The defining criterion is the presence of a central element, or burst, as a circle containing a series of small triangles or rays emanating outward from the center in a seemingly rotational movement (Figure 2a). The presence of at least one burst defines the motif, although variability is present with multiple bursts organized symmetrically with two or four on opposing sides. The burst motif is located on the body of the vessel where most ceramics in the corpus are bottle in form.

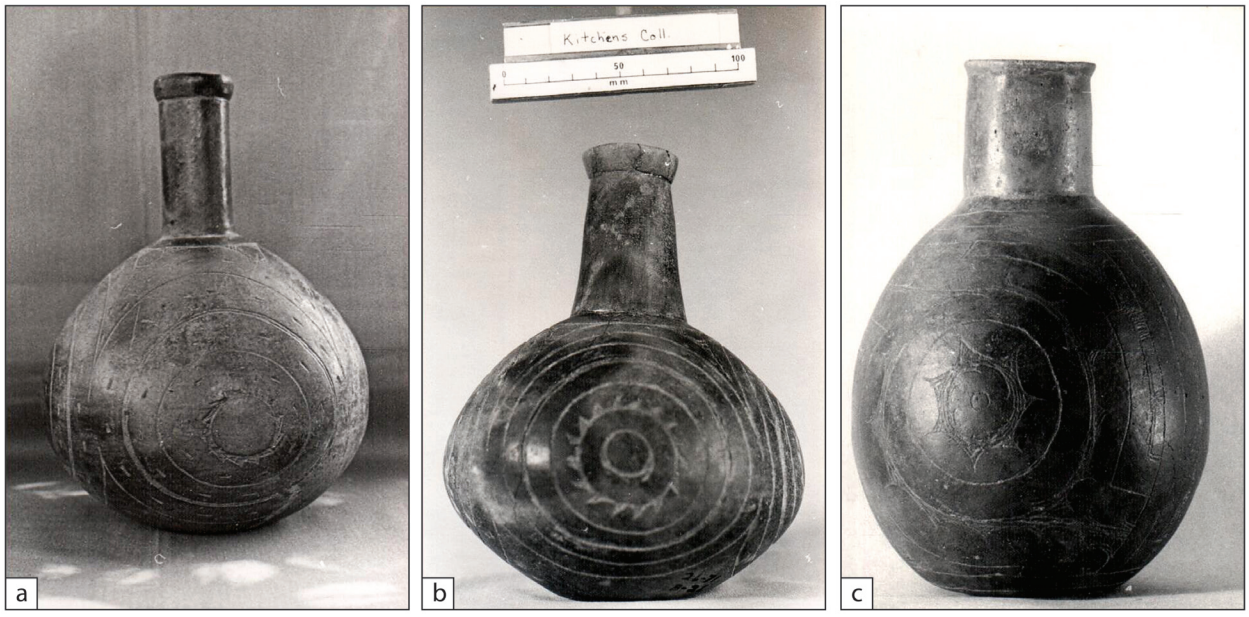

Figure 2. Examples of the Rayed Circle Burst motif (a) a bottle from Battle Mound (3LA1), AAS# 714111; (b) a bottle from Cryer Field (3LA35), AAS# 793229; (c) a bottle from Mineral Springs (3HO1), AAS# 651001. Images used with the permission of the Arkansas Archeological Survey.

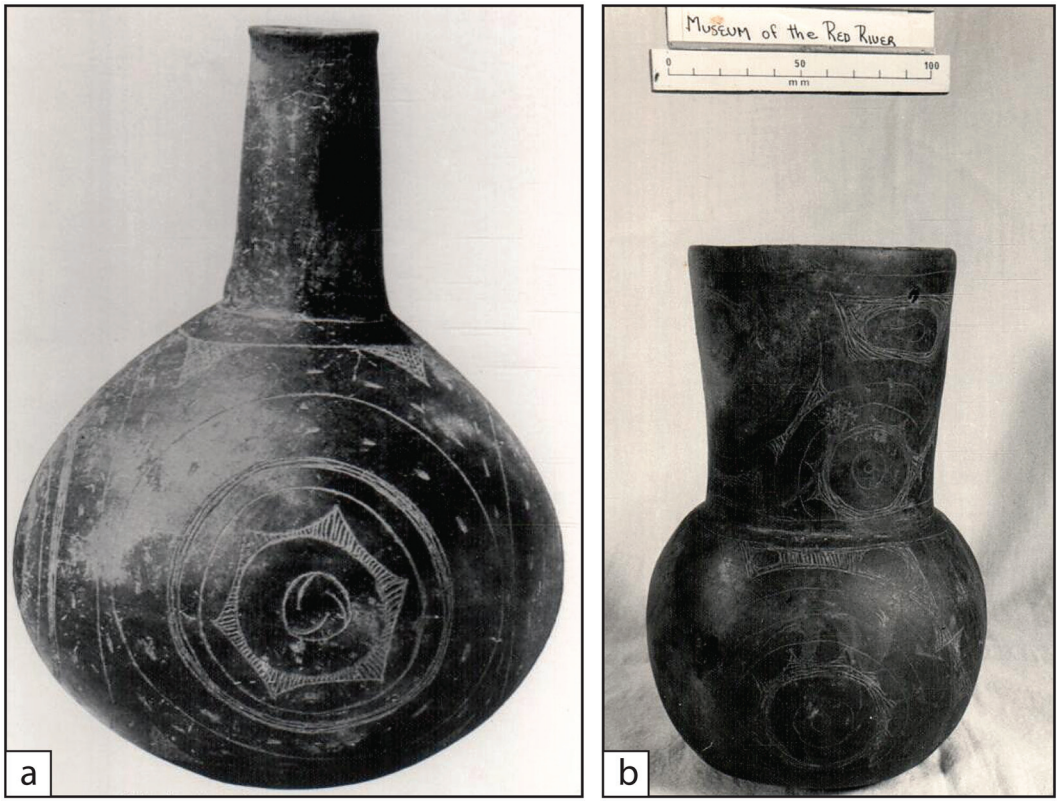

Figure 3. Examples of the Rayed Circle Burst motif (a) a bottle from the McClure Place (3MI29), AAS# 772380; (b) a bottle from the Bowman site (3LR50), AAS# 775335. Images used with the permission of the Arkansas Archeological Survey.

There are variations to the overall theme. For example, a bottle from Battle Mound contains the simplest representation composed of a single burst with no additional elements within the burst (see Figure 2a). A bottle from Cryer Field (3LA35) has a rayed circle burst with a separate unembellished circle within the burst element (Figure 2b). A vessel from Mineral Springs has a rayed circle burst with larger triangles that are less rotational with a separate single small circle within the burst element (Figure 2c). Additional variations include bottles from the McClure (3MI29) and Bowman sites. A bottle from the McClure Place has an overall similar organization containing a rayed burst with concentric circles radiating outward (Figure 3a). However, the rayed circle burst is defined by emanating triangles organized hexagonally. Additionally, the vessel contains a second rayed circle motif (rayed circle overhead discussed below) around the neck. A bottle from the Bowman site has a more distinctive variation (Figure 3b). The overall vessel form is more globular in form and has at least two, if not more, rayed circle burst elements on both the body and the neck. In most examples, a series of concentric circles radiate outward from the central rayed circle burst. In some instances, the concentric circles contain additional tics or bursts, whereas in others they are not included.

The rayed circle burst motif has been identified on 85 whole vessels within the current corpus. The 85 rayed circle burst vessels are all from sites containing Middle and Late Caddo (ca. A.D. 1200-1600) components, although many of the sites have not been studied fully to more distinctly understand their temporal components and the context of vessels within site intra-organization and affiliation.

Rayed Circle Overhead Motif

A second rayed circle motif variation, as defined herein, is termed the rayed circle overhead motif. This naming convention is associated with the location of the motif on vessels. There are 65 representations of the overhead motif in the current corpus. As with the rayed circle burst motif, all are (tentatively) associated with Middle and Late Caddo period sites.

The defining criterion of the motif is a series of triangles, often filled with engraved cross-hatching, and located at the base of the neck (Figure 4). The triangles are pointed downward in a fairly symmetrical organization and connected at the base of the triangles by a single circular engraving often with an accompanying set of nested concentric circles. The design organization is best viewed from overhead rather than in profile, as the naming convention illustrates. This distinction offers consideration that the visual perspective of the rayed circle overhead motif is as the bottle is being used rather than in profile, although this could simply be a result of the vessel shape and an artistic adaptation to commonly understood themes and associated meanings (see Gadus 2013). Since the bottle vessel form was likely used for storing and pouring liquids into other vessels (such as bowls) or drinking from directly, it is suggested that the bottle orifice is an important central element such that the liquid within the bottle "literally gushes forth" through a symbolic portal (Reilly 2004:130).

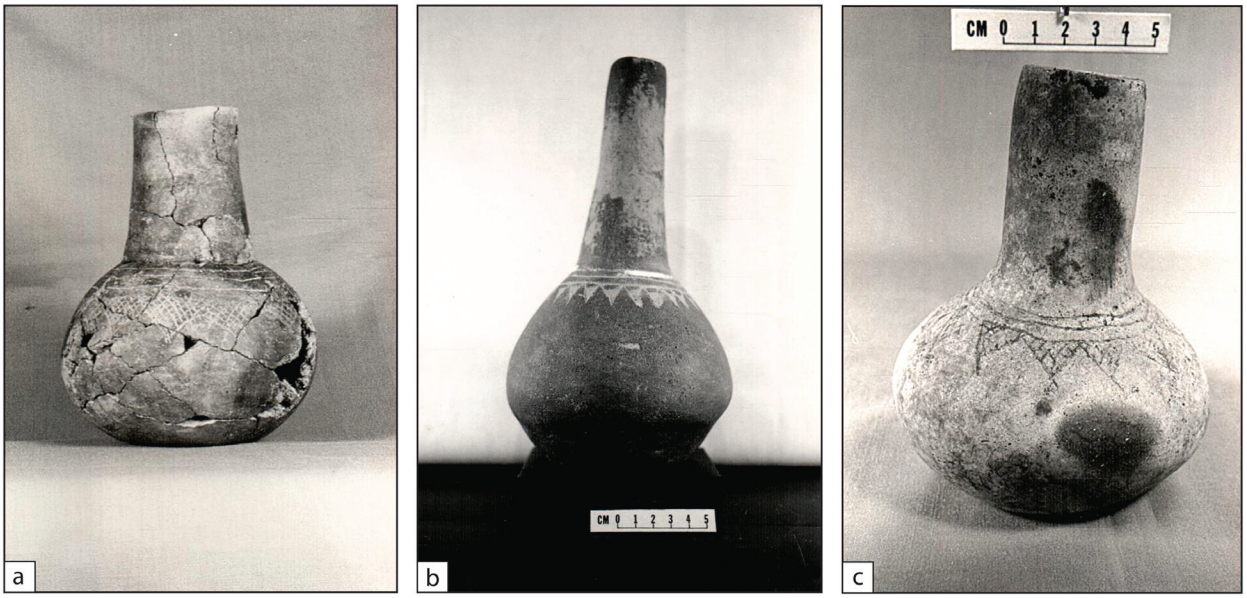

Figure 4. Examples of the Rayed Circle Overhead motif on bottles (a) a bottle from Ferguson (3HE63), AAS# 734671; (b) a bottle from Arnold Mound (3CL67), AAS# 714079; (c) a bottle from the Jim Keith site (3CO4), AAS# 712361 (see also McKinnon and Brandon 2014). Images used with the permission of the Arkansas Archeological Survey.

Rayed Circle Overhead Motif and Vessel Form

Whereas the rayed circle burst motif is primarily restricted to bottles within the current database, about half of vessel forms that contain the rayed circle overhead motif are bottles and the remaining are bowls (Figure 5). The rayed circle overhead motif on bowls is almost identical to representations on bottles. The bowls contain a series of triangles filled with engraved cross-hatching and are pointed downward from a circular engraving often with an accompanying set of nested concentric circles. However, as a result of the bowl form, the overhead motif is not fully visible from overhead. The interchangeable design elements on different vessel forms suggest a functional, perhaps symbolic, relationship or common identifier between the bottles and bowls. In other words, might the bowls represent the container in which the liquid from the bottles was poured into? Do they form a set?

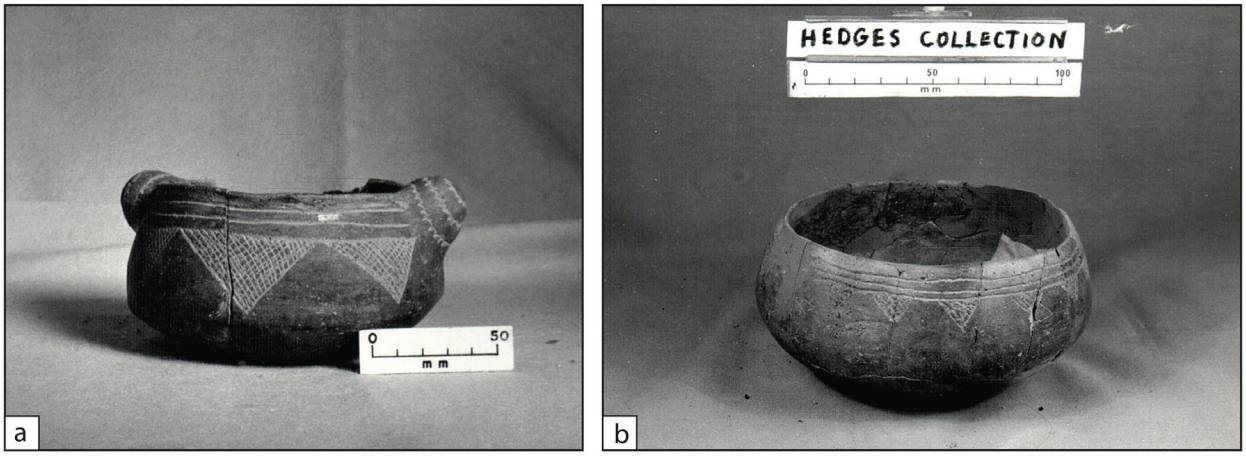

Figure 5. Examples of the Rayed Circle Overhead motif on bowls (a) a bowl from Ferguson (3HE63), AAS# 824442; (b) a bowl from Cooks East (3HS106), AAS# 773125. Images used with the permission of the Arkansas Archeological Survey.

Rayed Circle Motif Distribution

In order to examine the distribution and relationship of the two suggested rayed circle motif varieties across space, a GIS was utilized where site coordinates allows for ceramics to be situated across the Caddo landscape. When examined spatially, some preliminary patterns are realized that can be more fully evaluated as additional ceramics continue to be included in the database.

Rayed Circle Burst Motif

Vessels with the rayed circle burst motif have been found at sites located along major rivers and tributaries, including Red River, Caddo River, Little Missouri River and tributaries, Antoine River, Mine Creek as a tributary to the Little River, Ozan Creek drainage in Hempstead County, a single vessel along the Lower Ouachita in Union County (Boyt's Field), and a single vessel along the Sulphur River (Old Moore Place) in Texas (Figure 6). A simple distribution analysis reveals that rayed circle burst vessels are clustered primarily in two areas: (1) along the Red River in southwest Arkansas (Cluster 1) and (2) northeast of the Red River along the Caddo, Little Missouri, Saline tributary, and Ozan Creek drainage in south-central Arkansas (Cluster 2). Forty-one (48 percent) rayed circle motif vessels are located within Cluster 1 and 32 (38 percent) are located in Cluster 2. In terms of the number of sites represented, eight sites in Cluster 1 contain rayed circle burst vessels whereas 13 sites in Cluster 2 are represented. Cluster 1 contains a greater number of rayed circle burst vessels yet they exist in more concentrated occurrences at less sites. For example, the total number of vessels found at Battle Mound and Haley Place constitutes 49 percent of the vessels in Cluster 1 and 25 percent of the entire rayed circle burst corpus.

The concentration of rayed circle burst vessels in Cluster 1 can be further evaluated using a standard distance statistical algorithm. The 2-standard deviation distance analysis reveals a distributional radial distance of approximately 45 km (see Figure 6). This preliminary analysis also reveals the location of sites outside the initial 2-standard deviation distance analysis and external to the two proposed cluster areas (using the current corpus). They include vessels from Robinson Mound (3CL30) on the Caddo River, Boyt's Field (3UN13) in Union County along the Lower Ouachita, the Belcher site further south on the Red River, and Old Moore Place (41CS5) along the Sulphur River in northeast Texas. The Bowman site, although located within the statistical area, is included with this group because it is situated some distance upriver from Cluster 1. Initial observations show that the Belcher site, with its locational relationship to sites further upstream, has a bottle with the primary rayed circle burst motif that is almost identical to a bottle from Battle Mound (see Figure 2a).

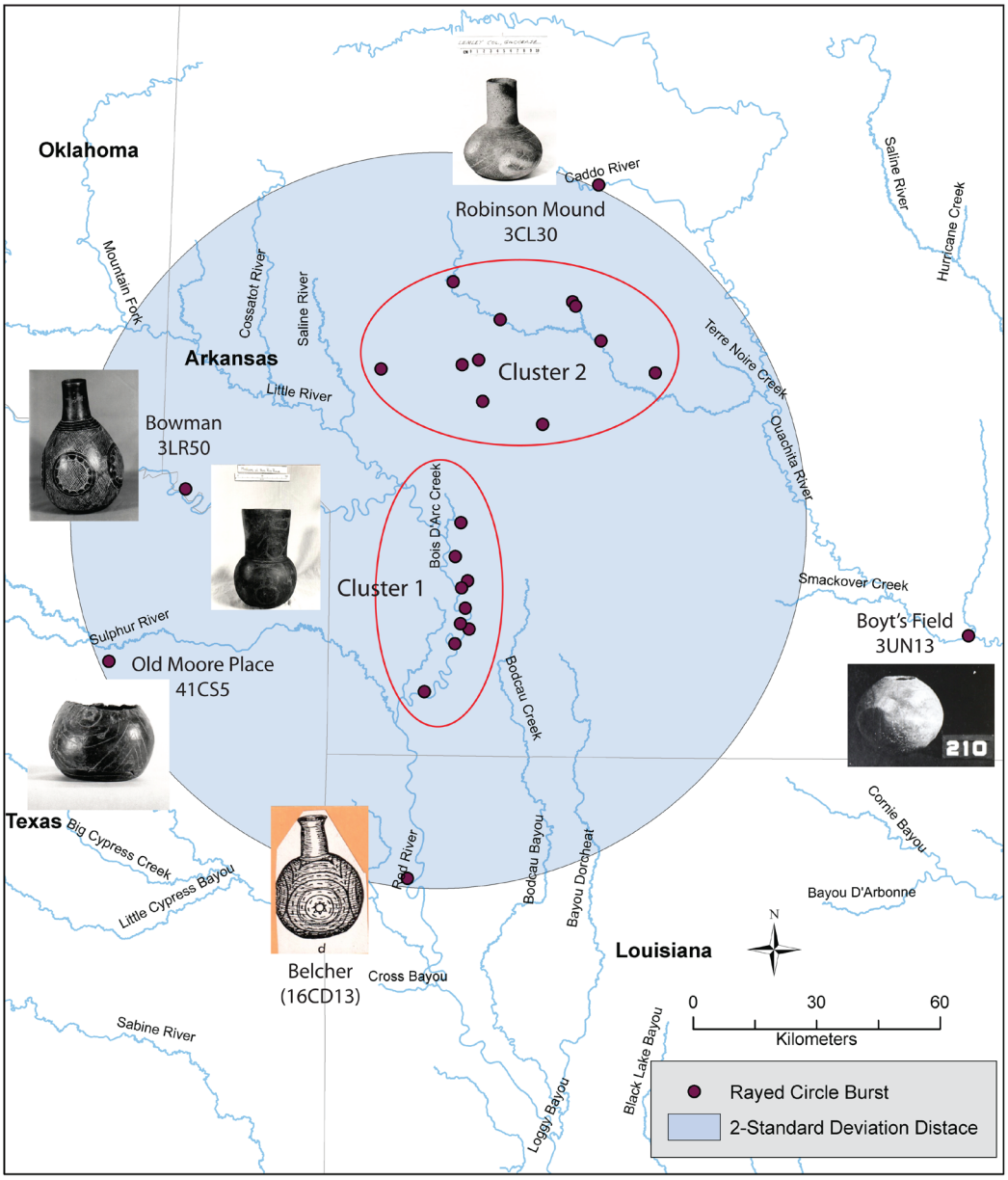

Figure 6. Distribution of the Rayed Circle Burst motif with results from a 2-standard deviation distance analysis. Outliers are shown as images of vessels. Images of outlier vessels used with the permission of the Arkansas Archeological Survey.

Rayed Circle Overhead Motif

The distribution of the rayed circle overhead motif is much more dispersed than the clustered rayed circle burst motif occurrences (Figure 7). There are no visible clusters and the motif is well represented throughout the major rivers and associated tributaries, although occurrences are more prevalent at sites northeast of the Red River along the Caddo, Little Missouri, Ouachita, Saline tributary, and Ozan Creek drainage in southeast-central Arkansas. Using a standard distance spatial statistical algorithm reveals a distributional radial distance of approximately 50 km (see Figure 7). The majority of sites are within the 2-standard deviation distance and consistent with the broadly distributed corpus and lack of cluster areas. Using the current database, the Noble Lake (3JE19) site in Jefferson County is shown outside the 2-standard deviation and situated along the Arkansas River. The Poole (3GA3) site is located in Garland County along the Upper Ouachita River and on the edge of the statistical boundary (Wood 1981).

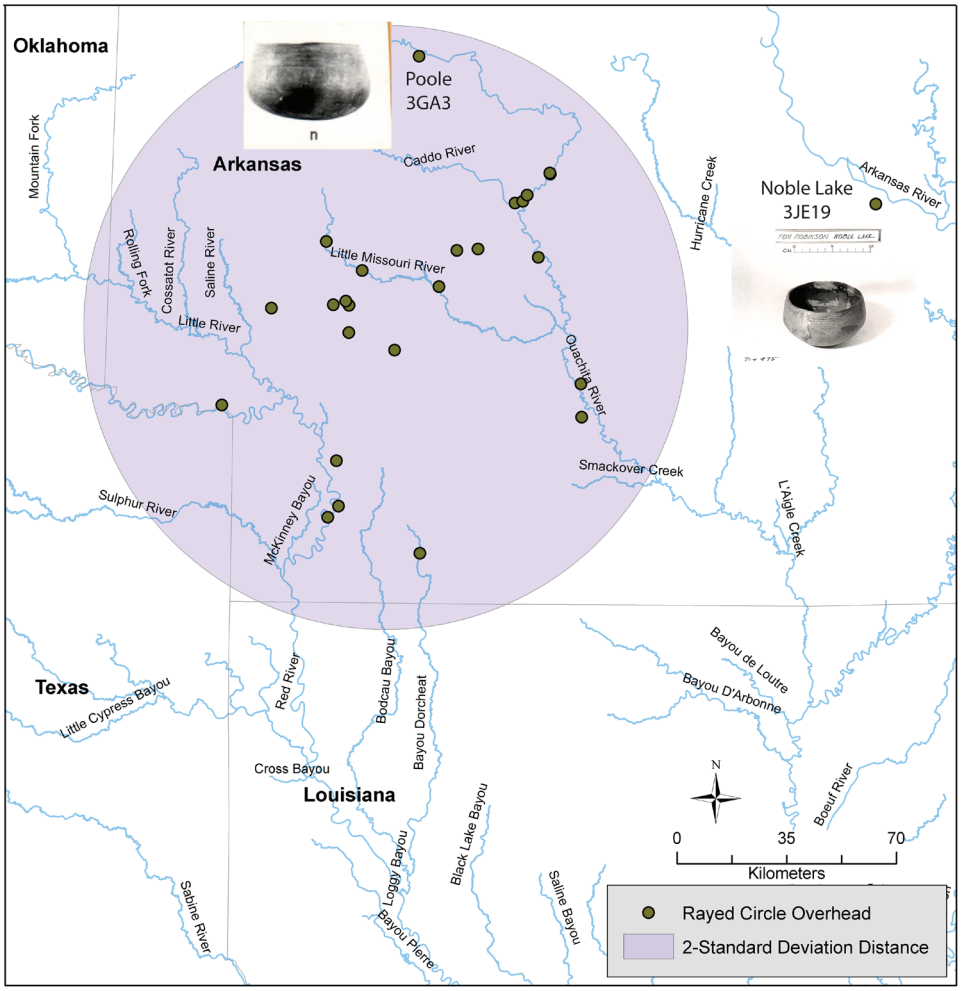

Figure 7. Distribution of the Rayed Circle Overhead motif with results from a 2-standard deviation distance analysis. Outliers are shown as images of vessels. Images of outlier vessels used with the permission of the Arkansas Archeological Survey.

Unlike the variation in design that is apparent in the initial rayed circle burst outliers, the rayed circle overhead outliers at the Noble Lake and Poole sites are identical in design to those within the 2-standard deviation distance. The Noble Lake site is part of the Menard Complex (A.D. 1400 – 1700) as a series of sites situated along the lower Arkansas River and at the confluence of the Mississippi (House 1995). This Noble Lake vessel was originally documented as "anomalous" (House 1995:Figure 39), although surface collections and excavated material contain some recognizable Caddo styles that demonstrate "evidence of [Menard Complex] interaction with the Caddoan area" (House 1995:90; see also House 1997; Walker 2014). The second outlier is at the Poole site where archaeological investigations document a long history of Fourche Maline and Caddo occupations (Wood 1981). Tangential to this case study, but interesting enough to highlight, is the observation made by Wood of a single "seed jar" found at the Poole site (Upper Ouachita) and common in the Middle Ouachita region (Wood 1981:57). I diverge on this because a Caddo style "seed jar" was also found at the Noble Lake site (Arkansas Archeological Survey, Fayetteville, Arkansas [AAS], Site file [SF] 3LJE19).

Rayed Circle Burst and Overhead Motif Relationships

When the distribution of the two motifs are overlain and examined across space, an interesting spatial patterning is observable (Figure 8). The combination of motifs reveals a possible corridor of sites in the proximity of Little Missouri, Ozan Drainage, and Caruse Creek. Initial observations hint at cultural

dispersal of the rayed circle overhead motif from the northeast and the rayed circle burst motif from the southwest, with the combination of both representations situated at sites of regional influence and exchange in the corridor between. Sites containing both motifs within this corridor include Murf Davis (3PI13), Stokes Mound (3PI17), and Hayes Mound along the Little Missouri drainage, Mineral Springs, Flowers, Jim Cole (3HE59), and Washington Mound along the Ozan Creek drainage, and Ferguson along Caruse Creek. The Lester (3LA38) and Battle Mound sites along the Red River also contain both motif varieties. While preliminary observations are clearly tentative based on the vessels included in the database thus far, the presence of both motifs at a few sites between the Ouachita River and Red River drainages is interesting and will require further analysis. Initially, the distributional analysis does not support the suggestion, as noted above, that the two motifs (and associated ceramic forms) represent an understood set with shared meanings and usages. In other words, the two are not represented equally at sites throughout the Caddo area. Yet, when considering biases in collection and current database, if these two motifs indeed represent a ceramic set then why is this combination limited to the possible corridor?

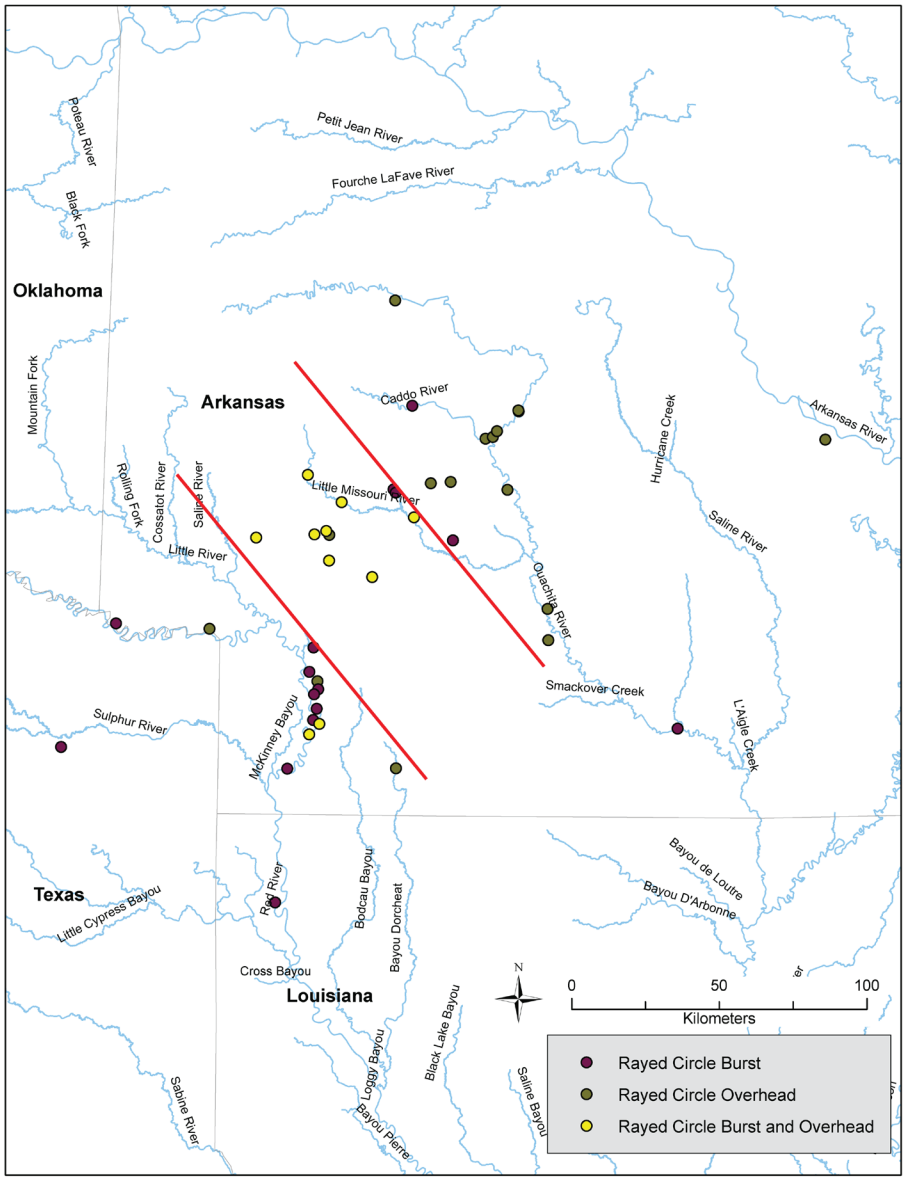

Figure 8. Distribution of both Rayed Circle Burst and Rayed Circle Overhead motifs and their spatial relationships. Note the possible corridor of sites in the proximity of Little Missouri, Ozan Drainage, and Caruse Creek.

Closing Statement

This second GIS case study offers some points to explore and refine with regard to spatial relationships of proposed rayed circle motif variations across the Caddo landscape. As research and evaluation continues and evolves, a primary concern in this initial phase is the broad nature of the temporal information with many sites lacking the much needed absolute dating to firmly organize their occupational history into a cultural landscape chronology. In order to examine cultural distribution of design and associated ideological influences, a more specific chronology will need to be developed. This will be challenging, but potentially feasible, since many of the vessels do not contain intrasite provenience and are restricted to broader relative dating techniques.

A second concern is the somewhat subjective and biased nature of the ceramic corpus. For example, the limited two-dimensional visibility of the vessels with the use of photographs prohibits an analysis of the entire vessel design. Furthermore, the current corpus is developed from incomplete or selective data gathered by collectors. The need to broaden the database to include vessels in publications as well as adjoining states is an important next step. The inclusion of vessels from east Texas and northeast Arkansas will greatly elucidate suppositions about cultural dispersal and influences related to the possible corridor that this initial case study suggests.

These two concerns are noteworthy and important to consider moving forward. Nonetheless, this case study demonstrates the value of spatial analysis to visualize cultural patterns. Results can be dynamically examined and integrated into other spatial layers, questions proposed, and analyses refined as additional data are included and re-evaluated. In this instance, initial observations offer visual considerations of influence and exchange at sites in Arkansas, where the rayed circle motif is present. These observations suggest a possible distinction of motif use and expression that can be tested further. As is the nature of scientific research, results often propose more questions than answers. This is a good thing. These results provide a framework to ask more specific questions, not only about the material objects themselves, but also about "how people create worlds for themselves and how these change overtime" in the context of "the lived experience of place" across a broad cultural landscape (Gosden 1999:153).

Acknowledgements

Thanks to the contribution of many individuals, including Dr. Ann Early, her students and employees from Henderson State University, including (the now) Drs. Mary Kay Sandford and David B. Kelley, Arkansas Archeological Survey photographer Dan Printup, University of Arkansas Museum photographer Mary McGimsey, Dr. Frank Schambach, and many others for taking all the photographs of vessels. Two anonymous reviewers provided valuable comments and suggestions to this paper. An original version of this report was presented at the 2013 meeting of the Arkansas Archeological Society held in Conway, Arkansas.

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How the ji'kmaqn Came to Spiro: Possible Additions to the Inventory of Sound-Making Instruments Depicted in the Spiro Engravings

James A. Rees, Jr.

Abstract

While doing research on turtle shell rattles the author stumbled onto a photograph of a rare and unusual idiophone whose exact likeness appears twice in one of the engraved shell images from Spiro. This paper describes the instrument and the Spiro image and discusses how an instrument currently found only in the Maritime Provinces of Canada may have come to be portrayed on a marine shell cup found at Spiro.

Several years ago I attempted to do an inventory of all the sound-making instruments depicted in the Spiro shell engravings or at least those included in the sample published by Phillips and Brown (1978, 1984) in the late 70s and early 80s. In doing that inventory I identified a number of sound-makers including idiophones (mostly rattles), membranophones (both vessel drums and hand held frame drums), and a few possible aerophones (2 flutes and a whistle). In addition to those instruments described in the published version of the inventory (Rees 2012), there were several other images that I suspected contained depictions of sound-makers but that needed further study. It was while doing research on these other possible sound-makers that I found the photograph of the instrument that is the focus of this paper (Figure 1).

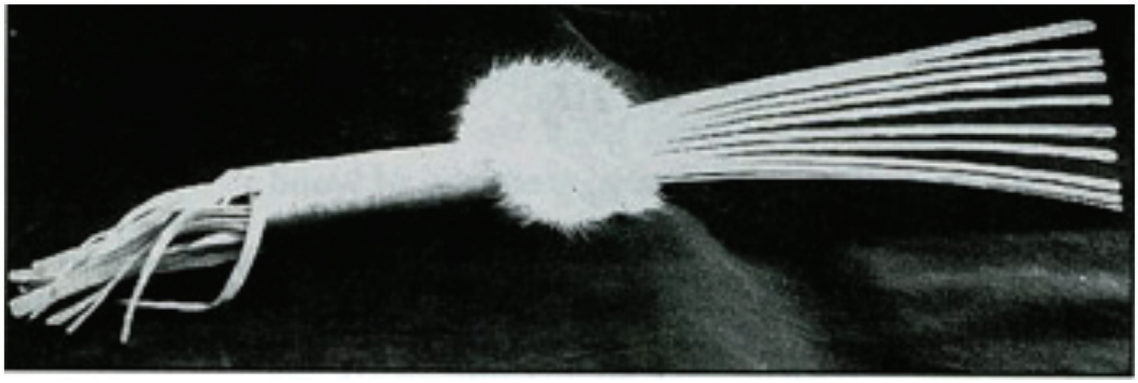

Figure 1. A ji'kmaqn or split-ash rattle (photo by Franziska von Rosen In Diamond et al. 1994).

As soon as I saw the photograph I remembered that something very similar to it appeared in one of the Spiro engravings. A brief search of Phillips and Brown (1984) led me to Plate 310 (Figure 2). The resemblance between the object seen here in Figure 1 and the objects held by the two anthropomorphic figures in the Plate 310 image is quite remarkable, even in details like the small pom-pom which separates the handle from the frayed end. In addition, the two anthropomorphic figures in the Spiro image appear to be striking the serpent–like pole between them with their instruments. This is a significant detail because this is how the instrument in the Figure 1 photo is played, by striking it against something.

However, there is more to the story than mere close resemblance. There are issues of time and space and context to be considered before suggesting that the objects in these two disparate images are the same

Figure 2. Detail of an image on a shell cup from Spiro (after Phillips and Brown 1984:Plate 310).

type of instrument. The principal obstacle to reaching such a conclusion is immediately apparent when you consider that the photo (see Figure 1) appears in a book about the musical instruments of the First Nations Peoples of the Maritime Provinces of Canada (Diamond et al. 1994). It is a sound-maker used today only by the Micmac peoples of Nova Scotia. In order to connect this instrument to the one in the Spiro image, many centuries of time and thousands of kilometers of distance must be explained. The balance of this paper will seek to do that.

The ji'kmaqn

In the language of the Micmac the instrument in the photo (see Figure 1) is known as a ji'kmaqn. The term ji'kmaqn is a generic term, which seems to refer more to the sound of sticks hitting together rather than to this particular instrument. In fact, the term is applied to several different related instruments (Diamond et al. 1994:75). In English the Micmac refer to this particular instrument as a split-ash rattle (Roger Lewis, personal communication) although technically it isn't a rattle.

The Micmac were traditionally a hunting and fishing people who extensively exploited their forested environment for the resources necessary to make tools, dwellings, containers and sea-worthy canoes (Whitehead 1980:8, 31). Early in historic times the Micmac became known for their fine ash splint basketry. Logs of white ash and black ash were cut and carefully split into long billets in which the rings of the wood were parallel to each other. These billets were then pounded, causing the wood to split along the ring lines into small splints which were then further processed and used to make baskets (Bardwell 1986:54-55; Whitehead 1980:54-65).

The process for making a split ash ji'kmaqn was essentially the same. A short billet of ash is pounded on one end to start the separation of the splints, leaving the other end as a handle. Notice how the instrument in Figure 3, which is approximately 38 cm long, has been pounded on one end and has split along the ring lines. Also notice how the splints, which are approximately 3 cm wide, separate nicely and splay out. This is necessary for producing a nice sound.

The Micmac use the split-ash rattle to accompany singing and dancing. The instrument is played by striking it against something. Micmac singers usually strike it against their hand or leg, but it can be struck against almost anything. The sound is produced when the splints are made to strike against each other, causing them to vibrate. The air space between them serves to amplify and resonate the sound.

According to von Hornbostel and Sach's (1961[1914]) instrument classification system the split-ash ji'kmaqn is a percussion idiophone, an instrument whose material is made to vibrate by striking it against something or by having it struck by something. In particular it is a type of percussion idiophone known as a clapper. Clapper type instruments appear to be very rare in the Americas (Izikowitz 1970:8-9), but two examples from North America other than the split-ash ji'kmaqn will be examined below. The closest thing to the ji'kmaqn in a modern orchestra is the rarely used slapstick.

Figure 3. A split-ash rattle in the making (photo courtesy of Roger Lewis, Nova Scotia Museum).

The Spiro Image

In order to determine if there is any possible connection between the instrument described above and those instruments appearing on the Spiro cup (see Figure 2), it will be necessary to take a close look at the Spiro image as it appears in the drawing in Phillips and Brown's 1984 book (Plate 310). Phillips and Brown placed this particular image in their Craig C style phase and also in a particular series of images, which they called dual, confronted figures. There are 16 of these dual confronted images (not counting ones too fragmentary to classify), which feature two anthropomorphic figures facing each other with some version of a pole between them. Ten of these, comprising the most standard version, show the two figures differing only in their facial decoration with a straight pole forked at the top between them. In the standard version one figure has a T-bar facial decoration and the other a wedge-mouth decoration. There are also six non-standard versions of the dual confronted series, and the Plate 310 image is one of these.

There are some unique features in the Plate 310 image (see Figure 2) which need to be examined. Obviously one unique feature is the presence of the instruments which are shown being used to strike the pole. There are no other images of similar instruments anywhere else in Mississippian iconography that I am aware of with the possible exception of Phillips and Brown (1984) Plate 124, which will be examined later.

Another unusual feature, which may help in determining what the instruments are being used for in this image, is the feet. Unlike many other images in this series which have downward pointing feet as if the figures are suspended in the air, the feet in the 310 image (see Figure 2) suggests that these figures are standing on the ground and the bent knee posture of the figure on the left may suggest dancing. In this regard it is worth comparing the 310 image to the one in Plate 309 (Figure 4), another of the non-standard images in the dual confronted figures series.

Figure 4. Image on a shell cup from Spiro now in the University of Arkansas Museum Collections. A version of this image also appears in Phillips and Brown (1984:Plate 309). Drawing courtesy of the University of Arkansas Museum Collections.

In the 309 image (see Figure 4) the figure on the left is in a posture that clearly suggests that he is dancing. It should be noted that the bent leg posture of anthropomorphic figures has been interpreted as dancing in other studies of Mississippian iconography (Reilly and Garber 2011:297, 299). Reinforcing this interpretation in the case of the 309 image is the fact that the dancing figure is holding a conventional rattle in his right hand. The presence of the dancing posture and the sound-making instrument in 309 may provide a kind of precedent for interpreting what is happening in 310 (that is dancing to the sound of idiophones).

Discussion

Now that we have looked closely at the split-ash rattle and the instruments in the Spiro image let me offer three possible ways to explain the resemblance between them:

The first possibility is that this is just a case of accidental resemblance and that the instruments in the Spiro image are not split-ash rattles and perhaps not even sound-makers but some other kind of implement, perhaps a weapon. We know that among some of the Dhegihan Siouan speakers such as the Omaha, the Osage and the Quapaw there were sacred pole ceremonies in which warriors would strike the pole probably with a weapon and recite their war deeds. On the other hand, according to some of the same ethnographic accounts, sound-making instruments such as drums and rattles were also present at these ceremonies sometimes in close proximity to the pole (Fletcher and La Flesche 1992 [1911]:231, 253-256).

It should be pointed out that in the Craig C dual confronted series none of the anthropomorphic figures are holding weapons and none of them are touching their poles with anything but their hands except for the two in Plate 310. The only object held by any of the other figures in the series is the rattle held by the dancing figure in 309.

A second possibility is that the objects seen in the Spiro image in Plate 310 are indeed split-ash rattles like the ones used today by the Micmac people. In order for this to be true a number of issues must be resolved such as the history of the split-ash rattle itself among the Micmac.

There is a controversy among scholars as to when exactly ash splint technology developed in the far Northeast and whether or not wood splint basketry was introduced into the area by Europeans or was indigenous. Some researchers point out that the earliest historical reference to ash splint baskets among the Micmac was in the early eighteenth century (Bardwell 1986:55-56) even though they had been in contact with Europeans since the late sixteenth century.

To counter that argument, others point out that wood splint technology was being used in the construction of dwellings and canoes much earlier. Prior to the arrival of Europeans the Micmac were making long voyages in their large birch bark canoes lined with cedar and/or ash splint ribs (Bardwell 1986:61; Whitehead 1980:55).

There is some archeological evidence for the early use of ash splint basketry in New England. Ash splint fragments including ash splint basket fragments have been found in four Seneca burial sites in western New York dating from 1565 to 1670. Although all of these sites had European trade goods, they were too remote from European settlement at the time to have been much influenced by European culture. Certainly these artifacts predate the 1712 date often given as the first historic reference to ash splint basketry in the Northeast and suggest an indigenous origin for wood splint technology (Bardwell 1986:58-60).

Whether or not ash splint baskets were made early on, people in the Northeast in Pre-Columbian times were exploiting the splitting properties of ash and other woods through pounding. Early European colonists did not use the pounding technique to make basket splints and indeed used types of wood that could not be split in this manner (Bardwell 1986:56-58). The knowledge of which types of native trees could be split by pounding seems clearly indigenous. Bardwell (1986:54) lists the following species as being pounded for basket splints: black ash (*Fraxinus nigra),* white ash *(Fraxinus americana),* red maple (*Acer rubrum),* and hickory (*Carya ovata).* Of these black ash was preferred in the Northeast, but had a limited range and set of

growing conditions. With the exception of black ash all of the other trees on this list are found widely across the eastern United States as far west as eastern Oklahoma and Texas (Kirkman et al. 2007; Moore and Sundell 2014).

In the Southeast split cane was the preferred material for basket making. However, pounding wood to make basket splints was also used. A Creek informant described to Swanton (1987 [1946]:605) how hackberry wood was sometimes pounded to make basket splints if no cane was available. Hackberry (*Celtis occidentalis)* is another tree species readily available in the Trans-Mississippi Southeast. Therefore the materials and possibly the pounding technique for making a split-wood rattle could have been known to the people who built the great mortuary at Spiro. However, at present, the only evidence for the existence of this instrument in the pre-Columbian Southeast is the 310 image itself. Further, there is no clear ethno-historical or ethnographic evidence for split-wood rattles outside of northern New England and eastern Canada. The only explanation for this is that these instruments which would not have preserved well in the archeological record once had a much wider distribution than they do today.

One piece of possible evidence supporting a wider distribution for the split-ash ji'kmaqn is language. The Micmac and many of their immediate neighbors speak an Algonkian language. In fact, many tribes to the south and west of the Micmac like the Shawnee, the Illinois, and the Ojibwa also spoke Algonkian languages. To the extent that material culture can be said to shadow or track the spread of a language family, then it might lend some credence to the idea that the split-ash rattle once had a much wider distribution.

There is growing evidence that beginning in the eleventh century the Cahokia phenomenon attracted immigrants and perhaps pilgrims from a wide area (Pauketat 2013:159-160). This surely included many Algonkian speakers who no doubt contributed to the religious movement that in turn spread from Cahokia to places like Spiro. As evidence for this, I need only point to the recent scholarship of George Lankford (2007a, 2007b) who often uses Algonkian mythology and cosmology as sources for interpreting Mississippian iconography.

The third and final possibility I would like to examine is that whereas the split-ash rattle may not have had much of a presence in the Mississippian world some other instrument looking and sounding very much like it may have existed and that it is this instrument we see portrayed in the Plate 310 image from Spiro. There is in fact some very scant ethno-historical and ethnographic evidence for this.

In 1699 Piere LeMoyne D'Iberville spent time with Houma Indians near the mouth of the Red River in Louisiana. The Houma were apparently a band of Choctaws who had recently moved west of the Mississippi. D'Iberville described an all night dance he witnessed which was accompanied by the sound of two "sticks" being struck together (Swanton 1911:287). There is no description of these sticks, but at the very least they constitute a type of clapper (Izikowitz 1970:8) and may have been some version of a split-wood rattle.

In the early twentieth century the photograph seen in Figure 5 was taken by ethnomusicologist Francis Densmore (1932:Plate 22) in Southwest Arizona. The photo is of a Yuma Indian drum set. The basket is the drum. The Yuma are one of several tribes in the Southwest who use basket drums. The Yuma don't make baskets and their neighbors the Papago don't make pottery. So, the Yuma trade pots to the Papago for baskets. The custom of using them as drums came to the Yuma from the Papago along with the baskets. However, instead of playing their basket drums only with their bare hands like the Papago, the Yuma also play them with sticks and bundles of arrow weed. It is these bundles that are of interest here because they are clappers and produce sound in a similar way to the split- ash ji'kmaqn. They also somewhat resemble the instruments in the 310 image from Spiro. One can imagine such instruments comprised of bundles of sticks, reeds, or cane culms having a wide distribution from the Southwest across the southern plains and into the Mississippi valley.

With this in mind it may be worth looking at another Spiro image from Phillips and Brown (1984) mentioned earlier, Plate 124. This image appears on a shell gorget and depicts an anthropomorphic figure with both legs bent at the knees suggesting motion, perhaps dancing. In his left hand the figure holds an

object, which has been variously interpreted as the end of his long hair, a fan, or some other object. This object very much resembles the reed bundle clappers seen in Densmore's photograph (see Figure 5). If the figure is indeed dancing, then the context is perfect for this object to be a clapper type sound maker.

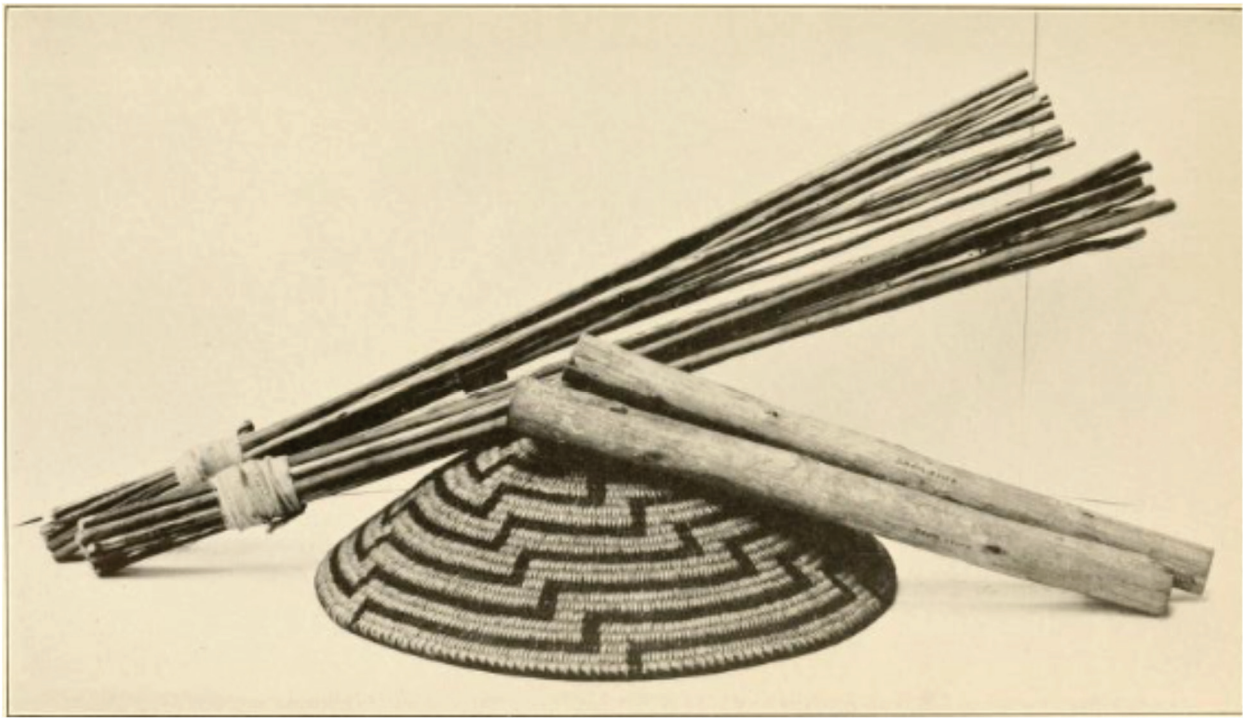

Figure 5. Plate 22 from Densmore (1932).

Conclusion

Phillips and Brown (1984:Plate 310) offered no serious interpretation of the implements wielded by the figures in Plate 310 even jokingly suggesting that they were some sort of futuristic outer space weapon (light sabers?). However, considering the strong resemblance of these instruments to ethnographic examples and their association with what appears to be a dancing anthropomorphic figure it is quite likely that they are indeed clapper type sound-makers, and perhaps even split-ash ji'kmaqns similar to those still used by the Micmac. A more definitive conclusion awaits further evidence.

Acknowledgments

I would like to thank Roger Lewis, Curator of Ethnography at the Nova Scotia Museum in Halifax, for the photo that appears in Figure 3. Special thanks go to Franziska von Rosen for permission to use the photo in Figure 1. I would also like to thank Jarod Pebworth for making a split-wood rattle for me to experiment with.

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Ouachita Mountains Foodways: Preliminary Results from 2013-2014 Excavations at 3MN298

Mary Beth Trubitt, Leslie L. Bush, Lucretia S. Kelly, and Katie Leslie

New excavations in the Ouachita National Forest in west-central Arkansas, co-directed by Meeks Etchieson and Mary Beth Trubitt, are resulting in significant information about foodways of ancestral Caddo Indians living in the Ouachita Mountains region. This work has focused on the Dragover site (3MN298), located on a floodplain of the upper Ouachita River (Figures 1 and 2). Artifacts from this extensive archeological site indicate use from about 6000 B.C. to the A.D. 1900s, but it was its potential for well-preserved organic material – animal bone, mussel shell, and charred plant seeds – that drew our research attention. Initial site testing in the 1980s uncovered several pit features with pottery sherds, chipped stone, animal bone, and mussel shells (Bennett et al. 1986). Later analysis of ceramics from those features indicated a Buckville phase Caddo occupation estimated to fall in the sixteenth century A.D. (Perttula 2009). Planting pine trees caused some damage to the site; one motivation for this project was the need for a current site evaluation so the Ouachita National Forest could better manage this historical location.

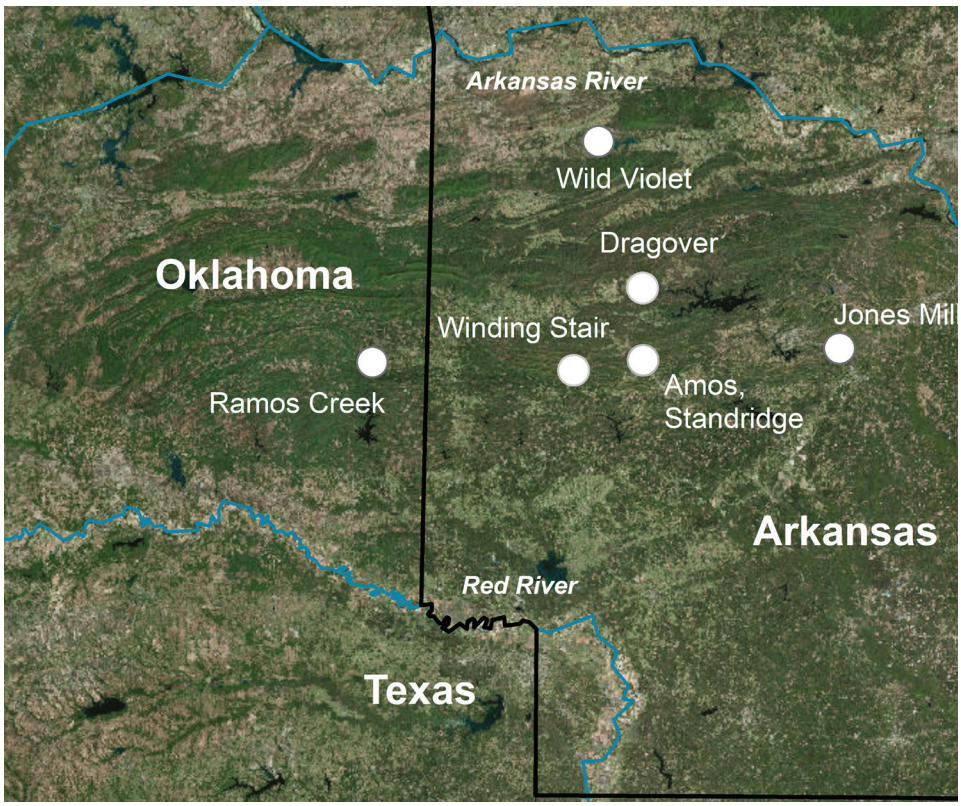

Figure 1. Location of Dragover and other archeological sites in the Ouachita Mountains region mentioned in text (map by Katie Leslie; base map uses World Imagery map layer from Environmental Systems Research Institute, Inc., and ESRI ArcGIS ArcMap 10.2.2).

Figure 2. View of Ouachita River in Montgomery County, Arkansas (photograph by Mary Beth Trubitt). The Central Hills, Ridges, and Valleys ecoregion of the Ouachita Mountains, formed by folded and faulted layers of sandstone, shale, chert, and novaculite, is characterized by oak-hickory-pine forest (Foti and Witsell 2013; Woods et al. 2004).

Etchieson and Trubitt (2013; Trubitt and Etchieson 2014) set out a research plan that included questions about tool stone choice, plant domestication, social identity, and culture change during the expected Archaic, Woodland, and Caddo period occupations. Excavations were conducted as a cooperative endeavor between the Arkansas Archeological Survey, the U.S.D.A. Forest Service, and the Arkansas Archeological Society, with fieldwork accomplished as part of the 2013 and 2014 Society Training Programs. Key to this research has been recovering and analyzing pottery and stone tools, architectural evidence, and food remains to interpret patterns or habits of daily life in the ancient communities. Our larger research goal is to understand relationships between Caddo Indian communities in the Ouachita Mountains and communities further away in the Arkansas and Red river valleys.

Since finishing the fieldwork, we have processed soil and flotation samples and begun analyzing artifacts, and we have received results from radiocarbon dating and specialized analyses funded by the U.S.D.A. Forest Service and by three Archeological Research Fund grants from the Arkansas Archeological Society. Preliminary results have been presented at conferences and published in several short articles (Hanvey 2014; Trubitt et al. 2014), and a summary of the dating results is anticipated (Trubitt and Leslie 2016). A children's book based on the 2013 excavations, funded by an Arkansas Heritage Month grant, was produced and distributed to area schools (Ouachita Chapter 2014), and a short description of the project appears in the "Current Research" section of the Arkansas Archeological Survey's website (Trubitt and Leslie 2015). Here, we present a summary of new findings on Caddo and pre-Caddo foodways based on Dr. Leslie Bush's archeobotanical analysis and Dr. Lucretia Kelly's zooarcheological analysis from selected cultural features at this important site.

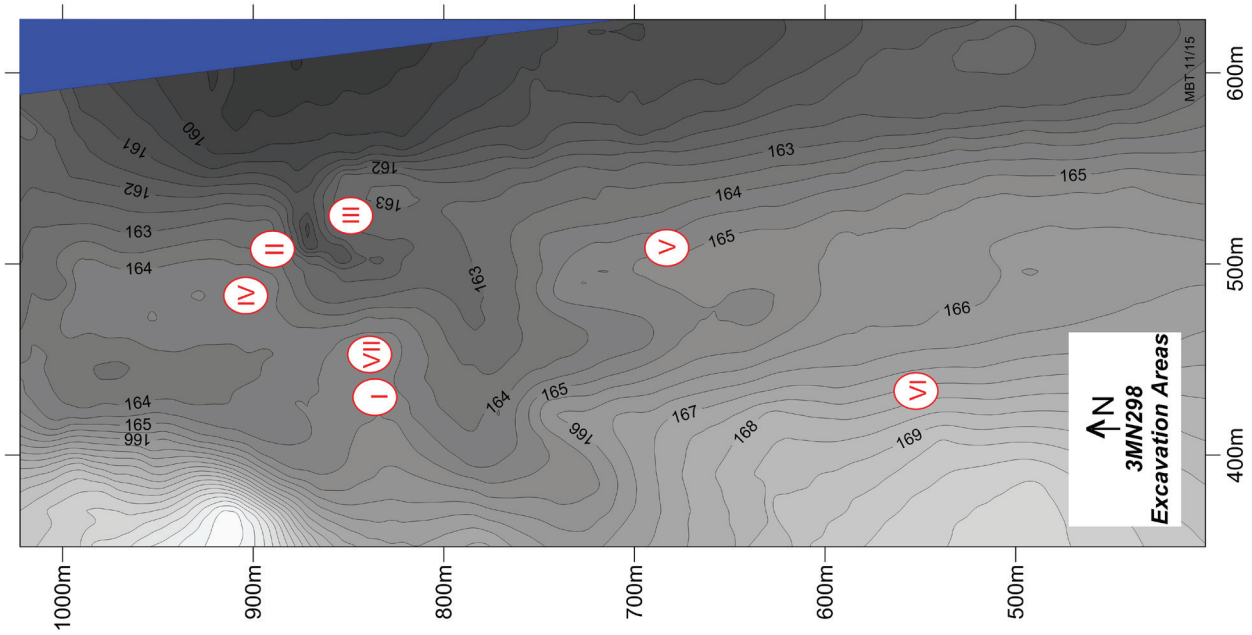

Figure 3. In 2013 and 2014, a total of 219 m2 was excavated in seven areas of the site. chert, and novaculite, is characterized by oak-hickory-pine forest (Foti and Witsell 2013; Woods et al. 2004).

Our excavations revealed cultural features such as clusters of fire-cracked rock (FCR) from dismantled cooking facilities, trash-filled pits, fire pits or hearths, and lines of postholes indicating house walls in six of the seven excavation areas (Figure 3). Soil samples from excavated features were processed using water flotation, and charred plant fragments identified by Leslie Bush were selected for radiocarbon dating. Eleven samples from features have been analyzed by Beta Analytic, Inc., using the accelerator mass spectrometry (AMS) technique, providing temporal detail on four main components or site occupations (Table 1 and Figure 4) (Trubitt and Leslie 2016). Late Archaic period use of the site is indicated by two dates from FCR clusters excavated in Area IV. A posthole, also in Area IV, yielded a Middle Woodland period date. A hearth or fire pit with burned clay and ash (F-82), now dated to the Late Woodland period, was uncovered in Area V (Figure 5). Six AMS dates establish a Late Caddo period component at the site. One of the postholes (F-71) associated with Structure 1 in Area V gave a date with a median probability of A.D. 1416. A large pit (F-97) in Area VII (Figure 6), filled with refuse including shell-tempered ceramic sherds and well-preserved animal bone and mussel shell, had an AMS date with a median probability of A.D. 1503. A portion of this feature had been dug and backfilled during the 1985 testing (as their Feature 3; Bennett et al. 1986). A line of postholes and a nearby hearth/burned clay concentration in Area I was designated Structure 2 (Figure 7); a combined sample of two AMS dates from features associated with Structure 2 has a median probability of A.D. 1560. A large trash-filled pit (F-11) excavated in Area I returned a date with a median probability of A.D. 1663 (but calibrated date ranges extending into the twentieth century). Further analysis will clarify the features assigned to each of these components and refine temporal interpretations. Here, we summarize the botanical analyses from the early (Archaic and Woodland periods) and late (Caddo period) components, and the analysis of animal bone from one Caddo period pit feature.

Provenience/Context	*Carbonized Material, Isotope Ratio (d13C)*	*Conventional Age*	*Calibrated Date, 2 sigma (95.4%) Probability*	*Median Probability*
Late Archaic period:				
Area IV, F-2 FCR cluster, 2013-325-31, Beta 402612	hickory nutshell, -25.3 o/oo	3800 +/- 30 BP	cal BC 2339-2139 (95.4%)	cal BC 2238
Area IV, F-27 FCR cluster, 2013-325-33, Beta 386085	hickory nutshell, -25.8 o/oo	3720 +/- 30 BP	cal BC 2201-2031 (95.4%)	cal BC 2106
Late Archaic Combined (n=2)		3760 +/- 22 BP	cal BC 2280-2249 (9.5%), 2231-2219 (2.0%), 2213-2131 (78.0%), 2085-2057 (6.0%) [T=3.6, .10 > p > .05, df=1]	cal BC 2172
Middle Woodland period:				
Area IV, F-34 posthole, 2013-325-56, Beta 402613	hickory nutshell, -25.1 o/oo	2140 +/- 30 BP	cal BC 353-295 (19.5%), 230-220 (1.5%), 213-88 (71.2%), 77-57 (3.2%)	cal BC 179
Late Woodland period:				
Area V, F-82 hearth, 2013-326-120, Beta 404379	pine bark, -26.9 o/oo	1280 +/- 30 BP	cal AD 662-774 (95.4%)	cal AD 720
Area V, F-82 hearth, 2013-326-122, Beta 386086	squash flower scar, -25.5 o/oo	1200 +/- 30 BP	cal AD 715-744 (6.2%), 765-895 (87.8%), 928-940 (1.4%)	cal AD 825
Feature 82 Combined (n=2)		1240 +/- 22 BP	cal AD 687-779 (69.8%), 790-870 (25.6%) [T=3.6, .10 > p > .05, df=1]	cal AD 743
Late Caddo period:				
Area V, F-71 posthole (Str. 1), 2013-326-100, Beta 404378	squash rind, -25.6 o/oo	520 +/- 30 BP	cal AD 1324-1345 (10.5%), 1393-1443 (84.9%)	cal AD 1416
Area V, F-38 pit, 2013-326-65, Beta 364859	corn cupules, -9.6 o/oo	420 +/- 30 BP	cal AD 1427-1515 (87.9%), 1598-1618 (7.5%)	cal AD 1460
Area VII, F-97 pit (zone 4), 2014-338-75, Beta 405442	corn cupules, -9.7 o/oo	380 +/- 30 BP	cal AD 1445-1524 (61.6%), 1558-1632 (33.8%)	cal AD 1503
Area I, F-167 hearth (Str. 2), 2014-336-62, Beta 422032	corn kernel, -9.8 o/oo	370 +/- 30 BP	cal AD 1447-1528 (55.0%), 1553-1634 (40.4%)	cal AD 1515
Area I, F-122 posthole (Str. 2), 2014-336-19, Beta 422031	black walnut shell, -27.0 o/oo	330 +/- 30 BP	cal AD 1477-1643 (95.4%)	cal AD 1562
Structure 2 Combined (n=2)		350 +/- 22 BP	cal AD 1461-1529 (42.0%), 1543-1635 (53.4%) [T=0.9, .50 > p > .20, df=1]	cal AD 1560
Area I, F-11 pit, 2013-322-32, Beta 364858	corn cupules, -9.9 o/oo	240 +/- 30 BP	cal AD 1526-1557 (5.7%), 1632-1682 (51.9%), 1738-1751 (1.3%), 1762-1803 (29.5%), 1937- (7.1%)	cal AD 1663

Table 1. Results of 3MN298 AMS dates. Conventional radiocarbon ages were reported by Beta Analytic, Inc., based on measured radiocarbon ages corrected for isotopic fractionation using delta 13C, and calibrated using the OxCal 4.2 program (Bronk Ramsey 2009, 2015; Reimer et al. 2013). Several groups of dates were combined or averaged using OxCal after testing for statistical difference (Drennan 1996:Table 13.4; Ward and Wilson 1978; see also Samuelsen 2014; Selden and Perttula 2013).

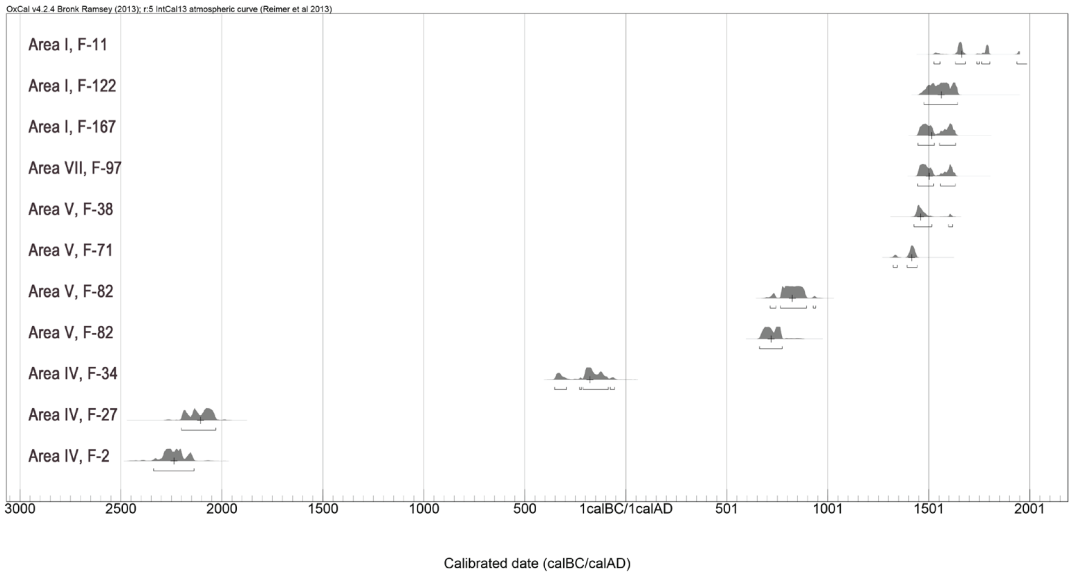

Figure 4. Calibration probability curves (2 sigma) for 11 AMS dates from Dragover (3MN298) features, calibrated using the OxCal 4.2 program and the IntCal13 curve (Bronk Ramsey 2009, 2015; Reimer et al. 2013).

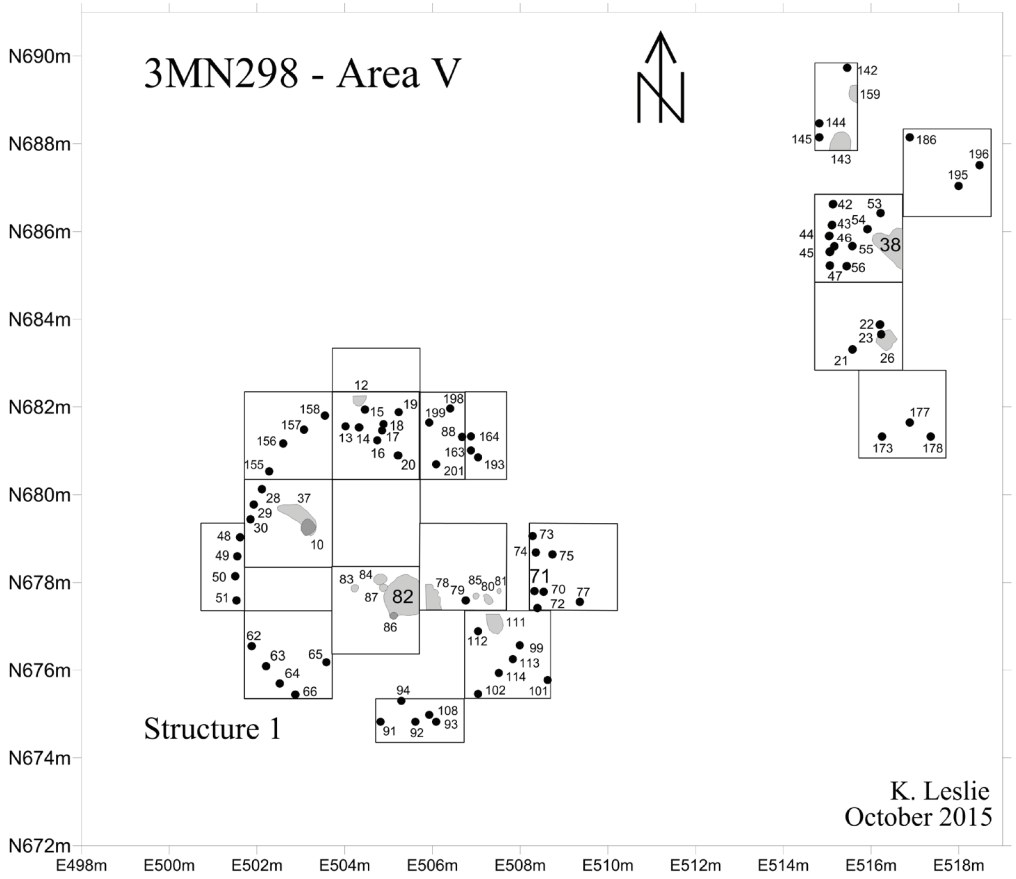

Figure 5. Feature plan for 3MN298 Area V excavations (larger numbers indicate dated features).

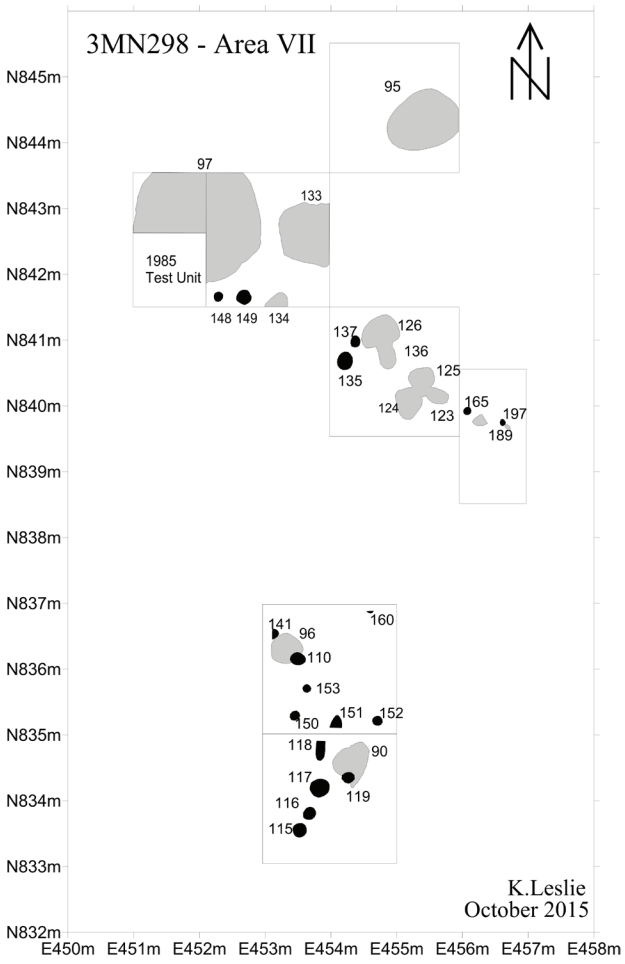

Figure 6. Feature plan for 3MN298 Area VII excavations. The southwest portion of Feature 97 had been dug and backfilled in 1985, but rest of this large pit was excavated as flotation samples in 2014.

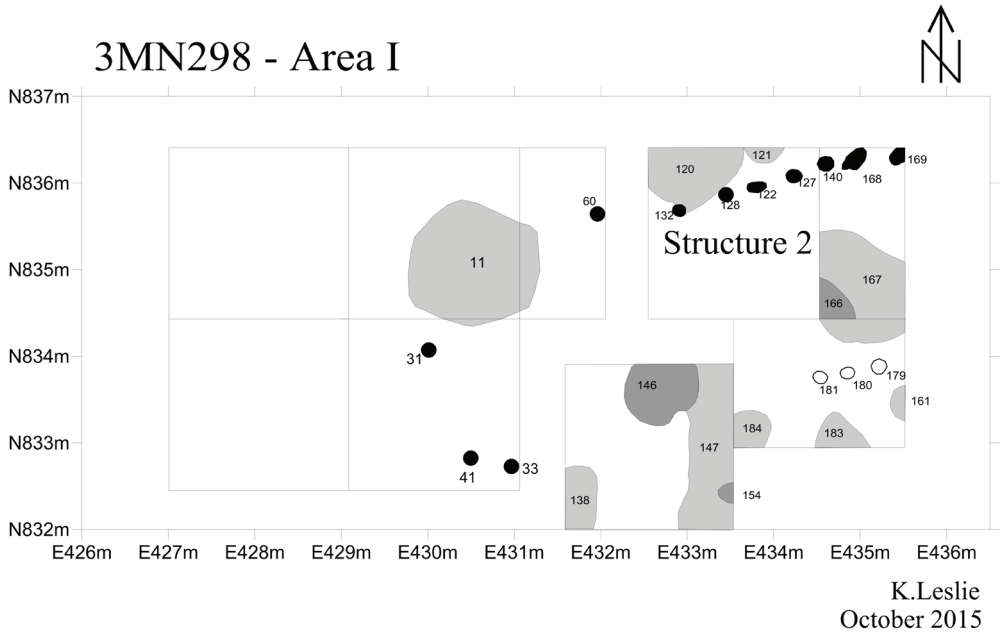

Figure 7. Feature plan for 3MN298 Area I excavations.

Methods

Flotation samples from the Dragover site were processed in the field lab during the 2013 and 2014 Society Training Programs or at the Arkansas Archeological Survey's Henderson State University Research Station in a SMAP-type machine (Figure 8). Carbonized material from selected features was removed from the heavy fractions and sent to Macrobotanical Analysis along with the flotation light fractions. Funding is always limited, and a priority list of key features (pits, hearths and structure postholes, and FCR clusters) from 2013 excavation areas was drawn up by Mary Beth Trubitt for botanical analysis and dating. Well-preserved faunal material was found only in a few of the Area VII features excavated in 2014, with pit Feature 97 (Figure 9) the only context yielding a significant amount of preserved bone. A sample of animal bone sorted from heavy fraction flotation samples excavated from the west half of Feature 97 was selected by Mary Beth Trubitt and Katie Leslie, and conveyed to Lucretia Kelly for analysis. Excavation of this portion of the pit was by depth (zones 1-6 and basal), and the analysis included samples from each zone except the uppermost (possibly disturbed) zone. Mussel shell from the same feature is currently undergoing analysis by Robert Scott (Arkansas Archeological Survey) and will be reported in a future publication. A small sample of carbonized botanical material from Feature 97 has been analyzed by Leslie Bush and is included here.

Figure 8. Katie Leslie processes soil samples from 3MN298 features using water flotation method at the Survey's HSU Research Station (photograph by Mary Beth Trubitt). The "heavy fraction" was caught on 1.0 mm mesh screen in the tank and the "light fraction" flowed out to be caught in the 0.25 mm mesh.

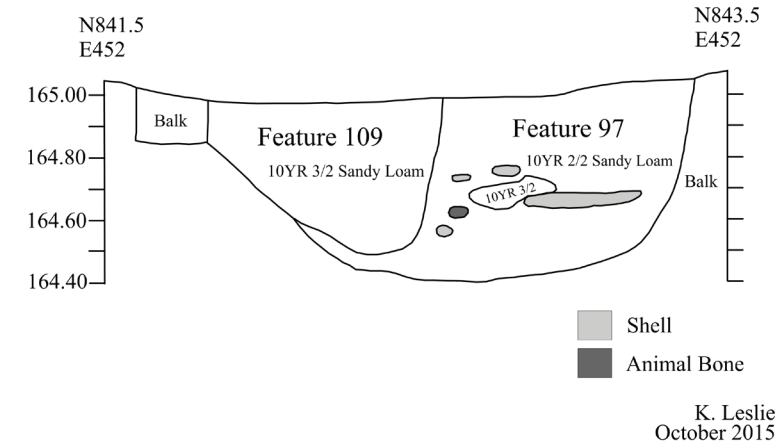

Figure 9. Profile of Feature 109 (representing backfilled test unit) and Feature 97 (refuse pit with well-preserved faunal material).

Twenty-six flotation samples representing 638.5 cubic decimeters ("liters") of fill from 20 features were sorted according to standard procedures at the Macrobotanical Analysis laboratory in Manchaca, Texas (Pearsall 2000). Heavy and light fraction materials were combined prior to size-sorting through a stack of graduated geologic mesh for ease of identification. Materials that did not pass through the No. 10 mesh (2 mm square openings) were completely sorted under a microscope at 7-45 X, and all carbonized and semi-carbonized botanical remains were counted, weighed, recorded, and labeled. Materials that fell through

the 2 mm mesh ("residue") were examined for carbonized and semi-carbonized botanical remains not previously identified in the larger size fraction. Wood charcoal identification was attempted for 20 specimens selected at random from those larger than 2 mm from each sample. Botanical materials were identified to the lowest possible taxonomic level by comparison to materials in the Macrobotanical Analysis comparative collection and through the use of standard reference works (e.g., Core et al. 1979; Davis 1993; Hoadley 1990; InsideWood 2004-onwards; Martin and Barkley 1961; Panshin and de Zeeuw 1980; Wheeler 2011). Plant nomenclature follows the PLANTS database (USDA, NRCS 2015).

All animal bone in this study was identified by direct comparison to modern osteological collections in Lucretia Kelly's laboratory or housed at the Illinois State Museum Records and Research Facility in Springfield, Illinois. Identification of the faunal remains was made to the most specific taxonomic level possible, given the completeness and portion of the bone present. Nomenclature follows the Integrated Taxonomic Information System (www.itis.gov). If a bone could be only tentatively identified to a certain taxon, it was given a "cf." designation. As is common in zooarcheology (Driver 1992; Reitz and Wing 2008; Uerpmann 1973), when a mammal or bird bone cannot be identified to a taxon more specific than class, it is placed in a size category where possible. The categories of large, medium, and small are based on the size of the major bones in a skeleton. For each bone identifiable to the level of class or to a more specific taxon, recorded information included element name, side, portion present and completeness, epiphyseal fusion, tooth wear and eruption, and type and placement of modification (weathering, gnaw marks, cut marks, staining, and burning). For the deer bone, locations of cut marks were recorded to aid interpretation of butchery techniques. Epiphyseal fusion and tooth eruption and wear can be used to calculate the relative age of deer (Gilbert 1990; Purdue 1983; Reitz and Wing 2008; Severinghaus 1949).

Following standard zooarcheological quantification practices, both NISP (number of identifiable specimens) and MNI (minimum number of individuals) are used here. For NISP, if two or more fragments could be glued or fitted together, they were counted as one (except teeth are counted separately even if still in the mandible or maxilla, for possible calculation of food utility indices). MNI was figured for each species for the feature as a whole because of potential mixing throughout the feature. MNI was calculated by counting the most frequently-occurring element after dividing lefts from rights. Completeness, portion, age, and, in some cases, size were taken into consideration.

Results: Botanical Remains from Early Components in Areas II, IV, and V

Fifteen flotation samples (302.4 cu. dm.) from ten features from Areas II, IV, and V were analyzed for macrobotanical remains (Table 2). Seven of these are interpreted as Late Archaic or Woodland period (Fourche Maline) features, including several that have now been AMS dates (two FCR clusters from Area IV with a combined median probability of 2172 B.C., a posthole from Area IV with a median probability of 179 B.C., and a hearth from Area V with a combined median probability of A.D. 743). Three additional postholes from Area IV that may be from either Fourche Maline or Caddo components are also discussed here based on the absence of cultivated plant remains and small seeds. With the exception of the Area V hearth, botanical materials from these features are similar, characterized by sparse wood charcoal and moderate quantities of nutshell. Feature 82 contained a large amount of wood charcoal as well as squash, the earliest cultigen identified from the site, several small seeds from wild plants (sida, spurge), and a fragment of cane.

Accession/FSN	2013-325-21, 24, 31		2013-325-22		2013-325-33, 79, 96		2013-325-101		2013-323-59		2013-325-56		2013-325-57		2013-325-52		2013-325-78		2013-326-120, 122			
Area / Feature	IV, 2		IV, 4		IV, 27		IV, 67		II, 58		IV, 34		IV, 35		IV, 36		IV, 39		V, 82			
Description	FCR cl.		FCR cl.		FCR cl.		FCR cl.		FCR cl.		Posthole		Posthole		Posthole		Posthole		Hearth			
Component (bold indicates AMS dated)	**LA**		LA-FM		**LA**		LA-FM		LA-FM		**FM**		FM/Cad		FM/Cad		FM/Cad		**FM**		Total	
Sample volume (cu. dm.)	50.6		22		97		7.5		13		1		0.5		2.5		1		107.3		302.4	
Squash (*Cucurbita* sp.), flower scar																			1	0.02	1	0.02
Nutshell																						
Hickory *(Carya* sp., thick-shelled)	63	1.16	15	0.17	163	2.92	6	0.08			3	0.03	2	0.04	1	0.02	1	0.01	26	0.68	280	5.11
Black walnut *(Juglans nigra)*																			1	0.02	1	0.02
Hickory-walnut family (Juglandaceae)	24	0.22	12	0.06	15	0.14	3	0.02			1	0.01					2	0.02	5	0.06	62	0.53
Hazelnut *(Corylus americana)*									1	0.04											1	0.04
Acorn *(Quercus* sp.)			4	0.01	1	0.01					1	0.01							1	0.01	7	0.04
Small seeds (wt.>=.01g)																						
Spurge family (Euphorbiaceae)																			1		1	
Sida *(Sida* sp.)																			1		1	
Indeterminable																			3		3	
Stems																						
Cane *(Arundinaria* sp.)																			1	0.01	1	0.01
Small grass (Poaceae)																			1	0.01	1	0.01
cf. Greenbrier stem *(Smilax* sp.)					2	0.01															2	0.01
Wood charcoal																						
Red group oak *(Quercus* sect. *Lobatae)*			1	0.01	2	0.03			5	0.03									23	0.37	31	0.44
White group oak *(Quercus* sect. *Quercus)*	3	0.18	4	0.06	4	0.07			2	0.01					1	0.01	3	0.01	6	0.08	23	0.42
Oak, unspecifiable *(Quercus* sp.)	8	0.11	2	0.01	7	0.05	1	0.01	2	0.01	4	0.02	1	0.01					3	0.02	28	0.24
Pine *(Pinus* sp.)	7	0.11	4	0.02	24	0.21	1	0.01	2	0.01	1	0.01	1	0.01			1	0.01	4	0.1	45	0.49
Hickory *(Carya* sp.)			1	0.01					1	0.01											2	0.02
Ash *(Fraxinus* sp.)					9	0.09															9	0.09
Beech *(Fagus grandifolia)*					1	0.04															1	0.04
Black walnut *(Juglans nigra)*									1	0.01											1	0.01
Redcedar *(Juniperus virginiana)*																	1	0.01			1	0.01
Sweetgum *(Liquidambar styraciflua)*									1	0.01											1	0.01
Hardwood, indeterminable	7	0.05	2	0.01	2	0.02					2	0.06							4	0.34	17	0.48
Indeterminable																			4	0.06	4	0.06
Not examined for species					24	0.2													1330	28.06	1354	28.26
Other pine parts																						
Pine needles *(Pinus* sp.)	7	0.02	4	0.01	4	0.01													1	0.01	16	0.05
Pine resin *(Pinus* sp.)	7	0.09	2	0.02	11	0.33			1	0.01	1	0.01	1	0.01			2	0.03	3	0.06	28	0.56
Other plant parts (and fungus)																						
Bark	1	0.02			9	0.04													10	0.11	20	0.17
Fungus			1	0.01															6	0.05	7	0.06
Starchy fragments																			1	0.01	1	0.01
Frass																			1	0.01	1	0.01
Indeterminable	1	0.01	3	0.01	14	0.08	1	0.01	1	0.01									6	0.04	26	0.16
Contamination > 2 mm		14.06		6.65		27.73		1.05		4.54		0.17		0.03		0.26		0.11		20.65		75.25
Residue < 2 mm		26.81		11.74		74.34		10.63		3.55		0.28		0.04		0.35		0.19		106.73		234.66

Table 2. Carbonized Plant Remains from 3MN298, Early Components (number of specimens/weights g).

Wood charcoal

There were 1517 fragments of wood charcoal weighing 30.57 g recovered from early component flotation samples; these are interpreted as fuel wood. Of the 163 fragments for which identification was attempted, 142 could be assigned to genus or species: 82 specimens (58 percent) were oaks, and 45 (32 percent) were pine. Much of the pine came from soil in/around Feature 27, a Late Archaic FCR concentration. Oak predominated in the Feature 82 hearth fill. Little wood charcoal was present in the four postholes (Features 34, 35, 36, and 39), and most had at least two types of wood as well as nutshell. Plant remains in the postholes are interpreted as general site debris rather than primary construction material.

Nut resources

A total of 351 fragments of nutshell (5.74 g) was recovered from the early features at Dragover. The nutshell is dominated by thick-shelled hickory and Juglandaceae nutshell consistent with hickory (98 percent by weight), but seven fragments of acorn, one of black walnut, and one of hazelnut were also present. Nut uses and nutritional properties are discussed in more detail below. Fats available in the nut resources would have been particularly important to hunter-gatherers who relied on lean meat for a portion of the year (Hall 2000).

Greenbrier vine

A Late Archaic FCR concentration (F-27) produced two fragments of a monocot stem anatomically consistent with greenbrier, a thorny, thicket-producing vine. Greenbrier has several food uses. Its young shoots are particularly tasty raw or sautéed, and they are also edible after boiling. The bland berries, although not terribly palatable, are at least not toxic to humans (Tull 2013). Historic records of aboriginal greenbrier uses focus on the starchy tubers. Cherokees, Choctaws, and Houma people of Louisiana dried greenbrier tubers and ground them into flour (Moerman 1998). Intriguingly, Melvin Gilmore (1933:126) records greenbrier vines as the main ingredient in a decoction that, when sprinkled on the bed of a couple, would cause them to quarrel and possibly separate. Greenbrier vines were also used in Native basketry in California (Moerman 1998).

Squash

The only possible domesticated plant identified in early component features at Dragover was squash recovered from Feature 82, a hearth or fire pit with ash deposits excavated in Area V. The squash flower scar, sometimes called a torus (Figure 10), has been directly dated and returned a 2-sigma calibrated age range of A.D. 715-940, with a median probability of A.D. 825. Although domestication status cannot be assessed from the flower scar, wild cucurbits are not reported for the Ouachita Mountains, making the squash either a domesticate or an import (Gentry et al. 2013; Smith 1992:82). Domesticated squash and gourd have been found in Late Archaic to Early Woodland period contexts in the Ozarks and in Woodland period components in East Texas (Fritz 1990; Perttula 2008), but domesticated plants have rarely been documented at sites in the Ouachita Mountains before the Caddo period (see Leith 2011 for discussion of Fourche Maline subsistence patterns on the northern edge of the Ouachitas in Oklahoma).

Figure 10. Carbonized plant remains identified from 3MN298 features: top left, squash flower scar from Feature 82 (2013-326-122), scale in mm; top right, common bean fragment from Feature 11 (2013-322-32), scale in mm; bottom left, hickory nutshell from Feature 97 (2014-338-75), scale in cm; bottom right, maypop seed from Feature 11 (2013-322-32), scale in mm (photographs by Leslie Bush).

Results: Botanical Remains from the Late Component in Areas I, III, V, and VII

Eleven flotation samples (336.1 cu. dm.) from ten features assigned to the Caddo component in Areas I, III, V, and VII were analyzed for macrobotanical remains (Table 3). Nearly three-quarters of the flotation volume of the Caddo samples comes from Feature 11, a seventeenth century pit from which 235.5 cu. dm. of fill were processed and analyzed. Features interpreted as belonging to the Caddo component at Dragover include several different domesticated plants, a variety of small seeds from wild plants, and cane, in addition to nutshell and wood charcoal.

Accession/FSN	2013-324-111		2013-326-25		2013-326-65		2013-322-74		2013-326-100		2013-326-101		2013-326-111		2013-326-126		2013-322-32, 69		2014-338-75		
Area / Feature	III, 8		V, 10		V, 38		I, 60		V, 71 (Str. 1)		V, 72 (Str. 1)		V, 77 (Str. 1)		V, 88 (Str. 1)		I, 11		VII, 97			
Description	Midden		FCR cl.		Pit		Posthole		Posthole		Posthole		Posthole		Posthole		Pit		Pit			
Component (bold indicates AMS dated)	Caddo		Caddo		**Caddo**		Caddo		**Caddo**		Caddo		Caddo		Caddo		**Caddo**		**Caddo**		Total	
Sample volume (cu. dm.)	30.5		12		38		2		3.9		0.8		1.5		3.9		235.5		8		336.1	
Corn (Zea mays), cupules and glumes					15	0.08	2	0.01							1	0.01	55	0.26	18	0.16	91	0.52
Corn (*Zea mays*), kernel			2	0.03	1	0.05									5	0.05	19	0.2	6	0.08	33	0.41
Squash (*Cucurbita* sp.), rind									3	0.04											3	0.04
Common bean (*Phaseolus vulgaris*)																	1	0.01			1	0.01
Nutshell																						
Hickory (*Carya* sp., thick-shelled)	2	0.01	3	0.04	27	0.83	10	0.11	9	0.17	3	0.09			4	0.1	2899	63.74	63	2.9	3020	67.99
Black walnut (*Juglans nigra*)					2	0.06													12	0.58	14	0.64
Hickory-walnut family (Juglandaceae)			2	0.03	4	0.06	1	0.01							2	0.01	397	3.25	9	0.14	415	3.5
Hazelnut (*Corylus americana*)																	5	0.07	1	0.02	6	0.09
Acorn (*Quercus* sp.)							2	0.02									14	0.05	1	0.01	17	0.08
Small seeds (wt.>=.01g)																						
Chenopodium (*Chenopodium* sp.)																			22		22	
Purple passionflower (*Passiflora incarnata*)																	1	0.01	3	0.24	4	0.25
Ragweed (*Ambrosia* sp.)					2												1				3	
Sandmat (*Chamaesyce* sp.)					2																2	
Cheno-am (*Chenopodium/Amaranthus* spp.)	2																				2	
Hawthorn (*Crataegus* sp.)																	2	0.02			2	0.02
Legume family (Fabaceae)															2						2	
Strawberry (*Fragaria* sp.)															1				1		2	
Purslane (*Portulaca oleracea*)															1				1		2	
Vervain (*Verbena* sp.)																			2		2	
Daisy family (Asteraceae)																	1				1	
Chenopodium (*Chenopodium* cf. *berlandieri* spp. *jonesianum*)															1						1	
Stick-tight (*Galium* sp.)																	1				1	
Morningglory (*Ipomoea* sp.)																	1				1	
Burclover (*Medicago* sp.)																			1		1	
Smartweed (*Polygonum* sp., lenticular)																	1				1	
Grape (*Vitis* sp.)																	1				1	
Indeterminable															4		2		5	0.06	11	0.06
Stems																						
Cane (*Arundinaria* sp.)	5	0.01			2	0.01	1	0.01	2	0.03	1	0.01	4	0.01			9	0.06	40	0.33	64	0.47
Small grass (Poaceae)																	5	0.01			5	0.01
Herbaceous	2	0.01																			2	0.01
Wood charcoal																						
Red group oak (*Quercus* sect. *Lobatae*)	4	0.04	1	0.01	3	0.02	4	0.04	3	0.01					3	0.04	5	0.05			23	0.21
White group oak (*Quercus* sect. *Quercus*)					10	0.25	5	0.05	4	0.02							19	0.22	8	0.53	46	1.07
Oak, unspecifiable (*Quercus* sp.)					1	0.01	1	0.01									11	0.22			13	0.24
Pine (*Pinus* sp.)					4	0.07	9	0.15	1	0.01	2	0.01			2	0.02	12	0.24	12	0.58	42	1.08
Hickory (*Carya* sp.)							1	0.01							11	0.02	1	0.02	1	0.02	14	0.07
Ash (*Fraxinus* sp.)	12	0.25													1	0.01					13	0.26
American elm (*Ulmus americana*)	4	0.07															1	0.01			5	0.08
Elm (*Ulmus* sp.)															1	0.01					1	0.01
American hornbeam (*Carpinus caroliniana*)															1	0.14					1	0.14
Kentucky coffeetree (*Gymnocladus dioicus*)			1	0.02																	1	0.02
Holly/possumhaw (*Ilex* sp.)															1	0.01					1	0.01
Redcedar (*Juniperus virginiana*)									1	0.01											1	0.01
Hardwood, indeterminable			2	0.01					1	0.01							1	0.01			4	0.03
Not examined for species	440	4.14			74	1.43	9	0.04							28	0.22	1893	24.59	394	9.13	2838	39.55
Other pine parts																						
Pine cone scales (*Pinus* sp.)																	2	0.01			2	0.01
Pine needles (*Pinus* sp.)																	5	0.01			5	0.01
Pine resin (*Pinus* sp.)	1	0.01			1	0.07											52	0.75	21	0.29	75	1.12
Other plant parts (and fungus)																						
Bark					69	1.02									6	0.1	41	0.36	4	0.03	120	1.51
Fungus	22	0.13																	4	0.02	26	0.15
Starchy fragments																	4	0.03			4	0.03
Tuber																			1	0.58	1	0.58
Grass rhizome (Poaceae)																	1	0.01			1	0.01
Root																	1	0.03			1	0.03
Indeterminable					5	0.03			1	0.01					3	0.01	119	1.91	48	0.44	176	2.4
Contamination > 2 mm		16.82		1.95		10.61		0.2		0.61		0.04		0.05		0.2		39.4		148.59		218.47
Residue < 2 mm		21.06		2.49		8.02		0.33		0.54		0.37		0.08		0.96		55.15		338.8		427.8

Table 3. Carbonized Plant Remains from 3MN298 Flotation Samples, Late Component (number of specimens/weight g).

Agricultural products

Several crop plants were recovered from late component features at the site. Six of the features produced corn, one contained squash rind (F-71), one (F-11) yielded a fragmentary common bean, and one (F-88) had a domesticated-type chenopodium seed (goosefoot). Corn consisted of loose kernels and kernel fragments (five features) and cupules and glume fragments (five features). In addition, the fragmentary tip of a corn cob was recovered from the east half of Feature 97 (2014-338-21) (Figure 11). Measurements were made of loose corn cupules and the cupules attached to the Feature 97 cob. Loose cupules from Features 11, 38, and 97 had a mean width of 4.3 mm (range 2.5-7.25, n=36) and a mean height or thickness of 1.8 mm (range 1.1-2.9, n=36). The cob fragment had mean cupule widths between 3.9-4.6 mm and mean cupule heights between 2.6-2.8 for the 6 ranks measured. The cob held 12 rows of kernels and was 11.1 mm in diameter at the broken end, as measured between the apical notches of lower glumes on opposite sides of the cob (Bird 1994). Corn from 4 features was directly dated using AMS, returning calibrated median probabilities of A.D. 1460, 1503, 1515, and 1663.

Figure 11. Corn from 3MN298: top, corn kernels from Feature 11 (2013-322-32), scale in mm; bottom, corn cob fragment from Feature 97 (2014-338-21), scale in cm (photographs by Leslie Bush).

Three pieces of squash rind were recovered from posthole Feature 71, associated with Structure 1. These rind fragments are 2.3-2.5 mm thick, sufficient to meet the "King's Rule" criterion for domestication (Smith 1992:41). They were directly dated using AMS and returned a 2 sigma calibrated age range of A.D. 1324-1443, with a median probability of A.D. 1416. A bean fragment was recovered from Feature 11, a seventeenth century pit (see Figure 10). This age is consistent with the late (post-A.D. 1250) introduction of beans into agricultural systems in the eastern United States (Hart and Scarry 1999).

Cane

Fragments of cane stem were recovered in eight of the ten features assigned to the Caddo component at Dragover (as well as in the Woodland period hearth Feature 82 from Area V). Cane (*Arundinaria* sp.) is the only North American member of the bamboo tribe, a woody group of the grass family (Diggs et al. 2006:836). A facultative wetlands plant, it grows in moist woods and low areas generally (USDA, NCRS 2015). Although cane is rare today, it was once far more abundant (Jurney 2012). Native people used cane in many items, including mats, baskets, screens to divide rooms, spear shafts, arrow shafts, pipe stems, blow guns, flutes, and blow tubes used in healing (Moerman 1998:104). Henri Joutel mentions use of cane for torches (Foster 1998:235). Historic accounts of the Hasinai Caddo in East Texas by Francisco Hidalgo, Fray Francisco Casañas de Jesús María, and Isidro Felíx de Espinosa all mention baskets or boxes that they describe as made of reed (Hatcher 1927a:56, 1927b:156), probably referring to cane. The larger cane baskets in Caddo country were used to contain crops in storage areas, and loosely woven baskets were useful in sifting and winnowing (Swanton 1996:157).

Nutshell

A total of 3,472 fragments of nutshell (72.30 g) was recovered from the late component features analyzed from Dragover. Nutshell consisted primarily of thick-shelled hickories (see Figure 10), but black walnut, hazelnut, and acorn fragments were also found. Nutritionally, hickory nuts are similar to walnuts, and both are more similar to hazel than to acorn. Acorn is intermediate in fat and starches between the other tree nuts and starchy seeds such as corn (USDA, ARS 2014).

Traditional hickory nut processing methods used by Cherokees, Choctaws, and members of many other tribes involves pounding the nuts into small pieces and then heating them in water, where the oil can be skimmed off, the nutmeat retrieved from suspension, and the shells allowed to sink to the bottom (Fritz et al. 2001; Moerman 1998). Experiments by archeologists show that this process yields a much larger number of calories per labor invested than does cracking and picking (Talalay et al. 1984:353). Other oily nuts cannot be processed in this manner because either their meats sink along with the shells (hazelnut) or the nuts become bitter (walnut).

Other wild plants

Seeds of wild plants identified in late component features include several from edible fleshy or dry fruits: strawberry, maypop (fruit of the purple passionflower, see Figure 10), grape, and hawthorn. Purslane has edible greens. Other plant seeds may be incidental inclusions (sandmat) or medicinal plants (verbena).

The 22 *Chenopodium* seeds from Feature 97 fall at the large end of the size range for this genus. At 1.6-2.0 mm in diameter, the seeds compare well to the reported dimensions of 1.3-1.9 mm for *Chenopodium simplex* and 1.7-2.0 mm for *C. berlandieri* var. *bushianum* (Clemants and Mosyakin 2003). Both species are native to Arkansas, although it is not clear whether var. *bushianum* is included in the Arkansas *C. berlandieri* species (Gentry et al. 2013). Testa thickness has not been measured for chenopodium at the site, but the Feature 97 specimens appear subjectively to be the thick, wild type. The single specimen from Feature 88, in contrast, is consistent with the domesticated variety *Chenopodium berlandieri* spp. *jonesianum* in having a thin testa and truncate margin morphology; it is 1.3 mm in maximum diameter. Thin seed coats sometimes occur in wild populations of chenopodium (Smith 1992:148-149), so the domestication status of all chenopodium in the late component at Dragover cannot be determined from a single specimen. Nonetheless, the presence of a domestic type chenopodium indicates an avenue for future research at the site.

Wood charcoal

A total of 3,003 fragments of wood charcoal (42.78 g) was recovered in the late component feature samples. Of the 165 fragments for which identification was attempted, 161 could be assigned to genus or species: 82 specimens (51 percent) were oaks, and 42 (26 percent) were pine. As in the early component samples, the remaining wood charcoal consisted primarily of hickory and ash. Five of the samples were from postholes (Features 60, 71, 72, 77, and 88), most associated with Structure 1 in Area V. As with the postholes from earlier components, these features appear to be filled with general site debris rather than the remains of construction material.

Results: Animal Bone from Late Component in Area VII

A total of 1636 vertebrate remains (453.4 g) make up the assemblage analyzed by Lucretia Kelly from the west half of Feature 97, a large pit in Area VII that has an AMS date with a calibrated median probability of A.D. 1503. The analyzed assemblage represents a sample (about 20 percent by weight) of the animal bone recovered from this pit. The results are discussed by animal class and feature zone to see if any differences can be observed as the pit was filled with refuse (Table 4). Remains from four of the five vertebrate classes are present (amphibians are not represented).

Some weathering, carnivore and rodent gnawing, and staining have taken place that indicate bones were exposed to the elements (Table 5). A portion of the assemblage has been burned. In some cases, only singeing is evident and that may reflect a cooking method such as roasting, where only a small part of exposed bone was directly subjected to fire. Bones that are blackened by fire are not usually exposed to high temperatures or are protected by soft tissue when exposed (David 1990). Calcined bone indicates exposure to higher temperatures or more prolonged exposure to fire. More blackened bone than calcined bone was recovered.

	338-71	338-72	338-75	338-76	338-78	338-79	Total NISP	Total MNI
	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Basal		
Mammals								
Didelphis virginiana		1					1	1
Scalopus aquaticus				1			1	1
Neotoma floridana		1	1				2	1
Sciurus sp.		3	3				6	1
cf. *Tamias striatus*		1		3			4	1
Odocoileus virginianus	7	13	18	5	13	5	61	3
large mammal			12	12	8		32	-
medium-large mammal	41	6	3	19	1	10	80	-
medium mammal		1	7	5			13	-
medium-small mammal		7		5			12	-
small mammal							0	-
Total mammal	48	33	44	50	22	15	212	8
Mammal or Bird		1		5			6	-
Birds								
Meleagris gallopavo				1			1	1
large bird				1			1	-
medium-large bird					1		1	-
medium-small bird		2					2	-
Total bird	0	2	0	2	1	0	5	1
Fish								
Lepisosteus sp.	1	3		1			5	-
Lepisosteus osseus				1			1	1
Catostomidae				1			1	-
Moxostoma sp.		1	1	7			9	1
Ictaluridae				1			1	1
Esox sp.			1				1	1
Centrarchidae	1	1	8	6		3	19	-
Micropterus sp.						1	1	1
Lepomis sp.			3	4			7	2
Aplodinotus grunniens	3		5	1		2	11	1
indeterminate fish	5	18	75	55		13	166	-
Total fish	10	23	93	77	0	19	222	8
Reptiles								
Terrapene sp.	1	2	1	3			7	-
Terrapene cf. *carolina*			1		1		2	1
Chrysemys complex		1	1				2	1
Testudines	16	34	14	42	3	3	112	-
Serpentes				2			2	-
Colubridae		3	1	1		1	6	1
Total Reptiles	17	40	18	48	4	4	131	3
Indeterminate Vertebrates	114	127	298	402	3	116	1060	-
Total Vertebrates	189	226	453	584	30	154	1636	20

Table 4. Summary of Fauna from 3MN298 Feature 97 (2014-338).

	Z2	Z3	Z4	Z5	Z6	Basal	Total	%NISP
Unburned	173	208	393	494	10	127	1405	85.9
Burned black	11	12	55	59	18	21	176	10.7
Calcined	5	6	5	31	2	6	55	3.4
Weathered	6	5	5	2	3	3	24	1.5
Gnawed	-	2	1	1	-	-	4	0.2
Cut Marks	1	1	-	3	1	1	7	0.4
Taphonomic Effects for Animal Classes:								
	Weight (g)	Unburned	Burned Black	Calcined	Weathered	Gnawed	Cut Marks	
Mammal	303.4	176	31	5	21	3	5	
Mammal/Bird	0.3	6	-	-	1	-	-	
Bird	38.1	4	1	-	-	1	1	
Fish	12.4	214	5	3	1	-	1	
Reptile	47.3	121	7	3	1	-	-	
Indeterminate vertebrate	51.9	884	132	44	N/A	N/A	N/A	
Total	453.4	1405	176	55	24	4	7	
N/A = Not available (weathering, gnawing, and cut marks were not recorded because of their very small size).								

Table 5. Feature 97 Taphonomy. Taphonomic Feature Effects by Feature Zone.

Mammals

The middle zones (3, 4, and 5) of pit Feature 97 yielded the most diverse taxa of mammals, with three to five taxa being identified. Deer (*Odocoileus virginianus*) is the largest and most likely the main economic mammal. The other taxa identified include small-medium sized mammals such as mole (*Scalopus aquaticus*), opossum (*Didelphis virginiana*), tree squirrel (*Sciurus* sp.), wood rat (*Neotoma floridana*), and possible chipmunk (cf. *Tamias striatus*). Tree squirrel and opossum could have been included in the diet, but it is likely that mole, wood rat, and possibly chipmunk are intrusions because they are burrowing animals. The other three zones contained only deer.

A total of 61 deer NISP was recovered from the feature, representing 3 MNI (Table 6). The deer specimens are scattered throughout the pit with zone 4 containing the largest number (n=18) and zone 5 and basal zone containing the fewest (five each). When viewing the deer remains as a single unit, a slightly lower percentage of extremity parts are present (56 percent) than what would be expected if an entire deer skeleton was present (67 percent). Axial elements are represented in a slightly higher percentage (32 percent as compared to 28 percent expected) and appendicular elements are present in almost three times the expected percentage (12 percent as compared with 5 percent expected).

A mandible with molars 2 and 3 was recovered from zone 3. The wear on the teeth was moderate to heavy indicating an individual about 4 ½-5 ½ years of age at death (Schwartz and Schwartz 1981; Severinghaus 1949). Five vertebral fragments (cervical) from zone 4 are very porous and are unfused. This individual was very young because vertebral centra fuse around two months of age (Purdue 1983). These fragments are only slightly larger than cervical vertebrae from a comparative skeleton of a full-term fetal deer. Since fawns are born in Arkansas between late March and late June (Sealander 1979:258), this deer was probably taken in the late spring or early summer months. There is an additional individual represented by a thoracic (zone 5) and a cervical vertebra (basal zone) with fused centra, but unfused centra epiphyses are present. These indicate an individual older than two months but younger than 2-3 years of age.

No bone tools are present. One antler tine tip was recovered from zone 3, but it could not be determined if it had been used as a tool such as a lithic flaker. Five deer specimens exhibit cut marks, most likely from butchering activity (Figure 12). Five deer specimens, all from zones 5 and 6, exhibit singeing that could be an indication of roasting meat. Non-human taphonomic processes include weathering (n=15) and rodent and carnivore gnawing (n=2). They were distributed throughout the pit rather than being concentrated in one or two zones.

	Standard	Z2	Z3	Z4	Z5	Z6	Basal	Total
Extemities								
Antler	2	5	1	-	-	-	-	6
Astragalus	2	-	-	-	-	-	-	-
Atlas	1	-	-	-	-	-	-	-
Axis	1	-	-	-	-	-	-	-
Calcaneum	2	-	-	-	-	-	-	-
Cuboid	2	-	-	-	-	-	-	-
Greater Cuneiform	2	-	-	-	-	-	-	-
Hyoid	2	-	-	-	-	-	-	-
Lateral maleolus	2	-	-	-	-	-	-	-
Lesser Cuneiform	2	-	-	-	-	-	-	-
Lunate	2	-	-	-	-	-	-	-
Magnum	2	-	-	-	-	-	-	-
Mandible	2	-	1	-	-	5	-	6
Metacarpal	2	-	-	-	-	-	-	-
Metacarpal, vestigial	4	-	-	-	-	-	-	-
Metatarsal	2	-	-	3	-	3	-	6
Patella	2	-	-	-	-	-	-	-
Phalanx 1	8	-	-	1	1	-	1	3
Phalanx 2	8	-	-	1	-	-	-	1
Phalanx 3	8	-	-	-	-	-	-	-
Phalanx, vestigial	24	-	-	-	-	-	-	-
Pisiform	2	-	-	-	-	-	-	-
Scaphoid	2	-	-	-	-	-	-	-
Skull	25	-	-	1	-	-	-	1
Tooth	32	1	2	1	1	-	-	5
Triquetral	2	-	-	-	-	-	-	-
Unciform	2	-	-	-	-	-	-	-
Total	147	6	4	7	2	8	1	28
%	67.10%							56.00%
Axial								
Innominate	2	-	-	-	-	-	1	1
Rib	26	-	5	4	-	1	1	11
Sacrum	1	-	-	-	-	-	-	-
Scapula	2	1	-	-	-	-	-	1
Sternebra	7	-	-	-	-	-	-	-
Vertebra, cervical	5	-	-	-	-	-	1	1
Vertebra, thoracic	13	-	-	-	2	-	-	2
Vertebra, lumbar	6	-	-	-	-	-	-	-
Total	62	1	5	4	2	1	3	16
%	28.30%							32.00%
Appendicular								
Humerus	2	-	1	-	-	-	-	1
Radius	2	-	1	-	-	1	-	2
Ulna	2	-	-	-	-	-	-	-
Femur	2	-	-	1	-	1	-	2
Tibia	2	-	-	-	1	-	-	1
Total	10	-	2	1	1	2	-	6
%	4.60%							12.00%
Total	219	7	11	12	5	11	4	50
Not used								
Metapodial	-	-	2	-	-	2	1	4
Sesamoid	-	-	-	1	-	-	-	1
Vertebra, unspecified	-	-	-	5	-	-	-	5
Total not used	-	-	2	6	-	2	1	11
Total Deer Remains		7	13	18	5	13	5	61

Table 6. Deer Elements from Feature 97, Site 3MN298.

Figure 12. Deer scapula from Feature 97, zone 2 (2014-338-71), with cut marks on glenoid from butchering, scale in cm (photograph by Katie Leslie).

Birds.

Only five bird NISP were recognized and only one taxon identified, turkey (*Meleagris gallopavo*). The one turkey specimen, a sternum, came from zone 5. It had light cut marks but also carnivore puncture marks.

Fish

Fish remains make up the largest number of NISP from the feature with 222, however 75 percent of the NISP could not be identified below the class level. Ten taxa were identified. These include longnose gar (*Lepisosteus osseus*), gar (*Lepisosteus* sp.), redhorse sucker (*Moxostoma* sp.), sucker family (Catostomidae), catfish family (Ictaluridae), pike (*Esox* sp.), sunfish family (Centrarchidae), bass (*Micropterus* sp.), sunfish (*Lepomis* sp.), and freshwater drum (*Aplodinotus grunniens*) (Figure 13). Centrarchids make up the largest percentage of the identified fish specimens (48.2 percent NISP) and 50 percent MNI. All but one of the taxa where MNI could be calculated had a MNI of one. Only *Lepomis* sp. had a MNI of two.

Most of the fish specimens are from small individuals. The longnose gar is of average size and is represented by a parasphenoid that has cut marks presumably made by dismembering the head from the body of the fish. The single bass specimen is weathered. The majority of the fish remains would likely not have been recovered without the use of flotation because the bones are so small.

Reptiles

Reptile remains, particularly turtle, were fairly numerous throughout the feature. Most of the turtle remains are small fragments of carapace or plastron that could not be identified further. Common box turtle (*Terrapene* cf. *carolina*) and box turtle (*Terrapene* sp.) were recovered from all zones but the lowest two (6 and basal). Two skeletal elements of a turtle in the *Chrysemys* complex of water turtles (which includes the

genera of *Chrysemys*, *Pseudemys*, *Graptemys*, and *Trachemys*; Ernst and Barbour 1989) were recovered from zones 3 and 4. None of the turtle specimens are from large individuals. Snake (Serpentes) remains (seven vertebrae and one rib) were recovered from four zones (3, 4, 5, and basal). Six of the eight vertebrae are from non-venomous snakes (Colubridae).

Figure 13. Freshwater drum pharyngeal from Feature 97, zone 5 (2014-338-76), scale in cm (photograph by Katie Leslie).

Discussion: Plant and Animal Foods at Dragover

Analysis of plant and animal remains from two pit features excavated at Dragover (3MN298) in the 1980s yielded a short list of taxa: plants included hickory and walnut shell, cane, grape seed, persimmon, and a wild seed from the bean family, but no cultigens; and animals included deer, turkey, fox squirrel, box turtle, snapping turtle, bullfrog, longnose gar, bowfin, channel catfish, shiners, chubs, topminnows, water snake, and freshwater mussels (Bennett et al. 1986:60-67). Our more extensive analyses of features excavated in 2013-2014 from the site has added plant and animal taxa to these lists, most importantly documenting cultivated plants. Squash now dated to the ninth century A.D. is the earliest cultigen present. Corn, squash, a bean, and a domesticated chenopodium seed came from features dating between the fifteenth and seventeenth centuries A.D.

Samples from the late component (Caddo period) contain nearly all the plant taxa of the features from the earlier components. In addition, the later samples produced remains of three crop plants and numerous small seeds. There is also an increase in non-wood plant density between the earlier and later component features (Figure 14). Cooking fires would have been necessary throughout the occupation

sequence. The increased density of non-wood plants may reflect an actual increase in plant food use, but better preservation in the more recent deposits or the destruction or dispersion of earlier plant material by later occupations may have contributed to the apparent increase.

The taxa composition of the wood and nutshell in the samples from earlier and later component features are generally similar. Wood charcoal recovered to date is interpreted as fuel wood. In this context, the similarly between earlier and later components suggests a continuity in the composition of the local forest composition from Late Archaic through Caddo periods.

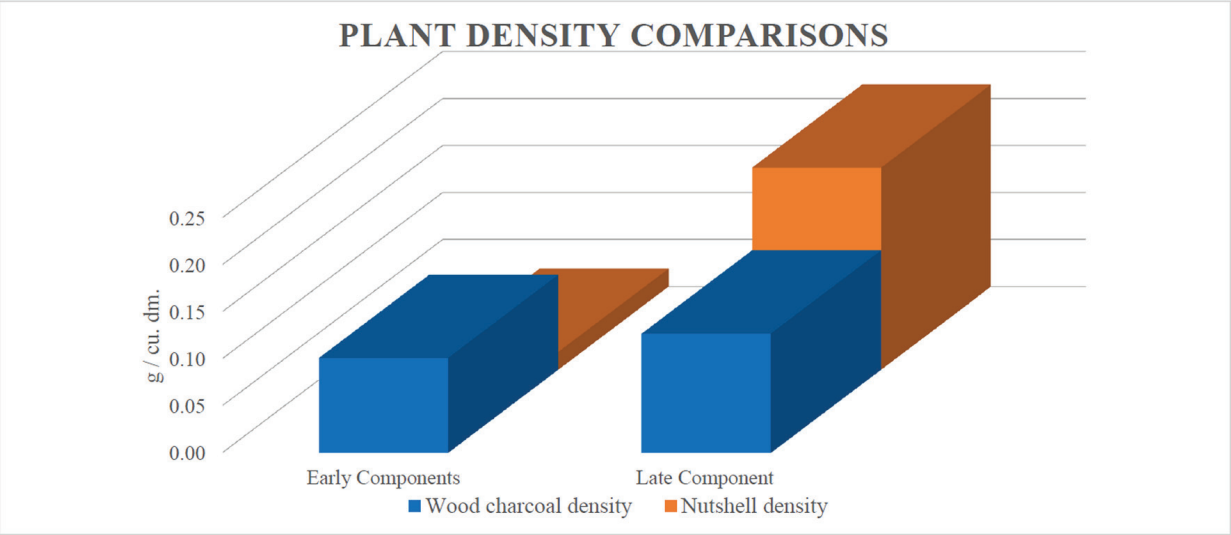

Figure 14. Comparison of plant densities between early and late components at Dragover (wood charcoal and nutshell density per cubic decimeter of processed fill by weight).

The relatively large number of animal remains recovered from Feature 97 is in part attributed to good preservation and to the use of flotation, but this was the only feature excavated with significant amounts of preserved faunal material. While 35 percent of the 1636 vertebrate NISP could be identified to animal class (Figure 15), only 9 percent could be identified to a taxonomic level of family, genus, or species. Mammals were identified most frequently, with deer remains present in the greatest number and at least three individuals present. The other mammals are small-medium in size and represented by only one individual each. Fish are frequent in the assemblage but most are small individuals and would not have made a great contribution to the diet. The same can be said of the turtles. Turkey is the only bird present and is represented by a single specimen.

The ancestral Caddos utilized the environments close to the site including the Ouachita River and the adjacent wooded areas. The young deer in Feature 97 was probably taken in the late spring or early summer months. The fish and turtles would also indicate exploitation in warmer months of the year. Because of their small size it is likely they would have been captured by net or basket. Weathering and animal gnawing on some of the bones indicates they may have lay exposed on the surface for a time before being deposited into the pit as refuse. Some bones were burned, so this may have included cleaned-out fire pits. The types of animals represented are most likely from general domestic activity rather than a specialized activity such as feasting.

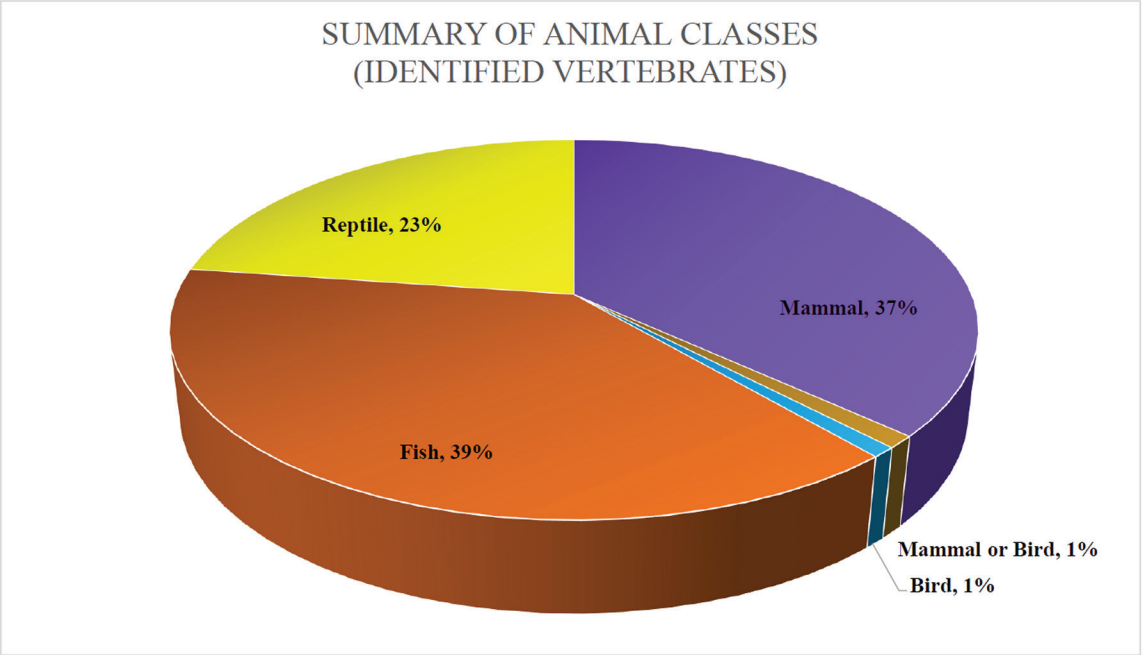

Figure 15. Summary of animal classes identified in Feature 97, 3MN298 (NISP percentages for identified vertebrates).

Regional Comparisons

The spectrum of plants recovered at the Dragover site is typical for the time periods represented, with wood charcoal and nutshell dominating the early components, and crops – especially corn – and small seeds present in the later samples. Dimensions of the corn cupules recovered to date from the site fall into the small end of the range of archeological Caddo corn (Table 7). It is worth remembering that 53 of the 89 cupules measured at the site come from the tip end of a single cob. Cupules and associated kernels at the tip (distal) end of corn cobs are typically smaller than those of the mid-shaft, and this is one possible explanation for the small mean cupule dimensions. Another possibility is that corn from Dragover was a smaller variety than that grown for consumption at other Caddo sites.

Late prehistoric corn assemblages are compared in Table 8 according to the number of rows of kernels present on cobs at the site. With only one cob of 12 rows available from Dragover, comparison to other assemblages is limited to the observation that 12-rowed corn is typical on Mississippian and Caddo sites. Seven cob fragments from Winding Stair on the upper Little Missouri River in the Ouachita Mountains consisted of three 12-row and four eight-row specimens (Williams 2000). Both cob fragments recovered from the Ramos Creek site in southeastern Oklahoma were from 12-row corn (Dowd and Regnier 2014). Fort Ancient sites more typically have higher percentages of eight-rowed corn. Although different varieties of corn often have different ranges of row numbers, row number varies within corn varieties, and more than one variety can have the same typical range.

Historical accounts offer more detailed information on historical varieties of Caddo corn. One of the earliest accounts of corn in the Caddo area comes from Casañas, writing to the Viceroy of Mexico in 1691:

> Among the seeds which the Indians plant in the proper season, is corn of two kinds, which they plant in abundance. One kind matures in a month and a half and the other in three months. (Hatcher 1927c:211)

Site	Cupule mean width (mm)	Cupule mean thickness (height) (mm)	Number of cupules measured	Reference
Dragover (3MN298) loose cupules (Fea. 11, 38, 97)	4.3	1.8	36	this article
Dragover (3MN298) Fea. 97 cob fragment	4.3	2.7	53	this article
Oak Hill Village (41RK214) Fea. 86*	4.8	3.1	~10,220	Elson et al. 2004
Musgano (41RK19)	4.8	2.2	1380	Bush 2014a
41PN175 Fea. 87	4.8	2.3	39	Bush 2015
W. A. Ford (41TT852)	5	2.9	10	Bush 2014b
Shelby Mound (41CP71)	5	2.8	52	Bush 2014c
Pine Tree Mound (41HS15)	5.3	2.3	106	Bush 2012
Stallings Ranch (41LR297)	5.4	3.1	35	Bush 2008
41CP183	5.4	2.1	24	Sherman et al. 2015
Eli Moores (41BW2) Cob #1	5.8	3.5	21	Perttula (ed.) 2014
Henry M. (41NA60) Lot 292	6.1	1.9	20	Perttula et al. 2010
Ramos Creek (34MC1030), all others	6.4	3.1	87	Dowd and Regnier 2014
Winding Stair (3MN496)	6.5	n/a	256	Williams 2000
Eli Moores (41BW2) loose cupules	7.1	3.4	60	Perttula (ed.) 2014
Indian Creek 2 (41SM404) Fea. 1	7.1	3.4	8	Nash 2012
Sha'chahdínnih (41MR211)**	7.2	2.8	229	Goldborer 2002
Ramos Creek (34MC1030) Lot 448.3	8.4	3.3	5	Dowd and Regnier 2014
*Mean of measurements given in Table 91. Number of cupules estimated from 108 measurable cobs, row numbers distributed as given in Table 91, assuming 10 measurable cupules per rank.				
**Mean of measurements given in Appendix Tables 3A, 3B, 3C and 3D				

Table 7. Corn cupule (*Zea mays*) measurements from selected Caddo sites.

Site	Row numbers, by percentage of cobs present						Site Type	Reference
	8	10	12	14	16	N		
Moundville (1TU500), I	21%	42%	13%	17%	8%	24	Mississippian	Scarry 1986:Table 9.1
Moundville (1TU500), II/III	29%	50%	20%	1%		119	Mississippian	Scarry 1986:Table 9.2
Angel (12Vg1)	35%	42%	22%	1%		367	Mississippian	Wagner 1991:Table 1
George C. Davis (41CE19)	36%	46%	18%			325	Caddo	Jones 2000:249
Oak Hill Village (41RK214)	39%	41%	17%	3%		109	Caddo	Elson et al. 2004
Pine Tree Mound (41HS15)	43%	29%	29%			7	Caddo	Bush 2012
Winding Stair (3MN496)	57%		43%			7	Caddo	Williams 2000
Ramos Creek (34MC1030)			100%			2	Caddo	Dowd and Regnier 2014
Dragover (3MN298) Fea. 97			100%			1	Caddo	this article
Sha'chahdínnih (41MR211)		100%				7	Caddo	Goldborer 2002:Appendix Table 2
Roseberry (46MS53a)	94%	5%				902	Fort Ancient	Wagner 1987:Table 6.3
Incinerator (33MY57)	77%	10%	7%	1%		88	Fort Ancient	Wagner 1987:Table 6.3
Canter's Caves (33JA3)	69%	17%	11%	2%		84	Fort Ancient	Wagner 1987:Table 6.3
Kettle Hill Cave (33FA2)	78%	18%	4%			77	Fort Ancient	Wagner 1987:Table 6.3

Table 8. Corn Cob assemblages at selected Late Prehistoric Agricultural Sites in the Eastern US.

Antoine-Simon Le Page du Pratz lived among Native people in Louisiana and Mississippi in the early eighteenth century, learning the Natchez language. Although not Caddoan speakers, the Natchez are Mississippian descendants who probably had similar corn traditions. Le Page du Pratz (1774:Book III, Chapter I) describes six types of corn that ripened at different times and had kernels of varying colors and sizes.

Squash was the only pre-maize crop recovered from Dragover, and it is among the earliest domesticates in the Americas (Kistler et al. 2015). The single domestic-type specimen of chenopodium was recovered from Feature 88 in a Caddo context. As discussed above, the chenopodium specimens from Feature 97 appear to be thick-testaed, the wild type of *C. simplex* or *C. berlandieri* var. *bushianum*. Similarly, the *Polygonum* specimen is lenticular in shape and clearly not the trigonous *Polygonum erectum* that was domesticated in some areas.

Cultivation of native starchy seeds of chenopodium, maygrass, little barley, and knotweed contemporary with Fourche Maline occupations is known elsewhere in the Central Mississippi and Ohio River valleys, roughly in the areas of the later Mississippian and Fort Ancient cultures (Johannessen 1993:Figure 5-1). Starchy seed cultivation was either absent or less important in other areas of the Eastern Woodlands. In the Lower Mississippi River valley, there is little evidence of native starchy seed use until Marksville times, but even then cultivation is "not on the scale of their trading partners to the north" (Fritz 2000:238). Only in the northern part of the Lower Mississippi River valley does pre-corn cultivation seem to have been important, as at the Taylor Mounds site in southeastern Arkansas (Fritz 2000:238). In contrast to the situation in the Lower Mississippi River valley, intensive cultivation of native seed crops is apparent in the Arkansas River valley (Fritz 2000:238). Although the investigators could not be sure the seeds were cultivated, all four types of native starchy seeds were recovered from the Hardman site, which lies farther down the Ouachita River in the Coastal Plain (Fritz 1993). In the Ouachita Mountains, the Winding Stair site in the upper Little Missouri River valley produced chenopodium and possible knotweed. Only chenopodium is present at Amos, in the upper Caddo River valley (Williams 2000). The dearth of these starchy seeds at Dragover is consistent with previous findings in the Ouachita Mountains.

Few Caddo sites from the Ouachita Mountains region have faunal remains preserved and reported (Dellinger and Dickinson 1941; Early 1988:140-142), so a regional comparison is not yet possible. A few Caddo sites along the Ouachita River to the south can be compared as well as a Woodland site in the Ouachita Mountains to the north. The Wild Violet site, located in Logan County on a tributary of the Petit Jean River, had a large but highly fragmented faunal assemblage recovered from the Woodland occupation (Kelly 2015). While there may be some bias in what taxa were identified because of taphonomic issues, the inhabitants of the Wild Violet site focused much of their exploitation of fauna from terrestrial habitats and on deer in particular. There was some utilization of the adjacent aquatic habitats as evinced by a few fish vertebra, aquatic turtles (soft-shell and *Chrysemys*), beaver, and freshwater mussel. In general, the few upland Woodland sites in Arkansas that have had faunal analyses conducted (Kelly 2011a; Styles et al. 1985; see also Jackson and Scott 2002) appear to be very similar in composition. Most of the remains are recovered from midden contexts, and are impacted by taphonomic processes of weathering, animal gnawing, burning, and fragmentation. Terrestrial habitats were exploited most frequently with deer and box turtles the primary taxa taken. They have a variety of small to medium-sized mammals present, but in relatively low numbers. Turkey was the primary bird exploited. Aquatic habitats were exploited to a lesser extent with the presence of a few aquatic turtles and mammals, fish, and freshwater mussels. It is possible the more fragile fish remains have been removed from the assemblages through taphonomic agents.

Turning to more contemporary Caddo sites in the Ouachita River drainage, only a few have had faunal materials preserved and analyzed. The Caddo inhabitants at the Jones Mill site, located to the east of Dragover, exploited nearby edge and aquatic habitats, the latter most likely being the Ouachita River (Trubitt et al. 2011). The assemblage recovered was very similar to Dragover where deer provided the greatest amount of meat, but fish, turtles, and possibly mussels would have also been important sources of animal protein. Birds do not appear to have been exploited to a great extent with turkey the only species identified. In the Gulf Coastal Plain south of the Ouachita Mountains, the Hardman site near the middle Ouachita River had faunal material recovered from Mid-Ouachita to Deceiper phase occupations (ca. A.D. 1450-1700; Styles and White

1993). The site inhabitants focused their faunal exploitation on deer and fish supplemented by freshwater mussels, aquatic turtles, and a variety of small and medium-sized mammals and terrestrial birds. There was an increase in aquatic taxa between the Mid-Ouachita and Deceiper phase occupations at Hardman. More taxa are found at Hardman than at Dragover, but the taxa are similar in composition between the two sites.

At the Hughes site, further south and east in the Gulf Coastal Plain near the Saline River in central Arkansas, deer and tree squirrels were the most utilized mammals (Kelly 2011b). Birds and fish remains were not prevalent in any of the units while turtle remains made up a slightly larger proportion. Turkey and passenger pigeon were the most utilized birds, and box turtles the most utilized turtle. Three-ridge and Wabash pigtoe were the most prevalent mussels.

Weinand and colleagues (1997) compared fauna from early and late Caddo sites. Their comparison (see Weinand et al. 1997:Table 17) suggests that if a site is located along a larger creek or bayou, more of the vertebrate remains come from aquatic animals or those that inhabit bottomlands (other than deer), but if a site is further from a larger stream, more remains come from deer. They conclude that location with proximity to water plays a greater role in what animals are exploited than whether a site dates to the early or late Caddo period. The fauna from the Hughes site, however, does not fit this hypothesis. The Hughes site is in a bottomland setting of the Saline River. One explanation for this difference is that the Hughes faunal assemblage comes from near the base of a mound and may represent food refuse from mound activity such as feasting or from higher status individuals (Kelly 2011b). Faunal remains from more contexts at Hughes are needed to confirm whether this small assemblage represents specialized activity. Fauna from domestic contexts at Hughes would also help determine if the exploitation pattern of the occupants was different from other Caddo sites located in bottomlands of larger streams and rivers.

The few Caddo sites with analyzed faunal assemblages in the middle to upper Ouachita drainage overall have similar assemblages. Deer is the primary mammal utilized with some small to medium-sized mammals also taken. Birds as an animal class are not well represented but turkey is usually present. If the site is near the river, fish, turtles, and freshwater mussels are well utilized, however, the amount of meat they would have provided would not have been great. The amount of aquatic species in the assemblages appears to increase from the Woodland period. However, it is possible that this may be more a function of taphonomy rather than utilization.

Conclusions

Analyses of plant and animal remains from excavations at the Dragover site (3MN298) provide new information on the foodways of the people who inhabited the Ouachita Mountains in the past. The dominant food represented in the earlier Archaic and Woodland (Fourche Maline) components is nuts, primarily thick-shelled hickory, but greenbrier was also present, as well as squash, the earliest cultigen recovered at the site. The lack of preserved bone or shell in the early components means there is a lack of evidence on Archaic and Woodland period animal use. Changes are documented in the use of plants for food through time, especially as ancestral Caddo Indians incorporated domesticated crops – corn, squash, beans, and chenopodium or goosefoot – into their diet. Wild plants continue in importance, with several kinds of nuts, wild fruits (strawberry, maypop, grape, hawthorn, and persimmon), and wild greens and grains (purslane, chenopodium) present. In the late component, the people exploited both terrestrial and aquatic resources for food animals, using deer, squirrel, opossum, turkey, several kinds of fish, turtle, bullfrog, snake (perhaps eaten), and freshwater mussel. Many of these foods are still important to contemporary Caddos (Attocknie 2015).

Further analysis will include comparisons of different excavation areas and clarification of community patterns at Dragover and their changes through time. The differential preservation of animal bone across the site is an issue for continued investigation, and the early presence of cultivated squash as well as both wild and domesticated chenopodium in the Caddo component can be pursued further. There are additional samples that can be analyzed once additional funding is secured. Nevertheless, these preliminary results show the research potential of this site and add much needed detail to our picture of Caddo and pre-Caddo lifeways in the Ouachita Mountains region.

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Report on the 2015 Caddo conference in Arkadelphia

Mary Beth Trubitt

The Caddo Conference is an annual conference bringing together people interested in the language, culture, history, and archeology of the Caddo Area in Arkansas, Louisiana, Texas, and Oklahoma. Academics, Caddo Indians, and avocational researchers present and learn from the papers, posters, discussion sessions, and the personal interaction. The 57th Annual Caddo Conference was held March 27-28, 2015, on the campus of Henderson State University in Arkadelphia. The conference was hosted by the Arkansas Archeological Survey, Henderson State University, and the Caddo Conference Organization. This year's planning committee included: Mary Beth Trubitt, Arkansas Archeological Survey; Elsbeth Linn Dowd, Sam Noble Oklahoma Museum of Natural History; Judy Harrison, Henderson State University; Jeri Redcorn, Metro Caddo Cultural Club; George Sabo III, Arkansas Archeological Survey; and Marvin Schultz, College of the Ouachitas.

Figure 1. Several participants at the 2015 Caddo Conference. Arkansas Archeological Survey photo.

The conference began Friday, March 27th, at 8 am with a program of research presentations in the Education Center at HSU. Presentations continued during the day on Friday and in the morning on Saturday, March 28th. Eighteen research papers and a research poster were presented, and a discussion session on

digitizing Caddo ceramic collections was held during this part of the conference. The full program with abstracts is available on the CCO website at http://www.caddoconference.org. During the day, publishers displayed books and several Caddo artists displayed art for sale in the adjacent book room. There were 77 paid registrants attending the conference. The audience reached its maximum during the Saturday afternoon public session, and it is estimated that 120 people attended in all.

A special Saturday afternoon session was the highlight of the 2015 Caddo Conference. This free public session, "Caddo Indian Cultural Traditions in the 21st Century," featured presentations on Caddo culture, language studies, art, and dance. This session was intended to attract local teachers, students, and the interested public in addition to the conference attendees. Caddo Indians participated both as presenters and audience. The session and conference concluded with a performance of traditional dances led by the Caddo Culture Club. A grant from the Arkansas Humanities Council, matched by donations from the Caddo Conference Organization, the Arkansas Archeological Survey, and the Arkansas Archeological Society, funded travel honoraria for members of the Caddo Culture Club, the Metro Caddo Cultural Club, the Kadohadacho Historical Society, and the Caddo Nation traveling from Oklahoma to Arkansas to present at this special session. Thanks go to the evaluation committee for their help with this grant: Mary Beth Trubitt, Arkansas Archeological Survey; George Sabo III, Arkansas Archeological Survey; Marvin Schultz, College of the Ouachitas; Shelley Loe, Arkadelphia Regional Economic Development Alliance; and Shona Wiley, Magnet Cove Elementary School.

Figure 2. Presentation by Guyneth Bedoka Cardwell, Arkansas Archeological Survey photo.

The "Caddo Indian Cultural Traditions in the 21st Century" special public session began with a short welcome by incoming Caddo Conference Organization President Scott Hammerstedt. Dr. Guyneth Bedoka Cardwell (Kadohadacho Historical Society) presented, "Kee whut nah sundah People: A Caddo Journey." Cardwell's talk incorporated oral history, family stories, and selections of her poetry about growing up in a Caddo family near Fort Cobb, Oklahoma. Tracy Newkumet Burrows (Caddo Nation) presented "Language Learning through Games, Stories, and Sounds: Caddo Class 2014-2015." Her presentation highlighted the progress made by the beginner and intermediate Caddo language classes as they learn vocabulary, grammar, and conversations during their Oklahoma City meetings.

Jeri Redcorn (Metro Caddo Cultural Club) presented "Generation to Generation: Our Time and Place." Redcorn's talk gave an overview of current activities of the Metro Caddo Cultural Club in Oklahoma City. The audience especially enjoyed it when two girls performed "It's the Hard-Knock Life" in Caddo.

Figure 3. Metro Caddo Cultural Club members singing in Caddo, Arkansas Archeological Survey photo.

During a break in the session, audience members took the opportunity to visit with Caddo artists Chad Earles and Chase Earles in the book room. A series of posters, "True to Tradition: Caddo History and Heritage" by Elsbeth Dowd, Tracy Newkumet Burrows, Kim Penrod, and Lea Vanderburg, was set up for viewing in the conference room.

Figure 4. Caddo artists Chad Earles and Chase Earles, Arkansas Archeological Survey photo.

The session continued with a presentation by Dr. George Sabo III (Arkansas Archeological Survey) on "Caddo Ceremonial Regalia through Time." In this presentation, Sabo showed depictions of ancient Caddo regalia as seen on engraved marine shell and other media, and discussed modern clothing and regalia that is a part of contemporary Caddo dances. Phil Cross (Caddo Culture Club) presented "Caddo Songs and Dances: The Everlasting Foundation of an Enduring People." Cross emphasized how Caddos have continued traditions into the modern day, and provided an overview of the Turkey Dance and several other Caddo dances that would be seen and heard later in the program. Two girls sang "Old MacDonald had a Farm" in Caddo to conclude the presentation.

Figure 5. Viewing posters during break. Arkansas Archeological Survey photo.

Figure 6. Presentation by Phil Cross, Arkansas Archeological Survey photo.

The Saturday afternoon public session, and the 2015 Caddo Conference, concluded with a performance of traditional Caddo dances, led by members of the Caddo Culture Club. The Caddo dance was held in the Education Center at HSU. Phil Cross served as master of ceremonies and introduced the dances. Caddo sacred and social dances are accompanied by drummers singing songs in the Caddo language. During this performance, 7 men drummed and sang in Caddo in the center of the dance space, while varying numbers of dancers danced. The dance began with the Turkey Dance, traditionally danced by women until the last song cycle when men are invited in as partners. There were several honor dances that honored a Caddo woman in attendance who is a former HSU student (and a veteran), as well as the conference organizers, the CCO president, and Caddo Nation chairwoman Tamara Francis-Fourkiller. The Caddo Culture Club performed the Drum Dance and the Alligator Dance as well. Several Caddo women led the dancing for many of these dances, with other women and men joining in. Non-Caddos were invited to join the dancers for the social dances, and by the end, much of the audience had become participants. Thank you to Steve Fellers (Henderson State University) for the use of several of his photographs from this event.

Figure 7. Caddo Culture Club performs Turkey Dance, Henderson State University photo.

The dances and songs celebrate aspects of Caddo history and origins, communities and family life. For Caddos, performances serve to reinforce cultural identity and teach language and cultural traditions to the youth. For non-Caddos watching as audience and participating in the dancing, the event shows that Indians still maintain unique cultural traditions while living as modern Americans in the 21st century.

During the Saturday afternoon session, volunteers circulated audience questionnaires to get feedback on the "Caddo Indian Cultural Traditions in the 21st Century" public session as part of the grant. A total of 56 questionnaires were filled out, with most completed before the Caddo dance at the end of the conference. This audience sample allowed us to estimate the audience profile (sex: 45 percent male, 55 percent female; age: 2 percent under age 12, 4 percent 12-18 years, 9 percent 19-25 years, 30 percent 26-40 years, 13 percent 41-55 years, 43 percent over 55 years old; educational level: 2 percent elementary; 7 percent high school; 22 percent college; 60 percent graduate work; 9 percent professional/technical training; ethnic representation: 63 percent Euroamerican; 2 percent African American; 2 percent Hispanic; 7 percent Asian American; 25 percent Native American; 2 percent other). A total of 84 percent responded that they participated in the event as audience, 11 percent as speakers or drummers/singers, 5 percent as contributors to the book/art room;

52 percent had attended a Caddo Conference or Caddo dance previously but 48 percent responded that they had not previously attended either one. When asked about group representation, 24 percent responded that they were students, 6 percent identified as teachers; 20 percent as Caddo Conference Organization members, 14 percent as professional archeologists or museum curators, 10 percent as members of the Arkansas Archeological Society or other state societies, 7 percent as Caddo Culture Club or Caddo Nation Council members, and 19 percent as unaffiliated members of the community.

Figure 8. Caddo Culture Club performs Turkey Dance, Henderson State University photo.

The audience questionnaires mentioned specific presentations as favorites from the Saturday afternoon session, as well as more general statements appreciating the Caddo singing, the Caddo dances, hearing personal stories and family history, learning about the Caddo language, seeing the efforts to preserve traditions, and enjoying the interaction with Caddo people, seeing old friends, and browsing the books and art on display. When asked about something learned from the session, many respondents mentioned something about the Caddo language, seeing younger generations engaged with learning the language, finding out about Caddo language classes, or learning some new words. Several responses mentioned efforts to keep traditions alive or seeing how Caddos build new traditions from earlier practices.

Figure 9. Caddo Culture Club performs Drum Dance, Henderson State University photo.

The Saturday afternoon public session was designed to draw local teachers and students to learn more about Caddo Indian history and culture in Arkansas and contemporary Caddo Indian life in Oklahoma. Coinciding with Arkansas Archeology Month in March, the event was also intended to draw interest from the local community. The project was successful in attracting audience from both groups: students, teachers, archeological society members, and members of the local community were well-represented, and nearly half the people responding to the questionnaire were first-time attendees. The Saturday afternoon public session and Caddo dance had the largest audience of the conference, and many people found this to be the highlight of the 2015 Caddo Conference.

In addition to the audience that attended the Saturday afternoon public session and the Caddo Conference directly, we hoped to reach a wider audience through the publicity with a message that Caddo Indians are here and maintaining their culture and heritage in the 21st century. Publicity for the event included electronic circulation of flyers and programs, newspaper notices and a story in *The Daily Siftings Herald* (Arkadelphia newspaper), a notice and follow-up picture on the Henderson State University website newsfeed, and postings on Facebook and Twitter. A film crew from AETN filmed during the Saturday afternoon session as part of a documentary project on the history of music and art in Arkansas. While this larger audience is difficult to gauge, a March 30th posting of pictures from the conference on the Arkansas Archeological Survey's HSU Research Station Facebook page reached 641 people, over five times the actual conference audience. We hope some of this wider audience links to the Caddo Conference Organization website, the Arkansas Archeological Survey's "Indians of Arkansas" website, the Arkansas Humanities Council website, or Facebook pages of the Caddo Culture Club, the Metro Caddo Cultural Club, or the Caddo Nation to discover more.

2015 Caddo Culture Club Activities Report

Written by Michael Meeks II, Caddo Culture Club Chairman

Founded in 1988, the Caddo Culture Club is a non-profit organization devoted to the preservation of Caddo tribal songs and dances. The Caddo Culture Club was the first known group established to help preserve the songs and dances of the Caddo Indians. As a Caddo organization, we find it very humbling being able to perform the very songs and dances that their ancestors once performed.

Over the past year we've taken part in many different events, activities and functions. The following are different events and functions that the Caddo Culture Club participated in.

57th Annual Caddo Conference

In 2015, the 57th annual conference was held in Arkadelphia, AR, on the campus of Henderson State University. We sung and performed various Caddo songs and dances and honored various individuals throughout the performance. We are looking forward to returning to Nacogdoches for the 58th annual conference!

Caddo Culture Day at Caddo Mounds S.H.S

In April, we were invited to perform at the Caddo Mounds State Historic Site in Alto, TX. The museum at the mounds site has undergone a complete remodel and the exhibits have been expanded. We were honored to be invited to perform at this spring activity as a way to celebrate a re-opening of the museum. The museum is now in the process of constructing a Caddo grass house on the Mounds site. We can't wait to see this project's completion and hope to return to the mounds soon!

Caddo Nation Child Development Benefit Powwow

In April, the Caddo Culture Club was asked to sing the traditional Turkey Dance to open the event. The proceeds from the yearly event benefit end-of-year activities for the children of the Caddo Head Start Center.

22nd Annual Caddo Culture Club Dance

In June, the Caddo Culture Club held its 23rd Annual Dance at the Caddo Nation Dance Grounds. The honored guest for the event was our Club Princess, Maxine Watan. The event began with the Turkey Dance and Flag Song, followed by a meal for all who were in attendance. The evening session saw various Caddo social dances and intertribal songs being performed. We are always happy to see a large attendance at our annual dance and we are looking forward to this year's dance!

Outgoing/Incoming Princess Dance

This past year, we elected a new princess for our organization. From 2007-2015, Maxine Watan served as our Club Princess. She began serving as our Junior Princess and later as our stand-alone Princess. Upon graduation from high school, Maxine applied and was accepted to Haskell Indian Nations University in Lawrence, KS. Before her departure, we chose to honor her at our Outgoing/Incoming Dance. Our incoming princess is Kayleigh Edge, a talented high school student whose lineage includes the Late Doyle Edge, former Chairman of the Caddo Culture Club. On behalf of our organization, I'd like to thank Maxine for her years of service and wish her the best of luck in her academic journey. To Kayleigh, I wish you luck in your time as our princess and I know you will do a fantastic job!

24th Annual Clara Brown Dance

In September, the Caddo Culture Club served as singers for the 24th Annual Clara Brown Dance held at the Caddo Nation Dance Grounds. The event began with the Caddo Turkey Dance, followed by an evening meal and Caddo Social Dancing. We saw many people in attendance and always look forward to participating in this dance.

Thanksgiving Dance

This past November, we thought it would be great to host a dance in honor of the Thanksgiving holiday. Many people were in attendance and there were many social dances performed. As a way to give back, a few of our Caddo elders in attendance received a basket of goods that we hope assisted in their own Thanksgiving meals. An event like this reminds us that we have many things to be thankful for and we should give thanks as much as we can rather than on a designated holiday. We look forward to having another dance like this soon!

Native American Heritage Month

This past November in honor of Native American Heritage Month, we were asked to perform for student bodies at different schools. We were honored to participate in these activities and help educate students about Native American culture!

The Caddo Culture Club would like to thank the Caddo Conference Organization and all of its members for their long-continued support and inclusion of our annual report in the Caddo Conference Journal.

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