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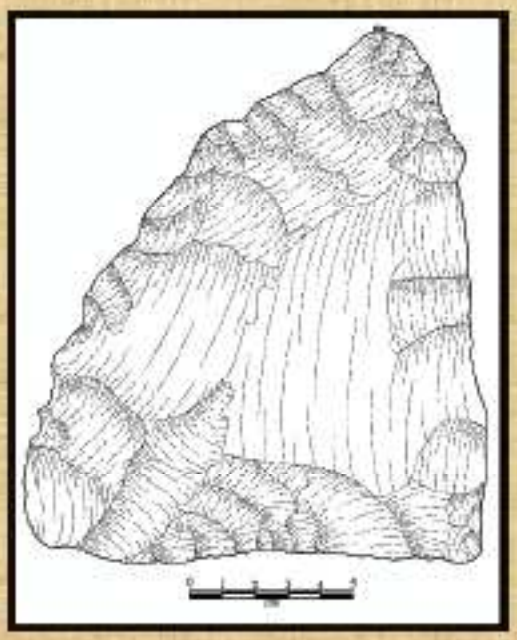

Large quartzite chopper from the Lewisville site (41DN72), Denton County, Texas.

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Wilson W. Crook, III, Editor

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Message from the HAS President

We're back! With this 133rd issue of ***The Journal***, I am pleased to announce that the Houston Archeological Society is continuing a 50+ year tradition of publishing high quality scientific papers on Texas Archeology. Starting in 1959 through 2009, a total of 132 issues of ***The Journal*** have been printed containing literally hundreds of articles and a wealth of archeological information. All 132 of these issues are now on line at the HAS website (www.txhas.org) and are available for all to access and study.

Our future goal is to publish at least one issue of ***The Journal*** each year; more if we have sufficient papers to fill additional issues. Each active member of HAS will receive a hard copy as it is published. After a period of a year, the current issue will be placed on the HAS website and be available to everyone.

Our policy will be to publish each paper in the year it is submitted. So this is a great opportunity for both young and experienced archeologists alike to get your research and discoveries in print. Our new editor, Wilson "Dub" Crook looks forward to receiving your input. Send your contributions to: Dub Crook (dubcrook@kingwoodcable.com; 281-360-6451).

Linda Gorski
HAS President

Forward

The ***Journal of the Houston Archeological Society*** is a publication of the Society. Our Mission is to foster enthusiastic interest and active participation in the discovery, documentation, and preservation of cultural resources (prehistoric and historic properties) of the city of Houston, the Houston metropolitan area, and the Upper Texas Gulf Coast Region.

The Houston Archeological Society holds monthly membership meetings with invited lecturers who speak on various topics of archeology and history. All meetings are free and open to the public.

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SHELL HOES FROM THE SISTER GROVE CREEK SITE (41COL36), COLLIN COUNTY, TEXAS

Wilson W. Crook, III and Mark D. Hughston

Introduction

Several well-preserved shell hoes have recently been found at the Sister Grove Creek site (41COL36) in Collin County. Worked shell is a diagnostic feature in sites of the Late Prehistoric along the East Fork of the Trinity (Crook and Hughston 2008). Reported artifacts include shell beads, shell gorgets, chipped shell scraping tools and perforated shells which are believed to have been used as digging tools (hoes). The latter have been found at a number of sites including Upper Farmersville (41COL34) (Crook and Hughston 2009), Butler Hole (41COL2) (Housewright et al. 1948), Thompson Lake (41COL3) (Crook 2013b), Mouth of Pilot (41COL4) (Crook 2013a), Upper Rockwall (41RW2) (Ross 1966), Lower Rockwall (41RW1) (Lorrain and Hoffrichter 1968), Glen Hill (41RW4) (Ross 1966), Raglan (41KF4) (Hatzenbuehler 1942), and Gilkey Hill (41KF42/41DL406) (Crook 2011). This is the first known occurrence of shell hoes from the Sister Grove Creek site and thus adds another occurrence for this type artifact. Moreover, since the hoes are constructed from fossil pelecypod shells as opposed to local freshwater mussels, they likely represent items which have been imported into the site perhaps as trade goods. This paper describes the artifacts and speculates on their origin.

The Sister Grove Creek Site (41COL36)

The Sister Grove Creek site is located in central Collin County about 6.5 km (4 miles) west of the town of Farmersville. The site lies on a small rise immediately west of Sister Grove Creek, a tributary of the East Fork of the Trinity. The site was explored by members of the Dallas Archeological Society in the 1950's and 1960's but due to lack of cultivation over the site, few diagnostic artifacts were recovered. The site's archeological potential was reviewed during a survey of the area prior to the expansion of Lake Lavon (Lorrain 1965). Due to the presence of a large, undisturbed Wylie Phase "rim-and-pit structure", the site was designated for future excavation. This work was undertaken by Mark Lynott of SMU in the summer of 1974 (Lynott 1975). The primary focus of the excavation was on determining the purpose of the rim-and-pit structure but parts of the rest of the site were also tested. While Lynott did not unambiguously determine the purpose of the pit structure, he did excavate a number of burials and more importantly, obtained nine radiocarbon dates which greatly added to framing the occupational horizon of the Late Prehistoric along the East Fork and its tributaries (Lynott 1978). Enlargement of the Lavon Reservoir in 1979 inundated the site halting all archeological investigation.

The extended drought over the last several years has significantly affected the lakes along the East Fork of the Trinity with both Lake Lavon (Collin County) and Lake Ray Hubbard (Rockwall and Dallas Counties) now being well below conservation levels (National Weather Service, 2014). As a result, most of the Sister Grove Creek site, including the area of the rim-and-pit structure, has become exposed (Figure 1).

Over 30 years of wave action has severely deflated the site including eroding the northern rim section of the rim-and-pit structure (see Figure 1). This erosion has exposed a large number of artifacts both around the edges of the pit as well as elsewhere throughout the site. In December of 2013 and January 2014, the authors visited the site to make an initial assessment of the cultural features still present and to photograph the rim-and-pit structure. In the area where the northern rim of the pit has been eroded, two well-preserved perforated shell hoes were recovered.

Shell Hoes

The recovered hoes were carefully cleaned using water and a firm brush. Both shells have been extensively worn with a smooth polish developed over all surfaces. As such, many of the key identifying features have been removed making specific species identification impossible. However, it is apparent that both shells belong to the same genus of oyster, *Ostrea sp*. These pelecypods are common from the Lower Cretaceous (Del Rio, Grayson, Fort Worth, Glen Rose and Bluffdale Formations) to the Tertiary Paleocene (Midway Group) (Finsley, 1999) in north-central Tex-

Figure 1. Mark Hughston standing in the Rim-and-Pit Structure at the Sister Grove Creek (41COL36) Site, Collin County, Texas. The shell hoes described herein were found to the right of the photo where the wave action of Lake Lavon has denuded the northern rim of the structure.

as. However, none of these formations crop out in Collin County.

The two shell hoes are shown in Figure 2. Maximum lengths of the hoes are 82.1 mm for Hoe #1 and 100.7 for Hoe #2. Maximum widths are 64.9 and 70.4 mm, respectively. As can be seen in the figure, both perforations were drilled from the exterior face of the shell to the interior and not biconically. The perforation in Hoe #1 was drilled with the length of the shell whereas on Hoe #2, it was made across the width of the shell. There is extensive polish on both shells, especially within the perforation and along the distal end of the artifact (see Figure 2). Both are consistent with wear from the shells having been hafted and subsequently used as digging tools.

Table 1 below summarizes all the features and physical measurements of the two Sister Grove Creek shell hoes.

Table 1. Measurements / Features of Sister Grove Creek Shell Hoes

Major Attributes	Hoe #1	Hoe #2
Shell Type	Ostrea sp.	Ostrea sp.
Maximum Length	82.1 mm	100.7 mm
Maximum Width	64.9 mm	70.4 mm
Maximum Thickness	12.1 mm	20.1 mm
Perforation Dimensions	15.5 x 17.6 mm	18.2 x 22.1 mm
Orientation of Perforation	Ovoid; greatest length with length of shell	Ovoid; greatest length across shell
Direction of Perforation	Exterior to Interior	Exterior to Interior
Wear Within Perforation	Extensive	Extensive
End-Use Wear	Extensive on Distal End	Extensive on Distal End
Color	White (10YR8/1 to Light Gray (10YR7/1)	White (0 9/N) to Very Light Gray (0 8/N)

Figure 2. Shell hoes recovered from the Sister Grove Creek site (41COL36) Hoe #1 (left), Hoe #2 (right).

Conclusions

As mentioned above, all of the shell hoes that have previously been found along the East Fork have been constructed from local freshwater mussel shells. In particular, shells from *Amblema plicata*, *Cyclonaias turberculata*, *Lampsilis cardium*, *Megalonaisas nervosa*, and *Potamilus purpuratus* have been noted in the archeological record (Griffin 1966; Brown 1976; Todd 2006). Within the East Fork and its tributaries, it is our observation that *Ambliema plicata* is most numerous and the most utilized pelecypod for utilitarian shell tools.

The two shell hoes described herein are unique, having been constructed from fossil oyster shells which are not found locally. The nearest occurrence is 50-100 km to the west for Lower Cretaceous exposures and an even longer distance to the south for good exposures of Paleocene fossil-bearing strata. As such, the shell material was likely imported into the East Fork region, either brought in by local inhabitants while on long distance hunting forays and/or as the result of trade. It is impossible to tell if the shells were modified into hoes prior to their importation or were constructed later at the Sister Grove Creek site.

While there is no ethnographic evidence for shells having been used as hoes, Todd (2006) has done extensive experimental replication studies and found that once hafted, shells not only work very well as digging tools but also can be used to cut grass, brush and even small saplings. The main drawback to freshwater mussel shells as tools is their weakness as compared to stone material (Myers and Perkins 2000). However, use of fossil shells, as in the case of the Sister Grove Creek hoes described herein, partially alleviates this potential problem. The extensive use wear observed on the two hoes testifies to both their suitability as hafted tools and their resistance to breakage over time.

Lastly, the presence of the hoes near the northern pit rim at the Sister Grove Creek site suggests that they may have been part of a burial complex. The authors have shown that high status individuals were buried

within the rims of the rim-and-pit structures along the East Fork (Crook and Hughston 2008; 2009). Contrary to what has been previously supposed about the Late Prehistoric of the East Fork (Bruseth and Martin 1987), many of these burials do contain grave furniture items. Frequently such burials contain unique items such as shell beads, pottery vessels, or exotic bone tools (Ross 1966; Harris 1945; 1948; Crook, 1984). The uniqueness of the two fossil hoes found at Sister Grove Creek fits this pattern. Whether this was true in the case of the two hoes described here is unknown as much of the northern end of the rim-and-pit structure has now been destroyed by erosion and the remaining portion (see Figure 1) is unavailable for excavation.

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A CERAMIC SPINDLE WHORL FROM THE SISTER GROVE CREEK SITE (41COL36), COLLIN COUNTY, TEXAS

Wilson W. Crook, III

Introduction

A partial spindle whorl made from the base of a broken grit-, grog-tempered pottery vessel has recently been found at the Sister Grove Creek site (41COL36) in Collin County. The discovery is the first spindle whorl ever recorded in nearly 80 years of excavations along the East Fork of the Trinity and its tributaries. Pottery is one of the key diagnostic features that defined the Late Prehistoric culture of the East Fork (Stephenson 1952; Crook and Hughston 2008). However, to date, direct evidence for local manufacture is limited to one plain shell-tempered vessel found at the Upper Farmersville site which fell apart during firing and was discarded into a trash pit subsequently excavated by the authors (Crook and Hughston 1986). Most ceramics from sites along the East Fork as well as exotic items such as bison scapula hoes (Harris 1945), boatstones made from igneous rock (Harris 1948), worked shell beads (Ross 1966), and Puebloan ceramics and obsidian artifacts (Lorrain and Hoffrichter 1968; Crook 1984; 2013) have historically been assumed to be the product of long distance trade (Crook 2014).

While no woven materials have been recovered to date, largely due to the acidic nature of the soil coupled with extensive cultivation on many of the area's sites, a large number of finely made bone pins and needles have been recovered (Stephenson 1952; Crook and Hughston 2008; 2009). These artifacts have been inferred by all previous researchers to indicate the manufacture and probably repair and maintenance of clothing by the aboriginal inhabitants of the region. To date, no direct evidence for fiber manufacture has been found in the area and thus the discovery of a spindle whorl from the Sister Grove Creek site marks the first such hint at local clothing (or at least fiber) production. This paper describes the artifact and speculates on its use and origin.

The Sister Grove Creek Site (41COL36)

The Sister Grove Creek site is located in central Collin County about 6.5 km (4 miles) west of Farmersville. The site lies on a small rise immediately west of Sister Grove Creek, a tributary of the East Fork of the Trinity. The site was explored by members of the Dallas Archeological Society in the 1950's and 1960's but due to lack of cultivation over the site, few diagnostic artifacts were recovered. The site's archeological potential was reviewed during a survey of the area prior to the expansion of Lake Lavon (Lorrain 1965). Due to the presence of a large, undisturbed Wylie Phase "rim-and-pit structure", the site was designated for future excavation. This was undertaken by Mark Lynott of SMU in the summer of 1974 (Lynott 1975). Enlargement of the Lavon Reservoir in 1979 inundated the site halting all archeological investigation.

The extended drought over the last several years has significantly affected the lakes along the East Fork of the Trinity with both Lake Lavon (Collin County) and Lake Ray Hubbard (Rockwall and Dallas Counties) now being well below conservation levels (National Weather Service, 2014). As a result, almost the entire Sister Grove Creek site has become exposed. Thirty-five years of wave action has severely deflated the site, exposing a number of artifacts. From December of 2013 through May of 2014, the authors visited the site to make an assessment of cultural features still present and to photograph the Wylie Phase "rim-and-pit" structure as well as a number of hearth features. Immediately to the east of the pit structure a large amount of pottery was exposed on the surface. These were equally split between plain, shell-tempered sherds (probably type Nocona Plain) and various plain and decorated types associated with East Texas Caddo sites. One of these sherds had been intentionally ground into a circular shape and perforated with a single whole near its center characteristic of known aboriginal spindle whorls.

The Spindle Whorl

The spindle whorl was carefully cleaned using water and a firm brush and then hardened in a bath of diluted muriatic acid. The artifact appears to have been constructed from the broken base of a flat-bottomed, grit- and grog-tempered vessel. No decoration is present on the sherd but even bases of decorated pottery vessels seldom show any decorative markings. Color

of the sherd varies from dark greenish-gray (GLEY1 3/1) to dark bluish-gray (GLEY2 3/1). The sherd has been intentionally ground into a circular shape with a single perforation drilled into its center. The artifact broke subsequent to its manufacture with the breakage occurring through the centerline of the perforation. Current dimensions of the artifact are 73.1 mm by 36.2 mm. Assuming the breakage occurred through the center line of the artifact, the original dimensions would have been close to a circle 72-73 mm in diameter. Thickness is fairly uniform across the sherd at about 8.0 mm, indicating that it likely came from a flat-bottomed vessel. Dimensions of the perforation are 11.9 mm by 4.0 mm, which would yield an original hole roughly 12 x 8 mm in size. The size and shape of the artifact are consistent with similar tools which have been identified as spindle whorls from Caddo sites across East Texas (Timothy K. Perttula, personal communication, 2014).

Microscopic examination of the sherd across the breakage plane shows it to be constructed of a dark paste with both grit and grog-temper. Both color and composition are consistent with a number of Caddo pottery types from East Texas through southern Oklahoma, Arkansas and northwest Louisiana. Without any form of decoration or idea of what type vessel the sherd originally came from, the artifact is impossible to type. It is also impossible to determine if the spindle whorl was constructed at the Sister Grove Creek site from a broken vessel or was made elsewhere and traded as a completed tool.

A photograph of the artifact is shown in Figure 1
.

Conclusions

Spindle whorls are a consistent, albeit not abundant artifact from many Caddo sites, especially those where a thousand or more pottery sherds have been recovered (Timothy K. Perttula, personal communication, 2014). Webb (1959) reported a large number were recovered during his excavation of the Belcher Mound site in Caddo Parish, Louisiana. Most were found on the floors of houses, were constructed from side-wall or basal pottery sherds, and were typically 50-63 mm in diameter with a single central perforation. Similar artifacts were reported from the George C. Davis site (41CE19) in Cherokee County, Texas (Newall and Krieger 1949). The artifacts varied from 50-70 mm in diameter and were identified as having been constructed from Frankston phase ceramics. Perforated ceramic disks have also been reported from a number of sites throughout the Caddo occupational area (Perttula 1992, 2005; Perttula et al. 2011).

It is noteworthy that even after extensive surveying and collecting from the East Fork region (Harris and Suhm 1963; Lorrain 1965; Crook and Hughston 2008), the artifact described herein is the only spindle whorl thus far reported and this includes the recovery of nearly 31,000 artifacts including over 10,200 pieces of pottery. Thus while the find may give a clue with regard to the local inhabitants producing some type of fiber, it does not appear that fiber production was extensive. Indeed, the artifact may have been used to produce fibers for the construction of something other than clothing, such as nets for fishing and/or trapping.

Recently, a number of ethnobotanists have begun to look at possible sources for fibers available to the

Figure 1. Broken ceramic spindle whorl recovered from the Sister Grove Creek site (41COL36)

aboriginal inhabitants of Texas (S. Alan Skinner and Leslie L. Bush, personal communication, 2014). A large number of possible fiber plants have been identified, a summary of which is presented in Table 1 below.

Of the 15 major plant species identified as potential sources for fiber use, ten are known to occur in north-central Texas today, and by extrapolation, were probably present in Late Prehistoric times as well. As can been seen on the Table, Thistles and Spanish Moss were either unsuitable for spinning and/or were likely used as insulation material rather than as a source of fibers. From the remaining plants, Milkweeds, Sunflowers, Cottonwoods and Cattails would have been the most abundant and thus likely candidates for providing fiber material.

The spindle whorl's occurrence at the Sister Grove Creek site is intriguing for several reasons. First, Lynott (1975) obtained an age date of A.D. 1590 +/- 70 from a hearth feature located just a few meters to the west of where the spindle whorl was found. This is the latest date obtained from any site along the East Fork (including 8 earlier dates from Sister Grove Creek). Secondly, the author recovered a near complete jar of type Foster Trailed Incised, *var. Foster* from the same site (Crook 2007; Crook and Perttula 2008). Foster Trailed-Incised is a relatively common Caddo pottery type made primarily by Belcher and Texarkana phase Caddo peoples living in the Great Bend area of the Red River valley in southwestern Arkansas, northwestern Louisiana, and a small part of northeastern Texas (Perttula 2005; Schambach and Miller 1984; Webb 1959). Ceramic analyses by Schambach and Miller (1984) indicate that different varieties of Foster Trailed-Incised tended to have been

Table 1. Fiber Plants for Texas (Compiled by Leslie L. Bush)

Common Name	Botanical Name	Part Utilized	Suitable for Spinning	Present in North-Central Texas
Indian Mallow	*Abutilon sp.*	Stem Fibers	Yes	No
Agave	*Agave sp.*	Leaf Fibers	Possible	No
Indian Hemp	*Apocynum cannabinum*	Herbaceous Bark	Possible	Yes
Milkweeds	*Asclepias sp,, especially A. incarnata and A. curassavica*	Herbaceous Bark and Seed Attachments	Possible	Yes
Thistles	*Cirsium sp.*	Seed Attachments	Probably too short to spin	Yes
Orinoco Jute	*Corchorus hirtus*	Stem Fibers	Possible	No
Sotols	*Dasylirion sp.*	Leaf Fibers	Possible	No
Sunflowers	*Helianthus sp.*	Herbaceous Bark	Possible	Yes
Red Yucca	*Hesperaloe parviflora*	Leaf Fibers	Possible	No
Cottonwood	*Populus sp.*	Inner Bark and Seed Attachments	Yes	Yes
Common Reed	*Pragmites australis*	Herbaceous Bark	Possible	Yes
Spanish Moss	*Tillandsia usneoides*	Whole Plant	No, stuffing only	Yes
Cattails	*Typha sp.*	Split Leaves and Seed Attachments	Yes	Yes
Stinging Nettle	*Urtica sp.*	Herbaceous Bark	Yes	Yes
Yucca	*Yucca sp.*	Leaf Fibers	Possible	Yes

made and used by the Caddo between ca. A.D. 1500 and ca. A.D. 1700.

The presence of a Foster Trailed Incised, *var. Foster* vessel in a Late Prehistoric site on the East Fork of the Trinity clearly indicates trade between an East Fork aboriginal group and one of the Red River Caddo groups, probably the prehistoric ancestors of the Kadohadacho. Caddo pottery and other items were widely traded across Texas and surrounding states (Perttula 2002) in prehistoric and historic times, especially after about A.D. 1400, when there were apparently periodic contacts and interaction between several different and non-Caddo aboriginal groups and southern Caddo groups. The discovery of a spindle whorl constructed from an East Texas Caddo pottery type is consistent with the same kind of trade pattern established by the Foster Trailed Incised, *var. Foster* jar. Whether the spindle whorl was constructed from a broken piece of Caddo pottery at the Sister Grove Creek site or arrived at the site as a completed tool is irrelevant; its presence is almost certainly the result of trade.

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AN OCCURRENCE OF A LEAD OCHRE PAINT POT AT THE UPPER FARMERSVILLE SITE (41COL34), COLLIN COUNTY, TEXAS

Wilson W. Crook, III and Mark D. Hughston

Introduction

During the summers of 1973-75, the authors conducted several focused excavations on the so-called "Wylie pits" which occur in many of the larger Late Prehistoric sites along the East Fork of the Trinity and its tributaries in Collin and Rockwall Counties, Texas. In particular, in May, 1973 we coordinated a salvage excavation on part of the rim as well in the interior of the pit structure at the Upper Farmersville site (41COL34) in north-central Collin County. During this work, an apparent trash pit was uncovered in the rim of the pit structure. Subsequent excavation showed the feature to contain the remains of a large shell-tempered plain ceramic bowl which had apparently fallen apart during firing and was discarded. Associated with the fragments of the bowl was a single Ellis dart point made from light gray quartzite, a broken piece of turtle shell with a well-made incising point on one end, and a small piece of limestone which had been hollowed out on one side and filled with gray-colored ochre. The entire pit containing these artifacts was filled with charred vegetable matter, from which the remains of hackberry, pecan and other burned shells were recovered (Crook and Hughston 2009).

Reconstruction of the shell-tempered bowl showed the vessel to be consistent with type Nocona Plain as defined in Suhm and Kreiger (1954) and Suhm and Jelks (1962). The reconstructed bowl was placed on exhibit in the Heard Museum of Natural Science in McKinney, Texas, one of the primary sponsors of the excavation of the pit structure at the Upper Farmersville site (Crook and Hughston 1986). The remaining materials were carefully labeled and stored for future study. All the burned vegetable matter was stored in aluminum foil and sealed in a glass container for possible future radiocarbon dating. These materials were then curated in the basement storage rooms of the Heard Museum.

In March of 2014, the senior author approached the Heard Museum about being able to photograph, record and re-study the collections from 1973-75. This was graciously allowed by the Museum staff and virtually all of the authors' previously excavated materials were found intact and still sealed. In particular, a split of the preserved vegetable matter was sent to Beta Analytical for radiometric dating. This has now yielded a calibrated two sigma date of AD 1300 +/- 30 (Beta #376327) which effectively dates all of the materials recovered from the trash pit.

In addition, detailed photographs and measurements were taken of the artifacts found associated with the Nocona Plain bowl including the limestone "paint pot". In the course of taking these photographs, the senior author noticed that the gray-colored ochre had a distinctive silver-gray reflectance under direct light. Examination under a high powered binocular microscope (20-200x) showed small rectangular metallic fragments, a few of which displayed cubic cleavage. The specimen was then taken to the laboratory of the Gault School of Archeological Research at Texas State University and subjected to X-Ray Fluorescence (XRF) analysis. This analysis confirmed the presence of the mineral galena, PbS, a rare archeological site component in Texas and especially along the East Fork of the Trinity. The discovery marks the third known occurrence of the mineral along the East Fork and the first where galena was definitively being powdered for use as a pigment. This paper therefore serves to describe the artifact in detail and speculates on the origin of the galena ochre.

The Upper Farmersville Site (41COL34)

The Upper Farmersville site is located in North-Central Collin County about 8 km (5 miles) northwest of the town of Farmersville. The site lies on either side of Farm Road 2756 immediately west of the confluence of Pilot Grove and Indian Creeks. The original landowners, the Warren Dugger family, cultivated the section of land north of the road leaving the smaller southern part of the site largely undisturbed. This untouched southern portion of the site contained remnants of a large Wylie Phase "rim-and-pit structure". The authors began a study of the site in 1971 and continued periodic work until the mid-1970's, with a special emphasis on the undisturbed portion of the site south of Farm Road 2756 (Crook 1984b; Crook and Hughston 1986, 2009). Enlargement of the Lavon Reservoir in 1979 was believed to result in the raising

of Pilot Grove Creek and the inundation of part of the site. As a result, a significant portion of the remaining southern part of the site was removed as fill material for the construction of a new elevated portion of Farm Road 2756. Only a small remnant of the southernmost portion of the rim-and-pit structure was left after road construction (Figure 1).

The Upper Farmersville site is one of the largest Late Prehistoric occupations along the East Fork and is well-known for having produced an abundance of unique trade items, including a complete Sanders Engraved water bottle (Harris 1936, 1948), eight socketed bison scapula hoes (Harris 1945), an exotic boatstone made from Arkansas diorite (Harris 1960), a unique bone harpoon (Crook 1984a), a juvenile burial with 12 attendant pieces of grave furniture (Crook 1984b), and a large cache of unusually-shaped arrow points made from exotic cherts (Crook 2009). Coupled with large amount if imported pottery, these artifacts demonstrate that the Upper Farmersville site was a major local entrepot for trade, especially with peoples to the east along the Red River (Crook 2014).

Ochre Paint Pots

A number of artifacts, which have been described as "paint pots", have been recovered from the Upper Farmersville site as well as other Late Prehistoric occupations along the East Fork. These artifacts are typically constructed from hollowed-out ironstone concretions or from fossil oyster shells, both of which can be found locally. These natural containers are frequently seen to be stained with red, yellow and other colored pigments. The most common component is what has been termed "red ochre", a naturally occurring earth pigment which when analyzed, consists primarily of the mineral hematite, Fe_2O_3. Of less abundance are the remains of yellow to yellow-brown pigments known as "yellow ochre". X-ray powder diffraction analysis has shown yellow ochre to be various forms of hydrated iron oxide, mostly the mineral limonite ($FeO(OH)\cdot nH_2O$). Other pigments of rare occurrence are purple to black ochre (mainly manganese oxides) and one occurrence of green ochre. The latter, found in a tiny oyster shell paint pot associated with a juvenile burial, was shown via X-Ray Diffrac-

Figure 1. Remnant part of the Rim-and-Pit Structure, Upper Farmersville (41COL34) Site, Collin County, Texas.

The original rim structure (from the tree to the right of the telephone pole) curved toward the position of the photographer with the trash pit discussed herein being located in the foreground of the photo.

Figure 2. Limestone "paint pot" from a trash pit in the rim of the pit structure at the Upper Farmersville (41COL34) site, Collin County, Texas.

The gray area covering the center hollowed out area of the obverse face of the artifact has been shown to contain residue from powdered galena (PbS).

tion to be the mineral malachite, $Cu_2CO_3(OH)_2$ (Crook 1984b).

As mentioned above, two other occurrences of galena have been found by the senior author in previous unpublished excavation notes. In R. L. Stephenson's notes on the Branch site (41COL9), he reports finding a piece of crystalline galena. Although this mineral specimen was not present in Stephenson's collections from the Branch site at the Texas Archeological Research Laboratory (TARL), this find was confirmed by R. K. Harris (R. K. Harris, personal communication, 1973). A second occurrence was in the form of two small (~5 mm) pieces of galena found in the Rex Housewright-Lester Wilson-Bobby Vance collections from the Randle site (41RW10) in Rockwall County (crook and Hughston, 2011).

The paint pot described herein is unusual for several reasons. First, it is constructed from limestone as opposed to fossil shell or a concretion. The yellow-brown color seen on the artifact's reverse side is typical of weathered limestone outcrops of the Upper Cretaceous Austin Chalk which forms the bedrock in western and west-central Collin County. The obverse face has been intentionally hollowed out creating a depression to contain the powdered ochre. Maximum length of the artifact is 66.5 mm; maximum width is 34.3 mm which narrows to 31.5 mm along its length. Thickness is as much as 15.0 mm on the rim of the obverse face decreasing down to 10.0 mm in the center of the artifact's depression. Figure 1 shows the Upper Farmersville paint pot described here.

The second unique feature is the distinctive gray coloration of the pigment staining the obverse face of the artifact. Color of the pigment is gray to dark gray (GLEY1 – 5/N to 4/N), which is completely unique throughout the entire East Fork area. As a result, the material was subjected to X-Ray Fluorescence analysis which is non-destructive as opposed to X-ray Power Diffraction which destroys the sample through grinding and powdering. Operating parameters of the XRF analysis were a current of 40 kV, a voltage of 55 ìA, and five successive 60 second count times. The analysis shows the reverse side of the artifact to consist primarily of calcium (consistent with limestone) with minor traces of strontium and iron (also consistent with Austin Chalk limestone). Lead is present, but only in very minor trace amounts. However, on the obverse pigment-stained face, lead is the dominant element present, averaging about 390 ppm across the artifact. Sulfur is also present, albeit in trace amounts. Coupled with the microscopic observation of tiny silver-gray fragments showing cubic cleavage, the analysis confirms the presence of the mineral galena (PbS) as the source material for the ochre. It is significant to note that other chemical elements commonly found in some galenas, such as silver, bismuth, antimony, copper, nickel, cobalt, etc. were completely absent (<0.1 ppm).

Conclusions

As mentioned above, the occurrence of galena at the Upper Farmersville site marks the third known occurrence of the mineral from sites along the East Fork and the first occurrence of where the mineral has been powdered for use as a pigment. Naturally occur-

ring galena is exceedingly rare in Texas, found only in the Shafter mining district in Presidio County and the Pavitte mine in Burnet County. In both occurrences, galena occurs as vein material in association with silver, copper and traces amounts of gold (Sellards 1934). In fact, both mines were exploited for silver rather than galena. As noted above, the galena present on the Upper Farmersville artifact was very close to stoichiometric PbS with little to no associated trace elements. This is more characteristic of galena from the Picher Field in the so-called Tri-State area of northeast Oklahoma-southeast Kansas-southwest Missouri (McKnight and Fischer 1970). While some galena from the Tri-State district has recoverable amounts of silver, many assays should only trace amounts with even less of copper, gold and other metals (McKnight and Fischer 1970).

Galena is well-known as a high value trade item throughout the Upper Mississippi River valley (Walthall 1981). Powdered and mixed with animal fat, galena made a unique silver-gray pigment which could not be duplicated by the more common earth pigments such as red and yellow ochre (Walthall, 1981). Five hundred pounds of powdered galena and over one thousand pounds of unworked galena ore was reportedly found in the major burial chamber of Craig Mound at Spiro (Brown 1976; La Vere 2007). Galena was also one of the items believed to have been traded from Spiro to its immediate network in exchange for other high value items.

Schambach (1995), Bruseth et al. (1995) and others have postulated that major sites along the Red River in Texas, such as the Sanders site (41LR2), could have served as a Spiroan entrepots for trade. Galena has been reported from the Crenshaw site (3M16) in southwest Arkansas (Jackson et al. 2012) as well as from the Hurricane hill site (41HP106) in east Texas (Perttula, 1987; Perttula and Brown, 1999). Ceramic trade between the Red River area and the occupants of the East Fork has been well established (Crook and Hughston 2008; 2009). Galena, either as unworked mineral or as powdered ochre could also have been part of this trade. It is intriguing that the lead ochre paint pot described above comes from one of the largest sites along the East Fork. It is probable that Upper Farmersville, along with other major sites like Branch, Upper Rockwall and Lower Rockwall, served as centers of trade between the East Fork and the peoples east of the region, thus serving as the principal entrepots for the East Fork.

Acknowledgments

The authors are indebted to the many previous researchers in the area who openly shared their knowledge about the Late Prehistoric occupations of the region. Foremost among these were the late R. K. Harris, R. L. Stephenson, Rex Housewright, Lester Wilson and Bobby Vance of the Dallas Archeological Society. We are also grateful to Dr. James Krakker of the Smithsonian Institution (Museum Support Center) for allowing us access to the R. K. Harris collection, and to Ms. Laura Nightengale who offered us unlimited access to the East Fork collections present at the Texas Archeological Research Laboratory in Austin. We want to thank Mr. Tom Williams of the Gault School of Archeological Research for his expertise in helping us with the X-Ray Fluorescence analysis of the paint pot. Lastly, we would like to specifically thank the Heard Natural Science Museum (McKinney, Texas) and the Collin County Historical Society who sponsored the original portions of this research and then gracious allowed us to re-examine and quantitatively analyze parts of our collections from the 1973-75 field seasons.

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TWO UNIQUE NEW QUARTZITE ARTIFACTS FROM THE LEWISVILLE CLOVIS SITE (41DN72), DENTON COUNTY, TEXAS

Wilson W. Crook, III

Introduction

The Lewisville site (41DN72) in southeastern Denton County was the first verifiable Clovis age site to be excavated in north-central Texas. The site was discovered in the early 1950's when a large borrow pit, created to construct the dam for Lake Lewisville, uncovered extensive Pleistocene mammal bones. When it became apparent that the completion of Lake Lewisville would inundate the area, members of the Dallas and Texas Archeological Societies conducted a detailed excavation of the site that lasted from 1956 into early 1957. Twenty one burned clay hearths and seven artifacts including a Clovis point, a quartzite chopper, a hammerstone, and four worked biface thinning flakes were recovered (Crook and Harris 1957; 1958). The site was then inundated in April, 1957 ending archeological investigations.

In 1978 a severe drought in north-central Texas brought the level of Lake Lewisville down below the level of the hearths. Dennis Stanford (1982) re-excavated the site in 1979-80 and made some new discoveries including several flakes from Hearth #1 which seem to match the material of the Clovis point found in the same location by Crook and Harris 24 years previously. Additional flakes of local quartzite, Edwards chert and Alibates dolomite were also found associated with the hearth areas. Excavations were terminated when heavy rainfall again brought a rise in the lake's water level.

Recently, two hitherto unknown flaked stone artifacts from the Lewisville site have come to light. After excavation of the site was completed in 1957, a local resident visited the area of the excavation and found a large quartzite chopper and a small bifacial knife near the excavated hearths. The artifacts were placed in a box with a site label and stored in the man's garage. After his death, his granddaughter, Ms. Elaine Waite of Little Elm, Texas rediscovered the box and its contents. Subsequently she learned of my research along the East Fork of the Trinity and contacted me asking if I was related to the Wilson Crook who had excavated the Lewisville site. When I replied that I was his son, she gave me the artifacts with the expressed desire that I study and record them as part of the Lewisville site record. This paper therefore serves to record these two artifacts and describe their characteristics.

Lewisville Site

The Lewisville site (41DN72) lies in southeast Denton County near the confluence of Hickory Creek and the Elm Fork of the Trinity River. The site is located on the west side of the Elm Fork close to the location of Lake Lewisville dam. Lake Lewisville, as it is now known, was the expansion of the old Lake Dallas and serves as a primary water supply for Dallas, Denton, Highland Park, and University Park as well as many of the local communities bordering the lake. The enlarged lake was originally called Garza-Little Elm Reservoir but was renamed Lake Lewisville in the mid-1970's to avoid legal confusion resulting from the government's naming of the dam as Lewisville Dam.

As mentioned above, the location was originally discovered in the early 1950's when removal of dirt for the construction of the dam exposed an immature extinct bison. Nearby, a small area of darkened, fire-hardened clay was observed, but at the time this was believed to be natural and not a cultural feature. Subsequent to this discovery, members of the Dallas Archeological Society began to explore the borrow pit as well as the area of darkened clay. Believing the feature to likely be man-made and of possible great age, excavations were initiated in the mid-1950's. A total of 21 fire-burned features were exposed which were interpreted as hearths. In Hearth #1, a Clovis point made from an opaque white chert was recovered (Crook and Harris 1957; 1958). The hearth also yielded burned carbon material which subsequently yielded a radiocarbon date of "greater than 37,000 years BP" (Crook and Harris 1962). Additional artifacts including a crude quartzite chopper, a well-used quartzite hammerstone, and four worked chert bifacial thinning flakes were recovered in the gullies of the borrow pit near the hearths (Crook and Harris 1957).

As would be expected, the extreme age date coupled with its association with a Clovis projectile point initiated a great deal of controversy. Scientists who had never visited the site claimed that the hearths were not in fact, cultural features but burned pack rat nests

(Heizer and Brooks 1965). Even Crook and Harris' scientific integrity was challenged by claims that the Clovis point had been "planted" (despite the fact that the Clovis point had been jacketed in plaster and removed with the entire section of hearth material it was found within including the point's fire hardened impression). When the lake was inundated in April 1957, not even Crook and Harris believed that the controversy surrounding the site would ever be resolved.

In 1978 a drought brought the level of Lake Lewisville down such that many of the hearths were again exposed. A re-excavation of the site was conducted in 1979-80 by Dennis Stanford of the Smithsonian Institution. The excavation was terminated in 1980 when heavy rains subsequently raised the lake and re-inundated the site. However, Stanford was able to confirm the original conclusions of Crook and Harris as well as provide a more refined interpretation of the site. Cross-sections of the burned areas showed that they were indeed man-made hearths (Stanford 1982). Two independent laboratories (University of Illinois and Harvard) confirmed the anomalously old age dates of the hearths but also found that much of the carbon material was admixed with lignite which served to contaminate the sample and generate a false age date (Stanford 1982). Lignite can be found in the Cretaceous Woodbine sandstone which crops about 1 km west of the site. A corrected date of roughly 12,000+ years BP was assumed for the Lewisville site so as to more clearly place it in the range of a Clovis occupation (and thus match the Clovis point). Stanford also noted that this represented the oldest known use of fossil fuels in North America (Stanford 1982).

Additional floral and faunal remains were found in Stanford's excavation of the hearths as well as several small flakes of local quartzite, Edwards chert and Alibates dolomite. Two of these appear to be of the same white chert as in the Clovis point and could well be flakes resulting from the resharpening of the artifact (Dennis Stanford, personal communication, 2008; 2013).

One of the unique features of the Lewisville site is the depth and breadth of its associated faunal assemblage. Many Clovis age sites are known for a single mammal species or at most, a few smaller mammals associated with larger fauna. At Lewisville, however, nearly 30 species were recognized including mammoth, bison, horse, camel, bear, deer, peccary, wolf, coyote, raccoon, skunk, tortoise and many other species of small mammals, reptiles, fish and birds. Invertebrates such as gastropods and pelecypods are also abundant (Crook and Harris 1957; Slaughter et al. 1962).

The barrow pit which contained the hearths was located in the second terrace above the Elm Fork of the Trinity, which is particularly well-developed both along most of the Elm Fork as well as its major tributaries such as Hickory Creek. Both Shuler (1935) and Taggart (1953) mapped this as the "Love Field" terrace; Crook named it the "Pemberton Hill - Lewisville" or "T-2" terrace (Crook and Harris, 1957); and Ferring

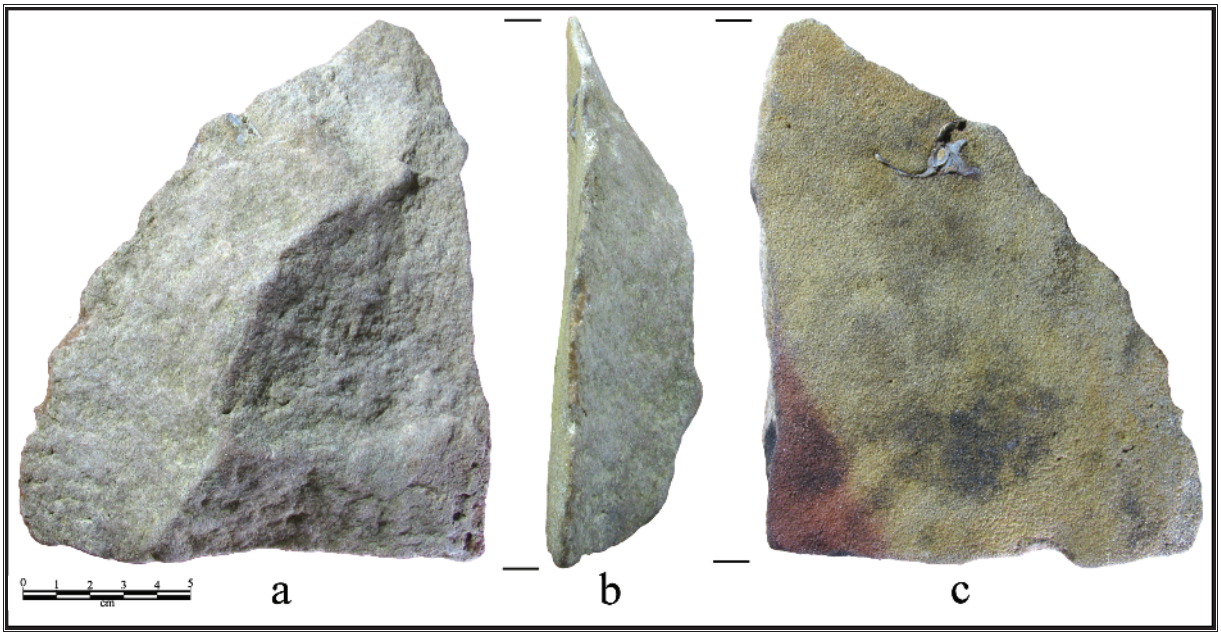

Figure 1. Large quartzite chopper from the Lewisville site (41DN72), Denton County, Texas. Obverse face (a), Flaked edge (b), Reverse face (c)
(Photographs by Lance K. Trask)

(1990; 2001) redefined it as the "Hickory Creek" terrace.

In Ferring's description of the Hickory Creek terrace, he described the terrace fill as the "Coppell Alluvium" which included a series of fine-grain sandy-clays with a gravel layer at the base. The entire section is overlain by a dark gray soil of more recent origin. Crook (Crook and Harris, 1957) subdivided the terrace into four components based on major unconformities separating depositional units. Exposed at the surface is a dark gray alluvium which contains small caliche nodules throughout. Crook called this unit the "Richards Formation", which is clearly younger than the rest of the underlying components of the terrace as it contains no fossil faunal remains. This unit varied from 1-1.7 meters in thickness across the pit.

Below the dark soil layer was a thick zone (5-6 meters in thickness) of medium to fine-grain yellow sandy-clay which Crook referred to as the "Upper Shuler Formation" (Crook and Harris, 1957). At least seven distinct depositional layers with temporary surfaces could be recognized, each representing major individual flooding periods over a considerable period of time. The Lewisville hearth material was found on the surface of one of the depositional units in the middle of the Upper Shuler sands.

Below these sandy-clay layers is a fairly uniform 1.5 meter zone of very fine-grain laminated yellow-brown sand which Crook termed the "Lower Shuler Formation". These sands differ from the overlying units in being much finer-grained and deposited in a number of thin, parallel layers. Manganese oxide staining is more prevalent toward the base of these sands. Below this unit is a layer of iron-cemented gravels of indeterminate depth. Crook referred to these gravels as the "Hill Formation" and they are the source material for all gravel operations in the area. Local bedrock based on cuts along the Elm Fork is presumed to be the Upper Cretaceous Eagle Ford Formation.

Fauna present in Hickory Creek terrace support a prolonged period of deposition. Slaughter et al. (1962) originally believed the faunal assemblage to be Sangamon (75,000-125,000 BP) in age. However, later work in Denton County (Slaughter and Ritchie, 1962) and downstream along the Trinity in the Moore pit near Dallas showed the assemblage to more likely be of mid to late Wisconsin age (Slaughter, 1966). An age date of 28,840 +/- 4740 years BP was obtained from the upper Coppell Alluvium (Upper Shuler sands) in Denton County. While this date may not be precise, Ferring and Yates (1998) state an age of 30,000-40,000 years BP for the terrace is not unreasonable.

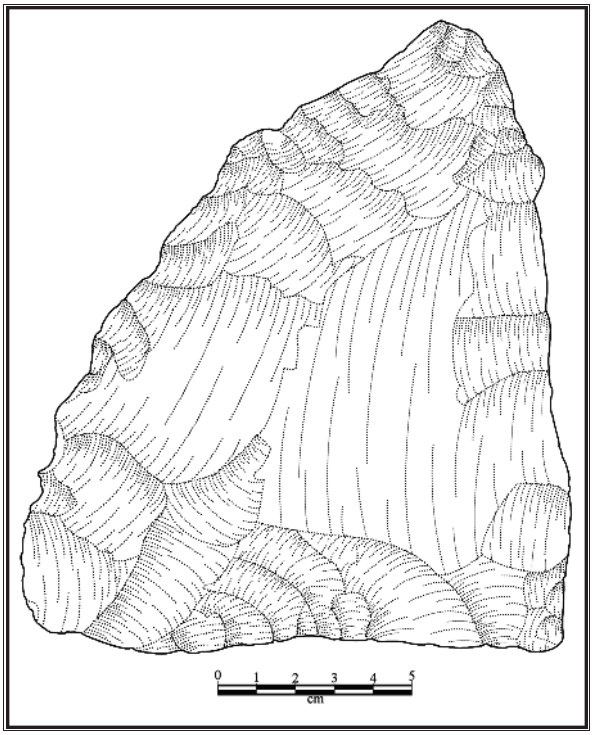

Figure 2. Line drawing of obverse face of large quartzite chopper from the Lewisville site (41DN72), Denton County, Texas.
(Drawing by Lance K. Trask)

Artifact Description and Analysis

The artifacts found by Ms. Waite's grandfather were recovered from the bottom of the borrow pit reportedly "near to where the excavations had taken place" (Elaine Waite, personal communication, 2014). They are both composed of a tan to light yellow brown tabular metaquartzite (2.5Y 6/3-6/4 to 10YR 6/4). On the larger of the two artifacts, minor red hematite staining is present on the obverse face, probably the result of heat treating. The larger artifact has been flaked on one edge to form a large chopping tool. Minor flaking is present on the obverse face along the cutting edge in order to create a sharper edge. Microscopic examination of the flaked edge shows some polish but no obvious striations which could be associated with a particular function. A photo of the artifact is shown in Figure 1; a line drawing of the tool is presented in Figure 2.

As can be seen in the above figures, the chopper is distinctly tabular in shape. Length of the left lateral edge is 122.5 mm; length of the right lateral edge is 151.1mm; and the length of the bot edge is 191.3 mm. Thickness at the proximal end of the chopper (lower right corner of Figure 2) is 33.1 mm, rising to a maximum thickness of 41.1 mm near the center of the

Figure 3. Quartzite bifacial knife from the Lewisville site (41DN72), Denton County, Texas. The artifact is resting on its proximal end which retains the original cortex; the bit edge can be seen on the left side of the photo.

artifact. Thickness of the flaked edge ranges from 5.9-9.1 mm. The artifact is both large and quite heavy; total weight is 725.7 gm. The artifact's heavy weight makes it possible that it was used either single or two-handed.

The second artifact (Figure 3) is a bifacial knife constructed from the same tabular metaquartzite material as the large chopper. The artifact appears to have been constructed from a flake as the original cortex is retained on the proximal end as well as on part of the reverse face. The flake has been worked bifacially to produce a single cutting edge. Length of the biface is 61.8 mm; maximum width is 22.1 mm. Thickness at the proximal end of the artifact is 14.2 mm, decreasing to 4.2 mm along the bit edge. Microscopic examination (20-200x) of the artifact shows extensive use-wear polish, especially along the bit edge. No edge crushing could be observed and the polish is consistent with the tools being used as a knife for cutting soft tissue.

While quartzite is one of the most common components of gravels found in the terraces of the Upper Trinity Watershed, it is exclusively found as rounded cobbles (Byrd 1971; Menzer and Slaughter 1971; Banks 1990). The artifacts described herein, especially the large chopper, are very different in character, having been taken from a tabular bedded sandstone which has subsequently undergone low grade metamorphism. The local Cretaceous Woodbine Sandstone, which crops out immediately west of the site, is typically strongly iron-stained and friable in character (Ambrose et al. 2009; Dokur and Hentz 2012). While parts of the formation are tabular, nowhere is it as consolidated as the material comprising these two artifacts.

The nearest source of tabular sandstone is approximately 250 km (160 miles) to the north in Pittsburgh County, Oklahoma at the edge of the Ouachita Mountains. There, the Carboniferous Jackfork Formation crops out in tabular beds up to 15 meters thick (Klein 1966; Morris 1964). The Jackfork is typically a thick, consolidated flysch-deposited sandstone that occurs over most of the Ouachita Mountains (Morris 1971). However, at its westernmost exposure it has undergone low-grade metamorphism. Hydrothermal fluids have cemented parts of the sandstone into a hard, flakable

lithic material. In Pittsburgh County in particular, quarries have been found where Jackfork quartzite was accessed by prehistoric peoples over a long period of time. Nearly 2 meters of knapping debris have been found at some of these quarries (Don Wyckoff, personal communication, 2014). In terms of color, composition, and tabular character, both the chopper and the bifocal knife described herein match the descriptions of Jackfork metaquartzite perfectly.

Conclusions

The chopper and the knife add two another tools to the known artifact assemblage for the Lewisville site. The large size and weight of the chopper would suggest that it was potentially used on large mammals, which fits with the Pleistocene fauna reported from the site (Crook and Harris 1957). The observed bit edge polish is consistent with its use on soft tissue (meat, hides, etc.) and not on bone or wood where more edge crushing would have been present (Keeley 1980). Conversely, the chopper could also have been used on plant materials (roots, tubers). Microscopic examination of the smaller biface also shows extensively use-wear polish consistent with cutting meat.

The composition of both artifacts clearly indicates that they are not of local origin and most likely come from the Jackfork Formation to the north in Oklahoma. Several of the original pieces of the Lewisville artifact assemblage, including the Clovis point, a finely worked flake side scraper, and two biface thinning flakes were also made from non-local materials (Crook and Harris 1957). In addition, Stanford found flakes of exotic material in several of the hearths including an unknown white chert, Edwards chert and Alibates dolomite (Stanford 1982). While the source of the white chert used to make the Clovis point, the flake side scraper and several of the biface thinning flakes is presently unknown, it clearly represents an imported lithic source. Possible sources include the Edwards Plateau and/or Oklahoma (Frisco chert, Florence A chert, Burlington chert, etc.).

A worked flake of a similar white color was found 10 km upstream along Hickory Creek in the same geologic context as Lewisville (Crook 2013). Investigation of this site (Hickory Creek – 41DN63) indicated it was likely occupied by the same group that also lived at Lewisville. X-Ray Fluorescence analysis of this flake conducted by the author showed it to be identical to Gault chert from the Edwards Plateau.

The presence of Edwards chert, Alibates dolomite, possible Oklahoma chert and Jackfork quartzite at the Lewisville site supports the observation at many Clovis age sites of the presence and preference for exotic toolstones (Bradley et al. 2010). Assuming the Lewisville occupants acquired these materials themselves and not as a result of trade, it would require traveling distances of 300 km (185 miles) to the south along the Blackland Prairie, 250 km (160 miles) to the north, and 580 km (360 miles) to the west across the Great Plains. While representing considerable distances, these are well within established movement patterns for Clovis people (Stanford and Bradley 2012).

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THE SANBORN COMPANY MAPS

William E. Moore

Introduction

Maps have always been a major primary source of information for most historical research projects. One particular source that I have found to be especially useful is the series of maps created by the Sanborn Company. This was not the first company in the United States to create maps for fire insurance purposes but over time it became the largest and most successful American map company having produced detailed maps for approximately 12,000 towns and cities for 140 years. The company was founded by Daniel Alfred Sanborn who was a surveyor from Somerville, Massachusetts. The home office was in New York and regional offices were later opened in Atlanta, Chicago, and San Francisco. The production of maps began in 1867 and lasted until 2007.

Sanborn Maps

The main purpose of the Sanborn maps was to accurately portray the composition of a town in terms of its potential for the risk of fire so that insurance companies could decide whether or not to provide coverage. Sometimes, this decision was made solely through the use of a Sanborn map. These maps are very detailed lithographs, produced in color, drawn to a standard scale of 50 feet to 1 inch (1:1600), and printed on sheets of high quality paper measuring 21 x 25 inches in size.

Large numbers of surveyors were dispatched to all of the major urbanized areas of the country in order to record the relevant details about a town's fire liability. The amount of labor that went into creating these maps in the days when technology was far inferior to what is available today is hard to comprehend. It often takes hours to accurately map a moderate size prehistoric site using GPS and other advanced systems. The Sanborn maps were all done by hand with equipment that today would be considered primitive and outdated but the surveyors commonly mapped entire towns to scale.

Since available water was a major criterion for determining the risk of fire to a particular area of a town, Sanborn maps identify the location of sources of water such as rivers and streams, wells, sprinkler systems, fire hydrants, cisterns and water mains. Local fire departments were also mapped and their strength (i.e., number of hoses available) was often mentioned. All buildings are identified according to the building material used and color-coded for easy identification. Wood buildings, for example, are yellow, brick buildings are red, rock or stone buildings are blue, and concrete structures are gray. This standardized coloring system also allowed insurance companies to estimate the potential of fire spreading across an area where wooden structures are clustered.

Maps for towns and cities often required several sheets. In most cases, the first sheet was an index that depicted that portion of the town covered on each sheet. This index contained names of businesses, streets, and the month and year of publication. Sanborn maps also included information on the local economy, population and prevailing winds. Specific data included street names, block and lot numbers, and addresses. One of the more salient aspects of the Sanborn maps is their documentation of change. One town, for instance, may have been mapped over a period of 20 years or longer. The emergence of significant buildings and other forms of infrastructure are well documented. Footprints of buildings were drawn to scale and relevant information such as type of building, shape of roof, number of stories, and placement of windows and doors. This type of detail makes Sanborn maps an important source of information for historians, genealogists, sociologists, city planners, and urban geographers.

Figure 1 is a section of the 1921 map (Sheet 2) of Blooming Grove in Navarro County, Texas. This portion of the map depicts City Block 5 and clearly shows the streets that border it as well as lot numbers and the various buildings on that block at the time.

There are four major sources for Sanborn maps in Texas. The Fondren Library at Rice University has a complete set available online to students and faculty and researchers. Information about these maps can be obtained by writing to gisdata@rice.edu. The Briscoe Center for American History on the campus of The University of Texas at Austin has a large selection of original maps that can be viewed by researchers and these maps can be viewed online at the Perry-

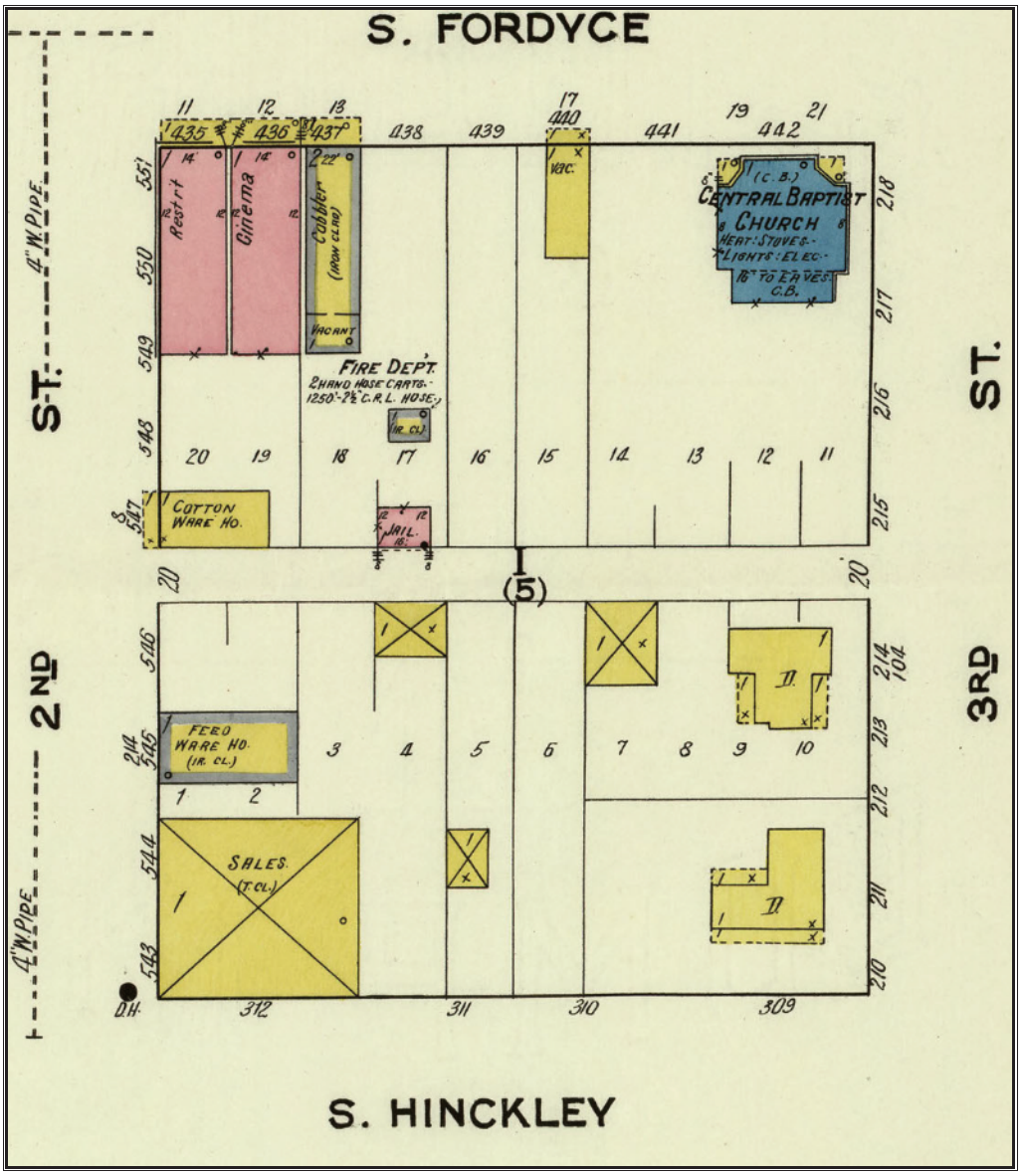

Figure 1. Blooming Grove, Texas 1921

Casteòeda Library website. The University of North Texas in Denton also has Sanborn maps that can be accessed through the website entitled "The Portal to Texas History." Sanborn maps for Texas are also housed at the Library of Congress in Washington, D.C.

Additional sources that discuss Sanborn and other fire insurance maps include *Sanborn Fire Insurance Maps, a Brief History* by Chris Nehls, (Geospatial and Statistical Center at the University of Virginia) written in 2003 and *Fire Insurance Maps: Their History and Applications* by Diane L. Oswald and published in 1997 by Lacewing Press in College Station, Texas.

THE CALABOOSES OF TEXAS

William E. Moore

Introduction

Most of us are familiar with the term "calaboose" from western movies, but personally I had never given any thought to what it meant until I saw my first real calaboose in Gause, Texas (Milam County). Behind the local grocery store was a small, almost whimsical, structure made of concrete and standing out like a ghost of the past (Figure 1). The windows had bars, and when the locals told me it was their old calaboose I was immediately interested in knowing more. I learned that the word "calaboose," as used in Texas, was taken from the 18th century Spanish word *Calabozo* meaning jail or dungeon. Although any jail can be technically labeled as a calaboose, the term appears to be most often applied to the very small, one-story buildings that were constructed of logs, milled boards, poured concrete, concrete blocks, bricks, and/or stone. On the Sanborn maps, the smaller jails are almost always referred to as a calaboose. An example of this is the wooden calaboose in Giddings, Texas (Lee County) on Sheet 1 of the Sanborn map dated 1885

Figure 1. Calaboose in Gause, Texas

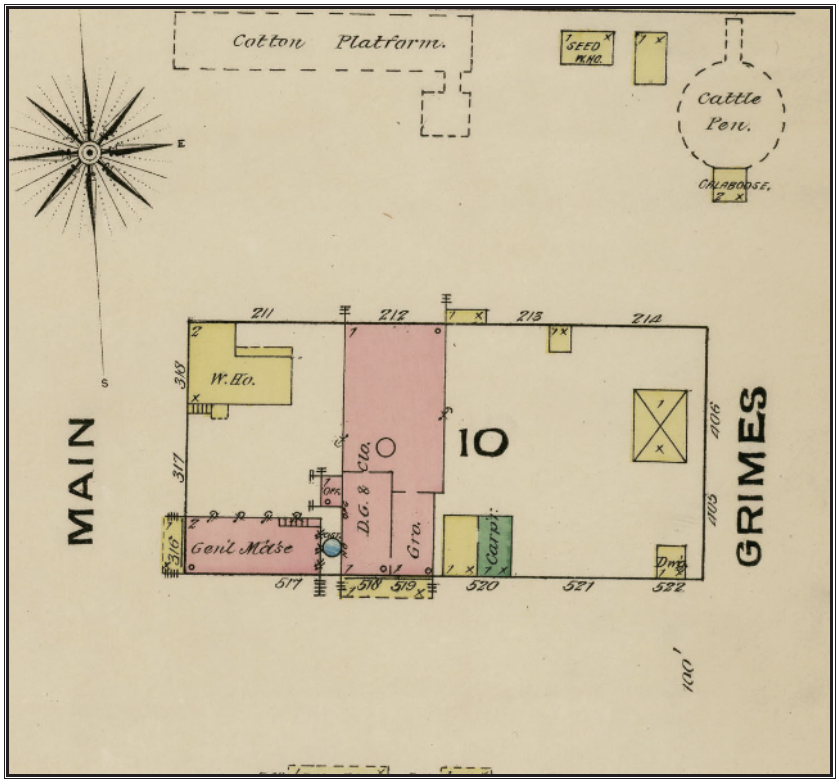

Figure 2. Sanborn Map of Giddings, Texas – 1885

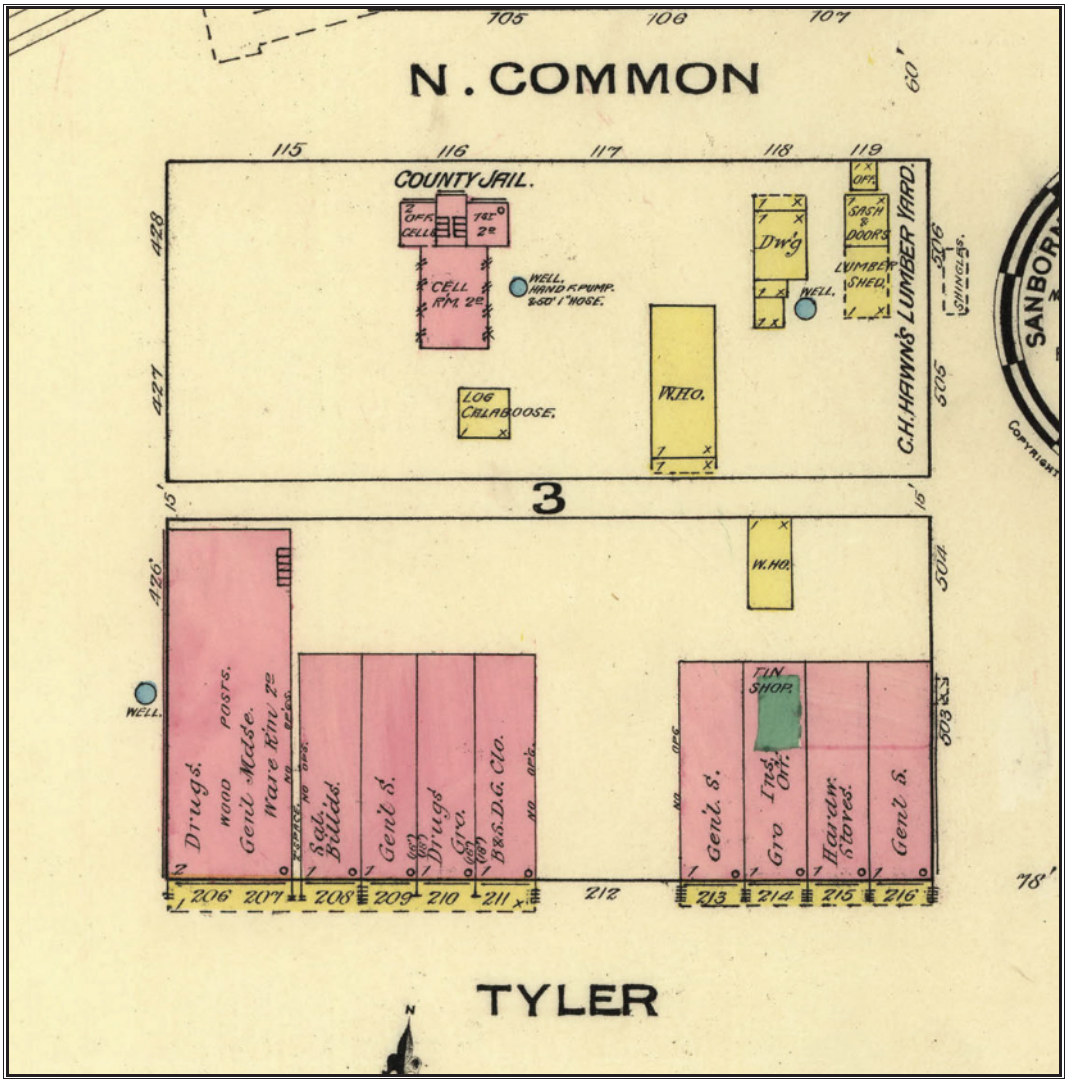

Figure 3. Sanborn Map of Athens, Texas – 1885

(Figure 2). The larger two-story county jails are never labeled as a calaboose. For the purposes of this study, my definition of a calaboose is a small one-story building that rarely exceeds 400 square feet in size and has from one to three cells.

Although it is often written that the calaboose was a small town icon, they were also present in county seats in Texas and often were erected before funds were available for the construction of a more formal county jail. Once the county jail was in service the little calaboose was no longer needed and the structures were often demolished. This statement appears to be validated by the Sanborn map for Athens, Texas (Henderson County) dated 1885 (Sheet 1) that shows a log calaboose on the same block as the two-story brick county jail (Figure 3). Sometimes, instead of being demolished, the old calaboose found new life as a storage building like the one in LaGrange, Texas (Fayette County), or as a city office like the one in Petrolia, Texas (Clay County), or as a Girl Scout building like the one in Eagle Lake, Texas (Colorado County).

The small Texas towns and unincorporated communities usually lacked the funds for a formal police force, and the County Sheriff was not always available to make on-the-spot arrests. Therefore, local citizens with titles of Constable, Marshall, or Night Watchman were often charged with the responsibility of enforcing the law. Many calabooses were often constructed with minimal funds using the most expedient materials available. During the early to middle part of the 20th century, concrete was a common building material and was often used in towns where other resources might be considered to be more difficult or expensive to obtain. The calaboose was mainly used as temporary housing for minor offenses such as fighting and public drunkenness or as a holding facility for prisoners until they released or transported to the county jail.

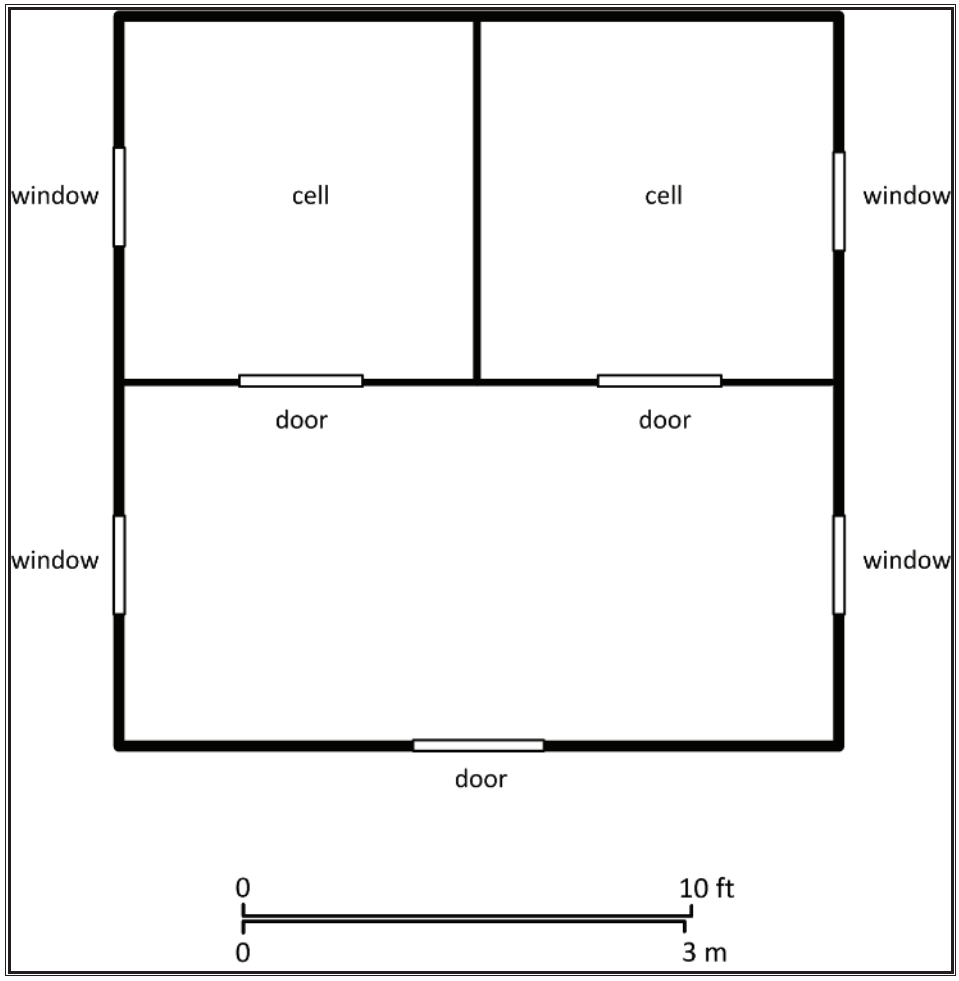

Figure 4. Floor Plan of Calaboose in Boling, Texas

The temporary nature of the calaboose is described in *An American Glossary* by Richard Hopwood Thornton (1912) in the following quote from 1840, "The pugnacious gentlemen were lodged in the calaboose" and "… He will be put in the calaboose tonight and tomorrow sent to jail or to the hospital. …"

The need for the calaboose in small Texas towns appears to have ended in many cases when the Farm-to-Market Act of 1949 funded paved roads that made it easier local law enforcement officers to transport prisoners directly to the county jail. Before that time, the county seat was often considered a major trek in wagons or automobiles on muddy roads that were sometimes impassable in bad weather.

Research Methods

After realizing that I had stumbled onto a very interesting and undocumented part of Texas history through architectural expression I decided to visit and document as many calabooses as possible. I also wanted to collect data regarding possible regional use of building materials, variations in size and number of cells, and time period when they were most common. Each calaboose visited was photographed and measured and scale drawings were made of the different floor plans. Figure 4 shows the floor plan for the calaboose in Boling, Texas (Wharton County). Other items of interest such as graffiti and furniture (i.e., beds and toilets) were also documented. All of the calabooses visited have been recorded as historic sites at the Texas Archeological Research Laboratory (TARL) on the campus of The University of Texas at Austin.

Whenever possible, I gathered information from locals who had personal knowledge of these structures. In some cases, I was fortunate to be able to obtain historic photos of now defunct calabooses. The Sanborn map dated 1921 (Sheet 2) depicts a small one-story city jail made of stone in Rising Star, Texas (Eastland County) next to City Hall. The local historical society provided me with a photo of a stone jail next to a wooden courthouse in that town (Figure 5).

Although, this has not been confirmed, it is possible that the two are the same.

Summary

At the time of this writing, I have recorded 64 calabooses still standing in 45 counties and 85 counties where calabooses were once present (Figure 6). There are approximately 10 standing calabooses that I have not visited. The rest of my research can be accessed through my website - www.tinytexasjails.com. If anyone is aware of a calaboose (present or gone) that is not discussed on my website, I would appreciate knowing about it. My email address is bvracrm@gmail.com.

Figure 5. Calaboose in Rising Star, Texas

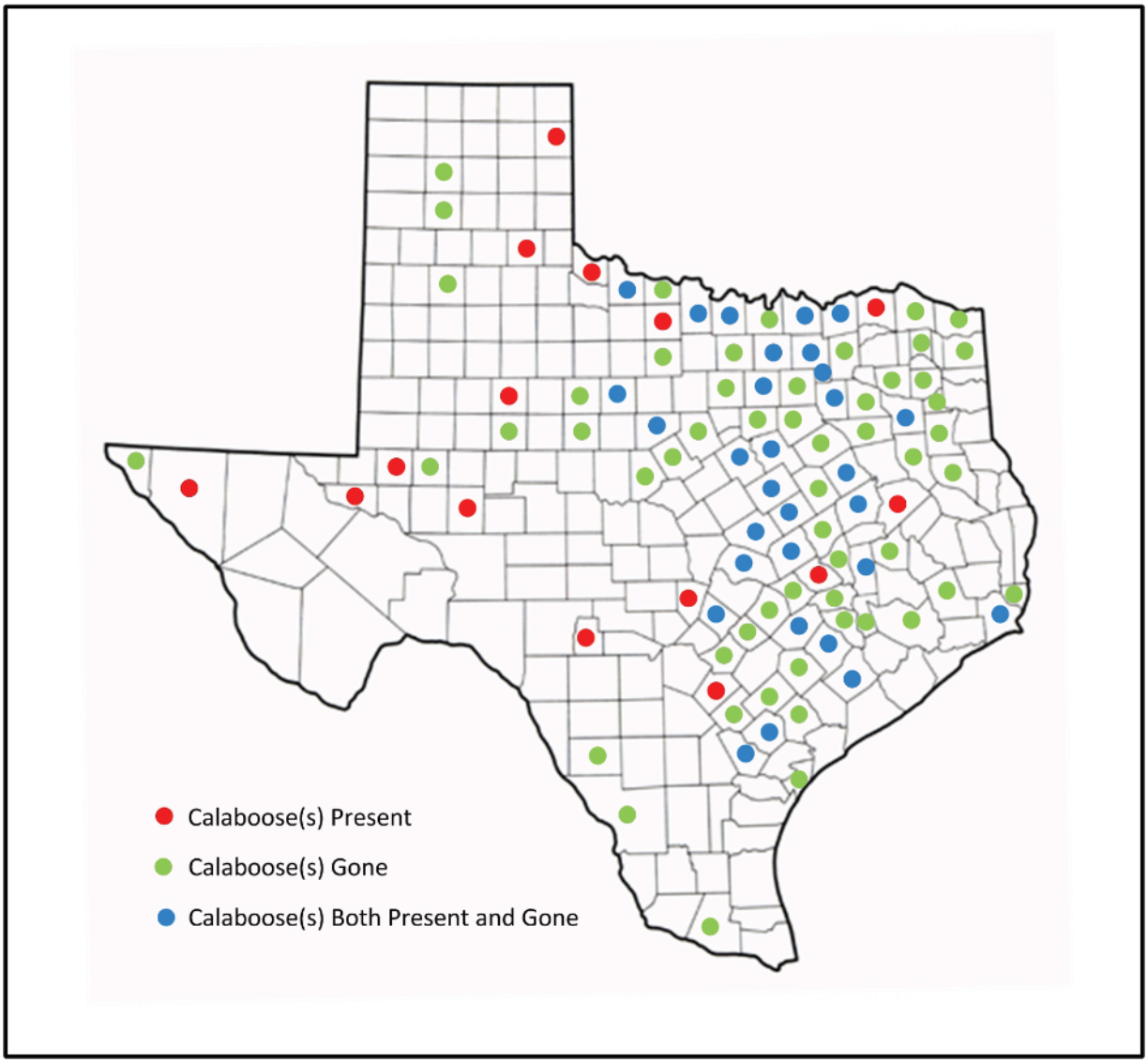

Figure 6. Distribution of Calabooses in Texas

BACK WHEN HOUSTON RECYCLED: RESOURCE UTILIZATION PATTERNS IN THE UPPER GULF COASTAL PLAIN

Jason W. Barrett, Roger G. Moore, and Richard A. Weinstein

Introduction

Today, Houston has one of the lowest recycling rates among all major US cities. In a 2001 waste management study (NYC Department of Sanitation 2001), Houston's recycling rate for waste (excluding yard waste) ranked 26th out of 30 major U.S. Cities. Cheap landfill rates and the high expense of collection caused by the city's lack of zoning are cited in a 2008 *The New York Times* (Ellick 2008) study as contributing to the low value Houston places on conservation. Major initiatives like the city's new "One Bin for All" program aim to change this pattern, making the area a model for responsible resource use. However, while many will view Houston's new dedication to resource recycling as innovative and progressive, archaeologists, with our appreciation for the *longue durée*, view the approach as more retro. Indeed, for several millennia, residents of the greater Houston region were diligent and successful recyclers that expended considerable effort in extracting every last bit of utility out of material resources.

Perhaps the marked difference observed between present and past levels of material conservation throughout the Texas' Upper Gulf Coastal Plain is principally related to availability. Several critical resources were once less readily accessible and required more planning and energy to obtain. Group mobility may also be a factor as prehistoric peoples followed mobile lifeways, accumulating few material possessions. Today, our sedentary lives allow us to amass more material, and along with it, we generate more waste. This paper considers chipped-stone artifact data from a number of archaeological assemblages across southeast Texas in an attempt to better understand how Houston deviated from its early conservation ethic.

The Dimond Knoll Site (41HR796)

The recently excavated Dimond Knoll site provides one of the largest stone tool assemblages in the Houston area. Moore Archeological Consulting, Inc. (MAC) discovered the site in northwestern Harris in 1996 during TxDOT-sponsored investigations associated with the Grand Parkway project (Figure 1). The low, sandy knoll is one of many similar knolls that once flanked Cypress Creek for much of its length. Data recovery investigations, sponsored by TxDOT, were conducted at Dimond Knoll from early May through late October 2012 by Coastal Environments, Inc. (CEI) and MAC.

Figure 1. Location of Dimond Knoll (41HR796) and other sites discussed in the text within Texas' Upper Gulf Coastal Zone.

Archeological investigations produced a wealth of important data relating to prehistoric diet, resource use, and technological transitions within the Upper Gulf Coastal Region, and the potential for more finely discerning patterns of group mobility and interaction through time appears high. While material analyses are presently in their incipient stages, preliminary findings based on the presence of chronologically-sensitive artifact types within the assemblage suggests that the site was visited regularly by mobile foraging groups for more than ten millennia.

Dimond Knoll in Context

Overall, 105.1m^3 of sediments were hand excavated. Additionally, approximately 275m^3 of sediments were taken off-site for screening by volunteer groups as part of TxDOT's public outreach program. Artifacts recovered in off-site screening have increased the available study sample, allowing for a more comprehensive trait analysis to be undertaken for various artifact classes including stone tools, prehistoric ceramics, and faunal bone. From the more than 900 bifacially chipped stone tools discovered through hand excavation and off-site screening, a sample of 600 dart points, arrow points, and knives was chosen for a preliminary study focused on resource use and material conservation (Barrett et al. 2014).

Dimond Knoll is situated within the San Jacinto River basin, a resource poor area with respect to tool-quality lithic resources. The San Jacinto River and its tributaries, including Cypress Creek, carry few gravels exploitable for tool construction as there are no major chert-bearing formations within the drainage basin. The most common siliceous stone found within the San Jacinto River Basin with utility for tool manufacture is petrified wood emanating from the Miocene Fleming and Pliocene Willis Formations (Banks 1990). However, the petrified wood is generally of a poor, platy quality, and typically available only in small package sizes. Higher quality stone, including cherts, chalcedonies, and petrified woods with a more cryptocrystalline structure, can be found among channel gravel deposits within the Brazos, Colorado, and Trinity drainages and were well represented among the tools found at Dimond Knoll. Nevertheless, none of these source areas offer exploitable deposits within Dimond Knoll's immediate catchment, however generously defined.

Archaeological Measures of Material Conservation

Given that the availability of tool-quality lithic resources is notably poor in the site's immediate environs, which is true in a more general sense throughout much of the Upper Gulf Coast, high levels of material conservation should be expected. Evidence of material conservation may be expressed through a variety of traits observable within the chipped-stone artifact assemblage. For example, resharpening is the most basic form of material conservation, and is observed fairly ubiquitously among stone-tool using cultures, regardless of resource availability. This maintenance activity generally takes the form of pressure-flake removals along the blade edge, often resulting in removal of previously developed polish along the lateral margin, a more steeply beveled, less acute edge angle, and the distal portion of the blade becoming disproportionately thin in proportion to the midsection when viewed from the side (Figure 2). Resharpening primarily affects the overall length and width of the blade; thickness of the tool is affected to a much lesser degree, if at all.

The metric transformations that occur over the use-life of a projectile point through material attrition have a distinct effect on the effectiveness of the tool (Wilhelmsen 2001). This is particularly true of dart points as the higher velocity achieved in arrow delivery can compensate for many of the negative design effects resulting from curation (Tomka 2013). Two primary changes occur in dart points over their use-life that directly affects their functionality as effective

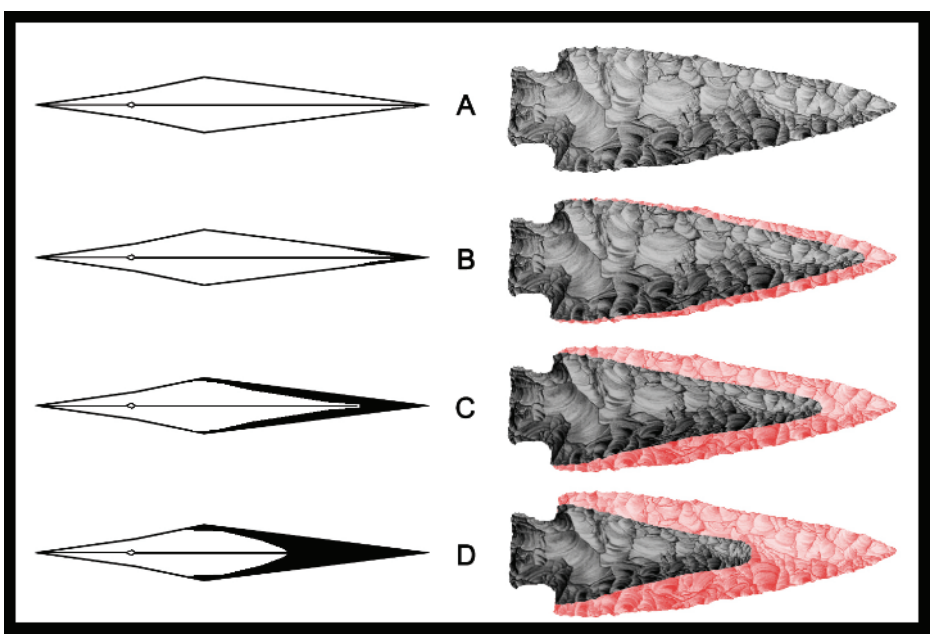

Figure 2. Illustration of typical curation effects on dart points. The relative reduction in thickness is illustrated on the left, and the corresponding reduction in length and width is illustrated on the right.

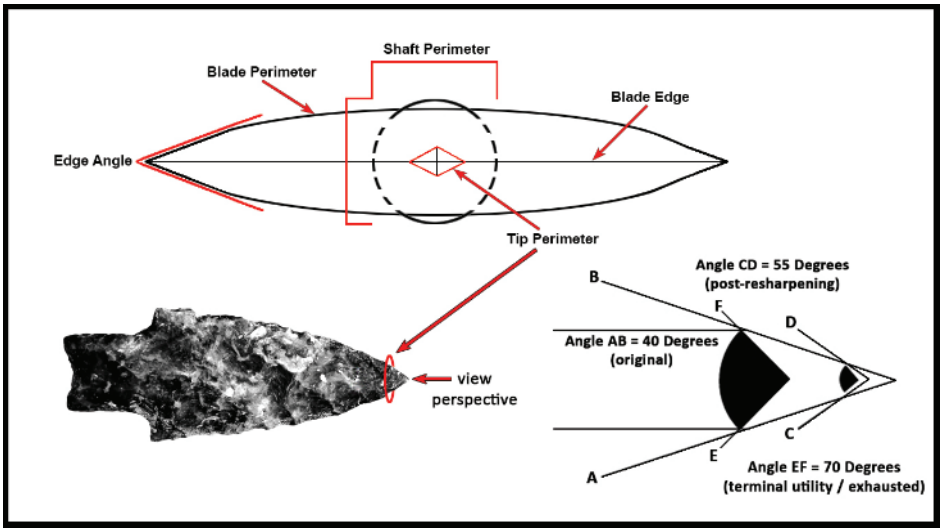

Figure 3. Metric attributes related to measuring point utility.

weapons. First, the decrease in blade width produces a decrease in the weapon's tip perimeter (Figure 3), which directly effects how effectively the haft and shaft are able to penetrate the prey's hide and flesh (Hughes 1998). Secondly, the edge angle of the lateral margins and tip become less acute as tool thickness does not reduce in proportion to length and width. As such, the tip and blade become correspondingly less sharp and less effective at piercing and cutting.

Experimental studies have demonstrated that the edge angle of a dart point's tip is within its optimal range when measuring between 20° and 40° degrees, and is ineffective when the angle exceeds 55° degrees (Dev and Riede 2012). When newly manufactured, the blade-edge angle of a bifacial dart point form generally measures between 45° and 55° degrees. So long as the tip maintains an effective edge (i.e. less than 55° degrees), the lateral margins may become less acute and still retain functionality. However, there does appear to be a limit to this as expended dart forms typically have edge angles measuring at or in excess of 70° degrees. It would seem perhaps that blade edges at that point cannot reach the degree of sharpness necessary to increase the aperture of the wound to effectively outweigh the frictional effects acting against the weapon. In support of this, ballistic studies have shown that the thin, elliptical cross-section typical of a dart point form early in its use history is an ideal design for maximizing target penetration, while the thicker, more conical shape often observed near the end of a dart's life cycle is markedly less effective without an exponential increase in delivery velocity (Hughes 2008).

Thus, a study incorporating a metric analysis of blade edge-angle, tip angle, and tip perimeter relative to the haft perimeter, as well as observations assessing a specimen's ability to be further reduced to achieve functionality, should produce a reasonably objective measure of utility or exhaustion. At this early stage in the analytical process, however, only the latter has been achieved for the Dimond Knoll study sample. Remaining utility was gauged for the study sample through a subjective assessment of observed edge and tip sharpness, along with an assessment of future reducibility, measured as a function of remaining material mass, material hardness, siliceous structure of the raw material, presence of detectable material flaws, and presence of observable manufacturing errors that would inhibit present functionality or future resharpening.

Thermal Alteration

Thermal alteration was another common tactic employed to extend the functional use-life of stone tools, including dart points. Heat treating raw materials, generally as bifacial blanks, has been shown to increase the knapping quality of poor-quality stone. However, excessive heating may cause raw materials to fracture or spall, rendering them useless. Evidence of alteration on stone tools often takes the form of color changes within the material and development of a dull, waxy texture. Of the 600 tools analyzed within the study sample, an astounding 506 (84%) were observed as exhibiting some signs of thermal alteration (Figure 4). Only 12 (2%) specimens were definitively not heat altered, while no assessment could be reached for 75 specimens (13%). The raw material could not be directly observed on the remaining seven due to heavy oxide staining or patination. It is worth considering that this high number of thermally altered specimens could partially reflect the incidental, post-depositional heating of several pieces.

Comparing the degree of thermal alteration observed within prehistoric tool assemblages among various sites in the Upper Gulf Coast region is

Figure 4. Examples of thermally-altered material among the Dimond Knoll stone tool assemblage.

problematic. First, this data is not recorded consistently within all site reports. The more critical issue, however, is that published datasets are not readily comparable because the ability to accurately detect thermal alteration on stone artifacts is a skill not equally developed among all analysts. A sample of sites from which comparative information can be drawn includes 41HR751, a Late Prehistoric site on Greens Bayou in central Harris County, site 41HR530 on Langham Creek, and 41HR1114 on South Mayde Creek. The relatively low percentages of thermally altered material in the lithic assemblages at sites 41HR751 (56%, n=47), 41HR530 (25%, n=11), and 41HR1114 (5%, n=37) may reflect differences in how analysts identify heated material. Each of these sites are predominantly Early Ceramic or Late Ceramic in age, which is an important consideration as the relatively small-sized, flake-based arrow points that dominate the later period weaponry forms may have required less thermal alteration of lithic raw materials to make.

The senior author additionally analyzed the lithic assemblage from 41LB42, a Late Prehistoric site in nearby Liberty County, finding that 75% (n=21) of the assemblage exhibited thermal alteration. Higher percentages of heat modified material may be more indicative of prehistoric patterns throughout the region, although its relative prevalence may have varied between periods. Regardless, the prolific use of thermal alteration at Dimond Knoll as a means to improve material knapping qualities and extend the use-life of tools is undeniable.

Assessment of Remaining Utility

Out of the 100 specimens within the Dimond Knoll sample that represent point types likely to have functioned as arrows (Figure 5), 44 were assessed as having no further utility, 53 were found to have remaining functionality, and three were observed as indeterminate. If we limit the analysis of arrow point only to those that were found complete (unbroken), 12 were assessed as having no further utility, 47 were found to have remaining functionality, and one was observed as indeterminate. Thus, if we eliminate the potential for post-depositional breakage to skew the determination

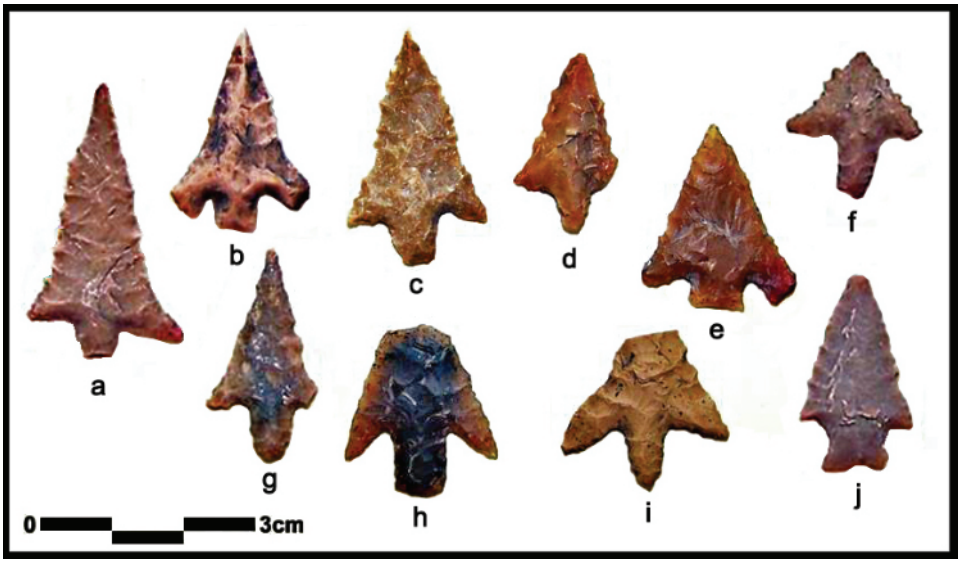

Figure 5. Examples of bifacial arrow points within the Dimond Knoll lithic assemblage.

Figure 6. Examples of bifacial dart points within the Dimond Knoll lithic assemblage.

of utility, 80% of Late Prehistoric arrow point forms are observed as retaining future utility.

Out of the 462 various types of points analyzed that are likely to have functioned as atlatl darts (Figure 6), 245 were assessed as having no further utility, 180 were found to have remaining functionality, and 37 were observed as indeterminate. If we include in our assessment only those specimens for which a determination of utility could be made, approximately 58% were assessed as having no further utility, with about 42% exhibiting remaining functionality.

We attempted to integrate these observations from Dimond Knoll with some other extensively excavated sites in the Southeast Texas region. Unfortunately, a direct comparison of remaining dart or arrow point utility is not possible because no such systematic evaluation of the degree of point exhaustion has been made for any of the regional sites for which comparative data is available. Perhaps the most comparable measure is the enumeration of resharpened Middle Archaic to Early Ceramic period dart points from 41HR1114 located near the Addicks Reservoir. There, seventeen out of 26 (65%) of the bifacial dart points exhibited evidence of resharpening.

The lack of standardized reporting across the region makes direct, ready comparison of site data rele-

vant to this topic problematical. This is actually an issue for much of the reported lithic data across the state of Texas, where idiosyncratic research strategies and the subjective nature of recording methodologies, as well as significantly varying skill levels among analysts, have contributed to unusable or unreliable datasets. An analysis of chipped stone tools assemblages from a number of sites across the Upper Gulf Coastal region following the same analytical protocols being employed at Dimond Knoll would make a substantial contribution to our understanding of the region's prehistory. The state-wide adoption of this or a similar protocol would be a beneficial and reachable goal for the professional community.

Discussion and Conclusions

When one evaluates the available data from the Houston region, the picture of material conservation through time is fairly complex. Interestingly, if we use the rate of remaining utility and the prevalence of thermal alteration on point forms as a proxy measure for conservation, from a temporal perspective, the ascent of Houston's resource wastefulness appears to have begun about 1300 years ago during the Late Prehistoric period. This assessment is based on there being less evidence for tool exhaustion and (possibly) thermal alteration during this period. However, this pattern could simply reflect a reduction in the overall level of lithic raw material consumption caused by a change in weapons systems during this period as the bow and arrow replaced atlatl-propelled darts. Arrow point forms are notably smaller than dart points, and in general are more expediently produced. Arrows also show a tendency to fracture after a limited number of uses, which would affect their ability to exhibit extensive curation. Thermal alteration would have a negative effect on durability, so this may have been avoided whenever possible.

From the early zeal observed in resource conservation among Houston's prehistoric residents, the decline into the present has been markedly steep. We can only hope that Houston's ambitious new recycling program, "One Bin for All," can return the region to its glory years of millennia past, where Houstonians appreciated the finite availability of natural resources and planned accordingly.

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