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Contents

Empty Quarter Archaeology

Donald J. Blakeslee, Wichita State University
David T. Hughes, Wichita State University

When a small survey fails to reveal any archaeological sites, it is unusual for someone to ask why. When larger surveys produce negative results, however, some explanation is called for. Some of Wichita State University's recent survey projects turned up very little, and for a variety of interesting reasons.

Recently, for example, WSU has been conducting an archaeological survey of the federal land around Cheney Reservoir, about twenty miles west of Wichita, for the Bureau of Reclamation. Two years of survey have yielded a variety of historic sites—farmsteads and schoolhouses—but very little in the way of prehistoric remains.

In fact, all of the prehistoric sites and isolated finds reflect a single phenomenon, the occasional testing of lag gravels for chippable stone. There are spots scattered around the reservoir, on ridgetops and elsewhere that erosion has exposed gravels, where an occasional tested nodule or isolated flake are found. The gravels are from isolated remnants for the Ogalalla formation, and are common on ridges and hilltops in the region. Where there are extensive gravels, close survey reveals relatively numerous tested nodules and flakes all across the exposure. Smaller exposures may yield only a single item. Indeed, we have questioned whether or not it is appropriate to designate even the larger spots as sites, given the tenuous nature of the evidence.

Why were no other sites found? Part of the reason has to do with the effects of the reservoir itself. It covers most of the ground near the river and creeks that were likely camping spots. What is more, the reservoir was not surveyed when first constructed, before erosion could destroy evidence. Indeed, wave erosion has cut down to bedrock along a large portion of the shoreline, and sedimentation has covered most of the upper end. Furthermore, wind erosion has also created a zone around the lake in which it would be nearly impossible to locate sites even if they were present. The reservoir is located in a wide shallow valley, and wind has blown sand from the beach into a more-or-less continuous dune at the edge of the beach where trees and shrubs lower the wind velocity. Leaves and other litter accumulate on the shoreward side of this dune, creating a layer that is less permeable than the sand. Since the land everywhere slopes down toward the beach, water accumulates there and creates a swamp, the decaying plants and dust in which thicken the clays, making the drainage problem even worse. As a result, the whole reservoir is surrounded by beaches and swamps in which sites, if present, are invisible.

Another factor in the relative lack of sites has to do with more ancient geomorphology. When two other, much smaller surveys in the vicinity of Cheney Reservoir failed to reveal sites in what seemed like prime locations, we asked Rolfe Mandel about what his geomorphological survey of the state had revealed. He told us that an episode of erosion had stripped Holocene sediments from the whole upper end of the Ninnescah basin, and that sedimentation had begun again, perhaps less than a thousand years ago. Thus there has been relatively little time for sites to accumulate.

A third factor may have been operating as well. When we checked the General Land Office survey maps for the area, we found record of a single Indian trail through the general area, but it was located several miles west of the reservoir. Thus native traffic through the general area may have been channeled just far enough away from the present-day reservoir so that campsites normally would have been located elsewhere.

We have found a similar lack of prehistoric sites around Cedar Bluff Reservoir west of Hays. Here again, there are historic sites, many of them associated with the state park, which has had to shift the location of its facilities repeatedly in order to adapt to the changing water levels in the reservoir. Prehistoric sites are the same as at Cheney Reservoir, gravel exposures that contain an occasional flake or tested nodule. Cedar Bluff Reservoir is in a much deeper valley than Cheney, so it does not have the continuous shoreline dune and swamps, but during much of our survey, there were large areas covered with dense growths of salt cedar and other brush that grew on old shorelines. Nevertheless, we found the occasional flake on them, and the sandy soil provided relatively good visibility, given the density of the vegetation.

Only one prehistoric site seemed to be different from the rest. It consisted of a small lithic scatter located around the upper end of a ravine that cut into the upland. Similar sites exist across much of the Midwest and seem to reflect a hunting pattern in which one or more beaters walked up a ravine to drive game to men waiting at the top. In the few cases where we have seen diagnostic artifacts in such sites, they have been Archaic in age, but modern pheasant and deer hunters sometimes use the same strategy.

Cedar Bluff Reservoir is also associated with a trail. The Smoky Hill trail, used by the Butterfield Overland Dispatch during the Colorado gold rush, ran across federal property on the north side of the reservoir. We have found no prehistoric materials on this trail, and the records of archaeological sites kept at the Kansas State Historical Society hint at the presence of a prehistoric trail in a different location. Most of the sites in Trego County lie along the divide between the Smoky Hill and Saline Rivers, and they may mark the presence of a trail that followed the divide. Such trails offered potential campsites at the headwater springs of the creeks that flowed down from the divide. Another factor drawing prehistoric travelers away from the Smoky Hill River in this region is the presence of outcrops of excellent quality Smoky Hill jasper along the Saline River but not along the Smoky Hill River.

Cheney Reservoir and Cedar Bluff Reservoir provide examples of explaining lack of finding archaeological sites by demonstrating a possible settlement system that did not include the area examined. The Cimarron River in southwest Kansas was a major access point to the Rio Grande valley from the Plains. Such sites as Middle Springs and Point of Rocks are still known among Santa Fe Trail buffs and local legends about these sites are common. A survey of the area in the 1970s turned up hundreds of archaeological sites in a relatively small sample survey of the Cimarron National Grasslands. However, in 2002 WSU conducted a complete survey of more than 20 160-acre quadrats on the Cimarron National Grasslands, and found very little. A survey of much of the same area in the 1970s by Kenneth Brown produced information on several large prehistoric lithic scatters. We relocated only three of the more than 15 sites Brown had reported within our survey blocks. Our field technique was sufficient to conditions with 30 meter spacing between parallel traverses for thorough coverage of the entire quarter section. Because of the drought conditions and abundant rodent activity surface exposure of soils was not a problem. Clearly, there had been prehistoric archaeological sites here but they were not observable in 2002.

That raises new questions for the lack of materials. This was not a case of no sites: sites were present. It was not a case of inappropriate technique or method: the method was more intensive than that used by Brown. Why then were so few archaeological sites being found?

To answer that question, we began to examine the details of the site settings more completely. The first thought was that aeolian deposition during the past 25 years might have obscured the sites. The Cimarron National Grasslands is not a farming area: only well-

controlled grazing for pasture management is allowed. Therefore, any potential for silt accumulation would not be reversed by tillage. After consideration of the survey data, we found evidence of moderate to heavy trash and debris dating from the 1930s into recent times. If the site areas had been buried under a very recent silt rain, then those historic materials should also be obscured.

By ruling out natural transformation processes (albeit tentatively) we began to look at cultural transformation processes: could people have completely removed all site materials in the quarter century between Brown's investigation and ours? This would mean intensive surface collection of sites by unknown parties. To see how that could have resulted in complete loss of site information requires some background information on the nature of recreational artifact collectors. Not a great deal has been published on the ethnology of collecting, but 30 years of working with collectors, avocational archaeologists, and weekend hobbyists by Hughes can provide some general background information.

Not all collectors work alike. There are some whose primary concern is to collect "one of each." That is, one Scallorn point, one Clovis point, etc. These are directed collectors and generally do little more on a site than walk and observe, perhaps picking up likely additions to their collections for later (perhaps not much later) sorting and gleaning. Others feel it important to protect "their" sites from the intrusion of others. These vacuum-cleaner collectors make regular visits to the sites they feel a proprietary interest in and collect everything they can see on the surface that might indicate the presence of a site. Watching and talking with collectors at federal reservoir and conservation programs in Oklahoma and Texas, Hughes has come to the opinion that most sites are visited by a modest mix of people who use one of these two approaches.

The first indication that surface collecting might be a source for the lack of archaeological sites was a find made during the survey of our twenty-fourth quadrat. In a location in the bottom of a narrow swale where rock is exposed next to softer sediments, surrounded by shrubs and with some grass remaining in the shelter of the shrubs, a pile of over 50 artifacts, most larger than 5cm, was found. These included coarse bifaces, large flakes, broken unifaces, and one piece of ground stone. All artifacts were fragmentary. Close examination of the locale showed that the artifacts were occurring in an isolated setting above the root-mat of the grasses: they had been deposited there within the past 10 years. On the ridges east and west of this locality, Brown had recorded archaeological sites we did not find. This pile of materials is highly indicative of the sort of post-collection sorting that the "one of each" collector might leave behind. After a long day of searching, the collector will then find a quiet place to sit and go through the collector's bags or pockets and sort out the "good stuff" from the leavings, lightening the load for the walk back out to a vehicle. Although such material is suggestive of collecting activity, it is not definitive. Further information would be needed.

To acquire a rough test of this particular cultural transformation process in the archaeological record, we have begun by examining two survey blocks of two quadrats each. In the first block access by vehicle is quite difficult and involves travel for several miles across private property and through agricultural fields. The second block is along the main Cimarron River and is bisected by the road that follows the north side of the Cimarron River. Both settings include similar topography, availability of springs, distance to the river, vegetation, outcrop-geology, and differential elevation. The only apparent difference between the two areas is facility of access.

In the first block, Brown had recorded three archaeological sites. We successfully relocated all three sites and spent some time doing a close-search of those sites for diagnostics and possible features. We did find diagnostics on each and were able to identify them as probable pre-ceramic or early ceramic

period settlements. In those two first blocks, we also encountered isolated materials (small flakes, projectile point fragments, scraper fragments, etc.) in a remarkably uniform scatter along the flanks of the minor tributaries to the river. The density of these isolated occurrences was about 1 per acre.

In the second block, Brown had also recorded three sites. We found none of them. We found no indication of prehistoric settlement of any significance, only a single corner-notched arrow point on the edge of the caliche escarpment in an area well beyond Brown's recorded sites. We attempted some limited shovel testing in the area of Brown's sites, but the extreme drought made the soil impossible to excavate by hand tools within the time constraints of our project.

Two research blocks, similar locations, but very different findings (Figure 1). The only difference between the two appears to be access to the area by the public. It seems probable to conclude that the archaeological sites once known along the Cimarron National Grasslands have, wherever there is convenient public access, been completely obliterated by collectors. This conclusion is still under investigation and will be expanded upon in the final report.

While the surveys we have mentioned failed to yield much prehistoric material of interest, they were not devoid of important archaeology. In 2002 at Cedar Bluff Reservoir, we tested the location of the Bluffton Station of the Butterfield Overland Dispatch stage route. Armed with a map drawn by an amateur historian and an aerial photograph, we had tested the site once before with no luck. The photograph showed a vegetation mark in the vicinity of the spot where the historian had drawn the main building of the stage station. We had excavated a test pit there and in a low spot on the terrace edge where he had placed an outbuilding. Both test pits were entirely negative. In 2002, we went back to the site with Don Henkle, an avocational archaeologist who uses a metal detector. With his help, it took only a few minutes to locate a scatter of historic material that corresponds to the location of the main station. At the terrace edge, we also found historic material, but not where the map showed any outbuilding. The historian had mistaken small natural notches in the terrace edge for dugouts. The historic materials, including many nails, were located on top of the terrace between the notches.

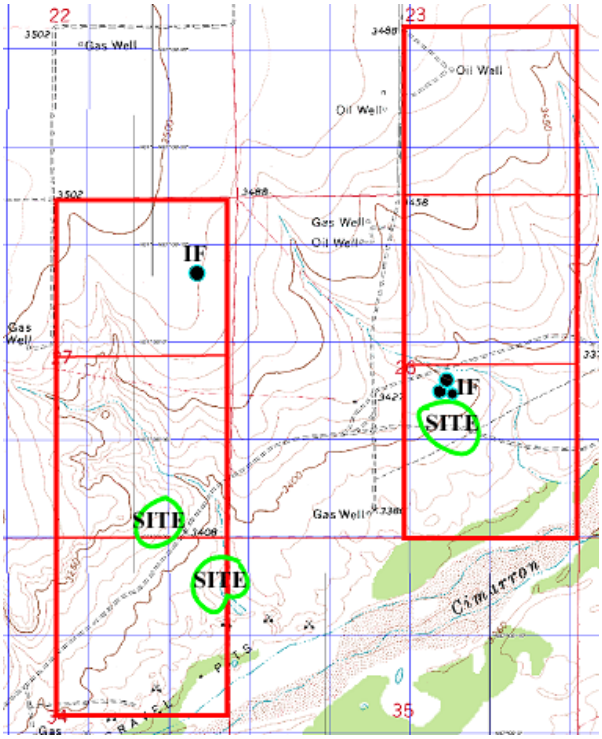

Figure 1. Two Survey Blocks

We also used the metal detector to check the spot of a locally famous skirmish. The little canyon in which the site is located is called Threshing Machine Canyon, and it is named for a piece of farming equipment left there after an Indian attack. Local tradition has it that a small group of Mormons were taking a threshing machine to Utah, and that when they camped in the canyon, they made the mistake of camping near the stream, just across from the mouth of a ravine that cuts though a limestone cliff. (In contrast, the stage station is located in the open on a high terrace, well back from the cliff). Indians used the ravine to approach the camp, and they attacked

successfully. Apparently, the threshing machine abandoned there gave the canyon its name.

When Don Henkle checked this location, he found a scatter of historic material. The most interesting item was a brass cartridge from a .55-56 caliber rifle bullet, perhaps from a Spencer rifle. Other metal objects were found, but nothing that might have come from an early threshing machine. It is likely that some enterprising early settler took it.

Metal detectors also proved useful in the Cimarron Grasslands survey. Early historic wagon and freight trails are often marked by ruts, but the trails and related activities often extend well beyond the ruts. Since two of our survey areas crossed the Cimarron Cutoff of the Santa Fe Trail, Don was charged with trying to find material evidence of the trail activities and limits. At the first segment we found some unusual materials, including a pair of .40 caliber lead balls (hand-cast), one .44 rimfire cartridge case, probably a Henry cartridge fired from a modified percussion-cap revolver, one #2 percussion cap (as might be used for revolvers or sporting rifles – not used on military rifles), one metal arrow point, and some other minor detritus. That all these materials co-occurred in the southern Plains between about 1860 and 1880, the final days of the Santa Fe Trail's use, was at least interesting. This was also a period of increasing unrest among Native Americans as westward expansion of the United States began to increase at the close of the Civil War. It seemed possible that these finds represented a skirmish along the Santa Fe Trail. Furthermore, it was likely that if it were a skirmish, there was no United States military involvement: The government never adopted the Henry rifle and never approved for issue the modified Remington pistols that would take Henry cartridges. Muzzle-loading rifles of under .58 caliber were considered to be too small to be meaningful for warfare and so were never adopted. Only frontiersmen and sportsmen hunting small game (or defending themselves) would use such small caliber weapons.

What Lies Beneath: Archeological Investigation of Two Deeply Buried Sites in the Whitewater River Basin

C. Tod Bevitt, Kansas State Historical Society

Introduction

In accordance with the goals and procedures of the Cooperative Agreement between the Kansas State Historical Society (KSHS) and the Natural Resources Conservation Service (NRCS), the Society recently completed Phase III investigations of two sites along Four-Mile Creek, a major tributary of the Whitewater River. The drainage is the proposed setting for the Whitewater River Watershed Joint District #22's structure #29. Phase II survey in the project locale identified four archeological sites: two surface lithic scatters along the upland margin overlooking the creek valley (14BU1304 and 14BU1306), a deeply buried site (14BU1305), and an intact segment of the Ft. Smith-California Trail used from around 1850 to 1860 (Bevitt 2002). Only site 14BU1305 was recommended for further work due to its deeply buried nature. The integrity of the surface sites had been compromised by erosion of the thin soil mantling the upland edge, and the trail remnant failed to yield any evidence of

associated campsites or any material evidence apart from the visible ruts that were recorded and mapped. During Phase III investigation of site 14BU1305 another buried site (14BU1308) was found in a nearby cutbank and was also investigated. In addition, a third site was identified during geomorphological backhoe trenching and was subject to a brief salvage excavation.

14BU1305

Site Description

As described in the Phase II report, site 14BU1305,

> was identified within an exposed segment of the T-1 terrace escarpment along, and immediately adjacent to the east or left bank of Four Mile Creek. Cultural material was found eroding from the approximately 2.5 meter high terrace. Further investigation indicated that the cultural debris was associated with a roughly 20 centimeter thick dark, organically enriched band of soil located approximately 1.5 meters below ground surface. Noted material from this area included isolated secondary reduction flakes, tertiary flakes (including several small retouch flakes), burned and fire-cracked rock, calcined bone, and charcoal. The area of cultural material was limited to a relatively discrete area approximately five meters long within the possible paleosol (Bevitt 2002:4).

Geomorphological investigations consisting of description of the original cutbank as well as an exploratory backhoe trench extending to the north-northeast of the excavation area suggest that the buried component is situated in a thin paleosol that slopes gradually into the Four Mile Creek valley directly north and west of the site, with the gradient becoming more pronounced as it moves out onto/into the alluvial floor of the larger drainage. These investigations further found that the soil associated with the alluvial fan converged with the upper portion of a thick A horizon found throughout much of the valley floor at approximately 1.8-2.0 meters below ground surface. Geomorphological investigations approximately ¾–mile downstream have dated a soil in a similar setting to between 2110 and 2700 B.P. (Mandel 1991:48).

The site is interpreted to have occupied a portion of a small alluvial fan associated with the modern draw which borders the southern edge of the site and which has in part led to the erosion that exposed the site and allowed for its recent discovery. This fan offered a slightly raised elevation above the creek floodplain (approximately one meter higher) nestled against the valley wall in the form of the steep rock strewn escarpment bordering the east edge of the site. If the modern setting offers any further clues to the appearance of the immediate site vicinity, one might also expect a fairly dense riverine woodland setting along the adjacent creek and lower portion of the draw.

Excavation Summary and Preliminary Interpretation

Artifacts recovered during Phase III investigations offer some insight into the activities associated with the occupation of the site. Primary classes of material include faunal remains, both burned and unburned, burned and fire-cracked rock, lithic debitage consisting mostly of small biface thinning and retouch flakes, modified flakes, and bifaces. Nearly all lithics, and all modified flakes and bifaces were locally obtained Permian chert.

Faunal material was recovered as small fragments of bone typically identifable only as "large mammal" that was often burned. Isolated identifiable portions indicate both deer and bison present in the assemblage. Most significant among the bone assemblage was a

short blunt-ended portion of faceted bone identified as the base of an awl. Light polish and lateral striations were noted on the fragment of lightly burned bone.

The chipped stone assemblage is composed almost entirely of debitage, nearly all tertiary in nature. Florence A and C and Wreford cherts were notable varieties among the dominant Permian material. The category of miscellaneous Permian chert includes cortical, weathered, and often burned chert or cherty limestone material, basically anything that precluded a positive identification as a specific chert type. Other noteworthy material includes a clear quartz-like material and a few flakes identified as Smoky Hill Jasper (Table 1).

Florence A	138 (11)
Florence C	50
Wreford	48
Misc. Permian	193 (85)
Quartz	20
Smoky Hill Jasper	3

Table 1. 14BU1305 lithic debitage by type (thermally altered totals in parentheses)

Modified flakes that typically exhibit steep retouch along lateral and occasionally distal margins dominate the lithic tool assemblage. Crushed and/or rounded edges accompanied by flake scars exhibiting hinged and stepped terminations suggest fairly intensive utilization. Edge modification is often found to create irregular, somewhat undulating margins.

In addition to these modified flakes, an endscraper and side scraper were collected as were the tip of a projectile point and a broken early stage biface.

These recovered materials suggest a number of cultural activities were carried out on-site. Principal activities that may be inferred include faunal processing, food preparation, and lithic tool production and rejuvenation. The site setting offers further clues for interpreting site function on a portion of a small alluvial fan protruding onto the valley floor provided a slightly raised setting nestled against the valley wall created by the steep rock strewn escarpment at the east edge of the site.

During the course of the excavation it became apparent that while cultural materials were relatively dense they were also confined to a very small area due to: 1) the size of the alluvial fan and 2) erosion of much of the fan by modern drainage from the same draw leaving only the periphery of the original fan intact. Phase III investigations removed nearly all intact deposits of substance.

14BU1308

During the Phase III investigation of site 14BU1305, inspection of a nearby cutbank led to the discovery of a newly exposed deeply buried site on the opposite bank. This site, 14BU1308, was identified at approximately 4 meters bgs and was initially recognized only as a large basin-shaped, rock-filled feature eroding from the cutbank (Figure 1).

Figure 1. Profile view showing Feature 1 as exposed by creek erosion

Geomorphological examination of the site (after backhoe excavation) revealed a massive buried soil over 2 meters thick. Interestingly the site, as identified by the feature, lay below this soil within the AC portion of the profile suggesting a relatively unstable setting at the time the feature was originally created and used. As discussed elsewhere, the top portion of this soil is believed to date to approximately 2110-2700 B.P. Dates on the lower portion of this soil as well as dating of the feature itself are still pending at this time, however during his investigations Rolfe Mandel estimated an age of approximately 4000-5000 B.P. may be appropriate for this site considering its setting in relation to the entire soil exposure.

Excavation Summary and Preliminary Interpretation

Extensive backhoe excavation opened an approximately 5 meter long portion of the cutbank that extended approximately 4 meters into the bank and nearly 4 meters down to the rock-filled basin-shaped feature and allowed immediate investigation through hand excavation of this feature that was fortuitously exposed during other investigations in the vicinity. Due to the rather precarious integrity of the feature, it was decided that complete removal of the feature would be the best way to assure preservation/recovery of the information it contained.

With that in mind, two 1x2 meter units were laid out in the exposed area. The first, lying roughly parallel to the bank, was placed to attempt to fully encompass the feature (this was only partially successful as the feature was considerably larger than initially anticipated). A second unit extended perpendicularly to the west from the center of this first unit and sought to investigate any related activities in areas adjacent to the feature.

Excavation revealed a large oval-shaped basin 2.8 meters long, 1.5 meters wide (truncated by creek erosion), and 50-60 centimeters deep below the identified existing surface at time of use as recognized by the lense of cultural material in X2 (Figure 2). Massive quantities of burned rock lined the sloping walls and floor of the feature. Intermixed with the rock on the floor and covering much of the lower portion of the feature was a lense of burned soil and organic material. It is hypothesized that the feature may represent an earth oven used for processing floral resources, particularly wild roots. Isolated lithics (debitage) and infrequent faunal remains were encountered. Most common were box turtle carapace fragments however at least isolated specimens attributed to prairie dog and waterfowl (*Anas* sp.) were also recovered from the feature fill.

Figure 2. Planview showing Feature 1 and Phase III test units

Excavation immediately west of the feature uncovered evidence of a former living surface with a thin scatter of debris consisting of limited amounts of chipped stone debitage and bison bone consisting of phalanx and a portion of the pelvis (socket region) as well as

other unidentifiable large mammal fragments, some of which were burned. Activities associated with the site include faunal processing, food preparation, and lithic reduction in addition to the as yet undetermined function of the large feature that initiated the investigation in the first place.

In sum, Phase III investigations salvaged the visible intact feature and found evidence of associated ancillary activities within a relatively small area. It is apparent that additional data important for a better understanding of Archaic lifeways could be provided by further investigation of the site and plans are underway to return to the site for further data recovery. In addition to this, specialized analyses such as lipid analysis of a sample of burned rock from the feature, paleoethnobotanical and/or pollen and phytolith analysis of portions of the recovered fill from the feature will be important in attempting to accurately determine the original function of the large "earth oven". Phase III investigations collected over 90 ten liter bags of fill from the feature. Much of the soil from the upper portion of the feature (that area above the rock-filled zone) appeared to be relatively sterile and very similar to adjacent undisturbed soil noted in the cutbank. That portion of the fill collected from among and immediately below the rocks was considerably more rich and contained obvious charred organic material in addition to soil matrix. While soil dates on the overlying paleosol and one date on the feature are in the process of being attained, additional dates will be sought in order to more firmly establish the temporal context of this site.

A final report on these sites awaits radiocarbon dating of burned bone from 14BU1305 and charred organic material from 14BU1308 and will contain a more detailed geomorphological discussion.

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Ongoing Investigations of the Plains Woodland in Central Kansas

Mark A. Latham

Over the last several years I have continued to record archaeological sites that I had first discovered in my youth along the Little Arkansas River in central Kansas. After recording several of these sites with Middle Woodland Hopewell-like ceramics, I have initiated a side-project to investigate Plains Woodland occupations in central Kansas. During the initial investigations I have become aware of certain patterns and have been informed of several other similar sites in surrounding drainages. This paper examines

some of the preliminary data on these sites and in doing so, I hope to receive further leads for continued study of the central Kansas Hopewell-like Plains Woodland.

Introduction

The original study area falls predominately within the Arkansas River Lowlands in south central Kansas. I've labeled it the Buhler locality (Latham 2001a) based on Willey and Phillips (1958) definition of an archaeological locality and of the same pattern I used in the Glen Elder locality (Latham 1996) and other studies (cf. Latham 2001; 2000a; 2000b). The Buhler locality is found in portions of Reno, McPherson, and Harvey counties and is defined as the sum of the Little Arkansas River tributaries from Wolf Creek (just upstream from Medora, Kansas) to Kettle Creek (Halstead, Kansas), the eastern border of the sand hills. As I have studied this locality and have become intrigued by the Hopewell-like manifestation, I have expanded the search to include reported sites throughout central Kansas. Nine of the sites discussed below are within the Buhler locality. Additional manifestations of Hopewell-like ceramics are known along other tributaries of the Little Arkansas and the Arkansas River, but also within the basin of the Smoky Hill River to the north. Previous investigations indicate Hopewell-like or influenced ceramics are present beyond the area defined for Kansas City Hopewell (Banks *et al* 2001; Benison et al. 2000; O'Brien *et al.* 1979; O'Brien 1972; Wilmeth 1972; Wedel 1959; Solecki 1953; Schultz and Spaulding 1948).

Middle Woodland is characterized by the widespread manufacture of pottery, mound building, permanent villages, and small-scale gardening of native cultigens. It was during this stage that ceremonialism, the elaboration of mortuary practices, ceramic style, and the chipped-stone industry reached its apex. Throughout the Midwest, ornate objects were widely distributed through elaborate and extensive networks. Some of these objects include marine shell, copper items, mica cutouts, obsidian flaked objects, finely made ceremonial blades, drilled grizzly bear teeth, plummets, ear spools, and platform pipes. The poorly understood Hopewellian Interaction Sphere (H.I.S.) as described by Struever (1964:87-106) is a prehistoric logistics network within which quantities of raw materials circulated, together with the array of stylistic and probably ideological concepts that underwent local modification (Caldwell and Hall 1964). Whatever Hopewell was, it involved an active economy oriented around distant exchange and deep socioreligious attitudes. The Middle Woodland sites in central Kansas were likely influenced by the H.I.S., but the level of this influence remains unknown.

Many of the artifacts reviewed for this study were in the possession of local collectors, including portions of the large collection my grandfather had. Most of these collectors were friends of the family and the information was supplied was candid. For example, the base camp discussed below was found by one of these local collectors while he was hunting turkeys after the 1993 flood. The flood exposed over 400 large sherds of pottery, among other artifacts. No evidence of the site had been observed prior to the flood as it had been deeply buried in the terrace. These sherds were large and in good condition, indicating that they had not been disturbed by cultivation.

Ceramics

Many of the sites identified in this study contained ceramics of Middle and Late Plains Woodland styles. The base camp, on the other hand, contained ceramics types from Early to Late/transitional Plains Village occupations. Six types of ceramics have been tentatively identified during this investigation based on vessel shape, surface treatment, and temper (Table 1). All of the ceramic vessels represented in the sample appear to have been made from local clay, which is naturally very sandy.

Table 1. Preliminary Ceramic Types Identified in the Buhler Locality.

Type	Frequency in locality	Vessel shape	Exterior Treatment	Exterior Color	Interior Color	Zones of Decoration	Decoration Types	Paste	Temper
A	Low	Conical	Brushed	Reddish yellow	Black	None	None	Local sandy clay, gray in color	Sand, grog, and trash/junk
B	Moderate	Conical	Vertical cord-roughing	Pale brown	Pale brown to black	None	None	Local sandy clay, gray in color	Large, angular sand
C	High	Conical	Brushed, some smoothed over	Yellowish gray to grayish brown	Black to yellowish gray	Punctates on upper portion & rims of vessels, both interior & exterior; incised lines on the rims	Parallel or curved lines of punctates and/or incised lines	Local sandy clay, gray in color	Fine sand, naturally occurring in paste
D	Low	Conical	Smoothed over	Reddish yellow	Black	None	None	Local sandy clay, gray in color	Trash/junk
E	Moderate	Sub-conical	Vertical cord marked	Very pale brown	Very pale brown	Punctates on upper rims of vessels	Rows of punctates	Local sandy clay, gray in color	Fine sand, naturally occurring in paste
F	Low	Sub-conical	Cordmarked	Very pale brown	Very pale brown	None	None	Local sandy clay, gray in color	Sand, limestone, and trash/junk

All of the ceramics identified in the sample are locally made. These vessels appear to represent a range of Plains Woodland ceramics, but most likely those related to Middle to Late Plains Woodland occupations.

Other Artifacts

Approximately 90 percent of the chipped stone tools and debris found at the Middle Woodland sites in the Buhler locality originated from local stream cobbles. A few specimens are Florence chert from the Flint

Hills, but these are all formal tools, including arrow points and perforators. All of the larger tools, such as knives and scrapers, are local materials. Most of the projectile points are small, corner-notched arrow points (Scallorn) points, which are typical of the Keith focus. A few corner-notched points also have serrated blades. Expediency tools, such as retouched

flakes, were all made from local material sources.

Site Distribution

Of the eight sites identified as related to Plains Woodland with Hopewell-like characteristics, seven are found north of the river. A total of five are found on second terraces of the Little Arkansas River. The remaining sites are on the rims of natural lakes in the area. The only base camp thus far identified is on a terrace between the Little Arkansas and an unnamed tributary stream. The terrace sites have a higher artifact density and diversity than do those associated with the lakes. Based on the surface finds at these sites, field camps and base camps are typically found on the terraces of the Little Arkansas River and its tributaries. Sites associated with the natural lakes appear to be related to special tasks, likely hunting or gathering of resources found in and around the lakes.

A ninth site has recently been found by the Kansas State Historical Society. This site is less than a mile upstream from the base camp, and is on the north side of the river. Wichita State has evaluated the site, but due to the extensive cultivation it lacks integrity (Blakeslee 2002, Personal Communication).

Conclusion

The locality in which these sites are found is rich in resources needed for human survival, yet the little is known about how the people used these resources and what was the limits of their seasonal rounds to gather them. Significant water, game, and edible plant sources were found in the area during the early historic period. It is not clear if these sources were as rich during the Plains Woodland occupations, as data on faunal and botanical remains at the sites is limited to what local collectors salvage of eroded areas. Faunal remains that I was able to observe included predominately deer, but turtle and several other small to medium mammals also appear to have been represented. All of the species observed were readily available during the early historic period and most are still quite common in the locality.

Based on the raw material sources found at the sites thus far identified, the people using these sites were staying in the area for long periods of time. Raw lithic materials not readily available to the area are a minor component to the artifact assemblage of the sites. The main source of outside material appears to be from the southern Flint Hills. Other minor sources include Smoky Hill Jasper, found in northern Kansas, but also found in some stream cobbles in the area. Other yet unidentified materials may be from more southerly sources, but they have not yet been determined.

No evidence of trade within the HIS has been documented to date, as the lithic materials are from local sources and the paste for the ceramics is also from the area. Based on the limited data obtained during survey level investigations, the ceramic decoration style is the only Hopewell-like characteristic represented in the Middle Woodland sites of the Buhler locality. Continued research of the Hopewell-like manifestations in Central Kansas will likely add levels of understanding of the Middle Woodland in the area and how these sites relate to the HIS.

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A High-Power Use-Wear Analysis of Stone Tools Recovered from 14DO417

William E. Banks, Kansas State Historical Society

Introduction

Site 14DO417 was discovered in southern Douglas County, Kansas, at the headwaters of Coal Creek, a tributary of the Wakarusa River. The site consisted of a human burial containing the remains of a single individual and deer bone elements (Hoard et al. 2002). Researchers from the Kansas State Historical Society, the Kansas Anthropological Association, and the University of Kansas excavated the burial. Osteological analysis determined that the interred individual was a male 45–55 years of age (Hoard et al. 2002). Deer bone recovered from the in-situ burial was submitted to Stafford Research Laboratories, Inc., for an AMS date and yielded an age of 6160 $\pm$ 35 RCYBP (SR-6190, CAMS-87695). When the site was initially discovered, human and deer bone elements, a complete side-notched projectile point, and a complete chipped-stone drill (Figure 1) were recovered on the surface immediately downslope and within a few meters of the burial location. Because the projectile point and drill were found in association with human and deer bone elements, it is inferred that they were originally situated in the burial context. This inferred association is strengthened by the fact that human femur and deer tibia fragments found with the stone tools were refitted to elements recovered from the in-situ burial.

These tools were subjected to a high-power use-wear analysis with two goals in mind: (1) to determine if they were unused and therefore possibly manufactured expressly for inclusion in the burial, or if they had once been functional items in a prehistoric toolkit; (2) if used, to describe the nature of use and the types of material(s) they had been used to process.

Related to the second goal was the desire to determine the function(s) of the projectile point. In the archaeological literature of the Americas, such bifaces are often referred to as projectile point/knives (PPKs) without high-power microscopic verification of such a designation. High-power use-wear examinations of Paleoindian and Archaic age bifaces have demonstrated that these tools often did serve both as armatures, or weapon tips, and cutting tools, but these studies are few in number (Kay 1996, 1997, 1998, 2000). The present analysis of the projectile point was performed with the hopes of adding another example of multi-functional use to the existing literature. The development of a body of data composed of such examples can assist archaeologists in understanding or identifying specific tool attributes, or suites of attributes, that may relate to a specific function.

Materials and Methods

Chipped-stone Tools

The side-notched dart point is similar to White River, Big Sandy, and Graham Cave point types (Lopinot and Ray 1996; O'Brien and Wood 1998:139–144). The proximal portions of both blade edges are slightly wider than the corresponding distal blade portions. A clear boundary exists between these proximal and distal areas suggesting that the point was reworked or rejuvenated while hafted. The point is made from a mottled gray Permian-age chert from the Flint Hills region of Kansas whose nearest outcrop is approximately 80 km distant.

The drill is complete and the left-hand ear (when viewing Side A) has been reworked such that its morphology differs from the right-hand ear (Figure 1). This specimen is made from a dark tan and light-medium gray banded raw material. Upon initial examination, it was evident that the lithic raw material was unquestionably Pennsylvanian in age due to its texture, color, and fossil fingerprint. Based on the comparative specimens observed at the University of Kansas, the drill appears to be made from Argentine chert which is present in exposures approximately 20–30 km to the east of 14DO417 (J. McLean 2002, pers. comm.).

Use-wear Methodology

A binocular differential-interference microscope with polarized reflected-light and Nomarski optics (Hoffman and Gross 1970) was used at intermediate to high range magnifications (100X–400X) for the use-wear examinations. This microscope and optics are ideal for use-wear studies because they afford a high resolution, three-dimensional view of artifact surface microtopography (for examples and general methodology see: Kay 1996, 1997, 1998). This resolution is superior to conventional binocular microscopes commonly used to examine wear traces.

Each artifact was cleaned of all adhering sediment and oils prior to microscopic analysis by placing it in a clean polyethylene plastic bag filled with a solution of water and ammonium based liquid detergent. The bag was then placed in an ultrasonic cleaner for approximately 30 minutes.

The raw material used to manufacture the drill is highly reflective and such reflectivity complicates analysis by making it difficult to observe and document wear traces at higher magnifications. To overcome this obstacle, a polyvinylsiloxane mold and an epoxy cast of side A of the drill were made. The casting method accurately replicates microscopic traces of use and is described in detail by Banks (1999) and Banks and Kay (2003). No cast was made of side B of the drill because this side of the artifact was not as highly reflective under the microscope. The casting procedure was not used on the projectile point as wear features were readily observed and easily documented on its surfaces.

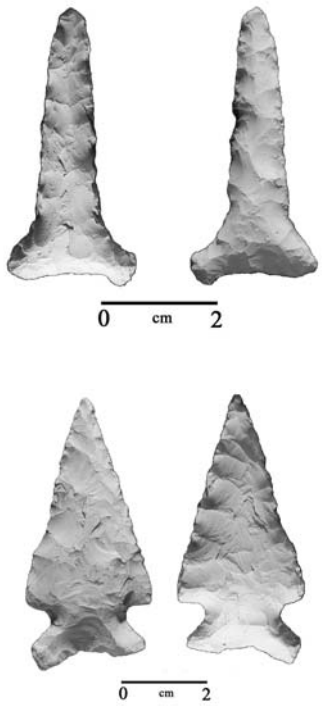

Figure 1. Scaled photographs of the chipped-stone drill and the side-notched projectile point. (Side A of each specimen is the left-hand photograph; artifacts have been smoked with ammonium chloride for photography)

After cleaning, striated soluble inorganic residues (additive wear features) and abrasive wear features were located at 100X, further examined at 200X, and described and photomicrographed at 400X on the projectile point, drill, and the cast of the drill. The soluble inorganic residues are most likely composed of silica that became a soluble gel during tool use and then hardened and became fixed to the portion of the tool that was in contact with the worked material (see Kay 1998:756–758; Kay and Solecki 2000:32; see also Mansur 1982; Vaughan 1985). These traces are therefore additive in nature, and Kay (1998:745, 2000:178) applies the term "microplating" to such features.

The features classified as abrasive do not all have a similar origin. It is apparent that some abrasive features were originally microplating events. In these instances, after an additive feature's formation ceased, continued use of the tool served to abrade the polish surface. This formational history can be identified for such polishes when remnants of microplating are still visible in what outwardly appears to be an abrasive wear feature. Other abrasive features appear to have had a formational history that was always abrasive in nature. Such abrasive wear may be weakly, moderately, or extensively developed. The most recognizable abrasive features are those that are extensively developed, usually resulting from prolonged tool use. These features are highly reflective and are typically flat and featureless. Abrasive planing is the term assigned to the formation of such features (Kay 1996:325).

Use-wear features were interpreted by comparing them to wear features recorded on experimental tools, as well as published documentation of high-power use-wear examinations (Kay 1996, 1998, 2000). The comparative experimental database consists of wear features documented on a variety of tool forms (e.g., bifaces, burins, flake tools, etc.) used to process a wide range of worked materials (e.g., carcasses, plants, wood, bone, antler, etc.). A number of researchers conducted these experiments, and tool and wear feature documentation is maintained by Marvin Kay at the University of Arkansas.

Results

Side-notched Projectile Point

Numerous use-wear features were documented on both sides of the projectile point. Prior to the use-wear analysis, it was hypothesized that this artifact was a hafted tool due to the noted difference in blade width between the distal portion of the blade and the blade element just above the notches. Such width variability is consistent with a tool that has undergone edge rejuvenation while contained in a haft element (e.g., a foreshaft). The analysis documented a number of wear features supporting the hypothesis that this artifact was a hafted tool, and the most illustrative examples are discussed below.

Areas b and c (Figure 2) are small portions of larger areas of extensively developed and striated abraded areas of microplating. On the opposite side of this biface, Area i (Figure 3) documents a portion of a larger area of extensive abrasive planing that has removed the higher surface topography in this region of the tool. Kay (1996, 2000) demonstrates that such abrasive planing is a common type of wear feature produced on a tool while it is contained within a haft element. Thus, it is clearly evident that the movement of the point within a haft produced the features described above.

The use-wear evidence also indicates that the biface functioned both as an armature tip and a cutting tool. Area c (Figure 2) exhibits striations oriented nearly parallel to the tool's long axis. These are consistent with wear produced by a hafting element when a tool impacts a target with its distal portion acting as the leading edge (see Kay 1996, 2000). These longitudinal striations in Area c are the only wear attributes recorded on this tool that can be clearly linked to its use as an armature.

These impact striations are overlain by striations oriented both perpendicular and oblique to the tool's long axis and are the result

of the tool being used as a knife subsequent to its use as an armature (Figure 2, Area c). Area b (Figure 2) is immediately adjacent to Area c, and while it does not exhibit any wear attributes consistent with impact, it does exhibit extensive striations that are both cross-cuttingly oblique and perpendicular to the point's long axis. This bi-lateral movement in the haft element, in conjunction with other features near the tool's tip, indicates that both edges of the biface were used for cutting activities. However, one tool edge has undergone more edge rejuvenation than the other and many of the features have a dominant oblique orientation indicating more intensive use of this edge.

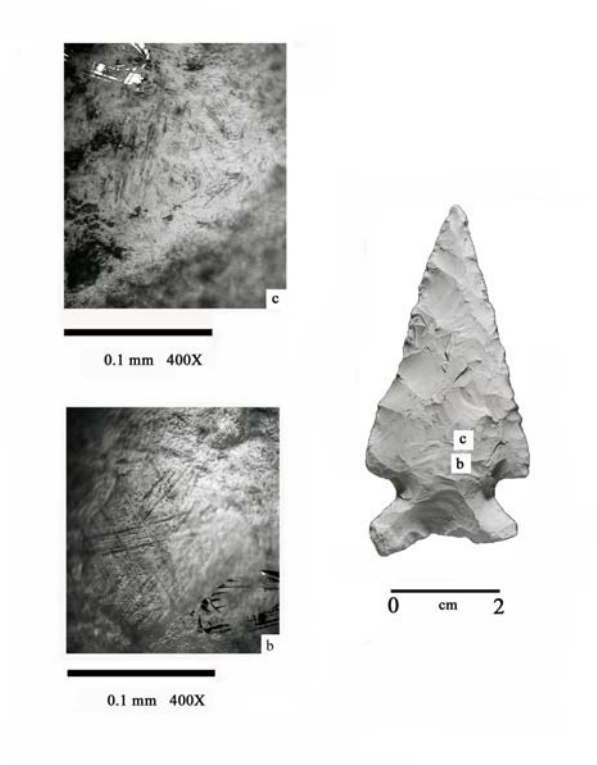

Figure 2. Side A of the projectile point and the location of use-wear features produced by a haft element and their corresponding oriented photomicrographs (artifact is smoked with ammonium chloride)

Numerous other features documented on this tool indicate cutting activities and contact with both soft and hard materials. Such wear is consistent with butchery. The features indicating contact with hard material are identical to features produced by contact with bone or cartilage during carcass dismemberment. Based on the analysis summarized above, it can be inferred that the tool was initially used as a projectile, and later carcass butchery or processing, performed while the tool was hafted, produced the majority of the documented wear features.

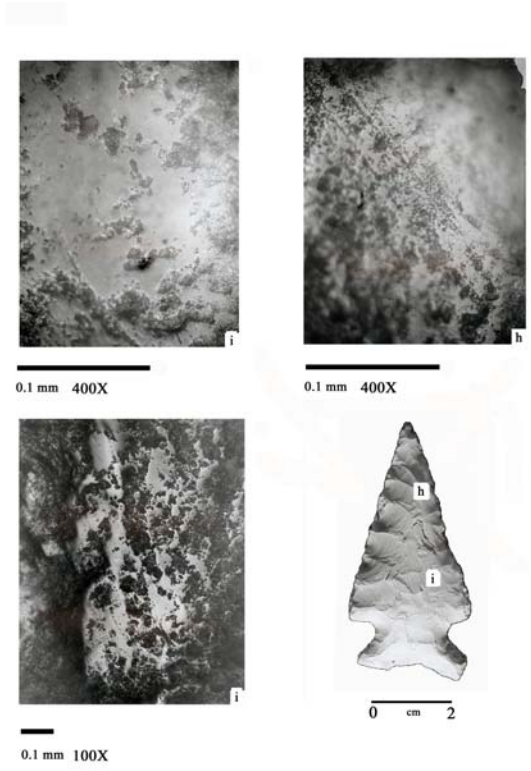

Figure 3. Side B of the projectile point and the location of use-wear features classified as abrasive planing. Area i was produced by a haft element, and area h was produced by prolonged cutting of soft material

Drill

An epoxy cast of one side of the drill was examined microscopically, in addition to both sides of the drill itself. Numerous wear features were documented that enabled a determination of tool use and worked material to be made. Features a, b, and c were

documented and photomicrographed on the epoxy cast. Area a (Figure 4) illustrates striated abrasive wear covered with small patches of microplating on the margins of the feature. Movement parallel, oblique, and perpendicular to the tool's long axis produced this feature. Area a is a small portion of a larger feature that runs along the central ridge of the artifact and is restricted to the ridge itself. This narrow zone of wear, the density of striations, and the small blocky patches of microplating, all indicate a worked material of medium hardness. Proximal to Area a are two areas of microplating (Areas b and c, Figure 4) that are characteristic of contact with wood. Their signatures are much larger, although they too are located on the central ridge of the drill. These two features are most likely the result of movement within a wood haft. Striations in these microplating events (Areas b and c) indicate a predominate movement perpendicular to the tool's long axis, while less frequent oblique and longitudinal striations are present. These striations indicate that this tool was used in a rotary motion or manner.

A wear feature documented at the tip of the drill is has attributes consistent with working dry wood. There are also small abrasive particles trapped in this polish which are most likely small fragments of the worked material (see Kay and Solecki 2000:34). The presence and characteristics of this feature support the medium hardness interpretation of the worked material that produced Area a.

Conclusions

The side-notched biface shows use-wear features indicating that it functioned initially as a projectile point. Later use of the tool was prolonged and characterized by cutting activities on soft materials, most likely from butchery activity. Wear features on the proximal third of the tool indicate that it was hafted, and their attributes support the interpretation of at least one impact event followed by prolonged use as a knife.

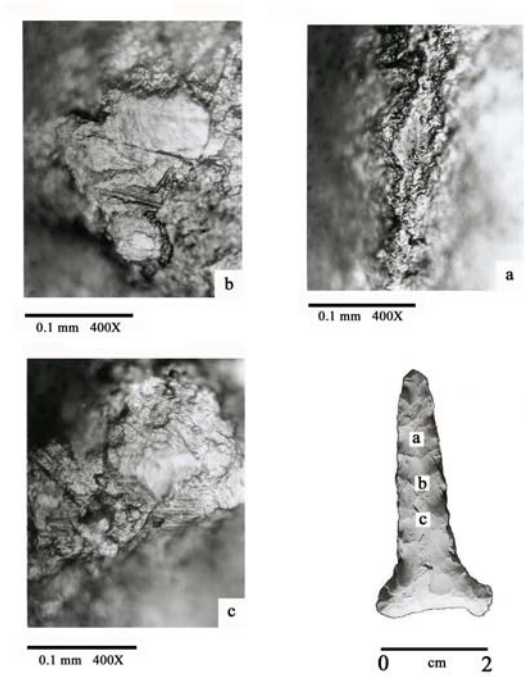

Figure 4. Side A of the chipped-stone drill and the locations of microplating features related to both rotary use on wood and movement within a haft element (artifact is smoked with ammonium chloride)

The chipped-stone drill was hafted in a wooden handle, and the haft covered a little over half of the tool's length. The documented wear features indicate that the tool was indeed used as a drill to work a contact material of medium hardness. Comparisons with experimental tool replicas suggest that the worked material was a dry hardwood.

Both of the artifacts discovered with the 14DO417 burial illustrate extensive use histories indicating that they were not unused tools when they were placed in this individual's grave. Therefore, it is clear that they were not "ceremonial" grave goods manufactured for the express purpose of being placed in the burial. It is possible, although impossible to determine, that these were tools used by and belonging to the buried individual.

Burial practices associated with Archaic populations are poorly understood as there are

only a handful of recorded Archaic age burials in the Central Plains region (Hoard et al. 2002). One way of gaining a better understanding of burial behaviors and associated cultural beliefs is through the study of burial items or grave goods. With respect to stone tools contained in graves, high-power use-wear methodologies can provide unequivocal evidence as to whether or not such items were unused ceremonial objects or utilitarian objects with demonstrated use-histories. The results of such studies could be used to infer the everyday tasks that individual may have performed as well as the status of the buried individual. Therefore, use-wear studies have the potential of improving our understanding of the social components of these hunter-gatherer cultures.

The results of this study also have broader technological implications. They provide unambiguous evidence that the projectile point found with the 14DO417 burial functioned both as an armature and a cutting tool. It is not uncommon in site studies and reports describing prehistoric lithic technologies to see bifaces referred to as projectile point/knives. However, this inferred dual function of such items is usually unsubstantiated or merely assumed. Only a handful of studies have evaluated such assumptions on North American samples with high-power use-wear methodologies (see Kay 1996, 1998, 2000). High-power use-wear methods can be used to determine if such bifaces functioned strictly as armatures, strictly as cutting tools, or both. With such information, archaeologists may be able to identify tool attributes that correlate to, or are specific to, these separate functions. Such identifications can lead to more accurate understandings of the organization and use of prehistoric toolkits and lithic technologies.

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Archaeological Investigation of the Scott Site House (14LV1082) Stranger Creek Valley, Northeastern Kansas A Progress Report

Brad Logan, Museum of Anthropology, University of Kansas

In last year's issue of *CAK*, I reported on the discovery and initial excavation of the Scott site house, a Late Prehistoric (Steed-Kisker phase) habitation in Stranger Creek valley, a north-bank tributary of the lower Kansas River in Leavenworth County (Logan 2001). Our work in July 2001 uncovered about one-half (32m^2) of the house floor, including all of the northwestern quadrant and portions of the adjacent quadrants. We had also exposed the central hearth, a large trash-filled storage pit near the western wall, three internal support postmolds (though one of these features may have served a different function; see below), and two postmolds on the northern side. This report summarizes the final excavation of the house and the initiation of laboratory processing of recovered materials.

I directed excavations at Scott on three successive weekends in October 2001 and over a three-day weekend in early May 2002. We uncovered the remainder of the house floor, the postmolds of three more internal supports, a storage pit in the southeastern corner of the lodge, and an extended entryway on the southern side. Only a dozen peripheral postmolds have been defined, none of which is on the western edge of the house. However, the dimensions of the house were clearly marked by the relatively loose, dark grayish brown silt (A horizon) that filled the semi-subterranean floor to a depth of ca.15 to 23cm.

Beyond the house fill, the soil was a compact, pale brown to yellowish brown clayey silt (B horizon) that contained very little cultural material.

In most respects the Scott house is typical of those of the Central Plains tradition and is comparable to several previously reported structures of the Steed-Kisker phase (Calabrese 1969; Shippee 1960, 1972). With regard to the central hearth, number and location of main support posts, and placement and orientation of the extended entryway, it is like House 1 at the Steed-Kisker site (Wedel 1943). It differs in being larger (7x7m vs. 4x5.5m) and containing storage pits.

The house fill appeared to taper to greater depth toward the central hearth, a circular area (diameter=75cm) of dense, oxidized earth with little charcoal and no ash or hearthstones. The postmolds of four main supports, each about 25cm in diameter, were arranged with near symmetry around the hearth. A smaller postmold found near the northwest main support probably indicates later addition of a prop. Four postmolds were found along the eastern edge of the floor, though rodent burrowing had disturbed one of these. An entryway near the center of the southern edge of the house was marked by four postmolds. Three of these were on the western side of the entryway, the northernmost marking its junction with the house. The fourth, opposite the others, defined the entryway's width as 1.25m. That the entrance was ramped was indicated by its fill, which thickened from the house toward its southern terminus at ground level. The fill contained a roughly linear trail of 46 plotted artifacts, including 30 sherds.

A storage pit was found in the extreme southeastern corner of the lodge (Figure 1). It was cylindrical, approximately 75cm in diameter and 44-45cm in depth. Its unstratified fill, saved for flotation, contained ten plotted items: two blade tools, five body sherds, a large piece of burned earth, the distal end of a deer metapodial with traces of score-and-snap treatment of the shaft, and a sandstone slab. The slab, with one smoothed and concave surface, was clearly used for plant food processing. Like all other suspected plant-food processing tools from the site, it remains unwashed pending microscopic analysis of the adhering soil for phytoliths (cf. Bozarth 1998). The pit differed in several respects from that found in July 2001 near the western wall of the lodge. That feature, a belled double-pit, was noticeably larger and deeper (1x1m), had more complex stratigraphy, and yielded a greater number of artifacts.

Figure 1. Feature 12 (storage pit) with large sandstone grinding slab. This feature was in the southeastern corner of the Scott house (north is to top of photograph)

Of the 20 features recorded in the Scott house, the function of all but one is apparent. The exception was found at the intersection of lines drawn between the two southern postmolds and the entryway and hearth. It is

unclear whether this feature was a postmold or small pit. Of greater diameter (40cm) than the other internal supports and 42cm deep, it may have served as a small storage pit. Wedel (1943) describes a comparable feature in the same approximate position in House 1 at Steed-Kisker and suggests that it was either a pocket cache or a mortar hole. One of the burned sections of wood collected from the house in 2001 rested nearly upright above (though not in) this feature. Identification of the wood may shed light on the function of the nearby feature.

Many more artifacts were piece-plotted, following the criterion that these items be equal to or greater than 2.5cm along any dimension. Table 1 is a preliminary summary of all items plotted in the Scott house based on the field log (note: these totals will be refined once the final computer catalog is completed). Ceramics (n=635; 71%) dominate this assemblage, with the balance composed of lithic artifacts (n=155; 17.3%), biological remains (n=51, 5.7%), and an assortment of large pieces of daub, charcoal, and other as yet unidentified debris (n=55; 6.2%). Eva Cook has cataloged all of this material at KUMA and is now mending sherds that had been mapped as "complexes".

Table 1. Counts of Piece Plotted Artifacts from the Scott Site House (n=896).

Ceramics		Lithics		Lithics (cont.)		Biological	
Body Sherds-	492	Projectile Points-	8	Abrader-	14	Bone/Teeth-	17
Rim Sherds-	85	Biface/Knife-	11	Sandstone-	19	Burned Nuts-	6
Sherd Complex-	50	Scraper/Uniface-	11	Mano-	1	Charred Timber-	28
Handles-	8	Debitage/Core/		Metate-	1		
		Other Tool-	64	Cobble-	14	Other	
				Hematite-	6	Daub, Charcoal	
				FCR-	6	Miscellaneous-	55

A sample of one of the burned wooden beams from the Scott lodge returned a radiocarbon date of 630±70 rcybp (ISGS-5074; $\delta^{13}C$ –25.9), which calibrates to AD 1275-1428 (two sigma range) (Calib 4.3; Stuiver and Braziunas 1993; Stuiver et al. 1998a; Stuiver et al. 1998b). This postdates the range for the Steed-Kisker phase suggested by O'Brien (1995), but is within the greater range for it suggested by Logan and Ritterbush (1994). The Scott house date is also contemporary with two AMS dates on maize from DB (AD 1286-1397; calibrated average, two sigma range), another Steed-Kisker phase occupation in Leavenworth County (Logan 1998a:310-311). These dates are particularly intriguing because they provoke questions about relations with Oneota populations that expanded to the Central Plains during that time (Logan 1998a:328-329, 1998b; Ritterbush and Logan 2000; Ritterbush 2002).

Beyond their dating potential, the many burned beams from the Scott house present other research opportunities. In last year's *CAK* I said that taxonomic identification of the wooden supports might indicate the home-building wood preferences of the builders (Logan 2001). So far, four samples have been identified (Johnson 2002; Miller 2002) and as many more will be identified in the near future through a grant from the Carlyle S. Smith Memorial Fund. Three are red elm (*Ulmus rubra*), an "easily split, but … strong and durable" wood still used by Kansas farmers for fence posts (Stephens 1973:136). A fourth sample is hickory, probably pecan (*Carya illinoiensis*), a river bottom species. That identification is interesting as Leavenworth County is the northwestern edge of the modern distribution of pecan, which is more common in the eastern United States (Stephens 1973:80).

Elm and hickory (more commonly bitternut and shagbark hickory) were readily available along Stranger Creek prior to Euro-American settlement (Logan 1985). Both were among the charred wood samples identified at Steed-Kisker phases lodges in the Smithville Lake area in Clay County, Missouri (Calabrese 1969:64). Hopefully, we will learn more about Steed-Kisker architecture through the identification of more samples and the detection of any pattern in their spatial arrangement within the lodge.

Spatial analysis of Scott site material is the task of students in a course (Anth 406: Laboratory Techniques in Archaeology) I am directing at the University of Kansas this year. Eight students have sorted all waterscreen samples (1/8 inch mesh) from the 1x1m units of the house block. Prior to sorting, students waterscreened the last 280 samples of more than 1,000 (each containing ca. 5gl of soil) recovered from the site. Most of the sorted material is daub and burned earth, but it also includes charcoal, burned seeds and nutshells, burned bone, ceramics (rim sherds, body sherds, appendages), chipped stone tools (small retouched flakes, several arrow points and point fragments and one complete end scraper that eluded piece-plotting), chipped stone debris, and other stone (i.e., sandstone, quartzite). The students have analyzed the distribution of these artifact classes (including piece-plotted artifacts) by mass and (for lithics and ceramics only) by counts, in order to interpret any distinct patterning as it may reflect house activities, or the destruction of the lodge (cf. Logan and Hill 2000).

At this time I am limited to intuitive interpretations of house activities and here discuss only one of these: lithic tool maintenance. Debitage is composed almost entirely of tertiary flakes, suggesting that tool maintenance was a dominant task with regard to stone. I predict that evidence of primary and secondary stone reduction will be found outside the house (cf. Logan and Hill 2000). It is particularly intriguing that, thus far, surface inspection of the area beyond the lodge has yielded few artifacts. I hope to search for such areas of extramural activity that may have escaped scouring by the flood that exposed the lodge in June 2001.

Much laboratory work must be done before a final descriptive and interpretive report of the Scott house can be completed. Sorted waterscreen materials must be cataloged and flotation samples must be processed. Students in the lab class have processed about 50 flotation samples but nearly 200 remain. In the meantime, the readers of *CAK* can look forward to continued updates on the Scott site project.

I take this opportunity to thank the many persons who volunteered their labor toward excavation of the Scott site. Most of them represent the following organizations: the Kansas Anthropological Association, University of Kansas, Kansas State University, Kansas City Community College, Archaeological Association of South Central Kansas, and the Kansas City District, U.S. Army Corps of Engineers: Dustin Caster, Steve Collins, Bobby Conard, Mary Conrad, Gayla Corley, Charley and Laurie Gann, Sarah Harrington, Don Henkle, Jim Huss, Dan and Tonya Judd, Dick Keck, Gail Lundeen, Jeanne McGuire, Janice McLean, Matt Padilla, Milton Reichart, Samantha Richens, Henry Roeckers, Richard and Shirley Roeckers, Tobin Roop, Sharon Sage, Lisa Simmons, Rodney Staab, Amber Swafford, Bob and Freda Thompson, Vita Tucker, Paul Waite, Andrew Weil, Adam Wood, and Bob Ziegler.

I am particularly grateful to Dick Keck, who again served as Field Director of the project in October and May. Thanks also to the Kansas State Historical Society and to Virginia Wulfkuhle and Chris Garst for the loan of field and lab equipment. I am grateful to Bill Johnson, Department of Geography, University of Kansas, for volunteering his geoarchaeological expertise, for funding the radiocarbon date, for taxonomic identification of one of the burned beams, and for directing me to Dr. Regis Miller. Dr. Miller, Director of

the Wood Anatomy Laboratory, Forest Products Laboratory, U.S. Department of Agriculture, Madison, Wisconsin, identified three other samples of burned timbers. Many thanks to Jeannette Blackmar, Archaeological Collections Manager at KUMA, for taking on the task of accessioning the Scott site materials and to Eva Cook for her the tireless efforts in cataloging them.

Hundreds of bags of fill were waterscreened at Clinton Lake through the courtesy of Project Manager Lou Ruona and Assistant Manager Dave Rhoades. They let us use their "bean sprayer" (a trailer mounted reservoir with gas-driven pump and high-powered hose) and thousands of gallons of water for this purpose. Having suffered through the "zen" of pump maintenance while drawing water from Stranger Creek near the Scott site, I appreciate the greater luxury of the "Clinton" method. I owe much to Kale Bruner, who directed waterscreening at Clinton this past spring, and to her volunteers, Tina Warriner, Dustin Caster, Kara Jennings, Dan and Tonya Judd, and Courtney Hinton.

Mary Kerns, Curatorial Assistant at KUMA, helped me set up the Flote-Tech and process some flotation samples with two students in a summer workshop; Tina Warriner volunteered several days to flotation in August 2002. Mary also logged in the waterscreen samples and sorted them according to provenience unit in preparation for my Lab Techniques class. I thank the students in that class for waterscreening, flotation, and artifact sorting and analysis: Lya Gillott, Kelly Jarvis, Andrew Luxem, Erinn Roos, Alexandra Spencer, Jessica Walker, Jessica Weaver, and Andrew Wolff.

We are all indebted to John Evans, the landowner, and Henry Caenan, the tenant, whose generosity made our continued work at the Scott site possible. Last, but certainly not least, my eternal thanks to Scott DeMaranville for finding the site and bringing it to my attention, for donating to KUMA his collection from it, for transporting to his barn and storing therein hundreds of bags of waterscreen samples through the winter of 2001-2002 and then trucking them again to Clinton Lake.

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Kansas Archeology Training Program Field School, 2002

Virginia A. Wulfkuhle, Public Archeologist, Kansas State Historical Society

Two sites near Studley in the South Solomon River valley of northwestern Kansas were the focus of the Kansas Archeology Training Program field school, June 1-16, 2002. The Kansas State Historical Society (KSHS) and the Kansas Anthropological Association (KAA) returned to the Albert Bell site (14SD305) and Cottonwood Ranch (14SD327), which also were the subjects of the 1990 field school. A total of 138 people registered for the field school, and they donated 5,472 hours to the project.

Donna Roper served as principal investigator at the Albert Bell site, a late prehistoric site lying on an upland ridge that extends into the Museum Creek valley of

eastern Sheridan County. The 1990 KATP had excavated the remains of a single lodge, attributed to the Upper Republican phase, and sampled a midden north of the lodge. The primary goal of the 2002 excavation was to excavate another possible lodge.

Field school participants excavated a total of 34 m^2 on the western part of the ridge, comprehensively sampling the area where surface debris is exposed. A low-density artifact scatter was found, but there was no evidence of house fill, features, or a floor. With no lodge materializing on the west part of the ridge, the crew moved back to the eastern part of the site and excavated 16 m^2 of the midden and 19 m^2 adjacent to the previously excavated lodge.

The portion of the midden area yielded a considerable quantity of very highly fractured bone, much or all of it from fairly large mammals, such as bison. Debris recovered from the squares surrounding the lodge is small and consistent with the expectations of a farmstead model. The pottery is in the tradition of material from Upper Republican sites elsewhere in Kansas and southern Nebraska. An important raw lithic material is Niobrara or Smoky Hill jasper, but not all of the chipped stone artifacts were made of this local material; other raw materials appear to have come from a larger area of the High Plains to the south and west of the site. Analysis determined that obsidian found at the Albert Bell site came from southeastern Idaho.

Although the expectation of finding a prehistoric house was not realized, the excavation collected valuable information. An Upper Republican "yard" and part of a midden were investigated.

Excavations at the Cottonwood Ranch were directed by Marsha King, on loan from the Kansas Department of Transportation. Virginia Wulfkuhle assisted. The Cottonwood Ranch, a late-nineteenth-century English sheep ranch, became a state historic site in 1982. Ranch records show that John Fenton Pratt hired neighbors to cut ice from the Solomon River and nearby ponds and deliver it to his icehouse as late as December 1932. The KATP crew set out to find the remains of this icehouse.

Fifty units, a total of 96 m^2, were opened, and nearly 54 m^3 of soil were excavated and screened. Two weeks of digging did not uncover any clear remnants of mortared stone foundations, although lots of bits and pieces of structural materials were found. Excavators also found extensive layers of organic material that was identified as compacted hay—perhaps the material used to insulate the ice.

Local informants said that the Pratt family had used the depression from the abandoned icehouse as a dump, so it was no surprise that large quantities of artifacts were recovered, including pre-1933 artifacts. About two-thirds of the 7,000 artifacts collected were household or domestic items. The following selected list gives an idea of the types of artifacts recovered: bones of chicken, turkey, sheep, and possibly geese, some with butcher marks; dishware fragments, including fine china, whiteware, transferware, stoneware, ironstone, and crockery, many with English makers marks; glass fragments from windows, drinking glasses, bottles, chimney lamps, and ink bottles; remnants of leather shoes, particularly the heels, and buttons; doll fragments, toy dishes, figurines, and many slate pencils; fragments of farm machinery, metal tools, shell casings, iron pots, wire, a coal shovel, barbed wire, tin cans, nails, bolts, safety pins, lead seals, an ivory handle, an ivory cribbage piece, and three pennies--two with readable dates of 1865 and 1890.

While excavations were in progress at 14SD305 and 14SD327, KSHS archeologists took the opportunity to pursue other areas of research. Tod Bevitt interviewed local residents and did ground checks to find archeological evidence of what is known as Ft. Floyd, a berm that was used in a one-day battle in 1857 between the U.S. Army and the Cheyenne Indians. It is thought to be between Morland and Penokee, although area historians disagree on the exact location. Bevitt was unable to

definitely prove or disprove any of the proposed spots.

Martin Stein also pursued another special project, searching for jasper outcrops in six counties--Gove, Graham, Norton, Phillips, Sheridan, and Trego. Stein's team collected large samples of jasper, which were shared with six universities and the Denver Museum of Nature and Science. Samples have been sent to geologists at Louisiana State University to see if the jasper contains unique microfossils that will positively identify it in comparison to stones from other geological formations.

Other essential elements of the field school were the artifact processing lab and classes. Christine Garst supervised the lab, and Anita Frank managed the project records. Classes were taught by Randy Thies (orientation and Principles of Archeology), Martin Stein (Archeological Site Survey), Bob Hoard (Basic Archeological Excavation), Tim Weston and Will Banks (Mapping), and KSHS preservation specialist Christy Davis (Historic Architecture). Members of a Kansas City Boy Scout troop took advantage of the KATP field school to fulfill some requirements of the BSA Archaeology Merit Badge. Jennifer Epperson assisted with special instruction for them at the Albert Bell site.

Preliminary reports of the project were published in Volume 24, Nos. 4 and 5 and Volume 25, No. 1 of *Kansas Preservation*. Donna Roper will produce a technical report for the Albert Bell site under contract with the KAA, made possible by grants from the Kansas State Historical Society, Inc., and the KSHS Historic Preservation Office.

Spatial Variability in Central Plains Tradition Lodges

Donna C. Roper, Kansas State University

A fallacy of the traditional Central Plains tradition site report is that while it may contain notable information about variability within artifact classes, it often contains little or no such information for that largest and most complex artifact of them all, the house or lodge. Typically, of course, an excavation will have uncovered the remains of no more than one or two lodges, and this is part of the problem—intrasite variability is not a issue when the sample size is one or two. But all lodges are not alike and to consider their variability, we need to step outside the confines of a single site report and compile data on many reported lodges. This has been done on a few occasions, with variability in construction detail usually interpreted as stylistic (e.g., Wood 1952), and size variability as a function of the size of the co-residential group (Johnson 1973; Kivett and Metcalf 1997; Wedel 1979). A starting point of some of my recent work is that factors producing variability among lodges are more complex than that.

In this contribution, I want to briefly consider aspects of the spatial element in Central Plains tradition lodge variability. By this, I mean not an essentialist evaluation of differences among lodges assigned to ultimately arbitrarily-defined taxa, but rather a materialist consideration of variability across the continuum of space, regardless of the taxonomic label affixed to the site. My only taxonomic constraint is that I limit my consideration to sites assigned to some taxon within the Central Plains tradition. Although it would be possible to conduct a study of broader scope and stay within the Central Plains tradition, this preliminary analysis considers only lodges in the drainage of the

Kansas River, from western Pottawatomie County to about 100° W longitude. In standard parlance, these could be sites assigned to the Smoky Hill and Upper Republican phases, or taxa derived from earlier formulations of these units.

Most archaeologists seriously misunderstand the structural dynamics of even a small lodge and do not appreciate the demands made on a lodge's wood infrastructure. The lodge's wood frame—essentially the upright wall, interior, and entryway posts—bears loads of several types: its own weight, the weight of the materials that form the lodge's covering (rafters, earth, etc.), and the dynamic loads produced by periodic partial or complete saturation of the earth covering, piled up snow, wind, or even people and animals performing activities on the roof (see Benjamin 1991:11-24 or other sources for a discussion of loading on a building's frame). My preliminary calculations suggest that just the building materials for an average-sized Medicine Creek valley lodge might weigh about 30 or 40 tons or more, without yet considering the other loading factors. The stress placed on the lodge's frame, therefore, is considerable and the uprights have to be up to the task or the result could be a catastrophic failure.

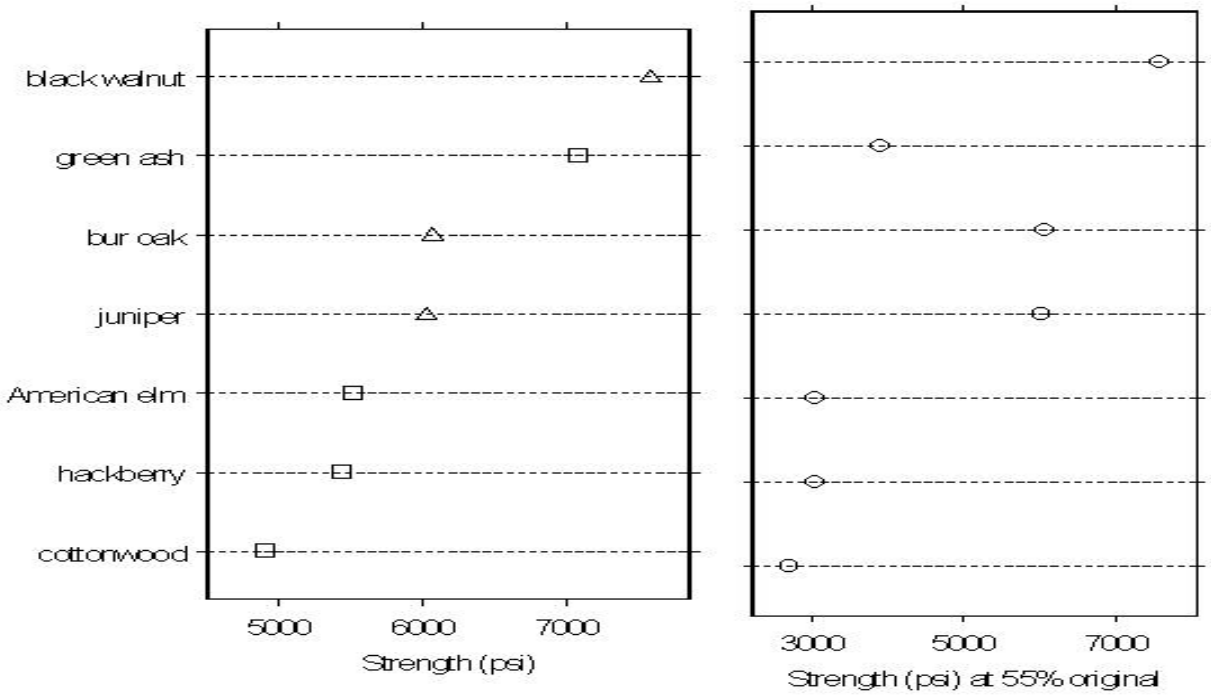
Discussions of wood selection for lodges sometimes suggest hardness as an important wood property. This is not strictly true, however, for hardness as a mechanical property of wood refers to its resistance to indentation (Wangaard 1951:71) and this is not a particularly salient consideration in lodge building. Instead, the salient properties of wood for lodge construction are strength, resistance to decay under exposure to moisture, and, to an extent, stiffness. Strength, the material's resistance to stress (Hoadley 1980:108), is measured along several dimensions, the most relevant for present purposes being under compression parallel to the grain, as in upright posts with a load on them. Posts are columns, the strength of which is a product of the strength of the wood under compression parallel to the grain times the cross-section area of the slenderest part of the column. Lodge posts must be able to resist not only the initial loading as structural elements are added to the building, but also to continuously resist that load that is a static or dead load, since it is composed of the building materials and remains for as long as the structure is intact (Benjamin 1991:11-12). The post will deform (or deflect) some when it is initially loaded and will continue to deform slowly (creep) as the load remains (Stalnaker and Harris 1997:21-22). Ultimately, the post will fail, generally by compression failure. Failure may be hastened, because strength is reduced, as wood moisture content increases and as the wood decays. Thus, a post, even in the early stages of decay, may retain only 55% of its original strength (Stalnaker and Harris 1997:359). Woods do, however, vary in their resistance to decay under exposure to moisture; thus, the relative strengths of posts of varying species may be a product not only of their initial size but of their stage of decay: a smaller post of resistant wood may in fact be stronger down the road than is a larger post of a non-resistant wood. Clearly, though, obtaining a proper balance of post size, strength, and resistance to decay is critical to lodge durability.

One way to maintain some degree of predictability of a lodge's performance and durability is to be familiar with the properties of the various available woods and to know something about the relative sizes of the posts that must be obtained if a particular species is to be used. A good example of this comes from North Dakota, where the Mandan consultant who assisted with the building of a replica lodge in Bismarck indicated that oak, if available, was the preferred wood for construction, and that oak timbers for stringers should be 6 inches in diameter, but if cottonwood was to be used, then timbers should be "about one foot in diameter" (Will 1930:42). As we will see momentarily, oak is both stronger and more resistant than

cottonwood and thus oak posts need not be as large to perform similarly to cottonwood posts. The problem, of course, is that wood species diversity is not particularly high on the Central Plains, and it declines the farther west one goes. The problem I am addressing here, then, is what effect this might have had on lodge construction.

The first panel of Figure 1 shows the strength of seven woods that we might expect to have been used in the Central Plains for lodge building: green ash, cottonwood, American elm, hackberry, juniper (red cedar), bur oak, and black walnut (strength data from Wangaard 1951:18-25). Some of these, along with willows, are the dominant species of the floodplain forests that line the east-west flowing streams comprising the upper Kansas River drainage; the others also are characteristic (Küchler 1974:600-601). Black walnut is the strongest of the species included in this portrayal, but it is not one of the dominant species, nor are the also-strong green ash or bur oak dominant species. In fact, both black walnut and bur oak drop out of the species mix, save for occasional occurrences, in about the Smith-Osborne-Russell counties area, or at about 98.5-99° W longitude (Stephens 1969:36, 60), near the Tatschl Line that Küchler (1970) has shown to be a biogeographical boundary running north-south through Kansas.

Further, the two different symbols in this graph shown in the first panel of Figure 1 differentiate between woods that are slightly or non-resistant (squares) and those that are resistant or very resistant (triangles) (data from Hoadley 1980:36 or Stalnaker and Harris 1997:360; a class of moderately resistant also is defined, but none of the woods discussed here fall into it) and the second panel of the graph shows the strength of the same seven woods with those woods that have little or no resistance to decay shown at 55% of their original strength. This is relevant to lodge dynamics, because the portions of posts below the ground surface are exposed to sufficient moisture to produce decay and it is here that compression stress failure will occur. I have several times measured wood moisture content of posts in the new Dancing Leaf Earth Lodge near Wellfleet, Nebraska and, even in droughty weather, have invariably found even the immediate subsurface portions of posts (the only portion I can measure) to have sufficient moisture as to inevitably produce decay of a non-resistant wood. I also know that all but a few of the interior and wall posts of the eleven-year-old original Dancing Leaf Earth Lodge at



Stockville, Nebraska showed compression failure below the surface when that lodge was dismantled. Black walnut and bur oak, both of which are resistant to decay, remain the strongest, but they also are the least available at the western part of the range of Central Plains tradition sites with lodges. Some of the most common woods throughout the area where Central Plains tradition people built lodges, particularly the cottonwood and hackberry, are the weakest when partially decayed (even when not partially decayed). Only the juniper, or red cedar, is strong, resistant, and found throughout the area. It also, however, produces most of the slenderest trunks among the listed species.

Lodge builders in the Central Plains, therefore, clearly faced some constraints when procuring posts for framing their structures, and the farther west they were, the more constrained they would have been. They would have known the size-strength-moisture-resistance "equation," such as the Mandan consultant cited above did, but they also could have run out of choices in areas where species diversity was low or decades, perhaps a couple centuries, of drawing on the wood for construction and other uses had limited their selection. They would have had several ways to respond to such situations, including varying the sizes of houses, varying the shape of houses, and varying the number of posts used in their construction. The effect of varying the size of the houses is obvious: it reduces the weight of the building and thus reduces the loads the frame must bear. Varying the shape also is effective in reducing the amount of building material needed and therefore the weight of the building. Shape is one of those variables whose correlation with cultural factors has been sought in cross-cultural studies (Robbins 1966; Whiting and Ayres 1968), but it may also be related to building material availability. Simply put, a given amount of floor area can be enclosed with a shorter perimeter if a building is circular than if it is rectangular. For example, a rectangular building that measures 8-x-8 meters has a floor area of 64 m^2 and a wall perimeter length of 32 meters, but a circular wall perimeter need be only 28.4 meters long to enclose the same 64 m^2. This way of reducing the needed amount of building material will also reduce the weight of the building. Reducing the number of posts also will reduce the amount of needed building material, but also will reduce the strength of the frame. It may be usable in combination with other means of reducing the needed amount of building material, but will be practical only to a point.

A dream study would be to evaluate woods used for the posts of excavated Central Plains tradition lodges. It is a dream, of course, because most lodges were excavated many years ago and much of the wood was not saved. So we cannot systematically evaluate actual wood use over space. We can, however, evaluate such factors as lodge sizes and shapes, and post sizes from existing records and reports. In the remainder of this study, therefore, I examine some of these variables for a group of Smoky Hill phase and Upper Republican phase lodges that are spread throughout the Kansas River drainage from western Pottawatomie County, at about 96º 40' W longitude, to Lane County, at about 100º 40' W longitude.

Figure 2 shows variability in dimensions of 44 lodges that I have placed in five spatial groups arrayed from east to west across the Kansas River basin. Table 1 lists the lodges, and their spatial group assignment, and references the sources of data used in this analysis. To construct the graph in Figure 2, I first compiled both length and width of each lodge, and then, for this first look, used the longer of the two dimensions for the analysis (most lodges are not so far from square that it makes a great deal of difference which measurement was used—floor area might have been better way to do it, but the results of the analysis almost certainly will be the same). The box plots were constructed using Axum 6.0 (MathSoft 1999). The box portrays the midspread, which is the portion of the

range between the first and third quartiles, while the line through it is the median. The whiskers plot

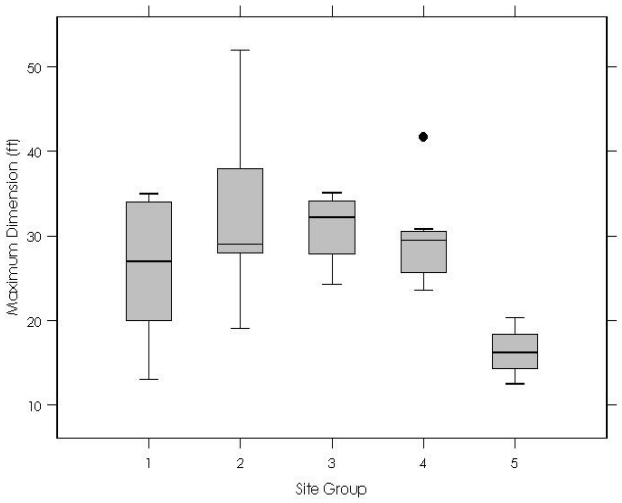


Figure 2. House Size Distributions

the remainder of the range, to the limits of the variability expressed within the data for each group. When so plotted, this data set portrays an important message: all of the largest Central Plains tradition lodges are in the Ottawa/Saline counties area, and all of the lodges in the western part of Kansas are small; the Medicine Creek valley lodges may be larger than the western Kansas lodges, but they are still overall smaller than many of the central Kansas lodges. This result should be predictable, for the supply of building materials in the Medicine Creek area and western Kansas was more limited in quantity and species diversity than it was in central Kansas and the lodge builders to the west had fewer options than did the lodge builders in the lower portions of the river drainages comprising the Kansas River basin.

Some further support for this inference comes from looking at the variability in post sizes. The data set for this variable that I have been able to so far compile is more limited than for lodge size, containing only 16 lodges. They do, however, sample all the same areas except the Waconda Lake locality. The range of post mold diameters for each lodge are shown, again arrayed in an east to west direction, in Figure 3. For this, it worked best to portray ranges and high-low-average plots (in this case, the average I used was the median), because some of the data are no better than this. Again, though, the message is clear: the largest posts are in central Kansas houses, while the western Kansas sites houses were built using smaller posts. The western Kansas houses also were built using many fewer posts than were some of the central Kansas houses.

The analysis, therefore, would seem to suggest that lodge construction, including size, may well have been partially conditioned by wood availability and was not entirely a product of the size or social organization of the co-residential group, or of the "wealth" of the builders (cf. Wilk 1983). I am not discounting these as factors, of course—after all, some of the houses in central Kansas are small and just because one **can** build a larger house does not mean one **must** build a larger house. The point, though, is that people to the west simply had fewer options when they built their lodges and this becomes all the more critical when we recall something discussed earlier in this paper, viz., that some of the stronger and moisture-resistant woods were severely restricted in their availability in western Kansas, if not lacking in that area, leaving lodge-builders with mostly weaker and non-resistant woods, which on top of that probably were smaller. The possibility of obtaining juniper—or eastern red cedar—would be the one saving grace in this region. It would be interesting to examine any available wood samples from these houses (and the collections do contain some samples) to see what was really being used: cottonwood, ash, elm, hackberry, red cedar, and possibly black willow (a wood even weaker than cottonwood) would be about the only real choices.

Table 1
Sites, Lodges, Dimensions, and References

Site	Lodge No.	Length	Width	Group	Reference
14PO4	1	26	26	1	Johnson 1973
14RY21	1	34	32	1	Wedel 1959
14CY2	1	ca. 35'		1	Robinson 1951
14CY3	1	ca. 31'		1	Merriam 1954
14CY4	2	ca. 20'		1	Wille 1957
14CY30	1	27	24	1	Wille 1957; Witty 1963
14CY30	2	13	13	1	Witty 1963; KSHS site files
14OT5	1	25	26.6	2	Wedel 1934
14OT5	3	47	52	2	Wedel 1934
14OT5	8	38.7	34.4	2	Fosha 1994; KSHS site files
14OT5	23	39.25	44	2	Fosha 1994; KSHS site files
14OT304	1	27.17	28.25	2	Roper 2001
14OT305	1	28	28.5	2	Roper 2001
14OT308	1	25	28	2	Roper 2001
14SA414	1	25	29	2	Roper 2001
14SA415	1	38	27	2	H. Reed collection
14SA403	1	29.4	33.9	2	KSHS site files
14SA420	1	30	30	2	KSHS site files
14SA420	2	27	26	2	KSHS site files
14SA420	3	18	19	2	KSHS site files
14ML5	X104	24.3	24.3	3	Blakeslee 1999
14ML5	X201	33.5	34.1	3	Blakeslee 1999
14ML11	X110	26.6	27.9	3	Blakeslee 1999
14ML15	X103	29.9	34.8	3	Blakeslee 1999
14ML15	X112	32.2	35.1	3	Blakeslee 1999
14ML15	X203	23.3	31.8	3	Blakeslee 1999
14ML17	X101	26.9	33.8	3	Blakeslee 1999
14ML306	X101	25.6	25.6	3	Blakeslee 1999
14ML371	X101	26.6	32.2	3	Blakeslee 1999
25FT16	1	29.5	26.2	4	Kivett and Metcalf 1997
25FT16	2	30.5	24.3	4	Kivett and Metcalf 1997
25FT16	3	27.6	25.9	4	Kivett and Metcalf 1997
25FT17	1	29.9	28.9	4	Kivett and Metcalf 1997
25FT17	2	30.8	27.9	4	Kivett and Metcalf 1997
25FT17	3	25.3	24.9	4	Kivett and Metcalf 1997
25FT17	4	27.9	41.7	4	Kivett and Metcalf 1997
25FT17	5	27.2	27.2	4	Kivett and Metcalf 1997
25FT17	6	29.9	24.3	4	Kivett and Metcalf 1997
25FT17	7	23.3	23.6	4	Kivett and Metcalf 1997
25FT17	8	25.6	24.9	4	Kivett and Metcalf 1997
14LC301	1	20.3	20.3	5	Witty 1962
14SD305	1	16.4	9.8	5	KSHS site files
14LA1	1	12.5	12.5	5	Wedel 1959
14LA1	2	16	16	5	Wedel 1959

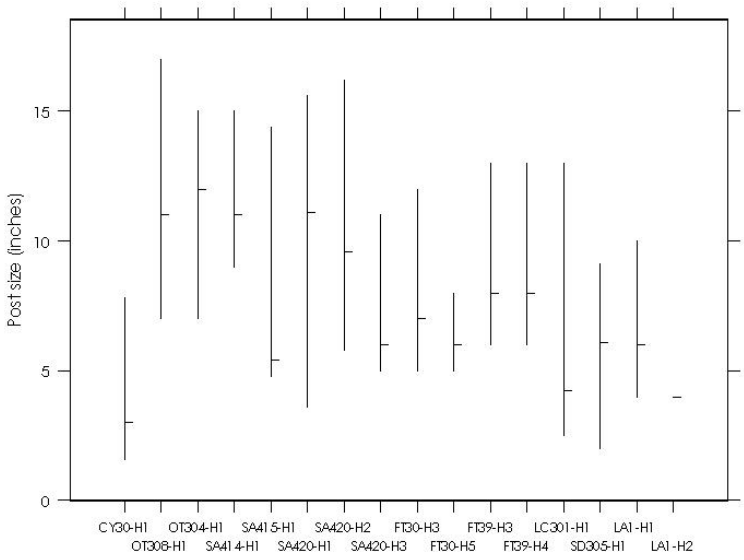


Figure 3. Post Sizes for 16 Lodges

About a half-century ago, Wedel (1953:503) noted that what we have come to call Central Plains tradition sites extend to about 100º W longitude, which he pointed out is the approximate longitude of the 20-inch average annual precipitation line in the Central Plains. The implication, of course, was that precipitation is a limiting factor in agriculture and occupation to the west of here would be too risky for the Central Plains tradition agriculturalists. The situation probably is a little more complex than this. Setting aside the fact that the location of the 20-inch precipitation line actually fluctuates from year to year, there is also the fact that wood resources were ever more limited to the west. What the analysis presented here hints at is that it was more and more difficult farther to the west to procure sufficient building materials to build a Central Plains tradition lodge. One of the hallmarks of the Central Plains tradition, though, is the presence of the lodges. Part of the reason the Central Plains tradition sites seem to end at around 100º W, therefore, may be that it was difficult to obtain the raw material to produce one of the very things that most makes a Central Plains tradition site a Central Plains tradition site.

Of course, some sites beyond 100º W do yield pottery and other artifacts that are definitely like Upper Republican—those sites sometimes are called High Plains Upper Republican sites and their interpretation has caused all manner of debate over the decades (Roper 1990:1-2). Their assemblages, though, vary considerably, suggesting that as an aggregate they reflect a settlement system composed of sites of several types, one of which may be a base camp. In this case, it is interesting to note that Gilmore has retrospectively examined the records from Withers' excavations at the Buick site (5EL1) near Limon, Colorado and suggested that a small and light structure once stood there (Gilmore, et al. 1999:261). Tucker et al. (1992) also suggest some small structures once stood at the Box-Elder-Tate site on present Denver International Airport property. These structures are not typical Central Plains tradition lodges. They were, however, built beyond the range of the availability of suitable woods for constructing a typical Central Plains tradition lodge by people whose material culture was not very different in important ways than that of people east of the 100º W meridian. As with some other taxonomic distinctions, therefore, the nature of the easily available (or, perhaps more to the point, not easily available) raw materials, not societal distinctions, may be a factor in taxonomic assignments.

To continue this analysis, I plan to continue to seek out additional lodge data and to continue to refine the data set I used in this preliminary study. The data set does, in fact, not yet contain data for all excavated central Kansas lodges, and I am still working on the Medicine Creek data. To my knowledge, however, the data set used here does include all the excavated Central Plains tradition

lodges in western Kansas, although it would be good to obtain more-specific data for the Pottorff site, if such data are available. In this case, the message in the analysis presented here is accurate. Given what we know about the distribution of woods and what we know about the properties of those woods, as I reviewed in the early part of this paper, we can have anticipated these results. Whatever else they do or do not do, though, they should put us off a rote interpretation of lodge size as a function of the exact size of the lodge's population—lodges obviously vary in size for more reasons than this.

Finally, the analysis presented here would suggest that while wood availability constrained how Central Plains tradition people built their lodges west of about 98-99º W longitude, it must have absolutely precluded protohistoric/early historic peoples from building their larger, heavier-timbered earthlodges in this region. The distribution of these villages was more limited for other reasons, to be certain, but it would have been even more difficult for a lower Loup/Pawnee village to have acquired sufficient quantities of suitable timbers for framing their lodges than it was for the Central Plains tradition farmsteaders to do so.

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Hit and Run: Preliminary Results of Phase III Test Excavations at 14HO308, a Stratified, Multicomponent, Late Prehistoric Site in Southwest Kansas

C. Tod Bevitt, Kansas State Historical Society

Project Background & Site Description

The Archeology Office of the Kansas State Historical Society (KSHS) conducted research at site 14HO308 as part of planned construction of Horsethief reservoir. The Horsethief reservoir locality occupies a portion of the central Buckner Creek drainage in west-central Hodgeman County, Kansas. This area is situated within the Dissected High Plains

physiographic province; near it's convergence with the High Plains proper.

To assess the effects of construction on cultural resources in the project area, the KSHS Archeology Office carried out a Phase II survey in 1986 within the limits of the proposed structure (Timberlake 1987). Return visits to the site in the early and mid 1990s yielded evidence of a potentially significant archeological site eroding from the banks of Buckner Creek. On the basis of the artifacts recovered during the initial Phase II investigation as well as these subsequent visits to the site it was recommended that further investigation at the Phase III level be undertaken. Phase III fieldwork was carried out in July 2002 and is the subject of this preliminary report.

Geomorphological research of the Buckner Creek valley was conducted in conjunction with the original archeological survey of the locality (Mandel 1987). The geomorphological investigation was part of larger research project studying the entire Pawnee River drainage, of which Buckner Creek is a part (Mandel 1994). This research was particularly important for proper assessment of the archeological record in the locality as all sites were found in buried contexts, having been made visible in eroded contexts along and adjacent to the creek and associated

This locality has significance for the regional geomorphology as two late Holocene stratigraphic markers; the Hackberry Creek and Buckner Creek paleosols are described in a type section associated with site 14HO306 nearby (Mandel 1994:43). Each of these buried soils had cultural materials associated with them at this location (14HO306) dating from Late Archaic and Early Ceramic periods and are considered distinct temporal markers with the Buckner Creek paleosol forming around 1350 B.P. and the Hackberry Creek paleosol forming between 2000 and 2800 B.P. (Mandel 1994:67).

Site 14HO308 is situated in the T-1 terrace, having buried cultural deposits from near surface (approximately 15-25 centimeters bgs) to as deep as nearly one meter. The Buckner Creek paleosol, while not encountered in any test unit excavations, was identified in backhoe trenches on-site at a depth of approximately 1.4 meters bgs. This information alone suggests that the identified cultural components dated no earlier than the latter part of the Early Ceramic period (A.D. 1- 950). It was hoped that test excavation would yield material for dating the cultural deposits directly.

Excavation Summary and Preliminary Interpretation

A total of six 1x1 meter units were excavated at the site, including two (Units 2 and 6) that were placed close together to investigate a particularly deep and dense area near the northwest margin of the site. In addition to these hand excavated units, three back trenches were opened along and outside of the east side of the site to assist in identification of site boundaries and test for the presence of cultural materials below the maximum depth of test units excavated in that vicinity. Another two short backhoe excavations were made into the T-1 terrace to the east and south of the Unit 2/Unit 6 area in an attempt to identify margins of this dense accumulation of cultural material.

While initially it was thought that the site consisted of a single buried component, Phase III testing revealed a sparse, poorly defined component in the upper 45 centimeters (generally 15-25 cm bgs) (Zone A) with three additional well defined components at around 58-62 centimeters bgs (Zone B), 72-76 centimeters bgs (Zone C), and 82-86 centimeters bgs (Zone D). These three lower components were identified in the area of Units 2 and 6 on the basis of relatively dense accumulations of cultural debris, often accompanied by occasionally dense amounts of hackberry shells, in thin lenses at those approximate depths. Bioturbation, most obvious in the form of rodent burrowing, had apparently allowed for movement of some of the material up or down in the stratigraphic column; however, this activity was minimal

enough so as to still allow for recognition of the separate cultural strata. Temporally diagnostic artifacts include plain triangular, Fresno type projectile points from Unit 5 and Unit 2- Zone B; a side-notched, Washita type projectile point from Unit 2- Zone D; and ceramics from Units 2, 3, and 6.

Lithic materials are dominated by locally acquired material consisting of generally high quality chert and chalcedony from Tertiary and/or Quaternary formations in the vicinity and opalite available from nearby Ogallala outcrops. Often several distinct material types could be identified in any one zone. Other materials include Smoky Hill jasper, trachite, and limited amounts of Dakota quartzite, Alibates, and Flint Hills chert. Nearly all identified formal tools were manufactured from Smoky Hill jasper, though trachite was identified in at least two instances. Differences in the lithic raw material frequencies for the well-defined zones (B-D) are apparent as indicated by the sample from Unit 2 (Table 1).

	Smoky Hill Jasper	Trachite	Cherty Gravels & Unidentified Cherts	Opalite	Chalcedony	Misc. Quartzite	Dakota Quartzite	Alibates	Flint Hills Chert
55-65 cm (Zone B)	19	2	130	62	8	4	0	0	0
65-75 cm (Zone C)	43	4	28	19	13	1	0	0	0
75-85 cm (Zone D)	14	24	92	132	48	11	6	3	7

Table 1. 14HO308 lithic debitage by type in Unit 2 by level (and corresponding cultural zone).

The ceramic assemblage is limited and in general is represented by small fragments. Ceramics were present in Unit 3 (0-15 cm and 15-25 cm levels), Unit 2 (35-45 cm, 55-65 cm-Zone B, and 65-75 cm-Zone C), and Unit 6 75-85 cm-Zone D). Ceramics in Unit 3 were primarily from a single type and probably represent a single vessel. The ceramic is a plainware that was quite hard and tempered with a fine sand. The sherds ranged in thickness from 3.3-5.5 mm. Unit 6 yielded a single sherd corresponding with Zone D. This exfoliate had a smoothed, almost burnished cordmarked surface and exhibited relatively coarse sand temper.

The largest sherds (both in size and quantity) come from Unit 2-Zone C. This pottery is represented by a variably smoothed cordmarked ceramic tempered with sand and calcium carbonate ($CaCO_3$). Sherd thickness ranges from 5.5 to 7.3 mm, and again the sample could very well represent a single vessel. Ceramics from other levels in Unit 2 were too small to offer any detail beyond noting the presence of pottery for that particular level.

Faunal remains were limited and generally consist of small fragments of large mammal bone, probably representing bison as that was the only identified large mammal at the site in any provenience. Notable information concerning the faunal assemblage comes from Zones B-D. In Zone B probable bison bone fragments with cutmarks were noted as were

the right tarsometatarsus and a single phalanx of an unidentified perching bird that was slightly smaller than a robin.

Zone C yielded the partial remains of at least two prairie dogs, based on notable size differences among identifiable elements (primarily long bones and cranial/mandible fragments). Also present in the level were probable bison bone fragments and the ulna and radius of an unidentified small mammal (possibly ground squirrel).

Zone D contained four nearly complete bison ribs scattered across the Unit 2 floor around the perimeter of the Feature 2 hearth associated with this zone; other presumably bison bone fragments were present as well. The ribs exhibited oblique cutmarks primarily along the proximal end of the rib, but also identified elsewhere on individual specimens. At least one prairie dog, identified by cranial and long bone fragments, was present as was at least one crow, represented by several elements from the upper and lower limbs.

Cultural features were identified in association with Zones B and D. In both instances ephemeral surface hearths were identified by the presence of a thin oval area of burned earth accompanied by quantities of charcoal. This and other charcoal material collected from apparently undisturbed contexts (i.e. areas not exhibiting rodent burrowing) were the sources of a suite of radiocarbon dates that have been submitted recently. A single date on each zone is being sought for this phase of investigation. At this time only the result from the Zone D sample has been received, as it was the only level containing enough charcoal to attempt dating by standard methods. This sample (ISGS-5304) yielded a radiocarbon age of 1110±70 BP. This age offers calibrated intercepts of AD 902, 917, and 962, suggesting the possibility of an incipient Middle Ceramic period age for this lowest identified cultural component.

The assemblage collected from the Phase III investigation, as well as the earlier visits to the site, suggests a variety of activities including hunting, faunal processing (butchering and hide processing), tool manufacture and rejuvenation, and cooking/heating have occurred at the location. Identified distinct cultural zones bear evidence that similar activities occurred at the site over an as yet undetermined period of time, though the lowest identified cultural component at the site (Zone D) has yielded a date comparable with the beginning of the Middle Ceramic period. Lithic utilization points to a heavy reliance on locally available raw materials of varying quality. Non-local lithics are limited, with Smoky Hill jasper being identified most often. Other non-local material is rare and limited to specific cultural zones.

Phase III investigations have confirmed that there are intact cultural remains at site 14HO308; in fact, several discrete cultural components were identified where only one had been suspected based on previous visits to the site. At least three cultural zones with moderate to dense artifact frequencies were identified in Units 2 and 6 in the northwest portion of the site at depths of up to nearly a meter. Fortuitously, excavations identified cultural features, consisting of hearths, in association with at least two of the identified buried components. These components appear to represent multiple occupations of the landform for relatively short periods during the Middle Ceramic and possibly Late Ceramic periods. These test excavations have demonstrated the site's significance for a better understanding of the prehistory of the region. As the site will undoubtedly be destroyed by inundation, additional excavation will be necessary in order to preserve the information site 14HO308 contains. Currently, preliminary discussions are underway to achieve this purpose.

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Building a Regional Chronology for Southeast Kansas

H.C. Smith, University of Oklahoma

The research presented here began as an exercise in data accumulation and chronology building with the intended purpose of augmenting an archaeological database profoundly lacking due to the effects of both natural and cultural processes on the archaeological record. The research focuses on the locality of Wilson and Montgomery counties in southeast Kansas, as well as the broader culture area comprised of southeast Kansas, northeast Oklahoma, southwest Missouri, and a small part of northwest Arkansas.

Southeast Kansas is a region which has been occupied for at least twelve thousand years. Hunting and gathering populations lived in the valley between the Fall and Verdigris Rivers, intermittently or on seasonal rounds, for much of prehistory. Initially, the present research focused on the utility of surface collections in reconstructing a local chronology. However, the focus shifted throughout the course of the research to how the regional chronology was constructed, and the problems inherent in the defined sequence. The artifacts examined have helped establish a local chronology for southern Wilson County, Kansas, and to document additional components at a previously recorded site.

The goals of the initial research were to:

1) perform a survey of private artifact collections in the Neodesha, Wilson and Montgomery counties, area of southeast Kansas;

2) provide photographs to the Kansas State Historical society of artifacts collected off of known sites in order to provide a more accurate portrayal of these sites;

3) place the artifacts, based upon typology, into a regional chronology which has not previously been firmly established;

4) ascertain which cultural complexes are represented in the collections and document their presence in the area.

Typology is an important method for working with a surface collection. Because I was examining artifacts collected from the surface by an avocational, the use of typology was necessary in order to glean information

from the collection. The struggle over typology and its utility is ongoing, however it is recognized here that 1) types, as useful shorthand notations, create a metalanguage with which we may effectively communicate and organize data (O'Brien and Wood 1998: 360); 2) types are created in order to refer to specific morphological attributes which may be used to reference morphology alone (Steward 1954: 52; Thomas 1979: 222-225; O'Brien and Wood 2000: 360), temporal placement (Ford 1954:2; Steward 1954: 54; Thomas 1979: 222-225,1986: 619), cultural affiliation (Spaulding 1935:305), spatial distribution (Ford 1954: 2; Krieger 1944: 272; Steward 1954: 54), function (Krieger 1944: 272; Steward 1954: 54, 56), or a combination thereof; and 3) types are not real in and of themselves, and should not be imbued with properties they do not possess (O'Brien and Wood 1998:360).

It was a review of typology, in the context of goals three and four, which led to a perception of the need to reorganize and re-examine the local cultural historical sequence of Wilson and Montgomery counties. A review of the published site reports from Elk City Reservoir, Big Hill Creek, Big Hill Lake, Fall River and other reservoir and highway projects, as well as of site reports from most of eastern Kansas, northeastern Oklahoma, and southwestern Missouri, has established a comparative data base with which to place assemblages in the region into cultural-historical context. Through review of the literature, it became evident that the cultural historical sequence as it is presently understood and utilized in the Plains is not appropriate for southeast Kansas. This has led to what I see as a misinterpretation of the past due to a too rigid adherence to the present arbitrarily constructed temporal scheme.

In September of 2001, I began a survey of local collections in Wilson and Montgomery counties, Kansas, specifically of materials from the Neodesha area. The first collection examined was the Albion collection. Two sites represented in the collection were selected for analysis: the previously recorded Whitehair Bridge site, 14MY2328, and an as yet unrecorded site which the collector refers to as the Cuttsinger site (recording of the site is pending landowner permission). Diagnostics from each site were photographed, though, unfortunately, further information, such as debitage and flake counts and lithic material data, is at present unobtainable. Each site is dealt with separately, and is examined by time period. Both local and regional information is used for comparative purposes, in order to place the site components into both chronological and cultural context.

Tim Weston of the Kansas State Historical Society recorded site 14MY2328 during Phase II survey for the Southeast Kansas Highway Corridor project, undertaken prior to the construction of Highway 400. Site 14MY2328 lies on the Wilson and Montgomery counties line. Phase II survey of the site yielded only three diagnostic projectile points, and three diagnostic potsherds. These artifacts suggest a Middle Woodland/ Early Ceramic manifestation. Weston attributes the site to the Cuesta Phase, though he did suggest that there might be an Archaic component to the site (Weston 1993:223,224). The lack of artifacts recovered by Weston and his crew is not surprising in light of the site's notoriety among collectors, from Kansas and from surrounding states (Weston 1993:223).

The owner of the Albion collection states that he has collected for decades from 14MY2328. This site was selected for analysis so that information could be contributed to the existing site information on file at the Kansas State Historical Society, and with the hope that more information about the occupants of the site might be forthcoming. One hundred and twenty-eight diagnostic projectile points were photographed, and later classed according to type. In addition, forty drill fragments and one nearly complete drill, thirty-seven scrapers, three bifaces, three fragmentary and one complete alternately beveled knives, two potsherds, and a celt were also photographed.

Weston was quite correct in his inference that the Whitehair Bridge site has an

Archaic component. Site 14MY2328 appears to have been a favored habitation site in the Archaic. There are more than forty projectile points which are associated with the Archaic in the Albion collection from site 14MY2328, and at least twenty types were identified.

There are other components to this site as well. There are three Dalton complex points present in the collection from 14MY2328. The Dalton complex is not included in the sequence utilized by the Kansas State Historical Society for the area, though the Dalton complex occupied the temporal, and perhaps cultural, space between Clovis and the Archaic in the east, and Dalton points have been found in every county in Missouri (O'Brien and Wood 1998:73).

A Middle Woodland component may also be present at 14MY2328. There are only five types that can be attributed to the Middle Woodland in the Albion collection, all of which also occurred in the Archaic, and are therefore not diagnostic of a Middle Woodland component. However, two small potsherds were present, and these, in combination with the point types that persisted from the Archaic into the Woodland, may indicate a Woodland component at the site. When this sample is combined with Weston's sample, it appears likely that there is a Woodland component at the Whitehair bridge site, though whether this was a Cuesta Phase site or a Greenwood Phase site remains to be seen.

The Cuttsinger site is the second site selected for analysis. This is an as yet unrecorded site (site record pending landowner permission). However, due to the large number of artifacts, and the twelve thousand years of occupation they represent, the site is presented here prior to being assigned an official site number. The Cuttsinger site is located on a terrace of the Fall River, about a mile north of its convergence with the Verdigris River.

There are several components at the Cuttsinger site. The earliest of these is Paleo-Indian, represented by five point types, including five complete Clovis points. The five Clovis points were found at different times by the same collector, but in the same area which is reportedly less than five meters square. This reported location is in a depression, either natural or the result of borrow to create farm terraces in the past. Further investigations at the site are necessary to determine whether there may be cultural context still intact. Three other points: a Plainview point, a San Patrice point, and a Quad point are also present in the Albion collection from this site.

There are two Dalton points and one probable Dalton base present in the Albion collection from the Cuttsinger site. As stated above, this is noteworthy. The cultural historical sequence for Kansas does not make room for this component, yet Dalton points are obviously present in the eastern part of the state.

The Archaic is very well represented at the Cuttsinger site. There are forty projectile points/hafted knife blades from the Cuttsinger site that are attributable to the Archaic. These represent 19 types, though 3 of these types are the ubiquitous Gary, Carrolton, and Langtry points/knives which are not temporally diagnostic. There is also a large chipped stone biface which may have been utilized as an axe or hoe.

There are three Middle Woodland types present in the collection from the Cuttsinger site, and fourteen potsherds. Of the sherds, one is a grog tempered, orange slipped plain ware of the Cuesta Phase. Two sherds exhibit cross-hatching, and two have been cord-marked and then smoothed over. Two sherds have been heavily eroded. The remaining seven sherds are vertically cord-marked. All of the sherds are thick, and aside from the one Cuesta sherd, the temper is not distinguishable. The single Cuesta sherd is Middle Woodland, and the cross-hatching on two additional sherds is common to the middle Woodland. However, the vertically cord-marked sherds and the cord-marked and subsequently smoothed over sherds are problematic. Sherds of this description have been associated with both Greenwood (Middle Woodland) and Pomona (Plains Village) occupations. There are also five

projectile point types present in the collection which represent the Plains Village period.

The materials from the two Neodesha sites are similar to materials from several archaeological cultures identified in eastern Kansas. However, many of the materials present in the collection do not have identified counterparts in the southeast Kansas area. In order to gain a more accurate picture of prehistory in southeast Kansas, a broader regional perspective is necessary. The cultural historical sequence utilized for Kansas does not fit the archaeological record for southeast Kansas, as this area has Dalton Complex artifacts rather than Folsom. Many of the point types which have no local correlates are point types seen in southwest Missouri and Northeast Oklahoma, therefore examining these sites in terms of the identified Kansas phases and point types is informative, but not sufficient if we are to gain a better knowledge of the prehistory of the Neodesha locality, and the southeast Kansas area. The Neodesha materials were therefore compared to materials from southwest Missouri and northeast Oklahoma. The artifacts from 14MY2328 and from the Cuttsinger site were compared to similar materials from Oklahoma, Missouri, and in a few instances, to materials from Arkansas.

The archaeological record of the southeast Kansas area fits quite well with those of northeast Oklahoma, southwest Missouri, and northwest Arkansas. These latter areas are dealt with together by Sabo et al. (1990), but southeast Kansas is not included in their Ozark-Oachita Mountains culture area (with the exception of a discussion of the Cuesta Phase). Southeast Kansas should be included in studies of the Ozarks. The prehistoric inhabitants of the area adapted to riverine biomes in the Ozarks-prairie borderland much as the inhabitants of northeast Oklahoma, southwest Missouri, and northwest Arkansas did. The archaeological record reflects this similarity.

The region exhibits a great deal of continuity from the Archaic into and throughout the entire Woodland period. This is not a local phenomenon, but a regional one. Prehistoric cultures from this region exhibit similarities in artifact assemblages, similar settlement patterns, preferences for biomes in which several resource zones were easily accessible, and long term continuity of life ways. The material cultures changed slowly over time, and are quite similar across this Little Ozarks culture area.

Because southeast Kansas is a part of the Little Ozarks, the archaeological record in this area should be viewed through the same temporo-cultural lens through which the rest of the culture area is viewed. The first step toward this is the adoption of a more appropriate chronological framework with which to interpret the area. More reliable dates are needed in order to firmly establish the chronology of occupation of this area. Figure 1 outlines a proposed cultural sequence based upon the most recent dates from the area, alongside both the Plains and Missouri sequences.

A recognition of the continuum of occupation that defines southeast Kansas is necessary in order to avoid ideas of abandonment and re-occupation that are not applicable. A Plains cultural historical sequence is not appropriate for the southeast Kansas area. The material presented here suggests many avenues of future research, and it is my hope that future excavations will yield reliable dates in addition to further hints as to the origins and ultimate fates of the groups discussed here. A refined chronological sequence is but the first step toward understanding the archaeological record of this area. Recent archaeological theories, including interaction theory, offer much promise, and I am presently examining the Middle Woodland data from the area in terms of inter-group interaction. However, until more dates are obtained, interpretation will remain problematic.

	PLAINS (Griffin 1967:177)	POSSIBLE SEQUENCE FOR LITTLE OZARKS	MISSOURI (Chapman 1975: 27)	
1800			HISTORIC	1800
1600	PLAINS VILLAGE		LATE MISSISSIPPI	1600
1400			MIDDLE MISSISSIPPI	1400
1200		PLAINS VILLAGE	EARLY MISSISSIPPI	1200
1000		LATE WOODLAND		1000
800			LATE WOODLAND	800
600	PLAINS WOODLAND	MIDDLE WOODLAND		600
400				400
200			MIDDLE WOODLAND	200
A.D.				A.D.
B.C.				B.C.
500			EARLY WOODLAND	500
1000	ARCHAIC	LATE ARCHAIC	LATE ARCHAIC	1000
2000				2000
3000		MIDDLE ARCHAIC	MIDDLE ARCHAIC	3000
4000		EARLY	EARLY	4000
6000		ARCHAIC	ARCHAIC	6000
7000		DALTON	DALTON	7000
8000	PALEO-INDIAN			8000
9000		PALEO-INDIAN	PALEO-INDIAN	9000
10,000				10,000

Figure 1. Proposed cultural sequence for the Little Ozarks culture area.
Table format after Roper 1977: 14

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Geoarchaeological Survey of Kirwin National Wildlife Refuge, Northwestern Kansas: Application of GIS Method

Brad Logan, Museum of Anthropology,
William C. Johnson and Joshua S. Campbell, Department of Geography
University of Kansas

Introduction

The Museum of Anthropology at the University of Kansas began archaeological survey of Kirwin National Wildlife Refuge (NWR), Phillips County, Kansas in 1999 under a cooperative agreement between that institution and the Bureau of Reclamation, Great Plains Region. Kirwin NWR includes about 7,100 acres of land above the normal flood pool of the reservoir, which inundates a reach of the North Fork Solomon River and its tributary, Bow Creek. It is at the interface of the High Plains and Smoky Hills physiographic regions of north-central Kansas in an area of mixed-grass prairie.

Kirwin NWR is the fourth reservoir in Kansas to be the subject of archaeological investigations since the agreement was initiated in 1989. The others are Lovewell Reservoir in Jewell County, Norton (Keith Sebelius) Reservoir in Norton County, and Webster Reservoir in Rooks County. Surveys in these other areas, each consisting of less acreage than Kirwin NWR, succeeded in documenting 24 prehistoric sites at Webster (Logan and Pearson 2001), 38 such sites at Lovewell (Logan and Hedden 1992; Logan 1993, 1995), and 51 prehistoric sites at Norton (Logan et al. 2001).

It was disconcerting, then, to discover at Kirwin NWR a paltry number of prehistoric sites, most limited to small numbers of undiagnostic lithic artifacts. The senior author noted a clue to one possible explanation for this during the 2000 survey at a geomorphic site we call Genesis (see below). Here the exposure of buried soils along the principal stream suggested that some, indeed we now believe much, of the archaeological record at Kirwin is buried beyond the reach of traditional methods of surface survey. While such burial has been recognized in the central Plains for sites of early to mid Holocene age (i.e., Paleoindian to Middle Archaic) (Johnson and Logan 1990), our geoarchaeological investigations at Kirwin now indicate that this also applies to lowland sites of Late Prehistoric, perhaps even Protohistoric, age.

Archaeology

Our survey of about 6,000 acres of the project area and earlier surveys by the Smithsonian Institution and the Kansas State Historical Society have discovered 16 prehistoric sites. Of these, three are Woodland and three are suggested to be Late Prehistoric. Ten sites are light lithic scatters and isolated lithic finds of undetermined affiliation. The low number of sites could be attributed to the small size of regional prehistoric populations and their relatively mobile settlement pattern throughout the late Pleistocene and much of the Holocene. However, these factors would also hold for populations along the nearby South Fork Solomon River and Prairie Dog Creek where surveys of Webster and Norton reservoirs encountered a greater number of sites.

The paucity of ceramic age sites is surprising, particularly with regard to those of the Woodland period. Two well known sites of the Keith variant are in Phillips County: Woodruff Ossuary, a well documented mortuary site in the northern part of the county (Kivett 1953), and West Island (14PH10) in the project area. Recorded in 1951 by the Smithsonian Institution River Basin Survey, West Island was then on a terrace on the south side of the North Fork Solomon River. It yielded a modest assemblage of pottery and chipped stone tools. By the early 1960s, filling of the reservoir had raised the water level such that the site was confined to a small remnant of the terrace that, at maximum flood pool, is an island. Discovery of human remains at West Island in 1963 led to more intensive survey and limited profiling of wave-cut faces by the Kansas State Historical Society under the direction of Thomas Witty (Witty 1966).

In 1963 survey of the beach yielded more human remains, as well as ceramics, chipped stone and groundstone tools indicative of the Keith variant. Artifacts were also found within a buried soil exposed on the north and south sides of the island. The depth of this horizon was 4.6ft, or 1.4m. While evidence of Woodland occupation at West Island suggests a relatively high potential for other sites in the Kirwin reach of the North Fork Solomon River, only two other small sites of Woodland age have been recorded there. Given the few prehistoric sites on the Quaternary terrace in the project area and the ubiquitous nature of soils buried within the terrace fill, we decided to add a geomorphological component to our reconnaissance survey in 2001.

Geomorphological Investigations

The goal of our geomorphological research at Kirwin NWR is to determine the number, age, and context of buried soil horizons, correlate these with periods of

prehistoric occupation of the region, and present a predictive model of site locations. We will merge geomorphic and archaeological data in a Geographic Information System (GIS) format. That method allows graphic exhibition of relations between these data and an array of environmental and cultural factors and of their historical context with respect to water level fluctuations that affected site erosion and burial.

In our geoarchaeological work to date we have obtained geological descriptions of vertical exposures at 11 locations and dated buried soils at each. We have also collected cores with a trailer-mounted Giddings machine at 22 other locations, several of which also revealed buried soils. Nine of the vertical exposures are on the North Fork Solomon River and two are on Bow Creek. The ages of their buried soils cluster in five periods of soil formation: ca. 550-940 rcybp, 1300 rcybp, 1520-1750 rcybp, 2020 rcybp, and 2770-3060 rcybp. The soils are found at depths from one to over four meters and span Late Prehistoric to Late Archaic time. They suggest that evidence of occupation during that time may be found at comparable depths. Here we describe four locations that exemplify these soil forming intervals (SFI).

The youngest, SFI 1, is evident at West Island. Here aggradation of the lake bed since 1963 has buried the cultural horizon to a depth of nearly 70cm. We did not find artifacts during our exploration of West Island, neither during shovel testing of its surface, in our trench profile, nor in a soil core. However, in the profile and core we encountered a buried soil at a depth of 1.5m, approximately the depth of the cultural horizon that Witty described (i.e., 1.4m).

Given recovery of Keith variant artifacts within the soil (Witty 1966; KSHS photographic files), it is apparent that horizon was forming during the Woodland period (i.e., ca. 1500-1000 years ago). The clay and silt/clay fractions of samples from the upper portion of the A horizon yielded dates of 890±70 and 940±70 rcybp respectively, indicating the soil continued to form during the early years of the Late Prehistoric period. A large piece of wood found atop the buried horizon returned a date of 550±70 rcybp, indicating the surface on which it came to rest was exposed at that time. It is apparent then, that evidence of Woodland, Late Prehistoric, and possibly even Protohistoric occupation could be found where this soil is preserved elsewhere below the terrace of which West Island is a remnant.

As stated above, our research also entails interpreting the archaeological and geoarchaeological data from Kirwin NWR in a GIS environment. One aspect of this has been to portray the project area in a 3D drape of digital satellite imagery over topography. One such image shows West Island with respect to the water levels of Kirwin Reservoir in 1986 (1708 ft amsl) and 1994 (1729 ft amsl). Neither was a record elevation; the record high was attained in 1995 at 1737 ft amsl and the all time low occurred in both 1985 and 1991 at an elevation of 1695 ft amsl. A total range in water levels of 42 feet thus occurred within a span of only ten years. The vulnerability of the terrace fill containing the Woodland component, and likely others as well, is apparent in overlays of high resolution aerial photography, site locations, and water levels (Figure 1). High water levels have laterally eroded the island and buried what remains of its cultural horizon. Obviously, other areas of the terrace have been affected as well during the history of the reservoir.

SFI 2 and 3 are exposed at a location recorded as KRG-14 on Bow Creek. Pedestrian survey of the extensive terrace in its vicinity did not discover any prehistoric sites. Below this surface, however, the west bank of Bow Creek at KRG-14 contains two buried soils, one at a depth of 1.26m that dates to 1300±70 rcybp and the other at a depth of 3.05m that dates to 1600±70 rcybp. The upper horizon is assigned to SFI 2 and the latter to SFI 3. Both could contain evidence of occupation along Bow Creek during the Woodland period, roughly contemporary with that at West Island.

Geomorphic site KRG-01 is on the south side of the North Fork Solomon River in the upper portion of the reservoir. We call it 'Genesis' because it was the exposure the senior author noted in 2000 and where we initiated our geoarchaeological investigations last year. Buried soils at 'Genesis' include one at 2.04m below surface that dates to 1520±70 rcybp and another at a depth of 4.49m that dates to 2020±70 rcybp. The younger soil here is assigned to SFI 3, contemporary with the lower soil at Bow Creek. The older one is assigned to SFI 4. The latter could contain evidence of occupation during the transition from the Late Archaic to Woodland periods. Undated buried soils also exist at Genesis above that assigned to SFI 3.

Three soils were exposed at KRG-02, a short distance downstream from Genesis and, like it, on the south side of the reservoir. The lack of any soil development at the surface suggests the uppermost of these, at a depth of about 70cm, is the modern soil buried by recent alluvium. The middle soil, at a depth of 1.6m, dates to 1580±70 rcybp and the lowermost soil, at a depth of 2.3m, dates to 3060±70 rcybp. The younger of the dated soils is assigned to SFI 3, contemporary with the lower soil horizon at the Bow Creek site. The lowest soil, the oldest dated horizon yet documented at Kirwin, is assigned to SFI 5. The younger soil could contain evidence of Woodland occupation, particularly given its proximity to West Island; the older soil could contain evidence of Late Archaic occupation.

Ideally, a predictive model of archaeological site location would begin with a more adequate sample of known sites, but we have only the 16 prehistoric sites found to date. Their locations are shown in Figure 2 with respect to surfaces of Quaternary age: alluvium, terrace, dunes, and manmade. One Late Prehistoric site (14PH7) is associated with dunes and all others are associated with the terrace. A core extracted below the dune at 14PH7 revealed a soil at 4.84m below surface that may represent a period of soil formation older than that exposed at KRG-02, which dated to 3060±70 rcybp (i.e., soil formation interval 5). Thus, there is potential for discovery of an even more deeply buried record of Archaic occupation at Kirwin.

The most striking aspect of the site distribution is the low number of sites on the terrace along both the North Fork Solomon River and Bow Creek. Models provided by surveys elsewhere in the central Plains suggest that this is where we should find evidence of ceramic-age occupations (Johnson and Logan 1990). The scarcity of such sites at Kirwin suggests that the fill below the terrace there could be extensively mantled with historic alluvium, such as that seen at KRG-02, and that traditional surface survey and shovel testing would not be nearly deep enough to discover sites of relatively young (i.e., <500 years) age.

Conclusions

Based on our findings to date, we conclude that:

- buried soils range in depth from 1m to more than 4m;
- buried soils within the upper 4m of fill date from 3060±70 to 550±70 rcybp,
- ages of these soils correlate with the Late Archaic, Woodland and Late Prehistoric periods,
- depths of the buried soils preclude site discovery through traditional survey methods, including shovel testing to depths of 30-50cm

As stated earlier, our ongoing geoarchaeological research at Kirwin NWR will be presented in a GIS environment, including 3D representations of the project area that portrays the varying levels of the reservoir with respect to archaeological and geomorphic site locations and interpretation of the affects of these fluctuations. This approach is valuable for predicting the location and context of

prehistoric sites and it provides a management tool for their discovery and protection.

Note: This paper is based on one presented by the authors at the 60th (2002) Plains Anthropological Conference in Oklahoma City. A website version of that paper that includes illustrations of the geomorphic sites discussed, 3D satellite imagery with lake levels, etc. can be found at http://www.geog.ku.edu/resources/media.

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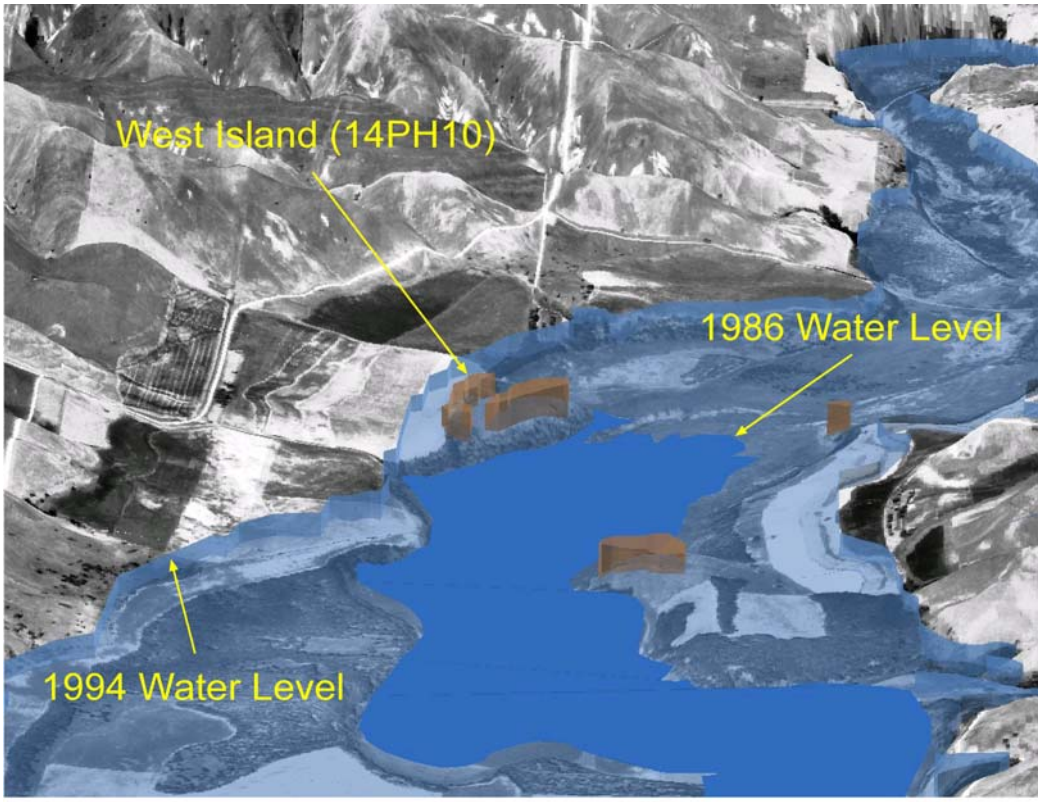

Figure 1: Overlay of 1-meter aerial photography on a digital elevation model of Kirwin NWR showing the location of West Island with respect to historically high and low water levels

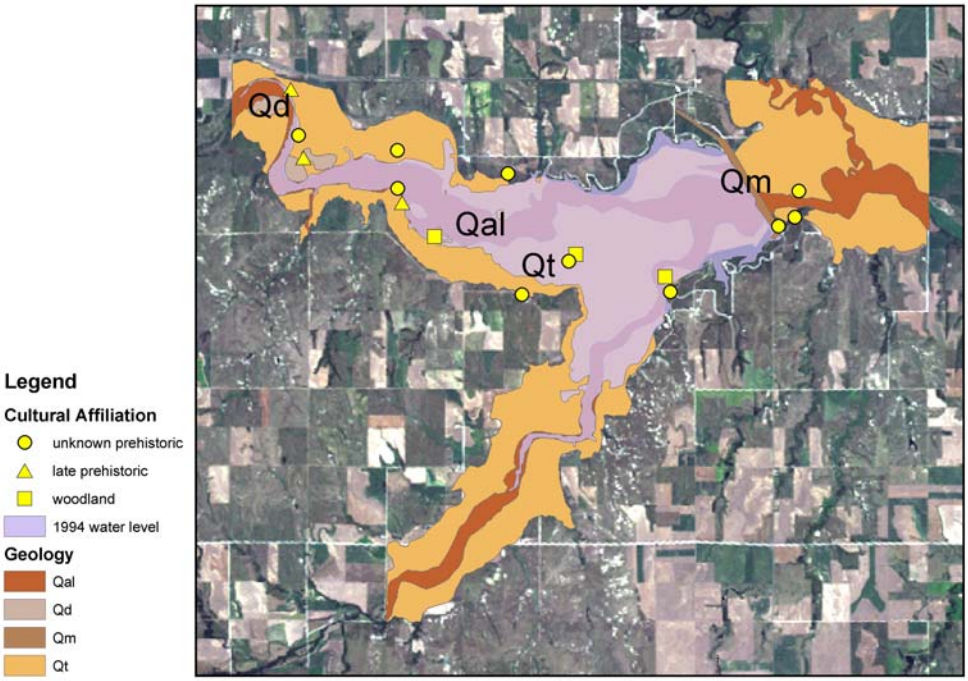

Figure 2: Quaternary geology at Kirwin NWR showing distribution of prehistoric sites and 1994 water level.

An Update on the Museum of Anthropology

Mary J. Adair, Museum of Anthropology, University of Kansas

After the University of Kansas announced budget cuts in June 2002 that eliminated positions at the Museum of Anthropology and closed the exhibit gallery, many of you let the KU administration know that you did not support such a drastic decision. Since then, many of you have asked me about the status of the collections at the Museum and the effect of the decision on undergraduate and graduate research opportunities. While I wish I could announce that the decision has been reversed, I can tell you that despite the unfortunate cuts, the Museum is open on a daily basis and research continues as usual. In fact, I want to take the opportunity this newsletter provides to let all of you know a few of the positive things that are happening at the Museum of Anthropology at the University of Kansas.

But first, a note about where we are. The Museum's home is in historic Spooner Hall, a wonderful sandstone structure built in 1894 as the University's first library. Today, over 12,000 ethnographic objects, over 1 million archaeological artifacts, staff offices, research laboratories, and graduate student research space co-exist in this building. Years of work, and grant support from a number of national programs, has upgraded collection care to professional standards and created a stable environment with a controlled temperature and humidity system. There are no plans to move the collections out of Spooner Hall or compromise curation standards in any way.

We are continuing work towards increased access to our collections by adding information to our recently redesigned web page (www.anthro@ku.edu). You can now search both the ethnographic and archaeological collections databases on-line. Access to these databases provides you with the opportunity to know what materials from specific archaeological sites or geographical areas are curated at the Museum. This level of information will hopefully lead to an increased use of the collections for research and provide a greater enrollment incentive for prospective students. The web page also contains images of items from the Museum research and teaching collections. Additional images, representative of other collections, are being taken and will be included in the near future. The Museum was recently awarded a grant from the University of Kansas, Digital Library Initiatives (DLI), to further this effort. This grant specifically focuses on producing digital images and associated descriptive information of over 2000 artifacts and 400 photographic records from five Kansas City Hopewell sites. This combined information will be formatted to be at home on the DLI website as well as the Museum's website.

The Museum received a wonderful donation last fall from a couple interested in supporting research on our pre-Columbian collections. You may have noticed that many of the first digital images to be put on our web page were of our pre-Columbian ceramics and stone objects. We will be working with John Hoopes (Associate Professor in Anthropology) to use this donation to support graduate student research on these collections, with a long-range goal of producing an exhibit highlighting the objects from Costa Rica, Panama, and Columbia.

The exhibit gallery will reopen this spring. Cases will display a variety of ethnographic and archaeological objects, as well as casts of early hominid remains. The gallery will be open Monday through Friday 9:00–5:00 to benefit and enhance the curriculum of several classes, including discussion sections. We also encourage visits

from the public and area schools during these times. We are in the planning stages of creating a grant proposal for a major exhibit, so please watch for further developments!

A conservation grant from the Institute of Museum and Library Services (IMLS) will help inventory and stabilize the Paleoindian faunal collections and re-organize space in Spooner Hall to provide more laboratory research space. Many of you attended the wonderful conservation workshop offered last fall by Julie Reilly, Director of the Gerald R. Ford Conservation Center, on the care of archaeological faunal material. We have been able to implement many of Julie's suggestions into the IMLS project. Associate Professor Jack Hofman's involvement with this project will assure that contextual information about these collections will be included in the databases and eventual web information.

Web access to information about the Museum and the collections serves a valuable purpose, but does not replace dedicated hands-on research. We have recently allocated space in Spooner to serve as a classroom for courses that utilize anthropological collections. By working with the Department of Anthropology and the College of Liberal Arts and Sciences, we plan to equip this space with necessary laboratory supplies and add a multi-media dimension. We have dedicated space in the recently vacated gift shop room for exhibit preparation, and will be finalizing plans to make this resource available to the Museum Studies program. We are also working with other departments and units at KU who have expressed an interest in using our collections in various classes and outreach programs. For example, the popular "Days of the Dead" exhibit was displayed in the Museum's gallery last fall, but was produced by the Center for Latin American Studies. A recent donation by a KU alum has been earmarked to support archaeological excavation and research. It is our plan to use this initial donation to designate a special research fund, thus making it possible for researchers at KU and elsewhere to secure small awards to help conduct research on the Museum's collections.

All of this work has been a product of team effort and cooperation. There is clearly more to be done to bring the Museum back to its former viable and productive unit with permanent professional staff. Thank you all for your past support and I hope I can count on your continued support as we move forward. Please visit us on the web, or in person at Spooner Hall.

Research Notes

Ceramic Sourcing Study Grant Received

Bob Hoard (KSHS) and Donna Roper (KSU) have been awarded a grant of up to $7,000 for neutron activation analysis (NAA) of pottery from archeological sites in western Kansas and Nebraska. NAA allows researchers to detect minute amounts of elements in materials such as stone and clay. This analysis lets researchers "fingerprint" specific source areas, assisting them in determining the sources for raw materials used to create artifacts and to trace prehistoric exchange routes.

A sample of 10-30 sherds each from seven archeological sites: Albert Bell 14SD305), Minneapolis (14OT5), two sites in the Medicine Creek drainage (25FT22, 25FT167), LeBeau (14NT301), the Kohr Houses (14SA414) and Coal-Oil Canyon (14LO1/401) will be analyzed using NAA and compared to previously

analyzed sherds and clay sources from Upper Republican sites in the Medicine Creek locality (Cobry 1999; Cobry and Roper 2002). These samples will be compared for similarity among and between sample groups. In the case of the Coal Oil Canyon materials, sherds will be selected representing different regional types to see if that variation is the result of pots moving to the site from different areas or if it simply is stylistic variation among potters at the site.

In addition to the artifact samples, 5 samples from clay sources in the vicinity of the Albert Bell site will be analyzed and compared against the sherds from that site to determine if they were locally manufactured.

The analysis will be conducted at the Missouri University Research Reactor (MURR), the nation's largest nuclear reactor dedicated to research (http://www.missouri.edu/~murrwww/). The grant money is provided by the National Science Foundation through MURR. This funding matches funds provided the Bureau of Reclamation under a continuing cooperative agreement with Kansas State University, under Roper's direction.

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--- Robert J. Hoard

Wallace County Research

From 1954 to 1959, an amateur archaeological group called the "Fort Wallace Dornic Club" (FWDC) took advantage of the extreme drought-induced erosion of the "Filthy Fifties" to assemble a collection of artifacts from archaeological sites located in the headwaters & upper sections of the Smoky Hill River basin. During site visits, the FWDC collected any artifact showing trace of human modification and curated them by findspot provenance signified by landowner name and/or landmark features. Since October 2001, I have worked with Jerome S. Bussen, one of the six original members of the group and the collection's curator, to organize the FWDC collection and translate these findspot designations into site locations on USGS quadrangle maps. As a result of this process, 76 discrete site locations have been identified within Wallace County, Kansas alone. Additionally, the FWDC collection includes artifacts from 33 other sites located in Logan (n=28 sites), Greeley (n=3 sites), Sherman (n=1 site), and Scott (n=1 site) Counties, Kansas; plus one site in Cheyenne County, Colorado. Out of the 110 positively identified sites with artifacts represented in the FWDC collection, only 16 had been previously recorded in the Kansas State Site File—14 with information supplied by FWDC informants.

My on-going M.A. thesis research at the University of Kansas is based on the analysis of chipped stone artifacts from the 76 archaeological sites located in Wallace County, Kansas by the FWDC survey. In addition to the FWDC collection artifacts, my sample includes 79 chipped stone artifacts from two site collections stored at the KU Museum of Anthropology and three Paleoindian projectile points from a private collection in Wallace County. In total, it consists of 1,393 chipped stone artifacts, including 255 projectile points plus 60 other tools with diagnostic potential.

Only a few sites in Wallace County have been even test excavated, and, to the best of my

knowledge, no radiocarbon assays have been obtained as a result of this limited fieldwork. Since a chronological framework is a prerequisite for investigating patterns of culture change, my preliminary objectives are 1) to describe & classify projectile points and other diagnostic artifact types present in the sample using a combination of digital imaging and attribute analysis, and 2) to define a provisional cultural chronology by cross-dating types found in Wallace County with radiocarbon-dated types from adjacent regions. Ultimately, my goal is to use this framework to investigate inter- and intra-type variability in metric & non-metric attributes within the temporally ordered sample. Non-metric analysis of the non-diagnostic chipped stone artifacts sample will focus on lithic material usage at the county, site, and tool type scales, and is intended to provide a comparative baseline for future research.

The FWDC collected these artifacts with the hopes of reaching a better understanding of the archaeology of Wallace County. At the time, they were frustrated in that effort by the lack of research directly pertaining to their study area. Cultural chronologies and artifact typologies developed by the Smithsonian River Basin Survey for the central and eastern portions of the Plains fit poorly in the High Plains then, and still do. It is my hope that this and future collections-based research will help refine what is known about High Plains cultural chronology and provide motivation for field-based investigations.

--- Janice McLean

Another Pawnee Site in Kansas?

In 1907, Nebraska archaeologist E.E. Blackman paid a visit to the Kansas Monument Site, or Pawnee Indian Village, in Republic County, Kansas. As he left the site, he went to another location a couple miles up the Republican River, still in Republic County, Kansas, where he indicated another "village" was located on the bluff top overlooking the river valley. In the vicinity of a spring below the site he found at least one artifact he attributed to the Pawnee. His hints about the nature of the site on the bluff top are tantalizing, but also somewhat ambiguous. He referred to it as a "Stone Age" site (Blackman 1907:349-350). Blackman knew a Pawnee site when he saw one, since he had been visiting many of the historic Pawnee sites in Nebraska for several years, so the fact that he declined to explicitly identify this site as Pawnee may be indicative. On the other hand, he said that house rings had been reported around there. The Kansas state site files do not show a site at this location or contain any further information, and the aerial imagery available on Terraserver is not conclusive: some circles do appear, but their signature does not match that of the known lodges at either the Pawnee Indian Village or the cultivated Hill or Pike-Pawnee village site upstream near Guide Rock, Nebraska.

Intrigued by Blackman's report, however, Pawnee Indian Village Museum curator Richard Gould in the summer of 2002 learned that the owner of the property has a collection from the area and asked him to bring his collection to Artifact Identification Day at the Pawnee Village. The landowner did so. The collection contains pottery that is easily identifiable as Pawnee, or Lower Loup. The collection is somewhat mixed, containing some material from the Pawnee Indian Village site, as well as material from outside Kansas, but the owner avers that the pottery is from the location above the spring on his property. He gave permission to go look at the location, but with the temperature hovering near 110º that day and other business to attend to, the expedition was deferred.

On January 6, 2003, however, Richard Gould, Ryan Klute, and Donna Roper finally went to the site location. In spite of crop stubble and extremely dry soils, we rather quickly found the site Blackman described. In around two hours of walking on and around the site, and conducting intense surface

inspection, we were unable to find any pottery or diagnostic artifacts of any other kind. We did, however, find a considerable quantity of debitage and a couple of biface fragments. The landowner and his nephew indicated a second area, a short distance to the south, where they had also found material. Our inspection located a single flake there. The urge was great to probe with an Oakfield soil sampler or to shovel test, but the extremely dry soils repelled even pin flags. Obviously, it is desirable to return to the area after it has received some precipitation. Aerial photographs, taken at the beginning of the growing season with false-color infrared film, might help settle the question of the reported lodge rings.

The implications of finding a second Pawnee site in this general vicinity would be very interesting. At the present time, though, we do not have conclusive evidence that this is a Pawnee, or, perhaps more properly, Lower Loup phase, site. Then again, we cannot rule it out, either. A site form has been submitted (14RP326), so that nearly a century after Blackman reported the location, it is finally accounted for in the state files. The next step will be to try again to determine its cultural affiliation, whether that be Pawnee or something earlier.

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--- Donna C. Roper