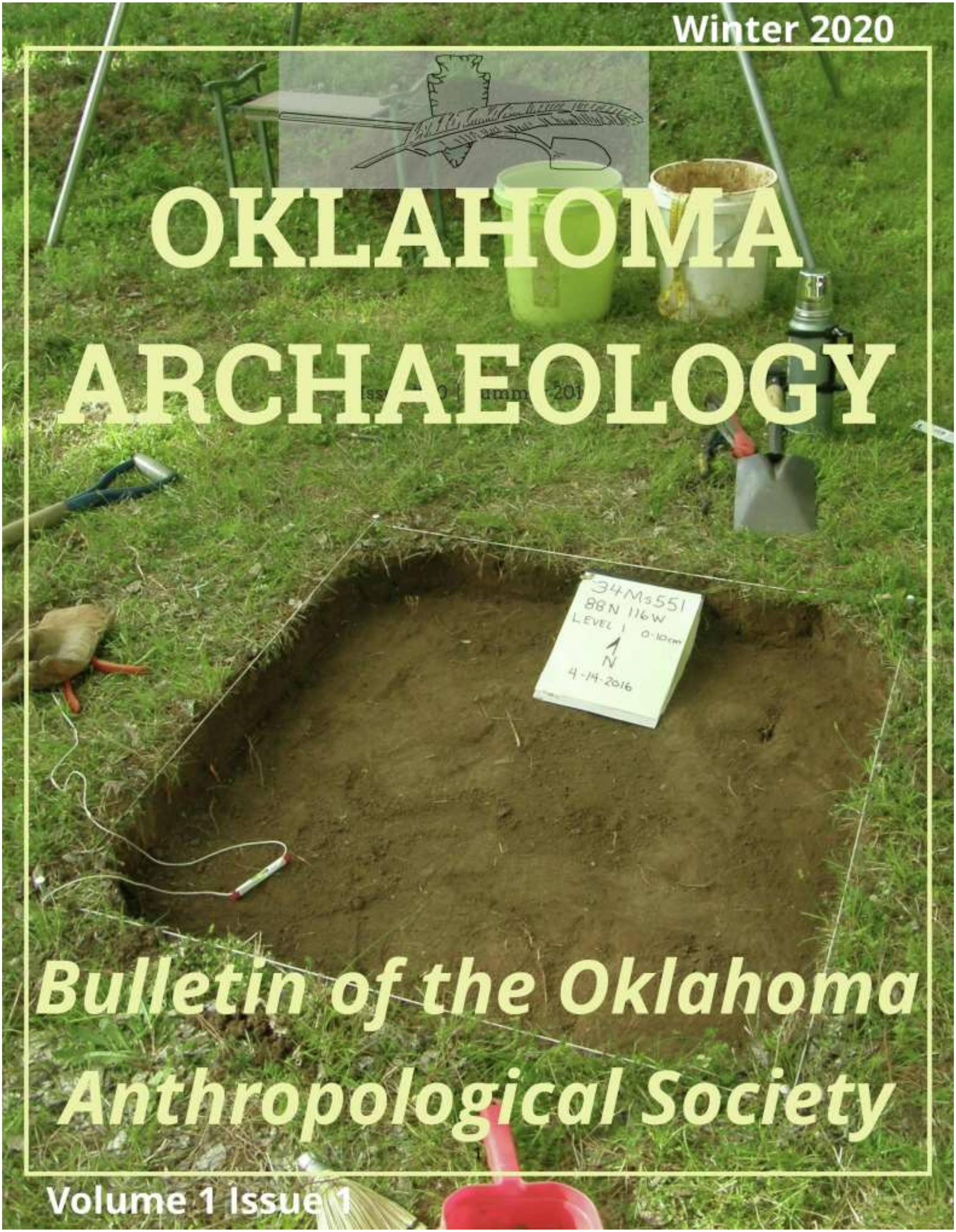
Winter 2020

OKLAHOMA ARCHAEOLOGY

Bulletin of the Oklahoma Anthropological Society



Volume 1 Issue 1

Oklahoma Archaeology *(OA)* is actively soliciting articles for the summer 2020 issue. Our *Bulletin* lineage has been research and technical/scholarly reports. Additionally, we now want to include activity reports, weekend survey reports, surface or private collection documentation, project progress or planning updates, educational articles - any archaeology/anthropology related topic that may interest a segment of our Society audience, inexperienced avocationalist to professional. For members that have a project or activity to report, but little composition experience, we may be able to help. Forward article submittals or inquiries via email to okla.anthro.society@gmail.com. Include the word "Editor" in the subject line. We hope you enjoy this copy of *Oklahoma Archaeology* and can share your own story in a future issue.   OA Editor

THE OKLAHOMA ANTHROPOLOGICAL SOCIETY

Email: okla.anthro.society@gmail.com
Website: https://okanthropologicalsociety.org/
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Cover – OAS avocational member excavation at Fort Gibson. Project design and oversight assistance from the Oklahoma Archeological Survey.

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of the
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The Oklahoma Anthropological Society

Explore, share, and preserve the historic and pre-contact story of Oklahoma

This Winter 2020 edition of *Oklahoma Archaeology, Bulletin of the Oklahoma Anthropological Society* is a new format for OAS. Many will recognize the name *Oklahoma Archaeology* (OA) from an OAS quarterly publication in the early 2000's. This new publication is a hybrid of the old OA and the OAS *Bulletin*. We want to continue the *Bulletin's* heritage of technical, scholarly works while expanding its reach with articles that newer OAS members and the interested public can enjoy and appreciate.

Oklahoma Archaeology will be published twice a year, alternating editions with OKPAN *Quarterly*. This volume will be the first OAS online, digital publication and can be accessed from the OAS and OKPAN websites and Facebook pages. OAS continues to coordinate and collaborate with OKPAN and other Oklahoma archaeology organizations to efficiently deploy resources, ensure synergy in our efforts and provide the best service to our state and its' citizens that we can.

More significant than the publication change is a decision by Dr. Robert L. Brooks to "hand over the reins" as OAS *Bulletin* Editor. Most of us are aware of Bob's illustrious career in Oklahoma archaeology, including being our State Archaeologist and Director of the Oklahoma Archeological Survey. My first exposure to Bob was an email request I made for assistance identifying lithic materials from a small excavation project. He had no idea who I was, but still spent significant amounts of his valuable time helping us.

Bob's willingness to share his knowledge and experience has served Oklahoma and the Oklahoma Anthropological Society very well. Bob's decade long tenure as OAS *Bulletin* Editor saw many changes and challenges in the Oklahoma archaeology landscape. Bob's leadership, stature within the archaeology community and plain old hard work kept the *Bulletin* viable during that period. We owe and offer Bob a heartfelt thankyou and our deepest gratitude for his service to OAS and Oklahoma. Thanks Bob.

Bob

Robert L. Cole
Editor, OAS *Oklahoma Archaeology*

Analysis of the Surface Collection for the Weil/Scott Site (34CN2), Canadian County, Oklahoma with Comparison to the Wheeler Phase Site of Little Deer, (34CU10), Custer County, Oklahoma.

Lauren Cleeland

Introduction

A great number of archaeological sites are known only through field survey and surface collections. Many of these collections are in the hands of private owners and are generally out of reach for archaeological investigation. However, a number of collectors are more than willing to share their collections with archaeologists in an effort to help document archaeological sites and enhance archaeological information.

Surface collections must be approached with some caution, no matter who has collected them. They generally represent only partial data, due to the nature of the collection strategy and depositional environments. Perhaps the most difficult obstacle is the lack of good stratigraphic provenience from a surface collection. However, surface collections still provide an incredible amount of information, especially when secure diagnostic artifacts are recovered, which archaeologists can and should use to complete the archaeological information they seek (Wyckoff and Brooks 1983:252).

Despite the inherent disadvantages of surface collections, the information recovered allows for comparative analysis between sites within a region, given the nature of what is recovered. Lithics are durable remnants of an archaeological assemblage and much data can be inferred from them. For example, the type of material used at a site allows the archaeologist to identify mobility ranges, social interaction in the form of trade or contact and resource utilization over sometimes large regions. This is vital information when examining past cultural groups. Enough spatially distributed sites allow for the categorization of interactions across space. If secure dating is possible, temporal comparisons can also be made (Wyckoff and Brooks 1983:254-255).

Well documented and well collected archaeological surface collections can provide much of this information and should be utilized by archaeologists. Collaboration with avocational archaeologists and experienced collectors facilitate the use of surface collections and the exchange between professional and avocational archaeologists improves community awareness, archaeological knowledge and collection techniques. Cultivating relationships with local collectors also increases our knowledge of site content and location. Often it is the local avocationalist who brings new sites to the attention of professional archaeologists (Wyckoff and Brooks 1983:284).

The Weil/Scott Site (34CN2) not to be confused with the Scott Site (34CD29) in Caddo County is one such site. Dean Gamel has collected a fine representation of the material from this site and has graciously allowed us the use of it for an analysis. The assemblage consists of several hundred pieces, mostly lithic material, but also two pottery sherds, three burned bones and a metal button.

This report has two parts, the primary focus of part one of this study is the Weil/Scott (34CN2) site located in Canadian county. A characterization of the lithic material, the implements, reduction strategies employed, and the descriptive analysis of the artifacts represent one aspect of this study. A second aspect is the comparison in part two of a specific implement – the scraper – with the scrapers from a nearby site in Custer County, the Little Deer site (34CU10). These two sites are in the same region of the state and are thought to be roughly contemporaneous. Both have been the subject of surface collections and allow the comparison of material based on similarity of collection and similarity of material type.

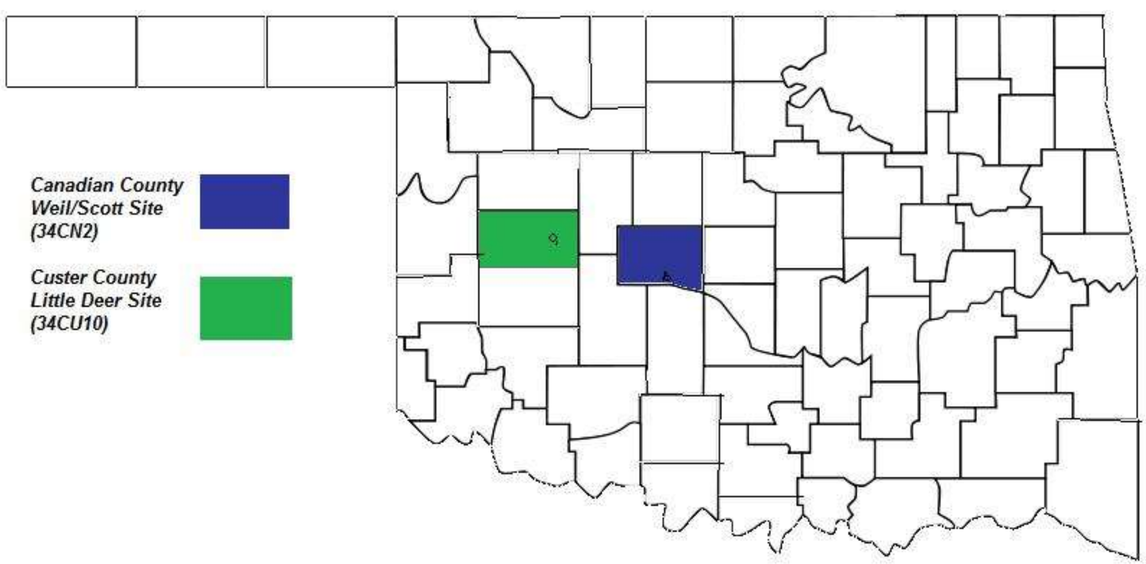
Because material remains can be examined from a number of perspectives and used to address a number of issues, chief among them, the association of groups with one another and the relationship between groups, based on characteristics of their assemblages, examining and comparing the attributes of a culturally important lithic implement allows us to answer the following questions.

1. Is there evidence in the process of lithic manufacture that suggests a cultural similarity between the Weil/Scott site inhabitants and the Little Deer inhabitants?
2. Do the components of the lithic material assemblage represent comparable production/tool needs in the type of implements utilized by both groups?
3. Does the lithic material suggest a mobile or sedentary lifestyle?
4. Do the lithic material types present in the assemblage inform on the movement of the groups in relation to either mobility and/or trade?

Comparative analysis is a beneficial method for exploring both the similarities and differences between cultural groups. It is the points where the comparisons diverge in which some of the most vital information occurs and the potential for new questions emerges. By incorporating comparative analysis into our examination of surface collections, we can delve deeper into the characterization of entire areas (Wyckoff and Brooks 1983:254-256).

Ideally, comparisons of material culture will include all categories of material remains. However, lithic comparisons provide much information on their own, including the spatial range in which the group moves and/or interacts, the decisions made regarding economic strategies in lithic production and the production of other items such as hides for either domestic consumption or trade. Based on the decisions made in tool manufacture, information can be gathered in relation to the behaviors associated with end product production and resource allocation. These are all important factors which allow a glimpse into the behavior of groups no longer extant.

Figure 1: Site Locations



PART ONE: The Sites

The Site, Weil/Scott (34CN2)

In May of 1950, Jack Grimm an anthropology student from the University of Oklahoma examined a site located just northwest of the town of Scott (Figure 1), Oklahoma, near the Canadian-Caddo County line on an Indian lease property owned by J. L. Nix. This is a rather extensive site, extending east and west for approximately a quarter mile and north and south between a quarter and one half of a mile, along a ridge near a small spring fed tributary of the Boggy Creek. A pool once occupied a place near this site but has since been filled in with sand. The site rests in a fenced pasture and the soil is very sandy (Bastian 1964; Drass 1987).

Jack Grimm's survey collected some small triangular points, and many small sherds. Grimm reported that the owner Mr. Nix had collected several small points, knives and decorated pottery sherds (Bastian 1964).

The site was again visited in June of 1953 by Fenton Wheeler. The Wheeler survey recovered 109 specimens including points, knives, scrapers, sherds, mano fragments, a drill, a hoe and other chipped stone implements (Bastian 1964).

In July of 1964, Tyler Bastian visited the site and the new owner Wilbur Weil, giving the name to the site. Bastian reported the presence of Washita and Fresno points, large end scrapers of Kay County chert (Florence A), metates, manos and other chipped stone implements. Bastian also met with a local man, J. B. McAlister, who had collected from the site and had recovered points, large end scrapers of Kay County chert and a shell button attributed to an early Euro-American origin (Bastian 1964).

Bastian goes on to report that the Nix family also had "beautifully worked drills one of which had a torque", decorated pottery and points in both small and large spear or lance sizes (Bastian 1964).

Dr. Richard Drass examined the site for the Oklahoma Archaeological Survey in August of 1997 and met with the new owners, Carl and Loretta Githens. Drass suggests the site may be deeply buried in the sandy soil but agrees that it is extensive in size. He recovered a Fresno point, a large scraper, a biface fragment and numerous Florence A flakes (Drass 1987).

The Oklahoma Archaeological Survey has categorized this site as a Plains Village site. The Plains Village period dates from 700 A. D. until 1550 A. D. with village settlement replacing farmsteads and hamlets at around 1200 A. D. (Wyckoff and Brooks 1983:17-18). The presence of a possible early Euro-American button could push the date of this site into the late prehistoric and early Historic period, a period often referred to as the Proto-historic (Bastian 1964). The Proto-historic is a rather nebulous period referring to early contact situations and varies spatially and temporally based on indigenous contact with European groups (Baugh and Perkins 2008; Perkins and Baugh 2008).

The earliest recorded contact between Southern Plains groups and Europeans occurred with the Spanish in 1541 (Conlisk 1996:355, 358-59, 373; Smith 2000:21, 25, 51,52,62, 73; Mildred M. Wedel 1988a:2; 1988b:21). Contact with the Spanish on the Plains was sporadic, although contact via the Puebloan groups was possible. The French made an appearance in the area beginning in 1719, mainly in the eastern areas (Mildred M. Wedel 1988b:21). Extensive trade existed prior to and during the early contact period, with evidence supporting long distance trade across the Southern Plains with both the Puebloan groups to the west and the Caddoan groups to the east (Wedel 1959; Wyckoff and Brooks 1983:18).

The Comparative Site: Little Deer (34CU10)

The Little Deer site was first reported in September of 1950 by the nephew of the landowner Joe Payne. Terry Nowka made the first inspection of the site. In 1953 Fenton Wheeler conducted a survey of the site for the Oklahoma Archaeological Survey. The site is located in the vicinity of Weatherford, Oklahoma (Figure 1). A large surface collection was recovered at this time including points, scrapers, abraders, bone, pottery sherds, hammerstones, metates, and bone and shell fragments. Also reported were glass beads, a turquoise bead, drills, clay pipe fragments and a single obsidian projectile point. Reports of burials are also noted, although the burials were not located. Material types present included "Hardy" flint (Florence A), Amarillo flint (Alibates) and some probable local flints (Wheeler 1953).

In 1966 Terry Nowka and Tyler Bastian revisited the site and recommended that the site be further tested. They make note of large, late points, a large centralized midden with a large quantity of shell, a double row of hearths forming two rows, which they attribute to tipi fires. The site is actually located on Deer Creek where the Little Deep Creek meets Deer Creek. They suggest that the site name of Little Deer is a misnomer, because the Little Deer Creek actually meets Deer Creek several miles to the north (Bastian 1966).

Richard Drass and Bob Brooks conducted a small excavation at the site using Oklahoma Anthropological Society volunteers, Gene Hallstern from UCO and students from both the OU and UCO. In one exposed pit, large amounts of charcoal, mussel shell, bone, and turtle shells were recovered. Also recovered were projectile points of the Fresno and Washita varieties, plain, sand tempered pottery sherds, and lithic flakes. The main lithic material types identified include Florence A, Alibates, Edwards and Ogallala quartzite (Drass 1996).

Bastian classifies the site as an open camp attributed to a late Prehistoric component (Bastian 1966). Wyckoff and Brooks (1983:167, 285), for the Oklahoma Archaeological Survey classify this site as a large Plains Village to possibly Historic site with possible habitation features, and possible trade goods from the Southwest.

Figure one shows the locations of the two sites in this comparison. The sites are approximately 45.9 km or 28.5 miles from each other calculated as the shortest distance between two points using online distance calculating software (Infoplease distance calculator which can be accessed at: www.infoplease.com/atlas/calculate-distance.html).

Indigenous Groups

The predominant indigenous groups occupying the Southern Plains include the various branches of the Wichita and the Caddoan groups. Also present in the western part of the Southern Plains were Apache, Jumano, some Puebloan related groups and other Plains Caddoan groups. Later, the Comanche, Kiowa-Apache and Kiowa are present in the Southern Plains (Hoffman 1978; John 1996; Smith 2000; Mildred M. Wedel 1988b; Wyckoff and Brooks 1983:65). Many of the groups could have been ancestral to the Wichita, but Wyckoff and Brooks (1983:65) note some dissimilarity in the assemblages of at least four sites in Archeological Region 4 of Oklahoma, including the Weil/Scott Site (34CN2) and the Little Deer site (34CU10), both assemblages are addressed in this paper.

Odell (2008) argues that lithics and particularly scrapers, arrowheads, abraders, and knives are inadequate to distinguish cultural units. The more utilitarian and less decorative an implement, the less identifying information it contains (Odell 2008). I argue lithic assemblages can help to identify cultural affinities and clarify cultural relationships, working on the premise that lithic reduction is a cultural and human behavior and as such will reflect both learning and choices of both the individual and the group in their production (Wyckoff and Brooks 1983). It is also important to note that there are multiple paths to a single end, therefore it is not inconceivable that the same processes are repeated to the same end by different groups. While, Odell (2008) found the scrapers, points, abraders and knives to be "almost indistinguishable" between the Wichita, Pawnee and Osage, I was able to demonstrate considerable change between scrapers of the same cultural groups separated temporally and representing a dynamic economic and cultural reordering (Cleeland 2008).

It is also important to note that the Pawnee represent a related group to the Wichita and share other similarities, while the Osage were enemies, but shared in similar economic pursuits during the Protohistoric and Historic periods (Smith 2000; Mildred M. Wedel 1988b). The sites in question are expected to be earlier in the Protohistoric and represent a geographic area rich with multiple cultural groups and therefore it is suggested that an examination of the lithics from this site will provide more discriminatory information than later sites involved in European exchange systems.

The Wichita represent a dominant indigenous group, which commanded and occupied an extensive area of the Southern Plains, ancestral Wichita being present by at least 500 A D. in the Central Plains and expanding south in successive periods (Smith 2000:3). George Odell in writing about the Lasley Vore site (34TU65) in Tulsa County called for a chronological and diachronic study of the Wichita across time and space (Odell 2003). Limited excavation of known Wichita sites limits the possibility of large-scale comparison and limits the geographical coverage possible in this investigation (Perkins and Baugh 2008:381). However, the incorporation of surface collection analysis allows additional potential Wichita sites to be included in comparative analysis of the Wichita lifeway (Perkins and Baugh 2008:387).

Diachronic comparisons of Protohistoric Wichita sites located in the Central and north central Southern Plains have recently taken place, comparing the ancestral Wichita of central Kansas associated with the Little River and Lower Walnut foci of the Great Bend aspect with the Wichita of north-central Oklahoma at the 18th century Bryson-Paddock (34KA5) and Deer Creek (34KA3) sites, as well as the later Historic era Wichita village at the Longest site (34JF1) (Cleeland 2008).

In 1978, Jack Hofman analyzed the surface collection from the Little Deer site (34CU10) and compared this assemblage to the assemblage available from the Weil/Scott site (34CN2). Jack Hofman argued against the Little Deer site being Wichita in origin based upon the surface collection, including both lithics and ceramics (Hofman 1978). Wyckoff and Brooks (1983:65) make the same suggestion based on the presence of pottery which is atypical of Wichita pottery. Additional data led Richard Drass and Timothy Baugh to conclude that it is possibly Wichita in origin, although they could not rule out a group associated through trade (Drass and Baugh 1997). Todd Smith makes note of an Iscani group moving in the early 1700's from the western edge of the Southern Plains to stay with the Wichita at Deer Creek (Perkins and Baugh 2008:386; Smith 2000:19). The Iscani are a band of the Wichita. No cultural affiliation has been declared for the Weil/Scott site, but for the purpose of this paper, the hypothesis to be tested is: Were the inhabitants of the Weil/Scott site members of the Wheeler Phase and if so, are they Wichita in affiliation?

To answer this question a number of factors will be evaluated from the assemblage. Most importantly are the implements included in the assemblages, the material types present and the procurement and management of lithic material. A comparison of the implement components will be concluded with the comparison of scrapers from both sites. Scrapers are chosen to study instead of projectile points, because the Fresno points which are abundant in these assemblages are also ubiquitous throughout the region and do not represent an implement with sufficient discriminatory power (Bell 1960:44). The scraper however has shown considerable similarity between known groups and incredible flexibility to new economic interests (Cleeland 2008).

The scraper, a typological and functional classification for a lithic implement known to have been used as a principal tool in hide processing has been shown to change over time and in response to changing economic interests (Schultz 1992b; Schultz and 1989 *Bison Hide Processing on the Plains* 1989). This tool type has also shown morphological consistency between related Wichita groups in specific temporal contexts allowing both comparison and association between groups (Cleeland 2008). Both the excavated and the surface collections contain ample representatives of this class of artifact for a comparison.

Method

Jack Hofman (1978) identified the following components in the Little Deer Wheeler Phase Lithic Assemblage: Fresno points, pipe drills, expanding base drills, reamers, four-pointed drills, bifaces, scrapers (end and side), knives, gravers, wedges, native made gunflints, cores and utilized flakes (unmodified flake scrapers and knives) and an anvil(Hofman 1978).

The Scott site assemblage also includes the majority of these items. Absent are the four-pointed drill and an anvil stone. There are no readily identifiable gunflints in this assemblage, although there are two specimens, which could possibly be gunflints. The Scott site also has several large lance points, which are not mentioned for Little Deer.

Because the Little Deer assemblage analyzed by Hofman was typological in nature, the artifacts were sorted based on the assumed function of and the morphological characteristics of the artifact. In his comparison, Hofman reports very few metric attributes. Therefore, there is little comparative potential above the typological level with the Hofman report. However, Little Deer scrapers from the Patterson collection housed at the Oklahoma Archaeological Survey provided a suitable scraper assemblage for comparison with the Weil/Scott assemblage. An added advantage is that both of these sample sets were analyzed by the author, utilizing the same criteria and tools.

Artifacts were sorted into groups based on morphological characteristics and typological classification. It must be remembered that these are essentially arbitrary distinctions that have become somewhat of a standard. Artifacts can be classified as debris or implements. And, both debris and implements can be further categorized by additional characteristics. As a result, there are generally accepted classes of lithic artifact type. Function of implements is often based on assumed function or inferred from indirect evidence, for example scrapers are assumed to be used in hide preparation based upon ethnographic and historical evidence of their use. Scrapers can also be used to scrape any manner of material (Frison 1968; Mason 1887; Schultz 1989b, 1992b). Only use wear analysis can identify the specific scraping function of an artifact designated as a scraper. Use wear analysis requires extensive training and was not performed on these artifacts. The entire Gamel assemblage from the Weil/Scott site was examined; however, lithic debitage is not specifically addressed in depth. Broken point fragments constitute the largest component of this collection and are sorted by base, midsection or tip, material type and heat treatment. These were not individually weighed and measured, but all are consistent with the average sizes of intact points. Broken points are likewise not addressed in depth.

Once the artifacts were sorted into types, they were further sorted according to material type, heat treatment and presence or absence of cortex and cortex type were noted, as was breakage. Analysis of each category then proceeded as follows.

Metrics: debitage and point fragments were counted, sorted and weighed in grams. All other implements were first oriented proximal to distal and then measured in millimeters using a digital caliper for maximum length, maximum width and maximum thickness. The items were also weighed in grams using a digital scale if the items were <100 grams or on a balance scale for items weighing more than 100 grams.

Cortex: Each artifact was closely examined for the presence of cortex. If cortex was present it was noted, and the type of cortex was identified. Cortex classifications include outcrop, which is a chalky, limestone shell on the stone, steamrolled, which produces a smooth slightly dull rind on the chert, residual which is the remnant of original cortex altered by weather and exposure to produce a thin, harder sometimes pockmarked cortex and stream rolled which provides a smooth water worn rind.

Thermal alteration: The thermal alteration of chert to improve its flaking properties is a common practice among prehistoric flintknappers. This process requires an exceptional amount of time and the length of time is directly related to the size of the lithic piece being treated (Schultz 1989a, 1992a). Altered lithic material appears matte and often changes color as does Florence-A chert to a rich pink to deep red color (Schultz 1989a). Material that was knapped after heat treatment produces very glossy flake scars in contrast to the matte appearance of the outer layer of rock. The thermal alteration of lithic material represents a distinct decision to use this process and the author has linked the decision to heat treat or not to economic decisions regarding tool manufacture (Cleeland 2008). Brooks also suggests that heat treatment might not be a preferred option when making large scrapers for heavy work (Brooks 1996). The decision to heat treat or not can also be related to issues of curation, in utilizing all the potential of the stone, especially if the quarry location is at some distance (Andrefsky Jr. 1994).

Material Type: All material was typed using comparative collections at the Oklahoma Archaeological Survey and the Sam Noble Oklahoma Museum of Natural History. Some items were too small to identify securely, and others remained unidentified even after several attempts to identify the material. The majority of material however was securely identified.

Descriptive Analysis by Lithic Typological Classification

Table 1: Material components of the Weil/Scott (34CN2) assemblage.

Implement	Count	Percentage of Assemblage
Utilized Flakes	36	**0.024**
Modified Flakes	19	**0.013**
Scrapers	93	**0.062**
Reamers/Gravers/Drills/Perforators	116	**0.077**
Points/Preforms	139	**0.092**
Debitage	101	**0.067**
Cores	7	**0.005**
Bifaces/Knives	46	**0.030**
Point Fragments	943	**0.630**
Misc.	4	**0.003**
Total	**n=1504**	

As can be noted above (Table 1), point fragments account for the largest portion of the assemblage, followed by intact points and preforms and then by scrapers. This suggests that hunting and the processing of the products of the hunt were important activities at the site. The debitage listed here, is entirely tertiary, and consists of bifacial retouch flakes, thinning flakes and general debris.

Points, Point Fragments and Preforms

Of the 943 point fragments, Florence-A represents the predominant material type accounting for all but 18 point fragments. Seventy-three fragments are burned, 169 are not heat treated, five were indeterminate and the remainder was thermally altered. Fragments are divided into four types: tip fragments account for 248 specimens, mid-sections for 123 and bases for 510. Forty-nine fragments were intact enough to take some measurements, but were broken enough to be categorized as such.

There are 139 complete points or performs. Points include small arrow points and larger lance points. Florence-A chert is again the predominate material type accounting for 113 specimens, but also present are Alibates agatized dolomite, Edward's chert, Niobrara chert, a possible Keokuk chert, a quartzite and one Tecovas jasper. Eleven intact points are unidentified for material type. Cortex is generally absent in this tool type. However, there are four specimens exhibiting cortex, one stream rolled and two residual. Two Florence-A specimens have residual and steamrolled cortex. This might at first seem unlikely, given that the majority of Florence-A is collected from quarries with outcrop cortex, however, Florence-A is available in riverbeds as well, so this is not entirely unusual. One Alibates specimen and the jasper also have steamrolled cortex.

The points are generally well made and bifacially worked most probably by pressure flaking. Fresno style points which have straight to slightly rounded edges in a triangular form with a straight to slightly concave base are the predominant point style and account for 75 percent of the intact points. Maud points are a variation of the basic Fresno point with a very concave base and account for 17 points (Bell 1960:44-45). There are three intact performs, which are generally rough Fresno outlines. Lance points which are large triangular shaped points with a stem account for two intact specimens, while the remaining points include two Scallorn, eight Washita, one unidentified corner notched point and one double side notched point, and one unidentified point type.

Jack Hofman identifies the Maud points as Fresno variety B, and it can be assumed that the points in this assemblage noted as Maud are the equivalent of Hofman's variety B Fresno (Hofman 1978:13). Table two illustrates the average size of intact projectile points.

Table 2: Intact Projectile Points (34CN2)

	Average Maximum Length	Average Maximum Width	Length to Width Ratio
Complete N=139	19.83 mm	11.65 mm	1.72 mm

Bifaces/Knives

There are 46 bifaces in the sample, thirty-five of which are broken. Eleven specimens are intact. Thirty specimens are Florence-A chert, five are Alibates and eight are unidentified. Included in the bifaces/knife category is one beautifully made unifacially worked knife of Peoria chert (Figure 2).

Figure 2: Unifacial Knife of Peoria Chert

This artifact is included here, because it is functionally classified as a knife and it is the only representative of its type. This implement could have been included with scrapers which are predominantly unifacially worked or in a class by itself. Table 3 provides the average measurements of both broken and intact bifaces/knives from the Weil/Scott assemblage.

Table 3: Biface size chart

Broken n=35	**Average**
Length	30.81 mm
Width	22.08 mm
Thickness	6.49 mm
Weight	5.18 g
Intact Bifaces n=11	**Average**
Length	58.83 mm
Width	30.71 mm
Thickness	8.36mm
Weight	18.69 g

Knives

There are two intact knives in the assemblage as noted above, one is bifacially worked and the other is unifacially worked. The unifacial knife is made of Peoria chert and is exquisitely made. The bifacial knife is made of heat-treated Florence A chert. The metrics for these two items are included in Table 4.

Table 4: Intact Knives

	Maximum Length	Maximum Width	Length to Width Ratio	Maximum Thickness	Weight
Unifacial Knife	72.18 mm	26.42 mm	2.73	6.11 mm	13.94 g
Bifacial Knife	91.04 mm	31.68 mm	2.87	12.11 mm	27.86 g

Reamers/Drills/Perforators/Gravers

Incising/drilling tools constitute almost 8% of the lithic assemblage. This category includes pipe reamers, drills, perforators and engravers. A number of these implements represent combination tools, for example one end is a reamer and the other end is a scraper or a wedge. There are double ended reamers as well. These tools are bifacially worked by pressure flaking. These implements are included in a single category, because they all are used for similar functions. All can be used to incise, puncture or drill/ream other material. The reamers are well worn, and the flake scars are well smoothed. The drills are likewise well worn, and the perforators show smoothing as well. There are 39 intact implements and 15 of them are retooled from other tools. Engravers are most often retooled from point fragments. The reamers also have two reamer/scraper combination tools and one reamer/wedge combination tool, and four of the reamers are double ended.

Drills and reamers are associated with pipe production. Perforators can be associated with hide work and even ceramic production. Gravers may be used for ceramic production or pipe production. It is possible that these items might also have been used in tattooing. Table 5 illustrates the average of both broken and intact reamers, gravers, drills and perforators as a group. Table 6 shows the distribution of types for complete incising/drilling tools. Table 7 shows the material type, cortex and heat treatment for all the incising/drilling tools both broken and complete. Florence A remains the dominant material type, but several additional varieties represent single specimens and due to the presence of steamrolled cortex on two of them suggest collection from secondary sources such as rivers or stream beds. Smaller cobbles often found in riverine settings would be of suitable size for these smaller tools.

Table 5: Drills, Perforators, Gravers and Reamers

	Average Maximum Length	Average Maximum Width	Length to Width Ratio	Average Maximum Thickness	Average Weight
Complete N=39	30.67 mm	14.69 mm	2.25	4.72 mm	2.62 g
Broken N=77	22.91 mm	11.70 mm	2.09	4.42 mm	1.54 g

Table 6: Complete Incising Implement Distribution

Complete Incising Implement	Count	Average Maximum Length	Average Maximum Width	Length to Width Ratio	Average Maximum Thickness	Average Weight
Drill	1	37.47 mm	12.1 mm	3.10	2.55 mm	--
Mini-drill	1	10.78 mm	9.96 mm	1.08	1.97 mm	0.24 g
Engraver	13	18.84 mm	15.54 mm	1.35	3.58 mm	1.44 g
Reamer	4	56.99 mm	15.57 mm	3.81	7.94 mm	7.20 g
Double ended Reamers	4	38.10 mm	9.85 mm	3.84	5.91 mm	2.26 g

Mostly Complete reamer tips	2	33.13 mm	11.20 mm	2.96	5.46 mm	2.14 g
Perforator	1	26.45 mm	12.11 mm	2.18	2.74 mm	0.65 g
Combination tools total	13	33.07 mm	16.35 mm	2.10	4.94 mm	2.91 g
***Engraver/drill**	2	20.66mm	13.75 mm	1.52	3.99 mm	0.96 g
***Perforator/drill**	8	30.15 mm	16.78 mm	1.91	4.44 mm	2.28 g
***Reamer/scraper**	2	51.76 mm	18.09 mm	3.02	6.20 mm	6.12 g
***Reamer/wedge**	1	43.81 mm	14.61 mm	3.00	7.80 mm	5.47 g

Table 7: Material Type, Cortex and Heat Treatment of All Incising/Drilling Implements Broken or Complete

Material Types	Cortex	Heat Treatment
Alibates N=4	None = 3 Steamrolled = 1	**None = 2 Unknown = 2**
Edwards N=2	None = 2	**None = 2**
Florence A N=99	None = 97 Outcrop = 2	**None = 29 Burned = 10 Yes = 60**
Jasper N=1	Steamrolled = 1	**None = 1**
Moorefield N=1	None = 1	**None = 1**
Peoria N=1	Steamrolled = 1	**None = 1**
Unidentified N=7	**Unknown**	**None = 3 Unknown =4**

Modified Flakes

Modified flakes account for 1.3% of the assemblage with 19 specimens. Eleven of these are complete. Modified flakes generally show modification and even retouch but are not necessarily identifiable as implements. They are expedient in nature, but not as expedient as utilized flakes. Of the complete modified flakes, the majority are Florence-A chert, there are three unidentified cherts, and one quartzite flake, all others are Florence A representing ~60% of the category. Ten of the flakes are heat treated, two are burned and the remainder shows no sign of heat treatment. Cortex is present in both steamrolled and outcrop varieties, suggesting both primary and secondary lithic resource procurement for Florence A chert. The remaining specimens are tertiary in stage and no longer retain cortex for examination. Table 8 represents the averages for these lithics.

Table 8: Modified Flakes

	Average Maximum Length	Average Maximum Width	Length to Width Ratio	Average Maximum Thickness	Average Weight
Complete N=11	41.91 mm	22.14 mm	1.92	5.99 mm	5.85 g
Broken N=8	32.57 mm	28.07 mm	1.15	7.44 mm	7.53 g

Utilized Flakes

There are 36 utilized flakes in the assemblage. Evidence of use was present on at least one edge, no other deliberate modification, nor retouch was evident. Breakage was not considered for this class of artifacts, because utilized flakes are the most expedient form of tool and can be from a broken flake or unfinished broken tool. Again, Florence-A chert is the predominant material type. Other material types include Alibates, Edwards, Quartzite, a possible Foraker and five unidentified types. Cortex is generally absent from these flakes, the majority being tertiary in nature, but of the secondary flakes with cortex present stream rolled is the most common, with one residual and one outcrop, suggesting procurement from secondary sources as well as primary sources. Approximately 50% of this category shows signs of heat treatment. Table 9 illustrates the averages for this class of artifact.

Table 9: Utilized Flakes

	Average Maximum Length	Average Maximum Width	Length to Width Ratio	Average Maximum Thickness	Average Weight
All N=36	25.25 mm	17.91 mm	1.43	4.26 mm	9.17 g

Cores

There are seven cores from this assemblage. Five of these are Florence-A chert and one is Florence-B chert. One Florence-A core has residual cortex but is thermally altered. The other three cores all retain outcrop cortex and one shows evidence of burning. This suggests that cores are being brought into the site as well in nodular form and from the source area which is in Hardy, Oklahoma near the Kansas border and within ten miles of the Bryson-Paddock and Deer Creek sites. The Florence-B chert comes from further north in the formation that produces the Florence-A chert. The final core is a Dakota quartzite with outcrop cortex. The largest core is 369.1 grams and was also heat treated as a core. Because heat treatment is a time consuming process and the length of time needed to thermally alter chert is directly related to the size of the piece being treated, this is a very interesting find (Domanski and Webb 1992; J. Jeffrey Flenniken and Ervan G. Garrison 1975; Gregg and Grybush 1976a; Mandeville 1973b; Purdy and Brooks 1971). Table 10 provides the averages for the cores.

Table 10: Cores

	Average Maximum Length	Average Maximum Width	Length to Width Ratio	Average Maximum Thickness	Average Weight
N=7	64.36 mm	42.03 mm	1.45	18.34 mm	77.31 g

Miscellaneous Items

The assemblage also has one piece of hematite with stream rolled cortex, and one sandstone abrader showing to be well used. An Alibates wedge or chisel bit without cortex but showing evidence of thermal alteration and an unknown tool fragment from an unidentified chert with stream rolled cortex.

Non-lithic materials in the assemblage include three burned and calcined bone fragments, showing carnivore chewing, two decorated dark sand tempered pottery sherds, one engraved or incised, possibly even stamped bowl rim fragment and one body sherd with an appliqué decoration. A very thin metal button is also present and may represent a modern addition to the assemblage from the surface collection, attempts to identify its date of manufacture were not successful.

Scrapers

Scrapers are generally associated with hide processing (Schultz 1989a; Weedman 2002). They can however be used to perform any number of scraping tasks, including woodworking, ceramic making, canoe building or other planning activity. Scrapers are a multipurpose tool for hide processing and almost all steps can utilize a scraper (Ray 1937; Schultz 1989a, 1992a). Scrapers are especially suited to processing large bison hides. The presence of a number of scrapers in the assemblage suggests hide processing was an important part of the production at this site (Cleeland 2008; Mason 1887; Odell 2003; Schultz 1989a, 1992a).

There are 93 scrapers in the assemblage. Forty-eight of these are complete intact scrapers. Only 47 are used in the analysis, as the metric data for one scraper was missing. The remainder is scraper fragments. Of the complete scrapers eleven are of Alibates, three have steamrolled cortex, three others may have cortex, two are heat treated and two may have been thermally altered. Twenty-six of the scrapers are made of Florence-A chert. Six have outcrop cortex. Fourteen are heat treated and one was burned after heat treatment. One specimen is a very dark chert or possibly obsidian with an outcrop cortex. One is a quartzite with steamrolled cortex and was both thermally altered and later burned. One is Tecovas Jasper with neither cortex nor heat treatment. Eight specimens remained unidentified, four with steamrolled cortex, two with outcrop one heat treated and one burned.

Thirty-eight scrapers are fragments. These include three Alibates, one with steamrolled cortex and two which are heat treated. Twenty-nine are Florence-A chert, seven with outcrop cortex, sixteen were thermally altered, two may have been, one was burned and one was burned after being thermally altered and used. There is one quartzite and five unidentified specimens of which two have steamrolled cortex, two are thermally altered and one is burned.

A complete analysis of the Weil/Scott site scrapers is presented in part two of this paper in conjunction with the comparative analysis of these scrapers with those of the Wheeler Phase Little Deer site in Custer County. As will be demonstrated, certain aspects of a lithic assemblage allow the researcher to address questions of cultural affiliation and shared behaviors, the assumption being that shared and learned behaviors are indicative of relatedness and group affiliation. A suggestion of important aspects of the lithic assemblage which may bear on these questions follows.

Assessing Cultural Affiliation and Shared Behaviors

The scraper category is especially important for this time period. It is accepted that the Little Deer scraper assemblage resembles that of the eighteenth-century Bryson-Paddock (34KA5) and Deer Creek (34KA3) scraper assemblages (Brooks 1996; Cleeland 2008; Drass and Baugh 1997; Hofman 1978). These consist of very large plano-convex scrapers, most often handheld and not finely modified. These are large and rather crude scrapers, unlike the typical highly modified small scrapers associated with earlier contexts like those at the Little River focus Tobias site (14RC8) (Cleeland 2008; Wedel 1959).

If the Scott site is ancestral Wichita in nature and indeed related to the Little Deer group and the Wheeler Phase, we would expect to see this reflected in the scraper size and reduction strategies (Cleeland 2008). It is possible that the sites on the western edge of the Southern Plains, entered into heavier trading endeavors with the Puebloan groups of the southwest and the Spanish earlier than the Bryson-Paddock and Deer Creek French hide trade (Wedel 1982; Mildred Mott Wedel 1988; Wedel 1959). If so, we might expect to see alterations in the production technology and tools used to process hides at an earlier date among these western groups as demonstrated by the similarity of the Little Deer scrapers with those of the later eighteenth century sites of Bryson-Paddock and Deer Creek (Cleeland 2008). The Spanish were the first Europeans to settle in the Western part of North America and approaching from the west the first to encounter Wichita groups in 1541 A.D.(Smith 2000; Mildred Mott Wedel 1988; Wedel 1959) The Spanish exacted tributes in bison hide as well as procured hides for their own leather industry (Clarkson 1960; Lange 1957; Smith 2000). It is possible that the groups in the western area were already increasing their productivity to meet an increased demand.

It has also been argued by Hofman (1978), Drass and Baugh (1997) and Brooks (1996), that the large plano-convex Florence-A scrapers represent a trade item, being funneled through the western area via the Little Deer site and others. Of particular interest is the retention of outcrop cortex and the very large size of the scrapers as these appear to be hallmarks of the early contact site scrapers and represent a distinct restructuring of the production process in relation to increased trade requirements.

Material Types

The lithic materials identified at a site provide information about the spatial range of resource exploitation and/or procurement that a group utilizes. For mobile groups with rather extensive movement patterns, this could indicate areas visited or points at which they might pause in their seasonal cycle to procure specific resources. For more sedentary groups, this can indicate points of articulation with other groups in either formal or informal trade relationships.

The Weil/Scott site inhabitants lived in a rather lithic poor area, although smaller cobbles of suitable cherts were available from streambeds nearby, the majority of their lithics were imported from very long distances. Cortex, if present, provides a way to assess the type of procurement for lithic material (Andrefsky Jr. 1994; Andrefsky 2009:75,78; Doelman, et al. 2001:15; Shiner 2008:81). For example, stream rolled cortex indicates a secondary depositional source for procurement from waterways. Outcrop cortex suggests primary depositional sources from quarry locations, at some distance from the site. Residual cortex or weathered cortexes also indicate a secondary source, which could be at the surface of a quarry site or elsewhere along the landscape.

Identifying which lithics are used in the manufacture of certain implements can also identify tool stone preferences between groups. All lithics have their own specific properties which either enhance or detract from their fracturing capabilities and therefore their suitability for certain tool types (Andrefsky Jr. 1994; Andrefsky 2009; Bamforth 1986; Bleed 1986; Brooks 1996; Doelman, et al. 2001; Shiner 2008). Many lithics can be improved by the process of thermal alteration, creating improved fracture control and edge sharpness. Heat treatment however is a time consuming process and this must be considered when assessing the economic decisions being made by prehistoric lithic tool manufacturers (Brooks 1996; Jeffrey J. Flenniken and Ervan G. Garrison 1975; Gregg and Grybush 1976b; Mandeville 1973a; Purdy and Brooks 1971; Schultz 1989a, 1992a). Table 11 identifies the material types and the lithic implements associated with them.

Table 11: Material Type Percentages by Lithic Typology at the Weil/Scott site.

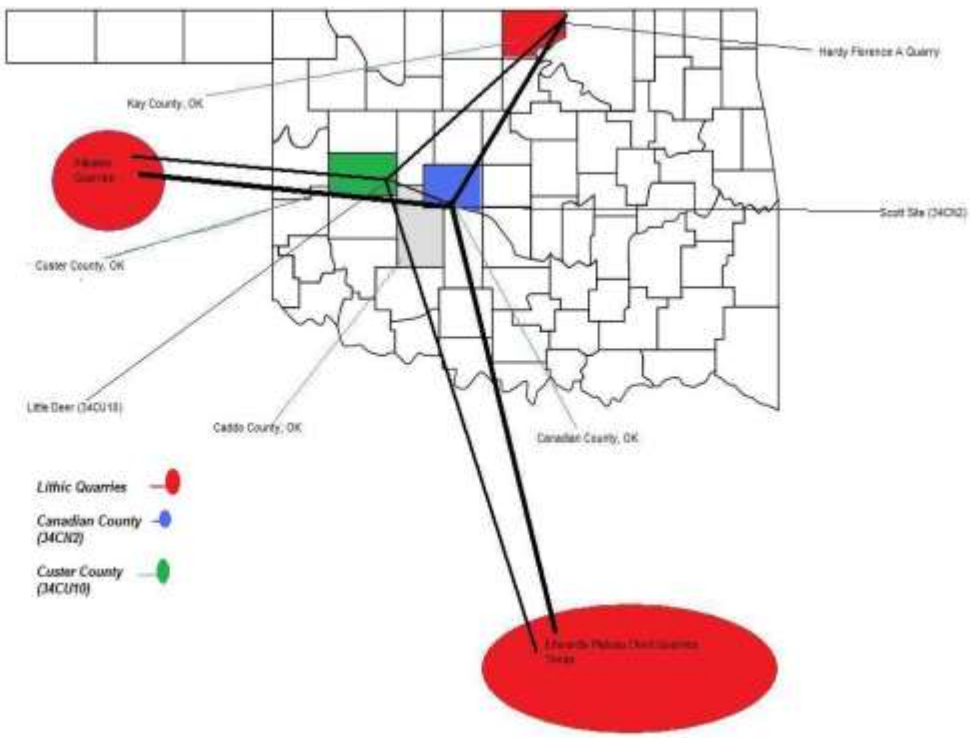
Material Type	Reamers/engravers/ perforators/drills n=116	Points N=1082	Scrapers N=93	Cores N=7	Bifaces N=46	Modified Flakes N=19	Debitage N=101	Utilized Flakes N=36
Florence A	0.86	0.88	0.64	0.72	0.67	0.79	0.69	0.61
Florence B	--	--	--	0.14	--	--	--	--
Alibates	0.03	0.02	0.18	--	0.11	--	--	0.11
Edwards	0.02	<0.01	--	--	--	--	--	0.03
Moorefield	< 0.01	-	--	--	--	--	--	--
Tecovas Jasper	<0.01	<0.01	0.01	--	--	--	--	--
Peoria	<0.01	<0.01	--	--	0.02	--	--	--
Neva/Nioibrara?	<0.01	<0.01	--	--	--	--	--	--
Quartzite	-	<0.01	0.01	0.14	--	0.05	0.02	0.08
Keokuk	-	<0.01	--	--	--	--	--	--
Foraker	--	--	--	--	--	--	--	0.03
Obsidian	--	--	0.01	--	--	--	0.29	--
Unidentified	0.05	0.08	0.13	--	0.19	0.16	--	0.14

Florence-A chert is the dominant lithic type used by the Weil/Scott inhabitants representing 0.84 of the total assemblage of 1500 lithic pieces. Unidentified lithics represent 0.08 and Alibates represents 0.04. All other material types represent the final 0.04 of the assemblage. This is significant when the spatial arrangement of the lithic quarries is noted in relation to the site location (Figure 2). The Hardy quarry which is the primary source of Florence-A chert is located in Kay County, Oklahoma approximately 219.1 km or 136.2 miles northeast of the Weil/Scott site. The Alibates quarries lie to the west of the Weil/Scott site approximately 313.6 km or 194.9 miles. Edward's chert, the only other material found in some quantity is found to the south of the Weil/Scott site approximately 549.5 km or 341.4 miles.

If cortex is used as a proxy for whether or not the material was retrieved from a primary or secondary source, it is possible to say that Florence-A was retrieved from a primary source given that the Florence-A cores have three with outcrop cortex still attached. The majority of Alibates have stream rolled cortex with at least one specimen showing outcrop. Because the majority of the material in this assemblage is from late stage reduction steps, the majority of the materials represent tertiary pieces and obtaining information in relation to the original condition and type of cortex is not possible.

However, based on the cortex present on the cores, it is possible to say that the Weil/Scott inhabitants exploited the Hardy quarries. Whether this exploitation was part of their annual round of exploitation or via trade networks is unclear. If the village was sedentary it is more probable that the material was obtained through trade. If the village was seasonally mobile and the Weil/Scott inhabitants wintered with other Wichita groups on the Plains, it is possible that they obtained the material directly. Likewise, it is possible that the quarry was part of a mobile group's annual round. The amount of conservation and retooling evident in this assemblage is consistent with the concept of curation and formal tool making as components visible in an assemblage when the lithic source is at a greater distance from the site as proposed by early reports which suggested the level of curation was linked to the level of mobility and distance from the source, this is not necessarily a consistent nor logical correlation and various levels of curation can be found in all mobility levels (Andrefsky Jr. 1994; Andrefsky 2009; Bamforth 1986; Morrow 1996; Nelson 1991).

Figure 3: Lithic Quarry Locations



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The thermal alteration of lithic material is another method for increasing the utility of a lithic resource. Thermal alteration increases the reliability of fracture and generally improves the quality of tool stone (Jeffrey J. Flenniken and Ervan G. Garrison 1975; Gregg and Grybush 1976b; Mandeville 1973a). It is a common practice. It is, however, a time consuming practice and in the archaeological record evidence for the economic decision to dispense with heat treatment can be seen at other Protohistoric sites such as Bryson-Paddock and Deer Creek (Cleeland 2008). Table 12 shows the percentage of thermal alteration of material at the Weil/Scott site by typological classification.

Table 12: Thermal Alteration at Weil/Scott

	Incising Tools N=116	Points N=139	Scrapers N=93	Cores N=7	Bifaces N=46	Modified Flakes N=19	Point Fragments N=943	Utilized Flakes N=36
Heat Treatment	0.47	0.49	0.35	0.14	0.48	0.52	0.52	0.42
Burned	0.09	0.05	0.08	0.14	0.13	0.21	0.14	0.06
Partial/Slight	0.03	0.03	0.04	---	---	---	---	0.02
Indeterminate	0.07	0.10	0.05	---	0.06	0.01	0.005	0.02
No Treatment	0.34	0.33	0.48	0.71	0.33	0.26	0.135	0.48

Retooling and Lithic Conservation

One noticeable attribute of the Scott site is the amount of retooling accomplished. Many of the gravers are made from point fragments, scrapers once broken are retooled into reamers or drills. And, several tools are multipurpose, being both a bifacial tool and unifacial tool. The Scott site occupants utilize much of their lithic material and reuse it as appropriate (Andrefsky 2009:66-75). The overall lack of cortex suggests that the material is well used and well reduced before it enters the site. There is a notable lack of primary and secondary flakes in the debitage. The specimens that do have outcrop are for the most part Florence-A. Even when stream rolled cortex is present it does not interfere with the modification of even small primary flakes. There are several very small but finely made scrapers and gravers at this site, smaller than any other tool I have encountered. It is well supported to state that the occupants of the Scott site practiced a conservative approach to their lithic technology, retooling, resharpening and curating their lithic materials (Andrefsky 2009; Bamforth 1986).

Hafting

The practice of hafting tools in a handle of wood, bone or antler, allows for the use of smaller lithic materials as tools, increases the pressure which can be applied to a tool and provides a protective backing or grip to prevent accidental injury to the hand. The production of hafts is often a time consuming process and hafts are often curated over long periods of time (Cassell 2003:158; Dorsey 1995 (1904):5; Schultz 1989a:8). There are several types of hafts including the more commonly identified adze or L-shaped antler haft, a split shaft handle as seen on knives and the jam or socketed haft identified in the Little River foci Tobias site in Kansas, associated with small scrapers (Bell 2004; Cleeland 2008:76-77; Schultz 1989a, 1992a; Wedel 1959). Lithic portions of complex tools are secured in their hafts by mastics, pressure and bindings. Hafting limits the usable tool edges and provides size constraints on the lithic implement. Regardless, hafting is often considered an attribute of curated technology. Toby Morrow (1996), however, argues that larger tools are often more efficient and effective than the smaller hafted tools and this should be considered when examining an assemblage.

Discussion

The use of surface collections in attempting to define the chronology of an area or the cultural affiliation of an area is a logical approach. It is of course to be approached with a thorough knowledge of the potential problems, especially a lack of provenience for the items and the very real possibility that the assemblage gathered is not representative of the site as a whole. That being said, the material provides us with some very good information, including material types, the presence or absence of cortex, manufacturing strategies, assemblage components, a general idea of the amount of material that might be present in an excavation and some clues as to the people themselves and their range of exploitation or interaction for trade.

Of particular interest to me, is assessing the place of the Scott site in relation to the Wheeler Phase site of Little Deer in regard to material components, raw material utilization and heat treatment. I am particularly interested in a comparison of the material components and the scrapers which are indicative of an economic change and increased spheres of contact for the express purpose of high-level trade in a specialized market.

In order to assess the comparability of the Scott site assemblage with that of the Little Deer assemblage and in order to answer the question of whether or not the Scott site is a member of the Wheeler Phase, I will now present a comparison of the scrapers from both assemblages based on analysis of the

PART TWO: Comparison

Scrapers

The large scrapers at Little Deer (Figure 4) are considered to be one of the distinguishing lithic components of the Wheeler Phase by Jack Hofman and others (Drass and Baugh 1997; Hoffman 1978). These are usually made of Florence-A chert. The presence of large scrapers can therefore be expected at the Weil/Scott site if it is in fact related to the Wheeler phase. However, as the charts to follow indicate, the scrapers from Weil/Scott site (Figure 5) are significantly smaller than the Little Deer scrapers and even smaller than the diagnostic scrapers from the Bryson-Paddock and Deer Creek Wichita sites (not shown) (Cleeland 2008).

Figure 4: Little Deer 34CU10 Scrapers photo courtesy of Dr. Richard Drass, Oklahoma Archeological Survey

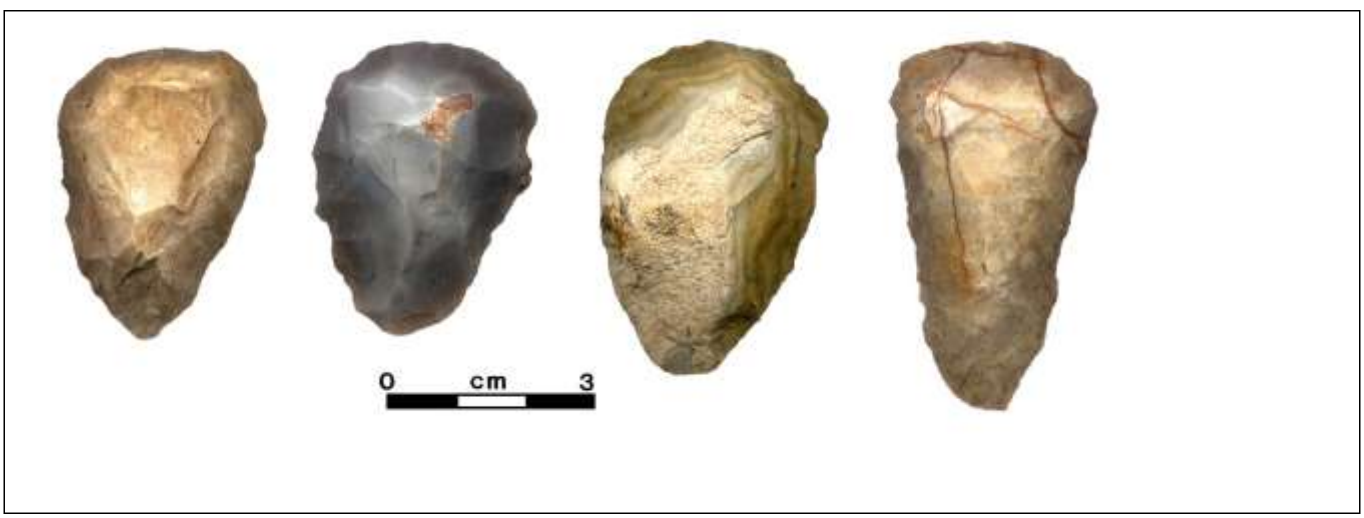


Figure 5: Weil/Scott 34CN2 Scrapers

Scraper Size

The Little Deer/Patterson surface collection complete scrapers all material types average 54.81 mm in maximum length, 35.12 mm in maximum width, 13.36 mm in maximum thickness and have an average weight of 30.47 grams. The Weil/Scott site complete scrapers all material types average 38.15 mm in maximum length, 22.65 mm in maximum width, 8.04 mm in maximum thickness and have an average weight of 10.49 g. A comparison is shown in Table 13.

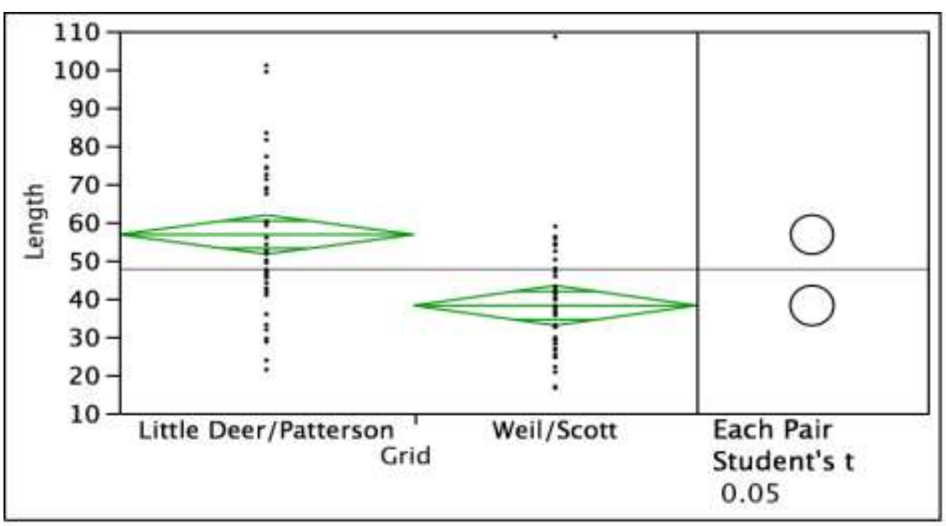
Table 13: Descriptive Statistics for Complete Scrapers

	Little Deer Scrapers N=59	Weil/Scott Scrapers N=47
Average Maximum Length	54.81 mm	38.15 mm
Average Maximum Width	35.11 mm	22.65 mm
Average Maximum Thickness	13.36 mm	8.04 mm
Average Weight	30.47 g	10.49 g

While the descriptive statistics appear to be different between the two sites, the reality of the difference can be analyzed using statistical methods which compare the collections to one another. Using JMP statistical software, a one-way analysis (Figures 4 and 5) completed 94 observations on the provided data and determined a significant difference between the two data sets with a 95% confidence level and a probability of <.0001 assuming equal variance. A comparison of the means of both data sets likewise returned a significant result at the 95% confidence level. Positive numbers indicate a significant difference between the datasets, suggesting that the two data sets are not from the same population and represent significant difference.

The statistical comparison in conjunction with the physical examination of the scrapers and the descriptive statistics indicate that the two data sets are not from the same population and are significantly different from one another. If the Weil/Scott inhabitants are related to the Little Deer inhabitants sharing a similar culture, we could expect the scrapers to be more similar than dissimilar. In this case, the relationship between the Weil/Scott inhabitants and the Little Deer inhabitants cannot be supported. It is therefore suggested that the Weil/Scott inhabitants represent a group other than the Wheeler Phase occupants of the Southern Plains.

Figure 6: One Way Analysis of Maximum Length by Site and Means Comparisons for Length by Site.



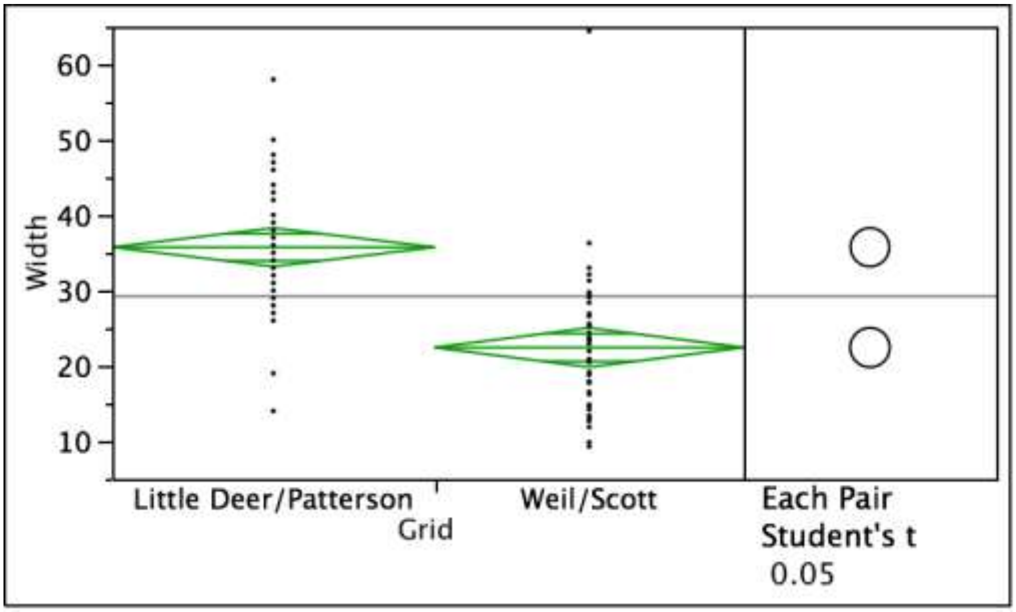
Means Comparisons: Lengths
Comparisons for each pair using Student's t

t	**Alpha**
1.98609	0.05

Abs(Dif)-LSD	**Little Deer/Patterson**	**Weil/Scott**
Little Deer/Patterson	-7.21115	11.27819
Weil/Scott	11.27819	-7.36625

(Positive values show pairs of means that are significantly different.)

Figure 7: One Way Analysis of Width by Site and Means Comparison of Width by Site



Means Comparisons
Comparisons for each pair using Student's t

t	**Alpha**
1.98609	0.05

Abs(Dif)-LSD	**Little Deer/Patterson**	**Weil/Scott**
Little Deer/Patterson	-3.61439	9.652224
Weil/Scott	9.652224	-3.69213

(Positive values show pairs of means that are significantly different.)

Scraper Shape

Additional differences are noted in the shape of scrapers, the presence and type of cortex, the use of heat treatment between the two sites and the material types utilized by the inhabitants of the two sites. Oval scrapers are predominant in both assemblages, but at a higher proportion at the Little Deer site. Oval scrapers have rounded edges and four sides. Triangular to heart shaped scrapers are three sided and have three corners which can either be rounded or angular. Rectangular scrapers are four sided and generally angular at the corners as are square scrapers. Round scrapers generally lack linear edges and are generally the same diameter at any point of measurement. A few scrapers have shapes that fail to meet the above criteria and are noted as indeterminate.

Table 14: Scraper Shape

	Little Deer Scrapers N=59	**Weil/Scott Scrapers N= 48**
Oval	.47	.375
Triangle	.34	.355
Rectangular	.14	.19
Round	.03	__
Square	--	.02
Indeterminate	.02	.06

Cortex

Cortex allows an assessment of the place of procurement for lithic material. Generally, outcrop cortex suggests procurement at a primary lithic source such as a quarry, while residual or weathered cortex suggests the collection of lithic resources either on the ground of a primary source or another secondary source. Stream rolled cortex suggests collection from river or stream beds as secondary sources for lithics (Doelman, et al. 2001; Shiner 2008). The Canadian River and its associated streams have a number of gravels consisting of small cobbles suitable for knapping and in an area considered lithic poor may provide the most available source of knappable material.

Because flint knapping is a reductionist technology, removal of the cortex during the process can complicate the use of cortex as a proxy for resource procurement. The majority of the Weil/Scott site material represents late stage reduction or tertiary material. The Little Deer scrapers are earlier stage and retain a greater proportion of cortex. However, as noted above, Florence A cobbles present in the Weil/Scott assemblage indicate that at least some Florence A was procured from primary sources, either through direct procurement in a seasonal round or resource procurement expedition or through trade. Scrapers generally retain more cortex, often being made from early stage reduction flakes, than implements such as projectile points. This allows some assessment of resource procurement.

Resource procurement is affected by a number of factors including group mobility, weight of the resource and season of availability. Lithics are generally available year-round, unless weather prevents mobility. But, the weight of the material and distance to the resource area may factor into the decision to obtain particular lithics.

Material Type

Another consideration for scrapers is the material type distribution. Little Deer has six material types represented in the complete scrapers (Table 15). These include three Alibates, one Day Creek Chert, eight Edward's Chert, forty-five Florence-A cherts, one petrified wood and one Reed Springs.

Table 15: Little Deer Material Types Distribution

Alibates	**.05**
Edwards	**.136**
Florence-A	**.763**
Day Creek, Petrified Wood and Reed Springs	**.051**

The Weil/Scott site has at least six material types represented (Table 16). These include eleven Alibates, twenty-six Florence-A cherts, one possible obsidian, one quartzite, one Tecovas Jasper and 8 unidentified gravels.

Table 16: Scott Site Material Types Distribution

	With Unidentified N=48	**Without Unidentified N=38**
Alibates	.23	.26
Florence-A	**.542**	**.52**
Unidentified gravels	.166	--
Obsidian, Quartzite and Tecovas Jasper	**.062**	**.08**

The Little Deer scrapers are predominantly Florence-A with Edward's second and Alibates third. At Scott, Florence-A is also predominant in the scrapers but followed by Alibates and Edward's is absent. As indicated above, lithic procurement from any of these three sources represents long distance movement of material and people. This could indicate different trading realms or even a different time period. The smaller size of the scrapers might indicate a time period closer to that of the Little River and Lower Walnut foci of the Great Bend aspect in central and southern Kansas, predating Little Deer, despite the close proximity of the two sites and the surface similarities between the two.

Thermal Alteration

The thermal alteration of lithic material is an important decision in the production process. The cost of heat treatment must be compared with the benefit of increased flakeability. It is possible that the cost is prohibitive in relation to the benefit and the economic decision to dispense with heat treatment recovers utility in increased time recapture and may or may not impact the efficiency and effectiveness of the tools. Only one Little Deer scraper is heat treated accounting for less than two percent of the assemblage, while 37.5% of the Weil/Scott complete scrapers assemblage is heat treated and another 8% are burned and for 5% of the assemblage heat treatment was indeterminate. This represents a significant difference in the assemblage and consequently in the decisions involved in the tool production.

Conclusion

While the approach taken in this paper was to assess the degree of relatedness between the lithic assemblages at the Scott Site and the Little Deer Site and to determine if the Scott site can be identified as a component of the Wheeler phase, it does not answer what other possible affiliations might be involved. There is a distinct difference in the material assemblages and a distinct difference in the approach to lithic use between the sites. It is possible to argue as others have that the Little Deer site represents a trade center or gateway to the west for Wichita trade goods, the presence of highly reduced but copious amounts of Florence-A at the Weil/Scott site suggests perhaps a down the line trade point rather than a trading center. However, the Weil/Scott site is closer to the Florence A quarry than the

Little Deer site. The distinct difference in reduction strategies most notable in the scraper technology suggests that the Weil/Scott site occupants are not related to the Little Deer occupants despite their close proximity to each other. While not specifically addressed in this paper, there are also distinct differences between the Little River and Lower Walnut assemblages as well, suggesting that the Weil/Scott site occupants were not of Wichita origin, although it is becoming more and more probable that the Little Deer occupants were a Wichita subgroup, perhaps the Iscani, who later moved to Deer Creek to join the other Wichita groups (Smith 2000:19).

The most important conclusion of this paper, however, is that surface collections can provide a viable and informative option for site analysis. A systematic effort should be made to analyze more surface and private collections in an effort to identify and clarify gaps in the archaeological record. The western edge of the Southern Plains was an area of great diversity with a number of groups no longer extant living and moving across the area, among them the Jumano groups. This area therefore represents an area of incredible vitality which should be more fully investigated in order to establish the intricate interactions between groups across the Plains and the Southwest. While this paper does not determine who the occupants of the Weil/Scott site were, it does tell us who they were not and this gives us a place to start, and new questions to ask.

One recurring question is the anomaly presented by the movement of large, heavily cortexed pieces of Florence-A chert. Charting the extent of this movement is critical to understanding the scope of Wichita trade and Wichita influence in the Southern Plains. The cost of transporting such a weighty material seems counterintuitive to the arguments that suggest material from the farthest away will be the most reduced (Bamforth 1986), although Angela Close found that carrying cost is not a consideration in many cases (Close 1996). People will transport large amounts of desired material to even the most remote of places despite its weight or the logistics of movement.

While the assumption that more mobile groups will have smaller more portable and more curated lithic assemblages is widely expressed and even supported, there may be some room for disagreement (Andrefsky Jr. 1994; Bamforth 1986; Binford 1979; Bleed 1986; Nelson 1991). Curation and maintenance of existing tools is a cost efficient and conservative approach to tool use. And, in an experimental study Morrow found that bigger tools provided more advantage than a number of smaller tools and suggests that larger tools might satisfy the needs of a mobile person more readily (Morrow 1996). The incredible amount of use, retooling and utilization of even small flakes at the Scott site, might suggest a mobile group. However, the presence of pottery and the volume of material seem to suggest perhaps a more substantial settlement. It would be an intriguing site to excavate.

Acknowledgements

I would like to thank Dean Gamel for the gracious loan of the Scott site surface collection for this analysis and for his dedication to conscientious and meticulous collection. I would also like to thank Dr. Don Wyckoff for sharing with us his incredible knowledge and the treasure of his resources for lithic study.

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Editors Comment *– Archaeology projects on post-contact civilian and military sites are common in Oklahoma. Remains of forge metal working areas can be invaluable to assess the period and nature of cultural activities. The metal artifacts depicted here are from a single 10 cm level in a square at Fort Washita during an OAS sponsored excavation. Gerald Franklin's artifact identifications characterized the site as likely being a small forge in a military wagon repair shop from the 1840s and 1850s. Gerald participates in many OAS activities and teaches OKPAN classes on this topic.*

Blacksmithing for the Historical Archaeologist

Gerald Franklin

Introduction

Early metal workers (blacksmiths) used a variety of structures, tools, materials, and fuels to manufacture and repair metal items. Just as paleo-archaeologists excavate and analyze lithic debitage so can historic archaeologists use residue from forging sites to help clarify the past activities of the site under analysis.

Structures

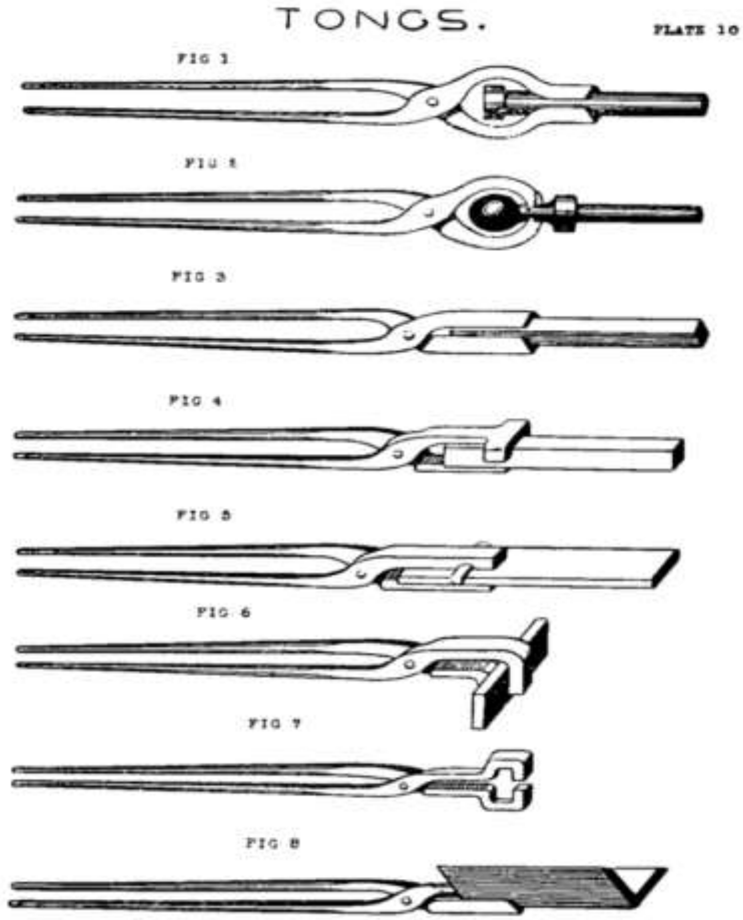
A forge does not a "blacksmith shop" make. Many early shops had forges on the premises. These include gunsmith shops, wainwright shops, wheelwright shops, or any other activity that required the shaping of hot metal. Structures in this context include the building that housed the activity, its related storage facilities, and internal structures such as masonry forges, benches, bins, etc.

Tools

A variety of tools were required in forging operations and we should expect to find representations of the blacksmith's toolkit upon excavation of a metalworking site. Large tools such as anvils and vises will probably not be left at a site but smaller, handheld tools such as hammers, chisels, tongs, etc. can be expected. Tongs (Figure 1) were particularly ubiquitous since they had to be sized and shaped to securely hold the material being forged. Figures 2 through 8 show some of the more common handheld and anvil supported tools. Often, such broken tools were discarded along with other metallic scraps (Figures 9 through 11).

Materials

The blacksmith's trade involved items made from iron and steel, the so-called "black metals". Steel is an alloy of iron and carbon while wrought iron has very little carbon content. The term "wrought iron" comes from the early manufacturing process of repeatedly hammering the raw iron to drive off unwanted excess silica. Another term for hammered iron is wrought iron. Prior to the 1850s, steel was an austere material and was reserved for special items that required higher carbon. Other metals that are often found during excavation include copper, brass, and bronze. Occasionally, pewter scraps will be excavated.



Lillico, J.W., *Blacksmith's Manual Illustrated*, COSIRA , UK, 1952.

Figure 1: Tongs must fit the stock being forged.

Figure 2: Blacksmith's anvils commonly had two holes on the face – the smaller, round "Pritchel hole" to give a punch (Pritchel) clearance to penetrate hot material and the larger "Hardy hole" commonly used to mount tools for forging hot material. As mentioned in the text, anvils are rarely recovered from sites.


Figure 3: The bending fork is used in the Hardy hole to make controlled bends in hot stock.

Fuel

Coal was the most commonly used fuel in many forges in the US. As such, we expect to find evidence of coal bins or coal piles around the area of excavation. Pieces of unburned coal, called "green coal", can often be found around the forge area. As coal is burned it forms a substance called coke which is the higher energy form of coal. Coke pieces are often found along with green coal around the forge area. Piles of ash and "clinker" are usually found during excavation. Clinker is formed when the dirt, rock, or sand that is present in most coal melts in the forge. Pieces of clinker are removed from the forge fire and discarded with other unburned residue (ash). Many early forges were fired with charcoal and evidence of this fuel can often be excavated. The mere presence of charcoal, however, is not an indicator of the type of fuel used since many shops used wood kindling to start a coal fire and many old shops were fire hazards and may have burned and been rebuilt over time. If the forging operation used charcoal as its main fuel, it would be expected that one or more charcoal kilns would be in the area if not on the premises per se.

Siting of Elements

Work areas and actual tool sites are often indicated by post molds. Anvils were commonly mounted on a large stump that was partially buried in the shop floor. Post or leg vises were often mounted on a pair of posts; one for the upper mount of the vise, and a shorter one for the "leg". The actual forge is usually indicated by masonry residue. The forge and chimney may have been constructed from bricks and mortar that are different from other masonry in the building such as foundations or stem wall footers.

Metal residue from the anvil would be cut and the hot pieces allowed to drop to the floor to accumulate around the anvil. This accumulation, along with an associated post mold, can be helpful in determining the anvil site.

Figures 4 (above) and 5 (below): The Hardy is used to cut hot metal. The Hardy hole is used to hold numerous tools, e.g. the bending fork in Figure 3 but the cut off Hardy is the only one that is commonly referred to as “the Hardy”. Note the fish-tail end being cut off that will be discussed in Figure 6.

Early blacksmith shops often used bellows to pump air through the forge. These were often five or six feet long and three or more feet wide. The bellows could have been hung from a trestle suspended between two or more posts, with associated post molds, or it could have been suspended from the roof framing. Regardless of the mounting, it was suspended above the level of the forge fire for two reasons: many of the volatile gasses given off by the coal are heavier than air and will collect in the bellows body creating an explosion hazard if it is hung too low; also, hanging the bellows tends to prevent vermin from nesting inside. This higher mounting feature provides a “dead space” area of twenty or so square feet that was sometimes used for storage but was more often used as a dump area for ashes and clinkers from the forge as well as metallic scraps from the anvil. This residue can provide a major clue to the location of the forge and bellows.

Soil samples can be analyzed for iron particle content. As iron/steel is heated, a scale of iron oxide is formed and flakes off during forging. This scale will build up around the anvils in the shop and become incorporated in the soil. Filings will fall to the floor around vises and can also give clues to the siting of vises, work benches, etc. Samples can be analyzed for iron particle content by wetting a pre-weighed soil sample until it forms a slurry. The slurry is then stirred with a pre-weighed magnetic stirring rod and weighed after drying. The difference in rod weights pre and post stirring should give a relative magnetic fraction that, when plotted on a floor plan, will show a concentration which can indicate the location of a vise, anvil or workbench.

A field expedient to measure the relative presence of iron particles in a dry soil sample held in the palm can be employed by passing a magnet over the sample. These quick relative measurements can give clues as to the siting of anvils, vises and benches.

Figure 6: The fish-tail finial is a common decoration on hinges, scrolls, etc. It is made using the peen of a cross-peen hammer. Finials such as this are commonly found in scrap piles due to trimming of re-used stock.

Figure 7: Top and bottom fullers being used to neck down hot stock. Top tools were often hafted with wooden handles which may rot before they are excavated. The bottom tools will have a square shank to fit the Hardy hole.

Figure 8: Top and bottom swages are used to neck down round or square hot stock to a smaller cross section. Note again that the top tool has a wooden handle and the bottom tool has a hardy shank.

Conclusion

The blacksmith's trash dump/debitage pile provides invaluable insight into what activities were going on around the facility. A preponderance of horse or mule shoe scraps would indicate a farrier's shop; a mixture of general cutoff items in addition to the shoe residue would indicate what some would call a "general blacksmith shop" or a "village smithy". Scraps that appear to be associated with heavy machinery could indicate an industrial shop such as that supporting a sawmill or manufacturing plant. Remember that broken or discarded tools can also give a clue as to the shop's main activities.

The most common metal used for forging prior to the twentieth century was wrought iron. Steel did not come into common use until the 1850s and even then, iron was cheaper to produce so it continued to be the material of choice until the cost effectiveness of steel surpassed that of wrought iron.

Large tools such as anvils and vises are rarely left for excavators to find. Smaller tools are commonly mixed in with residue piles or tramped into the soft dirt (mud) floor of the shop. Many of the smaller hand tools such as hammers, punches, or chisels are pretty much common among shops but some of the more specialized tools can indicate more specialized activities.

Figure 9: Scrap cut offs. Top row: two Scroll finials and square stock scrap. Bottom row: oval stock scrap. All were cut at forging heat using a Hardy.

Figure 10: Discarded tool scraps. A broken file tang and a tong jaw. Since file was higher carbon tool steel, the remainder of the tool may have been the retained in the shop to be repurposed into another tool.

Figure 11: Scraps that were cut with a modern Oxyacetylene cutting torch. This technology came into common use in the early 20th Century. Note the kerf marks burned into the steel by the hot gasses.

Endnotes:

The Art of Blacksmithing, Bealer, Alex W. ISBN 0-7858-0395-5

This is a pretty good, cost effective general reference for blacksmithing. It is available on Amazon for $9.14 + tax.

Blacksmith's Manual Illustrated, J.W. Lillico Published by COSIRA in the UK,

The COSIRA series of books used to be available for free download. There are sites that will sell you a hard copy. Email Gerald Franklin if you can't find a free download and he'll send you a digital copy.

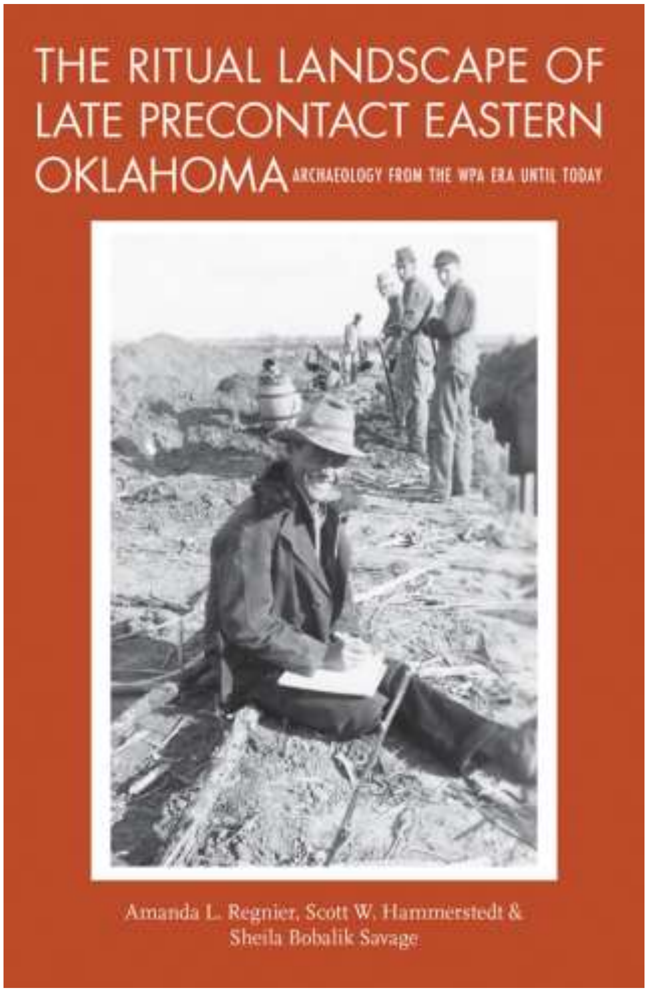
JSTOR

Has several journal articles dealing with the subject. Search for Blacksmithing Archaeology. The most informative articles are those written by John D. Light.

Photographs, all photographs by the author unless otherwise cited.

About the author

Gerald Franklin is an avocational archaeologist from Norman. He is a retired Field Artilleryman, retired rancher, and retired software engineer. Gerald is currently a working blacksmith and operates a shop in Norman. When not smithing, he volunteers at the Sam Noble Oklahoma Museum of Natural History in the Archaeology Collections.



Book Review,

The Ritual Landscape of Late Precontact Eastern Oklahoma – *Archaeology from the WPA Era Until Today*

By: Amanda L. Regnier, Scott W. Hammerstedt, Sheila Bobalik Savage

Ah, the carefree life of the Oklahoma archaeologist in the field. Working through the day, uncovering fascinating traces of the distant past, and settling in to banter and stimulating discussion with colleagues by a dying fire before being serenaded into gentle slumber by the soaring refrains of distant coyotes.

Nope, that's not what this book is about at all. In the opening chapters we relive the experiences of a half a dozen young men in their early 20's tasked with supervising the excavation of a series of pre-contact sites in depression era Eastern Oklahoma. The book reproduces (lightly edited) the field notes and quarterly reports created by these men, all graduate and undergraduate students of the University of Oklahoma, found in the archives of the Sam Noble Museum. The focus of the activity presented is 1938 to 1941. The excavations were funded by the New Deal WPA jobs program, to provide relief to out of work men in addition to generating archaeological data. Biographical sketches of the young women working back at the artifact lab in Norman are also included.

Our protagonists are confronted with unreliable or non-existent transportation, endless piles of bureaucratic forms and pointless rules, greedy cantankerous landowners, unreliable expense reimbursements, and the always fickle weather of Oklahoma. Occasionally, the work was dangerous, and there was a fatality at one of the sites during the excavations, prompting changes in the profiling of the mounds. Although frustrated by the challenges they faced, their correspondence reveals an attitude of perseverance and humor in the face of adversity.

As the Second World War erupted in late 1941, our group set aside their shovels and notebooks and took up arms in the various services. After the conflict they moved on to other challenges. The legacy of data and artifacts they amassed has since gathered dust in the archives of various repositories for the last 70 years, awaiting rediscovery.

The latter portion of the book contains the quarterly reports and some field notes prepared by the supervisors. Sketches and profiles are redrawn from the original documents. In many instances, these records are and will be our only information on the sites excavated, most have since been inundated by reservoirs or otherwise destroyed. Eight sites are featured. A contemporary perspective written by the authors is included at the conclusion of the chapter devoted to each site. We are treated to encountering the various sites through the eyes of the supervising archaeologist, and though the reports can be rather formal, a bit of the excitement of discovery often comes across through the words on the page. The concluding chapter of the book provides a summary of WPA era archaeology and a short overview of current understandings of the ritual world of the ancient Caddoans as reflected by their ceremonial mounds, many examined here.

I have always enjoyed reading history through the eyes of 1st person participants, and so I appreciated having the opportunity to have the young archaeologists present their work with little filtering. I recommend the book to anyone who is looking for a detailed overview of Caddoan and Spiroan era archaeological sites in Eastern Oklahoma, anyone interested in the practice of archaeology in the challenging environment of late 1930’s Eastern Oklahoma, and those interested in tales of our predecessors forgoing the comforts of home and dealing with all manner of obstacles to allow us a glimpse of the distant past.

Ray McAllister

Hello OAS Members!

Welcome to the all-new *Oklahoma Archaeology*, the Bulletin of the Oklahoma Anthropological Society. As both a fellow OAS member and Executive Director of the Oklahoma Public Archaeology Network (OKPAN), I am absolutely delighted to see this venue for sharing information about archaeological practice and findings in our state.

Although this inaugural edition showcases principally *Oklahoma Archaeology* content, future issues will feature an expanded "*OKPAN Quarterly* Corner." As *OKPAN Quarterly* readers already know, because the editors of both *OA* and *OQ* wish to emphasize story quality over quantity and avoid over-saturating readers, each journal will appear just twice per year. *Oklahoma Archaeology* will be published in winter and summer, whereas *OQ* will hit your screens in spring and fall. Each, however, will dedicate a section of their publications to the editor of the other organization; hence, "OKPAN Quarterly Corner" in Oklahoma Archaeology and "OAS Corner" in *OQ*. This will allow OAS and OKPAN to keep readers of both publications up-to-speed on news and coming events.

I hope you are enjoying this issue of *OA*'s report on the analysis of chipped stone artifacts—with a special emphasis on scrapers—from pre-Contact sites in Canadian and Custer Counties. I am also delighted to see Gerald Franklin's piece, "Blacksmithing for the Historical Archaeologist." Gerald taught a well-received OKPAN workshop on this topic in Norman this past October. His publication makes much of the information he conveyed then, accessible to more of you.

As I close this note, editor Kate Newton is hard at work on the spring issue of *OQ*. Watch for that, including its "OAS Corner." In addition, if you haven't already joined OAS and would like access to monthly chapter talks, fellowship, and other benefits of membership, I strongly recommend that you do so. Finally, please join us all at the upcoming Oklahoma Archaeology Conference in Tulsa in March—there will be content and fun for everyone from archaeologists themselves to parties with no formal background whatsoever.

Bonnie Pitblado
OKPAN Executive Director

The Oklahoma Anthropological Society

Explore, share, and preserve the historic and pre-contact story of Oklahoma

Amateur and professional archaeologists formed the Oklahoma Anthropological Society (OAS) in 1952 to promote the study of Oklahoma's past. Anyone with an interest in our state's pre-contact and historical world is welcome to join the society.

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OAS and its members collaborate and work closely with the Oklahoma Public Archaeology Network (OKPAN), Oklahoma Archeological Survey, Oklahoma Historical Society and many other archaeology and history focused groups in our state. OAS has local chapters throughout Oklahoma that have monthly meetings, often with presentations from accomplished archaeologists.

OAS sponsors "digs" or surveys each year. These field activities are managed by professional archaeologists and provide unmatched learning opportunities and contact with the Oklahoma archaeology community. It is real research, uncovering elements of our state's history and heritage where you can touch, feel, learn and contribute.

Photos from 2019 "Spring Dig" near Muldrow, OK

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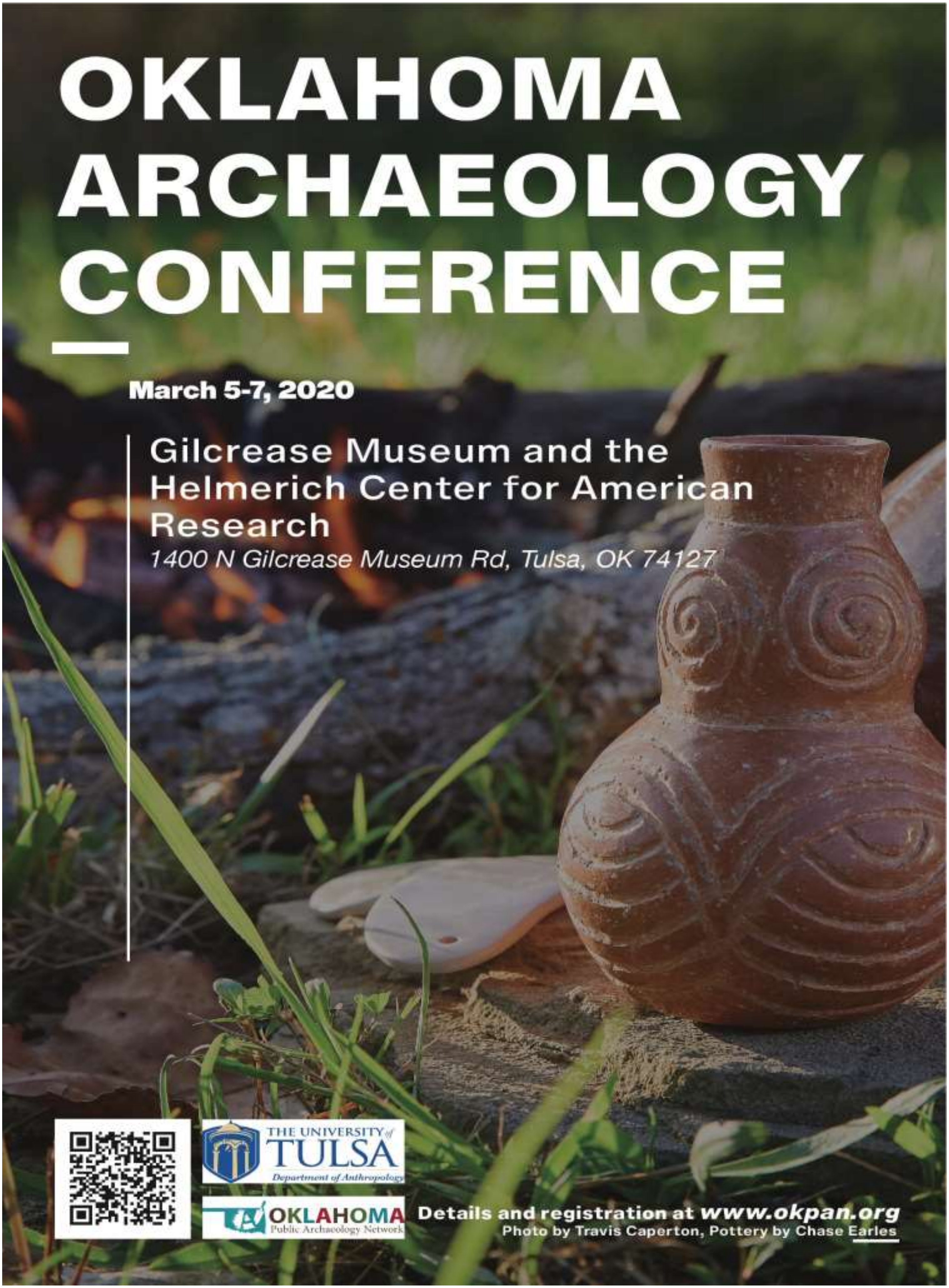
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