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Contents

The KANSAS Anthropologist

Journal of the Kansas Anthropological Association

Kansas Anthropological Association

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PUBLICATIONS

Each year members receive four issues of the *Kansas Anthropological Association Newsletter* (ISSN 1069-0360) and one journal, *The Kansas Anthropologist* (ISSN 1069-0379). They also receive six issues of *Kansas Preservation*, the newsletter of the Cultural Resources Division of the Kansas State Historical Society. All members and interested individuals, professional or amateur, are invited to submit material to the editors for use in these publications. Back issues of the journal or newsletter, if available, may be ordered from the Historian-Recorder at the address listed above. Prices will be furnished upon request. Abstracts of *The Kansas Anthropologist* are posted on the KSHS web site at www.kshs.org/publicat/anthropologist.

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A Caddoan-style Sherd from Marion County, Kansas: Surprising Results from Compositional Analysis

Harold Reed (deceased)
Salina, Kansas

Robert J. Hoard
Kansas State Historical Society

Robert J. Speakman
Michael D. Glascock
University of Missouri

The Kansas Anthropologist 26:1-7

This is a report on a sherd that exhibits characteristics common to pottery from the Caddoan region, recovered from a Great Bend aspect site (14MN306) in Marion County, Kansas. The authors used neutron activation analysis to determine the geographic source of the sherd but were surprised to find that it does not compare to pottery from the Caddoan region or any other region from which sherds have been analyzed by this method. It is recommended that local pottery be analyzed to determine if the Caddoan-style sherd is a copy produced by the Great Bend inhabitants of 14MN306.

Foreward

By Harold Reed

The subject of this paper is a single small ceramic sherd that I found more than 30 years ago. The sherd has the characteristics of Caddoan pottery more typically found in eastern Oklahoma and Texas, western Arkansas, and northwestern Louisiana. This little piece of clay is a traveler. Imagine that it started in the north about 500 years ago as a complete vessel and passed through uncounted hands, traveled over a rocky route for who knows how long to end up in central Kansas. If it arrived in one piece, then it suffered a crushing blow at what later became 14MN306. For years the piece lay in and on the ground until I picked it up in the early 1970s. I brought it to Salina, cleaned, and catalogued it; then it lay in my collection for 30 years. I knew it was unusual, and I wanted to get it written up but just had not done it.

During the 2004 Kansas Archeology Training Program field school, I was a student in an Archeological Report Writing class, taught by Bob Hoard and Marsha King. I brought the sherd with me to field school, and, when Bob Hoard saw it, he encouraged me to get the story in print; so, here we are. Now the sherd has done some more traveling, which has yielded surprising results.

Description of 14MN306

An apparent Caddoan sherd was found by the senior author near Marion, Kansas, on the surface of a protohistoric Wichita, or Great Bend aspect, site (14MN306), which was probably occupied about A.D. 1500. The site originally was recorded in 1962 by Tom Witty, now-retired state archeologist with the Kansas State Historical Society.

It is likely that local collectors M. O. Billings and

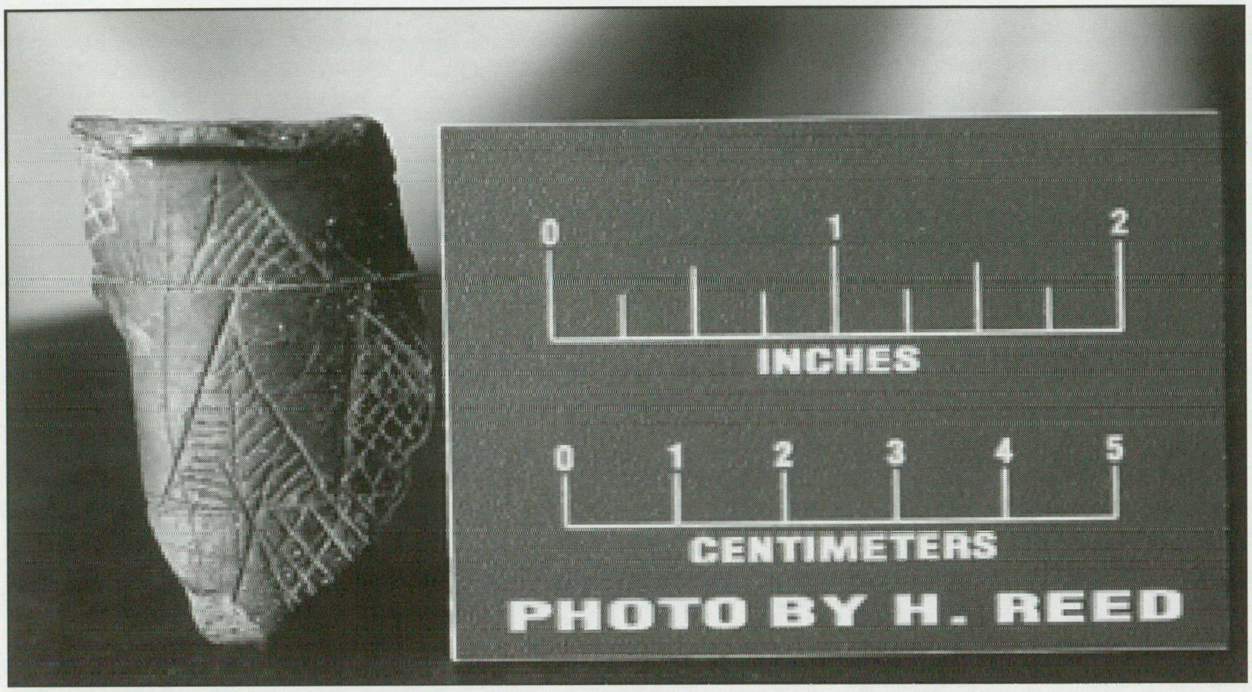

Figure 1. Photograph of the 14MN306 sherd that exhibits Caddoan characteristics.

Edwin Curtiss first excavated the site in 1879 under the sponsorship of F. W. Putnam of the Peabody Museum (Wedel 1959:498-499). These men also opened several mounds in the vicinity. Recovered items included typical Great Bend aspect artifacts and glass beads, the latter of which had to be trade items.

Site 14MN306 is rather large, encompassing several acres, which is typical for Wichita sites. It is located on a high terrace on the left (south) bank of a small creek, well above flood level of the creek, which flows southwest into the Cottonwood River. The surface is scattered with grey Permian-age chert from the nearby Flint Hills. Some Alibates agatized dolomite from Texas, Tahlequah chert from Oklahoma, and lots of Maple City and Kay County chert from the Kansas-Oklahoma border at the lower end of the Flint Hills are present, as well as chert from several other sources. Heat-treating of the Maple City chert appears to have been a common practice, as shades of pink chert from that quarry are plentiful.

Stone tools recovered from this site include small plain triangular and occasional side-notched arrow points, end and side scrapers, double beveled knives, and drills. Other lithic tools include a quartzite celt, large biface sections, and a hammerstone. One sandstone shaft abrader section completes the stone inventory. The surface of the site was littered with small pieces of limestone, which were left in place.

The ceramic sample obtained, like the lithic sample, is so small a number that it cannot be an accurate representation of the site; however, the authors worked with the available material and hope that it is not too far astray. The pottery of local manufacture included in this study are 34 body sherds, 4 rim sherds, and 2 handles. The exterior colors range from burnt orange to brown to gray-brown to black. The interior or core color of all the ceramic samples is dark gray to black. The temper of all the sherds is a mixture of crushed sherds, very fine sand, crushed mussel shell, and crushed limestone. Some sherds have an abundance of this temper, while others have a minimum of any temper at all.

The four rim sherds are small but appear to have had a vertical orientation on the pot. Three of the rim sherds are plain; one has smoothed cord marks. Their thicknesses range from 5 to 6 mm. No shoulders are present on any of the sherds, and so no rim heights can be determined. One lip sherd has a round top edge, with 45-degree, v-shaped indentations pressed into the wet clay about 45 mm apart. Two sherds have smooth rounded lips, and the fourth rim sherd has a flattened lip with a small roll of clay turned to the exterior of the vessel.

Two handle fragments are present in the collec-

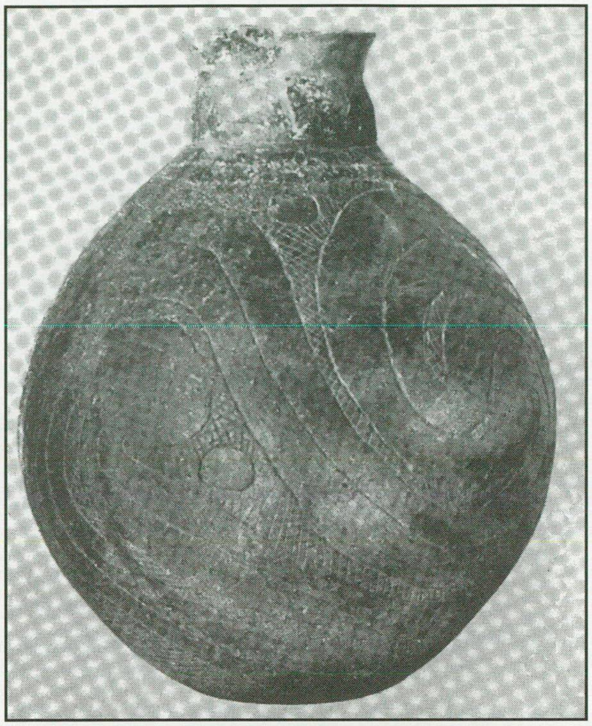

Figure 2. A Hodges Engraved bottle from the Adair site in Garland County, Arkansas (Suhm and Jelks 1962:Plate 38 l).

tion. One shows evidence of being fastened to the vessel by riveting; there is nothing present to indicate the fastening method on the other. This small pottery collection from the site is consistent with Great Bend aspect pottery in the area.

Caddoan Sherd from 14MN306

With that rather short sketch of the site and its history and a look at a few of its artifacts, the authors now turn to the primary subject of this paper: a small ceramic vessel sherd. The sherd has an exterior color of gley chart 1 2.5/N black and an interior color 10YR5/3 brown in the Munsell system. The interior has a very fine paste, and tempering is fine sand and crushed bone (Timothy Perttula, personal communication). The sherd measures 51 mm vertically, 33 mm horizontally, and 5 mm thick, and it weighs 11.0 g. By extending the curve of the sherd, the inside diameter is estimated to be 43 mm, and the outside diameter is nearly 50 mm (Figure 1).

Fortunately for diagnostic purposes, the sherd from 14MN306 is from a vessel rim. This fragment indicates that the vessel had a tall cylindrical neck with a bulbous bottom of uncertain size. Figure 2 shows a Caddoan Hodges Engraved vessel that serves as a model for the assumed vessel shape. The lip appears to have had at least one small lug, the function of which is unclear. The sherd is decorated with fine engraved lines, that is, lines cut into the pottery surface after it had been fired; this is distinct from incised lines, which are made in wet or leather-hard clay. The engraved decorations consist of lines contained within five triangular zones, which have one leg of the triangle sitting on a horizontal line that probably encircled the neck of the vessel. Two of these horizontal lines are present on the sherd (Figure 1).

Inspection of the sherd or photographs of the sherd by several archeologists with expertise in Caddoan ceramics led to general agreement that this sherd has the appearance of being from a Caddoan bottle. Such bottles are found throughout the Caddoan range and were traded to neighboring groups. However, they noted that the pattern of engraved designs is rare to nonexistent on Caddoan bottle necks.

Caddoan Pottery Overview

In referring to Caddoan pottery, the authors are describing pottery made by a group of southern Caddoan-language-speaking people who lived in eastern Texas and Oklahoma, western Arkansas, and northwestern Louisiana between about A.D. 800 and 1800 (Perttula 1997:3-9; Perttula et al. 1995; Story 1990) (Figure 3). Caddoan social order was ranked, with some people having higher status than others. This is reflected in variation in the organization of villages, methods of burial, and material wealth. Caddoan cultural developments parallel those of their Mississippian neighbors to the east in the Mississippi River valley. Readers are urged to read Timothy Perttula's *The Caddoan Nation* (1997) for a thorough introduction to Caddoan studies and to consult Perttula et al. (1995:176-189) for descriptions and illustrations of Caddoan pottery.

Distinct Caddoan pottery appears around A.D. 800 (Perttula et al. 1995:177; Story 1990:247). As might be expected from a prehistoric group with ranked social classes, Caddoan pottery exhibits a high degree of variation and includes a number of well-made wares that are identifiable, more or less, to specific time periods and regions. A distinction can be made between utilitarian and fine wares. Caddoan utilitarian wares typically are simple bowls or jars. They are relatively thick, have coarse temper, and have minimal decoration, at least when compared to the fine wares. The fine wares exhibit a wide array of vessel types, some quite complex, including bowls and long-necked bottles. They have distinct decorative

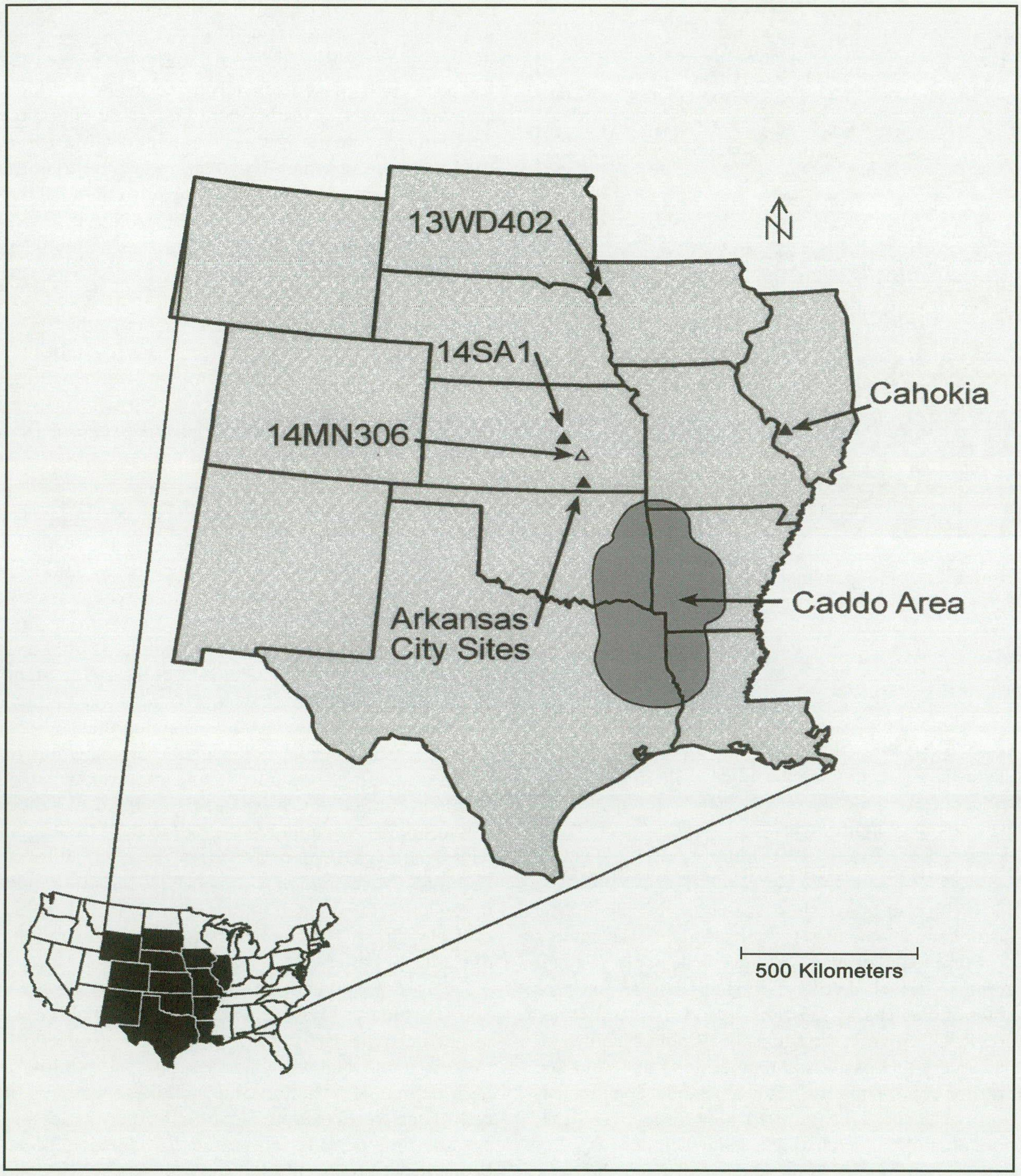

Figure 3. The Caddoan area and locations of selected sites outside of the Caddoan area where sherds with Caddoan characteristics have been found.

motifs, created by techniques that include brushing, trailing, incising, and, commonly, engraving. They frequently are slipped, polished, or burnished. Fine wares are thin and have finely crushed temper—bone or grog early and shell in some regions after A.D. 1200 or 1300 (Perttula et al. 1995:177; Story 1990:247). Early Caddoan fine wares are fairly homogeneous over their range of distribution. Vessel shapes and decorative motifs of later Caddoan wares are distinctive to particular river or creek valleys. Some of the variety of vessel shapes and decorations is illustrated in Perttula et al. (1995:178-181).

After A.D. 900 Caddoan fine wares are found far from their places of origin in the Midwest and Southeast (Perttula 2002:91). Researchers recovered a fragment of a Caddoan Holly Fine Engraved taper-necked bottle from the Siouxland Sand and Gravel site (13WD403), a Mill Creek culture cemetery in eastern Iowa (Anderson and Tiffany 1987). Pottery with Caddoan features also has been found at the well-known Mississippian Cahokia site (11MS38) in west-central Illinois (Bareis and Porter 1965; Holley 1989) and in southwestern Missouri (Chapman 1980:140-141; O'Brien and Wood 1998:267, 270).

In Kansas a Caddoan sherd was recovered from the Salina Burial Pit (14SA1), located about 75 kilometers northwest of 14MN306 (Roper 2006). This is a Smoky Hill phase (ca. A.D. 1000-1400) burial site. One radiocarbon assay on maize from 14SA1 dates the burial mound to A.D. 1039-1104 (2 sigma calibration using CALIB 4.3, corrected radiocarbon age 870±40 RCYBP). Smoky Hill is a Middle Ceramic period group, probably ancestral to the Caddoan-speaking historic Pawnee. The Caddoan sherd from 14SA1 was identified by Wedel (1959:520) as Crocket Curvilinear Incised. A small section of a clay human effigy pipe was recovered from a house associated with the burials at 14SA1. Wedel (1959:515) assumed that the pipe fragment was also of Caddoan manufacture.

Another 18 Caddoan sherds were recovered from 5 of the 7 Great Bend aspect sites near Arkansas City, Kansas, excavated by the Kansas State Historical Society between 1994 and 1996 (Perttula 2002; Perttula, Hawley, and Scott 2001). A full report on this project is nearing completion. Site 14MN306 is located about 140 kilometers due north of the Arkansas City area sites (Figure 3).

Seven Caddoan sherds from five of the Arkansas City area Great Bend aspect sites were analyzed using neutron activation analysis (NAA). This analysis showed that the Caddoan sherds came from the Red River and Big Cypress Creek valleys of eastern Texas (Perttula 2002; Perttula, Hawley, and Scott 2001).

Neutron Activation of the 14MN306 Sherd

Given the success of the NAA in determining the source of the Arkansas City Caddoan sherds, the sherd from 14MN306 was submitted to the Missouri University Research Reactor (MURR) for NAA analysis in an effort to determine its source. NAA has been used to determine the chemical composition of pottery with high precision and accuracy, thus allowing researchers to determine the source of tradewares. (See Glascock 1992 and Neff 1992 and 2002 for more detailed information on the application of NAA to determining ceramic artifact sources.)

Earlier work conducted on more than 800 sherds from the Caddoan homeland demonstrated that NAA can be used to determine 10 chemically distinct source areas (Descantes et al. 2004; Perttula 2002). It was assumed that NAA would be able to match the chemical composition of the 14MN306 sherd to that of one of these Caddoan source areas. The results are surprising: the sherd is distinctly different from all previously analyzed Caddoan pottery, as illustrated in Figure 4. Furthermore, comparison of the chemical composition of the 14MN306 sherd to the entire MURR database of more than 39,000 samples found that it did not match any previously analyzed pottery or clays.

What, then, is the source of this engraved sherd from Marion County, Kansas? It is possible that a local potter used her skills to create a replica of a valuable trade ware. If that is the case, she did a good job, because only sophisticated techniques demonstrated that the vessel in all likelihood is not from the Caddoan area. This would not be the first time that this has happened. Wilson (1999:98-100) reported that a sherd with decorations similar to Caddoan Holly Fine Engraved that was found in the American Bottom of western Illinois probably was made locally, as revealed by petrographic analysis. He suggested that Caddoan-style wares found at Cahokia also might have been locally produced. Another possibility is that the sherd is not prehistoric at all, but a fake planted on the site. This seems unlikely, as the sherd was in the possession of the senior author since the 1970s and the site is not frequently visited.

The matter of the origin of this distinct, engraved, bone-tempered ceramic bottle sherd remains unsolved for the time being. Considering the probable presence of locally made Caddoan-style pottery in the American Bottom and Cahokia, it is possible that a person from the Caddoan homeland—a spouse or a captive—was resident at 14MN306 and produced the vessel that yielded the sherd under discussion. This person may

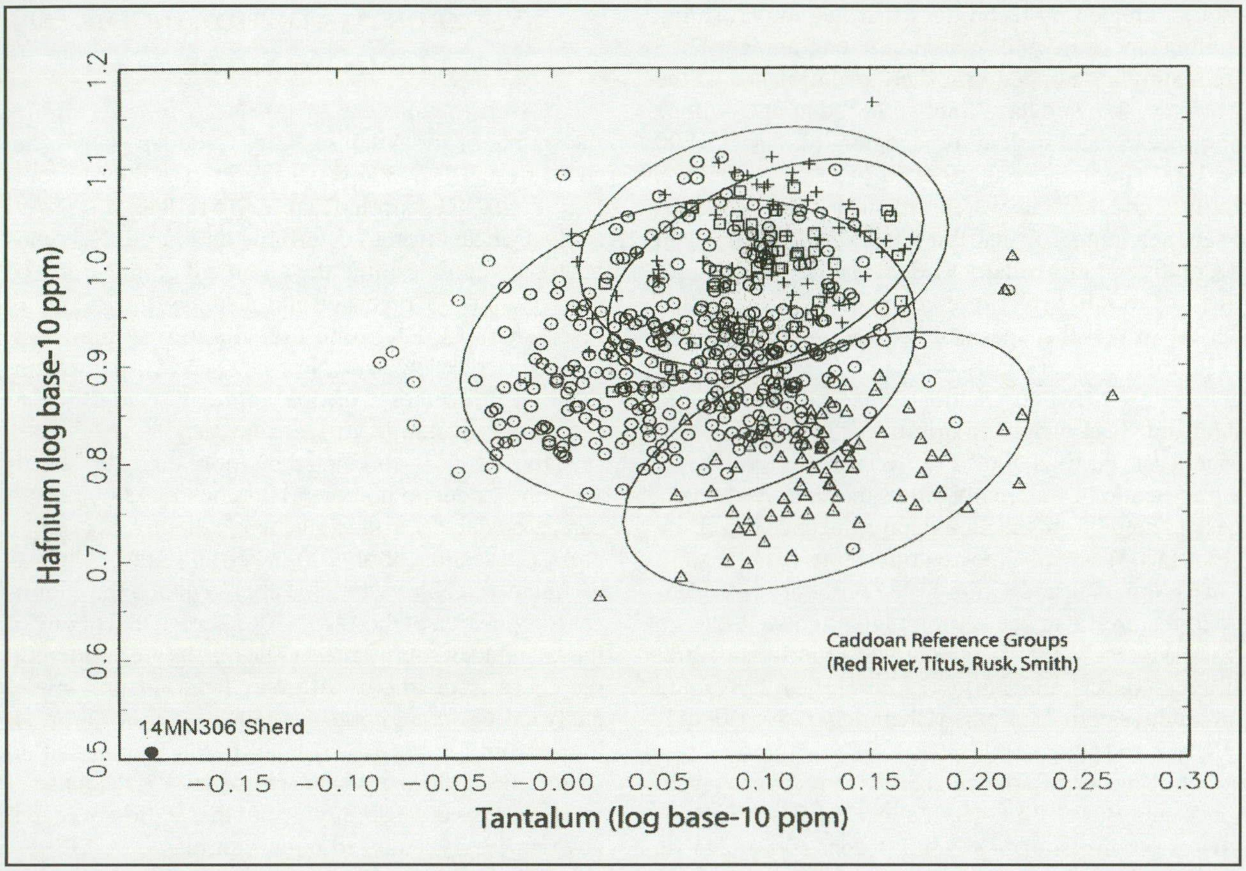

Figure 4. Bivariate plot showing sherds from the Caddoan area and the sherd from 14MN306. While the sherds analyzed using NAA from the source area cluster into discrete groups, based on the amounts of the trace elements hafnium and tantalum that they contain, the sherd from 14MN306 shows a very different chemical composition. The result of this analysis is confirmed using other elements as well.

have used local clays to create the vessel; thus, its chemical composition, as determined using NAA, does not match the clays of the Caddoan area. One possible method of determining whether the sherd was produced from local clays is to analyze pottery with similar paste from the site, if such sherds exist. In the absence of other bone-tempered wares, petrographic analysis might be useful in examining the clay bodies of the Caddoan-like sherd and other sherds from the site. Examination of the clay's inclusions other than the temper might show a match among the different sherds. But for now, the origin of this well-made bottle fragment remains a mystery. Who knows—maybe it has farther to travel before its journey is done.

Acknowledgments. Timothy Perttula, (Archeological & Environmental Consultants LLC, Austin, Texas), Ann Early and Frank Schambach (Arkansas Archeological Survey, Fayetteville, Arkansas), and Jeff Girard (Northwest State University, Natchitoches, Lousiana) commented on the sherd and its possible relation to Caddoan groups. The KAA's John Reynolds Memorial Research Fund funded this analysis.

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2006 *The Whiteford Site, or Indian Burial Pit: A Smoky Hill Phase Cemetery in Saline County*. Anthropological Series No. 18. Archeology Office, Kansas State Historical Society, Topeka.

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Notes

Addendum to an Annotated Bibliography of Great Bend Aspect-Wichita Archeology and Ethnohistory

Marlin F. Hawley
Wisconsin Historical Society

The Kansas Anthropologist 26:9-12

This addendum to An Annotated Bibliography of Great Bend Aspect-Wichita Archeology and Ethnohistory*, published in The Kansas Anthropologist (24:107-145) in 2003, includes items that were either overlooked or published after it went to press.*

Adair, Mary J.
2000 Tobacco on the Plains: Historical Use, Ethnographic Accounts, and Archaeological Evidence. In *Tobacco Use by Native North Americans: Sacred Smoke and Silent Killer*, edited by Joseph C. Winter, pp. 171-184. University of Oklahoma Press, Norman.

Adair reviews ethnographic accounts of use of tobacco by Plains Indians, including the Wichita, and the archeological evidence for its use as far back in time as the Woodland era. In late pre-contact times there is evidence of its use at the Mem site (14MN328) and at least two of the Lower Walnut sites near Arkansas City (i.e., 14CO501 and 14CO382).

2003a Great Plains Paleoethnobotany. In *People and Plants in Eastern North America*, edited by Paul E. Minnis, pp. 258-346. Smithsonian Institution, Washington, D.C.

This is a sweeping review of the paleoethnobotanical record for the Great Plains from the Paleoindian era to late pre-contact times. There is information about the use of maize and other cultigens by the Great Bend aspect peoples, including evidence suggesting an increased reliance upon the former.

2003b Great Bend Archaeobotanical Remains. *Current Archaeology in Kansas* 4:22-23.

Overview of archaeobotanical remains recovered in 1990s from eight Lower Walnut phase sites near Arkansas City, Kansas. Among the species identified are maize, beans, squash, sunflower, marshelder, goosefoot, pigweed, plum, cherry, grape, little barley, spurge, dropseed, black walnut, and tobacco. The presence of domesticated marshelder suggests that the use of this plant did not die out in the late pre-contact era as previously suspected. See also Adair 2000, 2003a.

Blakeslee, Donald J.
2003 A Meteor, A Mirror, A Metaphor. In *A Deep-Time Perspective: Studies in Symbols, Meaning, and the Archaeological Record*, edited by John D. Richards and Melvin L. Fowler, pp. 96-106. *The Wisconsin Archeologist* 84(1&2).

This brief, provocative essay explores the role of mirrors and their associations with meteors, in particular. Within this context Blakeslee briefly touches on the distribution of chain mail fragments on early historic Wichita sites in central Kansas.

Figure 1. Stacked limestone grinding slabs excavated in Pit Feature 828 at the Killdeer site (14CO501) in 1994. (Photograph by Marlin F. Hawley.)

2004 The Stauffer-Allison Collection. *Current Archaeology in Kansas* 5:52.

This brief notice about the donation to Wichita State University of a major, well-provenienced collection from sites in McPherson County includes some with Great Bend cultural affiliation.

Blakeslee, Donald J., and Marlin F. Hawley
2006 The Great Bend Aspect. In *Kansas Archaeology*, edited by Robert J. Hoard and William E. Banks, pp. 165-179. University Press of Kansas, Lawrence.

This overview of the Great Bend aspect, includes information on settlement patterns, structures, burial, and material culture.

Butler, Todd L., Christopher M. Schoen, and Susan E. Butler
2004 *Phase III-IV Archaeological Data Recovery Investigations at Site 14CO1310, Cowley County, Kansas*. Louis Berger Group, Inc., Marion, Iowa. Submitted to Kansas Department of Transportation, Topeka.

This is a contract report on investigations of a multi-component site on Grouse Creek in Cowley County, Kansas. The site had a Great Bend aspect component, although it could not be differentiated stratigraphically from Early Ceramic deposits.

Drass, Richard E.
2004 Salvage Excavations at Bryson-Paddock, a Wichita Village in North-Central Oklahoma. *Oklahoma Archeological Survey Newsletter* 23(2):1-3.

This article reviews a salvage dig conducted at the Bryson-Paddock site (34KA5). The paper offers a brief overview of the site and its place in post-contact Wichita history.

2005 2005 Remote Sensing at the Bryson-Paddock Site, 34KA5. *Oklahoma Archeological Survey Newsletter* 24(4):1-3.

Remote sensing at 34KA5 in 2005 revealed the presence of pits, hearths, mounds, and suspected structures, providing new information on the intensity of occupation.

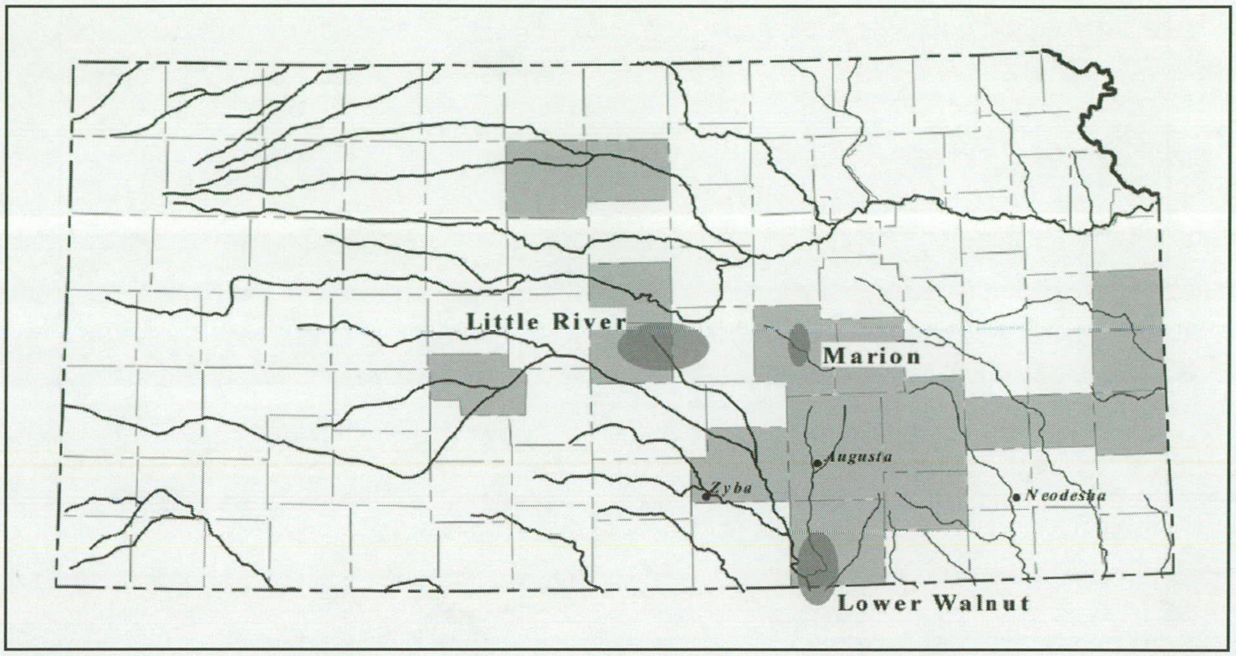

Figure 2. Location of village clusters and isolate sites mentioned in the text. Counties known to contain Great Bend hunting camps are shaded. (p. 165, *Kansas Archaeology*, edited by Robert J. Hoard and William E. Banks, published by the University Press of Kansas. Used by permission of the publisher.)

Hawley, Marlin F.
2004 The Arkansas City Country Club Site and Europeans in the Middle Arkansas River Valley. *Oklahoma Archeology* 52(3):17-29.

This paper presents information on an amateur excavation conducted at the Arkansas City Country Club site (14CO3) in 1917. Among the finds were gunflints and other post-contact artifacts. It is argued that these finds hint at overlap with the terminal occupations of the Lower Walnut sites and Bryson-Paddock and Deer Creek in Oklahoma, although short-term, post-abandonment use of the site by Wichita groups is also a possibility.

Hawley, Marlin F., and Martin Stein
2005 European-Contact Goods in the Lower Walnut Settlement, Kansas: An Update. *Plains Anthropologist* 50(193):73-76.

This short paper corrects and adds to the information presented in 2000 in an article in *Plains Anthropologist*. The meager record of contact goods (mostly beads) cannot be attributed definitively to either Spanish or French for the most part; however, a gunflint and other gun parts from a 1917 dig at the Arkansas City Country Club site (14CO3) suggest contact with the French.

Perkins, Stephen
2004 Radiocarbon Dates for the Bryson-Paddock Site, 34KA5. *Oklahoma Archaeology* 52:26-58.

This is a brief discussion of recent radiometric ages from the Bryson-Paddock site. The ages affirm the early- to mid-eighteenth-century placement of the site, based on beads and other contact goods, although there are dates that predate this era. See Drass 2004, 2005.

Steen, Charlie R., and John O. Littleton
1955 *A Survey of Archeology and History in the Arkansas-White-Red River Basins*. National Park Service, Washington, D.C.

While not as inclusive as its title might suggest, this report does have some information about the Arkansas City Country Club site, including photographs of both the 1916 dig and later finds at the site. See Hawley 2004.

Sundermeyer, Scott
2005 *Economic Specialization and Storage Pit Use at Crandall (14RC420), A Protohistoric Wichita Site of the Little River Focus in Rice County, Kansas*. Unpublished M.A. thesis, Department of Anthropology, University of Oklahoma, Norman.

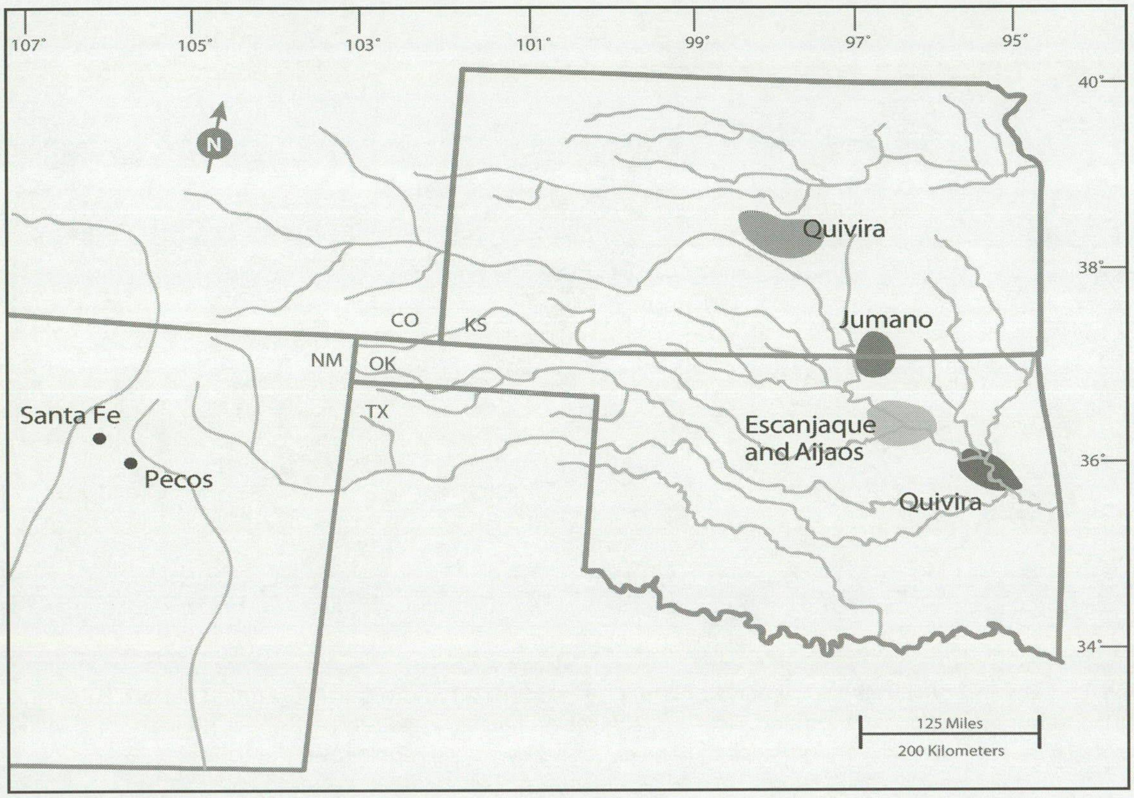

Figure 3. Wichita of A.D. 1650-1700. (p. 213, *Kansas Archaeology*, edited by Robert J. Hoard and William E. Banks, published by the University Press of Kansas. Used by permission of the publisher.)

This study explores economic specialization at the Crandall site (14RC420). Results of the analysis do not confirm specialist production at the site. There is some evidence of a commitment to processing hematite, silicified siltstone, and scapula hoes. Most material is associated with generalized subsistence activities.

Thies, Randall M.
2004 Waterway Discoveries at the Malone Site (14RC5). *The Kansas Anthropologist* 25:125-143.

Thies reviews data recovery work conducted in 1996 during waterway construction at the Malone site (14RC5). Several trash-filled storage pits were excavated and a radiocarbon age bracketed the occupation between A.D. 1432 and 1657.

Vehik, Susan C.
2003 Islands and Patches on the Plains. In *Islands on the Plains, Ecological, Social and Ritual Use of Landscapes*, edited by Marcel Kornfeld and Alan J. Osborn, pp. 301-320. University of Utah Press, Salt Lake City.

In the context of a discussion on "patches" and "islands"—which conceptualize the differential distribution of biotic or other resources within a landscape—Vehik focuses on Florence A chert, including its use by late pre-contact Native Americans (i.e., ancestral Wichita).

2006 Wichita Ethnohistory. In *Kansas Archaeology*, edited by Robert J. Hoard and William E. Banks, pp. 206-218. University Press of Kansas, Lawrence.

Vehik summarizes the state of the art in Wichita ethnohistory, squeezing information from a variety of historic documents to chronicle the movements of the Wichita and related peoples within what is now Kansas and Oklahoma from the time of first contact (i.e., 1541) into the nineteenth century.

Acknowledgments. I would like to thank Susan Vehik, Richard Drass, and Virginia Wulfkuhle for assistance in making this compilation.

A Demonstration of Primitive Archery for the 2006 KATP Field School

Clint Thomas

The Kansas Anthropologist 26:13-19

A recent demonstration of stone-tipped arrows fired from handmade bows—equipment similar to that used by prehistoric American Indians—showed that stone projectile points are both effective and durable and that primitive handmade bows produce adequate killing power. While heat treatment of stone points may be an important factor in their manufacture, point size is clearly the most important characteristic overall. Large points do not have the penetrating power of small points, while medium-sized points penetrate well and could inflect significant damage to the animal target.

As part of the evening programming at the 2006 Kansas Archeology Training Program field school, I demonstrated the strength and utility of stone arrow points and bows made in the same way as those used by prehistoric Americans (Figure 1). This demonstration allowed me not only to share with the audience the process that I went through in learning to make primitive bows and stone-tipped arrows, but also to further study—and simultaneously demonstrate—the killing power of bow and arrow technology as reflected in archeological sites that we excavate.

The bow-making process came to me much quicker than the flintknapping. Although bow making was easier to learn, I still produced my share of broken bows. I made my first wood bows after reading a book, entitled *Bows and Arrows of the Native Americans*, by Jim Hamm (The Lyons Press, Guilford, Connecticut, 1992). These bows were poor at best. It was not until I attended one of Hamm's bow-making seminars that I began to understand the skills and techniques required to produce efficient wood bows. My best advice to aspiring primitive bowyers is:

- Read up on the subject. There are many good books available.
- Watch an experienced bowyer at work.
- Use Osage orange, as it is the most forgiving bow wood. You can get away with mistakes on Osage orange and still make a functional bow. Other bow woods are not as forgiving and will probably break if you make too many mistakes.

As stated earlier, the flintknapping was much more difficult to learn. I was making good bows within a year, but it has taken many years to become just an average flintknapper. To learn how to flintknap, I suggest:

- Attend flintknapping events (knap-ins). Reading books on the subject will help but not as much as seeing a live demonstration.
- Depending upon the skill level you wish to attain, be prepared to break lots and lots of rock.
- Be patient.
- Sign all the points you make so that they will not be mistaken for ancient tools.

Finally, I would like to point out that making an arrow perfectly match a bow for optimum performance would have been the most difficult and skill-demanding task facing the primitive archer. Without well-made arrows that are correctly spined, straight, and matched to the bow, the bow—no matter how well made—is not going to perform as it should. (Arrow spine refers to the stiffness of an arrow or how easily it bends. A heavy bow needs a stiffer arrow.) In my opinion, the least important factor in primitive archery is the stone arrow point. I do not believe (within reason) that the shape or style makes a significant difference as long as the arrow point is mounted correctly on a properly spined arrow shaft.

I began making primitive bows 15 years ago and began making stone arrow points 8 years ago.

Figure 1. Author Clint Thomas, assisted by Gary Edington, demonstrating the use of primitive archery equipment at the 2006 KATP field school.

Table 1. Dimensions of Projectile Points Used in the Demonstration.

Point	Length (mm)	Width (mm)	Thickness (mm)	Weight (grains/grams)	Total Weight (grains/grams)
A	54	25	6	137/8.9	454/29.4
B	47	22	4	57/3.7	488/31.6
D	53	26	5	99/6.4	559/36.2
E	27	27	3	20/1.3	441/28.6
F	30	14	3	15/1.0	473/30.6
G	35	15	4	29/1.9	410/26.6
H	34	15	3	23/1.5	378/24.5
I	30	20	3	28/1.8	344/22.3
J	27	19	3	22/1.4	364/23.6
K	30	15	4	17/1.1	346/22.4
L	ND	ND	ND	ND	360/23.3
M	64	28	5	159/10.3	486/31.5
N	57	24	6	111/7.2	523/33.9
O	ND	ND	ND	ND	498/32.3
P	71	22	ND	125/8.1	586/38.0
Q	ND	ND	ND	111/7.2	546/35.4
R	60	31	ND	ND	545/35.3

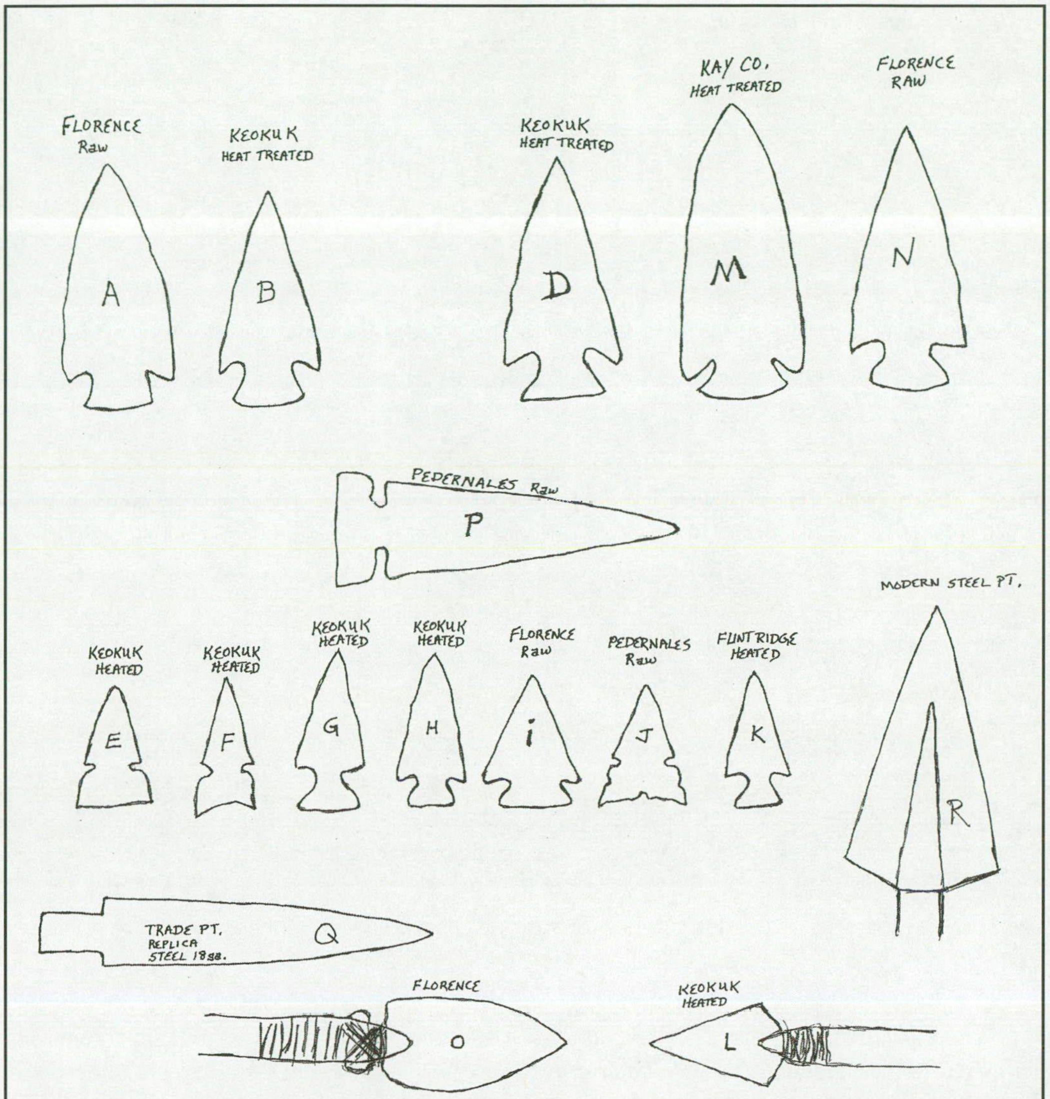

Figure 2. Projectile points used in the demonstration, noting their material of manufacture and, for the stone points, whether they were heat-treated.

For the field school demonstration, I chose to launch a variety of stone tips of various types and materials, including a replica of a metal trade point, from three different bows. The points are shown and described in Table 1 and Figure 2. The materials I used do not exactly replicate those used prehistorically, as the bows had Dacron string and the dowel-shaped arrows were made of ash and cedar. Still, these materials are close enough to the prehistoric tool components to accomplish the primary goals, which were to test the effectiveness of large versus small points, to test the effectiveness of metal as compared with stone points, and to demonstrate the effectiveness of a primitive bow.

Several factors affect arrow penetration, including the stability of arrow flight (a major factor), size of the arrow point, arrow speed, arrow weight, bow pull weight, arrow shaft diameter, and type and amount of point hafting material.

The Demonstration

To limit variation between shots, the following protocol was used. All arrows were shot by the same person wearing a shooting glove and using a three-finger release (one over, two under the arrow). The arrow shafts, all of modern manufacture and made of ash and cedar dowels, were marked at 25½ inches

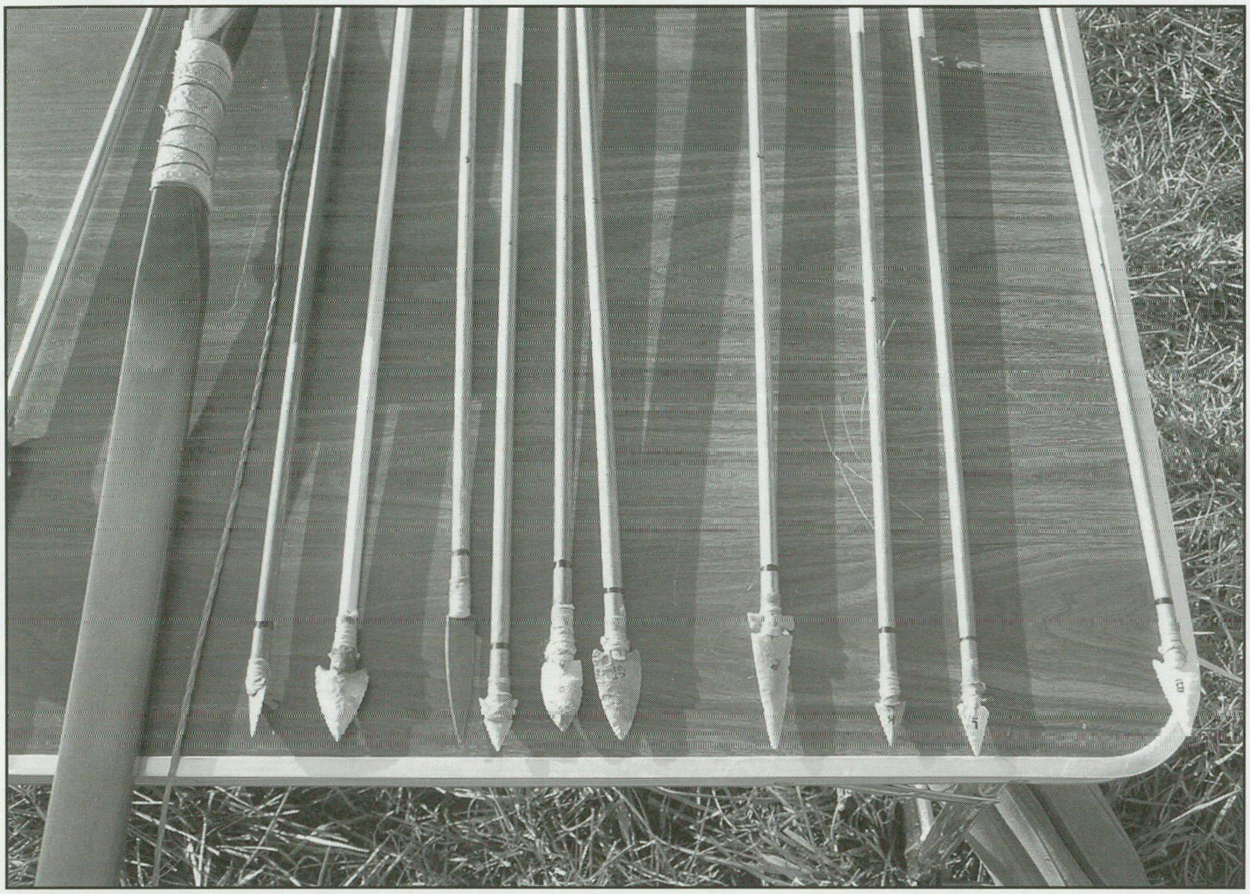

Figure 3. Some of the arrows used in the demonstration marked at 25½ inches to ensure consistent draw length.

(Figure 3). An assistant stood off to the side and told the archer when he had reached the 25½-inch draw length (Figure 4). The archer then released the arrow, allowing for a fairly consistent release velocity. It should be noted that poor release greatly affects arrow performance. Future tests should be conducted using a release aid. Finally, all shots were taken from a distance of 25 feet.

The main bow used in this demonstration is a handmade 63-inch, 45-pound Osage orange self-bow (i.e., a bow made from a single piece of wood). The pound measure of a bow is the amount of force required to pull the bowstring back to certain length. In this case the length is 25½ inches with a bow weight of 45 pounds; therefore, it takes 45 pounds of force to draw the arrow back to the 25½-inch mark. The bow has no attached arrow rest; arrows sit atop the archer's hand. Fourteen of the 16 shots taken were fired from this bow.

A 46-pound modern glass-laminated recurve bow with a shelf arrow rest cut into the riser was used to fire one arrow. This was done to compare the modern recurve bow using a modern broad head with a primitive bow using stone points.

Finally, one shot was fired from a 62-inch, 55-pound handmade Osage orange self-bow with slightly recurved limbs but no arrow rest attached to it. With a 55-pound bow, 55 pounds of force are required to draw the arrow to the 25½-inch mark. This bow was shot to demonstrate the increase in bow performance by raising the poundage of the bow.

All bows are equipped with 16-strand Dacron bowstrings.

The first target was a fresh deer hide placed over ½-inch foam insulation. Two groups of four arrows each were fired into the target. After four shots the arrows were checked for damage and measured for penetration. The arrows then were removed, and another group of four was shot. Table 2 lists all equipment used.

The first group of arrows fired—D, E, H, and N (Figure 2)—consisted of two arrows tipped with

Figure 4. The author prepared to release an arrow when assistant Gary Edington tells him he has reached the proper draw length.

Table 2. Materials and Experimental Parameters.

Bows used in demonstration
63-inch/45 pound handmade Osage orange self-bow with Dacron string
62-inch/55 pound handmade Osage orange self-bow with Dacron string
46-pound modern glass-laminated recurve bows with Dacron string
Arrows used in demonstration
7 stone-tipped arrows
1 arrow with replica metal trade point
1 arrow with modern 2-bladed steel broad head
(See Table 1 and Figure 1 for weights, shapes, arrow shaft material, etc.)
Targets and distance
Fresh deer hide draped over ½-inch foam insulation
¼-inch red oak plywood with ½-inch foam insulation in front of it
All arrows were fired from a distance of 25 feet.

Table 3. Penetration of Points through Targets.

Target: Deer hide and ½-inch foam target, handmade 45-pound Osage Orange self-bow	
Point	Penetration in inches
H (small stone)	22⅛
E (small stone)	17¾*
D (medium stone)	27¼
N (medium stone)	23
P (large stone)	27
M (large stone)	23
Q (metal replica)	23½
R (steel broad head)**	23½
Target: ½-inch foam and ¼-inch red oak plywood, handmade 45-pound Osage Orange self-bow	
H (small stone)	23¼
E (small stone)	25¾
D (medium stone)	24¾
N (medium stone)	pass through
P (large stone)	2½
M (large stone)	2¼
* The arrow with point E hafted on it hit the outer side of the target and penetrated the deer hide twice where the hide folded over on the back of the target, probably explaining its poor penetration.	
**Point R was shot with a modern recurve bow.	

small stone points and two with medium-sized stone points. None of the arrow points sustained damage, and penetration measurements were taken (Table 3). The second group was made up of arrows tipped with points M, P, Q, and R (Figure 2). Points M and P are large stone points, while Q is a replica trade point. Point R is a modern two-blade Zwickey Delta steel broad head. Arrows tipped with points M, P, and Q were fired from the self-bow, while R was shot from the modern recurve. Again, none of the arrows sustained damage, and penetration measurements are recorded in Table 3.

After shooting the two groups of arrows, the deer hide target was replaced with a target of ½-inch foam insulation placed in front of ¼-inch red oak plywood. The foam was used to protect bystanders in case a point shattered upon impact with the plywood.

The first group of points fired into this target included D, E, H, and N. None of these stone tips were damaged, and point N passed completely through (Table 3 and Figure 5). The second group consisted of only three arrows tipped with points M, P, and Q. No damage occurred to either stone points or to the metal trade point. Neither of the large stone tipped arrows penetrated the plywood target well (Table 3).

Finally one arrow was shot from the 55-pound Osage orange self-bow. The arrow fired from this bow was tipped with a medium-sized stone point, point B. This arrow made a complete pass through the plywood and insulation target and was deflected into the ground after striking the easel that held the target. This stone point had minor tip damage, which probably occurred upon deflection. The increase in speed and penetrating power of the 55-pound bow was quite noticeable.

Observations

Stone points are very durable. It did not seem to matter if the chert was heat treated or raw. Little difference was seen in the performance of the small,

Figure 5. Points H, E, and D fired through ¼-inch oak plywood. Point N, also fired in this round, passed completely through the target.

medium, and large stone points when shooting into the first target. I believe that medium points—which performed equally well on both targets—would be more lethal, due to their wider cutting surfaces. There was no difference between small and medium stone points when compared with the trade point. Large stone points did not penetrate the plywood target well but did quite well in the deer hide target. A comparison of the self-bow and the modern recurve also revealed little difference; however, increasing bow weight made a huge difference.

This demonstration proved that large stone points could be fired efficiently and effectively from a primitive bow at close range. It also showed that stone points are very durable. Even if stone points hit a hard material like plywood, or, quite probably, bone, they can stay intact. Heat treatment does not make a noticeable difference in performance, though flintknapppers will testify that it makes the stone easier to work.

Future Research

While a lot was learned from this experimental demonstration, many more tests could be done to expand our knowledge of prehistoric bow and arrow technology. In future experiments I plan to use a primitive bowstring made from rawhide or sinew. I also will shoot from a greater distance, possibly 15 to 20 yards, which is more like a hunting situation. To make a fair comparison of modern versus primitive, more shots need to be fired from the modern recurve and both modern and primitive bows need to be shot through a chronograph to get accurate measurements of arrow speed. Finally, tests should be conducted with dogwood or another primitive shaft material.

Notes

A Phase II Archeological Inventory Survey of Approximately 600 Acres along Holland Creek, Dickinson County, Kansas

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The Kansas Anthropologist 26:21-37

Between August 15 and October 20 of 2003, the author conducted a pedestrian archeological survey on Holland Creek near Abilene in Dickinson County, Kansas, as part of an independent research project through Kansas State University. Nineteen previously unrecorded prehistoric sites were identified, and five previously recorded sites were revisited. Of the 24 sites visited, 1 was recorded as Woodland, 1 as Late Prehistoric, 4 as unknown ceramic, and 18 as unknown age.

Previous archeological surveys in Dickinson and neighboring counties have revealed that this area was occupied throughout most/all of prehistory. These previous surveys recorded many sites, especially along the streams in this region. One of these is Turkey Creek, which flows northward to the Smoky Hill River. Paralleling this stream is Holland Creek (Figure 1). Before this survey, 7 sites had been recorded on Holland Creek in contrast to the 54 formally recorded sites along Turkey Creek. To test whether a similar distribution of sites existed along Holland Creek, portions of the Holland Creek valley were surveyed in 2003.

As originally set up, this project was to be a pedestrian survey of approximately 8 linear miles of the Holland Creek valley between the communities of Holland and Carlton. If time permitted, the survey would continue south from Carlton. This area was chosen for several reasons. First, having grown up in the area, the author had an advantage in obtaining permission from landowners and was familiar with the landscape. Second, topographically this area appeared to have the highest probability for sites (i.e., high terrace remnants that are well above floodplain). The area also consists largely of cultivated fields that would allow maximum visibility.

Environmental Background

The Holland Creek valley straddles two physiographic regions of Kansas: the Flint Hills and the Smoky Hills. "The Flint Hills extend north and south along the western edge of the Osage Cuestas and Glaciated Region in eastern Kansas. The Flint Hills region derives its name from the abundance of chert, or flint, found in the bedrock" (Mandel 1987:3.5). Native Americans moving through the area extensively used this chert to fashion chipped-stone tools.

Geomorphologist Rolfe D. Mandel (1987) described in detail the Osage Plains and Smoky Hills physiographic regions:

> . . . Like the Osage Plains, the Flint Hills were formed by erosion of westward-dipping strata. The rock units are Permian in age, and the limestones in the region contain numerous bands of chert. Because chert is much less soluble than the limestone that encloses it, weathering of the softer rock forms a clay-rich soil which contains a large volume of chert fragments. This gravelly soil armors the rocky uplands and slows the process of erosion compared to the rates of weathering

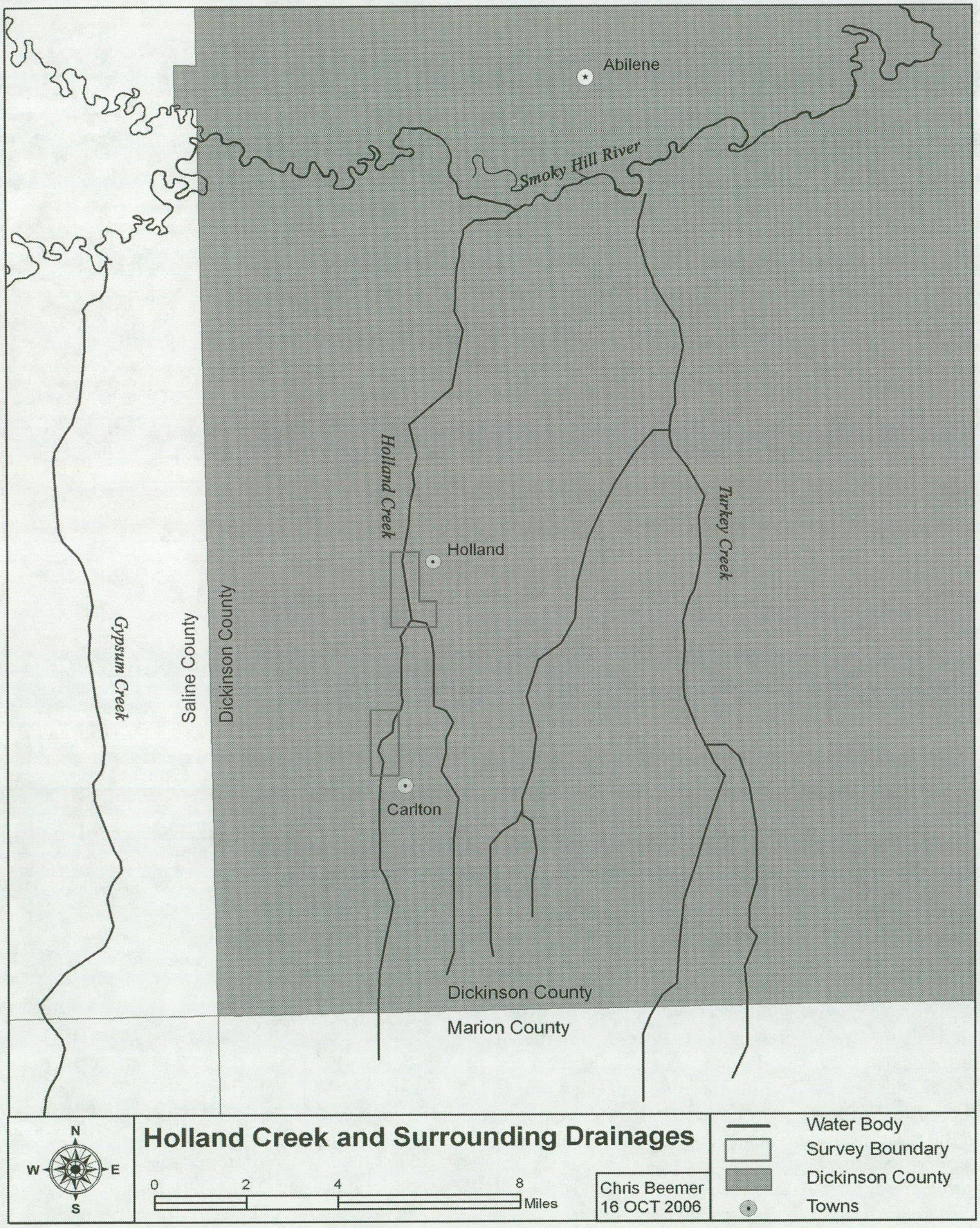

Figure 1. Map of southwest Dickinson and surrounding counties showing Holland Creek and Turkey Creek drainages.

in adjacent areas where the limestone bedrock does not contain chert. . . . The uplands are gently rolling, especially toward the western border of the Flint Hills. Major rivers and streams have dissected portions of the uplands, creating prominent strath terraces. The smaller streams in the region often have steep gradients and deeply entrenched channels bordered by rock ledges.

. . . The Smoky Hills physiographic subprovince extends across north-central Kansas from the western edge of the Flint Hills to the eastern edge of the High Plains. The region is bounded on the south by the Arkansas River Lowlands and the Wellington-McPherson Lowlands. The Smoky Hills consist of a broad belt of hills formed by the dissection of Cretaceous rock units. The easternmost range of hills is capped by thick sandstones of the Dakota Formation. This area is commonly referred to as the Dakota Hills, and it is characterized by hills and buttes which abruptly rise above the surrounding plains.

The uplands in the central region of the Smoky Hills are capped by the Greenhorn Formation. This formation is composed of thin, chalky limestone beds that alternate with thicker beds of gray shale. Erosion of the softer shale layers within the Greenhorn Formation has formed a rolling landscape, but limestone ledges stand out prominently as flat-topped buttes and mesas.

The westernmost range of hills in the Smoky Hills is developed on the thick chalks of the Niobrara Formation. Erosion of this formation has produced a "badlands" landscape, with high, flat-topped buttes and mesas scattered across the region (Mandel 1987:3.5-3.6).

Holland Creek starts in the hills of extreme northern Marion County at an elevation of 1,450 ft above mean sea level (amsl) and flows north through Dickinson County for approximately 19 miles before it empties into the Smoky Hill River at an elevation of 1,160 ft amsl 2 miles southwest of Abilene. Holland Creek splits into east and west branches approximately 10 miles upstream from the Smoky Hill. Both branches flow for about the same distance (approximately 13 miles), though the west branch is generally the larger stream in terms of water flow and stream width/depth. Holland Creek usually flows year round, although during the summer of 2003 long sections of the creek were dry because of drought conditions.

Today the creek banks are almost entirely forested with only small gaps near bridge construction or channel straightening zones. Trees observed during the survey included, but were not limited to, cottonwood, elm (Chinese and American), hackberry, hickory, bur oak, walnut, and, in places, Osage orange. Outside the forested area the stream is flanked by cultivated ground for most of its length. The narrowness of the valley and steep valley walls prevent cultivation in the upper reaches of this stream. In these areas the land is largely used as pasture. A check of the original Government Land Office (GLO) survey maps and field notes reveals that in 1857, when the GLO survey was conducted, only a few small sections of the creek were forested. The GLO field notes described the landscape as predominantly rolling uplands and level bottoms (Hawn 1857). Trees noted by the 1857 GLO survey team included walnut, oak, elm, hackberry, and hickory.

Culture History

This section presents a very brief discussion of evidence for human occupation of the broader region. Previous archeological finds in north-central and central Kansas provide baseline information for interpreting remains, especially diagnostic artifacts, found at sites along Holland Creek.

Paleoindian

Kansas State University Professor of Anthropology Patricia J. O'Brien (1984:27) placed the Paleoindian period in Kansas as approximately 10,000-6,000 B.C., representing the earliest known period of human occupation of Kansas. Societies appear to have been organized as small bands of hunters and gatherers whose subsistence base included big-game hunting. This period overlapped a time of marked changes in climatic conditions at the end of the Pleistocene epoch. With warmer and more seasonal conditions came the extinction of the megafauna, such as mammoth and giant bison, and changes in vegetation patterns. These environmental changes no doubt spurred adaptive changes in the lifeways of the early Americans. Among the artifacts that characterize the archeological remains of the Paleoindian period are fluted or finely flaked stemmed points (O'Brien 1984:30). Ceramics were not produced during this period.

Although no sites of the Paleoindian period have been identified in the Holland Creek valley, one site tentatively dated as Paleoindian was found on Turkey Creek to the east. 14DN448 was dated as Paleoindian, based on a section of a possible Plainview point (Mud Creek Chapter 1996:23). Another site, 14RY7151, recorded in part by the author on the Fort Riley military reservation, has been attributed to the Agate Basin culture.

Archaic

The Archaic period dates to between about 6000 B.C. and A.D. 1 (O'Brien 1984:39). University of Arkansas Professor of Anthropology Marvin Kay (1998:193) stated that the Archaic period in the Central Plains was not a uniform period of cultural development. "Rather, it is best conceived as a time of varied responses to a changing Holocene landscape, biota, and climate, on the one hand, and to equally dynamic hunting and gathering systems, on the other" (Kay 1998:193). Diagnostic artifacts from this period include stemmed and large side-notched points. Ceramics were not widely produced during this period. Subsistence was by hunting and gathering wild animals and plants. Hunting of wild animals included, but was not limited to, bison, deer, antelope, coyote or wolf, beaver, jackrabbit, squirrel, cottontail rabbit, badger, red fox, box turtle, and either mink, weasel, or ferret. Known Archaic sites have been found on terraces along well established streams (Brown 1987a:5).

One example of such a site in north-central Kansas is the Middle Archaic Coffey site (14PO1) along the Blue River in Pottawatomie County (Schmits 1978). The Coffey site contained several short-term encampments with no identifiable structures, although several postholes were defined. Its occupants relied heavily on bison and various wild flora. Radiocarbon dated to 5,270-5,055 years ago, the site most likely represents a Munkers Creek phase occupation (Kay 1998:178).

Currently no sites along Holland Creek are positively identified as Archaic. A slight possibility remains that artifacts found at 14DN621 are Archaic in age. Probable Archaic sites exist along Turkey Creek approximately 5 miles to the east (Mud Creek Chapter1996:23); 14DN10, for example, has a deeply buried (approximately 3 m) Archaic component (Quade 1968:8).

Plains Woodland (Early Ceramic)

Archeologists working in the Plains have long used the term "Woodland" to refer to prehistoric sites characterized by elongated pottery vessels with conoidal bottoms, corner-notched projectile points, and burial mounds—features recognized as diagnostic of the Woodland archeological period in the eastern United States. Since its earliest adoption in the area west of the Missouri River, the term "Woodland" has been prefixed by "Plains," in anticipation of the eventual demonstration of unique adaptive responses to the environmental constraints of a grassland-gallery forest setting (Johnson and Johnson 1998:201).

The Plains Woodland period dates to approximately A.D. 1-900 and is conceptualized as several discrete phases throughout Kansas (Brown 1987a:23). One Plains Woodland phase is defined for the Holland Creek survey area: the Schultz phase.

Sites assigned to the Schultz phase are dated to A.D. 1-700 and are distributed along the lower Kansas, lower Republican, and lower Big Blue Rivers. Both habitation sites and burial mounds are assigned to the phase, although the designation is largely based on excavations of burial mounds (Benison et al. 2000:21) and no houses have been excavated (Brown 1987a:25). While settlement patterns for the Schultz phase are not yet well documented, habitations probably consisted of small camps and farmsteads along major streams near their confluences with tributary streams (Brown 1987a:25). Schultz phase ceramics differ depending on site use: ceramics found at mortuary sites generally exhibit zoned rocker and dentate stamping, while ceramics found in habitation contexts have plain exteriors (Benison et al. 2000:21). Additionally, ceramics from habitation sites are grog-, limestone-, or grit-tempered jars with plain or cord-marked exteriors (Benison et al. 2000:22; O'Brien 1984:46).

Late Prehistoric (Middle Ceramic)

The Late Prehistoric period, approximately A.D. 900-1500 (O'Brien 1984:57), was a time of an increasingly sedentary lifestyle. There appears to be an increasing dependence on agriculture subsistence, although a wide variety of wild resources continued to be important.

The Smoky Hill phase of the Central Plains tradition is the most applicable to the Late Prehistoric period in the Holland Creek region. Sites of this phase are found principally in northeastern Kansas and southeastern Nebraska along the lower reaches of the Smoky Hill, Saline, Solomon, Republican, and Blue River drainages (Steinacher and Carlson 1998:248). Smoky Hill phase sites are recorded in Pottawatomie, Riley, Clay, Geary, Ottawa, and Saline Counties. Site 14DN611 is presently the only site along Holland Creek dated as Late Prehistoric. Some well-documented sites relatively near 14DN611 include the ForThree [sic] site (14RY3183), approximately 45 miles northeast on the Fort Riley military reservation (Richardson 1996); the Whiteford site (14SA1), approximately

22 miles northwest (Wedel 1959:512-523); and the Minneapolis site (14OT5), approximately 40 miles northwest (Wedel 1935). Central Plains tradition sites were found in the Turkey Creek valley (Mud Creek Chapter 1996). Burials have been found as single individuals and large cemeteries (Roper 2005:11; Steinacher and Carlson 1998:250).

The settlement pattern was highly variable, characterized by small units of one to several lodges on terraces overlooking floodplains of major and minor streams (Steinacher and Carlson 1998:248; Wedel 1969:558). There are exceptions, however, as the Minneapolis site in Ottawa County had the remains of at least 24 lodges and the Whiteford site in Saline County contained 12 to 15 lodge remains (Steinacher and Carlson 1998:249). Although these numbers make the sites appear to be villages, it is unknown whether the lodges were occupied contemporaneously or sequentially. Houses were square to rectangular with four support posts, central hearths, and extended entryways (Wedel 1959:558).

Subsistence concentrated on hunting and gathering. Small amounts of maize and beans have been found, "although agriculture may have formed only a small part of the subsistence base of these peoples" (Steinacher and Carlson 1998:250).

Smoky Hill phase ceramic ware is typically Riley Cord-roughened with sand or grit temper, sometimes with a small percentage of the cordmarking moderately to heavily smoothed over (Steinacher and Carlson 1998:241; Wedel 1959:563). "Vessel forms range from nearly globular jars to pots with subconoidal bases; shoulders, from those that are angular and well developed to those with gradually rounded forms. Vessel rims either are unthickened or have a thickened bevel or collar" (Steinacher and Carlson 1998:241). Rim embellishment is rare, with few motifs consisting of tool and finger impressions. On simple rims the decoration is confined to the lip; on collared rims it is on the collared edge. Decoration on the shoulder, present to some degree at most sites, consists largely of rectilinear opposed-line motifs (Steinacher and Carlson 1998:249). Shell-tempered pottery, clay pipes, and effigies also were found at some Central Plains tradition sites.

Chipped-stone artifacts diagnostic of this period include small triangular points, commonly side or side and basal-notched, although unnotched forms are also present (Wedel 1959:558). Other lithic artifacts include keeled end scrapers, dorsally retouched end scrapers, and ground-stone abraders, metates, celts, and hammerstones (Steinacher and Carlson 1998:250).

Protohistoric (Late Ceramic)

"By A.D. 900 or 1000, most of the Southern Plains was occupied by sedentary villagers, part of the Plains Village tradition. The Plains Village tradition is marked by the establishment of semipermanent villages and a mixed economy based on horticulture, hunting, and gathering . . . . There appears to have been a generally increasing reliance on horticulture and bison hunting through time" (Drass 1998:446).

"Great Bend-aspect sites are large villages built on terraces or hillsides near streams. Unplowed sites are characterized by large midden or refuse mounds" (Drass 1998:443). Sites of the Great Bend aspect Little River focus were recorded in McPherson (20 miles southwest) and Marion (12 miles south) Counties.

Ceramics at Little River focus sites were defined by Wedel (1959:233-245, 359-362) as Geneseo Plain, Geneseo Simple Stamped, Geneseo Red Filmed, and Cowley Plain. "Cowley pottery . . . is tempered predominantly with finely crushed shell, whereas Geneseo wares are tempered predominantly with sand" (Drass 1998:443). Most other artifacts from Great Bend aspect sites are typical of Plains Village assemblages: unnotched triangular arrow points, ovate and beveled knives, end and side scrapers, and drills (Drass 1998:443). European objects such as chain mail, glass beads, rolled copper beads, and an iron axe head also were identified at Great Bend aspect sites (Drass 1998:444).

While no evidence exists of a Great Bend aspect presence in the Holland Creek valley, the Mud Creek Chapter of the Kansas Anthropological Association (KAA) (1996:24) collected five red potsherds at 14DN489 that are "somewhat reminiscent" of Great Bend ceramics. The close proximity of the Holland Creek drainage to Marion and other counties where Great Bend aspect sites have been positively identified means that they could exist in or near the present survey area.

Historic Communities (1871-Present)

In 1857 when the GLO first surveyed the area to establish townships and sections, no permanent settlements were noted along Holland Creek. In 1871 two small communities were established in the survey area: Carlton near the southern boundary and Holland near the northern boundary of the survey area (Ade 1993:4). Both communities exist today, although they are much smaller than in their glory days.

Although no historic sites were recorded during this survey, this author believes that many probably

Table 1. Soil Types for Sites along Holland Creek (based on Jantz and Saffrey 1980).

Soil Type	Landform	Site Number	Period Assigned
Irwin (1-3 percent slope)	Terrace/Slope Upland Terrace	14DN613 14DN614 14DN622	Unknown Ceramic Unknown Unknown
Irwin (3-7 percent slope)	Terrace	14DN1429	Unknown
Irwin/Crete	Upland	14DN617	Unknown
Irwin/Geary	Terrace Terrace/Floodplain	14DN619 14DN621	Unknown Unknown
Muir	Terrace Terrace Terrace Terrace Terrace/Slope	14DN454 14DN462 14DN479 14DN607 14DN615	Unknown Unknown Unknown Unknown Unknown
Muir/Hobbs	Terrace Floodplain Terrace Terrace	14DN604 14DN612 14DN623 14DN442	Woodland Unknown Unknown Unknown Ceramic
Geary	Terrace Terrace Terrace Terrace Upland	14DN610 14DN611 14DN616 14DN618 14DN620	Unknown Late Prehistoric Unknown Unknown Unknown
Hobbs	Terrace Terrace	14DN1430 14DN1431	Unknown Ceramic Unknown Ceramic

exist. The best possibility for identifying intact historic sites along Holland Creek is south of Carlton, where the land is utilized more for pasture than for cultivation.

Previous Work

As noted earlier, few sites were recorded along Holland Creek prior to this survey. Previously the largest number of sites reported in the region was along Turkey Creek, which lies east of the Holland Creek drainage. These were reported by the KAA Mud Creek Chapter (1996).

The seven previously recorded sites along Holland Creek were reported by Verna Detrich of the Mud Creek Chapter between 1977 and 1980. Of those seven, five were revisited during this project. One, 14DN442, deserves to be reevaluated in terms of site boundaries. The site originally was recorded as one site with three localities separated by the stream and some distance. It is this author's opinion that 14DN442 should be broken into three sites, as no evidence suggests that they are related other than their proximity.

Field Methods

This survey was entirely a pedestrian survey; no subsurface testing was conducted. The area was surveyed primarily by the author alone, with occasional assistance of Dustin Caster. The survey was conducted largely in the fall after most crops had been harvested and ground visibility was good. The presence of milo prevented survey of certain fields.

Transects were spaced 15 m apart over most of the cultivated ground. When artifacts were located, transects were narrowed in an attempt to identify larger numbers of artifacts. Site boundaries were established by adding a 3- to 4-m buffer zone around artifact concentrations to account for migration of artifacts due to cultivation and erosion.

The boundaries were then marked onto a 1:24,000 U.S. Geological Survey topographic map for later transfer to an ArcView (GIS) shapefile. Approximately 5 linear miles (as measured in ArcView 9.0) of the stream valley were surveyed. This includes portions of Holland Creek, West Holland Creek, and two unnamed tributaries.

Table 2. Artifacts Observed at 14DN604.

Lithic Debris	Chipped Stone	Bifaces	1 corner-notched Gibson type point (described below) 2 biface fragments of gray chert 1 biface fragment of cream-colored chert 1 biface of dark brown quartzite
		Flakes	1 flake of possible Alibates Many other flakes noted but not collected.
		Utilized Flakes	1 large utilized flake of light gray chert
	Other Stone		1 piece of fire cracked rock (tan quartzite) Others rocks noted but not collected.

Collection of artifacts was limited to diagnostic or otherwise significant artifacts, as well as some lithic debris for raw material type identification. In all, only 15 artifacts were collected. They are curated at the Kansas State University Archaeology Lab.

Site Descriptions

The Holland Creek Survey was divided arbitrarily into two units: the Northern Survey Area, located near the confluence of the east and west branches of the creek, and the Southern Survey Area, encompassing the middle to upper reaches of West Holland Creek (Figure 1). Approximately 3 miles separate these two areas.

The following descriptions and recommendations are organized according to the arbitrary north-south divisions. Table 1 shows soil types for the recorded sites, correlated with landforms and time periods, if known.

Northern Survey Area

14DN604

Elevation: 1,215 ft amsl

14DN604 is an artifact scatter located on a terrace and terrace slope west of Holland Creek. The current tenant, who as a child collected "arrowheads" from this field, helped locate the site. Unfortunately, his artifacts have long since been lost. Recent ground cultivation, coupled with a rainstorm, created optimal survey conditions. Artifacts seemed to be eroding out of the side of the terrace.

One corner-notched Gibson type point (Figure 2), measuring 4.9 cm long x 2.6 cm wide x 0.5 cm thick, was collected from the site. The point is possibly made of Alibates agatized dolomite (Alibates), a translucent light pink material with white banding. The point was subjected to a black light, but it did not fluoresce. (Ultraviolet light emitted from low-pressure mercury arcs [black light] excites fluorescence in some stone types.) The Mud Creek survey noted a similar "pink chert" that they identified as possible Alibates (Mud Creek Chapter 1996:28). This presence suggests that the site dated to the Early Woodland period. Other artifacts collected are listed in Table 2.

This site should be tested to determine the presence of intact cultural remains and monitored for damage caused by erosion and cultivation. Continued study of the point is warranted to determine if, in fact, the stone is Alibates, as this could indicate either long-distance migration or trade with distant peoples.

Table 3. Artifacts Observed at 14DN608.

Lithic Debris	Chipped Stone	Bifaces	1 biface fragment of gray chert
		Flakes	2 flakes of gray chert
		Cores	1 core fragment of gray chert
Faunal Remains			Unmodified bone fragments

14DN607

Elevation: 1,200 ft amsl

This site is a small lithic scatter, consisting of three gray chert flakes and one tan quartzite flake, spread over a relatively large (6,700 m^2) area. The site lies on a terrace overlooking the confluence of Holland Creek (to the west) and an unnamed tributary (to the south). The site should be monitored for damage caused by erosion and cultivation.

14DN608

Elevation: 1,200 ft amsl

14DN608 is an artifact scatter located on a terrace inside a bend of Holland Creek. Artifacts (Table 3), consisting primarily of flakes but including one biface

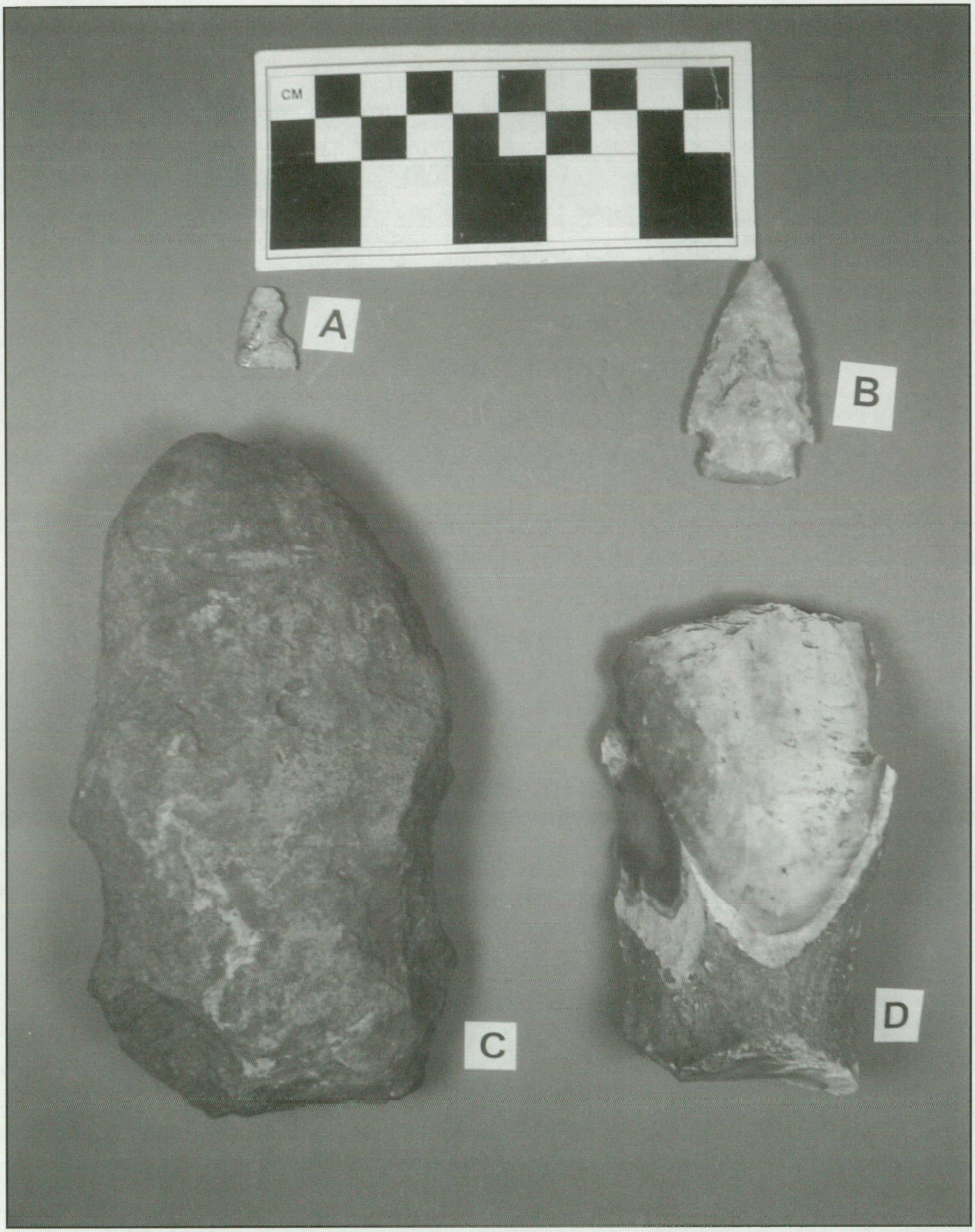

Figure 2. (A) Central Plains tradition triangular arrow point from 14DN611; (B) Woodland period dart point from 14DN604; (C-D) ground stone axe and chipped stone adze from 14DN611.

Table 4. Artifacts Observed at 14DN610.

Lithic Debris	Chipped Stone	Flakes	1 flake of tan quartzite 4 flakes of Niabrara jasper 16 flakes of gray Flint Hills cherts 2 flakes of white chert 4 flakes of unknown material
	Ground/ Pecked Stone		1 cobble of pink quartzite with signs of battering at one end, probably a hammerstone
	Burned Stone		Fire-cracked brown quartzite and burned limestone

fragment and some faunal remains, were located on the terrace tread, as well as on its slope.

Because the site is almost completely surrounded by the stream, it is endangered by erosion. The terrace is high enough that it would take a large amount of water to cause the stream to cut a new channel through the site. More likely, the site slowly will be eroded away over time as the stream moves to the east and straightens out. Test excavations at this site might determine if intact cultural deposits remain and, therefore, if measures should be taken to prevent future damage. The site should be monitored for damage caused by erosion and cultivation.

14DN609

Elevation: 1,200 ft amsl

14DN609 is a small scatter of gray chert flakes located approximately 70 m east of 14DN608. The site may be part of 14DN608, as it lies on the same topographic feature; however, due to the distance between artifact clusters associated with the two sites, this cluster was identified as a separate site.

The stream defines the site's northern and southern boundaries; in other words, the site is located at the constricted neck of a stream bend. If the stream ever straightens out by cutting across the neck of land, this site probably will be destroyed. The site also should be monitored for damage caused by cultivation and stream erosion.

14DN610

Elevation: 1,200-1,205 ft amsl

14DN610 is an artifact scatter located on a small terrace remnant east of Holland Creek. The site, which is predominantly a flake scatter, appears to be eroding out of the top of the terrace remnant.

As seen in Table 4, the lithic remains are of a wide variety of material, including various types (colors) of cherts, quartzites, and brown Niobrara jasper. The presence of fire-cracked rock suggests at least a short-term occupation. The similarity in material and the short distance between this and 14DN611 may indicate that they are somehow related.

This site should be monitored for damage caused by erosion and cultivation. The terrace appears to be eroding at a fairly rapid rate due to the high sand content of the soil. Because of this, testing at the site should be conducted to determine if intact cultural deposits remain.

14DN611

Elevation: 1,220 ft amsl

This artifact scatter is located on a terrace immediately east of Holland Creek. The stream defines the western boundary, and a Natural Resources Conservation Service (NRCS) grassed waterway defines the southern boundary.

This site had the highest concentration of artifacts of any located during this survey (Table 5). Based on a small, unnotched triangular projectile point (1.8 cm long x 1.3 cm wide x .3 cm thick; Figure 2), the site is currently attributed to the Late Prehistoric period. The original occupants probably were engaged in woodworking activities, as a ground-stone axe (15.2 cm long x 7.5 cm wide x 3.9 cm thick; Figure 2) and a chipped-stone adze (10.7 cm long x 5.9 cm wide x 3.9 cm thick; Figure 2) were found at the site. The axe is made of red Sioux formation quartzite, originating in Iowa or Minnesota but brought into northeastern Kansas during the last glaciation (Dr. Dick Shields, personal communication). An adze is a tool similar to an axe except that its blade is set at a right angle to the haft, and it is used vertically to shape, rather than chop, wood. A few bits of daub suggest that a structure once stood on the site, perhaps indicating a relatively long-term occupation.

14DN611 should be monitored for damage caused by erosion and cultivation. The site should be tested to search for intact cultural remains and to determine site significance.

Table 5. Artifacts Observed at 14DN611.

Lithic Debris	Chipped Stone	Bifaces	1 triangular projectile point of cream-colored chert (collected) 1 knife tip of gray chert (collected) 2 biface fragments of gray chert
		Unifaces	1 end scraper of gray chert 1 adze of gray chert (collected)
		Flakes	14 flakes of cream-colored chert 63 flakes of gray chert 5 flakes of Niabrara jasper 2 flakes of white chert with black mottling 2 flakes of tan quartzite 1 flake of dark brown quartzite
	Ground Stone		1 axe of red quartzite (collected)
Daub			Several pieces

Table 6. Artifacts Observed at 14DN613.

Ceramic Remains			1 sand-tempered, smooth-surface body sherd 1 rim sherd with unknown temper
Lithic Debris	Chipped Stone	Flakes	23 flakes of gray chert 13 flakes of cream-colored chert
Faunal Remains			Burned bone fragments
Daub			Several small bits of daub

14DN613

Elevation: 1,217 ft amsl

14DN613, an artifact scatter on a terrace east of Holland Creek, was the only new site located during the survey that contained ceramics. The ceramics include one body sherd with smooth exterior surface and sand temper and one highly eroded rim sherd with unknown temper (Table 6); however, neither is intact enough to be diagnostic. Daub was present, possibly indicating remains of a structure. The presence of daub and ceramics may indicate that this was a relatively long-term occupation site.

The site should be monitored for damage caused by erosion and cultivation. Test excavations should be conducted to search for more ceramics, other diagnostic artifacts, and intact cultural features and to determine site significance.

14DN614

Elevation: 1,220 ft amsl

14DN614 is an artifact scatter located on top of a small hill to the east of Holland Creek, containing five gray chert flakes and a small gray chert biface fragment. The site should be monitored for damage caused by erosion and cultivation.

14DN615

Elevation: 1,215 ft amsl

14DN615 is a small lithic scatter located on a terrace east of Holland Creek and north of an unnamed tributary. Heavy machinery may have disturbed the site, possibly during straightening of the tributary and the construction of flood control measures (a dike). Artifacts (Table 7) appeared to be eroding out of the terrace on the east side where a ravine was cut.

14DN615 should be monitored for damage caused by erosion and cultivation. The site should be tested to determine the extent, if any, of damage caused by what appears to be artificial channel straightening. Test excavations also could reveal intact cultural remains and be used to assess site significance.

14DN616

Elevation: 1,212 ft amsl

14DN616 is a small scatter of gray chert flakes located in a cultivated field on a terrace east of Holland Creek. A pond and grassed waterway have been constructed north of the site, and cultural deposits may have been disturbed during this construction, including flakes being brought to the surface. If this is the case, this site should be included in 14DN611,

Table 7. Artifacts Observed at 14DN615.

Lithic Debris	Chipped Stone	Flakes	3 flakes of gray chert 1 flake of white chert
		Tested Cobbles	2 tested cobbles of gray chert

Table 8. Artifacts Observed at 14DN617.

Lithic Debris	Chipped Stone	Flakes	20 flakes of gray chert 2 flakes of Niabrara jasper
		Utilized Flakes	2 utilized flakes of gray chert
		Core Fragments	1 core fragment of gray chert

which is located immediately north of the pond and waterway.

This site should be monitored for damage caused by erosion and cultivation and tested to determine if it is a separate site from 14DN611.

14DN617

Elevation: 1,240 ft amsl

14DN617 is a wide scatter of lithic remains, consisting primarily of gray chert flakes (Table 8). It lies on a hill above and east of Holland Creek. Most of the artifacts were observed in the farmer's path between the house and a lower field waterway. The path is an area of compacted soil created by motorized vehicles. It has been cultivated but not to the extent that it has been obscured. 14DN617 should be monitored for damage caused by erosion, cultivation, and vehicular traffic.

14DN618

Elevation: 1,230 ft amsl

14DN618 is located on a terrace on the north side (right bank) of a bend of Holland Creek. The site consists of a few lithic artifacts, including flakes of gray chert and a quartzite hammerstone, sparsely scattered over a wide area. The flakes were predominantly tertiary, that is, generally small flakes with no cortex, suggesting that tool retouching was conducted at this site.

The site should be monitored for damage caused by erosion and cultivation.

14DN619

Elevation: 1,230 ft amsl

14DN619 consists of a small lithic scatter located on a terrace east of Holland Creek. The site is predominantly a flake scatter, although some fire-cracked rock was observed. Flake material consisted of gray chert, a cream-colored chert, and tan quartzite. The type of material found at this site is consistent with material found at other sites in the area, especially 14DN611. This could indicate that the sites are related.

The site should be monitored for damage caused by erosion and cultivation.

14DN620

Elevation: 1,230 ft amsl

14DN620 is a small flake scatter (three flakes of gray chert) located on top of a hill overlooking Holland Creek (to the west) and a small tributary (to the east). An artificial terrace has been built through parts of this site, although no artifacts were found in or on the terrace.

The site should be monitored for damage caused by erosion and cultivation. The site also should be tested to determine the extent, if any, of damage caused by the construction of the agricultural terrace.

14DN621

Elevation: 1,215 ft amsl

14DN621, consisting of lithic material and some faunal remains, lies partially on a terrace and partially in a manmade stream. Several years ago the ravine that once flowed around the site was straightened so that it ran through the site. The channel is about 1.5 m below the present ground surface and is approximately 2-3 m wide. It is unknown from what depth the artifacts were excavated. Flakes dug out of the channel lie in an area to the north where the backdirt was spread, easily detected by extreme differences in the colors of the sediments. Dirt removed from the ravine is very dark brown, whereas the surrounding dirt is of a lighter orange color. The landowner has two projectile points that he found during construction of this ditch. One point was found in the backdirt, and the other was found sticking out of the side of the new channel. Unfortunately, these artifacts are currently unaccounted for, and he could not remember at what depth the one point was found. Based on his description of the artifacts, this site could be Woodland or Archaic, but formal dating will be reserved until the collection is found.

The site is particularly interesting because of the good possibility that intact cultural remains could be

Table 9. Artifacts Observed at 14DN621.

Lithic Debris	Chipped Stone	Flakes	7 flakes of gray chert 1 flake of white chert 3 flakes of Alibates-like stone

Table 10. Artifacts Observed at 14DN622.

Lithic Remains	Chipped Stone	Flakes	3 flakes of gray chert 2 flakes of white chert 1 flake of brown chert 1 flake of Alibates-like stone
		Utilized Flakes	1 utilized flake of gray chert

Table 11. Artifacts Observed at 14DN442.

Ceramic Remains			No new ceramic remains
Lithic Remains	Chipped Stone	Biface	1 biface of gray chert
		Flakes	9 flakes of gray chert 1 flake possibly Alibates 1 flake of chalcedony
		Cobble	1 tested cobble of gray chert
	Other stone		Fire-cracked limestone

found during test excavations. The presence of the Alibates-like material (Table 9) and the possibility that this is a Woodland occupation site could indicate a relationship with 14DN604, another known Woodland site. As with 14DN604, the possible presence of Alibates, an exotic material, may indicate long-distance travel to or exchange with people to the south.

14DN621 should be monitored for damage caused by erosion and cultivation. The site should be tested to determine the extent of damage caused by the channel straightening. Test excavations should also be conducted to search for intact cultural remains buried below the present ground surface and to determine site significance. Artifacts in the landowner's collection also warrant study. Tests to positively identify the Alibates-like material would be useful.

14DN622

Elevation: 1,230 ft amsl

14DN622 is an artifact scatter located on a terrace east of Holland Creek. The site also lies above site 14DN610 and below 14DN620. It consists of a sparse scatter of flakes spread over a relatively small area (approximately 2,000 m^2).

The site should be monitored for damage caused by erosion and cultivation. As with other sites where the Alibates-like material is found (Table 10), the origin of the material should be researched.

Southern Survey Area

14DN442

Elevation: 1,270-1,275 ft amsl

14DN442, recorded by Verna Detrich in 1977, originally was defined as three localities separated by bends of West Holland Creek. Locality A is south of an east-west section road and east of the stream. Locality B is on the opposite (west) side of the stream and south of the road. Locality C is east of the stream and north of the road. Locality A was confirmed during this survey, but due to alfalfa at Locality B and corn stubble and leaves at Locality C, the presence of cultural materials could not be confirmed. Given the separation of these localities, a strong case could be made for three separate site designations.

Artifacts found initially included "knife and projectile point tips, modified flakes, chopper, knife, drill section, pottery, and end scrapers" (Detrich 1977). A biface, several flakes, and fire-cracked limestone were observed in Locality A during this more recent survey (Table 11).

The site form was of little help in interpreting the discovered artifacts, as they were not described in detail; it is impossible to determine how many artifacts were collected and from which locality. This author's interpretation of this site is based entirely on what he found at Locality A. The presence of fire-cracked rock suggests a short-term occupation of the area. The presence of what appears to be Alibates and chalcedony indicates that exotic materials were either traded or carried into the area.

14DN442 should be monitored for damage caused by cultivation and environmental forces. Localities B and C should be revisited, as crops covered both at the time of this survey. The possible presence of Alibates could relate Locality A to others farther to the north (for example, 14DN604), where similar material was found.

14DN454

Elevation: 1,270 ft amsl

Verna Detrich recorded 14DN454 on a terrace on the west bank of West Holland Creek. The existence of this site was confirmed during this survey, although

Table 12. Artifacts Observed at 14DN605.

Lithic Debris	Chipped Stone	Bifaces	1 gray chert biface (collected)
		Flakes	2 flakes of gray chert flakes 1 flake of tan quartzite 1 flake of red chert 1 flake of translucent yellow chert (collected)

Table 13. Artifacts Observed at 14DN606.

Lithic Debris	Chipped Stone	Flakes	Flakes of gray chert
		Core Fragments	1 core fragment of gray chert
Faunal Remains			Small bone fragments; some burned, some not
			Small bits of shell

only a few flakes were found scattered over a wide area.

According to the site form, artifacts found during the original survey included the tip of a crude gray chert biface, a drill, and three flakes. As noted on the original site form, this site is known to local collectors (Detrich 1980a).

This site should be monitored for damage caused by cultivation. Research should be conducted to identify the collectors who have visited this site, as well as the others in the area (14DN1429, 14DN1430, and 14DN1431); inspection of those collections might provide additional information about this site. Test excavations might produce a better picture of the site, as it is on lower ground and, therefore, subject to deposition from both the stream and from higher ground to the west.

14DN605

Elevation: 1,275 ft amsl

14DN605 was located during this survey and is a sparse artifact scatter spread over a relatively large area (5,600 m^2). It is situated on a terrace between West Holland Creek (to the west) and what appears to be a former creek channel (to the east). The site is approximately 60 m east of 14DN442.

The site boundaries might extend into or beyond the road to the north. No artifacts were seen in the road, and survey of the field to the north was hindered by the presence of corn stubble and leaves. One gray chert biface and flakes of red chert, gray chert, and a light tan-colored quartzite were observed (Table 12).

The site should be monitored for damage caused by erosion and cultivation. Because the road determines the site's northern boundary, this author feels that artifacts found in immediate proximity to the road on the opposite side should be included in this site.

14DN606

Elevation: 1,260 ft amsl

14DN606 is a small artifact scatter on a low flat area of the valley floor (but still above the floodplain) between West Holland Creek and a small tributary. This site covers a very small area and contains only a few artifacts—mostly lithics but also some faunal remains (Table 13). Because the site is situated in the low area close to the stream, it is possible that portions of the site are being buried and that more artifacts exist below the surface.

Recommended for this site are shovel or larger tests that might reveal buried cultural materials and a larger distribution than what is indicated by the few surface artifacts. The site should be monitored for damage caused by ongoing erosion and cultivation.

14DN612

Elevation: 1,260 ft amsl

This site is a very small artifact scatter on the valley floor just east of West Holland Creek. It consists of three flakes of dark gray chert scattered over a relatively small area (500 m^2).

The site should be monitored for additional cultural materials, as well as for possible damage caused by erosion and cultivation. Because of its location in a low flat area just above the floodplain, additional cultural remains beneath the surface might be revealed by testing.

14DN623

Elevation: 1,260 ft amsl

14DN623 is a small lithic scatter spread over a wide area on a terrace west of West Holland Creek. This site has been heavily disturbed by the construction of a NRCS grassed waterway. Flakes of gray chert, cream-colored chert, and tan quartzite were observed at the site.

Additional investigation of the site, including shovel or more extensive tests, should be undertaken to determine the extent of the damage caused by the waterway construction. The site also should be monitored for damage caused by erosion and cultivation.

14DN1429

Elevation: 1,280 ft amsl

In 1980 Verna Detrich (1980b) recorded 14DN462, designating four areas. For the purposes of the Geographic Information System (GIS) in 1999, 14DN462 was divided into four sites: 14DN462 (Area 1), 14DN1429 (Area 4), 14DN1430 (Area 2), and 14DN1431 (Area 3) (Detrich and Moulden 1999a, 1999b, 1999c). 14DN1429 (Detrich's Area 4 of 14DN462) consists of an artifact scatter located on a terrace and its eastern slope on the west side of West Holland Creek. A portion of the site was destroyed when an agricultural terrace was constructed through it. Artifacts identified in 1980 included two jasper chert fragments and an unperforated shell disk about the size of a nickel. Although the site form gives the dimension of the shell artifact as 19 cm, this probably should have been 19 mm (Verna Detrich, personal communication 2006). Noted there during the present survey were flakes of gray chert, yellow chert, and brown quartzite.

The location of the artifacts found in 1980 should be researched, especially the shell disk. Since this ground was cultivated at the time of the original survey, it is highly unlikely that a large shell disk could have survived on the surface, leading this author to believe that the measurement is a typographical error. The site should be monitored for damage caused by erosion and cultivation. Subsurface test excavations should be conducted to determine the extent of the terrace construction damage.

14DN1430

Elevation: 1,270 ft amsl

14DN1430 is an artifact scatter located on a terrace west of West Holland Creek. The site was originally recorded in 1980 as Area 2 of 14DN462 by Verna Detrich (Detrich 1980b; Detrich and Moulden 1999b). The author twice revisited the location but was unable to locate any cultural evidence, possibly due to the site being buried by sediments eroding down from a nearby hill (colluvium). Artifacts found at this site in 1980 included a large tooth, heavy long bone section, burned and unburned bone scraps, large and small chert flakes, a modified flake, and a smooth body sherd with bone temper.

Artifacts collected in 1980 should be located and studied to get a better sense of the age of the site and its deposits. The site should continue to be visited to find additional remains. Shovel tests or test excavations should be conducted to determine if cultural deposits are being buried under recent colluvium.

14DN1431

Elevation: 1,270 ft amsl

14DN1431 is an artifact scatter located on a terrace on the west bank of West Holland Creek. This site was recorded in 1980 by Verna Detrich as Area 3 of 14DN462 (Detrich 1980b; Detrich and Moulden 1999c). Artifacts reportedly found in 1980 included bone and sand-tempered body sherds with cord-roughened and smooth surfaces. A return visit during this survey revealed a light scatter of predominantly gray chert flakes with a few cream-colored flakes.

The surface of the site is littered with an unknown mineral that ranges in color from black to brown to dark green and has glass-like properties. This debris bears a striking resemblance to the type of gravel used by the railroad in the area (approximately 2 miles south), and it may indicate historic disturbance of this site. Today the ground is cultivated, but this material may have been brought in prior to cultivation.

The unknown mineral scattered at this site should be analyzed to determine its identity and origin. This may require shovel tests or test excavations to determine if it is related to historic disturbance. The artifacts found in 1980 should be located so that they can be analyzed to provide additional chronological information. The site should be monitored for damage caused by erosion and cultivation.

Conclusions and Recommendations

During this project the author was able to survey about 6 linear miles or approximately 600 acres of the Holland Creek valley. Nineteen previously unknown archeological sites were recorded, two of which were dateable (one Woodland and one Late Prehistoric). The locations of five previously recorded sites were visited, although only four could be confirmed.

While the goal of every archeological survey is to interpret the cultural history of the survey area, the lack of dateable material in this study rendered proper interpretation impossible. Only two of the sites contained good diagnostic artifacts, and four sites contained non-diagnostic ceramic remains. Twice landowners reported that they had found projectile points on their land, but they were unable to locate those artifacts.

The first landowner, Rick Barkley, found what might be, based on his description, a Late Prehistoric arrow point. This find could not be confirmed nor a site recorded due to the construction of greyhound dog runs over the site. According to the present landowner, this construction involved placing approximately 2 feet of fill to level and raise the ground surface above floodplain. This area reportedly lies 20 m east of Holland Creek and 25 m south of the county road.

The second landowner-held artifact collection was that of Larry Haugh, consisting of artifacts from the property surrounding his house. Based on his description, two points that he found at 14DN621 during the new channel construction could be of Archaic or Woodland age. As previously stated, he was unable to locate this collection at the time of his interview.

The first site found during the survey, 14DN604, yielded a diagnostic artifact, a corner-notched projectile point (Figure 2b). This is probable evidence of an Early Plains Woodland period occupation. Current tenant Paul Lehman, who as a child collected "arrowheads" here, aided in the identification of this site. Artifacts are eroding out of the terrace; therefore, test excavations might reveal that this site is much larger than currently thought or that intact cultural remains may still exist. The point is reminiscent of the Gibson point identified in Cultural Horizon I at the Macy Site (14RY38). Gibson points are common to a period dating between 50 B.C. and A.D. 250 (Benison et al. 2000:81).

The other site to be dated to a specific period based on a diagnostic artifact is 14DN611. Based on a small unnotched triangular arrow point (Figure 2a), the site is assigned to a Late Prehistoric occupation. The abundance of artifacts found here is interesting. This site had the highest concentration of artifacts (secondary and bifacial thinning flakes) of any site visited during the project. In certain areas one could hardly take a step without finding an artifact. The site exhibits evidence of woodworking: a ground-stone axe crafted from red quartzite (Figure 2c) and a gray chert chipped-stone adze (Figure 2d). Small bits of daub were observed near the edge of the terrace.

Ceramic remains were noted at four sites along Holland Creek. One site, 14DN613, contained one sand-tempered body sherd with smooth surface treatment and one very thick rim sherd with unknown temper. The three remaining sites at which ceramics were noted on the original site forms were 14DN442, 14DN1430, and 14DN1431. The site form for 14DN442 did not describe the pottery, only stating that it was present. On the site form for 14DN1430, a single body sherd with bone temper and smooth surface treatment was mentioned, while a single sand-tempered body sherd with cord-roughened surface treatment was identified at 14DN1431. Throughout the survey, no ceramics were noted at any of the previously recorded sites. This could be attributed to several factors. First, these sites are fairly small, and there may not be a significant amount of pottery to be found. Second, ground cover, specifically at 14DN442, limited visibility. A third possible explanation may be the fragility of ceramics, especially in cultivated areas. Finally, these sites are well known to collectors and may be hunted out.

Given the limited information that can be derived from the cultural remains displayed on the surface of these sites, it can be stated that the Holland Creek valley was most likely utilized during the Woodland and Late Prehistoric periods, and possibly earlier. The majority of cultural materials observed are chipped stone debris. Various kinds of raw materials are represented: gray chert from the Flint Hills, as well as the aforementioned possible Alibates (from the Texas panhandle), Niobrara jasper (from Nebraska), red Sioux formation quartzite (glacial deposit from Minnesota or Iowa) (Dr. Richard Shields, personal communication), and translucent yellow chert (origin unknown). Although the limited quantity of materials observed on the surface at most of the sites inhibits interpretation of site function, the abundance of chipped stone debris indicated stone tool manufacture and/or maintenance. Woodworking is also suggested at 14DN611 by the presence of probable woodworking tools. Daub was present at some of the sites, possibly indicating the construction of relatively substantial structures and suggesting a possible long-term settlement in the valley.

Several sites, such as 14DN604, appear to be eroding out of the side of a terrace or—in the case of 14DN621 where the site was discovered by construction—to be buried at some depth. A geomorphic study utilizing coring and trenching in the valley might provide a better understanding of what role the stream has played in the formation of these sites. That is, how has the stream, through flooding and erosion, buried or eroded sites? Can one analyze a soils map (soils chart in Table 1) and determine where the highest probability for locating sites would be? Deeply buried sites (14DN10, for example) have been found on the floodplain of nearby Turkey Creek. The close proximity of these two streams makes it very possible that the same situation exists on Holland Creek. Geomorphic testing might aid in determining which sites possibly have deposition and which sites have been eroded or farmed into near non-existence. It is possible that what initially appear to be less significant flake scatters could hint at something more significant beneath the surface.

While the author was unable to achieve all the goals originally set for this project, he did lay the groundwork for future archeological expeditions in this area, whether by the author or someone else. Upon completion of this portion of the project, several points stick out.

1. As expected, the larger sites tend to be located on higher landforms, such as terraces or hills. This is especially evident in the northern survey area.

2. While all sites deserve more attention in the form of shovel testing, certain sites, such as 14DN611 and 14DN621, need more immediate work. The author suggests that 14DN611, the most substantial site found so far, be tested to determine site significance. 14DN621 should be tested to determine how much damage the ditch cut through it caused. If the two points found by the landowner could be located, a better understanding of this site could be developed.

3. Looking at the site descriptions contained in this report, one notices that some larger sites yielded a variety of materials. In other words, the lithic resources utilized at the sites were wide ranging. This could be due to the lack of good raw material in the area. Possibly there is an unknown gravel deposit nearby or the Native Americans were carrying (or exchanging) it from long distances. Additional research could determine the source of the raw materials. By knowing the source, the movements of the people can be traced or intercultural relations through exchange identified.

While this report is complete, the project is not over; a great deal of ground remains to be covered. The author intends to continue with this project and extract more information about past human use of this region of Kansas.

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NOTES

Establishing Archeology at the Kansas State Historical Society: Roscoe Hall Wilmeth, 1957-1960

Marlin F. Hawley
Wisconsin Historical Society

The Kansas Anthropologist 26:39-64

While archeological pursuits as part of the mission of the Kansas State Historical Society (KSHS) extend back into the 1880s, it was not until 1957 that the institution employed a professionally trained archeologist on its staff. From 1957 to mid-1960 Roscoe Hall Wilmeth, hired as an assistant museum curator, initiated archeological investigations. During his three and one-half years at the KSHS, he constructed museum displays on the archeology and ethnology of Kansas' Native American societies; made contact with numerous amateurs and collectors; began an archeological site inventory; organized old, donated collections; and conducted the Society's first professional surveys and excavations, some of which were funded by the National Park Service. This paper reviews Wilmeth's activities at the KSHS using various published and unpublished sources, the latter including his personal journals and other information supplied by his widow, Verna Wilmeth, and correspondence and documents at the KSHS and the Smithsonian Institution.

Historical explanations are endlessly fascinating in themselves, in many ways more intriguing to the human psyche than the inexorable consequence of nature's laws. We are especially moved by events that did not have to be, but that occurred for identifiable reasons subject to endless mulling and stewing. By contrast, both ends of the usual dichotomy—the inevitable and the truly random—usually make less impact on our emotions because they cannot be controlled by history's agents and objects, and we are therefore either channeled or buffeted, without much hope of pushing back. But, with contingency, we are drawn in; we become involved; we share the pain of triumph or tragedy. When we realize that the actual outcome did not have to be, that any alteration in any step along the way would have unleashed a cascade down a different channel, we grasp the causal power of individual events.

Stephen J. Gould
Wonderful Life, 1989

On February 8, 1957, Roscoe Hall Wilmeth, the Kansas State Historical Society's newly hired assistant museum director, sat in Storeroom No. 1 in the Memorial Building, surrounded by boxes, most filled to overflowing. KSHS photographer Wolfgang Gruber stepped in sometime during the morning and snapped a picture of Wilmeth as he sat bemused, pipe firmly planted in mouth, "in the middle of the whole mess" (Wilmeth 1957:28) and began to impart order on the Society's chaotic archeology collections. Gazing at the picture (Figure 1), we can share Wilmeth's emotions: there amidst the clutter are boxes big and small heaped with pottery sherds and chipped stone. Stone hammers and axes fill a box, while others are strewn across the floor. Most alarmingly, a human femur protrudes from a nest of wadded newsprint in an overflowing, crumpled Cliquot Club box. All of this was the result of the Society's long and storied—though somewhat haphazard—ventures into archeology.

Wilmeth had been hired only weeks before to fill a vacant curatorial position in the museum. The task before him was almost monumental: he was to plan and construct new Native American exhibits, organize

Figure 1. Roscoe Wilmeth in Storeroom No. 1, February 8, 1957.

old archeological collections, prepare educational materials, and direct tours of the museum. From the outset the tantalizing possibility that he might be able to initiate archeological work at the KSHS was raised. Over the next three and one-half years—even while he carried out his other duties—Wilmeth worked toward that goal. By the summer of 1960, with his departure imminent, he had in fact played a founding role in establishing archeology as a regular part of the Society's mission.

The present paper reviews Wilmeth's accomplishments at the KSHS, using a variety of primary materials, including his personal journals (for 1957 and January-September 1958; the journals for 1959-1960 have not been located) and correspondence supplied by his widow Verna Z. Wilmeth. At Mrs. Wilmeth's suggestion, correspondence between Wilmeth and his long-time friend Gilbert V. Wright, dating from 1957 through 1960, was obtained from the A. Gilbert Wright Papers in the Smithsonian Institution Archives. The Smithsonian Institution National Anthropology Archive is also the repository of correspondence between Wilmeth and Waldo R. Wedel (W. R. Wedel and M. M. Wedel Papers) from 1956 to 1977, which supplemented the correspondence and other documents, such as site records, located in the KSHS Archeology Office. Unless otherwise noted, citation of unpublished materials in this paper is of documents on file at the KSHS.

Early Archeology at the KSHS

Archeology at the KSHS did not begin with Wilmeth, of course. As early as the 1880s, KSHS Secretary Franklin Adams was involved in archeological pursuits. He visited mounds in eastern Kansas and presented a paper about artifacts from a Kansa village near Manhattan at the annual meeting of the Kansas Academy of Science in 1883 (Adams 1879, 1883). By the early twentieth century a "Committee on Exploration" was formed and submitted occasional reports on the locations of Indian sites. Perhaps the most significant achievement of this era was the acquisition and preservation of a Pawnee site in Republic County, erroneously believed by many to be the site of an 1806 visit by Zebulon Pike (Langsdorf 1975; Sanborn 1973; Witty 1994).

William E. Connelley, KSHS secretary from1914 to 1930, took an interest in Native American history, ethnology, and archeology; indeed, prior to and during his tenure as secretary, he published papers on the Wyandotte and Potawatomi (Connelley 1899, 1918a) and also more strictly archeological topics (Connelley 1918b). In the 1920s he granted commissions for several individuals, including Mark Zimmerman of White Cloud and Floyd Schultz of Clay Center, to conduct investigations on behalf of the KSHS.

George P. Morehouse, a long-time KSHS member, spent much time researching the history of the Kansa Indians, compiling data on them and their villages. He also was interested in Kansas archeology (Morehouse 1908, 1928). In the 1930s KSHS Secretary Kirke Mechem conferred his own commissions, visited a few sites, and even tried, without success, to establish an association of amateur archeologists to promote standards of collection and reporting (KSHS 1934:97).

The necessity of studying the aboriginal past in Kansas was not specifically invoked in the Society's charter in 1875. Perhaps as a consequence, archeology's fortunes, dependent on the interest and support of a few men, rose and fell with changes in personnel. Archeological activities, such as they were, were focused on the acquisition of collections. Although this has at times an antiquarian feel, it is quite understandable given that the KSHS had a museum and desired objects for its cases. But all the while, there was in Kansas and at the KSHS a longstanding interest not only in linking a few famous explorers, such as Pike and Coronado, to specific localities, but also in connecting historic Native American populations to archeological sites and vice versa (see Hill et al. 1996:31; Judge 1982). These latter goals were very much in keeping with the culture history program emerging in American archeology in the early twentieth century (see Lyman et al. 1997). The coexistence and complex intertwining of these disparate strands of thought characterize the late formative era in American archeology (Graves 1998).

Outside the KSHS, archeology in the state was in most respects, even in the 1950s, still in its infancy. The University of Kansas had employed an archeologist in the Department of Sociology and Museum of Natural History since 1937 (Hawley 1992a, 1992b, 1995; Smith 1992), and in the 1950s the Municipal University of Wichita also had an archeologist, Gordon N. Keller, on staff in the Department of Sociology. While Kansas State Agricultural College had no archeologist, Linwood L. Hodgdon, an assistant professor of sociology, was involved in excavations in the Tuttle Creek Reservoir in the early 1950s (Cumming 1958). The 1950s were a time of change in American and Plains archeology, as monies from federal reclamation projects and highway construction projects resulted in a boom in archeological activity, although the impact was not immediately felt in Kansas. Thanks in large part to Wilmeth's initiative, the KSHS found itself in something of a leadership position when it came to Kansas archeology in the 1960s and into the 1970s.

Figure 2. Nyle Miller, KSHS Secretary, ca. 1963. (Image courtesy of the Kansas State Historical Society.)

Beginnings

Roscoe Hall Wilmeth was born on April 17, 1922, in the Allegheny mountain town of St. Marys, Pennsylvania, but he grew up in the flat lands around Springfield, Illinois. Even as a child, Wilmeth displayed a relentless curiosity about almost everything. As a teenager in 1939-1940, he volunteered at the Illinois State Museum where he came under the mentoring influence of Gilbert Wright, later a well-known museum professional. He and Wright remained close, corresponding regularly for decades.

Entering the University of Chicago just prior to World War II, Wilmeth pursued an interest in zoology, completing three years toward a degree when he was drafted into the U.S. Army, where he served in the Medical Corps. His final posting in Los Alamos, New Mexico, proved to be a watershed in his life. The desert Southwest, with its readily tangible evidence of an ancient Native American presence, was a revelation. Verna Wilmeth (V. Z. Wilmeth to M. F. Hawley, letter, 1992) remarked, "He became acquainted with peoples from the local pueblos and became interested in their cultures and archaeology."

Discharged from the service in 1946, Wilmeth returned briefly to the University of Chicago. When he was not accepted in Chicago's anthropology program, he went back to New Mexico. For a while he worked as a clerk in the medical and technical libraries at Los Alamos, and in 1949 he enrolled in the anthropology program at the University of New Mexico. He completed his bachelor's degree in 1951 and stayed on for graduate studies under Florence H. Ellis, Stanley Newman, and W. W. Hill. His master's thesis, completed in 1956, focused on a pueblo near Santa Fe called *Cuyamungue'* (Wilmeth 1956).

In the course of his graduate career, Wilmeth had the opportunity for practical application of his knowledge. For a year he was employed by the Navajo Inter-Tribal Council to document sites in northern Arizona, southwestern Colorado, and western New Mexico for land claims cases against the federal government. He later recalled, "Old men of the tribe would take me places where their forebears had camped years before and we'd usually find evidence of Indian life there a long time ago. The location of these now-abandoned places was handed down from father to son" (Martin 1957).

After he had completed his thesis, Wilmeth set about finding a job and was soon hired at the University of South Dakota to fill in for Wesley R. Hurt, who was on sabbatical in Brazil (Hurt 1995). The position entailed curatorial work in the University Museum, as well as teaching service courses in anthropology in the Department of Sociology. During the summer of 1956, he acted as field director for excavations at the Payne site, located in the Oahe Reservoir basin (Wilmeth 1958a). The work was conducted under a contract with the National Park Service (NPS), which at the time was involved in the sprawling Inter-Agency Salvage Program (IASP), including the River Basin Surveys (RBS). The IASP was initiated in 1946 to

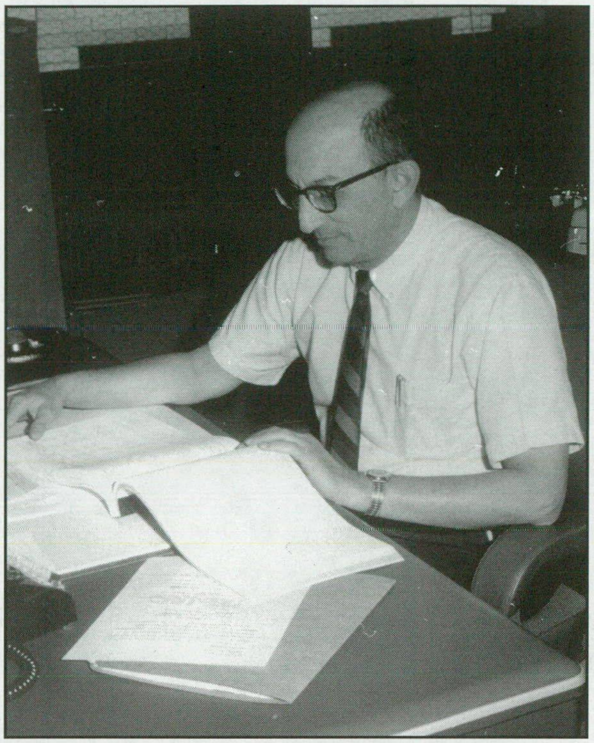

Figure 3. Ed Langsdorf, KSHS Assistant Secretary. (Image courtesy of the Kansas State Historical Society.)

salvage cultural resources prior to their inundation in the hundreds of reservoir projects planned throughout the United States (Jennings 1985; Thiessen 1999). The largest component of the program was centered on the Missouri River Basin (MRB) of which the Oahe Reservoir was a part.

In personal terms, Wilmeth's friend Richard Forbis (1982:220) noted that Roscoe Wilmeth,

> was born and raised ... a son of the staunchest part of Middle America. It is a no-nonsense tradition in which stout loyalty, good common sense and unswerving honesty combine with generosity and a profound sense of humour. With it all, too, a fierce independence that can amount to stubbornness. Although tolerance is not noted as a Midwestern characteristic, Roscoe picked it up in some quantity somewhere along the trail. However, he could not be bothered by shams and stupidities when he saw them; nor was it his style to try to set the world straight. While he believed powerfully in things dear to his heart, he could never be self-righteous, particularly if his being right made someone else feel wrong. He was not built to criticize, and would never demean any human being ... While he effectively defended his own individuality, in his own calm fashion, he gave full fair share to others for their beliefs. He was equally at home with the down-and-out sharecropper as with the dapper millionaire. There was no carping, no cant, no bravado, no obsequiousness, no self-seeking (Forbis 1982:220).

By nature, Wilmeth was affable and ever curious. As a result wherever he went, he quickly made friends. Upon taking the job in South Dakota, he was soon acquainted with a number of key Plains archeology personnel, such as Wedel, Robert Stephenson (MRB chief in Lincoln), Paul Beaubien (midwest regional archeologist, National Park Service, in Lincoln), Carlyle Smith (University of Kansas professor of anthropology), Charles McNutt (RBS in Lincoln), Marvin Kivett (Nebraska State Historical Society [NSHS]), Preston Holder, Albert Spaulding (University of Michigan professor of anthropology), and others.

At the KSHS

The South Dakota position was a temporary one, pending Hurt's return, and by the fall of 1956, Wilmeth again was casting about for a job. As it happened, an inquiry to the University of Kansas Museum of Natural History was forwarded to KSHS Secretary Nyle Miller (Figure 2). Assistant Secretary Edgar Langsdorf (Figure 3) wrote, informing him that the KSHS had a vacant position, that of assistant museum curator. "I am not sure that our job is what you are looking for, yet I believe it might suit you and that you might suit us. We are, of course, a history museum, and we would not be able to make full use of your background and training in anthropology and archaeology—at least at present" (E. Langsdorf to R. H. Wilmeth, letter, 13 November 1956). Wilmeth was definitely interested, and a meeting was arranged with Museum Director Stanley Sohl at the Plains Conference (now the Plains Anthropological Conference) in Lincoln. In short order the job was offered and accepted.

Early in 1957 Wilmeth and his family—wife Verna and children Frances and Ben (Figures 4 and 5)—moved from Vermillion to Topeka. They bought a house and by early February had begun to settle in. February 1 marked his first day of employment with the KSHS.

In Topeka Wilmeth and his wife frequently played host to family, friends, and colleagues in their home. A voracious reader, he consumed several books a week. He did not confine himself to the archeological or

Figure 4. Roscoe and Verna Wilmeth, probably in New Mexico. (Image courtesy of Verna Wilmeth.)

anthropological literature but read widely in biography, history, philosophy, current affairs, as well as science fiction and novels of all variety. When not reading or taking nature walks, he studied languages, including, at the time he worked for the KSHS, Navajo, Arabic, and Russian. He was at that time proficient in Spanish and moderately so in German.

Museum Work and Educational Programs

As the assistant curator, Wilmeth's responsibilities were first and foremost directed toward various museum-related tasks, including the planning and construction of Native American exhibits. Other tasks included reorganizing the old archeology and ethnology collections, research related to the old collections and exhibits, tours, and preparation of educational materials.

Sohl, the museum director and former museum artist for the NSHS, had joined the staff in 1954 (KSHS 1956:58). The KSHS evidently was interested in modernizing its museum. Within days Wilmeth was drawn into this effort and was busy working on the preparation of new Native American exhibits (Wilmeth 1957).

The exhibits already installed were patterned closely after those at the NSHS, but Wilmeth and Sohl studied pictures of other museums and dipped into the museological literature for ideas (Wilmeth 1957). The task, though, was largely Wilmeth's with only occasional input from the museum director.

> I began planning the Indian exhibits, which presented many problems. There would never be enough space to include all the Kansas tribes, some of whom were only scantily represented in our collections, anyhow. I thought I would split them evenly between aboriginal and reservation groups .... There are only four cases to worry about at present, with no more coming till August. Will probably stick to life of the Indians rather than their roles in Kansas history (Wilmeth 1957:32-33).

Particular displays—he chose the Kansa and the Pawnee to start—were preceded by a survey of the Society's archeological and ethnological collections and library research on the lifeways of each tribe. In addition to static displays in the museum, Wilmeth also put together portable displays "for exhibits to be

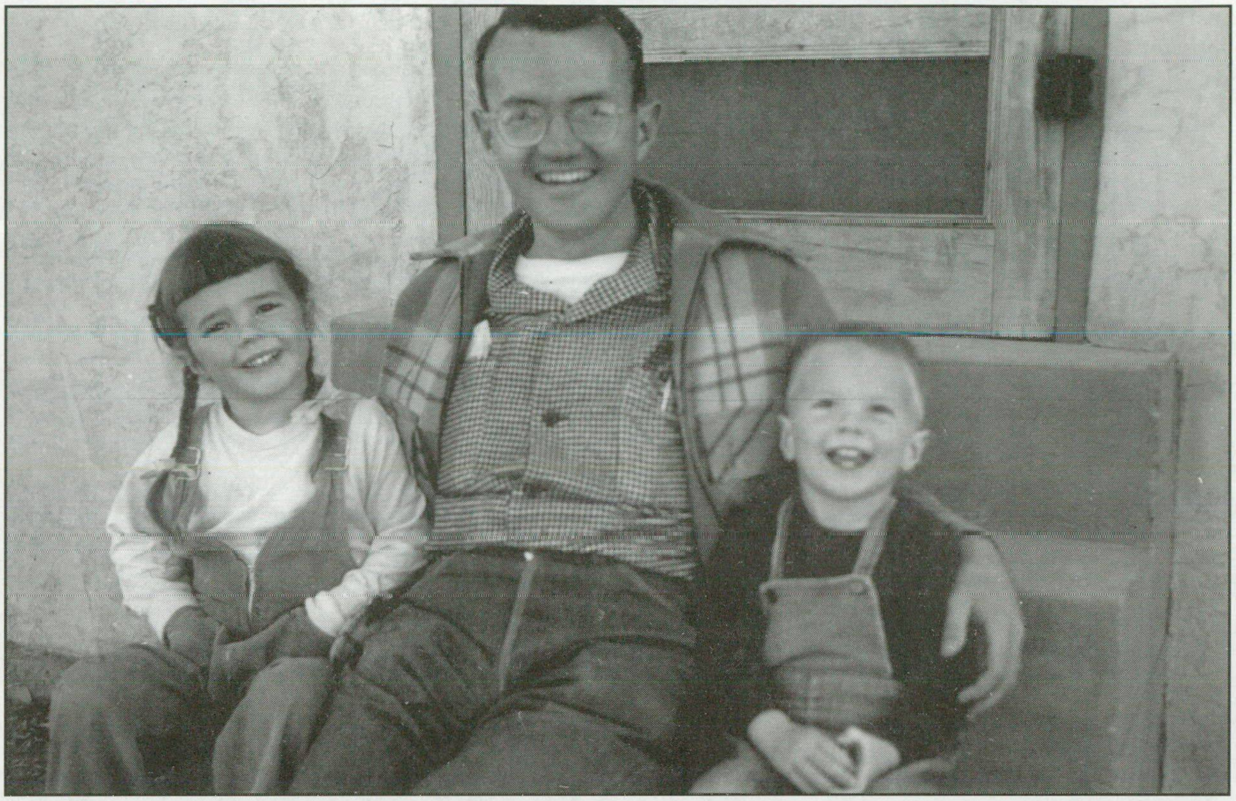

Figure 5. Frances, Roscoe, and Ben Wilmeth, probably in New Mexico. (Image courtesy of Verna Wilmeth.)

sent out to schools" (Wilmeth 1957:47).

The new exhibits were finally completed in the fall of 1958. In the interim Wilmeth created various temporary displays, which were replaced as the new, permanent exhibits were finalized. *The Historical Society Mirror,* KSHS bimonthly newsletter from 1955 to 1992, heralded the new addition to the museum:

> With the addition of five new case displays the Indian section of the museum is complete for the present .... For the first time the Society's museum now has an entire section devoted to the American Indian and the displays have already proved popular with both adults and children (KSHS 1958a:2).

The displays included cases, which featured an assortment of archeological specimens dealing with the Sac and Fox, the Kansa, and late pre-contact Oneota, and a display of moccasins from various Plains and eastern tribes; there was also a case entitled "The Harvest and the Hunt," detailing Native American subsistence practices. As with the Oneota case, this one employed archeological material "illustrating the culture of the Plains farmers who occupied the Central Plains more than 500 years ago ..." (KSHS 1958b:1). To a great extent the new gallery developed around the Society's holdings. However, Kivett at the NSHS sent an Oneota pot for display, and a trade for "duplicate" ethnological material was arranged with the Oklahoma Historical Society (Wilmeth 1958b:35, 37, 72). From Wilmeth's diary it is also evident that the exhibit evolved considerably over the nearly year and one-half that it took to put it all together (Wilmeth 1957, 1958b).

Concurrent with his work on exhibits, Wilmeth also was charged with preparing educational material to accompany them (KSHS 1958c:87). For the most part, this seems to have been descriptive material to be used in tours, given by him or KSHS Museum Division secretary Norene Catron (later Ketcherside), and lectures, mostly to school groups. After consultation with Sohl, it was decided "to keep the tours for younger children, but make them shorter, and to use lectures with slides for the older children" (Wilmeth 1957:50). Wilmeth drafted commentaries for each exhibit, though he chaffed at this sort of work. He noted in his diary on April 1, "Stan said Nyle had asked about it [the educational program], and since this seems to be the principal concern of both of them, I guess I will have to devote more time to it, to the detriment of archaeology" (Wilmeth 1957:70). The following day he wryly added, "Worked all day on the educational program, since I've resolved to give it more time than I have; I shouldn't really say 'resolved,' but rather yielding to a broad hint. Though for all I know, it may just have been Nyle's way of showing interest in my work" (Wilmeth 1957:71). In the end his programs were judged successful, as registration for tours and other programs doubled from 1957 (KSHS 1958c:87).

Another task was an inventory of Kansas' museums, which he was quick to use as a presentation, "Survey of Kansas Museums," at the Mountain-Plains Museum Conference held at the University of Oklahoma, October 31-November 2, 1957. Incidentally, the meeting was well attended by a number of Plains archeologists (Wilmeth 1957:189-192).

Wilmeth's frustration with the educational programs stayed with him. By the time he left the KSHS, he began to have serious doubts about the value of the museum work in which he had been engaged. In a letter to his old friend and mentor, Gilbert Wright, he wrote:

> It has seemed to me here, that a lot of our display selection and design in the museum has been without any basic underlying philosophy. While our techniques and methods are representative of the latest ideas in museum display, there has been little thought about what our museum is for and what we should be trying to do... I often wonder if we are educating anybody, although we are supposed to be an educational institution. I know people are interested in the museum, and enjoy seeing all the curious objects used by their ancestors, but is this enough? And can you teach history thru a museum? This I doubt. I think our museum can serve only to illustrate history learned through reading, or perhaps to stimulate people to do more reading. But the attitude here seems to be that as long as the number of visitors is high, this is all we should be concerned about. So should we have a basic philosophy and try to contribute to people's understanding of history, even at the cost of losing some of our duller visitors, or should [we] be satisfied with displaying oddities ... to attract large crowds of the curious? (R. H. Wilmeth to G. Wright, letter, 23 April 1960) [emphasis in original].

Archeology in Kansas

Wilmeth's immersion in Kansas archeology began on his first day of work, when Sohl took him on a tour of the Society's holdings, including the archeological materials. Eighty years of archeological collections—by modern standards haphazardly made—were squirreled away in a room behind the elevator (Storeroom No. 1), with some additional materials spilling into a smaller room, designated Storeroom No. 2. As most of the material had never been catalogued, the first task was to organize and catalogue it, which he began the following week. In this he was frequently assisted by Norene, Jim Ketcherside, Frank Smetzer, and Cliff (last name unknown). Sohl, a veteran of the NSHS, where archeology had long been a staple, was interested in bringing it to the KSHS (R. H. Wilmeth to W. R. Wedel, letter, 19 February 1957). Presumably this sentiment came out during the initial interview with Wilmeth at the Plains Conference, and this bit of common ground gave hope to both.

By mid-March 1957 Wilmeth had advanced far enough in his sorting effort that he needed boxes for storage. A brief canvas of downtown shoe stores soon brought in "tons of shoe boxes, enough to last ... for quite a while" (Wilmeth 1957:60). The shoeboxes were long a source of mirth by later archeological staff, but shoeboxes had several distinct advantages over artifacts in piles on the floor and in crumpled pasteboard boxes. They were convenient in their range of sizes, ease of access, and suitability for small collections; best of all, they were free for the taking. Wilmeth probably picked up this practice in the Southwest, where the use of shoeboxes in storing archeological collections harked back as far as Edgar Lee Hewett's pioneering surveys in New Mexico in the teens and twenties (Fugate 1995).

Wilmeth analyzed each collection as he catalogued, and where he came across specific site locations, he recorded these. Quickly recognizing the need for a running inventory of sites, he began to assemble a card file with whatever information was available. For the rest of his time at the KSHS, he continued to add to this file, gleaning data from old publications and recording locations provided him by collectors or amateurs and from his own field surveys.

Almost immediately Wilmeth visited the Society's library to take stock of its anthropological holdings. The literature on Kansas archeology was hardly voluminous, and it did not take him long to devour what little there was. Finding the library's archeology holdings sparse, he begged Wedel, Smith, Stephenson, Franklin Fenega (University of Nebraska), and others for whatever he could get, including Wedel's papers, RBS reservoir appraisals for Kansas, and back issues of the *Plains Anthropologist*. At this time Wedel's (1959) massive Bureau of American Ethnology volume, *An Introduction to Kansas Archeology*, had yet to be published. Wedel did, however, supply copies of portions of the draft manuscript to Wilmeth as early as 1957 (W. R. Wedel to R. H. Wilmeth, letter, 7 March 1957). The volume was published in 1959, in time for Wilmeth to make use of it in his reservoir salvage projects.

Wilmeth adopted a rotating schedule of duties, working in half-day blocks (Wilmeth 1957:45). The remainder of this section focuses on the major aspects of his archeological activities, which are reviewed topically below. Separation of these activities in discrete elements, while convenient, is admittedly somewhat arbitrary. Wilmeth had no choice but to "multi-task," and any given day might find him cataloguing and analyzing archeological collections, writing letters to solicit information, and discussing the prospects of highway or reservoir salvage with his supervisors—in addition to his regular museum duties.

In the evenings he worked on the report on the Payne site excavations, and he was even allowed to go to the 15th Plains Conference in Lincoln, where he read a paper on the Akaska focus, which he designated to include the Payne site material culture (Wilmeth 1957:203-205). He attended the Society for American Archaeology (SAA) conference in Norman the following spring, though he gave no presentation there (Wilmeth 1958:71).

Kansas River Survey

In mid-March 1957 Wilmeth began planning an archeological survey. As he knew that extended periods from the museum were out of the question, the survey consisted of a form letter sent to the editors of newspapers in communities located along the Kansas River between Junction City and Kansas City. The letter solicited the names of local collectors. Langsdorf passed along the name of a collector he knew in the Topeka area, and from KSHS historian Robert Richmond, Wilmeth got a set of county maps on which to plot site data. Apparently with the approval of at least Langsdorf, the letter went out and obliging editors responded with the names of local collectors and amateurs. One editor called Miller directly, which, Langsdorf informed Wilmeth, rattled him: "Apparently he hadn't heard of it, and thought he should have. I hadn't figured we were far enough along yet to bother him about it" (Wilmeth 1957:67). Although he started to receive hints about the educational program, *The Historical Society Mirror* (1957:4) soon proclaimed, "During the spring and summer months, the Society's museum will conduct an archaeological site survey in the Kansas river valley .... At present only fragmentary data exists concerning the prehistory of Kansas, it is hoped that the survey will be a contribution to the knowledge of the early history of this area."

The survey proceeded through the summer and fall; Wilmeth was even permitted occasional outings with collectors to verify site locations. As a result of the work, *The Historical Society Mirror* reported the following.

> A total of 31 sites [were] located, of which 14 were examined and surface collections made. In addition, a trip was made to the Solomon valley in north central Kansas where 23 sites were located and eight examined. A wide variety of Indian cultures was represented at these sites including "early man," generalized Woodland, Kansas City, Hopewell [sic], Upper Republican, Central Plains, and historic Kansa (KSHS 1958d:3).

Kansa

As an outgrowth of the Kansas River survey, Wilmeth developed an interest in the Kansa, the Dhegiha Siouan tribe after which the state was named. A local collector and Wilmeth searched out suspected Kansa villages near Topeka; library research yielded articles reporting sites and maps depicting specific locations. Over the next year or so Wilmeth began to pore over everything that he could find, especially accounts of early explorers, such as Bourgmont, Long, Lewis and Clark, and others for information on the Kansa (Wilmeth 1957, 1958b). A particularly useful source was the journal of the Reverend Isaac McCoy, a Baptist missionary who ventured into the region in 1828 in search of a new home for Indians displaced in the east (Barnes 1938).

From these sources Wilmeth wrote a paper, "Kansa Village Locations in the Light of McCoy's 1828 Journal," intended for *The Kansas Historical Quarterly*. Richmond and Barnes scrutinized the paper (Wilmeth 1958b:39), and he also sent a copy to Wedel for his comments. Wedel, who had published an article on the Kansa some years before (i.e., Wedel 1946), offered a few comments, adding, "That I am somewhat chagrined at not having caught the McCoy data in my reviews of the movements of the Kansa goes without saying ..." (W. R. Wedel to R. H. Wilmeth, letter, 2 April 1958). After revisions, Wilmeth forwarded the manuscript to Mechem, editor of *The Kansas Historical Quarterly*; the paper was published in 1960. By this time Wilmeth had written another paper, "Present Status of the Archaeology of the Kansa Indians," for the *Kansas Anthropological Association Newsletter* (Wilmeth 1959, 1960). This paper reviewed the main historical and archeological sources of information about the Kansa, as well as the prospects of using the direct historic approach to unravel their deeper history. To Wedel, Wilmeth indicated that, to the extent that time permitted, he had every intention of continuing his research on the Kansa (R. H. Wilmeth to W. R. Wedel, letter, 11 April 1958).

Kansas Anthropological Association

Within a few months of starting his new job, Wilmeth also came into contact with the Kansas Anthropological Association (KAA). Interestingly, it was Miller who arranged the introduction, directing him to attend the KAA's annual meeting in Hays on April 20, 1957 (Wilmeth 1957:78). Possibly, as the first president of the organization was a Fort Hays College historian, Eugene Craine, the news of the meeting came via the local "old boy" network of historians. Wilmeth duly attended, though he was less than impressed by the proceedings. The KAA meeting, he observed, was "as I had expected ... a group of farmers who collected Indian relics" (Wilmeth 1957:85).

The KAA was organized in 1955, largely by a small group of collectors and amateurs in the central and western parts of the state. Like many archeologists, Wilmeth approached amateurs with a good bit of trepidation. Of course, like many archeologists, he was aware of the value of collectors, and, as in the Kansas River valley survey and his hunt for Kansa villages, he relied heavily upon them for information. There was a difference, however, between the casual collector and those non-professionals who dug into sites. It was the latter that concerned him. In a letter to Craine, he summed up the source of his ambivalence.

> I hope you have been having good results in discouraging your members from attempting excavation. I know from experience elsewhere that membership in an organization is apt to lead amateurs to believe they are archaeologists, and to believe that because they record the location of their specimen, they are entitled to dig anywhere. This belief is hard to discourage. If we can prevail on the amateurs to limit their activities to recording sites and making surface collections, they can be of invaluable aid to professional archaeologists (R. H. Wilmeth to E. Craine, letter, 22 August 1958).

Craine, whose doctorate was in American history, was nonetheless aware of professional archeological opinion regarding amateurs, as too was Dorothy Richards, the second president of the KAA. In 1959 she wrote an impassioned defense of the organization.

> The so-called "pot-hunter" we have with [us] always, an ever-present irritation to the professional. We must face it ... . To my way of thinking we either help them and profit by the information gleaned or we force them underground and all is lost. The much maligned "pot-hunter" is a great potential source of information and turned in the right direction a most profitable one ... . We have groups over the state crying for information on the acceptable methods of archaeological procedure ... . We are quite cognizant of the adverse criticism of our organization and are very ready to admit our faults but we are trying and it must be admitted that Kansas has been very negligent in forming any sort of organization for preserving its own archaeological and anthropological data. Bordering states have long bled Kansas of materials that she, herself, should have been preserving. We feel that we have made a step in the right direction and with cooperation we should be able to give Kansas her rightful place in preserving her rich anthropological history and prehistory (D. Richards to R. H. Wilmeth, letter, 21 October 1958).

Richards implored Wilmeth to come to the annual meeting to speak on "Kansas archaeology and anthropology and particularly upon methods of handling finds and preserving data." Wilmeth readily agreed with Richards and, following her suggestion, offered "to try to outline some rules for the group to follow, which will perhaps make their work both more interesting and of greater value to scientific archaeology" (R. H. Wilmeth to D. Richards, letter, 28 October 1958).

As an aside, Richards noted in her letter that Smith at the University of Kansas had recommended Wilmeth be invited to speak. For a number of years, Smith was the most prominent professional archeologist in the state, which he later said imparted a sense of obligation to deal with archeological matters at large in the state, at least to the extent that teaching and his involvement in RBS projects and other research allowed. With Wilmeth's arrival Smith was only too happy to let him (and later Tom Witty) take over the local scene (Smith 1992:65).

While his ambivalence regarding avocationalists never diminished, Wilmeth encouraged when and where he could, submitting his article on the Kansa to the *KAA Newsletter* (Wilmeth 1959) and befriending several KAA members. After he left Kansas, he offered his successor, Tom Witty, a blunt assessment of the group as a whole. At the same time, though, he did recommend maintaining contact and even suggested giving blocks of site numbers to a few of the better qualified. "Those people are a long way from Topeka, and some members are rampant pot-hunters, so if we can establish contact with a few of the better ones, it may cut down on the destruction" (R. H. Wilmeth to T. A. Witty, letter, 2 December 1960).

Highway Salvage: A Blip on the Radar

The IASP-RBS, which began operation in 1946, led to the establishment of other salvage programs, including pipelines and roads (Jennings 1985). In 1956 Congress passed the Federal-Aid Highway Act, under which the federal government proposed a 15-year nationwide road construction program, estimated at a cost of nearly $60 billion (McGregor 1956). The act authorized the use of federal funds to reimburse states for a portion of the cost of archeological investigations, excluding survey and transportation costs, conducted in advance of highway construction. Highway salvage emerged in the Southwest in New Mexico and Arizona in the early-mid 1950s (Thompson 2004; Wendorf 1957, 1962), and salvage operations in these states became the model for other would-be salvage programs across the country (e.g., Ritchie 1960; Sears 1958).

Within days of his arrival, Wilmeth was already exploring the possibilities of highway salvage, writing Fred Wendorf, an early leader in this area. In March Smith forwarded a letter to him from John McGregor at the University of Illinois (Wilmeth 1957:25, 65). McGregor, a Southwestern archeologist, chaired the SAA's Committee on Salvage Archaeology. Wilmeth showed the letter to Langsdorf, who "said there would be no objection to my going out if it didn't interfere with the museum work" (Wilmeth 1957:65). Wilmeth now had the tacit approval of the Society's administrators to proceed cautiously with archeological work, though not specifically in relation to highway projects.

Where highway salvage was concerned, little happened. A year later Wilmeth received another letter from McGregor, which he again presented to Langsdorf and Miller. The news this time was more promising, as McGregor raised "the possibility of putting an archaeologist on State Highway's staff at Federal expense" (Wilmeth 1958b:37). Wilmeth sought clarification and was told that the federal government would pay 70 percent of a highway department archeologist's salary. Miller recommended writing to the highway commission, which Wilmeth did. *The Historical Society Mirror* declared, "A new problem concerning archeology in Kansas is arising as plans are made for large scale highway construction in connection with the projected Interstate system. In new construction and in highway relocation there is always a possibility that valuable historical and archeology sites will be damaged or destroyed" (KSHS 1958e:2). The impact, in fact, would be significant; as McGregor (1956:1) pointed out, major highways would have a 300-foot right-of-way, "plus barrow pits, grades, etc., will involve a considerable area."

As *The Historical Society Mirror* article indicates, through Wilmeth the KSHS was aware of both the problem of highway construction and the related potential of highway archeology. The hope was that enough funding would be available to enable the KSHS to get such a salvage program rolling. With a lot at stake, Wilmeth wrote directly to the U.S. Department of Commerce, Bureau of Public Roads to find out whether it was true that the federal government would cover some archeological costs as part of the planning process. He was informed, however,

> that costs of locating and recording on appropriate maps archaeological or paleontological sites are not reimbursable with Federal-aid funds .... I had thought that it would be possible to regard necessary exploratory work in locating these sites as a proper item in our highway planning process .... However, to the disappointment of myself as well as the archaeologists, this opinion did not hold .... (E. H. Holmes, Assistant Commissioner for Research, Bureau of Public Roads, to R. H. Wilmeth, letter, 9 July 1958).

Major impediments to the creation of highway salvage programs included funding, or rather the lack of it; absence of appropriate legislative mandates at the state level, that is, the legal basis to spend state money on cultural resources; and the indifference or hostility of highway personnel (Shaeffer 1957; Word 1979). For a time it looked as if the Rockefeller Foundation might offer grants to cover start-up costs, but after lengthy negotiations with the SAA, the Foundation declined to do so. Until the Act's interpretative Policy and Procedure Memorandum was amended in 1959, most states had only marginal success in setting up programs. The amendment allowed use of federal funds to cover the costs of not just excavation but survey within proposed highway rights-of-way. Despite this change and contact with the highway department, which elicited a polite response, little came of highway salvage in Kansas until the 1970s, by which time the destruction of several important sites underscored the need for such a program (Lees 1988; compare Schirmer and Wilson 1986).

Although highway salvage lay in the future, salvage operations were undertaken at the Koons site (14WC1). The work was not done by the KSHS, but by KAA members based in Wallace, Kansas. Jerome Bussen of Wallace wrote to Wilmeth in May 1958. The reason was that he and several other "pothunters," he joked, were concerned about a pre-ceramic site that would soon be affected by the relocation of Highway 40 (J. Bussen to R. H. Wilmeth, letter, 12 May 1958). At times George Metcalf of the Smithsonian Institution assisted Bussen and his cohorts in the work at Coal Oil Canyon (Bowman 1960a), which no doubt lent them a measure of credibility with Wilmeth that perhaps would have been lacking otherwise. With the permission of the highway engineer, the group had mapped and tested the site, but Wilmeth was unable to visit it. The problem, as he told Bussen, was that there were so few professional archeologists in the state, mainly he and Smith. "Both of us have a number of other duties that prevent us from taking off on short notice" (R. H. Wilmeth to J. Bussen, letter, 19 May 1958). The group continued to work at the site, hoping to be able to salvage features as they were exposed by construction, though Bussen fretted that "we would have no authority to halt the contractor if something really significant did turn up" (J. Bussen to R. H. Wilmeth, letter, 14 June 1958).

In May 1960 Wilmeth informed Bussen that, while there was still no highway salvage program, the highway department's legal division was weighing the matter. On the plus side there would soon be a state archeologist with more time available for travel. A one-man show for some time, Wilmeth had been all but overwhelmed with reservoir salvage and continued museum duties. As for the site, "I will contact the highway department ... (if they haven't gone through it already) and can perhaps get some sort of cooperation for you" (R. H. Wilmeth to J. Bussen, letter, 19 May 1960). In fact, Wilmeth supplied Bussen with the names and telephone numbers of the highway engineer and the contractor, who gave permission for the work—provided that it did not slow down the project (J. Bussen to M. F. Hawley, letter, 29 July 2005). From June through August 1960, the group monitored earthmoving at the site, salvaging what information they could (Bowman 1960b).

First Diggings

Although Wilmeth would end up involved in RBS salvage work in Kansas, his first forays into "dirt" archeology were much more modest, seat-of-the-pants affairs. Even so, each set a precedent—important in bureaucracies—and slowly advanced the cause of archeology at the KSHS and thus arguably at the state level.

At the Kansas Monument Site (14RP1)

Apparently as a result of a need in the museum for Pawnee-related artifacts, Sohl and Wilmeth planned an outing to the so-called Pike Pawnee Village, located northwest of Belleville, Kansas. The KSHS owned the site, which was discovered and donated to it in the 1890s. The two made the trip on May 8, 1957; on the previous afternoon Wilmeth had gathered what bags and boxes he could for artifacts (Wilmeth 1957:99).

> The monument site was on a high bluff just across the Republican River ... . The description certainly didn't fit Pike's of the village he visited. But there were lots of house depressions, so we were sure we'd find something. First we wandered along the edge of the bluffs, spying around badger holes for traces of burials, but in vain. In a plowed field west of the site we found a lot of iron and other scraps from someone's house or dump.
>
> We selected a site within the state fence, and after lunch, sank a five foot square, next to a house. We went right down to sterile yellow clay, without finding a thing. Outside the fence, near what we took to be Carlyle Smith's diggings, we dug another pit, without result. Apparently occupation must have been awfully short lived (Wilmeth 1957:100).

After closing the two pits, the two returned to Topeka empty-handed. The "dig" did have one positive outcome, however; the following day, Miller gave permission to buy field equipment and recommended talking to the highway department about obtaining a used transit (Wilmeth 1957:101). Several weeks later Langsdorf, Sohl, and Wilmeth walked to a nearby hardware store and purchased "2 shovels, a pick, a prospector's pick, an axe, and two trowels" (Wilmeth 1957:133).

At El Cuartelejo Pueblo (14SC1)

Within a couple of weeks of beginning at the KSHS, historian Richmond approached Wilmeth noting, "the state owned the [El Cuartelejo] site ... and that Nile [sic], the Society secretary, was anxious to have it excavated and restored" (Wilmeth 1957:29). El Cuartelejo Pueblo is the ruin of a late seventeenth-century pueblo, occupied by fugitive Picuris and Taos. The site had been partially excavated in 1898 by Samuel Wendell Williston and Handel T. Martin of the University of Kansas Museum of Natural History (e.g., Williston 1899; Williston and Martin 1900; Martin 1909). In 1939 Wedel (1959:424-468) also directed excavations at the site. Unknown to Wilmeth, a group of local collectors also had thoroughly worked over the ruin in 1945, ostensibly also in advance of a reconstruction effort (Witty 1983:103).

Wilmeth's work at the site was instigated by John Boyer, a newspaper editor in Scott City. Boyer, pondering the site, envisioned it reconstructed where it would have some potential as a tourist destination. In March 1958 Boyer met with Miller and in June published an article in the *Scott City News Chronicle* stating that excavation of the ruin was imminent (Wilmeth 1958b:40; J. A. Boyer to R. H. Wilmeth, letter, 17 June 1958). In a letter to Wilmeth, Boyer acknowledged that he and his sons had cleared the foundations and did enough digging to expose "a few rocks to give the tourists something to look at" (J. A. Boyer to R. H. Wilmeth, letter, 17 June 1958). Boyer also informed Wedel of his plans to have the site re-excavated and restored (W. R. Wedel to J. A. Boyer, letter, 28 July 1958). To Wilmeth, Wedel expressed concern about these plans, hoping that—if it came about—it could be done properly and with due sensitivity to the surrounding area (W. R. Wedel to R. H. Wilmeth, letter, 28 July 1958).

Although Wilmeth had told Alfred E. Johnson, then a student at the University of Arizona, that it was unlikely much would happen at the site, Boyer's announcement concerning immediate digging was viewed with some alarm by the KSHS. If the desire was to spur the KSHS into action, it had the intended effect. Boyer claimed that he wrote the story simply to work up local interest. Thus, Wilmeth found himself preparing to work at the site, reading the previous reports, writing Wedel, and conversing at length with Smith and Johnson about it. Wilmeth had a palpable interest in the site, having worked on a pueblo in New Mexico for his thesis. And there was still hope that additional excavation would generate new information (compare Witty 1983). Johnson, for instance, pointed out that Wedel had found burned material in his excavations, suggesting "that Martin either did not fully excavate the site, or that he failed to recover all that was present" (A. E. Johnson to R. H. Wilmeth, letter, 20 May 1958).

In the end the grand plans came to little. Wilmeth drove to Scott City on August 21, 1958, and took a tour of the area with the Boyers. Despite the claims that the ruin had been cleared, Wilmeth reported, "I was rather taken aback to find [it] completely overgrown in sunflowers. Only a few places could the rocks forming the outer wall of the pueblo be seen. Here and there were pits Boyer had dug, looking for I know not what" (Wilmeth 1958b:104-104). Over the next three days Wilmeth worked at the site, virtually alone except for a few visitors, despite the promise of a small army of volunteer laborers. A visiting KAA member confessed to some of the digging, which Wilmeth quickly sought to dissuade. In any case he spent a morning clearing weeds, and then worked "on one room only, trying to find a definable wall or floor .... Both walls and floor were apparently gone. I did find a fireplace, slab lined, about where it was supposed to be, and this made it clear that the stone walls had been destroyed" (Wilmeth 1958:104). To Wedel, Wilmeth reported additional details of his work:

> As far as I can see, walls and floors have long since been destroyed by looting and repeated excavation. The fireplace you saw was Martin's Room V, and judging from his drawing, I should have reached the walls if there were any. Rock has been carried away for house construction and also for the foundation of the DAR monument. The few rocks visible on the surface appear to have been placed there recently to mark the outline of the pueblo ... .
>
> There was no definable floor such as described by Martin. I assume that the fireplace represents the floor level. The other features he describes are not recognizable, though I found a post hole with charred wood southeast of the fireplace, which does not agree with Martin's drawing. Another puzzling thing was the presence of some charred corn in the fill in this area just about the floor level. This is hard to account for if Martin really cleared the rooms to floor level. In spite of the bad shape the site is in, I wish it could be

> re-done, as possibly there are other features missed by Martin which might turn up. There are apparently cultural deposits below the floor level, representing either an earlier floor below, or Dismal River occupation prior to the construction of the pueblo (R. H. Wilmeth to W. R. Wedel, letter, 22 August 1958).

Wilmeth took a couple of pieces of pottery recovered at the site with him to Albuquerque, where he went next to attend the Pecos Conference. These were identified as from the Rio Grande valley, rather than from Taos. He took a special interest in the Dismal River pottery, which Frank Hibben of the University of New Mexico pronounced as quite similar to the ceramics that he found on Jicarilla Apache camps in northeastern New Mexico and southeastern New Mexico (R. H. Wilmeth to J. A. Boyer, letter, 22 August 1958). Wilmeth also sent a micaeous sherd from the site to Alfred F. Whiting at Dartmouth College for mineralogical analysis (A. F. Whiting to R. H. Wilmeth, letter, 22 September 1959; R. H. Wilmeth to A. F. Whiting, letter, 28 September 1959).

The El Cuartelejo site was subsequently investigated in 1965 by James H. Gunnerson (1968) and in 1970 by Witty (1983). The latter resulted in the pueblo foundation being reconstructed; however, plans for an on-site museum with a visitor center, in keeping with earlier schemes, never materialized.

At the Anderson Site (14SH306)

Prior to his involvement in reservoir salvage work, in 1958 Wilmeth tested another site on Shunganunga Creek in Topeka, about which a collector had told him. Wilmeth and his son Ben located the site during a weekend walk and picked up a few pieces of pottery (Wilmeth 1957:201). Wilmeth, after finding out that the site was on city property, asked that it not be disturbed (KSHS 1958c; P. O. Hale, Commissioner of Parks and Public Property, to R. H. Wilmeth, letter, 26 November 1957; R. H. Wilmeth to P. O. Hale, letter, 3 December 1957). In mid-March the following spring, Wilmeth and an assistant, Jim Ketcherside, dug two 5 x 5-foot test pits. Both yielded bits of charcoal and fire-cracked rock, but Wilmeth concluded that the site had been so heavily disturbed by cultivation that further work, at least in the area that had been plowed, would be a waste (Wilmeth 1958b:43-44). *The Topeka State Journal* (1958) sent out a photographer, so the work at least provided a "photo op," which was to the Society's benefit.

Reservoir Salvage

In the same article in *The Historical Society Mirror* that announced the results of Wilmeth's Kansas River valley survey, it was noted that the KSHS had contracted with the National Park Service to conduct surveys of the Melvern and Pomona reservoirs, both in Osage County, as part of the River Basin Surveys (KSHS 1958:3). After he received permission for a limited amount of archeological work, Wilmeth wrote to his friend Paul Beaubien, the NPS regional archeologist, about the possibility of involvement in reservoir salvage.

> ... we are interested in learning some of the details of River Basin work. Specifically, we would like to know the obligations assumed by the contracting party, and the extent of the expenses which will be borne by the Park Service ... . Is there any difference between contracts for surveys and contracts for excavation (R. H. Wilmeth to P. L. Beaubien, letter, 29 June 1957)?

Beaubien responded, "When Congress passes the appropriation bill, we will have some money for archaeological salvage projects outside of the Missouri River Basin ... so it should be possible to arrange a cooperative project between the National Park Service and the Historical Society" (P. L. Beaubien to R. H. Wilmeth, letter, 9 July 1957).

Of the proposed reservoir basins in Kansas, the Pomona Reservoir, scheduled for construction in 1959, did not appear to have been surveyed. If Wilmeth and the KSHS wanted to survey this basin, Beaubien added, the NPS could pay for it by purchase order, provided the cost of the work came to less than $400. This option cut down on administrative paperwork on the NPS end, and, if it worked out, formal agreements covering the more expensive excavations could be negotiated at a later date. Initially, the Smithsonian Institution, Bureau of American Ethnology, had responsibility for coordinating reservoir work. In 1950, though, the NPS began to cooperate directly with numerous local institutions (i.e., universities, colleges, state historical societies) with personnel willing and able—meaning adequately trained—to conduct archeological surveys and excavation. Cooperating institutions were required to shoulder a portion of the cost of the work; this action significantly expanded the scope of reservoir salvage. It was through this mechanism that the KSHS began its participation in the RBS, although it was not until November 1957 that an agreement was finalized, with fieldwork to begin in the

Figure 6. Wilmeth at the Masenthin site (14OS301) in 1959.

spring of 1958 (KSHS 1958d; Wilmeth 1958b).

Wilmeth (1958a:48) remarked in his journal on March 27, 1958, "Today the Pomona Reservoir survey got officially underway … ." Off and on, as weather and other duties permitted, Wilmeth ventured to the reservoir area, where he made contact with landowners and surveyed. Survey in the Melvern Reservoir basin began on June 28, 1958 (Wilmeth 1958b:85). *The Historical Society Mirror* (1959a) reported "The work was supervised by Roscoe H. Wilmeth …," but, truth be told, he was alone much of the time. During the summer months Ketcherside accompanied him on occasions (Wilmeth 1958b). On the side he looked for suspected Sauk (an alternate spelling of Sac) and Fox villages on Salt Creek outside of the reservoir basin with some success (Wilmeth 1958b:68, 1958c:12). At least now Wilmeth had some field equipment, as the Kansas legislature approved a request for field equipment in January of that same year (Wilmeth 1958a:9).

By September 25, 1958, Wilmeth had completed surveys of both reservoir basins. All told, 15 non-consecutive days had been spent in survey and interview of landowners and local collectors about site locations (Wilmeth 1958c:1). Wilmeth reported 10 sites in the Pomona Reservoir and another 9 in the Melvern Reservoir basin. One site, 14OS307, was found outside the Pomona Reservoir and was attributed on documentary grounds to Sauk Chief Chekuskuk. Most sites were attributed to the Plains Farmer (Plains Village) era, with a few other Woodland and Archaic stage sites also present. A number of sites in both reservoirs were recommended for testing; Wilmeth considered 14OS301 and 14OS305 to be in immediate danger (R. H. Wilmeth to P. L. Beaubien, letter, 3 December 1958).

Excavations at these two sites commenced in July 1959. Wilmeth (Figures 6 and 7) had a crew of seven, including field foreman Curtis Tunnell, camp manager Viola Schroer, Barry Isaac, James McHenry, Larry Peters, Morgan Usadel, and Robert Widener (Wilmeth 1970a:2). A single grave was excavated at the Masenthin site (14OS301), the contents of which were cremated human bone and a few contact period artifacts. The grave was ascribed to the mid-nineteenth

Figure 7. Wilmeth and Stanley Sohl at the Hart site (14OS305) in 1959.

century Sauk and Fox occupation of the area. The Hart site (14OS305) was older, dating around A.D. 1000, and yielded chipped stone, ceramics, animal bone, and shell (Figure 8). Evidence of an oval, lightly constructed, wattle-and-daub structure also was found (Figure 9). The ceramics, tempered with grog (crushed pottery) and indurated clay, and the structure (presumably a house) gave Wilmeth fits. To that time nothing similar had been found in the state. For the rest of his time in Kansas, Wilmeth struggled to make sense of these, writing a flurry of letters exchanging information with James Shaeffer, J. Mett Shippee, Charles McNutt, E. Mott Davis, Harold Huscher, Warren Caldwell, and James B. Griffin (Wilmeth 1970a:2). The final report on the project was not completed until 1965 and was not published for another five years. Out of the work

Figure 8. Work in progress at the Hart site (14OS305) in 1959.

came recognition of the Pomona focus, as Witty (1967) designated it following the discovery of additional similar sites in eastern Kansas.

Wilmeth had hoped to work on Riley and Pottawatomie County sites in the Tuttle Creek Reservoir, expressing to MRB Chief Stephenson an interest in several sites (R. H. Wilmeth to R. L. Stephenson, letter, 7 October 1958). Smith had worked at five sites, including the Budenbender site (14PO4) during the summer of 1957 (Johnson 1973:273; Smith 1992). Wilmeth and Sohl had visited his field camp on at least one occasion (Wilmeth 1957:134-135). However, Smith informed Beaubien in 1958 that he no longer wished to work in Tuttle Creek; he was far more interested in the Northern Plains and hoped to return there. He requested that Wilmeth be allowed to pick up the work in the reservoir. "This would put archaeology on its feet at Topeka ..." (C. S. Smith to P. L. Beaubien, letter, 7 October 1958). In fact, Wilmeth planned on shifting his Pomona Reservoir crew to Tuttle Creek, should the sites they were working on turn out to have little of interest (KSHS 1959a).

Other reservoir projects loomed; for a time survey of the Perry Reservoir in Jefferson County was considered, but the construction date for John Redmond Reservoir, a non-MRB project in Coffey County, was closer. Formerly known as Strawn, the reservoir had been previously surveyed (i.e., Moorman 1953), but later the proposed dam was shifted 10 miles downstream. Thus, the basin required a new survey (P. L. Beaubien to R. H. Wilmeth, letter, 2 September 1959). Also pending was the Wilson Reservoir in Russell County, and for a while it looked as if work in the Milford Reservoir basin in Clay and Geary Counties was also possible. The Wilson Reservoir, however, was in construction, as it already had been surveyed, so it was slated for site excavation (P. L. Beaubien to R. H. Wilmeth, letter, 29 January 1960; Solecki 1952). Because of Wilmeth's pending departure, he would be able to carry out work only in one basin; he chose John Redmond Reservoir, presumably due to its proximity to Topeka and his impending move.

Method and Theory

At the survey stage Wilmeth's fieldwork involved pedestrian survey and informant interviews. During

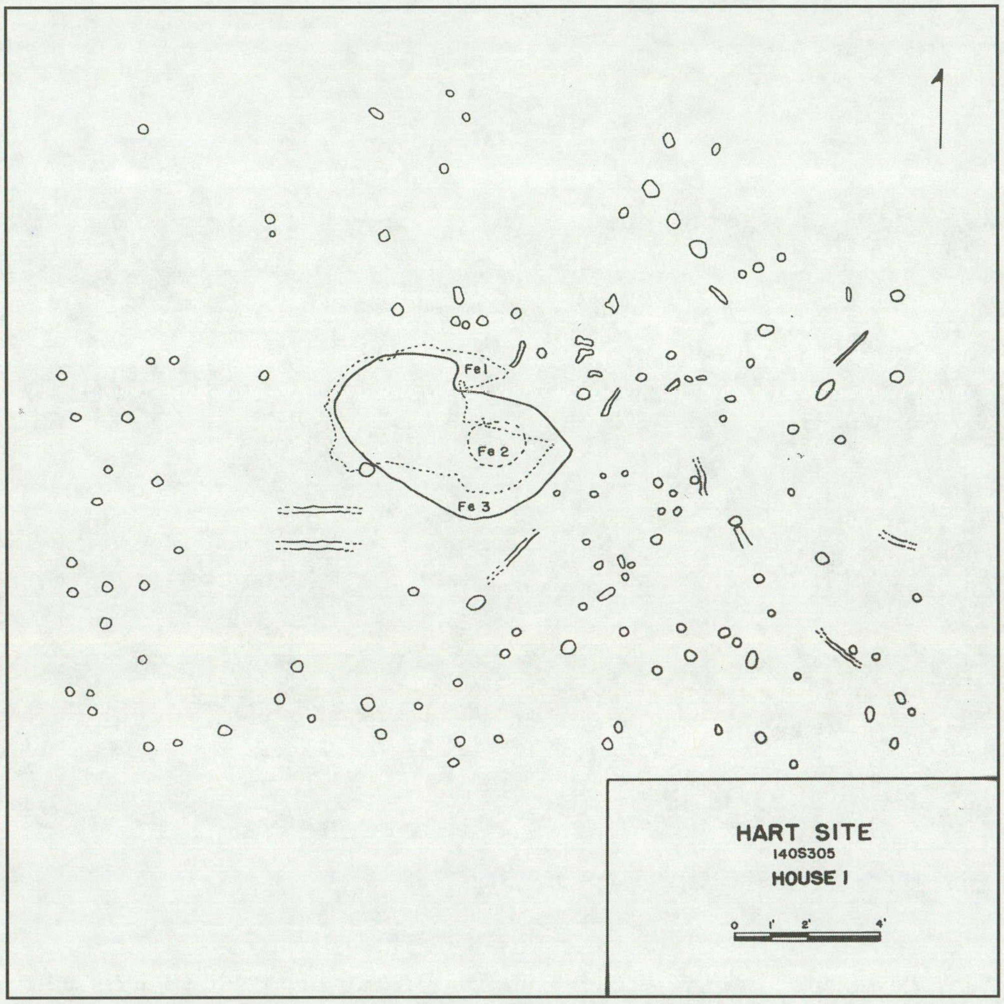

Figure 9. Plan of House I at the Hart site (14OS305).

excavations he used a standard grid of 5 x 5-foot squares, dug in arbitrary 6-inch levels (Wilmeth 1970a). These methods, with some variation, had been widely employed since the 1930s by archeologists, not just on the Plains but throughout the country (Dunnell 1986). Recovered materials were carefully described and explained with a framework involving migration and culture interaction (e.g., trade). Wilmeth was, as Forbis (1982:220) readily acknowledged, "Philosophically … an old style archaeologist. He had little or no interest in attempting to 'test' hypotheses; he believed in the narrative approach and in what made good sense. He liked to put things in place where they logically fit, without worrying about 'sciencing.'" Presumably, by "old style archaeologist" Forbis meant that Wilmeth would have considered himself to be a culture historian.

The culture history "paradigm" (compare Meltzer 1979) developed in the early twentieth century (Lyman et al. 1997). At the risk of oversimplification, within this paradigm archeologists employed such methods as seriation (mostly of pottery) coupled with stratigraphy to construct cultural chronologies. The cultural frameworks so developed proved generally sound in terms of the sequential ordering of cultural units, although the advent of radiocarbon dating in the late 1940s and early 1950s did lengthen the archeological past (see Dunnell 1999). Unfortunately, while archeologists could create testable chronologies—as radiometric dating affirmed—explanation rooted in diffusion, migration, trade, trait persistence, and so forth remained woefully underdeveloped. While the culture history program may have had its shortcomings, it did result in the construction of a cultural framework still widely employed, albeit with much elaboration.

A mainstay of culture history was a concern in identifying ethnicity of archeological manifestations. A prominent tool applied to this end was the direct historic approach, which used suites of culture traits (e.g., pottery types) in the attribution of ethnicity, as well as in anchoring relative chronologies, and as a source of specific historical analogy (Lyman and O'Brien 2001). Wilmeth's research on the Kansa exhibited these goals, although the published papers did not necessarily reflect this (see Wilmeth 1959, 1960). These papers instead focused on locating potential Kansa sites, a necessary precursor to use of the direct historic approach. His journals provide glimpses into his research process and indicate the importance of locating sites that could be linked to the Kansa using documentary sources. Archeologically, the sites should have European contact artifacts of the appropriate age. Nowhere in his journals did he state that he was interested in specific historical analogy (using ethnographic information to "flesh out" the culture of a related archeological manifestation), but his careful reading of Bourgmont's and later firsthand accounts of the Kansa certainly could be used as a source of such information (Wilmeth 1957, 1958b). Some of it did make its way into museum exhibits and a series of educational programs on explorers.

Wilmeth, as Forbis' implied, apparently rejected much of "the new archeology" program of the 1960s, as his later studies in Canada demonstrated (see Wilmeth 1977). The reasons for this are unclear, though part of it may be the vituperative rhetoric employed by the new archeologists to further their research goals (see O'Brien et al. 2005).

Teaching at Washburn University

In September 1958 Wilmeth began teaching an anthropology course in the Department of Sociology at Washburn University in Topeka. He instructed a course in 1959 called "Introduction to Anthropology," while in 1960 the course was referred to as "Cultural Anthropology" (Washburn University 1959:152; Washburn University 1960:178). His official title was "Lecturer in Anthropology." In 1960 William Key, the head of the sociology department, and Wilmeth began revising the course, as the department was expanding to include more anthropology. As he told several of the candidates for the archeologist position, the pay was a modest, but not inconsequential, $300/semester, and "the teaching experience certainly doesn't hurt your record" (R. H. Wilmeth to T. A. Witty, letter, 22 March 1960).

The State Archeologist

For some time Wilmeth, Langsdorf, and Miller discussed the possibility of creating a post of state archeologist. A request to create such as position was sent to the State of Kansas Department of Administration on November 6, 1958. According to this memorandum, "Mr. Nyle Miller, Secretary of the [KSHS], established a new position for which he [has] requested establishment of a new class .... Establishment of the proposed class of Archaeologist at salary range 34 ($415-$530) with concurrent adoption of the class specification is recommended, effective Dec. 1, 1958" (W. F. Kuiken, Director of Personnel Division to W. C. Salome, Executive Director, Department of Administration, letter, 6 November 1958). The document also spelled out the requirements of the new position, including a master's degree in archeology or anthropology and two years of field and one year of supervisory experience.

The proposal was sent to the Senate Finance Committee sometime later and met with approval on September 16, 1959, with the position to take effect October 1, 1959. The KSHS announced the new position during its annual meeting, held on October 20, 1959 (KSHS 1960b:75). Shortly thereafter the position request went to the legislature for funding appropriation. However, in mid-November 1959 the governor's budget committee refused to approve the salary for the position. Miller and Langsdorf appeared before the committee to justify the position, and for a time it looked as if it would not happen unless the legislature was willing to pass it anyway (R. H. Wilmeth to C. Tunnell, letter, 19 November 1959). At some point in all of this, Kansas statutes were amended as follows:

> The secretary of the state historical society is hereby authorized to appoint an assistant secretary, librarian, museum director, archeologist, state archivist, and such other employees as may be necessary, within available appropriations ... (Kansas Statute No. 75-3148, Chapter 75, State Department; Public Officers and Employees, Article 31: salaries and assistants).

In January 1960 the legislature approved the measure, appropriating funds for the position to open July 1, 1960 (Langsdorf 1975; R. H. Wilmeth to T. A. Witty, letter, 10 February 1960). Langsdorf (1975:386) credits Wilmeth's enthusiasm as a major impetus in the creation of the position.

In mid-March 1960 Roscoe Wilmeth became the first state archeologist. His successor, Tom Witty, was hired as the assistant museum director, and took over as state archeologist upon Wilmeth's 1960 departure, remaining in the post for another 33 years (Witty 1994).

Departure

By mid-1959 Wilmeth had made plans to leave Kansas. He was accepted into the graduate program in anthropology at the University of Michigan. A man of restless intellect, he was ready to move on to other things. Before he left, he directed the search for a successor. Possible candidates included Curtis Tunnell, later state archeologist of Texas; A. Dewey Buck, a student of Robert Bell's at the University of Oklahoma; Lionel Brown, a master's student at the University of Oregon; and Thomas A. Witty, Jr., a student of John Champe's and recent graduate of the University of Nebraska. Other names that came up included J. J. Hoffman, who did not have an M.A.; Adrian Anderson, who got his application in too late to be considered; and Donald P. Heldman, also too late. Gary Vescelius, a Ph.D. candidate at the University of Michigan, also applied late, though Wilmeth consoled him by suggesting "that this is a good job for someone just completing an M.A., who needs to recoup his economic losses before going back to school" (R. H. Wilmeth to G. Vescelius, letter, 7 March 1960).

Wilmeth also informed several friends and acquaintances, namely Alfred Johnson, Roger Grange, Elaine Bluhm, Claude N. Warren, and Jeremy F. Epstein about the position, but none were interested due to the low salary, other opportunities, or a desire to complete their graduate studies. Ultimately, Witty was hired in the summer of 1960. Almost immediately he found himself at Wilson Reservoir, where he dug in four sites on Hell Creek, while Wilmeth attempted to complete the survey of John Redmond (KSHS 1960a, 1960c; Witty 1962). Wilmeth and Witty had few opportunities to interact, perhaps only three times for a total of four or five hours (Tom Witty, personal communication to Virginia Wulfkuhle, 2005).

After Kansas

In September 1960 the Wilmeths left Topeka and relocated to Ann Arbor, Michigan. As a doctoral student with an assistantship at the University of Michigan, Wilmeth intended to continue in archeology. Ultimately, his goal was to work in Israel and West Africa, where he wanted to focus on "some of the problems arising from the cultural conflict produced by the contact of peoples of greatly varying European and Asiatic backgrounds" (R. H. Wilmeth to G. Wright, letter, 23 April 1960). To his dismay, the situation did not turn out as planned.

> When he was well into a thesis, his advisor, who had encouraged him to write on this topic, left for a year in the field. The interim advisor, after reviewing the thesis work, decided that the topic was "too thin" for a dissertation and that published or unpublished material was available only at distant specialized libraries, if at all. He recommended abandoning the research (V. Z. Wilmeth to M. F. Hawley, letter, 1993).

Shocked, he made up his mind to leave, but archeologist James B. Griffin stepped in, suggesting that he change his dissertation topic to the Central Plains. Wilmeth considered the matter and under Griffin's direction started work on a new dissertation. The whole experience did leave its scars. His friend Forbis (1982:220) noted, "that he once told me that he would take up a life of crime rather than go into the academic world."

Entitled *The Woodland Sequence in the Central Plains*, Wilmeth's dissertation was accepted in 1972, 12 years after he and his family left Kansas. In it he sought, as he put it, "to classify Plains Woodland sites within more significant cultural categories than those heretofore defined, and to arrange them in a temporal sequence" (Wilmeth 1972:7). Moreover, he argued, "[a] large part of the earlier inability to establish a temporal sequence for Plains Woodland can be attributed to a failure to look beyond the boundaries of the immediate area, particularly in the direction of the Northeast Woodland area" (Wilmeth 1972:7-8). Wilmeth argued for continuity from Hopewell through the Late Woodland, designating three sequential phases: Kansas City Hopewell, Orleans, and Loseke. The Central Plains phase, as he termed it, readily could be seen to have evolved from the preceding phases (Wilmeth 1972:212). Ironically, his dissertation, perhaps because it had been done outside the Plains area, was largely ignored. The subsequent accumulation of data and new interpretations, as well as new theories and data recovery techniques, have dated it.

Even prior to completing his doctorate, Wilmeth took a job with the Archaeology Division of the National Museum of Man (now the Canadian Museum of Civilization) in Ottawa, Canada, starting in 1965. His dissertation was completed while he was employed there. At the National Museum he successively served as the Prairie Provinces archeologist, head of the Western Canada Section, head of the Salvage Section, and archeologist for the Plateau region (Forbis 1982). At the time of his death, he was preparing to take up duties as Plains archeologist for the museum (Marois and Wright 1981:1).

Interestingly, Wilmeth's research interests in

Canada, focused on the Plateau region in British Columbia, tied together much of his previous career, extending back into the Southwest, where his interest in archeology was first kindled. Forbis (1982:219) observed that Wilmeth's "primary archaeological interests were in the protohistoric and historic periods, and tended to be centered on the Athabascans." This interest in the Athabascans arose directly out of his experiences in the Southwest.

> From the time of my work on the Navajo Land Claim more than twenty years ago, I have been fascinated by the problem of the origin of the southern Athapaskans: the location of their starting point in the north, the date and route of their journey southward, and most important, the reasons for this move (Wilmeth 1977:97).

Accordingly, the focus of much of his attention in Canada was the Anahim Lake in the Chilcotin area of the Plateau of British Columbia. The Anahim Lake district lay along a postulated line of movement of northern Athabascan populations from the Yukon across the Plateau region of the western U.S. and Canada, with populations dispersing into the Southwest (i.e., the Navajo) and out onto the Plains (i.e., Dismal River) (Wilmeth 1979). To his mind this route cleared up some problems, such as the lack of antecedent populations to Dismal River Apache in the Plains, though there remained significant problems and gaps in the data to contend with; it was to these that Wilmeth directed his attention (i.e., Wilmeth 1970b, 1975, 1977, 1979).

Although Forbis (1982:219) suggested that Wilmeth was getting close to establishing connections among the various Athabascan groups, he was not to complete his research. On August 19, 1981, as he was wrapping up his field season near Anahim Lake, Wilmeth was felled by a heart attack. In a moving tribute to Wilmeth, Forbis (1982:220, 221) remembered him as an affable "weaver of tales" who "could talk of a multitude of things, from cabbages to kings ... [as] he puffed away at his ever-present pipe (possibly with a bottle of beer at his side) .... I like to think of him regaling the angels, whom he will meet on this last journey."

Wilmeth's Legacy at the KSHS

This paper began with an epigram on contingency and a brief introduction to the history of archeology at the KSHS. The importance of contingency in understanding evolution is a contentious issue, but at the micro-scale of the three and one-half years that Wilmeth was at the KSHS, contingency seems to be a particularly useful concept. Consider that archeology in one form or another arose and then disappeared several times at the KSHS. There appears to have been an interest in archeology at the KSHS, if perhaps only initially on the part of the museum director, but it is far from clear that integrating archeology into its mission was inevitable. The curator position had been open long enough that, when Wilmeth's vita came across his desk, Secretary Miller decided to contact him. It was by chance that Wilmeth's name came to the attention of the Society's administrators and by chance that he had the minimum requisite museum experience. Given the ups and downs in the history of archeology at the KSHS, archeology may well have made its return, but for the chance of Wilmeth's hiring, it almost certainly would not have happened for some years.

Pioneers have a certain responsibility, and in his early days at the KSHS Wilmeth seems to have been conscious of this. He hoped from the start that he would be able to establish archeology at the agency. When he was hired, the possibility was acknowledged, even if tentatively so. Caution was in order, as the administration was understandably somewhat hesitant about how it might be worked into the "mission" of the KSHS. (A related issue was the impact of conducting this work on the Society's very limited budget.) For Miller that mission was educational. Wilmeth was thus obliged to feel his way, backing off sometimes, being aggressive at others. In the end it was a strategy that paid off: by the time of Wilmeth's departure, the KSHS had undertaken archeological fieldwork, was actively involved in reservoir salvage, and had established the position of a state archeologist. Through his research, both in the field and library, Wilmeth also contributed to an understanding of late pre- and post-contact Native American cultures in the Central Plains.

Acknowledgments. First and foremost, I would like to thank Verna Wilmeth for access to her late husband's journals and correspondence and for other information. Verna Wilmeth and her daughter Frances also gave the manuscript a careful reading, catching several errors. The late Edgar Langsdorf, back in 1992, spoke to me briefly about Wilmeth and the introduction of archeology to the KSHS. Tom Witty directed me to Wilmeth's old files in the KSHS Archeology Office, which were invaluable for this paper, and made helpful comments. Virginia Wulfkuhle supplied me with a copy of the site file on the Koons site

(14WC1) and information about the creation of the state archeologist position at the KSHS, researched by intern Kelly Scott. Mary Lou Anderson in the KSHS Library put me in touch with Norene and Jim Ketcherside of McPherson, who read this paper and shared impressions of Wilmeth from the student point of view. Jerome Bussen of Wallace, Kansas, kindly answered my inquiry regarding the salvage work at the Koons site. For copies of Wilmeth's correspondence with Gilbert Wright in the A. Gilbert Wright Papers at the Smithsonian Institution Archives, I would like to thank Tracy E. Robinson. My brother Von J. Hawley secured the Wilmeth-Wedel correspondence from the National Anthropology Archive, which indicated that Wilmeth and Wedel were acquainted as early 1956 and continued to write into the late 1970s as topics of mutual interest arose. Early on in my research, Donald W. Clark of the Archaeological Survey of Canada, Canadian Museum of Civilization, provided a copy of Wilmeth's obituary and other information.

This paper has had a particularly long gestation, as I began researching it in 1992; however, the press of professional responsibilities, relocating to another state, children, and so forth are the reasons I give for not completing it sooner. At the same time I would like to think that it is better, at least in some respects, than it would have been had I written it all those years ago. I hope that I have learned something since then! Any errors of fact or judgment are, of course, my responsibility.

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Ceramic Period Components at the Claussen Site, 14WB322, Wabaunsee County, Kansas

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The Kansas Anthropologist 26:65-119

The 2003 Kansas Archeology Training Program field school directed part of its effort to Ceramic period components at the Claussen site (14WB322) in Wabaunsee County. This site lies along Mill Creek in a valley that has received little systematic archeological attention since J. V. Brower's activities over a century ago. The studied components are buried in a point bar deposit and were recognized by flakes, rock, shell, and charcoal exposed in the eroding cutbank. As such exposures afford a very meager glimpse of an occupation, the research design emphasized testing two occupation areas to determine their size and overall nature. Only a small amount of material was recovered from the northern of the two areas. The occupation was during the Early or Middle Ceramic period and represents a small temporary camp, but little was learned about it. A larger excavation into the southern area exposed a pair of surface hearths with associated scatters of chipped stone debitage, pottery, and mussel shell, plus several tools and some animal bone. This occupation represents a Middle Ceramic-period short-term encampment. Its closest material culture similarities are to Smoky Hill phase sites in the Blue River valley. Rapid burial after the occupation meant that the occupation surface suffered little adverse effect after abandonment. Thus, the activity structure and spatial organization are exceptionally clear.

The 2003 Kansas Archeology Training Program (KATP) field school was conducted in Wabaunsee County in northeast Kansas, with much of the field effort directed toward test excavations on two parts of the Claussen site, 14WB322. Claussen is a complex site, containing a series of stratified components within two Holocene-age terraces in the middle reaches of the valley of Mill Creek, a stream that drains a portion of the eastern Flint Hills and flows to the Kansas River. The higher, older, and more extensive terrace (hereafter referred to as T-2) contains several components dating to the Paleoindian and Archaic periods. KATP participants conducted some limited excavations into one of these components in cooperation with the Odyssey Archaeological Research Program of the Kansas Geological Survey at the University of Kansas. Those directing the work on what came to be called the lower components will report it elsewhere. The lower and younger terrace (T-1) also contains several components. How many components are represented in this terrace, how old the components are, and how extensive any component is, have yet to be determined; however, it is certain that this terrace contains a record of occupation at least at two and probably more times during the Early and Middle Ceramic periods. These T-1 components, commonly known as the upper components, will be referred to by this term throughout this report.

The KATP field school devoted some of its summer 2003 effort to testing two of the upper components (Figure 1). The older of the two represents an Early or Middle Ceramic tradition occupation. This component, or at least the excavated portion of it, yielded only a small quantity of material in uncertain context, so rather little was learned about it. The younger of the two components was another story. This component,

Figure 1. Work in progress on one of the upper components.

dating to the Middle Ceramic period and broadly assignable to the Central Plains tradition, appears to represent a short and not necessarily very intense occupation, which nevertheless left behind a substantial amount of debris. Short-term occupation sites of Central Plains tradition affiliation are not well studied in this part of Kansas, or anywhere else on the Central Plains for that matter. Thus, although this is only one site, it is of a type that is virtually unknown and holds considerable research potential for archeologists who are interested in Central Plains tradition lifeways. Before describing the excavations and the material and information that came from them, it is pertinent to describe the site's setting, review past investigations and the results of those investigations in the Mill Creek valley and Wabaunsee County in general, detail what was known about the upper components prior to this investigation, and lay out the research problems this investigation was designed to address.

Site Setting

A traveler on Interstate 70 in Wabaunsee County can hardly help but notice some dramatic hills rising between mileposts 336 and 340. While certainly not as grandiose a spectacle as the first view of the Rocky Mountains about 450 miles farther west in Colorado, the view definitely belies the common perception of Kansas as flat and booooorrrrring to drive across. The discriminating traveler, approaching from the east in particular, may notice something else—that the hills seem to rise somewhat higher and more sharply south of and immediately north of the highway, and rather more gently and not to quite the same height a short distance farther north. The I-70 traveler likely would not know this, but the Claussen site is in the vicinity.

The topographic variability that the I-70 traveler sees can be understood by looking at the physiographic situation of the Claussen site. The site lies almost exactly on the border between two physiographic sections of the Central Lowland physiographic province of North America. As designated in Kansas (Schoewe 1949:276), these are the Dissected Till Plains and the Osage Plains (Figure 2), sections that are overall very similar except that the former was glaciated many hundreds of thousands of years ago, while the latter was never glaciated. Depending on the map consulted, the border marking the maximum extent of the ancient glacier was about 3 miles to the northeast (Ross 1991) or less than 2 miles to the west (Johnson 1987:20) of the Claussen site; either way, 14WB322 is beyond the border on the unglaciated Osage Plains. This detail is of little practical consequence for present purposes, as glacial deposits, while noticeable behind the glacial border, are very thin and do not control the topography at the extremes of the glaciated area. The grinding action of the glacier probably truncated and softened the hills north of approximately I-70, but the entire landscape surrounding the Claussen site is characteristic of the Osage Plains.

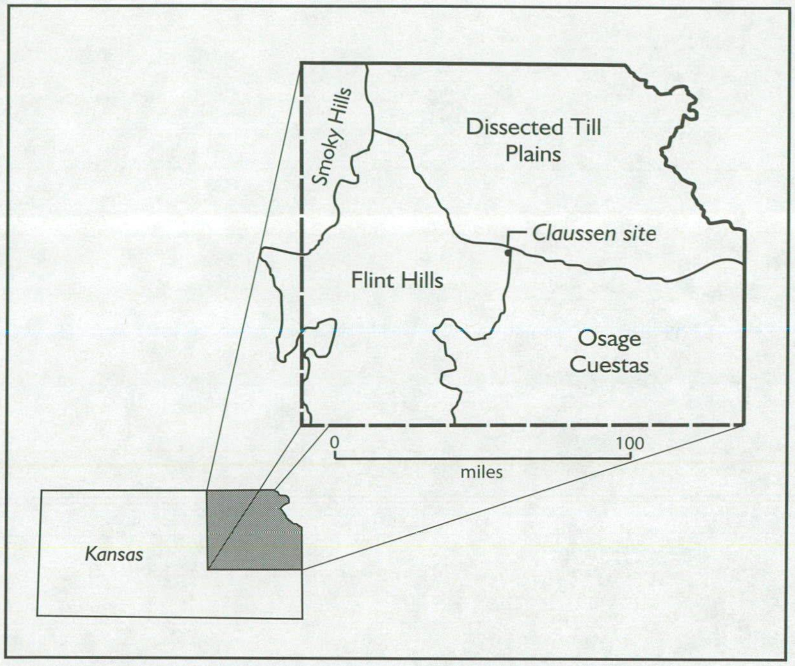


Figure 2. The position of the Claussen site relative to the physiographic sections of northeast Kansas.

More relevant is the position of the site near the border between two more specifically defined regions of the Osage Plains: the Osage Cuestas to the east and the Flint Hills Upland to the west (Schoewe 1949:276). This is pertinent because the surface bedrock formations are different, and chert is differentially available in the two regions. To the east the Osage Cuestas form a landscape featuring a series of northeast-southwest-trending, southeast-facing escarpments with flat to gently rolling plains, or vales, between escarpments. This terrain was formed on Pennsylvanian-system bedrock (Schoewe 1949:282). The Pennsylvanian system is not entirely devoid of chert, but only some of its formations contain this important raw material. The most notable of the chert-bearing Pennsylvanian formations are several members (i.e., strata of a formation) of the Oread Limestone (McLean [1998:172-176] provides a good discussion for the archeologist). The nearest Oread Limestone exposures are minimally 50 miles east of the Claussen site downstream in the Kansas River drainage; therefore, cobbles of these cherts would not be found in local stream gravels. To the west, however, the very name of the Flint Hills Upland reflects the abundance of chert available there. The bedrock formations of the Flint Hills are part of the Permian system. The limestones and shales of the Council Grove Group of this system are exposed in the lower valley walls of streams at the edge of the Flint Hills and contain little chert. The principal group of this system, however, is the widely exposed Chase Group. Formations within this group include the Wreford and Barnston limestone formations, each of which holds abundant chert (Merriam 1963; Ross 1991). The Chase Group is exposed in the Claussen site area and also is the predominant surface bedrock group upstream along Mill Creek, meaning that cobbles of its chert could be found in stream and valley gravels in the site area.

Mill Creek rises as a series of streams draining a portion of the northeastern edge of the Flint Hills in southern Wabaunsee County (Figure 3), the southeastern fringe of Geary County, and the northeastern corner of Morris County. These streams join near Alma to form Mill Creek proper. Mill Creek then flows in an overall east-northeast direction to enter the Kansas River from the south about 2½ miles northeast of Maple Hill and 12¾ miles east-northeast of the Claussen site. From about midway between Alma and McFarland to a mile or so east of Paxico, Mill Creek flows in a sinuous course and overall occupies the south part of its valley. Sometimes it is at the edge of the valley and right at the base of the south valley wall, which is Permian-age bedrock, principally of the Council Grove Group, with remnants of the Chase Group rocks on the highest points. The terrain is steep, rising more than 100 feet above the valley floor within 1,500 feet horizontally of the site and to approximately 170 feet above the valley floor within less than 1 mile. The valley is about 1 mile wide and is filled with Quaternary alluvial formations of Pleistocene and Holocene age. A low ridge of dissected Permian rock demarcates the northern edge of the Mill Creek valley and separates that valley from the Kansas River valley to the north. Upland topography north of the Kansas River valley is somewhat lower and gentler than on the south side—undoubtedly the legacy of the ice sheet.

Two Quaternary alluvial terraces fill the Mill Creek valley in the immediate site vicinity. The higher and older terrace, the T-2, contains a deeply stratified Early to Middle Holocene record with a Ceramic period surface component. The lower and younger terrace, the T-1, is a massive point bar that contains a stratified series of Late Holocene occupations within its sediments. Point bars are deposited by lateral as

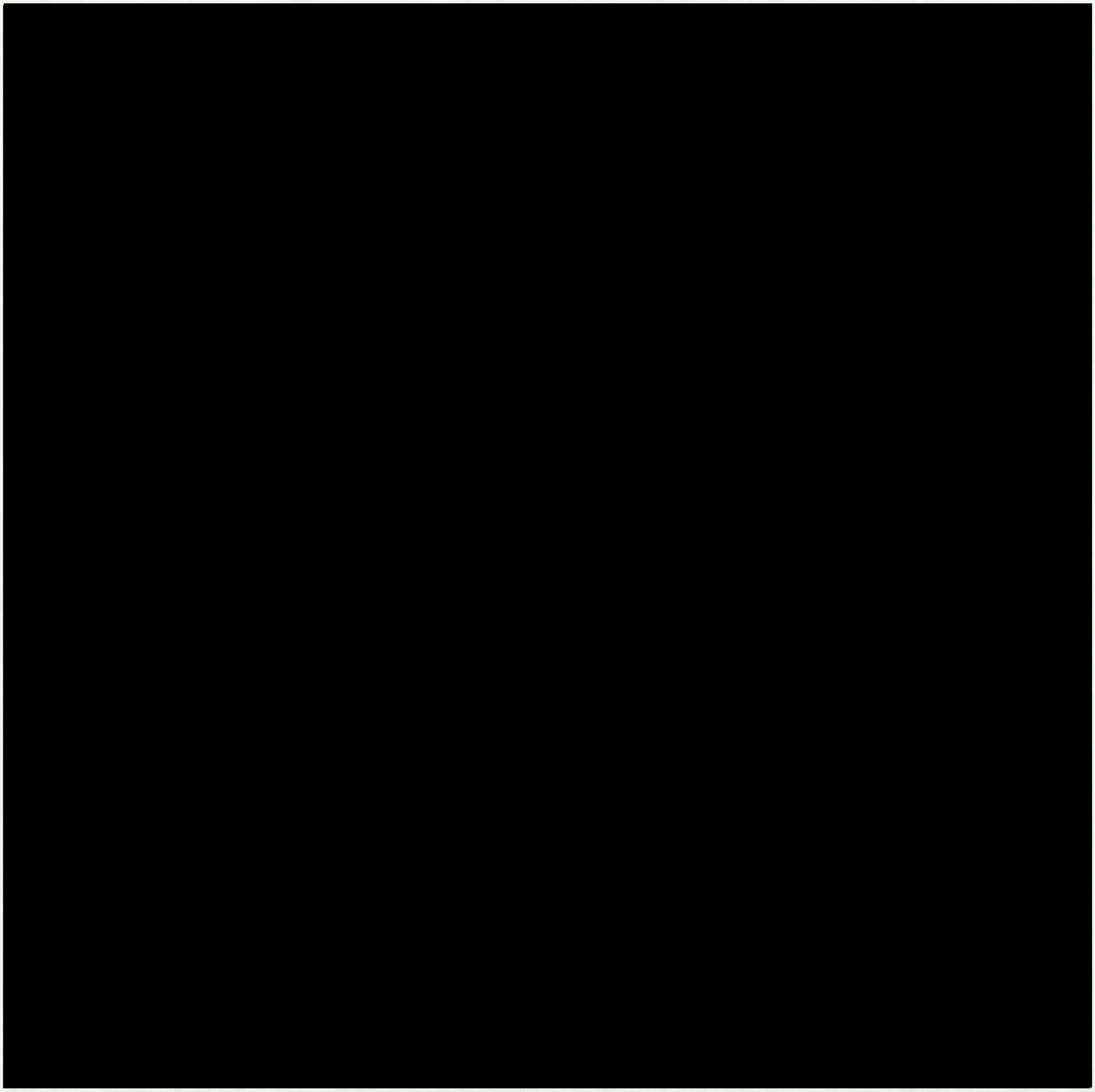


Figure 3. Shaded relief map of Wabaunsee County, showing the position of the Claussen site in the Mill Creek valley.

well as vertical accretion, which is to say that they are built not only vertically by the deposit of flood sediments, but they also are built horizontally when sediments are deposited within the channel on the inside of a meander loop (Brown 1997, especially chapters 1-3). This means that while the stratigraphic relationship of lower equals older will hold at any location on the terrace, sediments and any archeological components within them that lie at a given elevation but are horizontally separated will not be of equivalent age but will be progressively younger toward the toe of the point bar and the stream channel. The implications of this for understanding the cultural sequence within the Claussen site T-1 will become clear later.

The climate of Wabaunsee County is familiar for Kansas. Using the 1951–1976 weather record from the weather station at Eskridge, about 14 miles southeast of McFarland, as summarized in the county soil survey (Bark 1991:1-2 and accompanying tables), is a quick way to portray the climate of the Claussen site vicinity. The average daily January temperature at Eskridge during that period was 28.2° F, while the average daily July temperature was 78.4° F. Average annual precipitation during the same period was 35.39 inches, with 21.63 inches of that total (61.1 percent) falling during the five-month growing season of May through September. Snowfall averaged 21.0 inches per year, with all of it falling in the months of November through April, and most of it (18.2 inches or 86.7 percent) in the months of December through March. The frost-free period (temperatures above 32° F) five years in ten was 188 days from April 17 through October 22.

A potential natural vegetation map for Kansas shows most of Wabaunsee County as within the tall-grass or true prairie. This prairie is dominated by big bluestem, with much smaller quantities of little bluestem, Indian grass, switchgrass, and a variety of non-grass forbs (Küchler 1974:595, 597). A flood plain forest is mapped for the Kansas River valley and probably also lined Mill Creek before the land was opened to agriculture. Flood plain forest in this part of Kansas typically contains cottonwood, hackberry, ash, elm, willow, and other trees in smaller numbers. Some of these species can be seen today on the small point bar across the creek from the Claussen site. Additionally, hackberry seeds were abundant in the excavated sediments. This probably did not result from the people who camped here gathering and eating hackberries so much as it is seed rain from the vegetation on the point bar at the time the level of the occupation was the land surface.

The attractiveness of this particular place for occupation, albeit short-term occupation, probably was not the availability of plant resources, which would have been limited, and certainly not soils suitable for cultivation using a bone- or shell-hoe technology, as these are essentially absent in this location. Rather, the attraction was the faunal resources, particularly aquatic fauna, that the setting provided. These would have included fish, freshwater mussels, turtles, and the diversity of small mammals that inhabit stream banks and stream bottomlands. These, especially the mussels, are what was most in evidence in the Claussen site faunal assemblage.

Wabaunsee County and Mill Creek Valley Archeology

In spite of its proximity to three of the state's university anthropology programs and to the state historical society, Wabaunsee County has not been a particular hotbed of archeological investigations in modern times. A recent query of the state site file shows that Wabaunsee has fewer recorded sites than any of the eight counties that border it. Those numbers range from 108 in Morris County to the 834 sites recorded in Riley County. Eight of the 100 sites were recorded in conjunction with the 2003 KATP field school. When the different sizes of the counties are taken into account and the frequencies are converted to number of known sites per square mile, Wabaunsee County still has the lowest density of known sites in the nine-county area. Only a few of these sites are in the Mill Creek valley.

Contrary to this recent neglect, a little over a century ago Wabaunsee County and Mill Creek were involved in one of the more colorful episodes of early northeast Kansas archeology. In 1896 L. R. Elliott, a Manhattan land agent and amateur archeologist, sent some artifacts that he had collected in Geary County to Jacob V. Brower of St. Paul, Minnesota. Brower was a lawyer and a judge and also an explorer of sorts. Working with a commission from the Minnesota Historical Society in 1889, he correctly determined that the Mississippi River heads at Lake Itasca in Minnesota (Chaney 1908:771). This had been one of the unresolved questions of the day. He had also done a considerable amount of archeological investigation in the upper Missouri River valley and had recently published some of his findings (Brower 1896). With this background he found of considerable interest the material Elliott sent to him—not necessarily for itself, but for its bearing on the location of the Quivira that

Coronado visited in 1541. From the vantage point of the early twenty-first century, researchers are well aware that Quivira is represented by the Great Bend aspect sites in modern Rice County, Kansas; however, at the end of the nineteenth century, the identification of Quivira was far from settled. Offered solutions ranged from eastern New Mexico, through the Texas panhandle, eastern Colorado, the Missouri Ozarks, southern Nebraska, and only occasionally Kansas—and then not the correct location within Kansas. Even the identification of Quivira as the homeland of the ancestors of the Wichita Indians was not yet secure when Brower came to Kansas to follow up on Elliott's invitation. The material that Elliott had sent was from a site in the middle reaches of the McDowell Creek valley in north-central Geary County that Brower named and that is still known as the Elliot site. Brower went to the site with Elliott, and on November 20, 1896, he grandly proclaimed that he had rediscovered Coronado's Quivira. In fact, Elliott is a multi-component site that was periodically occupied over many millennia of the prehistoric period. Furthermore, the material Brower pronounced as representing Quivira is assignable to the Munker's Creek phase, a Middle Archaic culture dating to about 5,240 radiocarbon years before present (rcybp) (Banks and Weigand 2005) or, taking into account a calibration from radiocarbon to calendar years, around 5,500 years before the Coronado entrada.

The Brower/Elliott site episode might be dismissed as a minor footnote of archeological history and one of the numerous and sometimes high-profile misidentifications that seemed to plague Kansas archeology in the late nineteenth and early twentieth centuries, except that Brower did far more in Kansas than look at the Elliott site and pronounce it to be Quivira. Over a period of about five years, from late 1896 to sometime in 1901, he examined numerous sites in a portion of the Kansas River drainage from about the mouth of Mill Creek in Wabaunsee County to about Junction City in Geary County. Even today he is remembered (not terribly fondly) for virtually vacuum-cleaning the artifacts from numerous sites along several Flint Hills streams, including portions of the Mill Creek valley. Regretfully, the provenience designations on the artifacts in his voluminous collections leave much to be desired.

More positively, though, Brower did publish his findings, devoting three of the eight volumes in his *Memoirs of Explorations in the Basin of the Mississippi River* series to his Kansas explorations (Brower 1898, 1899, 1903). In the first of these volumes, he detailed a classification of sites. From the descriptions it is clear that he recognized the Archaic and particularly the Munker's Creek complex, Woodland, and Smoky Hill phase materials as separate cultural entities. Having briefly gone beyond the Kansas River drainage sites, he also recognized the Great Bend aspect sites of Rice and McPherson counties as distinct from the other three classes of sites (Brower 1898:11). In addition to calling the Munker's Creek sites Coronado's Quivira, he equated what are now recognized as Smoky Hill phase sites with the province of Harahey that Coronado had been told was beyond Quivira. He looked very skeptically upon Udden's (1900) suggestion that the Paint Creek site somehow might be bound up with Quivira. Of course, it is now acknowledged that Udden was prescient in that identification. Obviously, Brower was assuming that the complexes he had correctly differentiated from one another represented separate contemporaneous "tribes." This assumption, with its lack of any real time depth, seems very naive now, but remember that in the late nineteenth century the North American chronology was assumed to be short (Meltzer [1993:40-59] gives a good account). While the 14,000 or so calendar years (around 12,000 radiocarbon years) of North American prehistory is short compared to Europe, where the human occupation is measured minimally in hundreds of thousands of years, or to Africa and southern parts of Asia, where it is well in excess of a million years, it is not as short as Brower and his contemporaries believed. Brower would be dead for more than two decades before the Folsom find in 1927 showed that the North American chronology encompassed at least ten or so millennia. The antiquity of the occupation of North America remains a hot topic and one that the investigations in the lower components at the Claussen site were designed to address.

The Brower episode is a much richer story than there is space to tell here. Brower quite quickly came into conflict with the Kansas State Historical Society, which was interested in protecting Kansas turf for Kansas workers, but that, truth be told, was not in tune with the best archeology of even that time. Brower might have been somewhat justified in taking umbrage with how the Society dismissed his findings. He was so enamored of his "rediscovery" of Coronado's Quivira and his "identification" of Harahey that he erected no fewer than four granite monuments to the deed. One of these still graces the front lawn of the Wabaunsee County courthouse in Alma (Figure 4). The others are in Manhattan, Junction City, and Herrington, all identical in form, but each with a slightly different inscription, appropriate—at least in Brower's estimation—to its location.

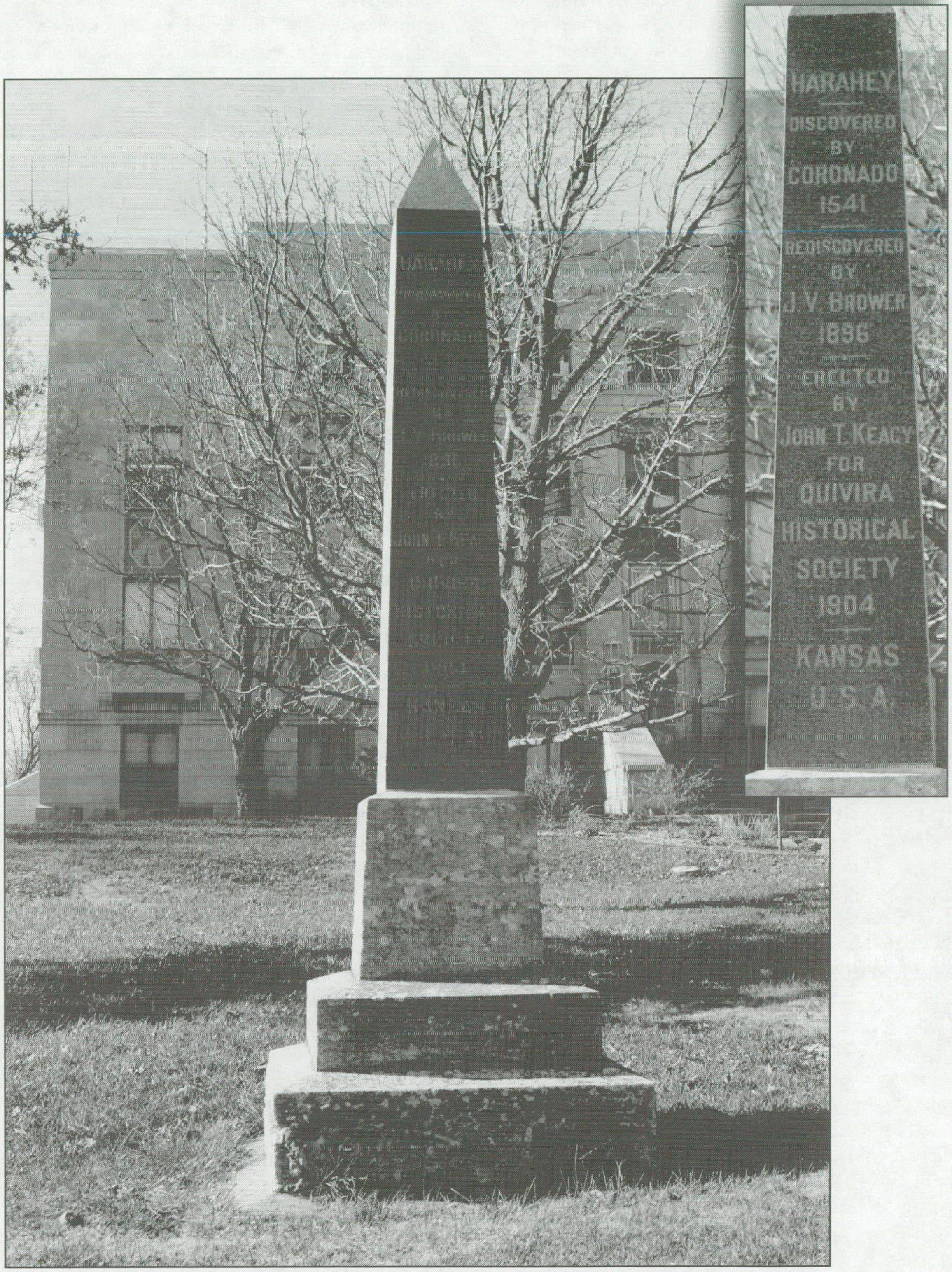


Figure 4. The Brower Monument in front of the Wabaunsee County Courthouse in Alma. The inset highlights the incription.

As noted, Brower's study area did include Mill Creek, and his "Archaeologic Chart of Interior Portions of Kansas" (Brower 1898:viii) plotted eight sites in this valley. None of these corresponds to a site recorded in the modern state files nor is any of them near the proper location to be the Claussen site. (There is no way to know if Brower looked for buried components exposed in stream banks or if anything was exposed in this location more than a century ago. In principle, however, Brower could have examined the large surface component on the T-2 near the Claussen site.) Brower (1898:34-46) also devoted 13 pages of his first Kansas volume to Mill Creek valley sites. This undoubtedly is more pages than have been devoted to the archeology of this valley in the following 106 years (excluding a few compliance survey reports), thus making it a pertinent source concerning the valley's archeological resources. Perhaps the most valuable part of Brower's study are the photographs of artifacts from Mill Creek valley sites. One of these photographs (Brower 1898:Plate X) shows "Remnants of Ancient Hunting Implements," all of them projectile points or fragments of points that are readily identifiable to the Late Archaic and Early Ceramic periods. In fact, a number of them are quite classic Woodland, so-called "Hopewellian," style corner-notched Snyders points in the collection of J. T. Keagy, an Alma lawyer and amateur archeologist. Inasmuch as Brower used several large sites in the Alma area to exemplify one of his cultural classes—and the description corresponds in other ways to what would be expected of Woodland sites—it may be surmised, subject to confirmation by future fieldwork, that perhaps rather extensive Woodland sites lie unrecorded in the Mill Creek valley. The other photograph of interest is quite specifically identified as illustrating artifacts from the Mill Creek valley (Brower 1898:Plate IX, 1). This photograph shows small points of types that would now be called Scallorn and the notched triangular points common to the Middle Ceramic period, thus suggesting the presence of Late Woodland and Central Plains tradition sites in the valley. The amount of pottery that Brower collected from the Mill Creek valley is small, at least judging from the labels on the boxes that hold the Brower Collection at the Kansas State Historical Society. Among the sherds, though, are rims clearly identifiable as from Central Plains tradition ceramic vessels. It is unfortunate that the provenience information is not more specific than simply Mill Creek valley.

Brower's work actually is the only real systematic (or at least somewhat systematic) archeological investigation in the Mill Creek valley. A few other site records have accumulated, and several collections from sites identified in site records as Middle Ceramic period sites in the Mill Creek valley or elsewhere in Wabaunsee County are curated at the Kansas State Historical Society. Alas, but a few tidbits of useful information can be gleaned from these collections and records. The collections from 14WB301, 14WB305, and 14WB311, none of them in the Mill Creek valley, all contain pottery rim sherds that are at least consistent with Central Plains tradition vessel rims. Site 14WB1, also not in the Mill Creek valley, is not attributed to the Middle Ceramic period, but its collection contains shell-tempered pottery and a small triangular unnotched projectile point. Both artifact classes suggest a Middle Ceramic period component and are consistent with a Central Plains tradition component. These sites do not seem to represent house or lodge sites, the best-known Central Plains tradition site class. They are represented by small surface collections only, and in the absence of any testing or excavation data, what function they represent is not apparent from the available data. In short, then, a research design for what appeared from prior data to be a Central Plains tradition component at the Claussen site had to begin with some quite basic questions. At the same time a plan could recognize that the site had great potential to provide information about a cultural tradition that is moderately well known in northern Kansas but virtually undocumented in this very specific part of Kansas.

Research Problems

Designing research to be conducted at a specific site always begins with an assessment of what is already known about the site. In the case of the upper components at the Claussen site, not much was known. University of Kansas geomorphologist Rolfe Mandel filed a state site form in May 2000 and updated it in April 2001. The site form suggests that the site has a Middle Ceramic period component with a specific cultural affiliation of "Smoky Hill Aspect," [sic] eroding from a "younger terrace formation," set against an older terrace housing Paleoindian and Archaic components. No other information is available from the site form itself.

More specifically, the late prehistoric or upper cultural components described in this report are contained within a late Holocene-age T-1 adjacent to Mill Creek. Mill Creek at this location is meandering in an overall west-to-east course at the southern margin of its valley. A short distance west of the site vicinity, the present stream course turns to the northeast to begin a broad horseshoe-shaped meander. The apex of this meander cuts into the broad T-2, exposing the older and lower components at this locality. The downstream arm of the meander flows in a course that is only slightly east of south. Here, the stream is cutting into, and more or less longitudinally cross-sectioning, the T-1. At this location the T-1 is a point bar deposit on the inside of the next meander downstream. As the stream cuts laterally into the point bar, it is exposing burned rock, charcoal, mussel shell, and chipped stone debitage well below the surface at two locations along its cutbank (Figure 5). At the northern or upstream of the two locations, it appeared that shell, rock, and charcoal were eroding from several cultural horizons above one another. The horizontal extent of any of these components was not known nor was any preliminary cultural or temporal affiliation possible, other than the certainty that, because this is a late-Holocene-age terrace, the occupations must be from sometime during the late Holocene (in general, Late Archaic or anytime during the Ceramic period). In fact, even the exact number of components at this location is not certain.

Only one component has ever been observed at the southern of the two locations. Here, flakes, bone, shell, rock, and charcoal were eroding from a well-demarcated cultural horizon, extending for several meters along the face of the cutbank. Prior to the 2003 testing, Mandel had obtained a radiocarbon age determination on charcoal lying just below a protruding slab of rock. This age was 810±70 rcybp. This calibrates to a one-standard-deviation range of cal A.D. 1163–1281 or a two-standard-deviation range of cal A.D. 1030–1296. The most probable part of that range is the interval cal A.D. 1150–1296. These dates, of course, fall within the Middle Ceramic period. None of the artifacts was culturally diagnostic, however, so the assignment to the Smoky Hill phase was a presumption, not yet a supported identification.

This basically was the entire body of information available for the upper components when the 2003 KATP investigations were planned. In many ways this body of information was no more limited than it often is for a site that has not been subjected to even preliminary test excavations. In this case, though, the components are buried, have no surface exposure, and were observable only in the bank profile. The situation, therefore, is a lot like trying to read a closed book by looking at the edges of the pages. Just as one must open the book and look at the surface of its pages to read it, so also was a plan view of the cultural components at the Claussen site needed to even begin to know what they represented. This, then, became a basic goal of the 2003 investigations.

Specific questions to be addressed included:

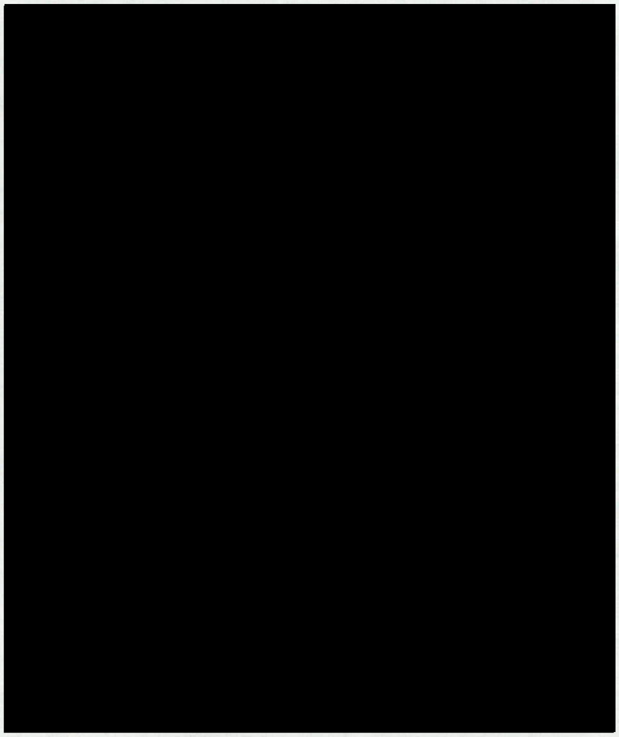


Figure 5. Aerial view of the Claussen site vicinity, showing the locations of the North and South Blocks of the Upper Components. (Photo courtesy of U.S.G.S. via TerraServer.)

How extensive is each component? What kinds of material does each component have? How good is the preservation, particularly of organic materials? Are features present? If so, what kinds of features are they? What are the ages of the individual components? What are the specific cultural affiliations of the individual components? What can be said about the site type that each component represents?

This last question in particular goes beyond simple and essentially administrative matters about a site and into a set of research problems that deal with specific past cultures. To an extent site types can be assessed in the absence of specific cultural affiliations. Archeologists do it all the time when they differentiate mortuary sites from living sites or permanent villages from short-term campsites. But settlement systems—functionally interrelated sets of sites in Winter's (1969:110) classic definition—are specific to a culture and its adaptive system. Not all short-term occupations are equal; not all cultures, even in a particular region, leave short-term occupations of all types (or, for that matter, permanent villages of all types). Further, laying out the details of a settlement system is not a matter of building a site typology from a set of ideal categories and applying it to the situation so

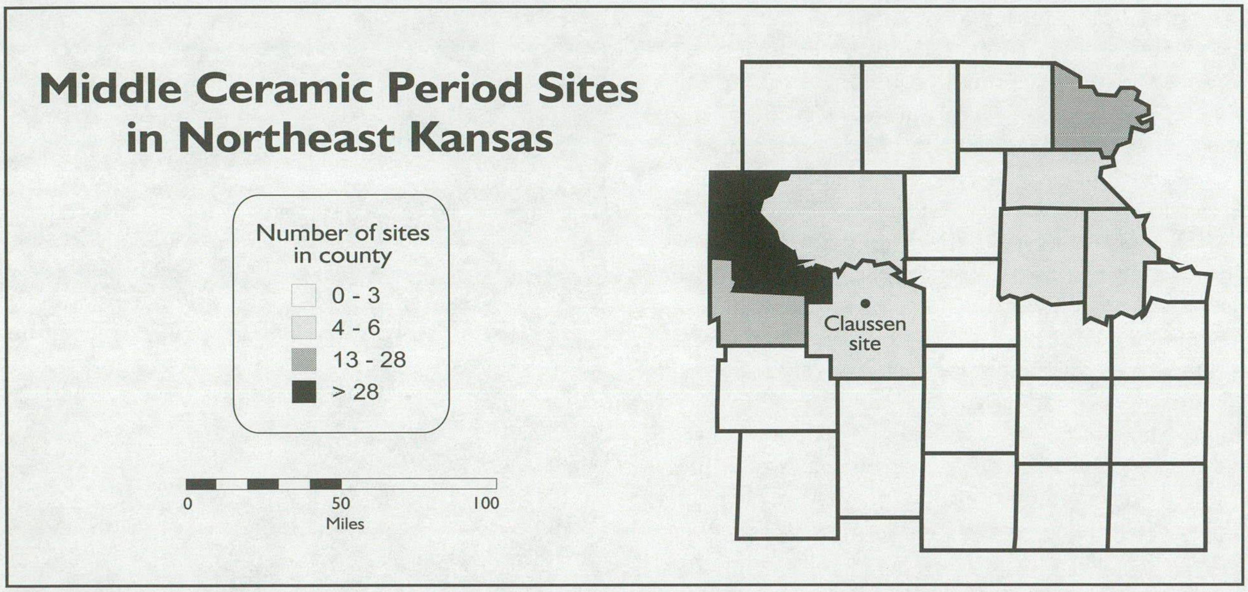


Figure 6. Numbers of known Middle Ceramic period sites in northeast Kansas by county.

much as it is of studying the range of variation among sites used by a culture and constructing an empirical model of that culture's settlement system. (Again, Winters' 1969 study is the classic case.)

Although there technically were no material indications of the cultural affiliation of any of the Claussen site upper components prior to the 2003 excavations, the Middle Ceramic-period radiocarbon age of the southern component led to a pretty good guess that the component might be assignable to the Central Plains tradition. Anticipating this identification prompted additional research questions, some of them related to the Central Plains tradition settlement system and some to other aspects of the culture and social organization of that tradition. The Central Plains tradition is well represented in the Missouri and Kansas River drainages of Kansas, Nebraska, northwest Missouri, and southwest Iowa. Of course, as reviewed in any number of syntheses of this cultural tradition, including Roper 2005a, 2006a, 2006b:52-73, the Central Plains tradition is prominently represented by sites with small lodges, storage pits, a diverse subsistence regime that included partial (but only partial) reliance on cultivated plants, and a distinct material culture (pottery, chipped stone tools, and so forth). Yet Central Plains tradition sites in general are sparsely represented in Wabaunsee and some of the adjacent counties on the Dissected Till Plains of northeast Kansas (Figure 6), and there is no indication that the few recorded sites actually are characteristic Central Plains tradition sites with agriculture, lodges, and evidence of permanent occupation. What then are they in functional terms? How do they fit within the Central Plains tradition settlement system? How do the few Wabaunsee and Shawnee county sites, including Claussen, relate to the lodge sites in the drainage of the lower reaches of the Kansas River to the east or the valley and immediate drainage of the Blue River to the west?

This study describes the 2003 investigation into the upper components at the Claussen site and uses the data from that investigation to address the questions posed above. Most of the attention is focused on the southern component, as this occupation area produced far more material in far better context than did the northern component. In fact, the amount of material that this component yielded is quite large relative to the size of the excavation. Because it is so large, practicality dictates that some priorities be set for analysis of the various classes of remains. By far the largest single class of material is mussel shell. Although there will be those who for one reason or another are interested in the specific identifications and other characteristics of these remains, the analysis here is limited to counting and weighing the shells. Animal bone also is identified to only general class (mammal, turtle, etc.), counted, weighed, and evaluated for burning, but not more specifically identified at this time (actually, the material is highly fragmented and much of it may not be more specifically identifiable). Consistent with the research questions, this analysis emphasized the cultural remains, including the features, ceramics, and chipped stone artifacts, as well as the context, associations, and distribution of all materials, including shell and bone, across the site.

The faunal material is more than subsistence remains and also is capable of providing some very good paleoenvironmental data. Fully realizing the potential of this material was beyond the resources available for this project. The remains are curated at the Kansas State Historical Society and will be more closely studied as research on the Claussen site continues.

Fieldwork Overview

The summer 2003 investigations dealt with components at both the northern and southern locations on the T-1. The University of Kansas archeologists previously had established an actual datum, a working datum, and a coordinate system for the entire site. The actual datum (0N, 0E) is a short distance to the south and well to the west of the more southern of the components described here. A working datum, 0N 1000E, is very near the southern of the two upper components. Measuring from this datum, a map station was placed at 22N 1002E to be used for the 2003 KATP upper component investigations. An optical transit was set at this map station and used with a metric stadia rod to take a series of elevation readings for drawing a surface topographic map with a 50-cm contour interval (Figure 7). A north-south baseline then was laid out along the 1002E line. The two locations where debris was eroding from the T-1 were in the 25–30N and 70–80N vicinity, so excavation block corners were placed at 25N 997E and 30N 997E for working on the south component and placed at 70N 992E and 80N 992E for working on the north component. Throughout this report, these are referred to as the South Block and the North Block.

Preliminary measurements of the depths at which cultural material was exposed were made by simply dropping a tape over the bank. Much of the overburden in each block was removed with a backhoe (Figure 8). To ensure that cultural horizons were not damaged by the backhoe, overburden removal was halted about 20 or 30 cm above where it was anticipated that cultural material would be found. Additionally, the backhoe operator was instructed to remove sediments in thin cuts, and archeologists monitored all work to ensure that cultural materials were not found higher than expected in the profile.

Following overburden removal, 1-x-1-m grids were established in each block and a vertical working datum, tied to the overall site datum, was established and marked with a string line on a piece of rebar placed near the edge of each block. Grid points were marked by spikes, each tagged with a piece of flagging tape on which were written the grid coordinates. Excavation in

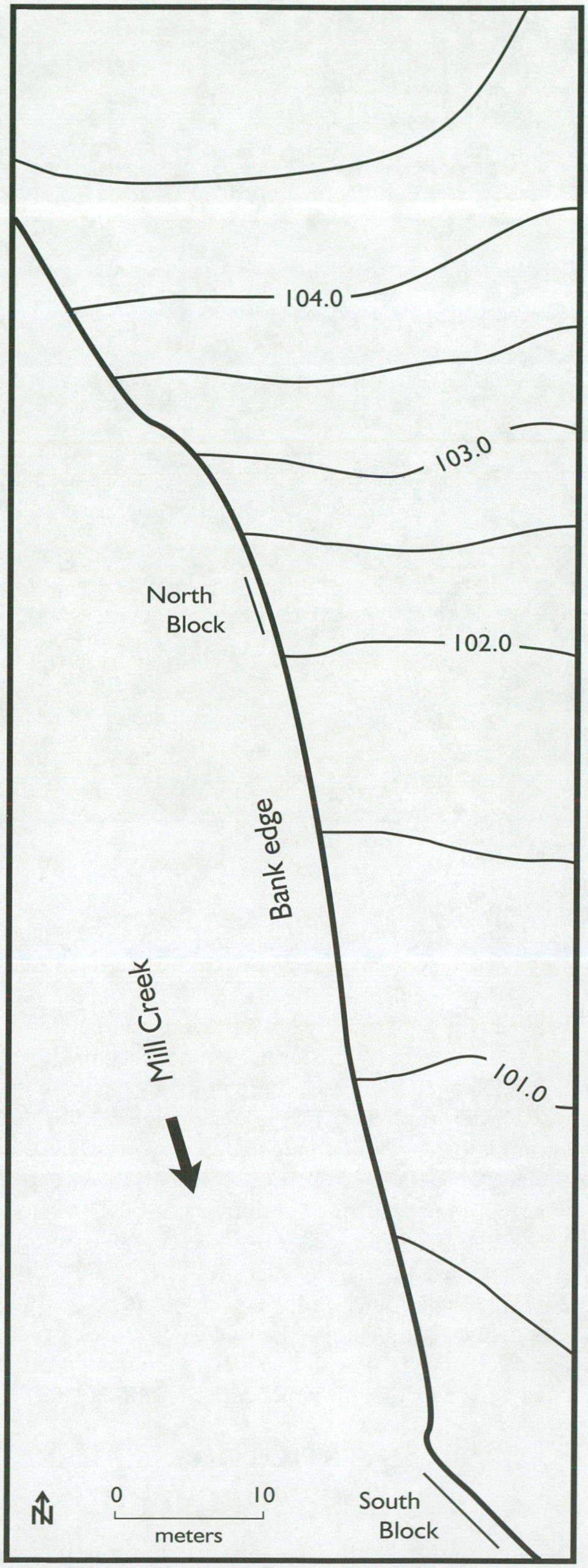


Figure 7. Pre-excavation topography along the Mill Creek bank edge.

Figure 8. Backhoe removing overburden from the South Block.

each block then proceeded by hand within individual 1-x-1 m squares, each designated by the coordinates of its southwest corner. Balk walls were not maintained between units. Except when removing the remaining overburden, excavation normally proceeded in 10-cm levels. Shovels were used for removing the remaining overburden, but most of the excavation within the cultural horizons was conducted with trowels. Many artifacts or ecofacts (shell, bone, charcoal) encountered were piece-plotted in three dimensions. To ensure that nothing was missed, all fill except overburden was screened through ¼-inch mesh hardware cloth. Any materials found on the screens were bagged by 10-cm level within the proper square. Features, which appeared only in the South Block, were mapped and excavated according to procedures described later.

Investigations in the North Block

The term North Block as used in this paper denotes the excavation unit placed in the northern of the two upper component loci with eroding material. This northern locus lies near the back of the terrace or point bar, close to the interface of the T-1 with the T-2. The current surface here slopes gently to the south and is overall at an elevation between 102.0 and 102.3 m above the site vertical datum (avd). It is on the outside of the meander and is being cut as the meander moves in its downstream direction (Figure 5), so the Mill Creek bank edge here is nearly vertical. Shell, rock, charcoal, and bone are exposed on this vertical bank between 75N and 80N in the site coordinate system.

The plotted material occurred over a vertical span of about 2.2 m, from about 98.7 to 100.9 m avd. This placed the uppermost objects about 1¼ m below the present surface and the lowest material about 3½ m below the present surface. Prior to the July 2003 investigations, it was thought that three cultural horizons could be defined in the eroding cutbank face. As investigations began during that month, the possibility of even more cultural horizons being exposed seemed to present itself. The number of exposed objects was rather small, amounting to 12 pieces. They were mapped with a total station, and the plot made from the mapping data (Figure 9) suggests that the

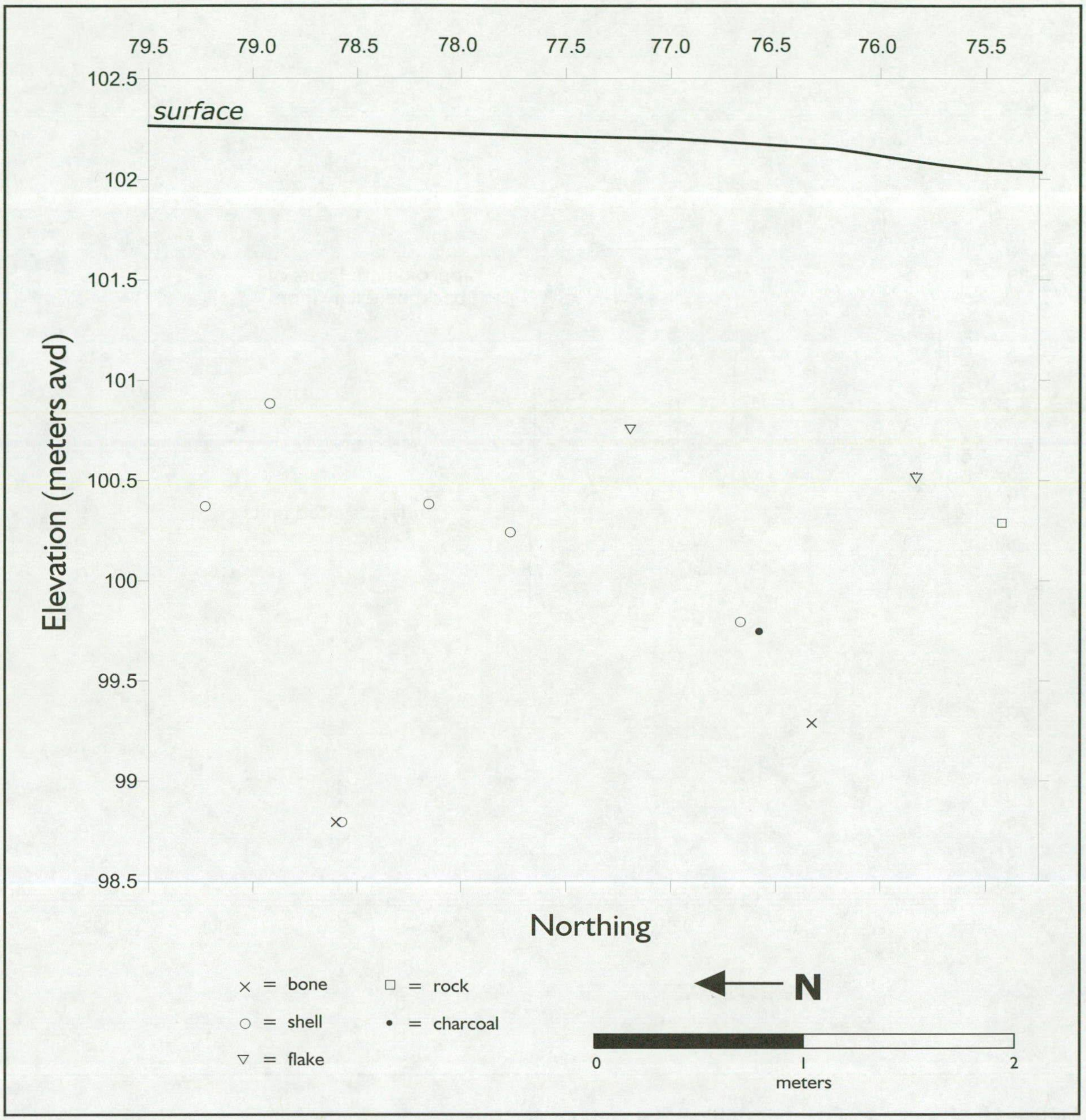


Figure 9. Positions of objects on the cutbank near the North Block.

number of stacked horizons is uncertain. A cultural horizon between 100.5 and 100.9 m avd seems clearly indicated. This cultural horizon might slope gently to the south, but this should be expected on a point bar surface. No other cultural horizon is indicated above this one. Additional material found on the bank below this horizon does not seem to as clearly pinpoint a discrete cultural horizon. The possibility that the material is in place and that two or more additional cultural horizons are represented cannot and should not be ruled out, but neither should the possibility be overlooked that some objects on the bank may represent material fallen from its original provenience higher on the bank—these objects are, after all, directly below those denoting the upper cultural horizon. Of course, some combination of in-place material and objects fallen from their original location also could account for the observed distribution. Only extensive testing will resolve the situation.

Regardless of the number of cultural horizons

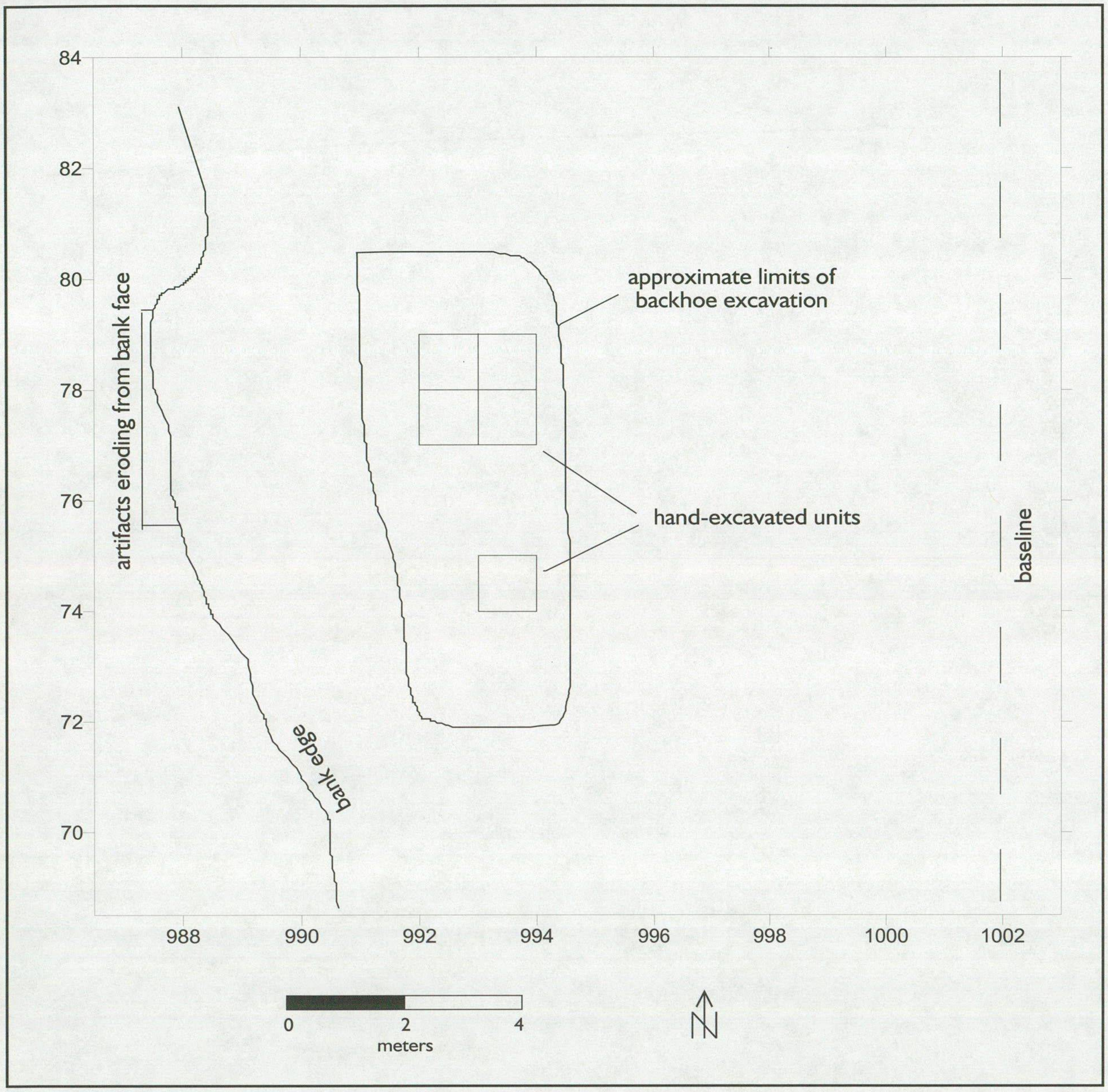


Figure 10. Plan view of the North Block excavations and their relation to the Mill Creek cutbank.

actually present in this part of the terrace, it was impractical to even consider testing more than the uppermost horizon during the nine-day field school. Of course, because the cultural horizon is buried, testing it with dispersed units was not feasible. A small block was the most efficient plan. Accordingly, an excavation block was laid out about 3 to 4 m east of the bank edge and due east of where the cultural material was exposed in the cutbank (Figure 10). The backhoe removed about 90 cm of overburden within the area demarcated for the block. Following overburden removal, a grid was set within the block, and five squares were laid out for excavation. Four of these—77N 992E, 78N 992E, 77N 993E, and 78N 993E, as designated by their southwest corners—comprised a 2-x-2-meter mini-block, divided into its four constituent 1-x-1-m squares. The fifth square was 2 m to the south with its southwest corner at 74N 993E (Figure 10). The site vertical datum was placed within the opened area at 101.300 meters avd. Vertical provenience throughout the excavation in this block was measured below this datum and later converted to elevation avd.

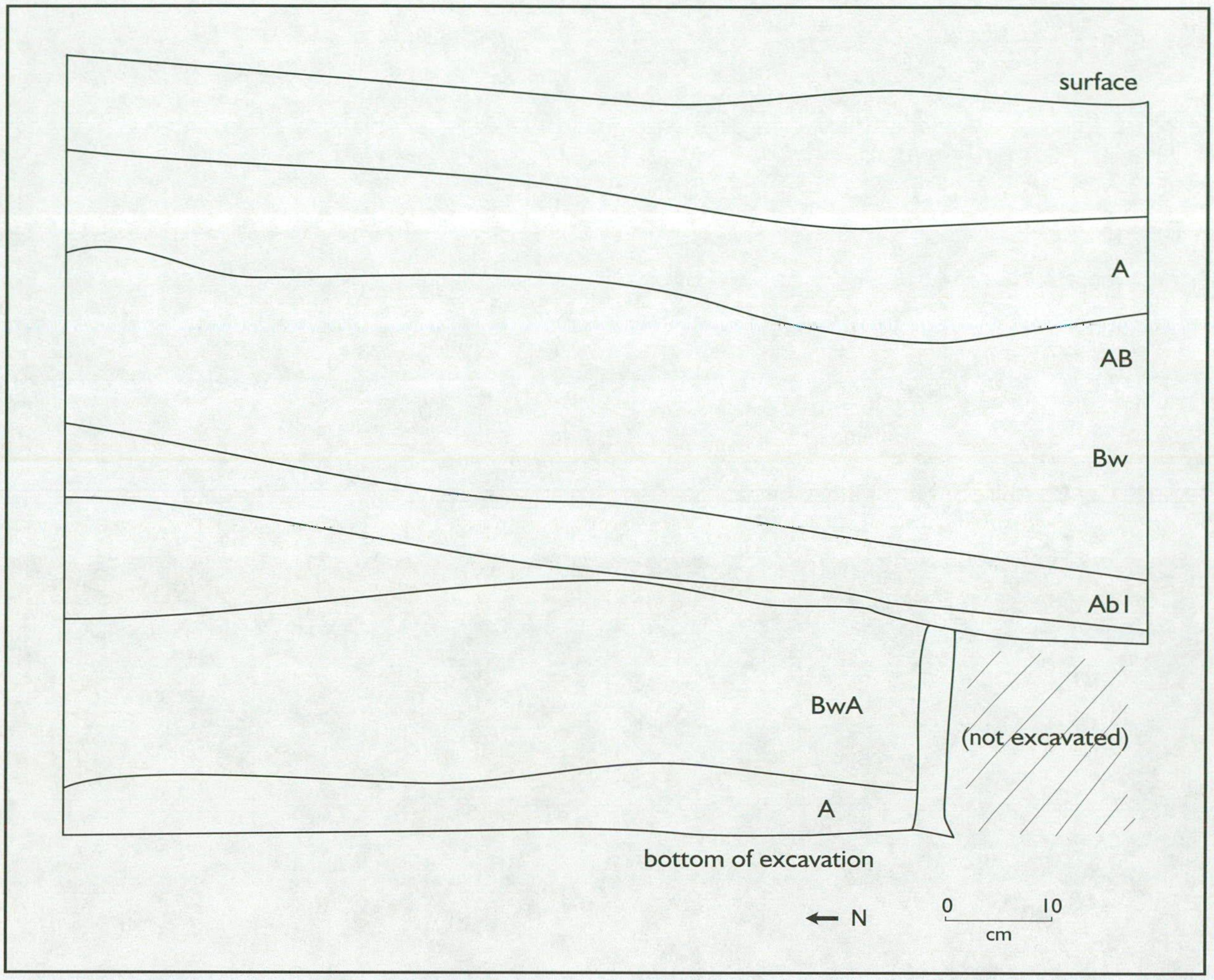


Figure 11. North Block profile along the 994E line.

Excavation proceeded rapidly by hand from the bottom of the backhoe excavation to the top of the cultural horizon. This entailed removing the remaining overburden to a level 30 cm below the vertical datum to an elevation of 101.000 m avd, in levels ranging from 4 to 13 cm thick across the block, as necessary to produce a flat and level surface. All excavations below 101.000 m avd were 10-cm levels. One 10-cm level was excavated below the 101.000 m avd starting point in 74N 993E, thus reaching a depth of 40 cm below the vertical datum or an elevation of 100.900 m avd. Three 10-cm levels each were excavated in the four squares composing the 2-x-2-m mini-block, thus reaching a depth of 60 cm below the vertical datum or an elevation of 100.700 m avd. No features were observed in any of these North Block excavation units, and only a small quantity of material was recovered. A total of 65 objects of all kinds were piece plotted; the remainder of the material was recovered on the screens.

At the completion of the excavation, Kansas Anthropological Association (KAA) crewmembers Kelsey Stein and Vita Tucker drew a profile along the 994E line from 77N to 79N (Figure 11). Mandel later described this profile in detail, using proper soils terminology. The texture of all but one soil horizon is silty clay loam. The exception is the lowest horizon, the Ab2 at 128-148+ cm below surface (approximately 100.6-100.8 m avd), which is a silt loam. Soil horizons as Mandel identified them are shown in Figure 11. The cultural horizon lies in the Bwb1 and Bcb1 soil horizons. This means that the surface was an actively accumulating floodplain and not a stable surface at the time the tested occupation was laid down. The profile shows that the soil horizons dip gently to the south. Back-plotting the piece plots along the north-south line

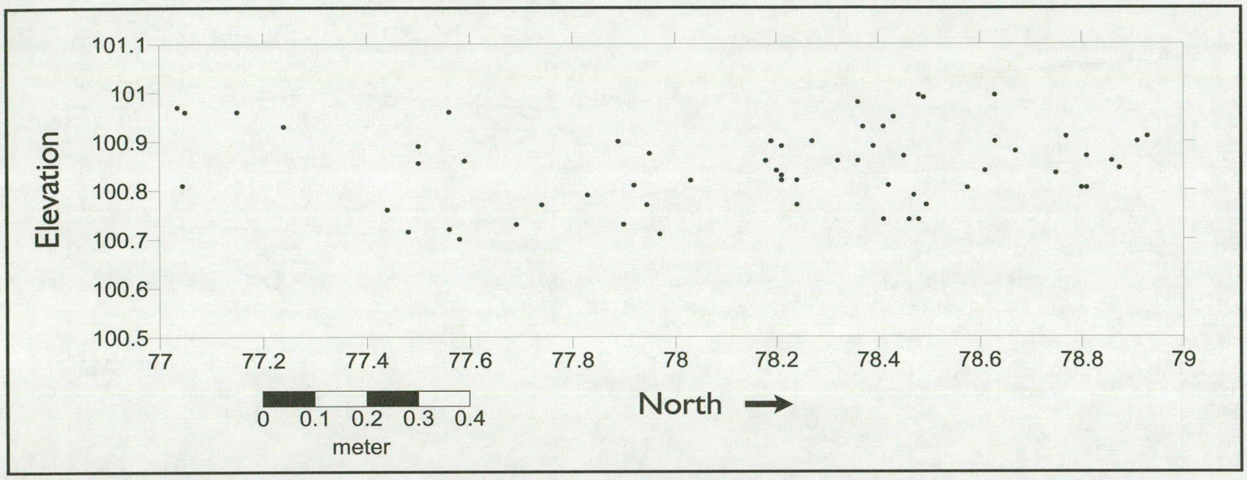


Figure 12. Backplot of North Block piece plots along a north-south line.

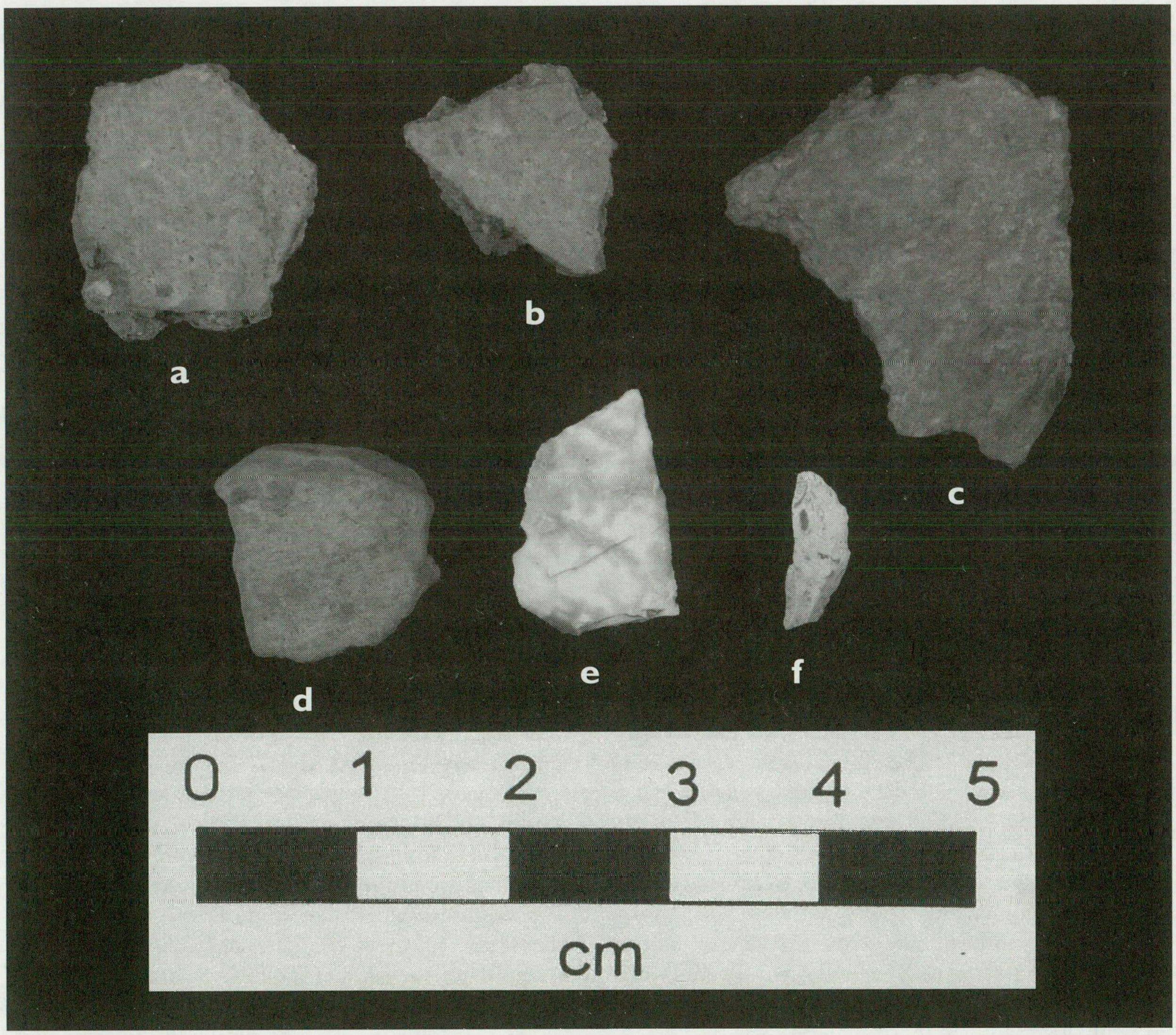


Figure 13. Artifacts from the North Block: a-d) ceramic body sherds, e-f) flake tool fragments.

Table 1. North Block Pottery Attributes.

Prov Code	Temper	Exterior Surface Treatment	Interior Surface Treatment	Dimensions (mm)	Thickness (mm)	Comments
29	Grit	Smooth	Smooth	15.8-x-12.3	6.1	Probably all from same vessel
31.1	Grit?	Spalled	Smooth	13.3-x-13.4		
31.2	Grit?	Spalled	Smooth	10.9-x-7.1		
108	Grit	Smooth	Smooth	18.3-x-15.7	6.9	
118	Sparse Grit	Smooth	Spalled	20.4-x-20.3	Indet	
200	Grit	Smooth	Smooth	27.0-x-22.9	7.9	
27	Sparse Grit	Smooth	Smooth	15.2-x-15.7	Indet	
28	Grit	Spalled	Spalled	11.5-x-6.9	Indet	
260	Grit and ls?	Spalled	Spalled	29.2-x-15.5		
263	Grit or sand	Cord-roughened	Smooth	14.3-x-9.7	5.3	
186	Prob. shell	Spalled	Spalled	9.1-x-6.3	Indet	
31	Shell	Spalled	Smooth	12.7-x-9.5		

shows that the cultural horizon lies between 100.5 and 101.0 m but also dips very gently to the south (Figure 12), as might be expected.

Collections

Artifacts and organic remains from the North Block were limited in both quantity and diversity. Objects include a dozen pottery sherds, two expedient flake tools, a quantity of unmodified lithic debitage, a small quantity of bone and shell, small pieces of charcoal, some burned earth, and unmodified rock, some of which may be—and much of which probably is not—associated with the occupation (Figure 13).

Pottery

The ceramic assemblage from the north block is limited to 12 small sherds (Figure 13a-d). None was recognizably from a vessel rim, with or without a neck, nor was any sherd recognizably from a vessel neck, shoulder, or base; in other words, all are body sherds. Individual sherd characteristics are described in Table 1. As many as six sherds may be from a single vessel. This vessel's ceramic fabric is a somewhat coarse paste, tempered with a moderate quantity of fairly fine grit or sand. The exterior and interior surfaces are smooth. No remnant of decoration appears on these sherds. Thickness of sherds whose surfaces are not eroded range from 6.1 to 7.9 mm. The other six sherds represent no fewer than two and possibly as many as six vessels. At least one and up to four of these vessels are grit-tempered; the other one or two are shell-tempered. No sherd in either temper group has any remnant of decoration. The sherds are too fragmentary to identify to a previously defined Central Plains pottery type.

Flake Tool Fragments

The only actual chipped stone tools from the North Block are two small fragments of expedient flake tools (Figure 13e and f). Each piece is too small to permit a reliable identification of the chert source type but large enough to show that it is not Permian chert from the Flint Hills and probably is from a source area to the east. Each exhibits a single row of either retouch or, more probably, use scars along one edge.

Unmodified Lithic Debitage

The collection from the North Block contains 178 pieces of unmodified lithic debitage with an aggregate mass of 130.59 g. The total includes 61 (34.3 percent) flakes retaining their striking platforms and bulbs of percussion; 88 (49.4 percent) flake fragments that, by definition, are broken such that the striking platforms and bulbs of percussion are missing; and 29 (16.3 percent) pieces of angular shatter (following the terminology of Andrefsky [1993:74]). Just over two-thirds of these pieces, 120 of 178 (67.4 percent), are 15 mm or smaller in maximum dimension; over four-fifths, 149 of 178 (83.7 percent), are 20 mm

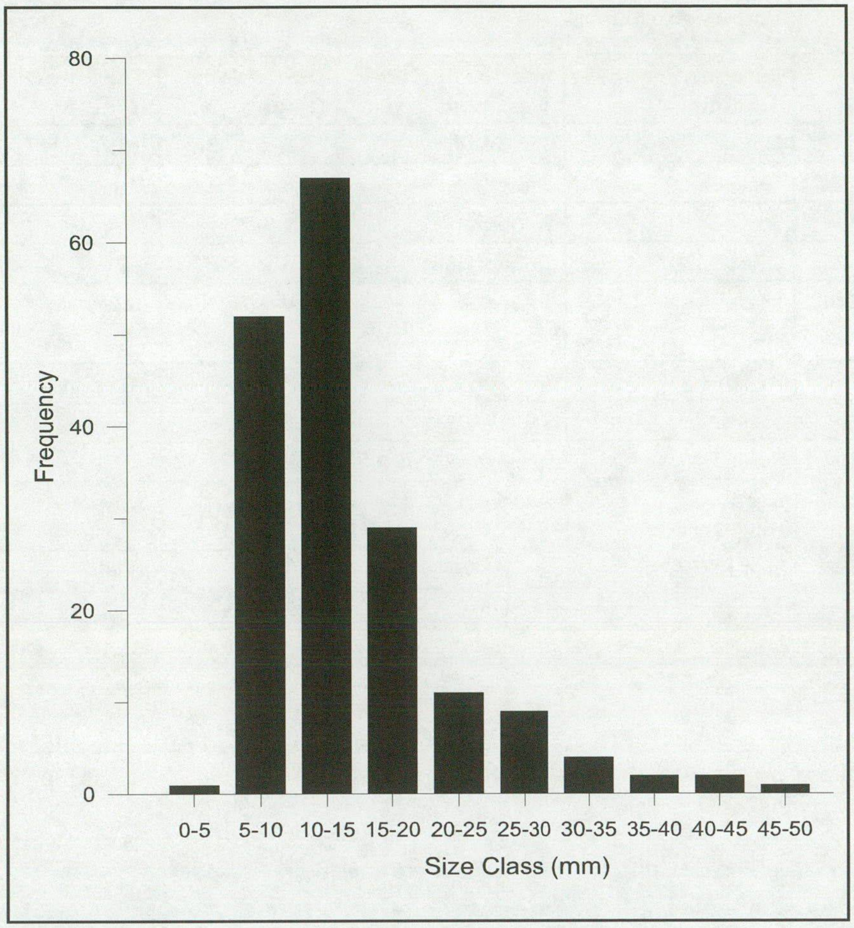


Figure 14. Size class distribution of North Block debitage.

or smaller in maximum dimension. The remaining pieces of debitage range to approximately 50 mm in maximum dimension (Figure 14).

The predominant raw material is Permian chert from the Flint Hills; however, only 101 pieces (56.7 percent) are Permian chert. The raw material represented by most of the remaining flakes is not certainly identified because they are so small. At least some (n = 20 or 11.2 percent) appear to represent Toronto chert from formations exposed west of Kansas City, about 50 miles east of the Claussen site, and possibly Mississippian formation cherts, the closest sources of which are even farther east of the site. The final 57 (32 percent) flakes were not even tentatively identifiable.

Cortex appears on 39 of the 178 (21.9 percent) individual pieces but 7 of these are angular shatter (no data is recorded for 8 other pieces of angular shatter). Cortex thus appears on only 18 percent (n = 32) of the flakes or flake fragments, and in just over half (n = 17) of these instances it covers less than one-half of the dorsal surface. Heat treatment is similarly restricted, appearing on 30 specimens, 28 of which are Permian chert.

By examining the interaction among some of these observations, more is learned about raw material usage in this occupation. Permian chert is locally available, but the Toronto and Mississippian cherts, if that is what these are, are not locally available and should not be expected in stream gravels either. Therefore, one might expect to find proportionally less angular shatter, which results from initial trimming of blocks of material, among the non-local cherts. Also, the non-local chert pieces might be expected to have overall less cortex, be represented as smaller pieces, or, put differently, be represented by fewer large pieces than would the Permian chert, and perhaps show more complex patterns of the dorsal flake scars that represent previous flake removals from the objective piece (a piece that has been flaked [Andrefsky 1998:9–11]).

Overall, these expectations are met in this small assemblage. A total of 23 (22.8 percent) of the pieces of Permian chert debitage, but none of the possibly

Toronto or Mississippian chert pieces, are angular shatter. Of the 20 pieces of possible Toronto or Mississippian debitage, only 2 retain any cortex, and 1 of those has only a small amount. In contrast, 22 of 94 (23.4 percent; no data were available for the other seven pieces) of Permian chert debitage retained cortex. No piece of possibly Toronto or Mississippian chert is larger than 25 mm in maximum dimension, and 85 percent (n = 17) are less than 15 mm in maximum dimension. This contrasts with the Permian chert, where only 65 (64.4 percent) pieces are less than 15 mm and sizes range to 50 mm in maximum dimension (Figure 14). The extent of removal of previous flakes reflected on flakes when they were part of an objective piece was evaluated using Andrefsky's (1998:105–107) ordinal scaling technique. The results showed that the pieces of possibly Toronto or Mississippian chert uniformly showed two or more previous flake removals, while the Permian chert pieces reflected a variable number, but often only one or none. Finally, 28 (27.7 percent) pieces of Permian chert debitage, but none of the possibly Toronto or Mississippian chert pieces, reflect heating.

Overall, these results indicate that the more distant cherts were being brought to the site in partially reduced form or even as finished tools that were refurbished at this camp. Some Permian chert probably also was brought here as partially reduced material or as finished tools, but this material, immediately available at this location, apparently also was brought to the site as blocks of raw material that were being reduced during the period of occupation. This is reflected in the composition of the debitage assemblage, the size distributions of the local versus non-local cherts, and the flake scar pattern data. The differential use of heat treatment on the different cherts, however, probably is a response to different workability of these various materials.

Unmodified Animal Bone

The North Block collection contains 47 pieces of unmodified animal bone. With an aggregate mass of a mere 13.39 g, or a mean mass of .28 g per piece with no piece weighing more than 1.95 g, these are small bone fragments. At least 14 bone fragments exhibit burning. The individual pieces are not identifiable to species and probably not even genus; however, it does seem clear that the collection includes remains of mammals, some of them medium- to large-bodied animals, turtles, fish, and possibly bird. Most of the bone identified, sometimes tentatively, as mammal, is burned; conversely, none of the turtle, fish, or bird bone fragments were burned.

Unmodified Mussel Shell

Mussel shell was the single most frequently piece-plotted object class, accounting for 26 of the 77 piece plots. It also was present in general level context in most excavation levels of the 2-x-2-m mini-block. The total aggregate of mussel shell from the North Block amounts to 267.32 g. Much of this mass is a few shells that either are complete valves or retain the hinge. The remainder is fragments.

Other Material

Other material is very limited. Charcoal amounted to four pieces with an aggregate mass of 15.97 g. Burned earth was present in most excavation units but in very limited quantity. The total mass of this material was 13.41 g. Some of it, however, may not actually have been burned. Rough rock was more abundant. A total of 127 pieces have an aggregate mass of more than 1,202.15 g, almost three-quarters of which is accounted for by two large pieces. Most of the rough rock probably is unrelated to the cultural occupation, although the larger pieces of rock may be an exception; their use is uncertain.

Distribution

Very little of the recovered material came from the isolated square at 74N 993E. The field notes reported that sandstone and flecks of burned earth showed in the floor of the excavation. Rock in the collection is limited to 13 pieces with an aggregate mass of 7.31 g. These pieces are unmodified water-worn pebbles, principally limestone, that probably are not associated with the human occupation at this location. Burned earth in the collection amounts to two small pieces with a combined mass of .30 g. Neither appears to actually have been burned, and this probably is just dried coarse sediment. Charcoal and bone are absent from this square. Material that was associated with the occupation thus is limited to two sherds, five flakes, and .25 g of shell fragments. This material could represent the outermost fringes of the occupation area, or it could have been moved to this position from the main part of the occupation by fluvial action sometime after the camp was abandoned.

Debris densities were notably higher in the 2-x-2-m mini-block, although they were not particularly high in absolute terms. Features were absent, and charcoal was limited in quantity. As with the isolated square, most rocks are water-worn pebbles unrelated to the occupation. The larger rock fragments, most of which probably are from the same original piece, may have been intentionally brought to the site,

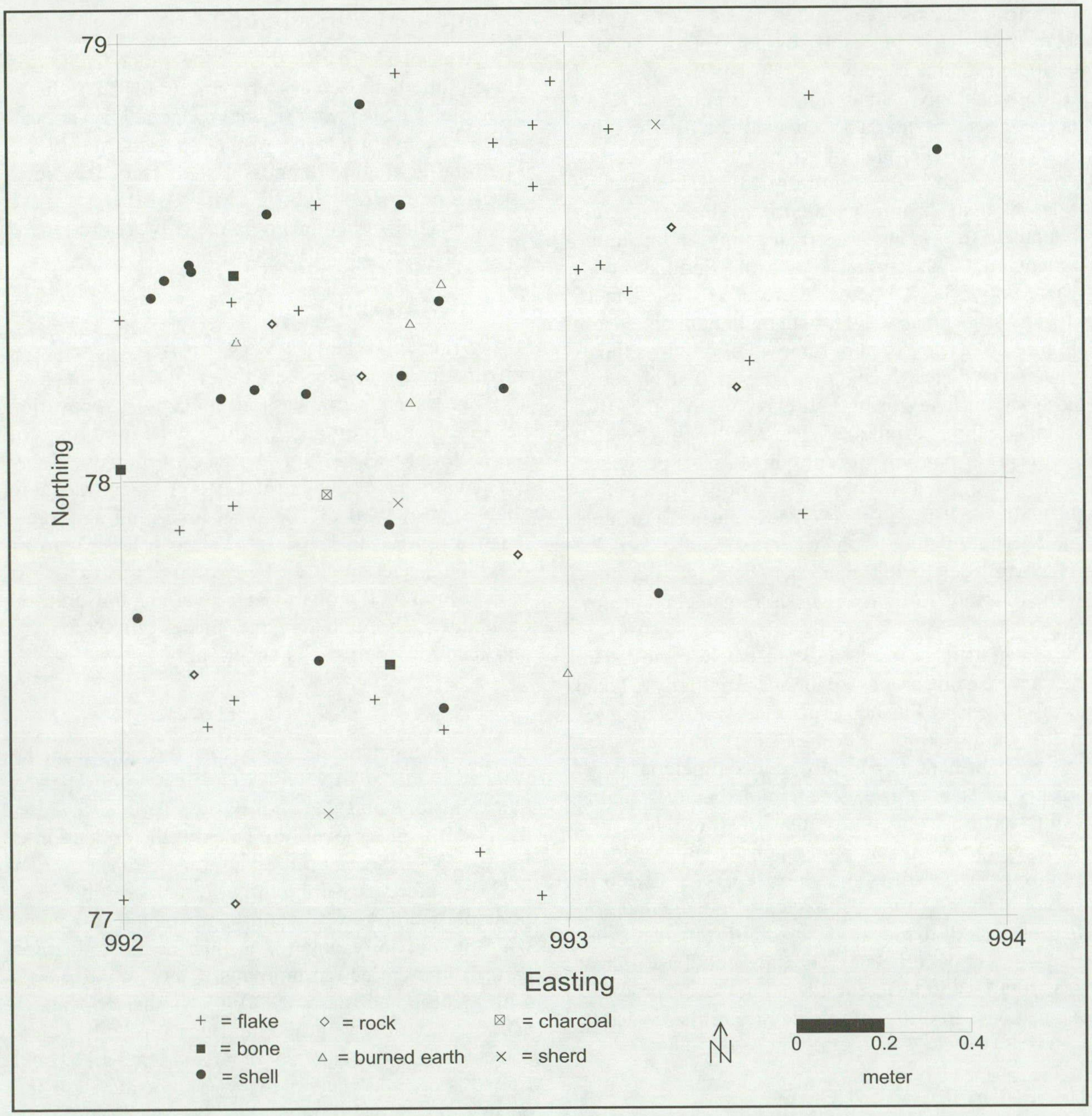


Figure 15. Plan view of North Block piece plots.

although they show no signs of deliberate modification or use.

Figure 15 shows the distribution of piece-plotted materials, including the larger pieces of rock. This plot shows quite clearly that the highest density of material was in the northwest 1-x-1-m square of the 2-x-2-m mini-block (78N 992E), and that the southeast 1-x-1 (77N 993E) had a quite low density of material. Still, highest is a relative term, and the debris density in the North Block is not high in absolute terms.

In a rather classic paper theoretical archeologist Lewis Binford (1980) discussed the structuring of small temporary camps, based on his study of mobile people in the Arctic. He shows that small temporary encampments often are hearth-centered, with debris distributed around the hearth in concentric zones, created by differential modes for disposing of various classes of material. The entire occupation area might have a diameter of 6 or 8 or so meters, centered on the hearth. Assuming that the encampment was

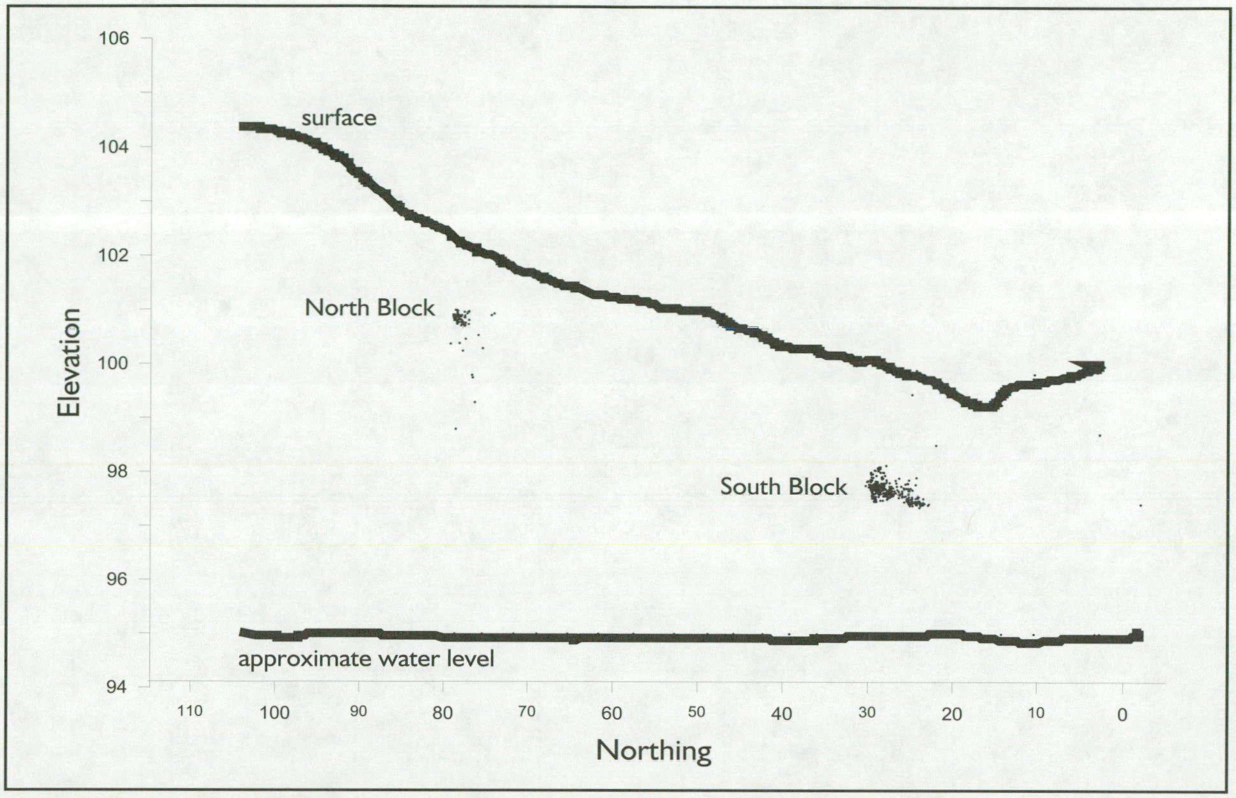


Figure 16. Backplot of all piece plots showing the relation of the two blocks to one another and to the modern surface (vertical scale is exaggerated).

simply abandoned, with the debris left where it was discarded, and that the spatial patterning thus created was not totally compromised by later disturbances, the archeological signature would reflect the manner of the site's creation. Debris would be zoned around the hearth and, beyond a point, would fade in density away from the hearth. The North Block of the Claussen site upper components might be such a situation. In this case any hearth—and with charcoal, burned earth, and burned bone it would seem there must have been at least a small one built during the occupation—probably is to the northwest of the 2-x-2-m mini-block. The excavation was into the southeast fringe of the debris scatter. The Mill Creek cutbank probably is eroding into the western edge. Much of the site probably is preserved between the excavation block and the cutbank. It may not ever have a particularly dense debris distribution and may or may not have a greater abundance of pottery, shaped tools, and larger pieces of bone or increased quantities of mussel shell. Still, the component does have the potential to provide further information, particularly if culturally or at least temporally diagnostic artifacts can be recovered. Only further excavation can resolve the matter.

Investigations in the South Block

The South Block location is farther out on the point bar than is the North Block (Figure 5). The surface elevation in the South Block area is about 99.5 to 100.1 m avd, making it about 1.9 to 2.8 m lower in elevation than is the surface near the North Block. The South Block's position on the downstream arm of the meander loop of Mill Creek puts it beyond the zone of most active bank erosion (confer Brown 1997:18, 68), so the bank here is more stable and less of a sheer vertical face dropping directly into the creek channel than is the North Block. Still, the bank here does erode, and erosion exposes flakes, shell, bone, and rock along an area between about 23N and 31N. This material clearly is derived from a single cultural horizon, lying about 2½ m below the present surface. Given the lower surface elevation at this locus and the greater depth below the surface of this cultural horizon, this occupation area actually was about 3 m lower in elevation than the tested North Block occupation (Figure 16).

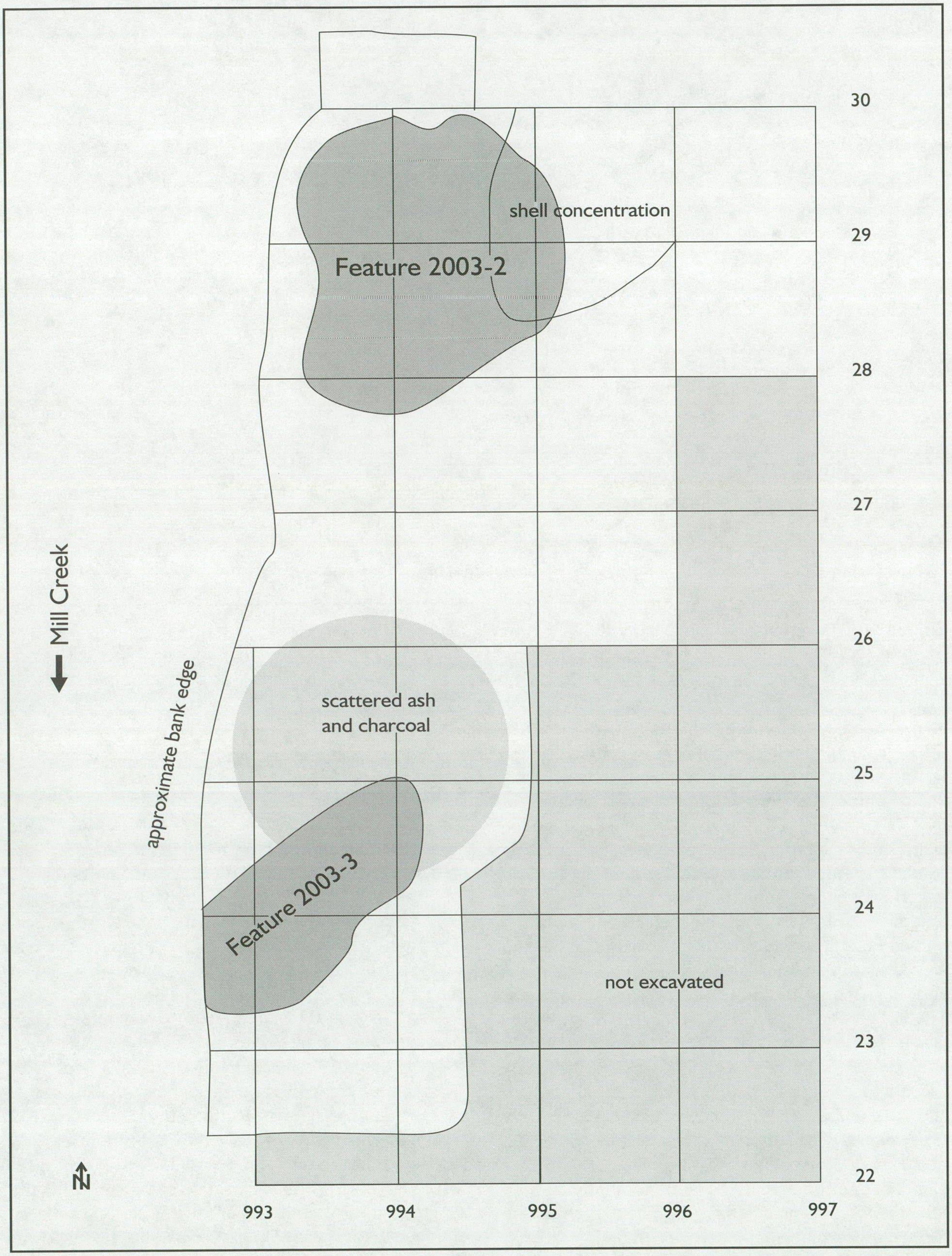


Figure 17. Plan view of the excavations and major features.

Excavation was confined to a single block placed at the bank edge, between 25N and 30N. The backhoe removed more than 2 m of overburden in an area bounded by these two coordinates on the south and north, the 997E coordinate on the east, and the bank edge on the west (Figure 17). Following overburden removal, a grid was set within the block, dividing most of it into squares for excavation. Squares again were designated by the coordinates of their southwest corners. The working vertical datum for this block was set at 98.300 m avd. Vertical provenience was measured below this datum and later converted to elevation avd.

Excavation proceeded by hand below the bottom of the backhoe excavation. As in the North Block, the excavators deliberately erred on the side of caution, leaving some overburden above the cultural horizon to be removed by hand. Overburden removal initially proceeded by excavating 10-cm levels. Later—after determining exactly where the cultural horizon was, that it was indeed the only cultural horizon at this location, and that the cultural horizon was discrete—overburden was rapidly removed using shovels. Excavation through the cultural horizon then continued in normal 10-cm levels except when features were encountered. In these instances the feature, or some part of it, rather than the 10-cm level of a 1-x-1-m square, became the basic provenience unit.

Excavations in the South Block began at the bank edge in the 24N, 25N, 26N, and 27N 993E squares. Excavation gradually expanded to the east, south, and north during the nine-day field school, a tenth day on which some people stayed to help bring the summer excavation to a satisfactory end, and several weekends through November 1, 2003. At the end it encompassed 28 1-x-1-m squares (Figure 17), several of which, including those on the bank edge, were partial. Four to seven 10-cm levels were excavated in most squares, with the larger numbers in squares where overburden was removed in 10-cm levels rather than as a single overburden level. Piece plotting was extensively used within the cultural horizon, although time precluded piece plotting as much as might have been desirable. Additional objects were recovered on the screens, in flotation, or simply were bagged by square level or feature as they were recorded.

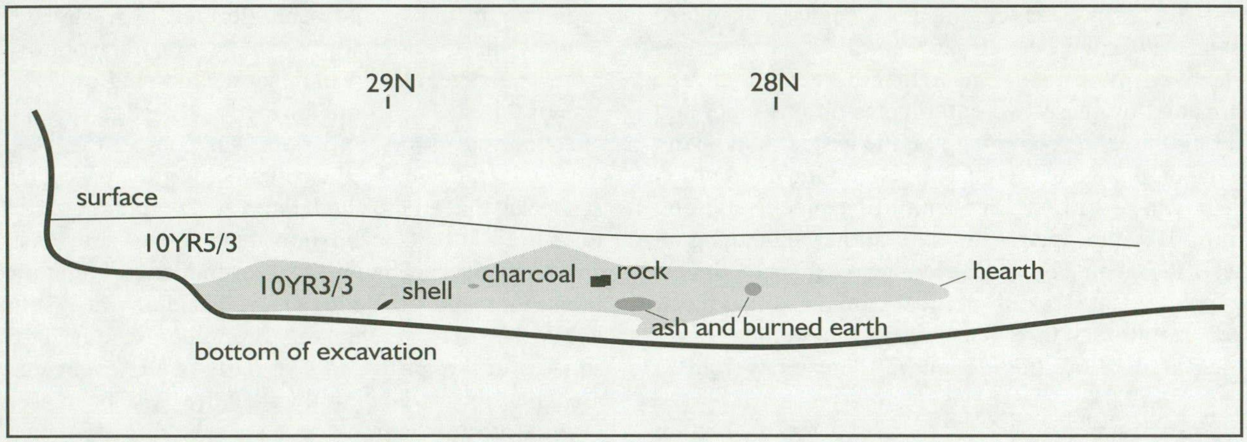
The Occupation Surface

The occupation surface partially exposed in the South Block was a complicated mosaic of artifacts, principally unmodified lithic debitage but also including a few chipped stone tools and the remains of a single ceramic vessel; faunal remains, most prominently but by no means limited to freshwater mussel shell; and features that were horizontally extensive, irregular in plan view, and shallow. The size of this surface is not known, as the edge was not encountered in any direction. Of course, the west edge was truncated by the cutbank of Mill Creek. It is suspected that erosion had removed about one-quarter to one-third of the occupation area. To the north, east, and south, the excavation was constrained by both time limitations and the edges of the backhoe cut. Still, debris densities were notably dropping in the farthest squares in the north and east parts of the excavated area, possibly indicating that had the crew been able to excavate another meter or so in each direction, they might have encountered the limits of the occupation area. Therefore, it appears that a sufficient amount of the area was exposed and that a sufficient amount of it was unaffected by erosion to allow a good reading of the nature of the occupation.

A total of 12 feature numbers, 2003-2 to 2003-13, were assigned to upper component features (number 2003-1 had previously been assigned to a feature in one of the lower components and is of no concern here). These numbers denote an initially perplexing, but ultimately understandable, complex of concentrations of charcoal, ash, and burned earth. Only two of them, Feature 2003-2 and Feature 2003-3, appear to be actual hearth features. They were irregular in plan view and shallow, but they were in place on the living surface and were horizontally somewhat separated within the block. They are not vertically separated and, while they may represent occupations at different times, it is more likely that they represent two hearths used simultaneously and possibly for different purposes. The remaining numbered features appear to represent ash and charcoal derived from these two main hearths and scattered across the living surface. The following, therefore, describes the two hearths and the scatters of charcoal and ash in their immediate vicinity then turns to the literature of ethnoarchaeology to help understand how they may have been formed. The association of artifacts and faunal remains with the features is evaluated in a later section of this report.

Feature 2003-2 and Its Immediate Vicinity

Feature 2003-2 appeared to be a fairly large, irregularly shaped, shallow hearth. It initially was recognized early in the excavation in squares 28N 993E and 29N 993E. Later, as the excavation progressed to the east within the block, it was found to encompass all or part of several adjacent squares. In final plan view it was an irregularly elliptical feature



Figue 18. Cross section of Feature 2003-2 along the 994E line (east wall profile).

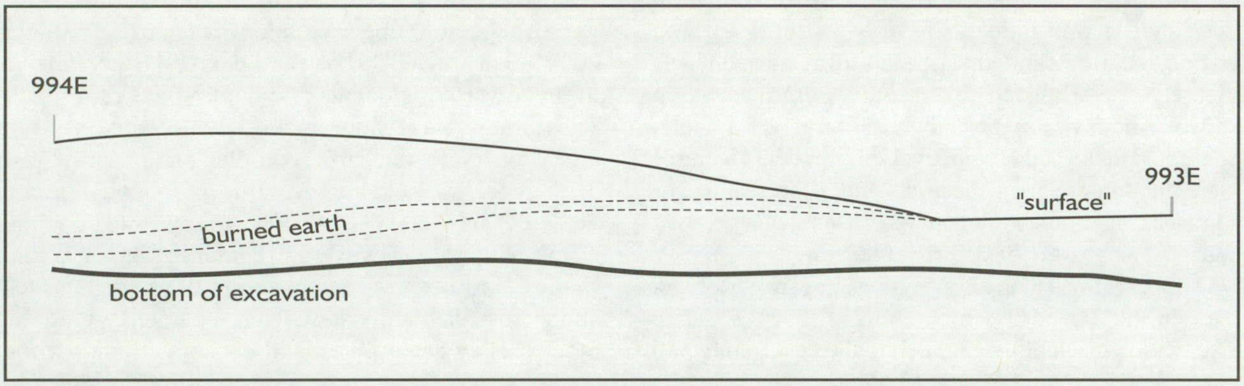


Figure 19. Cross section of Feature 2003-3 along the 24N line (south wall profile).

that measured not quite 2.5 m north-south by just less than 2 m east-west. In profile (Figure 18) it was a thin, irregular lens of dark brown (10YR3/3) fill with concentrations of ash and charcoal and inclusions of shell and rock. The bottom was lumpy and irregular and was not the smooth basin sometimes associated with prepared fire pits. The edges likewise were diffuse and perhaps somewhat arbitrarily determined. In fact, the plan view drawings from the western part of the feature (excavated in July 2003) and the rest of the feature (excavated in early September 2003), do not match properly. A probable explanation is that different moisture conditions at these two times—quite dry in July but more moist in September—made the plan view of the diffuse edges appear different at these two times. Lighting conditions also may have affected perceptions of feature limits.

Both artifacts and faunal remains in some quantity were associated with this feature. A large amount of chipped stone debitage and a few tools were concentrated near the western edge of the feature. Sherds from a single ceramic vessel were scattered through the middle of the feature. Overlapping the feature's eastern side, and extending beyond it to the east, was an intense concentration of mussel shell, mostly whole valves and sometimes even pairs. These were stacked several deep in an area measuring about 2.0 m (east-west) by 1.4 m (north-south, although the north edge is at the wall and may not be the actual north edge). A large rock slab lay toward the eastern edge of this shell concentration. Additional shells and occasional artifacts were scattered more broadly around the feature.

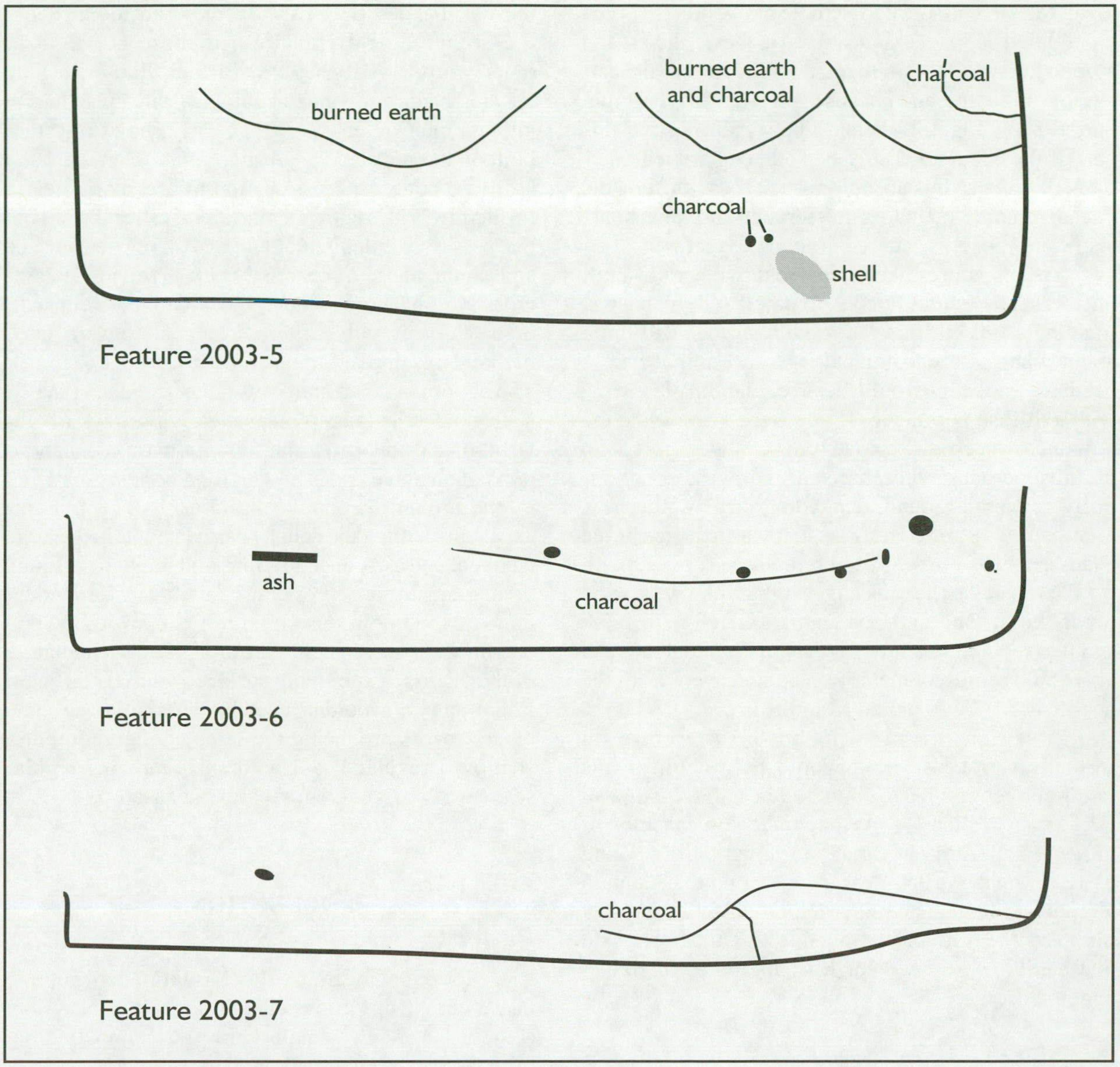


Figure 20. Selected profiles of other features.

Feature 2003-3 and Its Immediate Vicinity

All remaining numbered features, and some charcoal and ash concentrations without numbers, are in the south part of the South Block. Feature 2003-3 was the main feature. It actually was the edge of this feature, eroding from the Mill Creek cutbank, that allowed recognition of the cultural horizon at this location. Feature 2003-3 itself is a sub-rectangular concentration of charcoal and ash that extended about 1.5 m northeast-southwest and 1 m or so northwest-southeast across squares 23N993E and 24N993E (Figure 19). A profile of the cross section revealed a thin lens of darker fill and burned earth.

Feature 2003-3 is surrounded by a series of small concentrations of charcoal, ash, and burned earth, some with feature numbers, some without. These concentrations were irregular in plan view. They appeared at different elevations and usually were shallow and irregular in profile (Figure 20), sometimes amounting to no more than a line of charcoal that can barely be accurately described even as a lens.

The density of artifacts and faunal remains associated with the Feature 2003-3 area was considerably lower than that associated with Feature 2003-2. Some unmodified debitage was scattered to the northwest and around the west side of Feature 2003-3. From the pattern of the scatter and because some flakes were right on the bank edge, it seemed likely that more of this part of the occupation surface had been eroded away by Mill Creek, thus accounting for some difference. Faunal remains, including mussel shell and some bone, also were loosely scattered around the feature.

These features likely represent two hearths built on the surface, and not in prepared pits or basins. Imagine a fire built on the ground surface and think about what its archeological signature might be. A fireplace like this would be irregular in plan view with a diffuse perimeter. If one were to excavate the remains of such a fireplace, one would expect it to be thin, perhaps with charcoal and ash discontinuously scattered around, depending on how fuel was arranged. This, of course, is what was exposed at the Claussen site. Further, food remains associated with the Claussen site hearths suggest that they were used for cooking. One further imagines, therefore, that the small, irregular, shallow patches of charcoal and ash also could represent material scattered away from the hearth as food was pulled from the fire.

A search for anything in the literature on formation processes that would help confirm this intuitive scenario led to John Yellen's (1977; see also Brooks and Yellen 1987) ethnoarcheological study of intrasite patterning in camps occupied by the !Kung of Botswana. Yellen described camps that contain temporary shelters and, more importantly for present purposes, hearths placed outside the huts. He said that hearths were used for warmth and for cooking, and noted:

> [M]ost fires constructed for cooking at any location are simply piles of wood and dead grass or leaves. ... Generally no attempt is made to construct or excavate a formal hearth structure (Brooks and Yellen 1987:81).

He also reported that

> each [hearth] is marked by charcoal as well as by a small depression, which results from raking coals, ash, and hot sand during cooking. Other pits or scatters of surface charcoal ... may also be present and these result from special activities. ... scatters of debris [are] generally confined to the area immediately around each hearth (Yellen 1977:87).

Yellen's drawings and photographs supplement these verbal descriptions and remove any doubt about the archeological signature of these hearths—in other words, what they would look like once they became features on an archeological site. One hearth photograph (Yellen 1977:88) clearly shows a feature built on the surface. It had an irregular plan view and a diffuse edge. A cross section of a cooking hearth (Yellen 1977:87) shows a mixture of ash and charcoal that was overall lenticular and had an uneven surface and a lumpy base. A charcoal scatter (Yellen 1977:88) cross section shows scattered charcoal above discolored sediment with scattered charcoal above a patch of stained sediment that also had scattered charcoal. The bottom of this feature was quite irregular. Finally, Yellen's detailed camp maps clearly portrays irregularly shaped and sometimes discontinuous concentrations of charcoal and ash, with food remains scattered in and around the charcoal and ash concentrations. Loci representing the actual hearth lay within the large charcoal and ash concentrations and might be discrete or marked by a depression (Yellen 1977:appendix maps). Finding a description of a known situation that more closely matches the archeological signature of the Claussen site living surface would be difficult. Importantly, it would be even harder to imagine some other process producing the same configuration of a shallow irregular basin with surrounding irregular scatters of charcoal, burnt earth, and ash.

Collections

Pottery

Pottery in the South Block is limited to multiple pieces comprising a considerable part of a single vessel (Figure 21) and two small sherds that cannot be from this vessel. The two small sherds are each grit- or sand-tempered. One measures 13.7 x 10.8 mm in plan view and is 4.4 mm thick; the other measures 9.6 x 9.1 mm in plan view and is 5.4 mm thick. Surface treatment is difficult to reliably determine. The first of the two sherds may have some remnants of incised decoration, but that also is difficult to reliably determine. It is not certain that the two sherds are from the same vessel, but it is possible that they are. While these sherds are not diagnostic, they are consistent with a Middle Ceramic period identification.

The partial vessel is represented by at least 131 sherds spread over a small area of the excavation block east of and in the east part of Feature 2003-2 (Figure 22). The vessel was heavily burned and now is severely spalled. Vita Tucker partially reconstructed it using 52 conjoining sherds and some of the consider-

Figure 21. The partially reconstructed pottery vessel.

able number of exterior spalls that were recovered, mostly in flotation heavy fractions. This vessel is of considerable interest for several reasons.

Paste and temper. The paste of this vessel is fine textured and well compacted. It is tempered with moderately abundant shell flakes.

Manufacture. While the mode of manufacture is not totally clear, coiling does not seem to be indicated. A slight lumpiness of the surfaces suggests the vessel probably was lump modeled.

Vessel form. The vessel is globular. The body is overall nearly spherical, although slightly squatty, with smooth and evenly curved shoulders. The walls and the base form one smooth, continuous curve. The shoulder represents the widest point of the pot and otherwise is indistinct. The vessel walls above the shoulder converge to a circular orifice with no neck and no rim rising above the constriction. As reconstructed, the vessel is very fragile, and the dimensions are somewhat approximate, as the pot had to be handled very lightly to take measurements. The height is about 144 mm, the maximum width is about 170 mm, and the orifice is almost exactly 100 mm. The lip is 4.0 mm thick.

Surface treatment. The vessel interior is smooth, with wiping or scraping lines paralleling one another and the lip. The exterior also is smooth with some remnants of incompletely obliterated cord

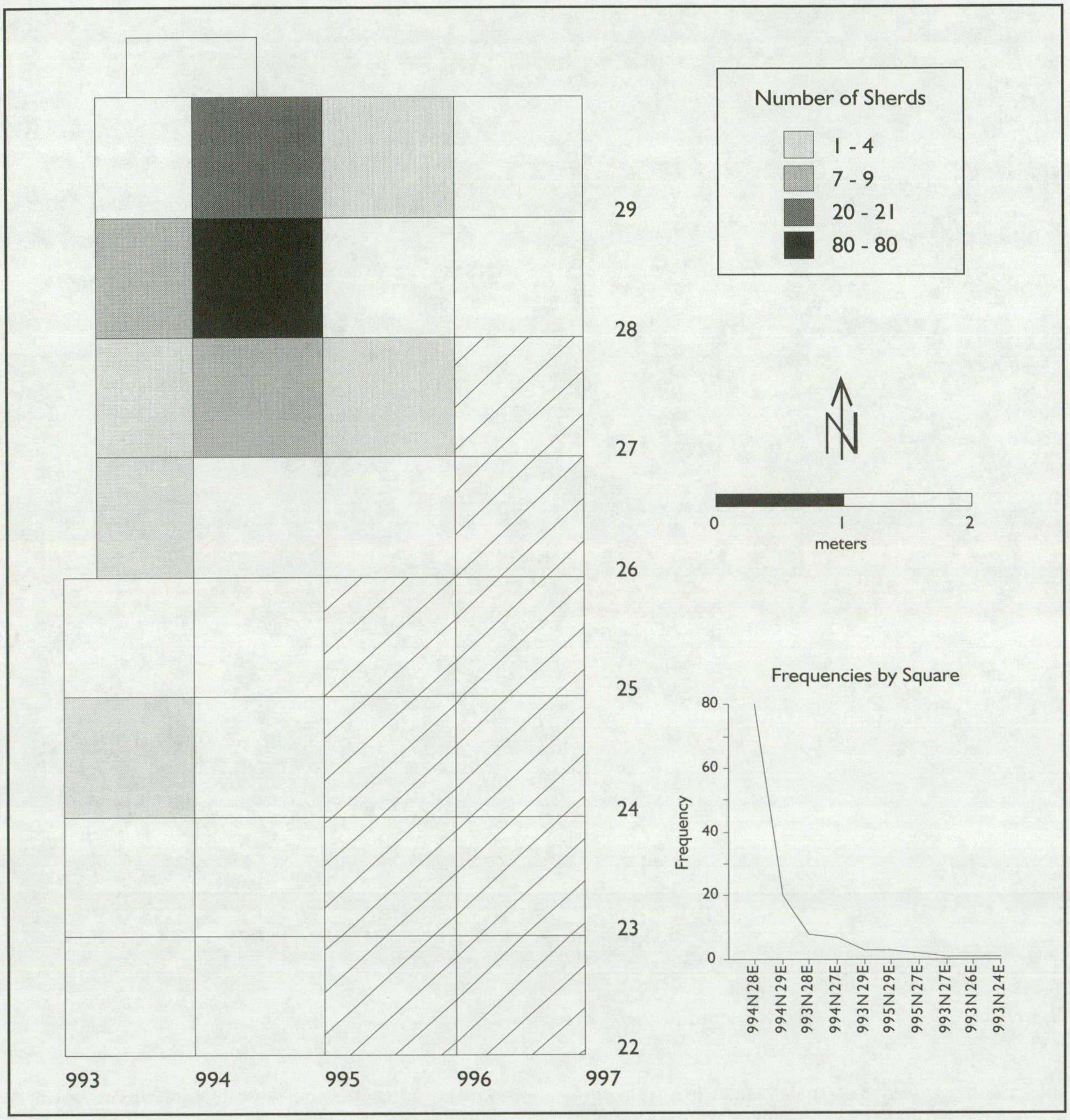


Figure 22. The distribution of the sherds making up the partially reconstructed vessel.

roughening toward the base of the pot.

Decoration. The vessel lip is undecorated, and the body is not decorated below the shoulder. Above the shoulder, a bold and repeating motif reaches from just about the widest point of the vessel (i.e., the shoulder) to about 15 mm below the lip. The decorative motif is an undulating or sinuous double line, the trough of the sine wave is chevron filled. It appears that six repetitions of this motif were executed. Upward-pointing chevrons alternate with downward-pointing chevrons around the upper part of the vessel. The execution of this motif is uneven, and the motif does not extend quite all the way around the vessel. The decoration was executed by incising over the well-smoothed, almost polished surface of the shoulder with a narrow and sharp, but not necessarily smooth-surfaced, instrument that left textured V-shaped incisions just more than 1 mm wide.

Figure 23. A closer view of the effigy face on the partially reconstructed vessel.

In the gap between the two ends of the incised motif is a lug or plug-shaped handle with a human effigy face (Figure 23). This handle is not quite cylindrical either in circumference or longitudinally. It measures 24.4 mm wide and 25.3 mm high at the point where it attaches to the vessel and 29.4 mm wide and 32.4 mm high at the outer end. It is smoothly attached to the vessel wall with its top about 15 mm below the lip, which makes it about even with the top of the incised motif. The effigy face is simply executed. The eyes and mouth are punctates made with a small hollow tool about 1 mm in diameter, possibly the same instrument used for incising the vessel upper body, judging from dimensions and overall appearance. Finger pinching formed the nose.

Opposite the effigy handle on the vessel is a small hole where another appendage apparently once was attached. The sherd with the hole was recovered in a flotation sample heavy fraction. A diligent search through all other flotation sample heavy fractions suggested that the appendage was not recovered. What it might have been is unknown.

Identification. It is neither possible nor desirable to give a type name to this vessel. It is not desirable because type names tend to be used as substitutes for carefully looking at a situation and thus get in the way of understanding what happened in past times. Instead of assigning the vessel to a type and moving on to draw all sorts of unwarranted conclusions from that alone, it is preferable to position this vessel in the greater context of Central Plains tradition pottery.

On the Central Plains most people readily associ-

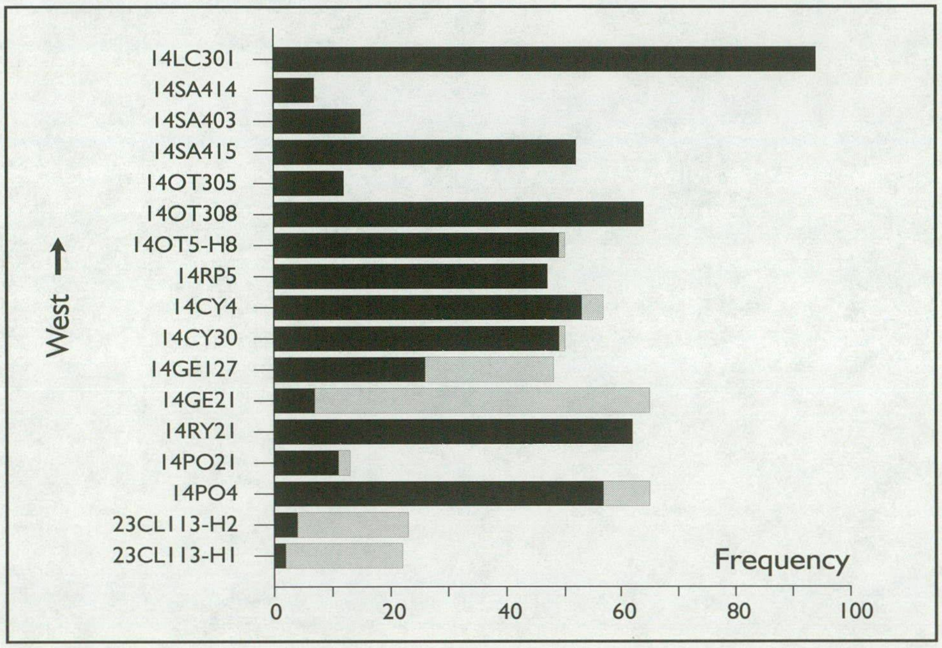


Figure 24. The distribution of grit-tempered (black bar) and shell-tempered (gray bar) pottery in 17 lodge site assemblages from across the Central Plains.

ate shell-tempered pottery with the Steed-Kisker phase of northwest Missouri and extreme northeast Kansas. They also tend to call Steed-Kisker Mississippian, in large part because it has shell-tempered pottery. However, this overlooks the wider distribution of shell-tempered pottery on the Central Plains during the Middle Ceramic period (it overlooks more than this, but that can be left aside for now). Robert F. Gilder (1926:32), Frederick Sterns (1915:245), and William Duncan Strong (1935:255–256), each of whom worked with Nebraska phase sites during the early decades of the twentieth century, all described shell-tempered pottery from those sites. Shell-tempered pottery also appears in Smoky Hill phase sites in northeast and north-central Kansas, although its proportion within collections varies.

Figure 24, slightly modified from a conference paper (Roper 2005b), uses published reports to compile the number of grit-tempered and shell-tempered rim sherds in collections from 17 lodge sites spread from northwest Missouri to about half-way across Kansas. The two Missouri lodges (23CL113, Houses 1 and 2) are assigned to the Steed-Kisker phase, the remainder are assigned to the Smoky Hill phase. The sites are shown in approximately an east-to-west order, reading from the bottom up on the Y axis of the graph. The graph clearly shows that shell-tempered pottery is not confined to the Steed-Kisker phase. Instead, it comprises a variable proportion of the assemblages from most Smoky Hill phase sites to as far west as the Minneapolis site (14OT5), about 150 miles west of the Steed-Kisker phase sites. Shell temper is absent from Smoky Hill phase sites in the Salina area and farther west and is absent from Upper Republican sites even farther to the west (sites west of Lincoln County, Kansas, are excluded from the figure because they would be portrayed by the same black bars as are the Saline and Lincoln County sites included in this graph).

Closing in, the nearest well-reported (Johnson 1973) excavated Smoky Hill phase lodge site is the Budenbender site (14PO4) in the Blue River valley (Tuttle Creek Lake area) of western Pottawatomie County. Budenbender is about 30 miles from Claussen. As Figure 24 shows, Budenbender has a notable proportion of shell-tempered vessels. The collections from two other Blue River valley sites, 14PO21 and 14RY10, also contain shell-tempered pottery (personal examination of collections). Jane Holden Kelley (1966:27) also reported a small amount of shell-tempered pottery from yet another Blue River valley site, the Pishny site (14MH2). Thus, Budenbender and 14PO21 are not anomalies in the northern Flint Hills, and neither is the Claussen site shell-tempered vessel.

The question, of course, is how shell-tempered pottery came to be a part of Smoky Hill phase ceramic assemblages; that is, did it get there by exchange or was it locally manufactured? The most direct approach to this question has been Margaret Beck's (1995) analysis of grit-tempered and shell-tempered sherds from the Mugler site (14CY1), a Smoky Hill phase site in Clay County; shell-tempered sherds from the Steed-Kisker type site (23PL13); and fired samples of clay collected near the Mugler site. Beck's study used petrographic analysis to compare the clay bodies of all sherds and the test tiles prepared from the clay samples. The clay of the Mugler site shell-tempered pottery did not match that of the grit-tempered pottery, nor did it match the local clay. The clay of the grit-tempered pottery did not match the local clay either. Perhaps most tellingly, though, the clay of the Mugler site shell-tempered sherds did not match that of the Steed-Kisker site sherds. The question thus remains in need of further research using petrography and/or instrumental neutron activation analysis.

More circumstantial, but nevertheless relevant, was a study of vessel form performed by Linda Greatorex (1998). Her analysis compared vessel forms between Steed-Kisker and Nebraska phase sites. The analysis found the pots to all be part of the same tradition, or, in Greatorex's (1998:68) words, they form a "dual ceramic tradition" of "a single group."

Roper's ongoing analysis of Smoky Hill phase ceramics also finds that grit-tempered and shell-tempered vessels in the collections do not notably vary in some important characteristics. This approach dispenses with formal pottery types and instead individually evaluates multiple dimensions of variation among vessels. Frederick Sterns (1915:242-259) did this for Nebraska phase collections more than 90 years ago and found that traits varied independently of one another and each showed clinal variation (characteristics changing gradually over space) (Roper 2006c, when published, will be an examination of Sterns' approach to ceramic analysis). After Sterns' time, archeologists working with Central Plains tradition materials jumped on the typology bandwagon and are still riding it. Around the rigid types are crystallized rigid phase definitions, which seem to be real to some archeologists. As a result, lost is all semblance of a feel for how late prehistoric society was organized and how people interacted. In studying assemblages (discussed in preliminary form in Roper 2005b), this author, like Sterns, has found that geographically contiguous sites have similar ceramic assemblages that are recognizably different from those of other localities. The distribution of shell-tempered pottery is one manifestation of this. Observable variation is expressed at the attribute level and immediately differentiates one locality's pottery from that of another locality. Put differently, microstyle expressions, even within specific types, can be isolated and are strongly correlated with specific localities. Yet the sites are assigned to the same phase, and the pottery is identifiable to the same broadly defined types.

The Budenbender site collection has been reanalyzed in some detail. A very striking aspect of this collection is how the rims of grit-tempered vessels resemble the rims of the shell-tempered vessels and yet how different they look from the grit-tempered rims from lodge sites in the Salina locality around the Indian Burial Pit (Roper 2001; Roper and Reed 2003). The sites are about 60 or so miles west of Budenbender. One, but not the only, very obvious difference is the height of the vessel rims. To evaluate this systematically, rim heights were measured (external rim height rather than internal rim height was a more reliable indicator). Indeed, while heights of the grit-tempered rims covered a wider range than did those of shell-tempered rims, they also completely overlapped the distribution of rim heights from the shell-tempered vessels. Although the 14PO21 sample is small, the rim heights are similar to the Budenbender site rims, and the grit- and shell-tempered rims are similar to one another. Other Blue River valley site rims have not yet been measured, although those seen by the author seem consistent with the Budenbender and 14PO21 rims. The grit-tempered rims also were overall lower than rims from sites farther west (Figure 25). All this argues that the grit- and shell-tempered vessels are very much a part of the same potting tradition, one that exhibits considerable spatial variability but yet features two wares.

The effigy handle on this vessel also bears comment. The presence of handles, or at least some sort of appendages, is another characteristic of Central Plains tradition pots that varies over space. Handles are more numerous to the east than to the west in the Central Plains tradition. They are present in eastern Smoky Hill phase assemblages, including those from the Blue River valley, and are largely absent west of the Minneapolis site area. Anthropomorphic effigies in some form have been recognized in Central Plains tradition ceramic assemblages for nearly a century. Although Gilder never described Nebraska phase pottery in any detail, he so abundantly illustrated it that it is readily apparent that his collections from southeast Nebraska sites contained a number of effigies (Gilder 1907:709, 1909:Pl. V, 1911:250, 1926:28). More have been collected and sometimes reported from both Steed-Kisker and Nebraska phase sites in years since. They are not well known from Smoky Hill phase context, though. There is at least one instance of a zoomorphic effigy rim-rider on a vessel

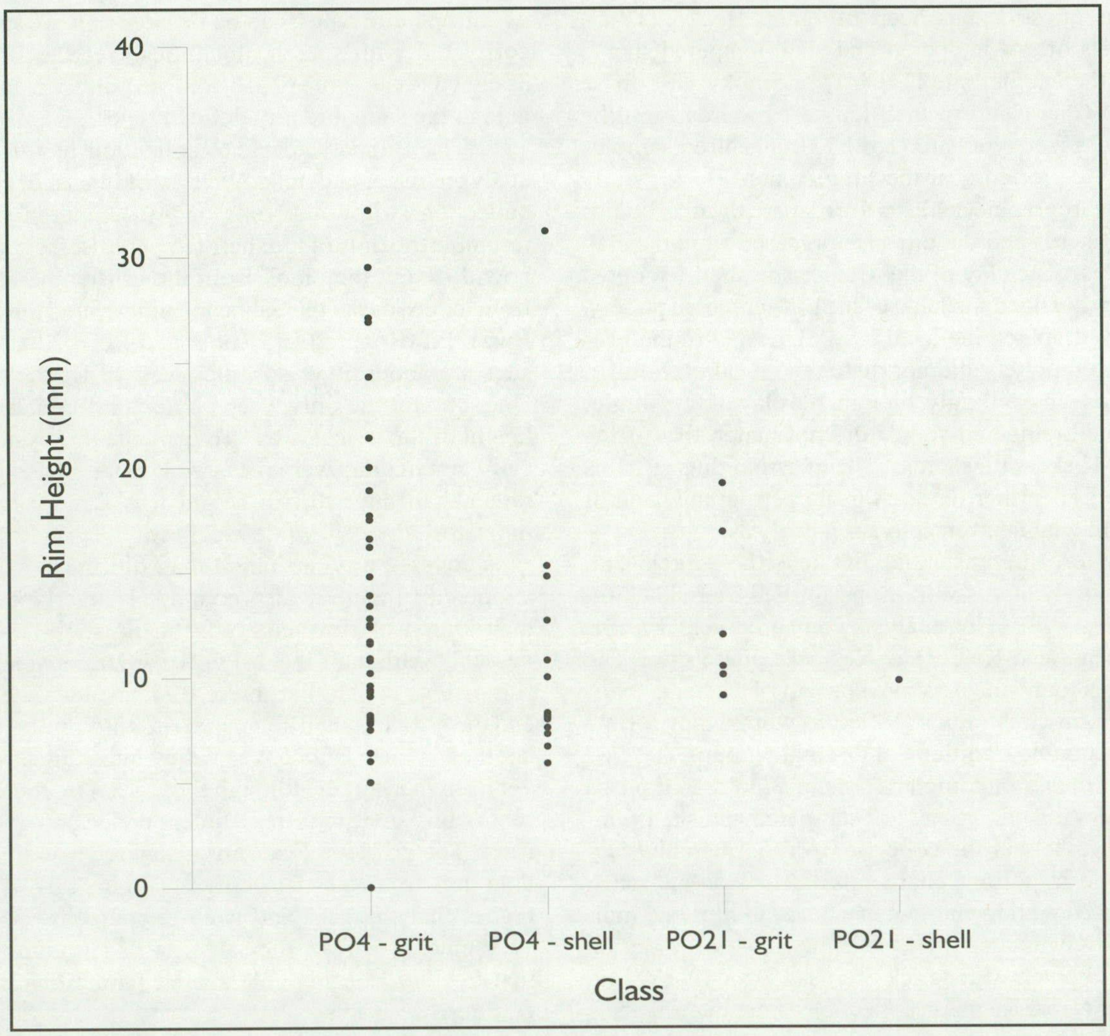


Figure 25. Scattergram of rim heights of grit-tempered and shell-tempered pottery in two Blue River valley sites (14PO4 and 14PO21).

from west of the Blue River valley, but the only other anthropomorphic representation in Kansas known to this author is the one that Johnson (1973:278-280) described in the Budenbender site collection. It is hard to see the effigy on this sherd, but it obviously is not an ordinary sherd either. No one has systematically studied effigies on Central Plains tradition (including Steed-Kisker phase) vessels. Impressionistically, from comparisons with photographs, the Claussen site effigy is one of the simplest of them all. It is a cylinder of clay with a flattened end. It has three properly placed small punctuates for eyes and mouth, probably made with the same implement used for incising the shoulder of the vessel, and a nose formed by a finger pinch. This was a common decorative technique in Smoky Hill phase pottery, particularly in the eastern part of the Smoky Hill phase (and the Nebraska phase, too, for that matter). The Claussen site effigy is rare, but its style is not so far out that it does not make sense and cannot be accommodated within the normal repertoire of Central Plains tradition pottery. The pot in general and the effigy in specific probably need to be understood in the social context of ceramic vessel usage rather than as simply a culture history indicator, but that is beyond the currently available data and far beyond the scope of this paper.

Vessel function and use. The function of this vessel and its use at this particular site are matters of considerable interest, but the function is somewhat puzzling. The vessel is a fairly small one. Its 144 mm height, when converted to English units, is only about 5½ inches, making it considerably shorter than many

Central Plains tradition vessels recovered from lodge site contexts (Roper 2006b:194–195). However, it is not like most lodge site vessels in that it has no neck and no rim rising above the constriction to the orifice. In this, it is largely equivalent to a vessel form that recurs in small proportions in Central Plains tradition assemblages; this form is sometimes called "coconut pot" after the resemblance to a coconut. Actually, this nearly spherical neckless vessel form is widespread. Elsewhere, it is variously called a seed bowl, seed jar, or, in Mesoamerica, a tecomate. The vessels may vary considerably in size in some contexts. Arnold (1999:163), for example, reports that Mesoamerican tecomates vary in size from about ½ liter to more than 20 liters or approximately a pint to more than 5 gallons. Surface finish and decoration also vary in different culture areas. On the Central Plains these pots are usually slightly larger than the Claussen site pot. Their exterior surfaces are cord-roughened and only occasionally decorated. Like the Claussen site pot, they often seem to be associated with features for freshwater mussel preparation or at least with sites that have extensive evidence of freshwater mussel use.

Ceramics from archeological sites are so commonly used to make temporal and cultural assignments that it is easy to forget that, as David P. Braun (1983) famously commented, pots are tools. Like any other tool, their materials, forms, sizes, and technologies are geared to specific uses. Not just any pot will do for many purposes; pots are designed for certain uses and the presence in an assemblage of a variety of pots of different forms, sizes, and manufacturing techniques is a reflection of different intended functions for the vessels. Realizing this, ceramic vessel function has been of some interest to archeologists for at least the last couple of decades. Archeologists have used several approaches to understanding vessel function. Examining the literature to learn how vessels were used is one approach. Another is to study contemporary people who make and use pots in a traditional manner. Yet another is experimental manufacture and use of pots using traditional techniques, followed by analysis of how different uses are reflected by use-wear on the pot and how pots made in different forms and with different materials (particularly temper) perform in various circumstances. The results of these approaches can be applied to studying vessels found in archeological sites.

Unfortunately, any of these approaches offers only limited advances in understanding coconut pots in Central Plains tradition sites in general and the Claussen site pot in specific. Such pots had disappeared from Central Plains ceramic assemblages by protohistoric and historic period times, perhaps because freshwater mussels and other aquatic resources were no longer parts of the diet. Thus, there is no written documentation of their use on the Plains to turn to for assistance. Searching more broadly, both Arnold (1999) and Skibo and Blinman (1999) have looked at these vessels in, respectively, Mesoamerica and the Colorado Plateau of the American Southwest, suggesting that they are general-purpose pots. While this may sound quite unhelpful, actually it is not. Arnold (1999:170), placing his examination of tecomate use in the context of residential mobility and, using an organization of technology perspective, proposes that the versatile design of these pots is consistent with a technology designed to be transportable. This is pertinent to the Claussen site, because it clearly was used for a short period of time. Central Plains tradition people were based at lodge-centered permanent farmsteads, but they did use limited-activity sites away from the farmsteads. Transporting to such sites a few versatile tools that could be used for a variety of purposes, rather than a large number of specialized tools, is expectable. Perhaps, then, if asked to predict what kind of vessel would be found at one of these limited-activity sites, one might predict that it would be a pot like this.

Task-groups setting out to conduct whatever activities they are undertaking at limited-activity sites may take versatile tools. Still, they anticipate the kinds of tools that they will need and select ones that will be best suited, while still leaving them options. Swiss Army Knife or Leatherman? Each is a versatile tool. The one selected, and even the model selected, often depends on the anticipated range of activities. In this spirit we can look a little more closely at how pots like the one at Claussen were used in this region.

One of the more useful studies for this purpose is Hally's (1986) analysis of the varied vessel assemblage from a Mississippian site in northwest Georgia. Hally did several things in his analysis that are relevant here. He combed the ethnographic literature of the Southeast for information on how food was prepared and how pottery was involved in food preparation. Without comparable documentation on the Plains, this will have to substitute. Furthermore, he evaluated performance characteristics of vessels of varying sizes and shapes to develop hypotheses about vessel use.

Two vessel forms that Hally identified in his Mississippian assemblages are similar to the Claussen site pot. He called these carinated jars and Mississippian jars, the latter of which come in both large and small sizes. The Claussen site pot does not exactly match either form, but it does share characteristics that help in inferring function of these vessel forms. Hally predicted that the small Mississippian jar might have been used to cook small amounts of food, suspended high above a fire. He further noted that it might have been especially suited to cooking beans, which require long boiling times. These pots also were frequent in mortuary contexts, where presumably they held food and drink offerings, but obviously this is not how the vessel was used at 14WB322. Hally proposed that carinated jars were used for short-term storage and serving of small quantities of liquid food. Several characteristics of this vessel led to this prediction: the restricted orifice would prevent loss due to evaporation or spillage; the orifice could be covered easily; it would be difficult to act on (stir, etc.) material inside; and, rather generically, it would not be particularly suitable for much else (Hally 1986:287-288). However, drinking from such a vessel would be difficult.

Predictions aside, pots may record traces of how they were used. As Skibo (1992) showed in considerable detail, patterns of carbon deposition correlate with vessel use. This seemed a promising approach to understanding the Claussen site vessel, which had a heavy carbon residue on the surfaces. Without going into great detail, however, the bottom line is that the carbon deposits on the Claussen site vessel are not consistent with the patterns expected from most cooking processes. Also, the heavy burning on the exterior is not consistent with a vessel used for cooking. After all, what good is a cooking pot if it goes to pieces when placed over a fire? The Claussen site pot probably was not used for cooking but was damaged by accidental exposure to heat that was more intense than it was designed to take. It may have broken during the occupation and tossed onto the occupation surface, or it may have been abandoned when the site was abandoned.

One final approach was tried in an attempt to understand or identify the Claussen site vessel's use: residue analysis. A sample was submitted to the Laboratory of Archaeological Sciences at California State University–Bakersfield, where it was tested with several plant antisera (chemicals used to react with the proteins in residues to identify the sources of the proteins) to detect grasses (maize, or corn, is technically a grass), weedy plants (chenopod, amaranth, etc.), onion, sage, other greens, and some nuts. No positive reaction occurred (Parr 2005:2). This result does not entirely rule out the possibility that the vessel was used for cooking; for example, it is not certain that the plant antisera tested for beans. Considering the reasons proposed above for the vessel not being used for cooking, perhaps the residue analysis results are not surprising. The residue probably is not actually food residue but rather carbonized fuel from the fire that damaged the vessel exterior.

So how was the vessel used at Claussen? How are coconut pots in general used in Central Plains tradition context? Coconut pots do not often show signs of use for cooking or heating contents. As Hally noted, these vessels would be good for storing liquids but not for drinking. "Liquids" cover a wide variety of substances. Water is a liquid, and so are oils. These pots, then, when used with mussel consumption, might have held some sort of sauce, possibly an oil that is not yet identified. Acting on the contents of these vessels might have been difficult, as Hally noted, but the lack of a rim might have made it fairly easy to access the contents for dipping. How mussels were eaten on the Plains is unknown, though dipping or sauces may or may not be involved.

An alternative is that the vessel had nothing to do with mussel consumption, for although evidence of mussel processing is abundant at the Claussen site, the mussels processed there were not necessarily consumed there. Further, just because mussel processing was prominent in this occupation does not necessarily mean that it was the only food prepared. Fermenting fruits or steeping leaves to produce teas are two other possible uses of this vessel.

The bottom line is that a number of possibilities remain, leaving a nice research project for someone to study how coconut pots were used in Central Plains tradition contexts (and to give them a better name). Lipid analysis—an analysis of oily or fatty residues absorbed by the ceramic fabric—might be one analytic technique to apply. It might at least rule out some possible uses. Another approach is a detailed examination of vessel context—not only the site function in general but the provenience within the site and associations with features. Seasonality data also might be helpful. Meanwhile, the realization remains that whoever left this pot at the Claussen site brought a vessel that could have been used for any of a number of purposes.

Chipped Stone

The chipped stone portion of the South Block artifact assemblage is neither large nor diverse, and most tools are neither formal or, for that matter, even complete. If it sounds like this is an assemblage with little informational value, that is untrue. Except in cases where intensive collecting or other activity has severely compromised an assemblage, the assemblage should reflect how the site was used. Sometimes a site simply was not intensively used. Because this

Figure 26. Formal chipped stone tools from the South Block occupation – a-c) projectile points, d-e) perforators.

component at the Claussen site was buried under nearly 2½ m of overburden, collection or plowing did not affect it. Erosion may have removed some material, but the recovered materials are quite interpretable and probably adequately reflect the overall nature of the assemblage as it was originally deposited. Before discussing this, it is important to describe the remains.

Projectile points. (Figure 26a-c) Three incomplete projectile points were recovered. The most complete of the three is a small, slightly damaged side-notched specimen (Figure 26a). It measures 21.8 mm long, 13.2 mm in maximum width (although this probably is not quite the complete width), 11.8 mm wide at the shoulders, 8.0 mm wide at the neck, and 3.2 mm in maximum centerline thickness. The haft element is obliquely broken from near the apex of one notch to beyond the middle of the base, making it impossible to measure a basal width. The blade is basically complete and is 15.9 mm long. Its lateral margins are convex, converging markedly to the tip. If the reader looks closely at the very distal-most end of the point, he or she will see that it looks like it is transversely fractured a millimeter or less from the end. Close inspection of the actual specimen confirms that is true and that the specimen has an impact fracture that removed only the very tip of the blade. The point is made of Permian chert.

A second point is the distal portion of a blade only (Figure 26b). The original form of the point is impossible to determine, and measurements are largely

Figure 27. Expedient chipped stone tools from the South Block occupation.

meaningless, save for the fact that the point probably was about the same size as the specimen described above. Technically, this is a medial segment, as it appears that the distal-most couple of millimeters of the original are missing. The proximal end of the segment exhibits a definite impact fracture. This point is made of Permian chert.

The final point also is represented only by the proximal portion of a blade (Figure 26c). A close look shows a proximal fracture across the neck, accompanied by some damage to one shoulder of the blade. The distal end was transversely broken by an impact fracture. It is not possible to determine all details of the original point. The orientation of the remnant of one notch suggests that the original point was side-notched. The length of the fragment is 22.8 mm, indicating that it originally was larger than either of the other two points. The point is made of Permian chert.

It is interesting to note that all three points have impact fractures. These fractures occur when a projectile hits a hard substance. A greater or lesser portion of the end is removed, essentially ripping a flake off the face of the point below the break. The telltale signature of an impact fracture, therefore, is a flake scar running down one face of the artifact, much like a fluting flake that runs from the distal rather than the proximal end of a point (Whittaker [1994:165] describes and illustrates this type of fracture that, in fact, he calls an impact flute). The first point described here has a tiny impact fracture. The tip could have been reworked to salvage the point except that apparently the haft took most of the force of impact and was damaged beyond repair. The other two points reflect the two sides of an impact fracture: one is a proximal end with the flake scar on one face; the other is a distal end with the flake removed by the impact. Impact damage like this can be produced as hunting arrows hit hard bone—or miss their target and hit a rock, tree, or other hard object. The presence of three such specimens in the Claussen site may indicate that tools used away from this camp were being refurbished while the site was occupied.

Perforators. (Figures 26d and e) Two perforators are quite like one another, the main difference being that one is far more complete than the other. The more complete of the two apparently was made on a blade by considerably narrowing about one-third of the blade and leaving the other two thirds to serve as a haft (Figure 26e). It is 59.2 mm long, 22.9 mm in maximum width, and 5.0 mm thick and is made of Permian chert.

The other perforator may have been manufactured similarly but the unworked portion is missing (Figure 26d). The remaining portion of the shaft is 22.4 mm long, 14.3 mm in maximum width, and 4.7 mm thick.

The cross section of the working end of each specimen is thickly biconvex. The distal ends are rounded and blunt. The working edges, including the distal ends, exhibit heavy step fracturing from use. Examination of the working edges with a binocular microscope shows that not only is each edge considerably dulled from use, but also that the cracks between step fractures contain remains of a fairly bright red (10R4/6) substance. Although the substance could not positively be identified, it probably is red pipestone. Tools like this, with a blunt rather than a sharp end, would not be effective for piercing hides or drilling wood. However, they are often thought to have been used for drilling pipes. Red pipestone is found in the glacial gravels of northeast Kansas, and pipes of this material are found in nearby Smoky Hill phase sites (Johnson 1973:288; Kelley 1966:98). No pipe was found at the Claussen site. Presumably, though, someone was either working on one during this encampment or using a drill to clean out tobacco. Whoever was using the drills simply took the pipe with him or her when leaving the camp.

Retouched flakes. (Figure 27) The most common chipped stone tool in the South Block is the retouched flake. Fourteen retouched flakes are all Permian chert. The majority measure 20 to 40 mm in maximum dimension; three range from 45 to almost 70 mm in maximum dimension. Comparisons with size class data for all debitage (see below) indicate that flakes were not randomly selected for retouch and use, but rather that selection was biased toward the larger flakes. Retouch is most commonly a single row of continuous flakes along all or part of one lateral margin of the flake.

Lithic debitage. Lithic debitage was fairly abundant in the South Block. A disclaimer must preface this account of that material. As much of the feature fill was processed by flotation, heavy flotation fractions contain many small flake fragments. Individual analysis of those fragments simply was not feasible. No new information was coming from examining yet another tiny flake fragment, and it is unlikely that every one of them was sorted from the fractions anyway. Therefore, this description and analysis used the following sorting criteria: all piece-plotted flakes were analyzed; all flakes in general level bags were analyzed; obvious flakes and large fragments in sorted flotation fractions were analyzed, but small flake fragments in flotation fractions were weighed in bulk and neither counted nor individually analyzed.

Using these criteria, 791 flakes were individually analyzed. This total includes 453 (57.3 percent) retaining their striking platforms and bulbs of percussion, 291 (36.8 percent) flake fragments, 44 (5.6 percent) pieces of shatter, and 3 (.4 percent) cores or core fragments. A count of 456 of 791 (57.6 percent) are 15 mm or less in maximum dimension, and 637 of 791 (80.5 percent) are 20 mm or less in maximum dimension. (These totals and percentages are cumulative, as all flakes 15 mm or smaller are also 20 mm or smaller.) A total of 151 of the remaining 154 flakes range from about 20 to about 60 mm in maximum dimension, with the largest three flakes measuring between 85 and 95 mm in maximum dimension. To these totals must be added what undoubtedly is several hundred fragments recovered in flotation heavy fractions. From inspection these fragments are less than 10 mm in maximum dimension, and many are less than 5 mm in maximum dimension.

Eliminating also material from the flotation fractions in the South Block leaves 687 pieces of debitage from the South Block. Of these, 393 (57.2 percent) flakes retain their striking platforms and bulbs of percussion, 253 (36.8 percent) are flake fragments, 39 (5.7 percent) are pieces of shatter, and 2 (.3 percent) are core fragments. A size distribution is as follows: 385 (56.0 percent) are 15 mm or smaller in maximum dimension, and 546 (79.5 percent) are 20 mm or smaller in maximum dimension. All pieces range to about 95 mm in maximum dimension. Clearly, adding debitage from the flotation fractions adds to the debitage totals but does not substantially change the proportions of either flake morphology types or size distributions. The remainder of the comparisons here, unless otherwise noted, will use the total that eliminates the flakes recovered by flotation.

Permian chert from the Flint Hills is by far the majority raw material represented in this collection. Of the 687 pieces of debitage considered here, 675 (98.3 percent) are Permian chert. The others include one piece that may be Niobrara jasper and 11 pieces that are not identified. Just over one-fourth of the collection, 175 of 687 (25.4 percent) pieces, exhibit some amount of cortex on their dorsal surfaces. In 61 (8.9 percent) of cases, cortex covers more than half and up to the entire dorsal surface of the flake. Additionally, 72 pieces (10.5 percent of the total number of flakes or 18.3 percent of the flakes that retain their striking platforms) have striking platforms on cortex. Another

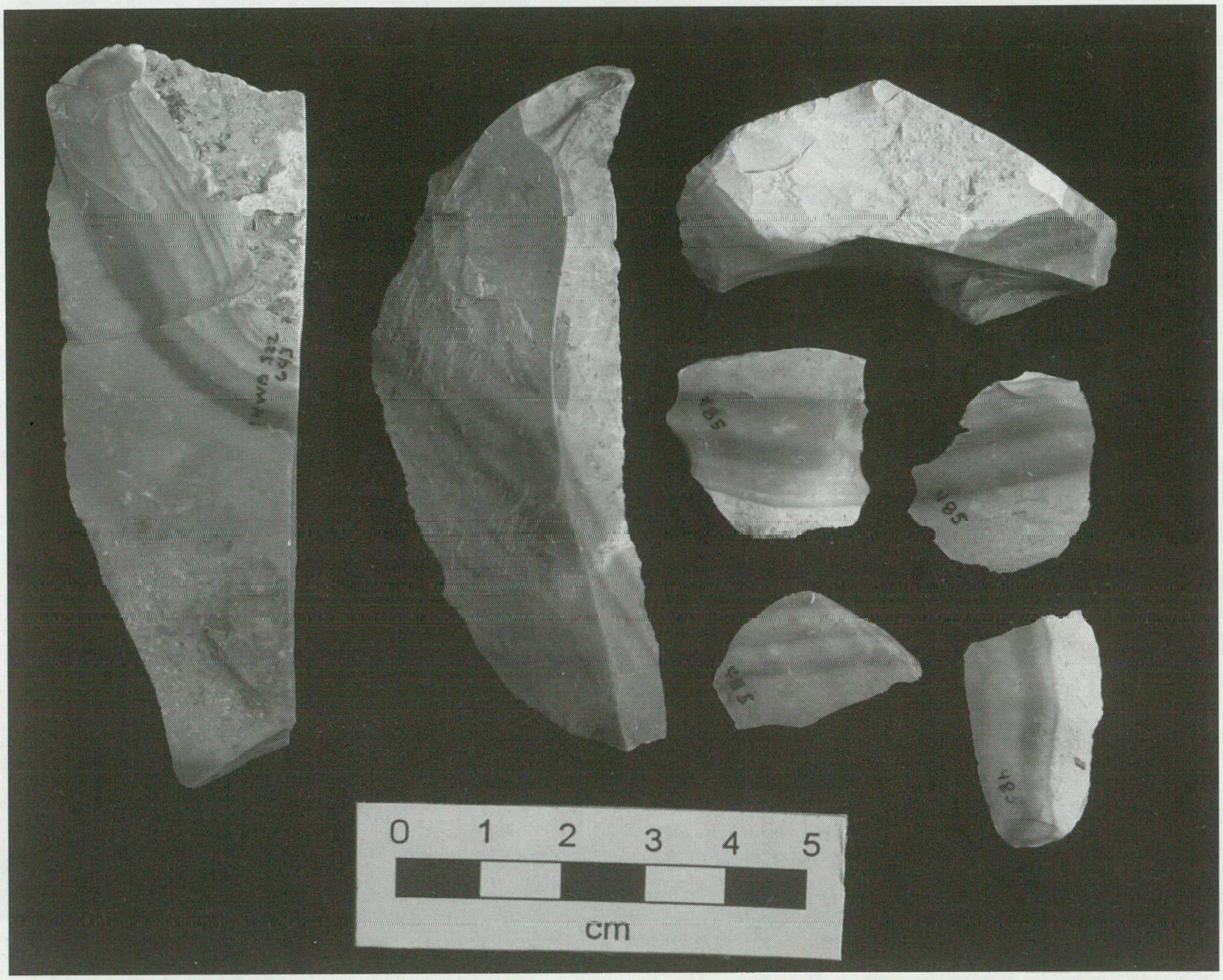


Figure 28. Some of the pieces of debitage from a distinct chert nodule.

270 striking platforms (39.3 percent of all flakes or 68.5 percent of flakes with striking platforms) are flat.

The numbers for amount of cortex and striking platform morphology reflect that a substantial proportion of the debitage in the South Block represents the early stages in the reduction of raw material. As described in an early section of this paper, the Chase Group, a chert-bearing bedrock formation, is exposed in the Claussen site vicinity. It seems likely that whoever was using this campsite procured a block of raw material, brought it to the camp, and reduced it during the period this site was used. A lithic analysis technique not used here is minimum analytic nodule analysis (Larson and Kornfeld 1997). This technique recognizes the individual nodules of raw material represented at a site, sometimes by using refitting to assist in the analysis, but in any event analyzes the pieces from an individual nodule to understand how it was introduced into the site, how it was reduced (if it was reduced at the site and is not a tool brought from elsewhere), and how the remains are distributed within a site and reflect the activity structure of the occupation. The number of individual nodules represented in the Claussen site South Block assemblage was not determined. However, one distinctive individual nodule accounts for possibly as much as half the debitage. Many of the flakes retaining cortex are from this nodule, as are some pieces of shatter and the largest flakes in the collection (Figure 28). Most of the retouched flakes, but none of the bifacial tools (projectile points and perforators), are pieces of this nodule. This means that someone probably had procured the block of material nearby and was reducing this nodule during this encampment. It also means that expedient tools (retouched flakes) used at the site were selected from some of the larger flakes derived from this nodule, any bifacial tools made from this nodule were taken away from the site, and the bifacial tools at the site were made elsewhere. Most of the flakes from this nodule were scattered around and in Feature 2003-2. A few, however, appear to have been scattered around Feature 2003-3. This is significant because it may indicate that the two features were contemporaneous.

A second recognizable nodule is more closely associated with Feature 2003-3. This nodule is less distinctive than the first one and is harder to follow through the assemblage. It is indicated by a small pile of homogeneous raw material in a small area adjacent to Feature 2003-3. Flakes from this nodule account for only a small portion of the debitage and none of the tools. Apparently the nodule was already in a more advanced state of reduction when it was worked at this site. This interpretation is supported by considerable evidence: the cortex had already been removed, the largest flakes in the collection are not from this nodule, none of the shatter appears to be from this nodule, and the core fragments are not from this nodule. In short, someone was apparently working an already partially reduced piece of raw material and removed from the site any tools they may have made from it. The nodule was not used extensively. A plausible scenario might be that the nodule was not so much being reduced here as it was being used as a source of flake blanks for making new tools. It can be expected that some flakes unsuitable for tool manufacture would have been detached while shaping the core to derive flakes suitable for tool manufacture. These, and small flakes removed during further reduction of a flake blank, are present at the Claussen site.

Two other characteristics of the debitage should be noted. First, few pieces of debitage reflect extensive prior flake removals, further suggesting that many flakes represent the earlier stages of reduction. Second, of the 687 pieces only 5 (a mere .1 percent) reflect heating. One of these was burned, probably from accidental rather than intentional heating. Given the negligible representation of heating at this site, it does not appear that heat treatment was being applied to cherts during this encampment. The other four heated but not burned flakes could have been intentionally or unintentionally heated, or they could be pieces that were not from the two recognizable nodules at the site and, thus, could represent pieces heated elsewhere.

Ground Stone

Probably only one actual formal ground stone tool was recovered. Several pieces of rock may represent expedient tools, possibly used for processing mussels or other food items found in the site.

Rock slabs. The most prominent ground stone objects are three large limestone slabs. One is a very irregular, although overall rectanguloid, piece that measures 26.7 cm long, 16.8 cm in maximum width, and about 3.7 cm thick. Its surfaces are smooth and undulating. This piece has no signs of deliberate alteration, but one end might have been exposed to heat.

A second piece also is irregular in shape. It measures 40.1 cm long, 26.8 cm in maximum width, and about 3.7 cm thick. Its surfaces are overall quite flat, but they are not smooth. The piece has no signs of deliberate alteration by pecking or grinding but appears to have been exposed to heat. From one end to the other, the color changes from a tan to a pink, implying heating, and some blackening also may be caused by heating.

The final and largest piece is an overall rectanguloid or parallelogram-shaped piece (Figure 29). Although the most regularly shaped of the three limestone slabs recovered on this occupation surface, it does not appear to have been deliberately trimmed to this shape. The piece measures 43.2 cm long, 26.4 cm in maximum width, and 4.8 cm thick. One surface undulates considerably and clearly is unaltered. In spite of its lumpiness, the piece is stable when sitting on a smooth surface. The other side is much more nearly flat. About 50 percent of this surface is grayer than the rest of the slab. It appears as if spalls have been pecked out of this surface (see inset on Figure 29), possibly by using the stone as an anvil. This area was inspected using both a 10X hand lens and a binocular microscope at 10X with direct light (it was too large to permit focusing the microscope at higher power), and no evidence of grinding was observed. Such evidence should consist of both striations across the surface, most likely in a single direction, and smoothing or polishing of interstices in the pecked area; however, these were absent from this piece. Jenny L. Adams (2002:143) recognized a class of ground stone tools that she designated "netherstones," defined as "bottom stones against which something was worked. … metates, mortars, lapstones, lithic anvils, and others are subsets." She noted that they are expediently designed (Adams 2002:143). Large rock slabs do not appear naturally in alluvial contexts, so someone went to the trouble of moving this rock to the camp. It shows no evidence of exposure to heat, but it might have served as an anvil for some activity connected with processing the foods cooked here. Too heavy to carry away; of no particular value, as no real effort was expended in its formation; and eminently replaceable, as limestone slabs are abundant throughout the northern Flint Hills, this expedient tool was simply left behind when the camp was abandoned.

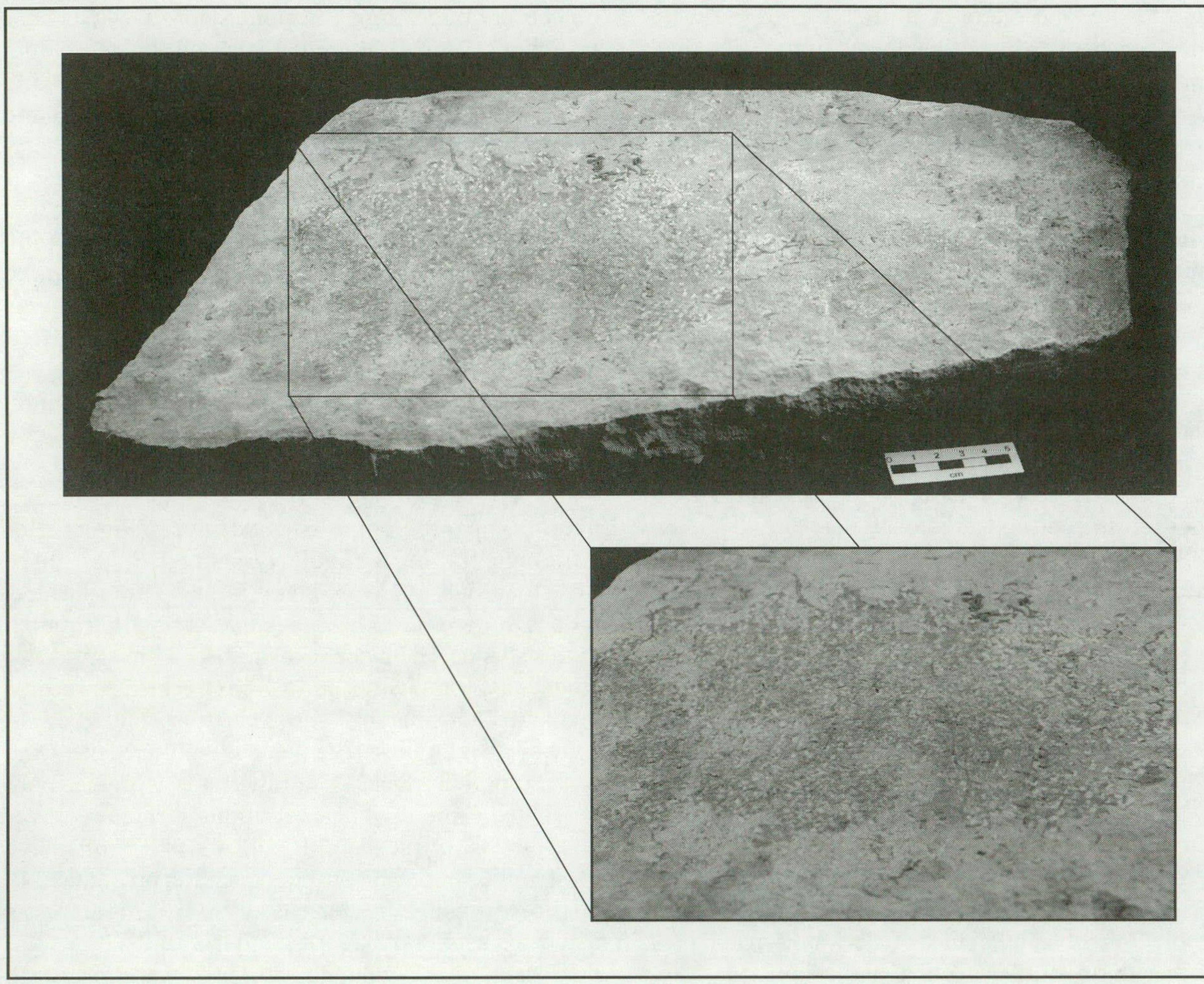


Figure 29. The large rock slab from near Feature 2003-2, with an inset showing the pitting on a part of the surface.

Mano-like hand stone. A single limestone cobble appears similar to a mano. The piece measures 132.3 mm long, 98.0 mm wide, and 35.6 mm thick. The identification as a mano is qualified, because the piece seems to show no real evidence of having been deliberately shaped on either the faces or the edges. A few striations on a small softer limey part of one face provide scant evidence of use and certainly are not evidence of extensive use. In fact, this piece likely is a cobble from the glacial deposits that lie a short distance north of the site, and it is possible that the striations are from glacial action. Again, though, it has to have been brought to the site by human agency and may represent another expedient tool.

Large rock. One other large limestone rock at the site exhibits no evidence of modification to produce its shape and no evidence of use. Inasmuch as this is an alluvial landform, the rock must have arrived where it was found as a result of human action. The association with a feature and other evidence of human activity is technically circumstantial but probably secure. Like most other ground stone tools at this site, this probably is an expedient tool.

Sandstone slab. A small slab of tan sandstone measures 79.8 x 57.5 x 9.2 mm, with a mass of 91.8 g (Figure 30). For the most part the slab shows no evidence of deliberate shaping. The exception is one face that is smooth and pink. When inspected under a binocular microscope at 30X, the surface showed no polishing or striations and possibly is an essentially natural surface.

At first glance the pink area resembles the heat discoloration that characterizes some of the limestone slabs described above. Looking more closely using a hand lens or microscope revealed that the discoloration was caused by a red (10R4/6) substance adhering to

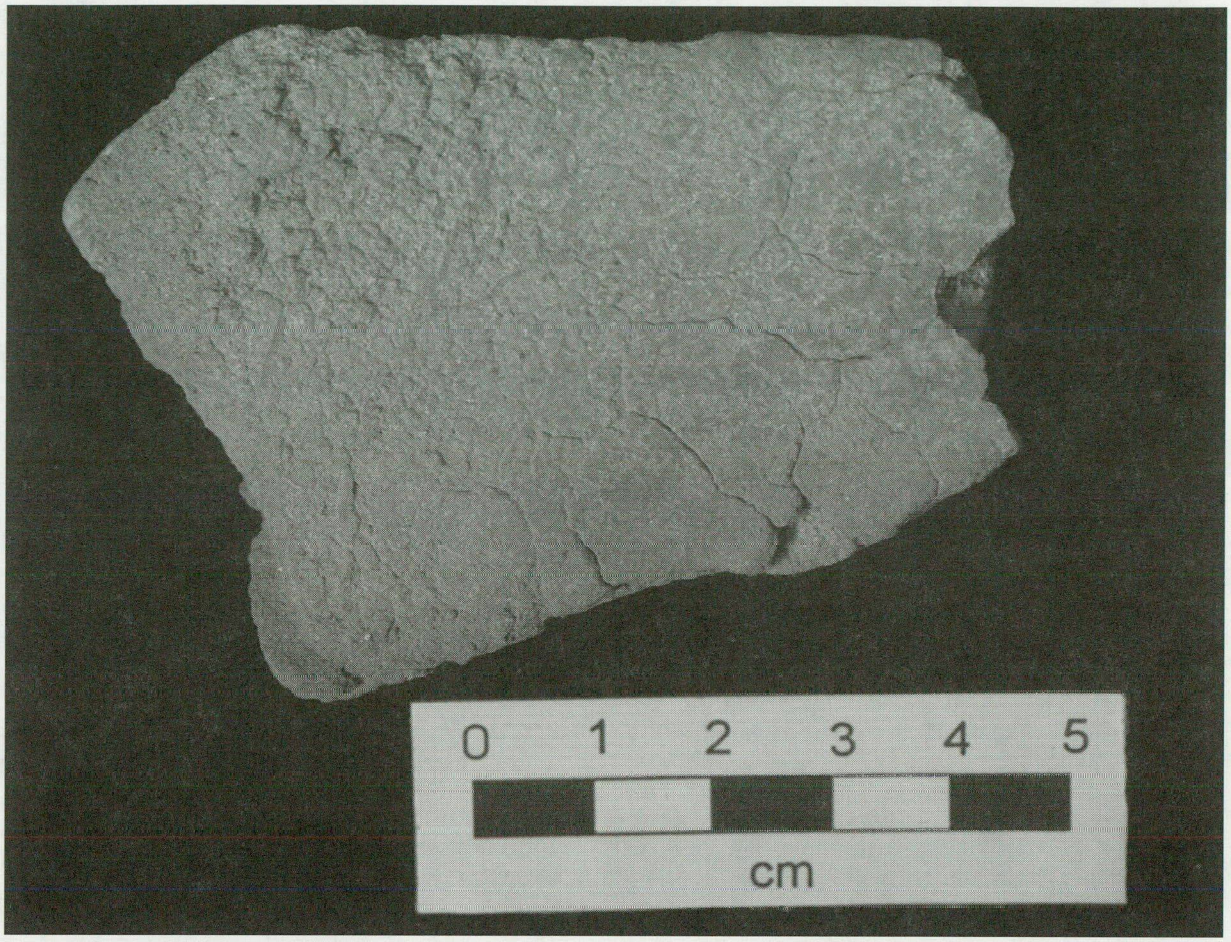


Figure 30. The sandstone slab apparently used for working a pipe; a red substance adheres to the upper right part of the face of this slab.

the surface. An obvious conclusion would be that this is hematite or ochre. Johnson (1973:290), for example, described traces of hematite on an abrading stone recovered at the Budenbender site. Hematite was found at Budenbender, making this a plausible identification. However, hematite is less plausible at the Claussen site, for no hematite is present in the collection. Of course, it is possible that hematite was taken away, but it tends to be messy and leave traces, even if only as small flecks. These, too, are absent from the Claussen occupation. Another possibility is that the stone was used for hematite grinding elsewhere and somehow was lost at this site.

It is more likely that the red substance on this stone is pipestone and that the sandstone slab was being used with the perforators to work on a pipe. Stone pipes often show striations on their surfaces, suggesting that an abrader of some kind was used to form them. The collection from site 14PO21 in the Blue River valley contains a piece of pipestone with such striations on it, perhaps indicating that someone was using a coarse abrader to shape it. This certainly is not to suggest a direct link between the 14PO21 pipestone and the Claussen site sandstone slab. Rather, the appearance of the pipestone from 14PO21, and for that matter pipes from various sites, lends credence to the notion that abraders such as that at Claussen were used in the pipe manufacturing process. Its occurrence with two apparent pipe drills is consistent with this suggestion.

Faunal Remains

Bone. The amount of animal bone in piece plots and general level bags (found on the screens) amounts to 649 pieces with an aggregate mass of 269.99 g (9.52 ounces). Individual pieces range in mass from .01 to 18.07 g, with a mean of .42 g and median of .11 g.

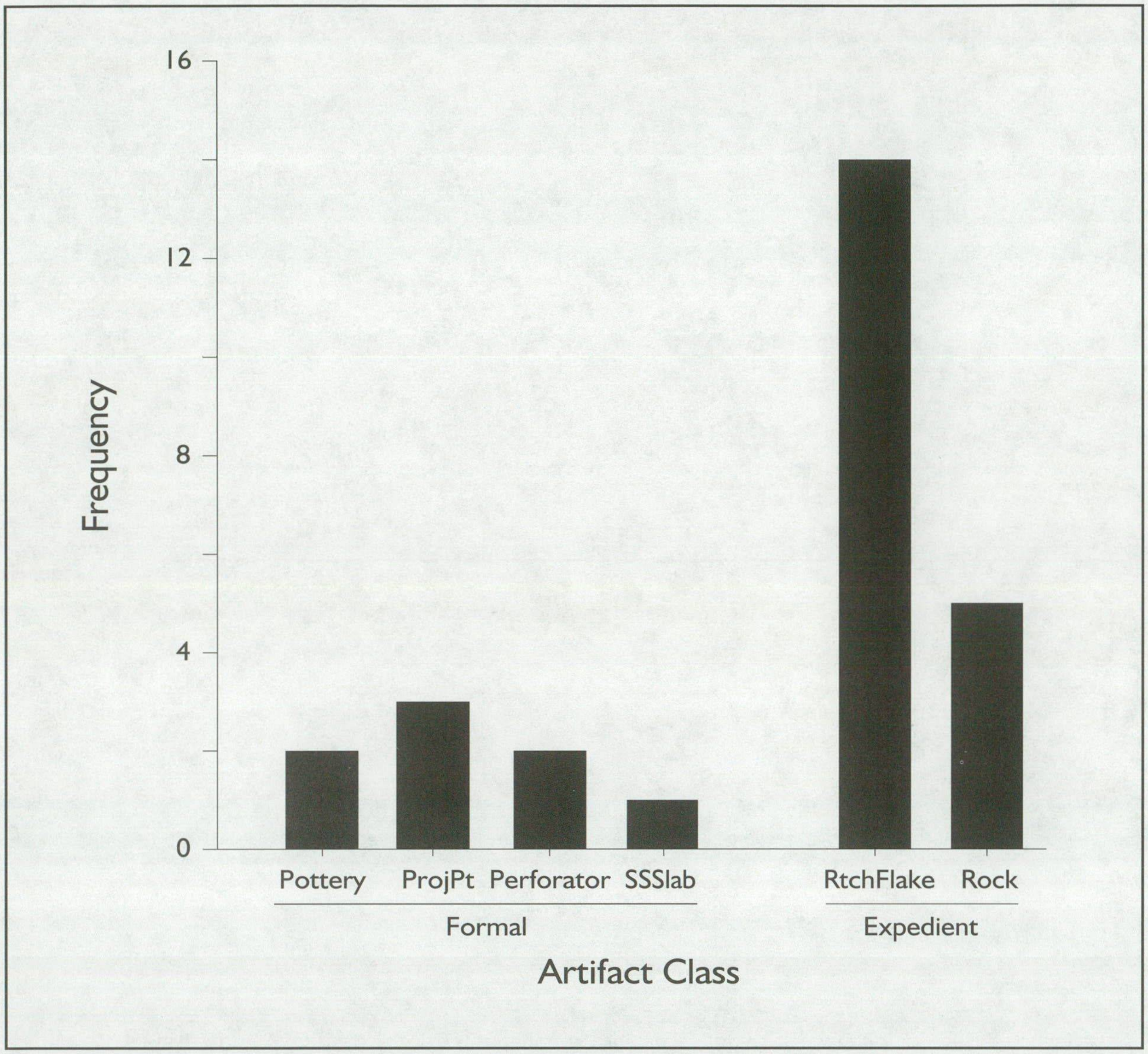


Figure 31. A graphic summary of the South Block occupation assemblage.

Only 10 pieces weigh more than 4.00 g, and 592 (91.2 percent) of the individual pieces weigh less than 1.00 g. An additional 93.00 g of bone were separated from flotation heavy fractions (not all flotation fractions have been sorted). The number of individual pieces in these fractions was not counted but, from inspection, clearly runs into at least the hundreds and probably the thousands. Obviously, much of the bone is very small, partly because the assemblage contains many small bones and partly because some bone is highly fragmented.

Much of the bone is not identifiable to species, but some can be identified to at least family level. Of the 649 entries for piece plots and material recovered on the screens, at least 217 pieces (33.4 percent) represent mammal bone. Of these, 80 (36.9 percent) were burned. Deer almost certainly is one of the mammals represented. Other mammals include medium-sized and small carnivores and rodents. Reptile or amphibian bones account for another 112 (17.3 percent). Much of this probably is accounted for by a single turtle, represented by portions of its carapace, plastron, and bones. Distinctive tail scutes suggest that this was a map turtle (*Graptemys* sp.). Several species of map turtles currently extend their range into eastern Kansas (Conant 1975:maps 14–19). Birds are sparsely represented in this collection. The piece plot/screen portion of the collection contains only a few fish bones. The flotation fractions from Features 2003–2 and 2003–3, however, contain an abundance (hundreds or thousands) of bones from small fish. Fish bone in this collection is not burned.

Freshwater Mussel Shell. Undoubtedly the most prominent part of the Claussen site South Block assemblage is the freshwater mussel shell. Certainly it, along with the effigy pot handle, is the most memorable part of the assemblage, especially to those who worked at the excavation on September 7, 2003. The total amount of shell is at least 12,971.98 g (12.97198 kg, which converts to 457.57 ounces or 28.6 pounds). Fragments of mussel shell pervade the collection, making the actual total somewhat, although probably not substantially, higher. To put the amount of shell in perspective, by weight, shell is more than 35 times more abundant at this site than is bone. The database table of individually evaluated shells has 619 entries. Of these, 368 are for shells that retain their hinges, and 168 of these are complete. Other shells do not retain hinges but are otherwise fairly complete. As discussed below, a large proportion of these complete or fairly complete shells were found in a single, spatially restricted concentration adjacent to Feature 2003-2.

Other Material

Other classes of material are abundant in the collection but add little or nothing to the overall picture of when or how the site was used. Charcoal was rather abundant, as might be expected from a site with large and open hearths. Ash also was present, although very little of it was collected. As described earlier, both appear as amorphous scatters across the occupation surface. Hackberry seeds occurred in some quantity, but it is doubtful that these represent food remains. Instead, they likely represent seed rain during the time that this was the surface and/or seeds redeposited by birds and other animals that cat hackberry in season. As the length of time that this was the surface is unknown, the seeds may not indicate the season of occupation. Finally, gastropods occur in the collection by the thousands. These are natural occurrences and are independent of the human occupation.

Site Function

As discussed in an earlier section of this paper, a major goal of the 2003 excavation into the upper components at the Claussen site was to evaluate the site's function and its role in the Middle Ceramic period settlement system. Little success was had in determining this for the North Block, but the function of the component partially exposed in the South Block is exceptionally clear. Site function will be analyzed by first evaluating the assemblage and activity structures of the component and then looking at the spatial distribution of the material. These analyses collectively lead to a strong assessment of what happened at this site.

Assemblage and Activity Structure

Figure 31 is a graphic summary of the Claussen site South Block occupation assemblage. As both the descriptions and the graphic summary show, the assemblage is small. Compare it, for example, to the Budenbender site assemblage, as reported by Johnson (1973:275-291). The Budenbender site assemblage comprises about 701 objects, counting ceramic rims as single vessels and omitting debitage. This compares to 27 objects from the Claussen site South Block, making the Budenbender assemblage about 26 times larger. Assemblages from other lodge sites vary in size, but rare to probably nonexistent in this area is an excavated lodge assemblage as small as that from Claussen.

The diversity of the Claussen site South Block assemblage also is very limited. The collection descriptions presented in this paper were organized according to standard quasi-functional/descriptive classes. They show the composition of this assemblage to be limited to pottery vessels, projectile points, perforators, retouched flakes, lithic debitage, rock slabs and hand stones, and a small sandstone slab abrader. Counting the number of object classes as a simple and effective measure of assemblage diversity, the Claussen site assemblage has a total of six object classes, omitting debitage. Again, lodge site assemblages are typically more diverse than this. Adjusting Johnson's Budenbender site descriptive classes somewhat to make them comparable to the classes used here, the Budenbender lodge assemblage contains pottery, projectile points, bifaces of several kinds, perforators, scrapers, retouched flakes, unmodified debitage, ground stone celts, pipes, manos, metates, grooved abraders, hammerstones, a fishhook, a bone awl, a bead, an antler handle, hematite, and a few other miscellaneous objects. Its 16 broad (some very broad for this purpose and, again, omitting debitage) object classes make it much more diverse than the Claussen site assemblage.

Yet another way to compare the assemblages is by the relative numbers of formal and expedient tools. The object classes represented in the exposed occupation area of the Claussen site South Block were

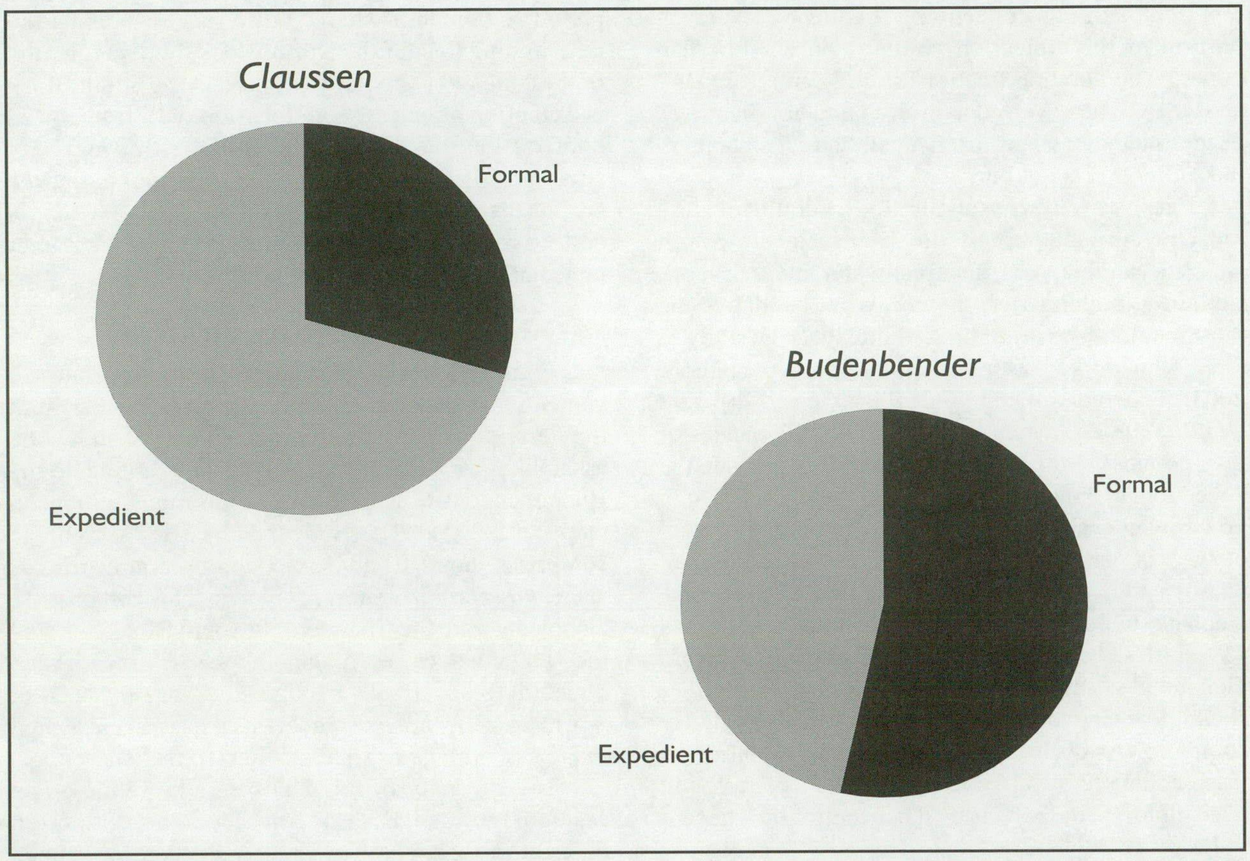


Figure 32. A graphic comparison of the proportions of formal and expedient tools in the Claussen site South Block occupation and Budenbender site assemblages.

grouped as formal or expedient tools in Figure 32. That graph indicates that formal tool classes occur in smaller numbers than expedient tool classes. The same holds true for totals: the assemblage contains 8 formal and 19 expedient tools (Figure 32a). Again, this contrasts with the Budenbender site assemblage, where formal tools outnumber expedient tools (Figure 32b).

Thus, the Claussen site assemblage differs from that of lodge sites in at least three ways: it is much smaller, it is less diverse, and it is weighted toward expedient rather than formal tools. At this general level the assemblage seems to reflect a short-term occupation with a restricted activity structure. The hearth features that were built on the surface rather than in prepared pits are consistent with this.

At a more detailed level, the assemblage offers an unusually sharp picture of the site's activity structure. Food preparation was the most prominent activity, as well reflected by the remains from in and around Feature 2003-2. It appears that a fairly large cooking hearth was built on the ground and used to prepare mussels, a mess of small fish, and a map turtle. The infrequent indication of burning on the mussel shells, fish bones, and turtle remains suggests that these foods were prepared by steaming. A small amount of what appears to be charred grass may indicate that the mussels and other food objects were covered with wet grass to effect the steaming. Prairie grass usable for this purpose should have been abundantly available a short distance from the camp area. The flat but unprepared (i.e., expedient) rock slabs probably were used in food preparation, possibly serving as platforms for gutting fish or opening mussels. Some retouched flakes (and, for that matter, some larger flakes that appear unused) also may have been used in preparing foods for steaming and/or processing them after cooking. The globular, neckless ceramic vessel may or may not have been involved in food preparation and consumption in some way, as previously discussed. It should be noted, though, and will be returned to later, that it should not be assumed that all food prepared at this camp was consumed there.

Other activities also are evident. Refurbishing the supply of chipped stone tools was one of them. Some hunting apparently had been conducted probably not too long before this encampment was made. The burned mammal bone may reflect direct cooking (roasting) and the consumption of some meat at the camp. None of the three projectile points found at this site were complete; all were broken by impact fracture. Their presence may suggest that arrows were refurbished by the removal and discard of broken and unsalvageable points. Indeed, not one of these points was salvageable, nor did it need to be salvaged in a region of abundant chert. A nodule represented by some debitage around Feature 2003-3 obviously was brought to the site in an already partially reduced form and was removed from the site in a somewhat more reduced form. Some flakes derived from this nodule were discarded on this occupation surface. Perhaps a close examination of small debitage would indicate that other flakes were chosen as tool blanks, were worked further, and then were taken away when the camp was abandoned; however, that is an open question at this point. A second nodule definitely was worked at this site. Apparently procured nearby, this nodule received primary reduction, including removal of cortex, during this occupation. It was carried away from the site in a partially reduced form. Again, it would require close examination of smaller debitage to determine if actual finished tools also were fashioned from blanks derived from this nodule and carried away from the site, but that is a possibility. Note that no knapping tools such as hammerstones or antler or bone flakers were found at this site. Presumably the person or persons making these tools brought their knapping equipment with them and took it when they left. Notice also that the discarded arrow points account for three of the eight formal tools in the assemblage.

It also appears that someone was working on a stone pipe during the encampment, though the pipe itself was not left here. Probably an individual brought it and took it away when he/she left. The evidence that a pipe was being worked is the red substance on the working edges of the perforators and on the sandstone slab abrader (assuming, of course, that the material is correctly identified). It is hard to say whether persons were smoking the pipe and then cleaning it out or working on its manufacture. The latter seems more likely, in part because the sandstone slab with adhering material seems more consistent with forming the pipe than with using it. Surprisingly, two perforators and the sandstone slab were left at the site. One perforator is broken, and perhaps that is why it was discarded. The other seems complete, although its working edges are dulled, so perhaps, given the abundance of chert in this region, there was no reason to save a worn and easily replaced tool. The perforators and the sandstone slab account for another three of the eight formal tools at the site. (The pottery vessels account for the other two formal tools.)

Distribution

The distribution of the remains reveals a little more about the occupation. This analysis begins with the two surface hearths—Features 2003-2 and 2003-3. These hearths were about 2 to 3 m apart. Feature 2003-2 in particular was surrounded by additional features designated in the field that now are interpreted as simply charcoal and ash scattered away from the unbounded hearths by burning fuel, the action of pulling food away from the fire, or perhaps the wind. The hearths contained some faunal remains and cultural debris and were surrounded by additional debris. Using data from piece plots, this is represented on plan view and three-dimensional maps. The plan view maps (Figures 33 and 34) plot individual objects, with the approximate boundaries of the features superimposed. For clarity the two feature areas are plotted separately.

Figure 33 shows the distribution of remains, by general object class, surrounding Feature 2003-2 in the northern part of the South Block. The limits of the feature as shown here are approximate, as they must be for an imprecisely bounded surface hearth. Also shown are the approximate limits of the shell concentration that lay to the east of, although overlapping, the hearth. This shell concentration was not really discrete, so these "limits," although drawn in the field based upon observation, are actually fuzzy. Few piece plots are shown within this concentration. This is because piece plotting of shells was started, but as the excavation proceeded and the density of the concentration became clear, time limitations (it was a Sunday afternoon in the fall, made worse by a prediction for stormy weather before work could resume on another weekend) demanded that piece plotting be suspended and the shells removed en masse. The best way to look at this plot is to imagine the hatched area filled with about 400 or more individual symbols for shells. While doing that, notice that very few other objects were plotted within the area of the shell concentration. Except a large quantity of small fish bone that undoubtedly was part of the same mussel-steaming event, this concentration comprised mostly shell. The large spalled or pitted rock slab (Figure 29) was near the south edge of the concentration; however, only a few flakes and a few sherds were within this

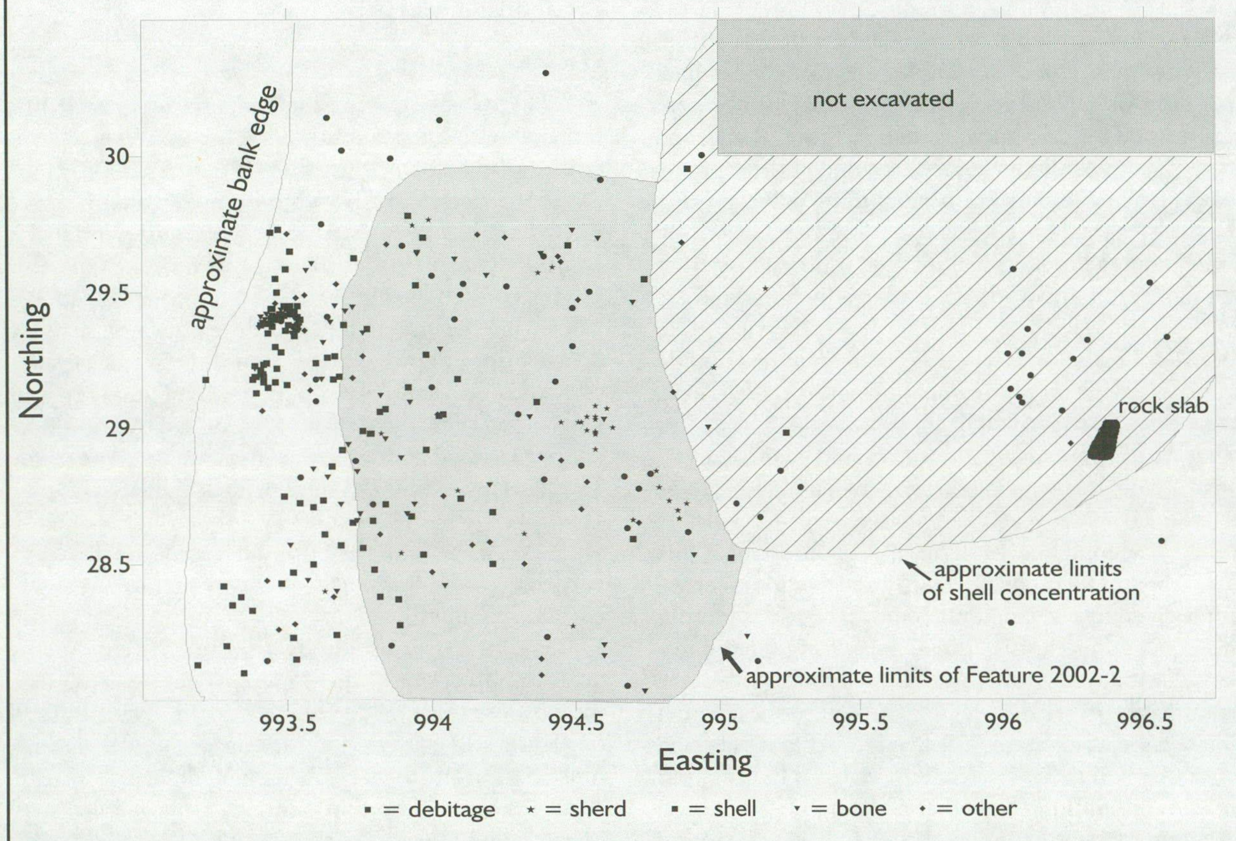
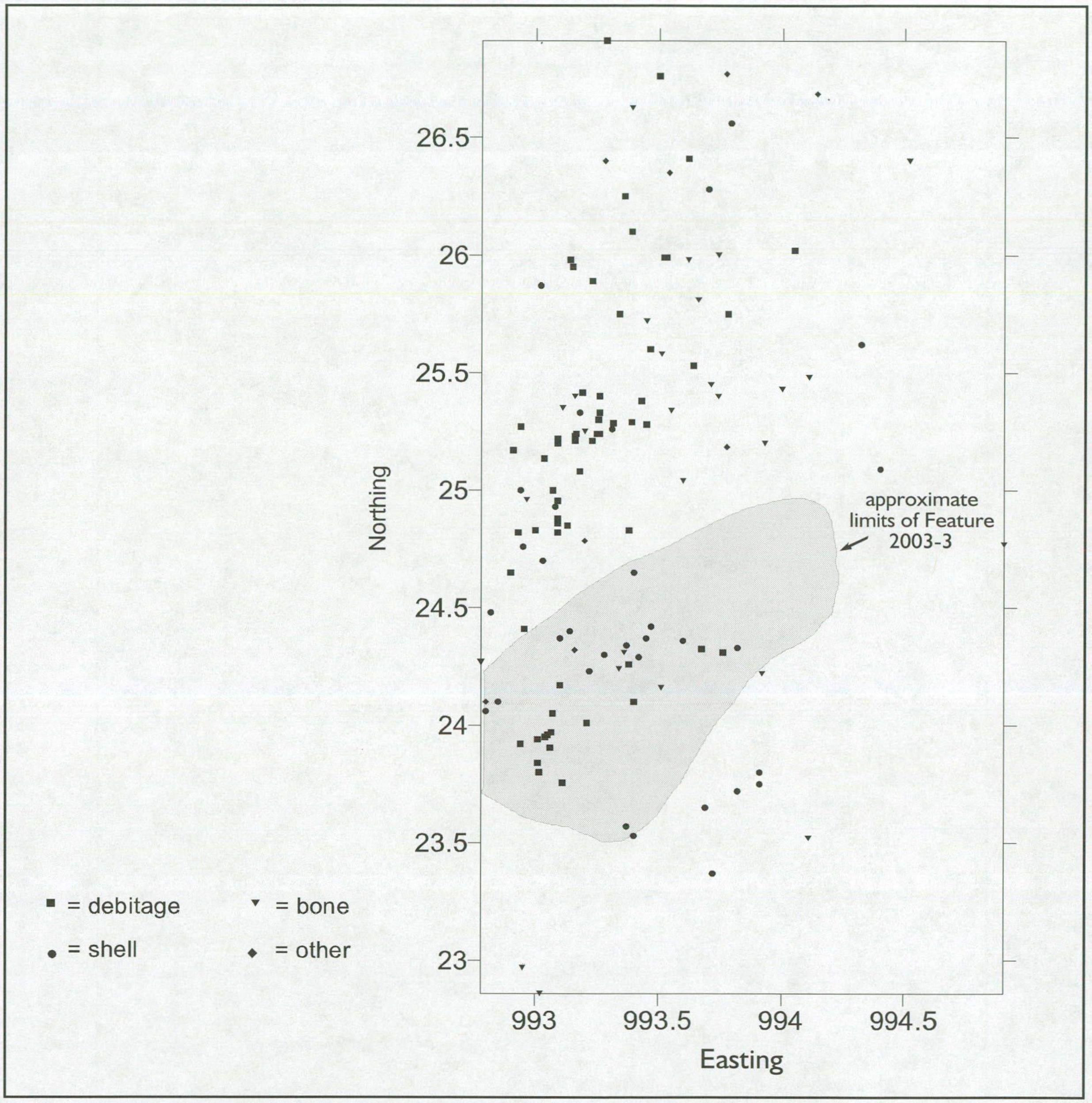


Figure 33. Plan view of the Feature 2003-2 area, showing all piece plots and the general area of the shell concentration.

concentration, and then they were at or toward its western edge.

Some debris was scattered through the hearth area, including sherds composing the shell-tempered pot. A small concentration of sherds lay in the center of the hearth area, with additional sherds linearly dispersed to the north-northwest and the southeast of this concentration (see also Figure 22). Shell was loosely scattered through this area (most shell from these squares was piece plotted), and some bone fragments appeared. Flakes also occurred in the western part of the hearth area.

A large concentration of debris was plotted just west of the hearth. The concentration included some shell, but it was rather sparse in comparison to the shell concentration east of the hearth. The density of bone fragments was higher here than in the hearth. Debitage, though, was the most prominent material in this concentration. This material was not evenly distributed through the area, and instead appeared as a very tight concentration centered approximately at 29.5N 993.5E, with density dropping abruptly to the north and decreasing more gradually to the south and east into the hearth (the Mill Creek bank edge is



Figue 34. Plan view of the Feature 2003-3 area, showing all piece plots.

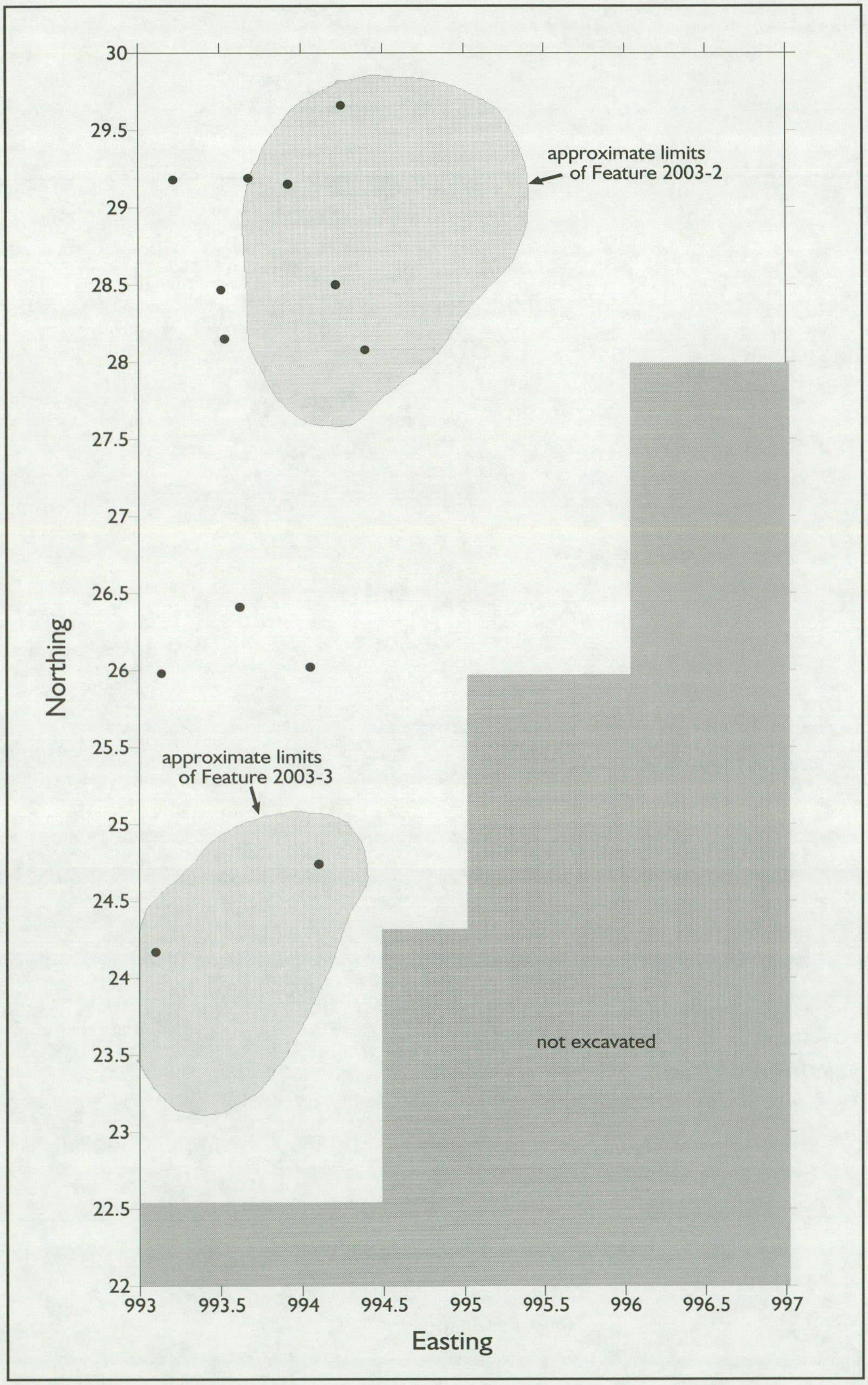


Figure 35. Plot of piece-plotted tools relative to Features 2003-2 and 2003-3.

Figure 36. Height surface maps of flake, sherd, and shell densities (see text for explanation of how these maps were produced).

immediately to the west). The distribution of chipped stone tools (and the sandstone pipestone-working slab) was similar to that of the debitage (Figure 35).

The debris distribution in and around Feature 2003-3 was much more diffuse (Figure 34). Some shell was plotted southeast of the feature, but in nowhere near the quantity it appeared to the east of Feature 2003-2. On the other hand, excavation did not proceed as far to the east here, and, as the limit of the scatter was not reached, technically the amount of shell that may or may not have been (and might or might not still be) present in this area cannot be known for sure.

Shell, again in low density, was found in the hearth. Some debitage also was recorded there. Debitage density and bone density was highest to the north and west of the hearth. Flakes from the chert nodule thought to be brought to the site already partially reduced were abundant in this area. A few tools were found in or near the hearth. The overall density of material was considerably lower than that of the material around Feature 2003-2. However, the Mill Creek cutbank was considerably closer to Feature 2003-3 than to Feature 2003-2, and there is no way of knowing how much of the scatter associated with the hearth was lost to erosion. In spite of this, it is probably fair to say that the activity structure around this hearth was overall similar to that around Feature 2003-2, differing mostly in being (probably) less intense.

The second way to represent the distribution is with height surface maps of several major individual debris classes: debitage (flakes), pottery, and shell (Figure 36). These maps, were created using the piece plot data in a three-dimensional data visualization program (Golden Software's Voxler). Data point values are the northing and easting coordinates of each piece plot and presence values for each data class. The program placed the data in grids and calculated a height surface to represent the density of each material class. In other words, the "higher" the surface (lighter in shading in a two-dimensional representation of a three-dimensional surface), the greater the density of that class of object. Each map in Figure 36 is placed with north to the top, and each has the same northing and easting boundaries. Each is rotated to approximately the same angle in all three dimensions, an angle that seemed to show heights the best. Unexcavated areas are not mathematically blanked; in other words, some areas shown as empty actually were not excavated (compare with Figure 17), so it is not known for sure what was or was not there.

The plots in Figure 36 thus generalize the debris distribution in the Claussen site South Block occupation. Most noticeably, flakes, pottery, and shell are differentially distributed. The pottery basically is a single pot-bust in Feature 2003-2. Shell is scattered in several places around the occupation area. It is most dense just east of Feature 2003-2 (as was well known without any data plotting of any kind; remember also that this concentration actually was far more dense than a portrayal from piece plots alone would indicate) and appears as a spatially broad but sparse scatter in and around Feature 2003-3. Debitage is scattered reasonably continuously along the west edge of what is preserved of the occupation area and perhaps lightly between the two hearths. This plot, or set of plots, does not tell anything new, but it does neatly summarize the spatial distribution of in the major debris classes. In this sense it complements the plots in Figures 33 and 34, each of which contains detail essential for describing the distributions but is too detailed to be an easily visualized summary.

Discussion

In contrast to the rather sparse information yield in the North Block, much was learned about the occupation excavated in the South Block. The occupation surface was not completely exposed; part of it had eroded into Mill Creek, and the excavation did not reach the limits of what remained. However, unless the occupation surface changed character unexpectedly to the east in particular, it is likely that much of the surface was exposed enough to understand the nature of that occupation.

The occupation can be attributed to the Middle Ceramic period, specifically the Smoky Hill phase. This determination is made in spite of the presence of shell-tempered pottery, which, as was shown in earlier pages, is a regular part of the ceramic assemblages of at least the eastern Smoky Hill phase sites (and many Nebraska phase sites to the north and east). The overwhelming predominance of Permian chert from the Flint Hills to the west is consistent with—and may even demand—this identification. Linking the site to the lodge sites in the Blue River valley or another nearby valley is more tentative; however, the Blue River valley sites do have shell-tempered pottery, are dominated by Permian cherts, and have pipes made of red pipestone. They also are the closest Smoky Hill phase lodge sites to the Claussen site.

Regardless of whether the Claussen site was occupied specifically by people coming from the Blue River valley sites or from sites in other valleys, there is some indication of the functional relationship of the site to the lodge site from which its occupants originated. This goes back to the notion, introduced early in this paper, of the settlement system: the functionally interrelated set of sites specific to a culture and its adaptive system. The occupation exposed in the South Block clearly was one at which a limited range of activities was conducted. The occupation also clearly was short, possibly not more than a day or so, and the number of people occupying the camp probably was not large. It need not have been a family or group of families, but more likely was a party of adults, possibly not even representing both sexes, that moved away from the lodge site for an unspecified time to procure resources not available at or near the lodge site. These resources may have included both biological (i.e., food) and mineral resources. This brings up a matter introduced earlier but left hanging for the moment, i.e., whether the food processed at this location actually was consumed there.

This matter is bigger than simply deciding if a few specific individuals ate everything represented by food remains at a particular camp. Instead, it goes to the largely unexamined question of the role of mussels in the Middle Ceramic period diet and how mussel procurement was scheduled into the yearly cycle of subsistence activities. A recent issue of *Central Plains Archeology* was devoted to "Freshwater Mussels in the Great Plains: Ecology and Prehistoric Utilization" (Lippincott 2000). Looking at the issue's contents, much is included about ecology and what species were used, but little information is given about human behavior relative to mussel use. This author senses—not necessarily from the papers in this volume, but rather from the broader corpus of site reports dealing with Central Plains tradition sites—that mussels are regarded as supplemental foods, perhaps an emergency food in hard times or something special, but not a regular and integral part of the diet. This is further epitomized when archeologists use the term "clambake" to describe a site such as the Claussen South Block occupation or any other site where mussels appear to have been processed in quantity. As a real curmudgeon when it comes to word usage, this author takes exception with "clambake" in this case. The term connotes a special and festive event, a communal feast, a party. A Web search on the term readily shows this. However, mussel shell is ubiquitous on Central Plains tradition sites and perhaps mussels ought to be considered as a regular part of the diet. This is consistent with the emerging picture of

Central Plains tradition subsistence as not focused on corn and bison, as were the later earthlodge-dwelling village tribes of the Plains. Rather, the people practiced a mixed agriculture that quantitatively was less important than it would be later, continuing to gather wild and weedy plant foods and making little use of bison. In other words, foraging continued to play an important role in Central Plains tradition subsistence, even if that role was diminished from what it had been in earlier times. Mussels were one of the regularly foraged foods and how their procurement might have been integrated into the settlement system needs to be considered. As one Old World archeologist commented in making this exact point for the Neolithic in the Mediterranean area: "[W]hilst scheduling of farming activities sets the seasonal pattern, the dovetailing of wild-food collection into this schedule is not to be dismissed as peripheral but should be perceived as part of a whole" (Deith 1988:117).

This has implications for how the mussel-laden occupation area at the Claussen site is assessed. The quantity of shell recovered represents hundreds of individual animals. This is an enormous quantity of mussels to have been consumed at a site where all other indicators suggest that only a few people were there and for a brief time. For example, Theler (1987:56) shows for one particular mussel species that it would require eating the meat of 124 individuals to satisfy a daily need of 2,400 calories, and a person doing so would acquire five times his or her daily requirement of protein. Somehow one does not imagine a few persons encamped here for even a day or two eating exclusively mussels to satisfy their nutrition requirements, and there still are too many mussels here. Furthermore, other foods, such as fish, turtle, and mammals (no clues about plant foods), also were prepared at this site. Therefore, it is legitimate to wonder if—assuming someone was not being extraordinarily wasteful of mussels (in which case more unopened and paired shells should have been found)—mussels were being procured and processed here for later consumption elsewhere. Theler (1987:56-57) also has addressed this issue, assembling a number of historic and ethnographic references to preparation and drying of shellfish. He shows that mussels can be dried and stored for some months, commenting, "[W]hat one has upon drying these meats is a very portable and storable lump of protein with other nutrients largely intact ..." (Theler 1987:56). Of course, the problem is that, since the shells were discarded at the camp where the mussels were procured and processed, it is hard to demonstrate what people did with the meats that leave no trace in the archeological record. The question must be raised and an argument made for its plausibility, though, when trying to understand the subsistence and settlement systems of the Middle Ceramic period. The standard phrase, "more research is needed," is applicable here. It may also be pertinent to comment that insights like this show how much the seemingly little sites can contribute to a comprehensive model of settlement systems.

Overall, then, it is not difficult to envision the occupation at the Claussen site as one component in a larger procurement effort by a group, possibly a small group, moving out from lodge sites some miles away. Members of the procurement party carried with them their hunting weapons (bow and arrows), flintknapping kits, including some partially reduced chert nodules, at least one ceramic vessel, a pipe that probably was still in the manufacturing process, and tools for working on the pipe. They probably had other objects with them, too, but no evidence of their presence was left. Some of these objects probably were perishable (nets or snares, for example), while others were carried away without leaving any trace of having been there. The procurement party had been hunting prior to their encampment along Mill Creek (or at least before this specific encampment) and apparently had obtained mammal meat, breaking some arrow points in the process. Perhaps they had acquired some of the chert at earlier stops. At some point during the procurement trip, they made the encampment uncovered in the South Block at the Claussen site. Here, they perhaps consumed some of the meat that they had already procured, but they also collected and processed a large quantity of mussels, some small fish, and a turtle. They may have consumed some of the fish and mussels during the encampment, but it is also legitimate to suspect that much of the mussel meat and perhaps some of the fish were dried for removal to another location, perhaps a permanent lodge in another valley. These foods were prepared by constructing large and somewhat amorphous hearths on the surface and probably steaming the food by covering it with wet grass. While at this camp and while not attending to food preparation, some of the hunting arrows were refurbished, another chert nodule was procured and received initial reduction, and the pipe was brought out and worked on. These latter activities were conducted while seated near the hearths, perhaps to take advantage of light and/or warmth. With all non-food-preparation activity debris on the west side of the hearths, one suspects that the wind was out of the west and that people were sitting upwind of the fires. The encampment did not last long. The people moved on, leaving behind a substantial amount of trash, including shells, animal bones, and chipped stone debris. They also left behind a ceramic vessel that was damaged beyond use. The discarded vessel was not intended to be a calling card, but it became that to the twenty-first-century archeologists who investigated the camp.

Conclusions

The 2003 excavation into two of the upper components at the Claussen site, 14WB322, was designed to test the components to determine their potential. The results showed that these Ceramic period components are well preserved, organic materials are abundant and well preserved, features are present, the age of the components can be determined, a temporal-cultural assignment can be made, and the site type for each component can be determined. If the answers seemed less certain for the North Block component than the South Block component, it is because the North Block was at the edge of and not squarely within that occupation surface. For the South Block, the answers to these basic questions not only are convincing, but considerable information regarding the role of sites like this in the Smoky Hill phase settlement system was obtained. Of course, this is only one site, but it is a solid beginning. The challenge now is to locate and examine additional such sites to more firmly understand these components and how the settlement system operated.

The emphasis in this paper has been on addressing the testing and evaluation questions that constituted the basic research design for the 2003 KATP testing project and on evaluating the function of the site. The testing showed that these components can yield a great deal more information. Paleoenvironmental information will be one important domain. For this purpose the thousands of gastropods contained in the sediments may be one of the most valuable data sets to come from this site. Studies of these shells will not further understanding of human behavior, as they are not food remains and did not arrive there by human agency; however, tiny snails may be the most sensitive indicators of specific environmental conditions at this site and can be studied for that purpose. Less sensitive but still useful will be the abundant wood charcoal and other nonfood floral remains. Wood charcoal was not systematically identified, but some hackberry was recognized. Given the abundant hackberry seeds in the sediments, which are argued to represent natural seed rain rather than food procurement, the use of hackberry as fuel is no surprise. Still, the charcoal and seeds taken together indicate that Mill Creek supported a floodplain forest in Middle Ceramic period times. The mussels also are paleoenvironmental indicators and reflect stream ecology. Beyond this, specific identification and analysis of the mussels can identify the season during which they were procured. This information will contribute to understanding how wild-food procurement was scheduled in the annual subsistence cycle.

Thus, the Claussen site upper components testing by the 2003 KATP was a resounding success. The testing objectives were met, much was learned, and, very importantly, the potential to learn even more was demonstrated. The potential has both diachronic and synchronic aspects. Diachronically, as the entire site contains a sequence spanning many millennia and because all components seem to feature human use of mussels and perhaps other aquatic fauna, the potential for studying changing environments and changing uses of aquatic fauna is an exciting aspect of the site's archeological record. Synchronically, the South Block excavation in particular reveals a Middle Ceramic site type, the existence of which may not really have been grasped. It is probably not a unique occurrence; thus, opening a window to a fuller understanding of adaptive systems of this period. This too is exciting.

Acknowledgments. On behalf of the entire KATP, I first thank Verne Claussen for access to this marvelous site during the summer of 2003 and for permitting us to continue excavations on weekends through the fall. The KAA acknowledges the support of the Odyssey Archaeological Research Fund and of several individuals (Mr. and Mrs. Ross Wulfkuhle, Jim Huss, and an anonymous donor) who contributed to KATP funds administered by the Kansas Anthropological Association and the Kansas State Historical Society, Inc.

I would like to thank all the KAA members who participated in the 2003 KATP field school for their good work on this site, and all who volunteered more of their time on fall weekends to continue what had been started in July. Those who were there on the weekend of September 6–7 are especially cognizant of what a difference the fall continuation made to our understanding of the South Block component. My thanks also to Virginia Wulfkuhle and the KAA for their patience when finishing this manuscript became a far more protracted process than anticipated. On the other hand, more than one KAA member knows what sorts of exploits and expeditions I have gotten myself and some of them into during the intervening period. I just keep hoping none of them regret the day they met me for the first time.

I made several comparisons with sites in the Blue River valley on the basis of not only the literature, but also actual reexamination of collections from the Budenbender site (14PO4) at the University of Kansas and 14PO21 at Kansas State University. KSHS photographer Craig Cooper took the photographs of the partially reconstructed vessel (Figure 21 and 23). Otherwise, I took all the photographs in this manuscript and, for once, did all the other illustrations, too. In this regard Golden Software's graphing and mapping programs are a godsend (I used four of them here), and a Wacom drawing tablet took some of the terror out of freehand drawing.

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Notes

Book Reviews

Amelia Earhart's Shoes—Is the Mystery Solved?

Amelia Earhart's Shoes—Is the Mystery Solved? THOMAS F. KING, RANDALL S. JACOBSON, KAREN RAMEY BURNS, AND KENTON SPADING. AltaMira Press, Walnut Creek, California, 2004. 438 pp., epilogue, notes, index. $24.95 (paper). ISBN 0-7591-0131-0. *Reviewed by* Virginia A. Wulfkuhle.

The International Group for Historic Aircraft Recovery (TIGHAR, pronounced tiger) was founded by former aviation insurance investigator Ric Gillespie and his wife Pat Thrasher in 1985. The organization was founded "to recover historic aircraft right, to help establish standards for deciding what should be flown and what should be put in museums, to work out ways to interpret them for the public without destroying them" (p. 5). By 2001 TIGHAR, headquartered in Wilmington, Delaware, had some 750 members worldwide, a web site (www.tighar.org), and a newsletter called *TIGHAR Tracks*.

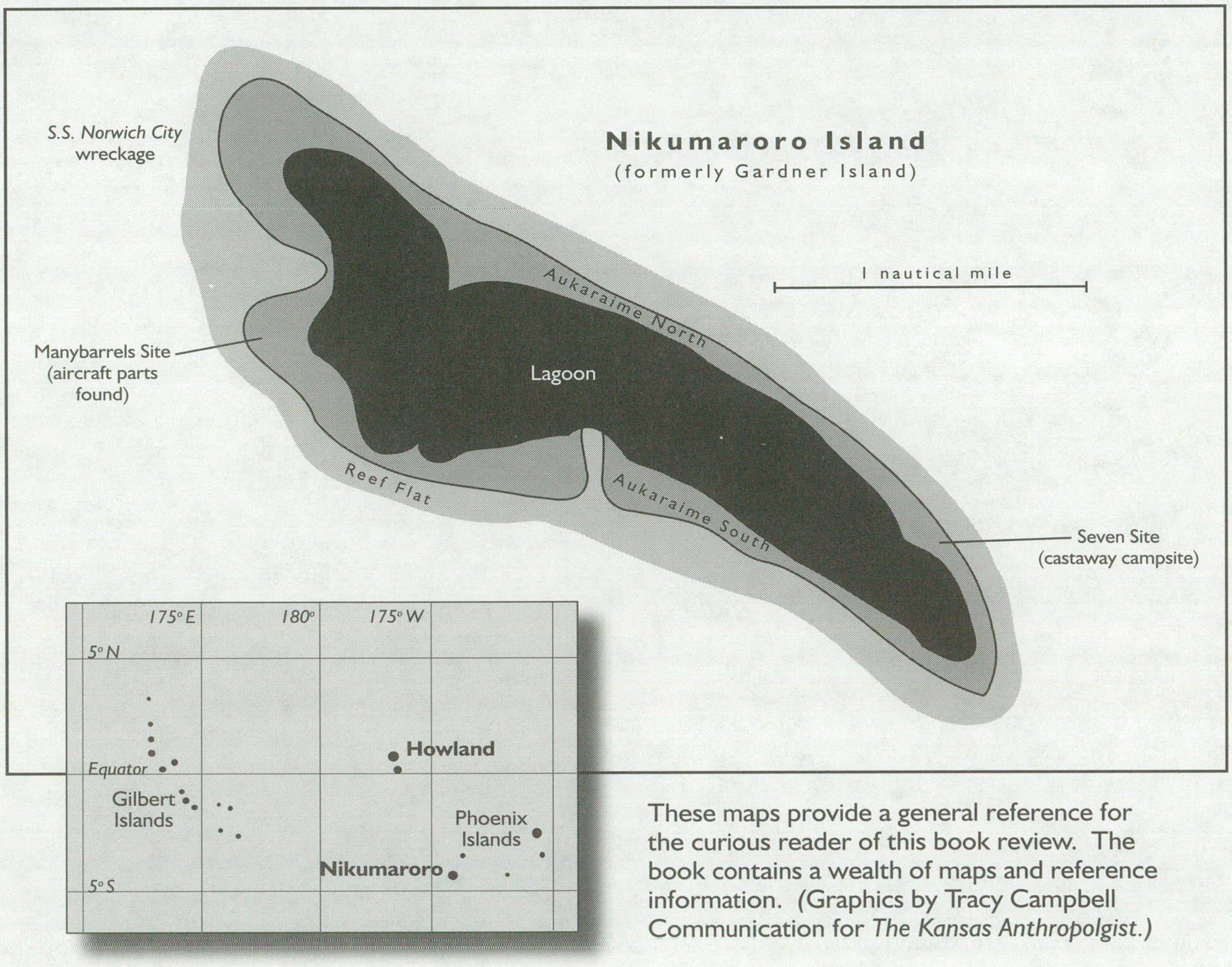
This book is not another biography of Amelia Earhart; it is about one investigation into the mystery of her disappearance. For about three years TIGHAR resisted being drawn into an Earhart investigation. However, in 1988 two members of the organization approached TIGHAR's Executive Committee with a new hypothesis about Earhart's disappearance—one that could be tested using accepted academic standards and sound scientific methods. The Earhart Project was inaugurated in November 1988, and during the 17 years of the project at least 6 expeditions have been conducted to the central Pacific Ocean at a cost of about $300,000 each. All the investigative teams consisted of volunteers.

Amelia Earhart's Shoes, which is an independent (not TIGHAR-sponsored) undertaking by the authors, unfolds like a mystery novel. It is told primarily from the point of view of principal author, Dr. Thomas F. King, a well-known archeological consultant, former program director of the Advisory Council on Historic Preservation, and a national expert on cultural historic preservation laws and practice. As project archeologist for TIGHAR's Amelia Earhart Project, King participated in the 1989, 1997, and 2001 expeditions to Nikumaroro and the 1998 expedition to Kanton Island and supervised the 2004 Fiji Bone Search.

King's coauthors are Dr. Randall S. Jacobson, a geophysicist with the U.S. Navy; Dr. Karen Ramey Burns, a forensic anthropologist; and Kenton Spading, a civil engineer with the U.S. Army Corps of Engineers specializing in computers and remote sensing technology.

The initial chapters of the book provide brief biographical sketches of Earhart and her navigator Fred Noonan, dealing with oft-repeated myths of Earhart's incompetence as a pilot and Noonan's alcoholism, and information about their Lockheed Electra Model 10E Special aircraft. Following are concise accounts of the 1937 round-the-world flight attempt, the disappearance, and the search, and evaluations of the subsequent assumptions, assertions, and conspiracy theories, including those that Earhart and Noonan were spying for the U.S. Government and that they were captured by the Japanese.

TIGHAR's Amelia Earhart Project set out to do better than announcing solutions to the mystery based on anecdotal evidence. The Nikumaroro hypothesis is based on informed ideas about what Noonan did on the morning of July 2, 1937, when he and Earhart found themselves in the position where they should have been in sight of Howland Island but, as the result of a series of errors, could not see it or communicate with the U.S. Coast Guard cutter *Itasca*, which was waiting there to assist them with refueling. A plausible proposition is that they



These maps provide a general reference for the curious reader of this book review. The book contains a wealth of maps and reference information. (Graphics by Tracy Campbell Communication for *The Kansas Anthropolgist.)*

would have flown southeastward on the 157-337 line of position toward the Phoenix Island group, survived a crash landing on the reef-flat at Gardner Island, only to die after a time as castaways on this inhospitable and uninhabited atoll. The British ship *S. S. Norwich City*, which ran aground there in 1929, would have been visible and a possible source of some supplies. British colonists inhabited Gardner Island (now Nikumaroro, a part of the Republic of Kiribati) from 1938 to1963, and they may have recovered and used various bits of wreckage. In 1940 British colonial officer Gerald Gallagher found a partial human skeleton at a makeshift campsite on the southeast side of Nikumaroro. The bones and artifacts have long since been lost.

The TIGHAR team focused on compiling and studying the best original archival sources, making new observations on known records and ferreting out several previously unknown historical documents. They rigorously considered both direct and circumstantial evidence, including oral histories.

In 1989 a TIGHAR team made the first expedition to Nikumaroro, performing a general survey of the island and experiencing its harsh environment. A return to the island in 1991 included a side-scan sonar search of the reef face and excavation at Aukaraime South, an area on the southwest coast of the island. The most exciting artifact recovered was the heel of a shoe, manufactured in the United States in the mid-1930s. Even though subsequent tests seem to suggest that the shoe was not the proper size for Amelia Earhart, King is still not convinced that it is unconnected to her presence on the island. And there were other promising artifacts—a sextant box, a dado (airplane interior trim), and airplane skin.

The 1996 expedition sought a reported water-catching apparatus on Aukaraime North and made discoveries in the colonial village on the northwest part of the island. At the Manybarrels site numerous aluminum pieces, some of which could have been from an Electra or other airplane, appear to be used in the production of handicrafts. The 1997 project included more archeological work at the colonial village and at Aukaraime South and detailed instrument and diving survey in the lagoon.

In 2001 a TIGHAR team investigated the Seven Site, the supposed castaways' campsite on the southeast coast of Nikumaroro. Artifacts found appeared to be beach-combed objects that were used as primitive tools—glass shards; a ferrous object that may have been used for prying; a metal knob and two small metal clips; and a few high-tech objects that probably relate to a wartime Coast Guard Loran station on the island. A considerable amount of faunal material, some charred, was recovered: clam shells and numerous bird, turtle, and fish bones.

Six seasons of fieldwork in the Phoenix Islands support, but do not prove, TIGHAR's hypothesis. Some of the archival and oral history searches have yielded tantalizing leads that turned out to be dead ends or changed the direction of the research. Many of the excavations have posed more questions than they answered. Obviously, what really happened may never be known, but King and his coauthors have made the search into a real page-turner.

Coming in September 2006 is another full-length book about the Amelia Earhart Project, tentatively entitled *The Suitcase in My Closet*, written by TIGHAR Executive Director Ric Gillespie and published by the U.S. Naval Institute Press.

Braindance: New Discoveries about Human Origins and Brain Evolution

Braindance: New Discoveries about Human Origins and Brain Evolution. Revised and expanded edition. DEAN FALK. University Press of Florida, Gainesville, 2004. 252 pages. $19.95 (paper). ISBN 0-8130-2738-1. *Reviewed by* Donna C. Roper.

Humans are part of the animal world, but several important characteristics set us apart from the rest of nature: our upright, two-legged walking—or bipedalism, in strict scientific terms—and the nature of our brains are two of these. In regard to the brain, what is special is not just its absolute size or even its size in proportion to the rest of the human body, although size is part of it; nor is it the basic brain structure and organization, for those are very similar to other mammals. Instead, it is the relative emphasis on parts of the brain, or the relative development of specific areas that, coupled with overall size, is the characteristic that truly distinguishes human brains from the brains of other mammals. Paleoanthropologist Dean Falk has studied tap dancing and says that, while a sequence of dance steps can be identical, a shift of emphasis in the steps may entirely change the feel of the dance. On this analogy she calls the course of the shifts in the timing of the development of parts of the brain the "braindance," and her book of that title describes how and why the human brain developed as it did over the last few million years.

Now, you say, how can we study the brains of deceased individuals? Doesn't the brain deteriorate shortly after the individual dies? Well, yes—except in some extremely rare and very exceptional instances—but not without leaving its mark in the fossil record. First, and this is true of any mammal, the inside of the skull is not smooth, but rather features impressions of the brain that it surrounds. Second, some of the recorded features reflect the network of blood vessels. These include both impressions of the blood vessels on the interior of the cranium and holes or foramina, through which blood vessels enter and exit the skull. Third, sometimes as a dead organism deteriorates, the interior of the skull fills with sediments. When these sediments harden, as they sometimes do, they create a cast of the brain, complete with minute anatomical details. Alternatively, the interior can be cast in the laboratory. Either way, these endocasts—casts of the inside of the cranial cavity—are extremely valuable for studying the structure of ancient brains. Falk has made a career of studying endocasts and the other indicators of brain structure and blood flow to the brain to document and understand human brain evolution. The results are fascinating.

In good scientific fashion Falk begins the book by laying out the research problem. The study of fossil hominids has been ongoing for more than 80 years, ever since Raymond Dart found the first australopithecine skull, the so-called Taung Child (after the lime quarry it came from) in South Africa in 1924. Even from the time of Dart's find, however, the question was asked whether Taung and the other australopithecines that soon were discovered were more ape-like or more human-like. Dart argued that Taung was human-like. This conclusion was not universally accepted, and there ensued a long-running debate about the ancestral status of australopithecines relative to modern humans (that is to say, us). The controversy was still around in the mid-1970s when Falk began her work. At that time she undertook her first studies of endocasts and particularly one feature of the brain recorded (or not, and that is the crux of the matter) in the casts. Taung happens to be represented by a limestone endocast and, of course, in the half-century since Dart described

Taung, other australopithecine and early *Homo* fossils had accumulated. Falk's conclusion: the brains of Taung and other australopithecines were more ape-like than human-like. Why does this matter? Along with evidence from other fossil hominids from throughout the 5-7 million years of hominid evolution, it helps pinpoint when the evolution of the human brain took off. And the answer to that is about two million years ago.

The next questions are "What happened during these last two million years?" and "How and why did it happen?" To set the stage for her investigations, Falk spent several chapters discussing brain structure and organization and the differences and similarities between the brains of humans and non-human primates, particularly those of our closest relatives, the chimpanzees. These differences and similarities are important for documenting what has evolved since chimpanzees and humans diverged and what is derived from the common ancestor of both chimpanzees and humans.

After this review Falk returned to the puzzle of human evolution. She started with Lucy, the approximately 40-percent complete (unfortunately lacking most of her skull) australopithecine that Donald Johanson found in Ethiopia in 1974. Lucy posed some problems. She lived about three million years ago and was identified as an australopithecine, although given a new species name (*afarensis*) with the genus *Australopithecus*. When she was found and described, she was suggested to be on the evolutionary branch leading to modern humans and to be the only australopithecine on this branch. Lucy was bipedal and perhaps the earliest bipedal australopithecine, but bipedalism is not in itself sufficient to assign Lucy to human ancestral status. Brain organization—that other important characteristic—also must be considered. This is right up Falk's alley, so she became involved in the problem a number of years after Lucy was described. Continuing her earlier studies of brain endocasts, she began to pay attention to the features that reflected blood flow to the brain. The bottom line to her investigations, detailed in Chapter 6, was that Lucy was on the australopithecine family tree, but she is not on the family tree of the genus *Homo*, the one to which humans belong. Implications for other australopithecines were discussed.

As Falk pointed out early in Chapter 7, "The nice thing about doing research is that it keeps building on itself" (p. 153). As she continued with the blood-flow work that was so important in putting Lucy in her proper place in the evolutionary scheme, she arrived at a major question: why did brain size increase rapidly in *Homo* about a million years after the beginnings of bipedalism? (The bipedal Lucy lived about a million years before the time that human brain evolution took off.) Chapter 7, therefore, becomes the central part of the book as Falk recounts how she addressed this problem. The answer does indeed have to do with blood flow and the complexity of the network of veins in the cranium. Our brains are cooled by the flow of blood through this network. Not surprisingly the number of foramina in the skull reflects the complexity of the network. Falk proceeded to count foramina in the crania of chimpanzees, gorillas, modern humans, and every australopithecine and early *Homo* fossil she could get her hands on. When she plotted cranial capacity (one overall measure of brain evolution) against the data on veins, she found that an increase in foramina kept pace with an increase in brain size over these last two million years. As she remarked, "Clearly, the brain and the veins had evolved relatively rapidly and together" (p. 160). This was significant, but while it charted brain-size increase and correlated it with the development of another notable characteristic of the human brain, it did not in itself show why this happened, the question she started with. About this time a chance remark by her auto mechanic, to the effect that a car's engine cannot be any bigger than a radiator can cool, had no implications at the time (except maybe for her car). However, in concert with some discussion with others concerned with brain studies, it soon led her to formulate the radiator theory of brain evolution. In fact, that moniker appeared in the title of her 1990 article in *Behavioral and Brain Sciences* that introduced the theory—with, I might note, all due credit to the auto mechanic. It held that brain expansion cannot outstrip the development of the blood-flow system that cools the brain and that once the beginnings of a complex cooling system did develop, as they did about two million years ago, then rapid brain expansion became possible. Simple, elegant, and with considerable predictive power, like any good scientific theory should be and is.

In essence, the remainder of the book discussed evidence consistent with the radiator theory, as well as Falk's own interpretation of the hominid family tree (the relations among the various forms of australopithecines and *Homo*). She concluded with chapters summarizing the "braindance" and what it has meant for the evolution of human culture. She also discussed the dark side of our brain expansion: human violence toward one another or the "brainwar," as she called it.

Overall, *Braindance* is two things. One, it is an up-to-date account of one line of investigation of human evolution. Two, it is a good account of a scientist at work and, even more broadly, of the workings of science. Falk has a nice sense of humor that comes through very effectively (for example, the author's photograph on the back cover renders her countenance into that of an ape with a notable resemblance to Falk, which tells you something right there), making *Braindance* an enjoyable as well as educational read.

The Allure of Turquoise

The Allure of Turquoise (second edition). Edited by VIGIL ARNOLD. New Mexico Magazine, Santa Fe (distributed by University of New Mexico Press, Albuquerque), 2005. 107 pp., 86 illustrations (including 72 color photographs), further reading. $19.95 (softcover). ISBN 0-937206-87-3. *Reviewed by* Jim D. Feagins.

This reviewer's first encounter with freshly discovered turquoise directly from an archeological site occurred more than 30 years ago at a Kansas Archeology Training Program campsite in western Kansas (see accompanying photograph). Ancient and modern Native Americans from the American Southwest, as well as many individuals from elsewhere on our planet, have experienced and continue to experience the allure of this attractive blue and bluegreen gemstone. Southwestern pottery, obsidian, and turquoise provide archeologists with some of the best examples of ancient trade between the Southwest and the southern and central Great Plains, including the area that became southern, central, and western Kansas.

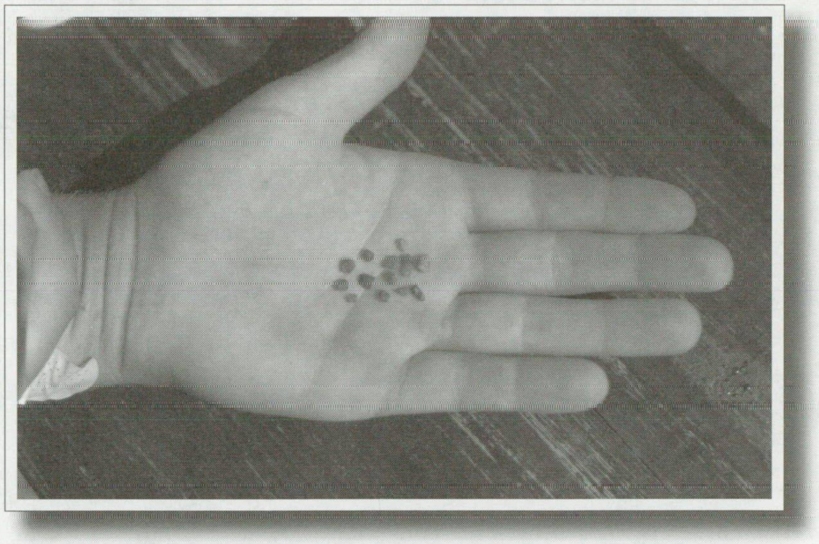
The 12 collected articles in this volume were written by 11 authors, and most were first published in various issues of the *New Mexico Magazine*. Turquoise is found naturally in the dry environments of Arizona, New Mexico, Colorado, and Nevada, where it has been mined from prehistoric times to the historic present. In addition, it is found in Utah, the Mexican states of Sonora and Zacatecas, western Texas, the Mojave Desert of California, and, strangely enough, Alabama and southern Virginia, as well as other countries on most continents.

The *Allure of Turquoise* discusses the ancient turquoise mines and briefly describes the prehistoric artifacts associated with mining, as well as the modern young native jewelers' work with this gemstone. The volume is filled with outstanding color photographs of various types of raw turquoise and old and modern jewelry.

The volume contains much useful information for anyone interested in purchasing modern Southwestern jewelry. One chapter is titled, "Buyer Beware: Hidden Facets of Turquoise;" another is titled, "Copycats Flood the Market." There the reader is introduced to such terms as stabilized, dyed stabilized, reconstituted, and temporarily treated turquoise. Quoting turquoise expert Joe Tanner, "...for each 100 pounds of ore taken from a turquoise mine, only 3-10 pounds is natural and of gem quality. The rest has to be strengthened or altered in some way to make it saleable" (p. 60). Of course, that is fine as long as there is no misrepresentation, and the price is commensurate with the quality of turquoise. Also buyers need to watch out for what are called "knockoffs"—cheap imitations made elsewhere (such as in Southeast Asia where labor is cheap) and sold as Native American craftsmanship/art.

"Old pawn" is a term used to describe turquoise and silver pieces that were made and pawned at Southwestern trading posts from around 1890 to 1940; that story provides a chapter of considerable interest.

Another article discusses the Turquoise Museum



Turquoise found by two young men—Steve Reed, son of Harold and Margie Reed, and David Witty, son of former State Archeologist of Kansas Thomas A. Witty, Jr. and his wife Mary Anne—on an anthill at El Cuartelejo (14SC1) during the first KATP dig. (Photo by Jim D. Feagins, June 12, 1975.)

in Albuquerque. Yet another is concerned with the efforts of one man, Douglas Magnus, to preserve the Tiffany Mine, an old turquoise mine near Santa Fe.

"Ants and Turquoise: A Discerning Relationship" is the title of an unusual chapter, which demonstrates that facts can be stranger than fiction. The author describes how harvester ants—the dark brown or black *Pogonomyrmex rugosus* and the reddish-orange *Pogonomyrmex occidentalis*—sometimes bring bits of turquoise to the surface and deposit them in the low sandy mounds formed around ant nests. Archeologists have found this ant action useful in locating and evaluating sites in the Southwest.

The Allure of Turquoise is a quick read, written for the general public. It is not a technical publication, nor is it confined to geological and archeological matters. It provides a good general introduction to the mineral that has held a special place in the hearts of Native Americans for many generations.

The second edition of this 1995 volume updates some chapters, offers two new chapters, and presents additional photographs. This fun book successfully introduces the reader to ancient and modern uses of turquoise and the special significance of turquoise in the lives of Native Americans.

The Allure of Turquoise can be obtained from your local bookstore or directly from *New Mexico Magazine* at (800) 711-9525 or from the University of New Mexico Press at (800) 249-7737.

From a Watery Grave: The Discovery and Excavation of La Salle's Shipwreck, La Belle

From a Watery Grave: The Discovery and Excavation of La Salle's Shipwreck, La Belle. JAMES E. BRUSETH and TONI S. TURNER (foreword by T. R. Fehrenbach). Texas A&M University Press, College Station, 2005. xii + 159 pp., 138 figures (mostly in color), notes, bibliography, acknowledgments, index. $39.95 (hardcover). ISBN 1-58544-347-6. *Reviewed by* Jim D. Feagins.

While it is written for the general public, *From a Watery Grave: The Discovery and Excavation of La Salle's Shipwreck, La Belle* is a book that professional and avocational archeologists and historians alike will find delightful. Published in a large format, the volume contains an abundance of pertinent color photographs to accompany the well-written text. It tells the history of René-Robert Cavelier, Sieur de La Salle's sea voyage to locate the mouth of the Mississippi River and colonize the river valley. It also describes the exciting discovery and excavation of one of his ships, *La Belle*, that wrecked in 1686 during a storm along the Texas coast. Within a relatively short time the vessel settled into the sandy floor of Matagorda Bay. The lower portions of *La Belle*'s hull became completely buried with silt and sand, thereby sealing much of the cargo and framework from the decay of anaerobic bacteria and the destruction of teredo worms. Preservation was excellent, providing archeologists with a time capsule of artifacts and a snapshot of shipbuilding technology. *La Belle* is considered one of the most important shipwrecks in all of North America.

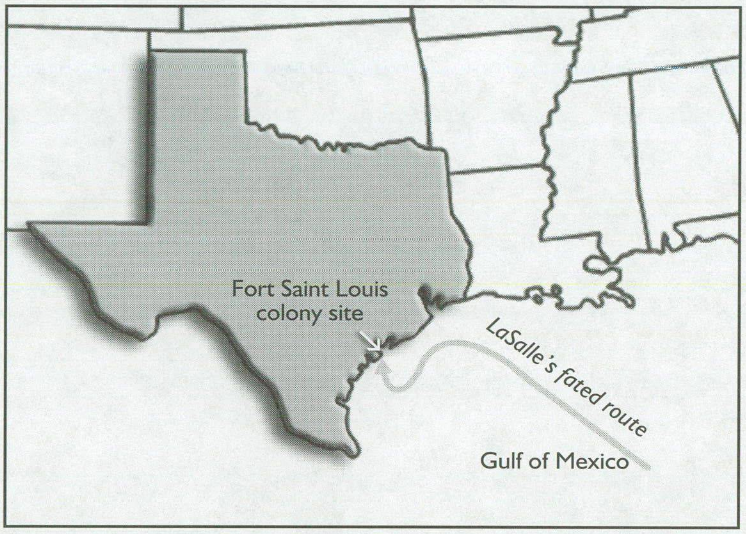
La Salle's story is one of intrigue, hardship, and adventure. He had a grandiose vision of empire and would let almost no hurdle stand in the way of his discoveries. His ship *La Belle* met its fate almost two years after La Salle set sail from France in 1684 with two other ships and more than 300 crew members and settlers. The French expedition built a fort at the mouth of the Lavaca River, but the Fort Saint Louis colony was relatively short lived. (The site of this colony is known today and has been partly excavated.)

Most of the ship's cargo space contained supplies and equipment for what turned out to be the doomed French colonial endeavor. Additionally, the cargo included artifacts relating to Indian "diplomacy"—trade items for appeasement or good will that could be traded for furs or food from the Indians if the colony's supplies ran short. Also within the cargo were weapons for defense, not only from the Indians but also from the Spanish.

These were dangerous times to establish a colony. The local Karankawa Indians were at first friendly toward the French. Through a misunderstanding on the part of the Karankawa and plain stupidity on the part of some of La Salle's men, warfare soon ensued. Over a period of time, many of the colonists were killed. The colony dwindled, and by March 1687 only 20 colonists remained. La Salle himself was murdered by some of his own men.

In 1996 at great expense, a cofferdam was constructed around the wreckage of the *La Belle*. This enabled Texas Historical Commission archeologists to fully excavate, remove, and preserve the vessel with the same kind of provenance control that dry land archeologists enjoy.

From a Watery Grave: The Discovery and Excavation of La Salle's Shipwreck, La Belle is a useful volume that tells an interesting story. While serving the general public, the book introduces archeologists to the great potential offered by the many cultural items recovered from this well-dated site for comparison with sites and trade goods found elsewhere. This is useful even to archeologists working far from any coast. A few of the trade items that were found in the wreckage are an estimated 790,000 glass beads (mostly tube-drawn seed beads, but approximately 2,500 are larger varieties manufactured in the same manner), 15,600 brass pins and several brass needles, 1,345 brass hawk bells of three sizes, 1,591 Jesuit finger rings of several types, clasp knives, case knives, small mirrors, wooden combs (of a type that could be used for combing lice), 579 iron axe heads (ranging in size from 3 to 5 inches), and vermilion pigment.



The site of the Fort Saint Louis colony along the southeast coast of Texas. (Graphic by Tracy Campbell Communication for *The Kansas Anthropolgist*.)

The bead colors are blue, white, black, green, and red (in that order of abundance). A well-preserved bead box, containing 568,798 glass seed beads, was an exciting find. The box is 28 x 11 x 11 inches in size and contained strung beads fastened to cards. Each string contains a single color of bead. The straight pins were made of 1- to 1½-inch lengths of brass wire, filed to a point at one end. The other end was wrapped with a fine wire and machine stamped to form the head of the pin. The brass bells are of the "flushloop" variety, thought to be manufactured in Holland; some bear maker's marks, such as "a star, an S, a Z, and an R" (p. 89). The glass mirrors are round (about 2 inches in diameter and approximately ¾ inch in thickness) and coated with lead on one surface. Interestingly they are convex in cross section, showing that they were made from large spheres of blown glass. The finger rings represent the largest collection of Jesuit rings anywhere in the world.

Other items recovered from the cargo included 85 wooden barrels (mostly of white oak staves with split willow and chestnut hoops) that had contained wine, water, tars or resins (for waterproofing), lead shot, gunpowder, iron tools, ship's tackle, and some of the previously mentioned trade goods. Other containers held muskets, swords, kettles, pewter plates, a ladle, candlestick holders, and carpentry tools. In addition brass wire, rope, eating utensils (forks and spoons), cannons, cannon balls, firepots, and large grinding stones were on board. The detailed analysis of the ship's trade goods should prove quite useful to historic archeologists interested in artifacts from the fur trade, early colonization, and shipbuilding technology.

This popular volume is not intended as a technical report. This reviewer looks forward to reading the detailed results in a future volume or volumes that contain complete artifact descriptions and additional information from this extremely important site. *From a Watery Grave: The Discovery and Excavation of La Salle's Shipwreck, La Belle* is a fun read for a wide range of the public interested in history, archeology, or just in an exciting story. It may be obtained through your local bookstore or from the Texas A&M University Press, John H. Lindsey Building, Lewis Street, 4354 Texas A&M University, College Station, Texas 77843-4354 or by calling (800) 826-8911.

Notes

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Christopher L. Beemer

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Christopher Beemer is a 2001 graduate of Kansas State University with a B.S. in anthropology. He has a fellowship in archeology through the Oak Ridge Institute for Science Education and conducts research at Fort Riley, Kansas. He is also working toward a graduate certificate in Geographic Information Systems at Kansas State University.

Jim D. Feagins

[redacted]

Jim Feagins is a private archeological consultant who also serves as part of the adjunct archeological staff for the St. Joseph Museum and is Senior Archaeologist for Environmental Advisors and Engineers, Inc. He received a B.S. degree from Pittsburg State University and a M.N.S. degree from the University of Oklahoma. After 30 years as a science instructor for Consolidated School District No. 4, Grandview, Missouri, he retired in 1995. Active in promoting archeological education, he is president emeritus of the Missouri Archaeological Society. He also has served as president of the Kansas City Archaeological Society and as a vice-president of the Missouri Association of Professional Archaeologists and the Kansas Anthropological Association. He is a life member of the KAA.

Michael D. Glascock

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Michael Glascock is a senior research scientist and group leader of the Archaeometry Lab at the University of Missouri Research Reactor Center. His research interests include compositional analysis of artifacts in support of provenance research and interpretation of archeological data.

Marlin F. Hawley

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Marlin Hawley is an assistant curator of archeology with the Museum Archaeology Program at the Wisconsin Historical Society, where he has worked since April 1997. A native Kansan, he now lives with his wife, Amy, and two children, Benjamin and Rachel–along with two reclaimed feral cats–in DeForest, a small community north of Madison. He has authored or co-authored papers in *The Kansas Anthropologist*, *Oklahoma Archaeology*, *The Minnesota Archaeologist*, *Plains Anthropologist*, *Southeastern Archaeology*, *North American Archaeologist*, and has manuscripts pending at *Nutritional Anthropology* and *The Wisconsin Archeologist*. He is quite cognizant of the fact that none of these papers are discipline-shaking in any way but admits that writing them does keep him off the streets at night and some weekends. When he remembers to pay his dues, he is a member of the Kansas Anthropological Association.

Robert J. Hoard

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Kansas State Archeologist Robert Hoard has research interests that include pottery and the chemical characterization of artifacts.

Harold Reed (deceased)

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Harold was a member of the Kansas Anthropological Association from 1967 until his death in December 2005. He recorded more than 80 archeological sites in Kansas. He served the KAA in many offices, including president from1974 through 1976, and participated in 26 Kansas Archeology Training Program field schools. He received the KAA Lifetime Achievement Award in 2005.

Donna C. Roper

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Donna received her Ph.D. in anthropology from the University of Missouri in 1975. After 17 years of unrelenting contract work, most of it in the Central Plains and Midwest, she moved to Manhattan in mid-1992. She was soon appointed adjunct associate professor of anthropology at Kansas State University. She continues to do some contract work as well as occasional university teaching.

Roper is heavily engaged in research on several aspects of Middle and Late Ceramic period prehistory in Kansas and Nebraska. Among her current projects, she recently finished a detailed description and analysis of the Salina Burial Pit. To assist with this and help put it in perspective, she has been working with collections from the Smoky Hill phase living sites. She seeks to understand the lifeways of those who were interred in the burial pit cemetery and in broader perspective how lifeways in central Kansas at that time compared and contrasted with those of their contemporaries on the edge of the High Plains to the west. She has been a KAA member for more than a decade.

Robert J. Speakman

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Robert Speakman is Senior Research Specialist at the University of Missouri Research Reactor Center. His research interests include Plains Village, Southwestern, and Beringian archeology; ceramic and lithic technology; and provenance-based research of archeological materials.

Clint Thomas

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Clint is a lifetime resident of Kansas and has lived in Emporia since 1987. He is a new KAA member but has been a member of the Kansas Archeological Society since 1999. An avid outdoorsman, he began bow hunting in 1980 and became involved with primitive archery in 1992. His interest in primitive skills and weaponry has led to a progression from the crafting of primitive bows to the knapping of stone points and tools. He enjoys researching and replicating the skills used by early man and hopes to continue with more testing in the future.

Virginia A. Wulfkuhle

[redacted]

Virginia joined the Kansas State Historical Society staff in 1990. As Public Archeologist, she is responsible for coordinating the Kansas Archeology Training Program and other public education programs. She is editor of *The Kansas Anthropologist* and *Kansas Preservation*.

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HAND, DAVID J	[redacted]	[redacted]	[redacted]	[redacted]
HAWLEY, MARLIN	[redacted]	[redacted]	[redacted]	[redacted]
HEASTY, DON & CAMILLA	[redacted]	[redacted]	[redacted]	[redacted]
HEDERSTEDT, DAVID	[redacted]	[redacted]	[redacted]	[redacted]
HEGEWALD, NADINE	[redacted]	[redacted]	[redacted]	[redacted]

HEIMAN, ARVILLA	[redacted]	[redacted]	[redacted]	[redacted]
HIEBNER, BRADEN	[redacted]	[redacted]	[redacted]	[redacted]
HIGGINS, JOE & CHARLOTTE	[redacted]	[redacted]	[redacted]	[redacted]
HOARD, BOB	[redacted]	[redacted]	[redacted]	[redacted]
HOLEN, STEVE	[redacted]	[redacted]	[redacted]	[redacted]
HOPPER, VIRGINIA	[redacted]	[redacted]	[redacted]	[redacted]
HOSTETLER, MAGGIE	[redacted]	[redacted]	[redacted]	[redacted]
HOWELL, JEAN & BILL	[redacted]	[redacted]	[redacted]	[redacted]
HUBER, DON	[redacted]	[redacted]	[redacted]	[redacted]
HUGGINS, A WENDY	[redacted]	[redacted]	[redacted]	[redacted]
HULA, JANET	[redacted]	[redacted]	[redacted]	[redacted]
HULSE, ROBERT & RUTH	[redacted]	[redacted]	[redacted]	[redacted]
HUSS, JAMES A	[redacted]	[redacted]	[redacted]	[redacted]
JACKSON, GREG & ALICE	[redacted]	[redacted]	[redacted]	[redacted]
JARVIS, ESTHER M	[redacted]	[redacted]	[redacted]	[redacted]
JOHNSON, MARK & ELMA	[redacted]	[redacted]	[redacted]	[redacted]
JOHNSON, NELLIE	[redacted]	[redacted]	[redacted]	[redacted]
JOHNSON, PAUL AND ROBIN	[redacted]	[redacted]	[redacted]	[redacted]
JOHNSON, RYAN	[redacted]	[redacted]	[redacted]	[redacted]
JUENEMANN, KEVIN & DONNA	[redacted]	[redacted]	[redacted]	[redacted]
JUSTUS, EARNEST W	[redacted]	[redacted]	[redacted]	[redacted]
KANSAS CITY KS PUBLIC LIBRARY	[redacted]	[redacted]	[redacted]	[redacted]
KANSAS HERITAGE CENTER	[redacted]	[redacted]	[redacted]	[redacted]
KANSAS STATE HISTORICAL SOCIETY	[redacted]	[redacted]	[redacted]	[redacted]
KANSAS STATE UNIV LIBRARIES	[redacted]	[redacted]	[redacted]	[redacted]
KECK, DICK & CYNTHIA	[redacted]	[redacted]	[redacted]	[redacted]
KENNEDY, CRYSTAL	[redacted]	[redacted]	[redacted]	[redacted]
KILMARTIN, KIM	[redacted]	[redacted]	[redacted]	[redacted]
KING, MARSHA	[redacted]	[redacted]	[redacted]	[redacted]
KREISSLER, ALICE	[redacted]	[redacted]	[redacted]	[redacted]
LATHAM, MARK	[redacted]	[redacted]	[redacted]	[redacted]
LIPPINCOTT, KERRY	[redacted]	[redacted]	[redacted]	[redacted]
LOCKHART, JEFFREY SCOTT	[redacted]	[redacted]	[redacted]	[redacted]
LOGAN, BRAD & LAUREN RITTERBUSH	[redacted]	[redacted]	[redacted]	[redacted]
LOHR, TED	[redacted]	[redacted]	[redacted]	[redacted]
LOMSHEK, JERRY & JANIS	[redacted]	[redacted]	[redacted]	[redacted]
LUNDEEN, GAIL	[redacted]	[redacted]	[redacted]	[redacted]
LUNDQUIST, MARVIN & VI	[redacted]	[redacted]	[redacted]	[redacted]
MALLOUF, ROBERT J	[redacted]	[redacted]	[redacted]	[redacted]
MATHERS, BRIAN	[redacted]	[redacted]	[redacted]	[redacted]
MAXWELL, MARY & DONALD	[redacted]	[redacted]	[redacted]	[redacted]
MCCALLISTER, WAYNE & NORMA	[redacted]	[redacted]	[redacted]	[redacted]
MCCLAFLIN, TONY R	[redacted]	[redacted]	[redacted]	[redacted]
MCGILL, LLOYD T	[redacted]	[redacted]	[redacted]	[redacted]
MCKEE, LINDA	[redacted]	[redacted]	[redacted]	[redacted]

MCKINNEY, SHARON & JOSEPH	[redacted]	[redacted]	[redacted]	[redacted]
MCLEAN, JANICE & ROBERT CONARD	[redacted]	[redacted]	[redacted]	[redacted]
MCPHERSON, PHILIP D	[redacted]	[redacted]	[redacted]	[redacted]
MEEKS, JOSEPH R	[redacted]	[redacted]	[redacted]	[redacted]
MELTON, BETTY & DON	[redacted]	[redacted]	[redacted]	[redacted]
MENDOZA, SARAH	[redacted]	[redacted]	[redacted]	[redacted]
MIDWEST ARCHEOLOGI CAL CTR	[redacted]	[redacted]	[redacted]	[redacted]
MINER, ANN & ROBERT AIKEN	[redacted]	[redacted]	[redacted]	[redacted]
MISSOURI ARCHAEOLOGICAL SOCIETY	[redacted]	[redacted]	[redacted]	[redacted]
MOORE, JIM & MARGARET	[redacted]	[redacted]	[redacted]	[redacted]
MULDER, CLEVE	[redacted]	[redacted]	[redacted]	[redacted]
MURRAY, KENT & GLENNA	[redacted]	[redacted]	[redacted]	[redacted]
NADEN, MELANIE	[redacted]	[redacted]	[redacted]	[redacted]
NICHOLS, PATRICIA	[redacted]	[redacted]	[redacted]	[redacted]
NICKEL, CHRISTINE	[redacted]	[redacted]	[redacted]	[redacted]
NICKOLA, KAT	[redacted]	[redacted]	[redacted]	[redacted]
NOVAK-ADEMOSKI, TRACY	[redacted]	[redacted]	[redacted]	[redacted]
O'BRIEN, DR PATRICIA J	[redacted]	[redacted]	[redacted]	[redacted]
ODELL, GEORGE H	[redacted]	[redacted]	[redacted]	[redacted]
OHARAH, TANNER	[redacted]	[redacted]	[redacted]	[redacted]
OLIVA, BONITA & LEO	[redacted]	[redacted]	[redacted]	[redacted]
ORTH, VALERIE	[redacted]	[redacted]	[redacted]	[redacted]
PATTERSON, RICHARD & MARTHA	[redacted]	[redacted]	[redacted]	[redacted]
PEARMAN, DOROTHY	[redacted]	[redacted]	[redacted]	[redacted]
PEARSON, GAIL	[redacted]	[redacted]	[redacted]	[redacted]
PEARSON, GENEVA	[redacted]	[redacted]	[redacted]	[redacted]
POE, JOHNEL	[redacted]	[redacted]	[redacted]	[redacted]
POLSON, DAVID	[redacted]	[redacted]	[redacted]	[redacted]
PRIVAT, GARY & MARILYN	[redacted]	[redacted]	[redacted]	[redacted]
RAY, BRANDY	[redacted]	[redacted]	[redacted]	[redacted]
REED, HAROLD & MARGIE	[redacted]	[redacted]	[redacted]	[redacted]
REED, EVELYN	[redacted]	[redacted]	[redacted]	[redacted]
REICHART, MILTON	[redacted]	[redacted]	[redacted]	[redacted]
RES & COLLECTIONS CENTER LIB	[redacted]	[redacted]	[redacted]	[redacted]
REXROAD, VIRGINIA	[redacted]	[redacted]	[redacted]	[redacted]
RICH, SARA	[redacted]	[redacted]	[redacted]	[redacted]
ROBBINS, STEPHEN & SUSAN	[redacted]	[redacted]	[redacted]	[redacted]
ROBERTS, JAMES E	[redacted]	[redacted]	[redacted]	[redacted]
ROBERTS, PAUL W	[redacted]	[redacted]	[redacted]	[redacted]
ROECKERS, RICHARD & SHIRLEY	[redacted]	[redacted]	[redacted]	[redacted]
ROECKERS, HENRY J	[redacted]	[redacted]	[redacted]	[redacted]
ROMINE, JOHN & PHYLLIS	[redacted]	[redacted]	[redacted]	[redacted]
ROPER, DONNA C	[redacted]	[redacted]	[redacted]	[redacted]
ROWE, TERRY & SHERRI	[redacted]	[redacted]	[redacted]	[redacted]
ROWLINSON, DANIEL & JIMMETTE	[redacted]	[redacted]	[redacted]	[redacted]

ROWLISON, DON	[redacted]	[redacted]	[redacted]	[redacted]
ROYCE, CLARE H	[redacted]	[redacted]	[redacted]	[redacted]
RUMANS, DEBORAH	[redacted]	[redacted]	[redacted]	[redacted]
RUOFF, NANCY	[redacted]	[redacted]	[redacted]	[redacted]
SABLAJAK, TONY	[redacted]	[redacted]	[redacted]	[redacted]
SAGE, SHARON & MARVIN	[redacted]	[redacted]	[redacted]	[redacted]
SALLEE, KENT	[redacted]	[redacted]	[redacted]	[redacted]
SCHMIDT, REX & JANE	[redacted]	[redacted]	[redacted]	[redacted]
SCHRATER, JUDY	[redacted]	[redacted]	[redacted]	[redacted]
SHAW, JUNE	[redacted]	[redacted]	[redacted]	[redacted]
SHERRADEN, KEN	[redacted]	[redacted]	[redacted]	[redacted]
SHIVELY, BARON	[redacted]	[redacted]	[redacted]	[redacted]
SIMMONS, BRYAN	[redacted] [redacted]	[redacted]	[redacted]	[redacted]
SLOCUM, DUSTI	[redacted]	[redacted]	[redacted]	[redacted]
SMITH, RICHARD N	[redacted]	[redacted]	[redacted]	[redacted]
SMITH,III, WALTER J	[redacted]	[redacted]	[redacted]	[redacted]
SPENCER, ERIN	[redacted]	[redacted]	[redacted]	[redacted]
SPENCER, JEFFREY	[redacted]	[redacted]	[redacted]	[redacted]
STALLBAUMER, DANNY	[redacted] [redacted] [redacted]	[redacted]	[redacted]	[redacted]
STARKEBAUM, TAYLOR	[redacted]	[redacted]	[redacted]	[redacted]
STATE HISTORICAL SOCIETY	[redacted]	[redacted]	[redacted]	[redacted]
STEIN, MARTIN	[redacted]	[redacted]	[redacted]	[redacted]
STITES, DEAN & VALORIE	[redacted]	[redacted]	[redacted]	[redacted]
STRICKLER, BRENDA	[redacted] [redacted]	[redacted]	[redacted]	[redacted]
STRICKLIN, WILLIS & MARGIE	[redacted]	[redacted]	[redacted]	[redacted]
STUBBS, MICHAEL	[redacted]	[redacted]	[redacted]	[redacted]
STUCKERT, MARJ	[redacted]	[redacted]	[redacted]	[redacted]
SUDBURY, BRYON	[redacted]	[redacted]	[redacted]	[redacted]
SWANEK, ED	[redacted]	[redacted]	[redacted]	[redacted]
TAYLOR, DOUGLAS	[redacted]	[redacted]	[redacted]	[redacted]
THIES, KARLA	[redacted]	[redacted]	[redacted]	[redacted]
THIES, RANDALL M	[redacted]	[redacted]	[redacted]	[redacted]
THOMPSON, ROBERT & FREDA	[redacted]	[redacted]	[redacted]	[redacted]
THOMPSON, RON	[redacted]	[redacted]	[redacted]	[redacted]
THORNBURG, BILL	[redacted]	[redacted]	[redacted]	[redacted]
THORNBURG, SYDNEE	[redacted]	[redacted]	[redacted]	[redacted]
THURMOND, J PETER	[redacted]	[redacted]	[redacted]	[redacted]
TODD, ARTHUR A & HELEN	[redacted]	[redacted]	[redacted]	[redacted]
TODD, CLARENCE	[redacted]	[redacted]	[redacted]	[redacted]
TREMBLAY, LELAND	[redacted]	[redacted]	[redacted]	[redacted]
TUCKER, VITA J & KEITH	[redacted]	[redacted]	[redacted]	[redacted]
UNIV OF KANSAS, WATSON LIBRARY	[redacted]	[redacted]	[redacted]	[redacted]
UNIV OF OKLAHOMA LIBRARIES	[redacted]	[redacted]	[redacted]	[redacted]
VEHIK, DR SUSAN	[redacted]	[redacted]	[redacted]	[redacted]
VINCENT, JOHN M	[redacted]	[redacted]	[redacted]	[redacted]

VINCENT, LINDSEY	[redacted]	[redacted]	[redacted]	[redacted]
VON WEDELL, CHRIS	[redacted]	[redacted]	[redacted]	[redacted]
WALKER, DANNY	[redacted]	[redacted]	[redacted]	[redacted]
WALLEN, ROSE MARIE & MIKE	[redacted]	[redacted]	[redacted]	[redacted]
WARD, ROGER	[redacted]	[redacted]	[redacted]	[redacted]
WATKINS, KENNETH	[redacted]	[redacted]	[redacted]	[redacted]
WATSON, JOHN-MICHAEL	[redacted]	[redacted]	[redacted]	[redacted]
WEDEL, VERNON	[redacted]	[redacted]	[redacted]	[redacted]
WEIHE, TAMMY	[redacted] E [redacted]	[redacted]	[redacted]	[redacted]
WERDER, DOLORES & FRANK	[redacted]	[redacted]	[redacted]	[redacted]
WERNER, NORBERT	[redacted]	[redacted]	[redacted]	[redacted]
WESTON, TIM	[redacted]	[redacted]	[redacted]	[redacted]
WETHERILL, BERT	[redacted]	[redacted]	[redacted]	[redacted]
WHITMORE, KATHY	[redacted]	[redacted]	[redacted]	[redacted]
WHITNEY, PATSY L	[redacted]	[redacted]	[redacted]	[redacted]
WIDDONS, ALICIA	[redacted]	[redacted]	[redacted]	[redacted]
WIECHERT, ALLEN & SANDRA	[redacted]	[redacted]	[redacted]	[redacted]
WILDGEN, MIKE	[redacted]	[redacted]	[redacted]	[redacted]
WILLIAMS, BARRY & HEDY	[redacted]	[redacted]	[redacted]	[redacted]
WILLIAMS, EMILY GABRIELLE	[redacted]	[redacted]	[redacted]	[redacted]
WILLITS, RAMONA J	[redacted]	[redacted]	[redacted]	[redacted]
WITTY, THOMAS	[redacted]	[redacted]	[redacted]	[redacted]
WOLF, MASON	[redacted]	[redacted]	[redacted]	[redacted]
WORKMAN, FRANK & CHERYL	[redacted]	[redacted]	[redacted]	[redacted]
WULFKUHLE, VIRGINIA A	[redacted]	[redacted]	[redacted]	[redacted]
WYATT, THOMAN & ROSE	[redacted]	[redacted]	[redacted]	[redacted]
YARMER, ROBERT E	[redacted]	[redacted]	[redacted]	[redacted]
YOUNG, A L	[redacted]	[redacted]	[redacted]	[redacted]
ZIELKE, LEROY	[redacted]	[redacted]	[redacted]	[redacted]

NOTES

Notes

INFORMATION FOR AUTHORS

Manuscripts are actively solicited for *The Kansas Anthropologist*. Articles should have a relationship to Kansas anthropology (archeology, ethnography, ethnohistory, cultural/social anthropology, physical anthropology, etc.). All manuscripts must be the original, unpublished work of the authors.

The varied readership of the journal should be kept in mind when preparing papers. **Jargon should be avoided.** The style authority is *American Antiquity* (see Volume 57, Number 4, 1992). Professionals are expected to submit their manuscripts in this form; others who are not familiar with the *American Antiquity* style guide will receive editorial assistance.

Illustrations are encouraged; at least two or three should be included if possible. **Digital photography with original resolution less than 300 dpi is not an optimal method for print publications.** The preferred format is 35- mm black and white or color prints or slides. All illustrations should be designed to fit within 6 x 8.5-inch margins, including caption. If protected by copyright, securing written permission for use is the responsibility of the author.

If IBM-compatible computer technology is available, please submit papers on diskette or as an e-mail attachment, **using as little internal formatting as possible**. Each table and figure should be submitted as a separate file rather than embedded in the text. A single hard copy also should be provided.

The editorial committee will review manuscripts and judge whether articles are appropriate and what revisions may be necessary for publication. Outside reviewers may be used. Five reprints will be provided free of charge to the author of each major article.

Book reviews are also requested. If you plan to review a book but have not been requested to do so by the editor, it would be best to check with the editor to make sure that a review of that work has not already been arranged. Book reviewers will receive two reprints.

The editor welcomes responses to articles. The journal is submitted for indexing in the Kansas Periodical Index, and abstracts are posted on the Kansas State Historical Society web site at www.kshs.org/publicat/anthropologist.

Submit manuscripts to the address below. The editorial staff is here to help you. If you have any questions, please contact:

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