Volume 41
2020

Contents

The KANSAS Anthropologist

Journal of the Kansas Anthropological Association

KANSAS ANTHROPOLOGICAL ASSOCIATION

P.O. Box 750962, Topeka, KS 66675–0962; www.katp.org

The Kansas Anthropological Association is the oldest amateur archeological organization in the state. Its membership is made up of individuals and institutions interested in the prehistoric and historic peoples of the area. The objectives and goals of the Association are the preservation and interpretation of archeological and ethnographic remains within the state; the scientific study, investigation, and interpretation of archeological remains and ethnographic materials; the publication and distribution of information concerning Kansas archeology and ethnology; and the development and promotion of a greater public interest and appreciation for the heritage of the state. Members are required to sign a code of ethics.

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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). All members and interested individuals, professional or amateur, are invited to submit material to the editors. Journal abstracts are posted on the KAA web site at www.katp.org. Back issues of the newsletter or journal, if available, may be ordered from the Historian-Recorder at the address listed above. Prices are furnished upon request.

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ERRATA

for The Quixote Site: Late Woodland in Northeastern Kansas by Brad Logan. *The Kansas Anthropologist* 40:43-158

* * *

Page 93–Table 12. AMS Radiocarbon Dates from F362 and F363.

The sixth column of the table should read as follows.

Calibrated 2 sigma range
A.D. 683–779 A.D. 789–872
A.D. 647–684
A.D. 661–712 A.D. 745–764
A.D. 564–690 A.D. 751–760
B.C. 756–679 B.C. 671–606 **B.C. 599–475** B.C. 446–430
A.D. 647–677
A.D. 650–683

Bold-faced figures in the column of 2-sigma ranges are those with the highest probability.

Page 98–Figure 58. Cross-mend of sherds 0176 and 0779 across the block (above) with accompanying coordinates (below).

Missing coordinates are provided in the following table.

Catalog Number	North	East	Level (cm)	Elevation
0176	489.61	780.80	40–50	99.52
0179	490.39	787.20	35–40	99.50

Page 101–Table 16. Arrow Point Data.

All linear measurements in the headings should be **mm** (not cm).

Page 103–Table 17. Non-Arrow Point Chipped Stone Tool Data.

All linear measurements in the headings should be **mm** (not cm).

Pages 110 and 111–Table 21. Counts for Identified **Vertebrate** (not Vertebrae) Specimens, Organized by Size Grade and Taxonomic Group.

Missing subtotal for fish is **97**; missing subtotal for mammals is **123**; missing total for all materials is **313**.

Page 117–Table 22. Identified White-Tailed Deer (*Odocoileus virginianus*) Remains.

Missing total for NISP is **35**.

Page 119–Table 23. Distribution of Identified Specimens by Sample Depth in Block Excavation, F362 and F363 (Roasting Pits), and 1988 TU1.

Missing subtotal for fish is **97**; missing subtotal for reptiles is **76**; missing total for *Odocoileus* sp. is **35**; missing subtotal for mammals is **123**; missing total for all materials is **313**.

Page 126–Table 26. Summary of 50-Seed Poppy Recovery Test.

Record number 364.002 had **40** poppy seeds recovered (not 41).

Page 127, column 2, paragraph 5–Bark, twigs, stems, and fungus were not particularly abundant (**Table 27** [not Table 28]).

Page 142–Figure 78. Plan view (above) and cross section (opposite page, top) of burned stone feature at the Senn's Hill site (14JF414) (Fosha et al. 1990:114–115). Charcoal from floated fill provided two radiocarbon dates, one of Late Archaic age that was discounted in favor of the other of Late **Woodland** (not Wooland) age (A.D. 683–908, 912–968; older span 87.6 percent probability), which is compatible with associated sherds of Grasshopper Falls ware.

Page 143, column 1, first full paragraph–Excavations at Quarry Creek by the Kansas Archaeological Field School in **1991** (not 1993), 2010, and 2012 discovered six cache pits, an extensive concentration of burned limestone, and part of a second (Logan 1993, 2011; Logan and Bagley 2015).

Page 161–John R. Bozell's correct address is History Nebraska, **5050 North 32nd Street**, Lincoln, Nebraska **68504**

A LATE HOLOCENE BISON KILL SITE IN NORTHWESTERN KANSAS: THE WILLIS-BEESON SITE (14CN6)

Jack L. Hofman
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Barbara M. Crable
Tonganoxie, Kansas

A visit to a bison bone bed site in the Cheyenne Breaks of northwest Kansas is documented here. More than 40 bison elements and bone fragments that were eroding from the arroyo were documented and provide some initial clues about the bison kill that occurred there. The site is not yet radiometrically dated but is believed to date to the late Holocene and is probably not more than 4,000 years old. No diagnostic artifacts were found with the bones.

A number of bison kill sites have been documented in Kansas (Figure 1 and Table 1). The studied sites are primarily located in western Kansas, but others throughout the state remain to be investigated. Most of the reported kill sites are early Holocene in age, which reflects focused research on Paleoindian sites rather than the lack of later bison kills. This initial documentation of the Willis-Beeson site (14CN6) simply helps fill the near void of information about post-Paleoindian bison kills in the region. A number of bison bone beds or bison skeletons have been noted or reported in the Cheyenne Breaks area of Cheyenne County, as well as in other parts of Kansas, but few have been recorded in detail. Late Holocene bison kills are well documented in western Oklahoma (e.g., Buehler 1997) and Colorado (e.g., Todd et al. 2001), and Middle Holocene bison kills are documented from western Nebraska and Iowa (Anderson and Semken 1980; Widga 2003, 2006). Middle Holocene bison kills are common in the northwestern Plains (Frison 1991; Miller 1976; Niven and Hill 1998).

The Willis-Beeson site is located at the head of an arroyo or gully in the Devil's Canyon drainage (Figures 1 and 2). This deeply dissected and eroded area is known as the Cheyenne Breaks, and it drains northward into the Republican River. This part of Cheyenne County had a mantel of late Pleistocene Peorian loess (wind-blown sediment) that was meters deep and originally was deposited between 25,000 and 11,000 years ago (Mandel 2006; Merriam 1963). Erosion of this loess from the uplands filled valleys and gullies that, when eroded in turn, exposed meters of redeposited loess (Mandel 2006, 2008). During periods of steady and relatively rapid deposition (one to a few millimeters per year), distinct soil horizons usually do not have time to develop. The bones exposed in the arroyo walls at 14CN6 are 2.6 meters below the modern surface (Figure 3). A modern or historic soil at the surface around the gully is about 30 cm thick and may have formed in at least a few decades but probably a few centuries. Deposition of loess apparently was fairly steady, as no buried soils are noted below the surface, indicating that no previously stable land surfaces are preserved in this part of the valley. If deposition was fairly steady at about 1 mm per year, an age for the bone bed would be about 2,500 years ago. This is just a rough estimate, and the actual age could be in the range of a few hundred to perhaps 4,000 years. Determining the actual age of bison bone from the site, based on radiocarbon dating, will be enlightening.

The Willis-Beeson site most likely represents a kill event that occurred at the arroyo head cut. Today this erosional feature is more than 4.5 m high; however, judging from the position of the bones, it probably was not higher than 2.6 m at the time of the kill. As bison are not great high jumpers, especially against a vertical bank that is over their heads and

Figure 1. Location of Willis-Beeson site and other selected sites mentioned in the text (Google Earth image).

Table 1. Location of the Willis-Beeson Site and Selected Bison Kill Sites in the Region.

Site	Location	Complex	Age (rcybp)	Site Type	References
12 Mile Creek 14LO1	Logan Co., KS	Folsom	10,200 – 10,600	Trap?	Rogers and Martin 1986; Hill 2002, 2006; Hawley 2009; Hofman 1996
Jones-Miller 5YM8	Yuma Co., CO	Hell Gap	9,700	Pound	Stanford 1978, 1979, 1999
Burntwood Creek 14RW2	Rawlins Co., KS	Allen	8,800–9,000	Jump	Hill et al. 1992; Hofman 2010; Hofman & Crable 2020
Winger 14ST401	Stanton Co., KS	Allen	8,800–9,000	Trap?	Mandel & Hofman 2003; Hofman 2010
Gardiner 14CK320	Clark Co., KS	Allen	8,800–9,000	Trap	Asher 2008; Hofman 2010
Laird 14SN2	Sherman Co., KS	Dalton?	8,500–9,000	Gully trap	Hofman & Blackmar 1997; Mandel et al. 2004

with soft loose sediment in the gully floor, a wall of 2 m is adequate to contain a herd. Animals in the main body of the herd simply follow and push the leaders forward. If the lead bison encounters a dead end, the herd's movement stops, and those in front are trapped against the head cut or end of the arroyo. This situation allowed hunters stationed around the arroyo rim above to kill the animals from positions of relative safety. These kinds of bison kills were very common throughout prehistory, and the remains are found in New Mexico (Speth 1983), the southern Plains (Buehler 1997; Hughes 1989), central Plains (Todd et al. 2001), and northern Plains (Frison 1973, 1984, 1987; Frison et al. 1976).

The defining limits of 14CN6 as visible at present are determined by the exposures in the arroyo

Figure 2. A. View west toward the Willis-Beeson site, Cheyenne County, Kansas; B. View southeast of the arroyo head cut.

Figure 3. A. Cody Beeson on ladder at arroyo head cut; B. Tibia fragment and mandibles in place.

Table 2. Inventory of Bison Bones from the Willis-Beeson Site.

Bone #	Element	Portion	Segment	Side	Break Type	Location	Cuts/ Impacts	Max Length (cm)	Gnaw	Root Etch	Notes
1	Skull pile	—	—	—	-	North wall	N	-	-	-	Not collected
2	PMX	CO	CO	—	D	North wall	N	4.6	N	N	Very light wear, piece of maxilla
3	MMX	CO	CO	—	D	Arroyo floor	N	4	N	N	Full wear, calculus
4	MR	CO	CO	R	G	In head cut wall	N	34.6	N	N	Symphysis missing, refits with bone 5c, full wear TTH, 13.65 TTH length, 6.69 mandibular height below M3
5	MR	CO	CO	L	D	In head cut wall	C	39.8	N	Y	Full wear TTH, 13.75 TTH length, mandibular height 6.89 below M3, symphysis attached to left MR
5a	IN	CO	CO	—	N	In head cut wall	N	2.6	N	N	Heavy wear
5b	IN	CO	CO	—	N	In head cut wall	N	2.5	N	N	Heavy wear
5c	MR	SYP	CO	R	G	In head cut wall	C	14.8	N	N	Was attached to bone 5, refits to bone 6
6	RB	PSH	CO	—	I	In head cut wall	?	19	N	Y	3 ribs in bank not collected
7	HY	BODY	CO	L	G	Arroyo floor	C?	8.7	N	Y	Below MR
8	RB	BL	FR	—	G	Slump block	N	6.8	N	N	
9	RB	BL	HB	—	I	Slump block	C?	6.8	N	N	
10	UL	SP	PR	R	I	Arroyo floor	N	9	N	Y	
11	CPS	CO	CO	R	N	In head cut wall	N	4.3	N	N	Above MR
12	IM	ACS	CO	L	D	South slump block	N	13.8	Y	Y	
13	IM	CO	CO	L	D	Central slump block	N	51	-	-	Not collected, frozen
14	RB	BL	FR	—	G	Central slump block	N	19.8	N	Y	
15	RB	BL	FR	—	D	Central slump block	N	12	-	Y	2 pieces
16	RB	BL	FR	—	G	Arroyo floor	N	17.3	N	Y	
17	PHT	CO	CO	R	N	In head cut wall	N	7.4	N	N	
18	SED	CO	CO	R	N	In head cut wall	N	2.4	N	Y	Above MR
19	RB (3rd or 4th)	PSH	CO	L	G	In head cut wall	N	23.3	N	Y	Above MR, fully fused, groove from root?
20	TH	CN	CO	A	G	Arroyo wall	N	6.2	N	Y	Both epiphyses fused, above MR, arch broken off
21	RB (2nd or 3rd)	PSH	CO	L	G	Arroyo floor	C?	18.4	N	Y	
22a	TH	CNS	CO	A	G	Central slump block	N	12.8	N	Y	Fused epiphysis

Bone #	Element	Portion	Segment	Side	Break Type	Location	Cuts/ Impacts	Max Length (cm)	Gnaw	Root Etch	Notes
22b	TH	DEP	FR	A	D	Central slump block	N	6.2	-	-	
23a	RB	BL	FR	—	G	Central slump block	N	10.2	N	Y	
23b	RB	BL	FR	—	G	Central slump block	N	4.4	N	N	
24	TH	SP	SH	A	I	Central slump block	C	10.7	N	Y	Cuts on both sides
25a	RB	BL	FR	—	G	Central slump block	N	18.4	N	Y	
25b	RB	BL	FR	—	G	Central slump block	C?	10.3	N	Y	
26	RB	PR	SH	L	G	Central slump block	C	15.4	N	Y	6th or 7th
27	LB	FR	FR	—	G	Central slump block	C, I	6.1	N	Y	
28	MC	CO	CO	R	D	Central slump block	N	19.8	N	Y	
29	RB	BL	CO	—	D	East arroyo wall	N	14.3	-	Y	In 3 pieces
30	CPS	CO	CO	R	N	East arroyo wall	N	4.2	N	Y	
31	PHF	CO	CO	R	N	Central slump block	N	7.1	N	Y	
32	RB	BL	CO	—	D	Surface of central slump block	N	28.7	Y	Y	
33	TH	SP	SH	A	I	Central slump block	C	9.7	N	Y	2nd-5th vertebrae
34	MR	HRM	VN	L	G	North wall slump	C?	13.9	N	Y	
35	CRN	FR	FR	A	I	North wall slump	N	5.7	N	Y	
36	RB	BL	FR	—	G	West end north bank	C?	16	N	Y	
37	TH	CNS	CO	A	I	Arroyo wall	C	15.7	Y	Y	Epiphysis not fused, TH7?
38	FM	SH	FR	—	D	Arroyo floor	N	10.2	N	Y	
39	CRN	PET	CO	R	N	North arroyo wall	N	3.9	N	N	
39b	CRN	FR	FR	—	D	North arroyo wall	N	6.4	N	N	With petrous
40	TA	PSH	PSH	R	G	In head cut wall	C?, I	24.8	N	Y	By MR, fused

Element
CPS: Fused 2nd & 3rd carpal
CRN: Cranium
FM: Femur
HY: Hyoid
IC: Incisor
IM: Innominate
LB: Long bone
MC: Metacarpal
MMX: Maxillary molar
MR: Mandible
PHF: First phalange
PHT: Third phalange
PMX: Maxillary premolar
RB: Rib
SED: Distal sesamoid
TA: Tibia
TH: Thoracic vertebra
TTH: Tooth row
UL: Ulna

Portion
ACS: Acetabulum & ischium
BL: Blade of rib or scapula
BOD: Body (of hyoid)
CN: Centrum
CNS: Centrum, neural spine & dorsal spinous process
CO: Complete
DEP: Distal epiphysis
FR: Fragment
HB: Half blade of rib
HRM: Horizontal ramus
PR: Proximal
PSH: Proximal + more than half of shaft

walls. To record the location of bones, a hand-held GPS unit provided horizontal documentation of the bone positions and their spatial relationships to each other within an accuracy of 3 m. The distance between the current head cut and the farthest down-channel in situ elements is 50 m. From the bones buried in the head cut wall, it is apparent that the original bone bed extends farther in that direction, as well as into the side walls of the arroyo. The original extent of the bone bed is unknown, and much of the original deposit likely has been removed by erosion. When Cody Beeson originally visited the site in about 2015, bones were more abundant in the arroyo walls, and importantly a stack of multiple bison skulls was found low in the arroyo wall (possibly in a slump block) about 30 m down channel from the head cut. For a variety of potential reasons, the patterned placement of skulls at kill sites is a phenomenon that recurs in bison kills from earliest prehistoric time until the historic period (e.g., Bement 1999; Brink 2008; Harrison and Smith 1975; Reher and Frison 1980).

No evidence of burning, either charcoal or burned bones, was found at the Willis-Beeson site. This suggests that hearths, which would have been associated with processing or camping near the kill, have not been exposed and may remain buried in the sediment fill surrounding the gully. It is not uncommon for chipped stone artifacts to be rare or almost nonexistent in bison kill sites, especially when conditions allowed for recovery of projectiles and most processing occurred adjacent to, but outside of, the bone bed. Small flakes from stone tool resharpening likely are present in the bone bed area if enough carcass processing occurred to result in dulling of tool edges. Fine screening of sediments is often required to recover such tiny flakes.

Human activity at the Willis-Beeson site is attested by cut marks on several bones, including dorsal spines of thoracic vertebrae and mandibles. Other possible cut marks are present but are less clear. Removal of meat packets and sinew strips along the backbone commonly results in cut marks on the surfaces of dorsal spines of vertebrae (e.g., Frison 1973; Todd et al. 2001). Cut marks on two spines from 14CN6 may indicate this kind of butchery (Figure 4). In addition, the lingual surfaces of both mandibles exhibit cut marks (Figure 5) near the anterior portions of the diastemas near the symphyses. A similar butchery pattern was reported from the Kaplan-Hoover site (5LR3953) in northern Colorado (Todd et al. 2001:138–139). Such carcass processing probably reflects a combination of both the condition of the animals and the needs of the people at the time rather than cultural-specific variation. The Willis-Beeson left mandible was broken across the diastema. The hyoid fragment recovered from the gully floor near the mandibles displays a green bone fracture. These breaks and cut marks may relate to the removal of the tongue from this animal. The surfaces of many bones are partially modified by acid etching from roots, which obscures or removes surficial cut marks.

Several bones have green bone or spiral fractures that suggest intentional breakage while the bones were still fresh. This activity could point to bone marrow extraction (Speth 1983; Todd and Rapson 1988) in the case of long bones or potentially production of bone grease in the case of ribs. The tibia, found near the mandibles in the arroyo head cut wall (Figure 3B), exhibits a spiral fracture, probably related to marrow extraction. The lower margin fragment of a third mandible also shows a green fracture and may indicate removal of marrow from it. A complete metacarpal (Figure 6B), a bone commonly broken for marrow extraction, testifies that not all marrow packages were exploited; whether this simply reflects need or animal condition is unknown. Small fragments of cancellous bone tissue from long bone ends, which were commonly crushed and boiled to extract bone grease (Logan 1998; Vehik 1977), were not noted or collected. However, because of their commonly small size, such fragments are not likely to be observed and collected except with screening. Furthermore, bone grease production was done with and near hearths for which currently there is no evidence at the Willis-Beeson site.

The actual number of bison present in this kill is unknown and may never be determined with certainty. Duplication of multiple elements (carpals and mandibles) demonstrates that a minimum of two animals are represented in the small collection. Age differences, based on the few teeth, including the minimally worn upper pre-molar as compared to the heavily worn mandibular teeth (Figure 6A), also indicate at least two animals. Size variations among a few elements, such as second and third carpals that

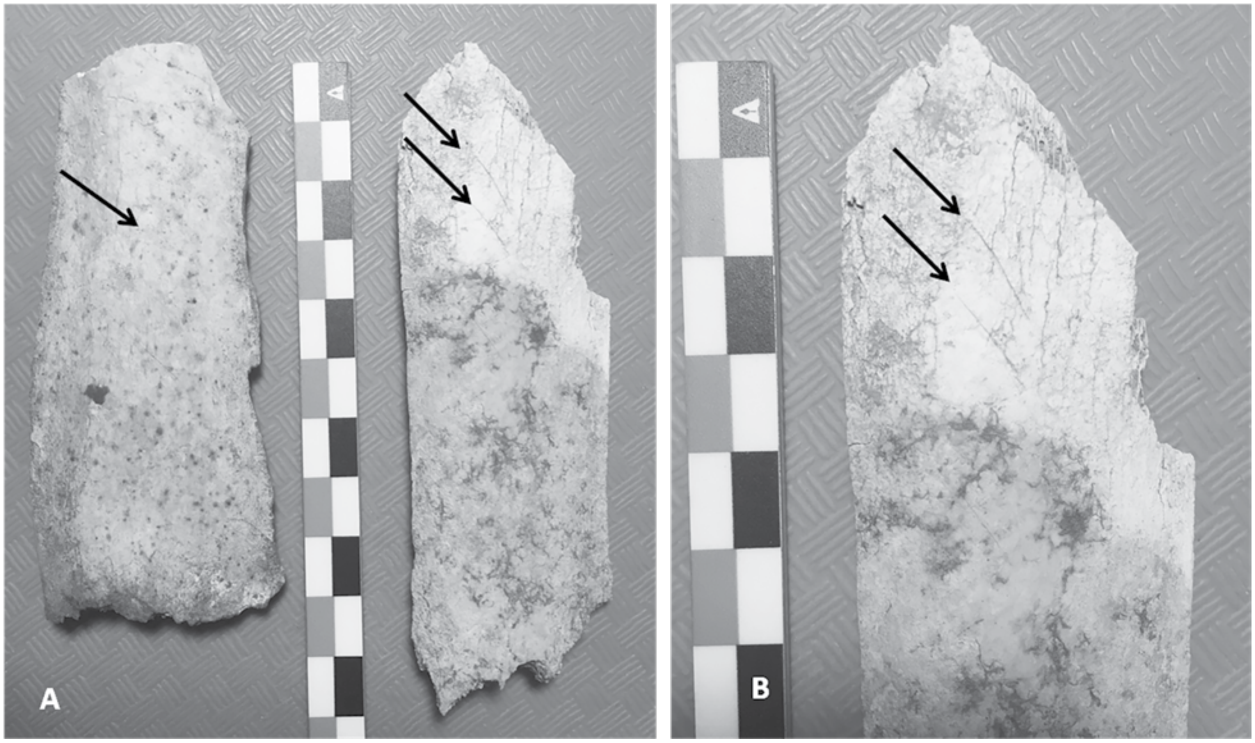

Figure 4. A. Thoracic spines showing cut marks, indicated by black arrows; B. Close up of cut marks.

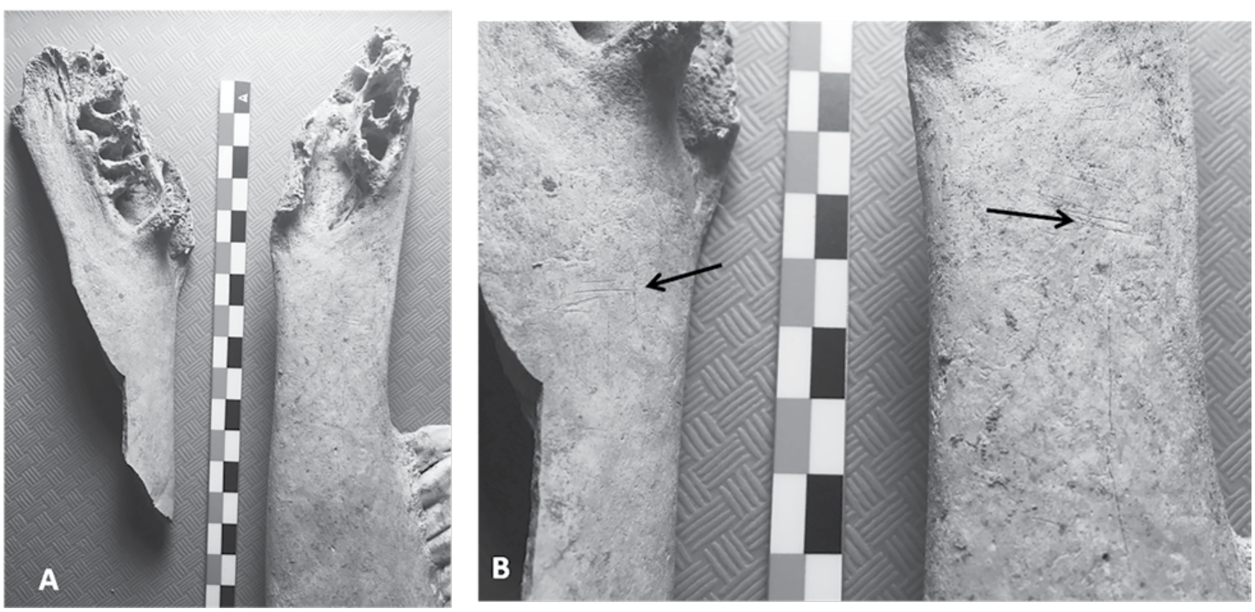

Figure 5. A. Mandibular symphysis from arroyo head cut; B. Close up of mandibles showing cut marks on lingual surfaces.

Figure 6. A. Occlusal surfaces of mandibles from the arroyo head cut; B. Metacarpal from central slump block; C. Inominant bone frozen in the arroyo floor.

represent a bull and a calf or cow (Morlan 1991), signal that multiple individuals were present. This is consistent with the reported presence of multiple stacked skulls at 14CN6.

The Willis-Beeson site will be monitored for further evidence of the bison kill and related activities. In the future it is hoped that at least limited testing, incorporating fine screening to aid in recovery of small-scale remains, will be possible to enhance interpretation. Radiocarbon dating of the bones will help better understand the age of the kill, as well as the site's formational history.

ACKNOWLEDGMENTS

The authors extend a special thanks to Cody Beeson for notifying us about this site and for helping with the investigations. We appreciate the support of Lonnie Willis, Trevor Steurgeon, and Nathan Sowers. The hospitality of Dan and Lynn Busse made the work delightful and possible; thanks for letting us borrow your ladder. The dedicated efforts of Nancy Arendt and Dr. Robert Hoard aided in documenting and collecting the sample reported here. The bone coding system used in this study was developed by Dr. Lawrence Todd, Colorado State University emeritus professor. The 14CN6 bone sample is curated at the University of Kansas Center for Archaeological Research, and Dr. Mary Adair is acknowledged for her assistance in the curation process.

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POTTERY RECONSTRUCTION

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This report offers guidance in the reconstruction of a prehistoric ceramic vessel. The pottery sherds pieced together were collected from a single provenience (14GT310) in Grant County, Kansas, in 2006 and were believed to be from the Early Ceramic period, specifically the Keith phase. In 2019 organic residue, taken from a few of the larger pieces, provided a radiocarbon date of 1142 ± 44 B.P. This date corresponds well with the pot itself, which is typical of Keith phase ware.

In the fall 2018 State Archeologist Robert Hoard at the Kansas Historical Society (KSHS) contacted me regarding a Native American pot to be reconstructed. At that time I was president of the Kansas Anthropological Association, and Hoard asked if I thought a KAA member might be interested in undertaking the activity. I readily agreed to give it a try myself. I have spent many winter days putting together jigsaw puzzles and have found that only the 2,000-piece or larger puzzles provided any challenge, so I was eager to tackle this task. After completing the proper paperwork with KSHS Laboratory Archeologist Chris Garst, I visited with Jackie Williamson, curator of the Thayer County Historical Society and Museum in Belvidere, Nebraska, near my home and was granted permission to occupy a space there.

DEVISING A PLAN

So where does a person begin on a project like this? My only experience with Native American pottery reconstruction was in the KSHS Archeology Lab in Topeka, where several years ago I spent a few hours gluing together a few large fragments. Hoard stated that he did not want the pieces washed, and Garst recommended that I clean the sherd edges with a dry soft-bristle toothbrush to remove dirt and debris. She advised forming the pot from the rim or from the base but not both at the same time. Both Garst and Hoard suggested placing the glued pieces in a sandbox, and I recalled Garst telling me to connect only two sherds at a time, then to let the adhesive dry overnight before attempting to add another.

Next I sought written records to help me design a plan. After exploring on the Internet, I was no further ahead on how to go about the project properly, so I tried another approach. Over the years I have researched George Lamb, another avocational archeologist, who, like me, was born and raised in Thayer County, Nebraska. Not only had he excavated several Central Plains tradition house remains on his farm near Hubbell in the 1930s, but he also worked for the Nebraska Historical Society with A. T. Hill on archeological investigations, including many hours of pottery reconstruction. Knowing this, I headed for the Archeology Office of History Nebraska (formerly the Nebraska State Historical Society) in Lincoln. HN archeologist Nolan Johnson and I looked through the files for some description of Lamb's process but did not locate any. We also examined examples in the HN collection. Lamb and others patched gaps with plaster of Paris to make complete pots, a method that I have seen many times. In some instances the infill was carefully and artistically repainted to match the original sherds; at other times the white plaster was left exposed, showing the amount of missing material that had been filled in. I had no intention of doing that, and I am not sure if the practice is approved today. I prefer to see what percentage of the vessel was recovered and refitted. I also value seeing the cross section of the walls. When filled with plaster, it is impossible to observe the cross section or the temper in the clay body.

My search had resulted in almost no information. Therefore, I went about the task in my own way, as I do a jigsaw puzzle, but documented my progress with many photographs.

ACQUIRING INFORMATION ABOUT THE VESSEL

Prior to receiving the fragmentary pot, Hoard sent the following metric data. The 14GT310 ceramic sherds weigh 2,545 g. They probably come from one vessel or possibly two. Base, wall, and rim sherds are represented; there may be two base segments. An unsystematic set of thickness measurements shows that bases range from 9 to 11 mm, rims from 3.8 to 5.2 mm, and body walls from 7.6 to 11.6 mm with a total range of 3.8–11.6 mm. Some body pieces are very large: one is 112 by 153 mm, and another is 123 mm wide. Two are drilled from the outside toward the inside. They display very little curvature in either dimension, indicating a conical or straight-walled vessel. One large rim sherd is 88 by 105 mm; a rim diameter of 52–60 cm is estimated on 8.5 cm length of the rim. The lip of the rim is flat.

The sherds are exclusively sand tempered, which includes some quartz granules. Most particles are 1–2 mm, but inclusions up to 9.1 mm are not unusual. Temper volume of 30 percent is estimated. The vessel exterior was cordmarked by vertical rolling, and no overlapping of cordmarks is apparent. Residue from cooking is evident on the interior and exterior of some sherds. All of these characteristics are consistent with Keith phase *ceramic* ware.

RECONSTRUCTING

Step one was to lay out the sherds from each sack separately on contrasting colored paper, which allowed me to see the patterns and colors more clearly. I picked up each item, examined it, and put it down with what I thought to be the outside facing up. I separated rims from body sherds and set apart any pieces with anomalies, such as drilled holes or base segments. On the paper I wrote the counts of body, rim, and base sherds and anomalous pieces and photographed each group. See an example in Figure 1.

Three of the five bags contained a single large body sherd and were labeled "scraped for residue." From those scrapings the 2019 sample for ^{14}C dating was taken. All three pieces fit into the final vessel.

Excluding a small container of fragments, the total number of pottery pieces came to 308: 2 body sherds with drill holes, 2 large body sherds, 2 base segments, 17 rims, and 285 various body sherds.

I began reconstruction on February 17, 2019, with the sherds spread out, outsides facing up, on a large table at the Thayer County Museum. I started with the larger fragments and what I recognized as the base. It was not difficult to tell if one sherd fitted to another because they "clicked" together just like interlocking puzzle pieces. Unless I was absolutely certain that the parts connected, I did not put them together. No guessing went into this project.

I used a cellulose nitrate adhesive manufactured by H. Marcel Guest, Ltd. (HMG) that does not yellow with age and is not water soluble, so it performs well for pottery restoration. Once I was confident that two pieces joined, I used a dry soft-bristle toothbrush to lightly brush all edges of the sherds. I squeezed a small amount of adhesive onto one or both edges, pressed them together, and immediately pulled them apart, according to the directions on the HMG container. On tiny sherds I used a toothpick so that excess adhesive did not smear onto the interior or exterior surfaces. After counting in my head for about two minutes, I placed another small amount of adhesive onto one or both surfaces and pressed them firmly together for at least one minute or longer, depending on their sizes. The conjoined sections were placed on top of fine sand in a clear box to support them while they thoroughly dried overnight. By using a sandbox, I could mold the sand beneath the sherds to conform to the shape at whatever angle was necessary to hold them.

My strategy for finding fits evolved over time. At the outset like colors made it easy to match fragments. However, this procedure became less effective. I found pieces that fit together perfectly yet were very different in coloration. Some obviously were burned and somewhat blackened, others were yellowed, and several were still covered with soil. According to the site file, these sherds were exposed to the environment, reburied, and exposed again. These changes, as well as the unknown condition of the vessel when it was laid down more

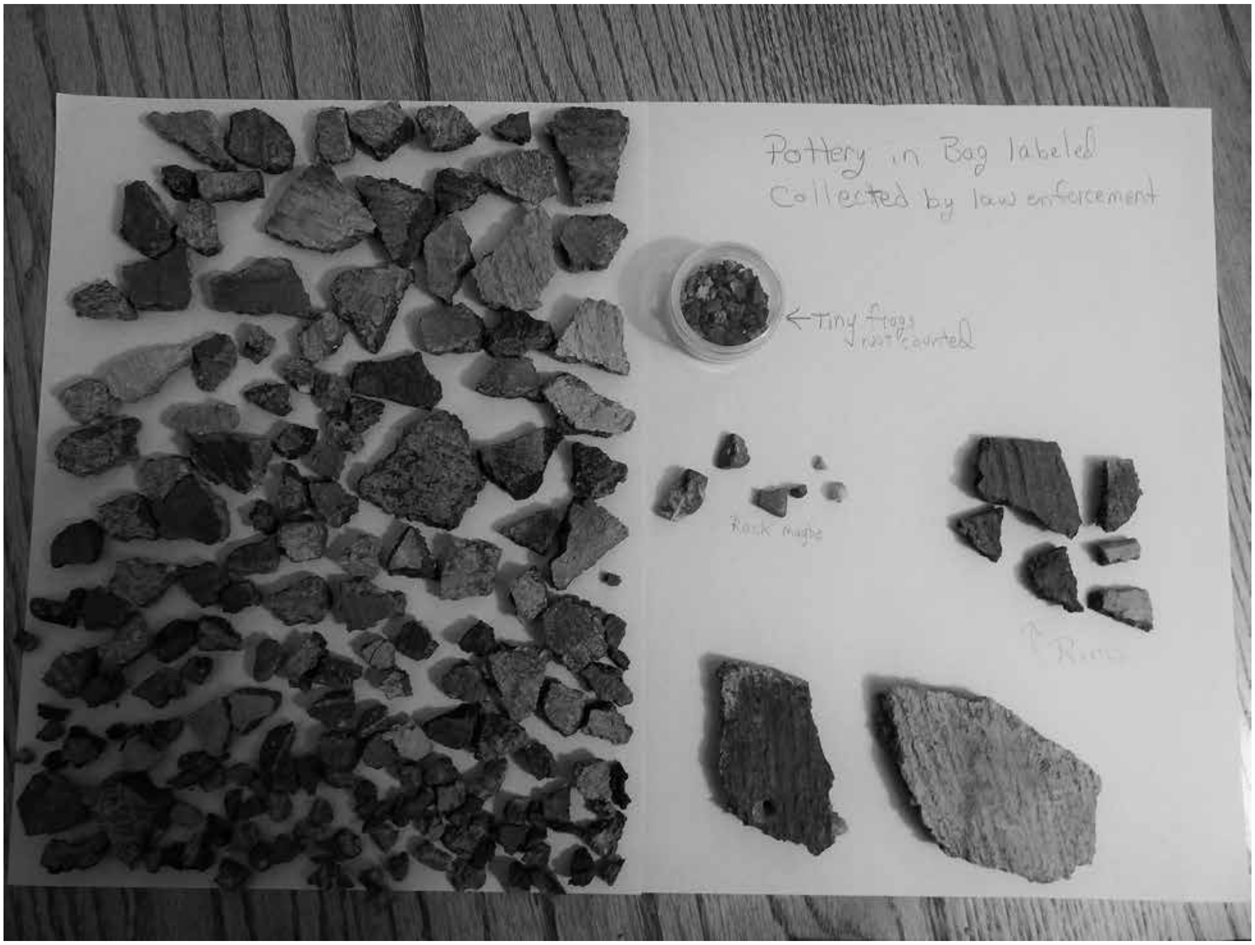

Figure 1. One group of pottery fragments on an 8½ by 11-inch sheet of colored paper.

than 1,000 years ago, likely explain the variations in color and texture. Some pieces were smoothed, perhaps by the constant blowing dirt, fine sand, and silt of southwestern Kansas.

As the weeks passed and the vessel started to take shape (Figure 2), I had to resort to another form of support. Supporting the reconstructed pot was the most challenging aspect of the project. Using cleaned animal bones that I had collected from the river over the years, I could rest the artifact on a block of Styrofoam. The bones provided numerous angles, heights, and widths that were needed to conform to the height and shape of the vessel in just the right locations to hold it as the conjoined sections dried (Figures 3 and 4). The bone support method functioned well as pieces dried on one side, but I was unable to continue work on the surface that was lying against the Styrofoam. My only option was to build some type of structure that would allow the pot to sit on the tip of its base, thus exposing all sides and edges. Deciding that I also wanted to see under the vessel, turn it in all directions constantly, and leave as much open area on the sides as possible, I constructed a platform of a lazy Susan screwed to a plywood square. I wrapped fabric around a thick Styrofoam block and glued and stapled that to the lazy Susan platform. This turned out to be a very inexpensive turntable. I cut the middle section out of a cone-shaped wire tomato cage and pushed the legs down into the foam. The lower half of the 14GT310 pot is the shape of a wide "V" and was cradled by the wire frame in an upright position. I stacked two flat decorative mirrors, purchased at a craft store, under it for added support and thus was able to view the underside of the base from ample perspectives (Figures 5 and 6).

As weeks became months, I found fewer and fewer sherds that connected to the partially

Figure 2. Vessel base prior to added support.

Figure 3. Vessel base with bone supports.

Figure 4. Base and side of vessel supported with bones.

Figure 5. Vessel supported by wire cage with mirrors for viewing the underside and turntable that allowed work on all sides of vessel.

Figure 6. Mirrors revealing all but a tiny fragment of the base.

reconstructed base. I started putting together pieces that did fit and laid them out separately on the table. Many rims joined to body sherds, but I was unable to attach any of these pairs to the formed body structure (Figure 7).

At the conclusion of the project on August 14, 2019, 157 pieces remained unconnected to the base structure. If multiple sherds were fitted and glued together, I counted them as one. The collection comprised 1 formed base (Figure 5), 7 rims, 29 composite pieces, and 120 fragments that did not connect to any other. Figures 5, 7, 8, 9, and 10 show the components as they were returned to the KSHS.

I had commenced on February 17 with 308 pieces and ended on August 14 with 157. The beginning rate of finding matches was approximately two sherds per hour, sometimes more on a good day. This dwindled to one fit every two to three hours, then to days of finding none. On average I spent two to three hours per day, documenting a total of 145 hours of labor. The information in this report may give aspiring experimental archeologists some idea of the time, concentration, and patience required to partially reconstruct a pot for which only about a third of the sherds were recovered.

ACKNOWLEDGMENTS

I extend a special thank you to Jackie Williamson and the staff at the Thayer County Historical Society. I appreciate the help of Robert Hoard, Christine Garst, and Nolan Johnson. Thanks to Virginia Wulfkuhle for patience and expertise in editing the manuscript.

Figure 7. Seven rim sherds with attached body sherds.

Figure 8. Twenty-nine composite body sherds with connecting pieces.

Figure 9. Thirty remaining fragments, measuring 1–2 cm in size.

Figure 10. Ninety remaining fragments, measuring less than 1 cm in size.

DESCRIPTION AND EVALUATION OF THREE RECONSTRUCTED KEITH PHASE CERAMIC VESSELS

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There are no known complete pottery vessels attributed to the Early Ceramic (ca. 500–1200 C.E.) Keith phase. Partial reconstruction of a Keith phase ceramic vessel from Grant County, Kansas, gives insight into construction and use of the earliest vessel form in the Central High Plains. The vessel compares favorably to other partially reconstructed Early Ceramic vessels in the region.

It is rare to recover a complete ceramic vessel from an archeological site. Typically whole pots are recovered from burial sites, explaining in part why people have looted burial mounds over the years. An intact whole vessel or one that can be reconstructed provides substantial information about how pottery was made and used prehistorically. This report uses data provided by Debi Aaron (herein) to compare a vessel from 14GT310, which she partially reconstructed, to other contemporaneous vessels in the region and offers new insights on the earliest type of pottery found in the western Central Plains.

SITE 14GT310

Site 14GT310 was discovered by a southwestern Kansas landowner in the mid-1990s, when a road grader exposed a human burial and many associated ceramic fragments. Out of respect and unaware of the Kansas Unmarked Burial Site Preservation Act, which requires that discovered human remains be left alone and law enforcement personnel notified, the landowner excavated and relocated the burial and ceramic sherds away from the road. Unfortunately, the burial was exposed by road construction again in 2006. At this time the Grant County Sheriff's Department and the Kansas Bureau of Investigation were alerted. They re-excavated the human remains and the associated pottery fragments and turned them over to the Kansas Historical Society.

I became interested in the ceramic sherds because I thought they had potential to be from a whole Keith phase vessel. The pieces are tempered heavily with coarse, quartz-rich sand, they are thick and show little curvature, and they were cord-roughened by rolling a cord-wrapped dowel vertically up or down the exterior walls. These are characteristics of Early Ceramic (ca. 500–1200 C.E.) Keith phase vessels, known by the style name Harlan cord-roughened (Kivett 1949). Deb Aaron accepted my request to reconstruct the pot, a task that takes patience and persistence.

PARTIALLY RECONSTRUCTED KEITH PHASE CERAMIC VESSELS

I know of only two partially reconstructed vessels from Early Ceramic Keith phase sites in Kansas (Figure 1). One is from the Forrest site (14PA303) in Pawnee County, and the other is from 14RH401 in Rush County (Hoard and Bozell 2016:19). Knowing the shape and dimensions of another pot would increase understanding of the range of variation of Keith phase vessels.

I had taken measurements of some of the large pieces before the artifact was loaned for reconstruction. Deb's work provides significant new information. First, the general shape of the 14GT310 vessel is very similar to that of the other two reconstructed Keith phase pots. It is cone-shaped with a thick

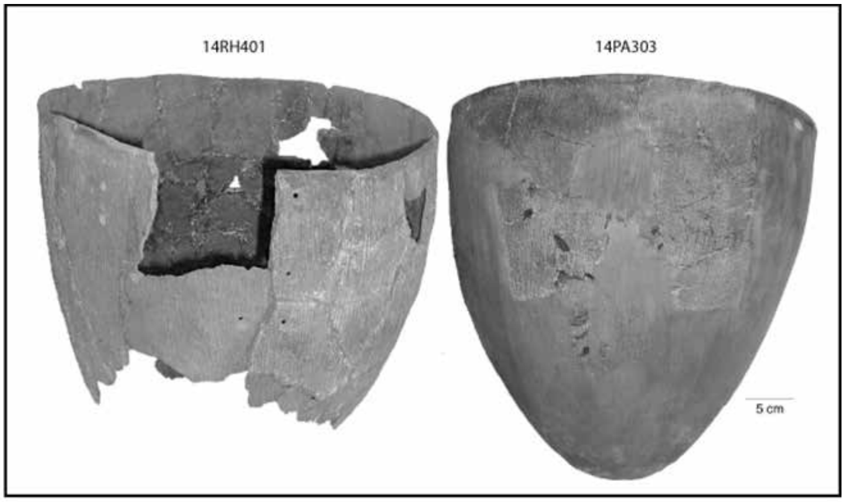

Figure 1. Partially reconstructed Early Ceramic vessels from 14RH401 and 14PA303 in Kansas. Figure modified from Hoard and Bozell 2016: Figure 1–13.

base, and the body wall gradually slants outward and then upward before terminating at the lip. Sets of conjoined sherds that do not attach to the formed base show no evidence of a shoulder, indicating that the vessel terminates in a wide mouth that also is its maximum width. The radius is calculated from one rim sherd along an 8-cm-long edge of the lip. Radius values range from 26 to 30 cm, so the estimated mouth diameter is 52–60 cm.

The reconstructed pot is gauged to be about 55 cm tall. To arrive at this figure, I photographed the reconstructed portion and drew the vessel profile over the image in Adobe Illustrator©. I extrapolated the angle of the wall upward until the two sides were at an angle and height that created a mouth diameter of 56 cm (the middle value of the diameter estimate) and at the same time measured 40 cm wide at a height of 25 cm above the base (the highest measurable diameter on the partially reconstructed pot). The resulting predicted shape is shown in Figure 2.

Base sherds are noticeably thicker than those above. The thickest basal section is 12.4 mm. Wall thicknesses average about 9 mm but range from 6.7 to 12.7 mm. Rim sherds are thinner—about 7 mm. This suggests that in general the wall is thicker toward the base and thinner toward the lip. The temper is coarse sand, with 8.4 mm being the longest dimension of one particle.

The base interior displays a series of shallow and generally rounded impressions (Figure 3). These were made before the vessel dried and may be evidence that the base initially was molded over another object and then built up with coils or bands. About 6 cm up from the base, the wall angles outward slightly and again, but less so, at around 12 cm from the bottom. The body wall is thinner than the base, starting at the alteration in angle at the height of 12 cm. These changes likely reflect the addition of flattened coils or bands of clay when building the pot.

On the vessel interior a clear color change occurs at a distance of about 10 cm above the base; the surface is lighter below and darker above. Because the line is level around the bowl, it apparently represents a boil line, above which whatever was last cooked burned onto the inside walls (Figure 3). Charred material above the boil line was used for a radiocarbon assay (sample number D-AMS 032319), producing an age of 1142 ± 44 RCYBP (radiocarbon years before present). The calibrated range is 778–986 C.E.; the median date is 895 C.E. (Calib 7.1 html; Reimer et al. 2013). This places the pot within the known date range of the Early Ceramic Keith phase (Hoard et al. 2017:22–25).

SIMILARITIES AND DIFFERENCES AMONG THE THREE RECONSTRUCTED KEITH PHASE VESSELS

The Forrest site vessel's height and width values are the same—34 cm (Hoard and Bozell 2016:16). The height and width extrapolated for the 14GT310 pot are comparable: 55 cm for height and 56 cm for

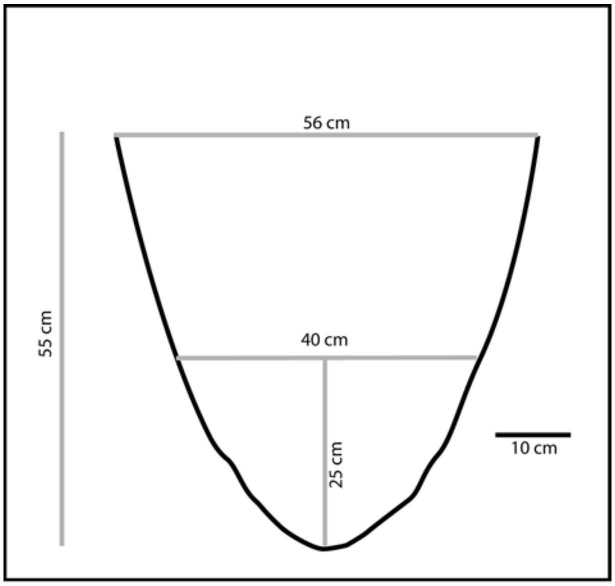

Figure 2. Extrapolated profile of the 14GT310 vessel.

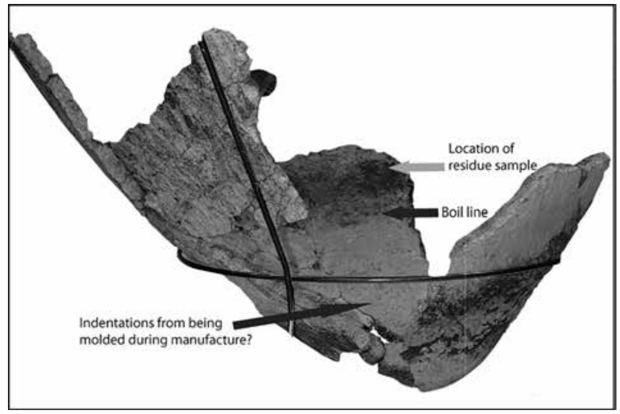

Figure 3. Partially reconstructed vessel from 14GT310, showing interior base indentations, boil line, and location of residue sample for radiocarbon assay.

width. The 14RH401 vessel could not be measured, but the proportions of the existing portions of the artifact demonstrate that all three share a very similar form, though they vary in size.

Sherds from 14PA303 average 8.1 mm thick, and those from 14GT310 average 9 mm. All show vertical, parallel cord marks from the base to the lip. Drilled holes to lace up and salvage broken containers are present on the 14GT310 and 14RH401 specimens. While the sample size of three partially reconstructed Kansas Keith phase vessels is quite small, they show a consistency in shape and proportions, along with other characteristics easily acquired from sherds alone, such as temper, surface treatment, and thickness.

Two partially reconstructed pots from unnumbered sites along the South Platte River in the eastern Colorado High Plains, identified as Jenson-Berthoud and Yeager Badger Creek, were donated to museums (i.e., University of Colorado Museum and Fort Morgan Museum, respectively). These also compare well to the 14GT310, 14RH401, and 14PA303 specimens (Ellwood 2002:14–17). Like the 14RH401 and 14GT310 pots, the one from Yeager Badger Creek has drill holes to lace a crack in the container. The Jenson-Berthoud vessel is similar in thickness to the 14GT310 artifact and also has a thinning wall from base to rim (Ellwood 2002:16). The similarities between these vessels demonstrates some continuity in Early Ceramic pottery manufacture, use, and repair throughout the High Plains of Kansas, Nebraska, and Colorado.

FUTURE WORK

There may be reconstructed or reconstructable Early Ceramic vessels from the High Plains in western Nebraska and Kansas and eastern Colorado unknown to the authors that would add information to the inferences made in this study. Also, analysis of the residue scraped from sherds may determine what was being cooked in the pot. Finally, measurements of fragments of mixed broken vessels from more Keith phase sites will present a more accurate understanding of the range of variation in this earliest type of pottery on the High Plains of Kansas and Nebraska.

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TIME, SPACE, AND FORM AT THE HAMON SITE (14JF350): A MULTI-COMPONENT LATE WOODLAND SITE IN NORTHEASTERN KANSAS

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During the fall of 1971 and spring of 1972, Kansas Historical Society (KSHS) archeologists and Kansas Anthropological Association (KAA) volunteers conducted excavations at the Hamon site (14JF350), located in northeastern Kansas. The site was interpreted as a single-component house feature and was assigned to the Grasshopper Falls phase of the Plains Woodland period (A.D. 500–1000). However, the field records and artifact assemblages went unanalyzed, and a report was not generated—until now. This paper presents a reconstructed spatial distribution and analysis of the artifacts recovered from the original excavations, new AMS radiocarbon dates, and the results of limited site testing in 2014. Evidence indicates that 14JF350 consists of a multi-component palimpsest, formed by peoples' repeated occupation during the Late Woodland period. The original interpretations were based upon unvalidated assumptions and incomplete data analysis. These problems extend beyond the Hamon site. Regional interpretations of the Late Woodland period are based upon taxonomic frameworks that have not been confirmed through comparative examination of archeological findings. More accurate reconstructions of the past rely on methods of thorough data analysis—not generalizations or suppositions, and this study demonstrates the value of applying such methods to curated collections.

Critical appraisal of field records and material culture assemblages generated during the 1971–1972 excavations of the Hamon site (14JF350) is the subject of this paper. All documents and artifact collections associated with the 1971–1972 investigations are curated at the Kansas Historical Society (KSHS) in Topeka. Analyses of the lithic and ceramic assemblages, a spatial reconstruction of artifact distributions, four new AMS radiocarbon dates, and a 2014 field survey were conducted for Master's thesis research (Keehner 2015). The project results presented here reveal that the Hamon site was occupied on at least two separate occasions during the Late Woodland period (A.D. 500–1000). Repeated site occupations resulted in superimposition and mixing of cultural materials associated with activities at different points in time. Recent agricultural plowing contributed to the mixed nature of components as well. This form of spatial-temporal mixing at an archeological site is an example of a cumulative palimpsest (Bailey 2006:203–204). Unlike a true palimpsest in which successive actions have removed all vestiges of previous behaviors, traces of distinct temporal activities often are preserved in cumulative palimpsests. Such traces at the Hamon site indicate that the occupants engaged in lithic and ceramic production and inhumation of the deceased.

This characterization is in contrast to the original interpretation of 14JF350 as a single component house structure with an infant burial located in its center. A multitude of factors influenced this explanation, the most important being that excavated materials and field records were never analyzed. Field interpretations were affected by the horizontal limits of the excavation boundaries, which never reached a subsoil depth devoid of cultural material.

Thesis research also exposed the need for a revision of archeological taxonomy for several designated units in the Late Plains Woodland period (A.D. 500–1000). The formal traits of artifacts from the Hamon site, as well as other sites used to define the Grasshopper Falls phase, are indiscernible from other Middle (A.D. 1–500) and Late Plains Woodland units and regional ceramic wares/types, including Valley, Sterns Creek, Loseke Creek, Held Creek, and Minotts. Specifically, the 14JF350 ceramic assemblage contains vessel forms, production techniques, and design configurations that could fit descriptions for any of the above-mentioned wares/types. As will be shown, the Grasshopper Falls phase was defined on assumptions rather than rigorous methods that isolated a particular material cultural manifestation in space, time, and form.

This paper begins with a review of the Plains Woodland period in the Central Plains, including taxonomic units with a critical focus on the Grasshopper Falls phase. The environmental setting and history of discovery and investigation of the Hamon site are summarized, followed by analyses of the lithic and ceramic assemblages. The field records are presented with a reconstruction of the 1971–1972 excavations. Original interpretations are compared to new ones, derived from the spatial analysis. New radiocarbon dates and the results of limited site testing in 2014 are introduced. The conclusion discusses the inferred activities at the Hamon site, evidence for regional social interaction during the Late Woodland period, and problems with current archeological taxonomies that can be addressed in the future with additional research of curated collections.

PLAINS WOODLAND PERIOD

The Plains Woodland period (500 B.C.–A.D. 1000) corresponds to a Formative period (Willey and Phillips 2001) in North American archeology. During this time the widespread use of ceramic technology, horticultural subsistence strategies, and semi-sedentary settlement patterns appear across the region. The preceding Late Archaic period, which in the Plains contains limited examples of early ceramic production (Reid 1984), likewise is marked by a gradual trend towards a semi-sedentary lifestyle. The succeeding Plains Village period is characterized by population growth and sedentary agricultural villages. Thus, the Plains Woodland period represents an important time of transition between primarily aceramic hunter-gatherers of the Archaic period and the more sedentary farmers of the Plains Village period.

In the early to mid-twentieth century, archeologists, namely William Duncan Strong (1933, 1935), Waldo Wedel (1938, 1947, 1959), A. T. Hill (Hill and Kivett 1940), and Marvin Kivett (1953), published research on prehistoric cultures of the Central Plains. Material culture traits at ceramic-age sites were evaluated in comparison to Woodland period traits in the eastern United States. General similarities in the use of pottery and settlement-subsistence strategies led to the idea that Plains peoples were recipients of technological diffusion from the east (Johnson 2001; Wedel 1972; Willey 1966). Analogous to the chronological framework devised for the Eastern Woodland period, the Plains Woodland period was divided into early (500 B.C.–A.D. 1), middle (A.D. 1–500) and late (A.D. 500–1000) sub-periods.

Early research, especially during the 1940s and 1950s, favored taxonomic concepts such as "aspect" and "focus" when referring to multiple sites with similar artifact assemblages. Beginning in the late 1950s, archeologists began defining new cultural "phases" according to the Willey and Phillips Culture-Historical Integration approach that describes a cultural phase as a distinct archeological unit with boundaries in space, time, and form (Willey and Phillips 2001:22). In the Central Plains this resulted in the definition of multiple phases within the Plains Woodland period. The geographic boundaries of these taxonomic units often overlap one another. In some cases this is due to their sequential chronological placements; sometimes they overlap because of their problematic formulations (Figure 1).

Cultural units identified for the Plains Woodland period, only some of which have been labeled as phases, include Valley, Keith, Greenwood, Cuesta, Schultz, Kansas City Hopewell, Sterns Creek, Loseke Creek, and Grasshopper Falls (Figure 1). Temporally, Valley, Kansas City Hopewell, and Schultz are considered Middle Woodland manifestations (A.D. 1–500), although some radiocarbon dates indicate that they may have appeared during the Early Woodland (500 B.C.–A.D. 1). The remaining units are designated as Late Woodland (A.D. 500–1000).

Plains Woodland phases share more similarities than differences with respect to formal traits of artifacts and spatial organization. General

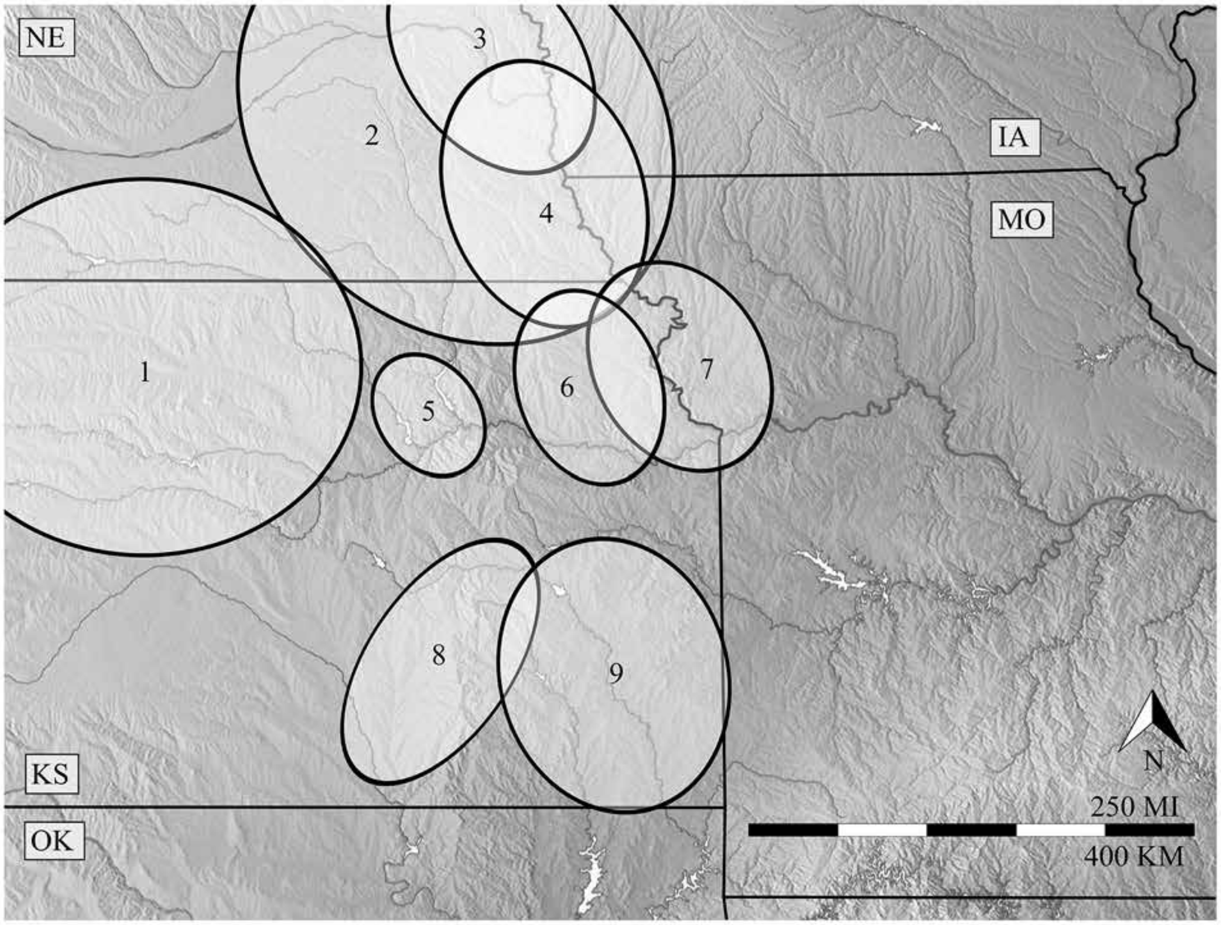

Figure 1. Geographic distribution ranges associated with Plains Woodland taxonomic units in the Central Plains: 1) Keith, 2) Valley, 3) Loseke, 4) Sterns Creek, 5) Schultz, 6) Grasshopper Falls, 7) Kansas City Hopewell, 8) Greenwood, 9) Cuesta.

characteristics comprise 1) lithic technologies in the form of medium to small size projectile points; 2) cord-roughened, smoothed-over, plain, and elaborately decorated ceramic vessels (Kansas City Hopewell); 3) site locations along major waterways and their tributaries; 4) the presence of post molds and/or daub associated with structures; and, to a lesser extent, 5) evidence for agricultural practices. Many of the phases and other taxonomic units differ from one another only in certain attributes of artifacts or features, such as the types of temper added to pottery or the presence/absence of hearths within an inferred habitation structure. Radiocarbon dates, which are limited for many taxonomic units, also have been used to distinguish units from one another.

Some researchers (Logan 2006:85) have criticized the fact that many of the Plains Woodland phases in Kansas were defined without critical peer review, resulting in confusing terminology, as well as issues of splitting and lumping unit designations. Some phases were delineated on the basis of extremely limited and perhaps insufficient evidence. For example, Butler, Bemis Creek, Wakarusa, and Deer Creek phases were described on the basis of material remains from one archeological site each. Logan (2006:86) stated that these remains may belong to other cultural units and suggested that the Wakarusa and Deer Creek phases might be subsumed within the Grasshopper Falls phase, based on traits in the artifact assemblages and geographical locations. However, the Grasshopper Falls phase itself was defined without critical peer review, relying on flawed samples and overall methods that did not fulfill the requirements of isolating archeological components in space, time, and form.

Grasshopper Falls Phase

The Grasshopper Falls taxonomic unit has been referred to as both a focus and a phase, but the latter designation is more complete and widely accepted. In a memoir of Hamon site excavations, Jim Feagins (personal communication January 8, 2014) recalled that in the late 1960s and early 1970s archeologists were informally labeling some northeastern Kansas sites as pertaining to a "Grasshopper Falls focus," according to the Midwestern Taxonomic Method (McKern 1939, 1943). However, Reynolds (1979) published a formal definition of a "Grasshopper Falls phase," following the Culture-Historical Integration approach. Earlier manuscripts referred to a Grasshopper Falls phase (Reichart 1974), and Reynolds (1978) had provided a tentative description, but the 1979 report became the principal reference for identifying and attributing site components to the taxonomic unit.

Reynolds' definition was based on artifacts from the Malm (14JF307), Anderson (14JF331), and Teaford (14JF333) sites, located near the Lake Perry Reservoir in northeastern Kansas. The diagnostic archeological traits of the Grasshopper Falls phase include 1) lithic technology in the form of medium to small corner-notched or unnotched dart points, arrow points, and other bifacial technologies; 2) stone celts and ground stone technologies; 3) ceramic technology, distinguished by medium-size vessels with conical bases, grit-tempered pastes, cord-roughened or smoothed over cord-roughened surface treatments; and 4) oval-shaped, wattle-and-daub habitation structures that lack internal hearths (Reynolds 1979). Grasshopper Falls phase sites were depicted spatially as located along the Delaware River and its tributary systems. While Reynolds (1979:65) noted that 124 site components in the region could be assigned to the phase, based upon these characteristics, these sites had not been (and remain to be) analyzed. He (Reynolds 1979:75) estimated the temporal framework for the Grasshopper Falls phase as A.D. 500–1000, based on one radiocarbon date of A.D. 760 ± 90 from the Anderson site.

Numerous sites have been assigned to the Grasshopper Falls phase since Reynolds formally defined it. Many contain multiple components attributable to other Archaic, Plains Woodland, and Plains Village taxonomic units. These identifications were made on the basis of the geographic location (northeastern Kansas), the presence of what is considered diagnostic grit-tempered pottery, and radiocarbon dates that fall within the range of A.D. 500–1000 (Baugh 1991; Benison 1996; Fosha and Logan 1991; Fosha and Williams 1990; Jones 1976; Williams 1986; Witty 1983). However, recent analyses of artifact assemblages and field records associated with 14JF350, attributed to the Grasshopper Falls phase (Reynolds 1979, 1987), raise serious problems with the methods and data that Reynolds used to define the unit.

HAMON SITE ENVIRONMENT

The Hamon site is located north of the town of Valley Falls, in Jefferson County, Kansas. Situated on a terrace adjacent to wide shallow slough on the north, it is east of Coal Creek West, a tributary of the Delaware River. This region of northeastern Kansas is part of the Dissected Till Plains physiographic subdivision of the Central Lowlands section of the Interior Plains. The Dissected Till Plains are comprised of the Kansas Drift Plain and the Attenuated Drift Border (Schoewe 1949:289). The central and northern portions of Jefferson County are located in the Kansas Drift Plain, characterized by glacial drift deposits that mantle the underlying bedrock as a result of at least two past glaciations. The topography is gently undulating with an erosional drift-controlled surface. Near larger stream courses the topography is dissected into gentle rolling slopes, and wide-open valleys are common. Areas adjacent to larger streams are highly dissected into large hilly regions. Glacial tills, including quartzite, granite, and other glacial erratics, abound. Deposits of Quaternary loess sediments are abundant in portions of the Dissected Till Plains.

The Hamon site terrace is composed of Wabash series soil. Immediately surrounding the terrace, silty clay loam and clay loam soils of Kennebec, Reading, Martin, and Pawnee clay series occur (Dickey et al. 1974:11–16). The Wabash silty clay loam is a deep soil, formed in clayey alluvium. A soil profile from a cultivated field in Jefferson County, sampled by the USDA Soil Conservation Service, provided a comparative characterization of the soil in which 14JF350 is located (Dickey et al. 1974:20).

Depths are in non-metric units. The Wabash soil is a dark silty clay loam through A-C horizons. The upper surface soil has an Ap horizon 0–6 inches in depth, followed by an A12 horizon 6–19 inches in depth. Both soil horizons are black, transitioning to a B2g horizon 19–38 inches in depth and very dark gray. This is followed by a thinner grayish brown B3g horizon. The C horizon from 43–80 inches is dark gray and dark grayish brown. The A12 horizon incorporates some fine dark gray mottles. The B horizons exhibit fine distinct yellowish brown and strong brown mottles. The C horizon has fine, faint, but distinct yellowish brown mottles. Notably, this soil series holds high clay content and is very dark in color to a depth of 2 m.

The vegetation today is a mixture of deciduous floodplain forests and savannahs that occasionally are interrupted by freshwater marshes in and around rivers and their tributaries. Bluestem prairies dominate upland areas adjacent to the floodplains. Among the major species along the floodplain forests and savannahs are hackberry (*Celtis* spp.), cottonwood (*Populus* spp.), peach-leaved willow (*Salix amygdaloides*), and black willow (*Salix nigra*) (Kuchler 1974:600–601). The freshwater marshes contain species of tall Gramineae, most notably prairie cordgrass (*Spartina pectinata*). The bluestem prairies sustain a mixture of tall and medium size Gramineae and numerous forbs. The most common species include big bluestem (*Andropogon gerardii*), little bluestem (*Schizachyrium scoparium*), switchgrass (*Panicum virgatum*), and indiangrass (*Sorghastrum nutans*) (Kuchler 1974:595–597). This mosaic ecotone provides vegetation, abundant sources of chert, glacial till, and alluvium clay that would have appealed to the sustenance, shelter, and tool production needs of foraging groups.

HAMON SITE DISCOVERY AND EXCAVATION

Milton Reichart, a local amateur archeologist affiliated with the Kansas Anthropological Association (KAA), brought the Hamon site to the attention of Kansas State Archeologist Tom Witty in 1971. Expressing to Witty that the site was significant and known to local collectors, Reichart urged KSHS archeologists to consider investigating it before more data was lost. After he donated a surface collection of pottery sherds, lithic tools, a stone pipe, and possible clay figurine fragments to the KSHS, Witty accompanied him on a site visit. They surveyed the entire field, gathered additional surface artifacts, and cored the densest concentration of surface scatter. On the basis of this inspection, Witty recommended further subsurface exploration through excavation.

In the fall of 1971, KSHS archeologist Tom Barr led the project with the assistance of Reynolds, Reichart, and other KAA members. The initial plan was to excavate over one weekend; however, heavy rain started late on the first day, so the crew excavated for three days over two weekends. The results of the dig were summarized in the KAA fall newsletter (Barr 1971). In April and May of 1972, a crew, consisting of Witty, Reynolds, KAA members, and Washburn University students, returned to the site and expanded the excavation grid (KSHS 1972:14JF350 record number 58).

Recovered artifacts comprised lithic tools and debitage, rocks (non-flaked), daub/burned earth, and pottery sherds. Interpreted features included storage pits; post molds for a presumed house feature; a pit with an infant burial, located in the center of the house feature; and additional human remains, consisting of a mandible and occipital fragments (Barr 1971; Reynolds 1987). One conventional radiocarbon date was obtained on a charcoal sample, retrieved from the upper fill of the pit containing the infant burial. The uncorrected date of 1000 ± 95 B.P. was calibrated in 1998 by the University of Washington's Quaternary Isotope Laboratory. Using Radiocarbon Calibration Program 4.3 (Calib Rev 4.3), the lab determined a 2-sigma probability range of A.D. 862–1251 and a median age probability of A.D. 1041, which is close to the A.D. 1000 chronological boundary defined for the Grasshopper Falls phase. Due to the presence of the infant burial, 14JF350 was assigned an Unmarked Burial Site number (UBS 1991-51) in compliance with the Kansas Unmarked Burial Site Law (KSA 75-2741 through 75-2754).

The above summary was compiled from Barr's (1971) KAA newsletter update, records on file at the KSHS, and a reference in a later publication by Reynolds. In this report Reynolds (1987) presented a plan view map of 14JF350 that depicts a post mold pattern for a house structure with the infant burial and a concentration of daub located in its center.

He stated that the Hamon site consisted of a single component Grasshopper Falls phase house structure, at the same time acknowledging that analysis of the artifact collection and field records had yet to be accomplished.

Recognizing the value that the Hamon site artifact assemblages and field records held for Late Woodland research in the Central Plains, an analysis eventually was undertaken for Master's thesis research (Keehner 2015). At the outset of the project, the original interpretations of the site and the Grasshopper Falls phase were not expected to come into critical focus. However, lithic and ceramic specimens displayed variable attributes, and an examination of the excavation records revealed artifact proveniences and features suggestive of multiple components. It became apparent that remedial work was required, i.e., additional radiocarbon dates, a thorough spatial analysis reconstruction, and limited field testing to establish site boundaries and validate assertions that it had been completely excavated.

LITHIC ASSEMBLAGE

Formal attributes of specimens in the lithic assemblage were analyzed to ascertain tool and debitage types. Raw materials were identified through cross reference with the lithic comparative collection at the University of Kansas (KUMA-LCC). Both aspects of the lithic analysis are important for understanding activities that took place at the Hamon site. Distinguishing the variety among raw material types is essential for understanding resource procurement strategies and/or the possibility of trade with non-local groups. Determining the lithic reduction sequences (tool sharpening versus tool production) across material types can reveal patterns of site activity. Coupled with a chronological framework, pattern variation can indicate the labor diversity within one population or signal that multiple groups occupied the site at different times and engaged in different pursuits.

The lithic assemblage consists of 2,277 artifacts, of which 1,082 are classified as tools and debitage (Table 1). The remaining 1,195 show no signs of human modification and have been designated "unmodified rock" (Table 2). However, this does not imply that they entered the site via factors other than human action. They may have been deposited in the contexts of 1) hearths and cooking tasks, 2) raw material for ceramic production, and 3) raw material for lithic production. The stone tools were classified by a type-variety method based on the criteria of 1) formal shape, 2) technological function, 3) type and location of intentional modification, and 4) use-wear (compare Odell 2004:106–107). Debitage, resulting from stone reduction during tool manufacture and maintenance, was categorized based on a hybrid model of the Sullivan Rozen Technique (SRT) (Sullivan and Rozen 1985) and the triple-cortex approach (Andrefsky 2005:115–118).

The SRT method classifies debitage into four categories: 1) complete flake, 2) broken flake, 3) flake fragment, and 4) debris. In this system a complete flake is entirely intact, a broken flake shares the same attributes but has fractured margins, a flake fragment is missing platforms and bulbs of percussion, and debris has an indiscernible ventral surface. The triple-cortex approach classifies flakes into primary, secondary, and tertiary reduction sequences, based on the amount of cortex present on dorsal surfaces. Primary flakes exhibit 50 percent or more cortex, secondary flakes display less than 50 percent, and tertiary flakes lack cortex. Andrefsky (2005:115) noted that this method is the most popular for assessing stages of stone tool manufacture, although some researchers have used alternative percentage ranges in their classifications, a practice criticized by Sullivan and Rozen (1985:757).

Flake and debitage classification based on both the SRT and triple-cortex methods simplifies categorization and identifies what Odell (2004:101) calls "the technique used to produce [flakes] or the stage in which they occurred in the lithic reduction process." The Hamon site lithic artifacts are divided into flakes and debitage, the latter described as blocky/angular debris and shatter. The definition of a complete flake was modified slightly from the one specified in the SRT method. Flakes with damaged margins that still have identifiable striking platforms and bulbs of percussion on the ventral surface were classified as complete flakes, but only when more than 75 percent of the flake from proximal to distal end was present and when a complete margin fracture was located in the 25 percent portion of the distal end. Flakes could have minute fractures or small areas of their lateral margins missing. As long

Table 1. Lithic Tools and Debitage. Asterisk (*) denotes categories with counts that include both whole specimens and fragments.

Lithic reduction/ tool type	Westerville/ Toronto	Plattsmouth	Winterset	Permian	Secondary	Glacial Till/ sedimentary/ metamorphic	Unidentified	Totals
Debitage								
Primary flakes	3	3	2	2	53	1	3	67
Secondary flakes	10	11	2	4	95	0	13	135
Tertiary flakes	19	14	13	2	11	0	4	63
Utilized flakes*	5	3	3	1	4	0	0	16
Debris	51	34	33	14	403	7	149	691
Debitage totals	88	65	53	23	566	8	169	972
Tools								
Points	5	2	2	0	4	0	1	14
Bifaces	5	2	2	2	5	0	0	16
Scrapers/drills	0	0	2	0	2	0	0	4
Cores	5	6	1	0	26	0	1	39
Ground stone/ hammerstone*	0	0	0	0	0	25	0	25
Celts	0	0	0	0	0	3	0	3
Abraders/ sandstone pipe/ polished hematite	0	0	0	0	0	9	0	9
Tool totals	15	10	7	2	37	37	2	110
Overall totals	103	75	60	25	603	45	171	1,082

Table 2. Lithic Material Classified as "Rock."

Lithic material (unmodified rock)	Totals
Basalt	11
Gabbro	8
Granite	58
Unidentified glacial till	8
Hematite	19
Limestone	398
Limonite	16
Quartz/quartzite	176
Sandstone	456
Schist	6
Secondary	19
Unidentified	20
Total	1,195

as the piece was not fractured from one margin to another, severing it into two or more parts, it was classified as a complete flake. Following Andrefsky (2005), flakes were classified as primary when the presence of cortex was > 50 percent from proximal to distal end, as secondary when it was < 50 percent, and as tertiary when no cortex remained.

Midsections and distal portions of broken flakes were considered as debitage along with blocky debris and flake shatter. Such fragmented flakes are difficult to classify and conservatively should be included in undetermined categories (Odell 2004:121). Flakes that showed retouch on one or both lateral margins were categorized as utilized flakes. It is difficult to differentiate between utilized flakes and flakes with a thin margin caused by silica dissolution due to weathering, trampling, or other post-depositional processes. Therefore, utilized flakes were categorized conservatively as well. The analysis provides an interpretive model for reduction activities represented in the lithic assemblage. Chert types are referenced in the tool and debitage analysis, but identifications of lithic raw materials are discussed in the section that follows.

Tools and Debitage

The 1971–1972 excavations recovered 14 projectile points (Table 3; Figure 2), representing a mixture of morphological types, ranging from medium to large corner-notched dart points to small triangular arrow points. Projectile point classification can be a difficult task because types defined for specific sub-regions sometimes share characteristics with types from other sub-regions. The Steuben, Lowe Flared, Bakers Creek, and Chesser Notched types are good examples of this issue. A number of archeologists (Bell 1958, 1960; Justice 1995; Perino 1968, 1971) have acknowledged that these four types are morphologically similar—if not identical. Likewise, morphological similarities across chronological units can make classifications problematic. Many Archaic points resemble Woodland ones. For instance, Late Archaic Table Rock and Middle-to-Late Woodland Lowe points, as well as Late Archaic Merom and Late Woodland Scallorn points, appear synonymous. Radiocarbon dates obtained from contexts in which points were acquired can alleviate classification problems, but this is not always possible. The issue of morphological similarities among projectile points classified under different names in disparate regions has been handled best by Justice (1995), who grouped regional morphological correlates into clusters. The description of points from the Hamon site follows Justice's method.

Two items from the 14JF350 assemblage are morphological correlates for types associated with different temporal periods: the Late Archaic Table Rock cluster and the Middle-to-Late Woodland Lowe cluster. Six (Figures 2 and 3, bottom rows) have expanding stems that vary from straight to convex with either deep, round corner notches or upward-curving corner notches. They are most comparable to Late Archaic and Woodland Snyders, Motley, Table Rock Stemmed, and Lowe cluster points. The blades are subtriangular and either straight or excurvate. One specimen (Figure 2l) that exhibits notching and pronounced shoulder barbs looks like a Snyders point (Bell 1958:88; Justice 1995:201–204); however, the neck is extremely thin in comparison to an Early-to-Middle Woodland Snyders point, and the blade is more triangular than ovate. The overall morphology corresponds well with the Late Archaic Motley cluster (Bell 1958:62; Justice 1995:198–200). Maximum length, width, and thickness measurements were compared to those made on 224 Motley points from Poverty Point, Louisiana (Justice 1995:254). The piece is within the ranges and means of the Motley point data (Table 4), although neck and base widths were not available for the stems of the Poverty Point artifacts, so those traits might reveal further correspondence or discrepancy.

Two points (Figure 2m-n), both biconvex in cross section, resemble Lowe cluster points. They exhibit upward-curving notches, excurvate blade edges, expanding stems, and straight to convex bases (Justice 1995:208–214; Perino 1968:94, 1971:6, 60). Their measurements are within the average range of other Lowe cluster points (Justice 1987:254–255; Table 4). Moreover, they are analogous to Late Archaic points, such as the Table Rock Stemmed,

Table 3. Projectile Points Classified as Morphological Correlates and by Material Type.

Projectile point correlates	Westerville/ Toronto	Plattsmouth	Winterset	Secondary	Unidentified	Totals
Motley	0	0	0	1	0	1
Lowe cluster/possibly Late Archaic	0	0	0	2	0	2
Lowe cluster/reworked Snyders	0	1	0	0	0	1
Lowe cluster	1	1	0	0	0	2
Scallorn cluster	4	0	2	1	1	8
Totals	5	2	2	4	1	14

Figure 2. Projectile points. Top row, left to right: a) c.3385, b) c.356, c) c.72.62.773, d) c.2999, e) c.2369, f) c.4086, g) c.338, h) c.72.62.772. Bottom row, left to right: i) c.1500, j) c.72.62.771, k) c.1499, l) c.3274, m) c.72.62.752, n) c.2343. c = catalog number.

Table 4. Measurements of Projectile Points from the Hamon Site Compared with Available Morphological Correlate Measurements Compiled by Justice (1995).

Point correlates	Maximum length	Maximum width	Stem width (neck)	Stem width (base)	Thickness	Sample number
Motley	R=42–120 M=68.1	R=25-46 M=34	NA	NA	R=5-8	224
Hamon	65.23	29.33	12.86	21.33	8	1
Snyders	M=69.1 SD=11.1	M=54.5 SD=4.7	M=21.4 SD=1.9	M=27.8 SD=1.9	NA	27
Hamon*	52.28	23.22	20.35	27.09	9.1	1
Lowe cluster-Lowe Flared	R=30-77 M=42	R=16-28 M=23	R=13-20 M=16	R=18-26 M=21	R=5-8 M=7	32
Lowe cluster-Steuben	M=50.9 SD=13.5	M=27.1 SD=3.6	M=16.3 SD=2.7	NA	NA	15
Lowe cluster-Baker's Creek	R=43-78 M=55	R=23-28 M=26	NA	R=21-27?	R=7-10 M=8	11
Lowe cluster-Chesser Notched	R=41-70 M=54.6	R=18-27 M=23.5	NA	NA	R=7-11 M=8.8	10
Hamon*	M=52.9 SD=8.1	M=24.4 SD=1.7	M=17.2 SD=2.9	M=21.6 SD=4.2	M=8.7 SD=1.1	5
Scallorn	R=25-45	R=15-20	NA	NA	NA	NA
Scallorn-Sequoyah	R=23-52.3	R=10-14.7	NA	R=4.9-12.1	NA	61
Hamon	M=26.5 SD=5.7	M=12.3 SD=2.8	M=5.9 SD=1.4	M=11.3 SD=1.4	M=3.5 SD=0.65	8

*One point, resembling a possible retouched Snyders or Steuben correlate, was averaged in both categories.

M = median, R = range, SD = standard deviation.

in basal-grinding and pressure-flaking techniques. One specimen (Figure 2m), missing its distal tip, has chert impurities that appear to have affected the manufacturing process. Another (Figure 2j) is akin to a Steuben point of the Lowe cluster or may be a reworked Snyders point. The stem and base widths, along with the convex base, correspond with data for other Snyders points (Justice 1995:254; Table 4). Two examples (Figure 2i and k) fit extremely well with the morphology and measurements of Lowe cluster points. They display upward-curving corner notches, expanding stems, rounded shoulders, and slightly excurvate, subtriangular blades. Overall, the five Hamon artifacts match favorably with Lowe cluster points in every measurement category (Justice 1995:254–255; Table 4).

Six specimens that correlate with Motley, Snyders, and Lowe cluster points were compared with points from Quarry Creek (14LV401), a Kansas City Hopewell site in Leavenworth County, Kansas (Logan et al. 1993). This was done for three reasons: 1) 14LV401 is located less than 30 miles east of 14JF350 in the same geological region, 2) some Hamon site points resemble Middle Woodland Hopewell correlates, and 3) the collection is curated at the University of Kansas. Several Hamon artifacts are morphologically similar to Quarry Creek points (Figure 3, top row) and were manufactured from equivalent Pennsylvanian series cherts, except for those that appear to be made from secondary source material. This includes a gray chert with abundant fossils identified as Plattsmouth or Spring Hill (Logan et al. 1993:134) and light gray varieties that look like Westerville chert. The Quarry Creek points also correlate morphologically with Snyders and Steuben types (Logan et al. 1993:135–136), supporting the classification of Hamon points and suggesting a technological relationship with terminal Middle and Early Late Woodland Kansas City Hopewell points.

The other eight points (Figure 2, top row) are correlates of the Scallorn cluster (Bell 1960:80; Justice 1995:220–222), and five of them are morphologically identical to the Sequoyah variety (Justice 1995:223–224; Perino 1968:88). These are thinner than the regular Scallorn type and have pronounced serrations on the blade edges. Two pieces (Figure 2c and g) are missing stems, but the shoulders and

Figure 3. Top row, dart points from the Quarry Creek site (14LV401), left to right: a) c.A2728-91, b) c.A2334-91, c) c.A4182-91, d) c.A1989-91, e) c.A4002-91, f) c.A4135-91. Bottom row, dart points from the Hamon site (14JF350), left to right: g) c.1500, h) c.72.62.771, i) c.1499, j) c.3274, k) c.72.62.752, l) c.2343.

extreme distal portions of the necks are present. Another (Figure 2d) is missing the extreme distal tip, and two (Figure 2e-f) are complete. The remaining three items are typical Scallorn types: the first (Figure 2a) lacks a stem, the second (Figure 2b) is missing a segment of a lateral stem edge, and the third (Figure 2h) is complete. The latter point has deep corner notches, giving it very pronounced shoulders, slightly excurvate blade edges, and a slightly convex base. It is morphologically similar to Snyders cluster points but in miniature. Despite the typological ambiguity of this specimen, the averaged measurements of all eight points are consistent with data for the Scallorn cluster (Justice 1995:255), especially the Sequoyah variety (Table 4).

Sixteen bifacial knives and preforms (Figures 4 and 5) were identified in the assemblage (Table 1). The knives are thick and biconvex in cross section (Figure 4a-c). Four fragments (c.1285, c.0-3, c.72.62.753, c.72.62.760) are not pictured here. Two may have functioned as scrapers, but their overall morphology and use are ambiguous. One of the bifacial portions may be the lateral half of a corner-notched projectile point base. One of the preforms (Figure 5e) is made from Westerville or Toronto chert, and its dimensions are comparable to the larger points in the assemblage. Another specimen (Figure 5a) is morphologically similar to the unnotched Scallorn type known as Crisp Ovate, which some consider to be a preform for the Scallorn cluster or Sequoyah variant (Justice 1995:223).

Four artifacts are drills and/or scrapers (Figure 4, bottom row). Two (Figure 4f-g) may have functioned as both. One object (Figure 4f) may have been a medium to large point that was retouched until it no longer functioned as a projectile. Two others (Figure 4d-e) are unifacially worked end scrapers.

Thirty-nine cores (Figures 6 and 7) were recovered, of which 23 represent testing cores of secondary source material. These water-worn, chert-bearing cobbles appear to have been flaked for the purpose of examining their potential quality for tool production (Figure 6). The remaining 16 pieces are blocky, bilaterally reduced cores with multiple faces that exhibit reduction. Some were reduced in overlapping directions until expended. Many raw material identifications could not be made with confidence, but the core assemblage is dominated by

Figure 4. Bifaces, scrapers, and drills. Top row, left to right: a) c.72.62.757, b) c.0-2, c) c.72.62.756. Bottom row, left to right: d) c.72.62.751, e) c.72.62.754, f) c.72.62.755, g) c.0-4, h) c.390.

Figure 5. Bifacial preforms. Left to right: a) c.1862, b) c.751, c) c.2246, d) c.72.62.758, e) c.2963.

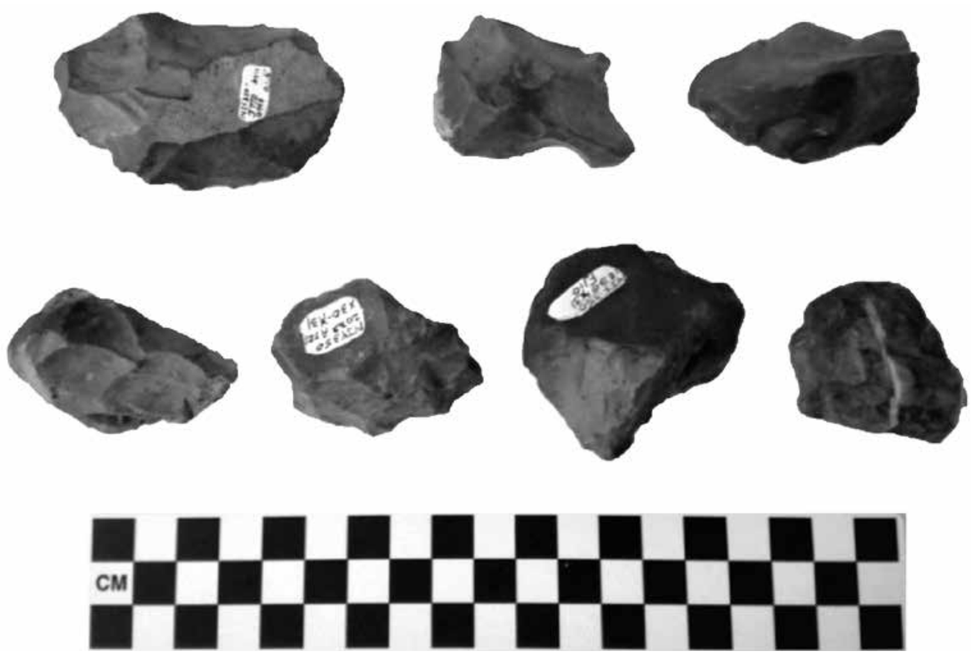

Figure 6. Secondary source material cores. Top row, left to right: a) c.3710, b) c.1750, c) c.3011. Bottom row, left to right: d) c.72.62.761, e) c.2053, f) c.1830, g) c.1513.

secondary source materials. The remaining cores were produced from primary source material, including Plattsmouth, Westerville/Toronto, and Winterset cherts (Table 1; Figure 7).

The assemblage contains debitage in the form of flakes, utilized flakes, and debris (blocky/angular debris and shatter). Flakes comprise 27.3 percent of the total debitage: 6.9 percent primary, 13.9 percent secondary, and 6.5 percent tertiary. Utilized flakes constitute another 1.6 percent, and blocky debris and shatter make up the remaining 71.1 percent (Table 5).

When the percentages of debitage categories are examined according to raw material sources, two patterns are apparent. The first arises with the secondary source, Permian, and unidentified cherts,

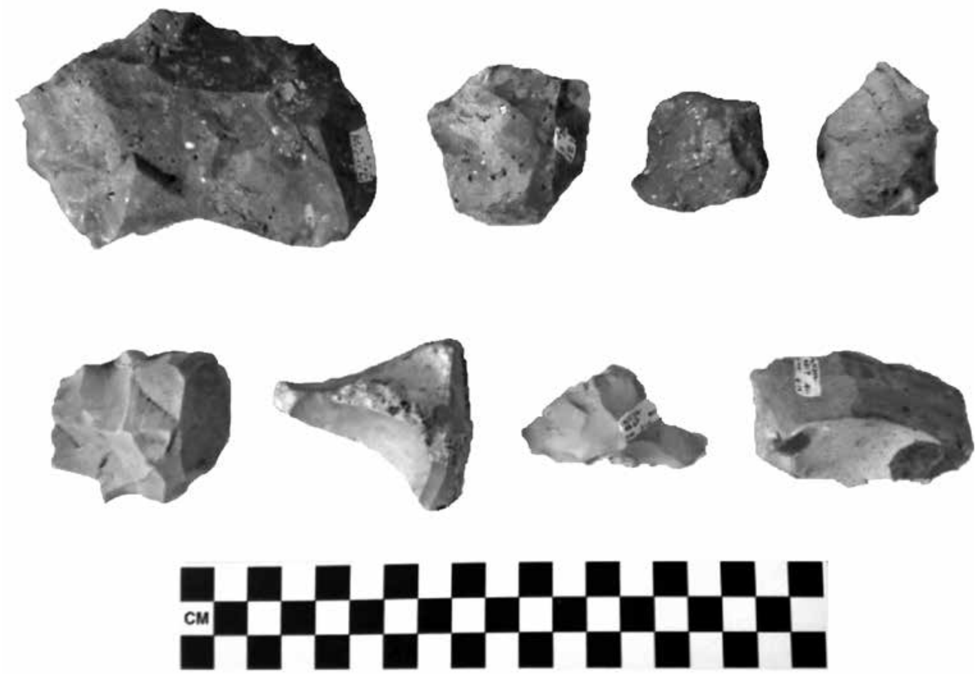

Figure 7. Primary source material cores. Top row, left to right: a) c.846, b) c.4171, c) c.3793, d) c.4250. Bottom row, left to right: e) c.2706, f) c.0-1, g) c.4263, h) c.4217.

which account for 766 artifacts, including 1 primary flake and 7 pieces of quartzite debris. Primary flakes, secondary flakes, and debitage categories compose 97.4 percent of the total for the secondary cherts, 87 percent for the Permian, and nearly 97.7 percent for the unidentified chert materials (Table 5). The low percentages of tertiary and utilized flakes support a primary lithic reduction sequence for this material. In combination with the "testing" aspect of the secondary source cores and the inferior quality of these chert-bearing cobbles, the generation of a large amount of blocky debris and shatter is consistent with primary decortication activities. The total numbers for identified Permian chert are low, but a large amount of the unidentified material and even the secondary source material might be distinguishable as Permian due to the corresponding reduction pattern. Possibly the secondary source, Permian, and unidentified material show nearly identical reduction sequences because they were used by the same person or group of people at the Hamon site. Difficulty in recognizing the secondary, Permian, and unidentified chert is a problem. This topic will be discussed further in the lithic sourcing section.

In contrast the Pennsylvanian cherts (Westerville/Toronto, Plattsmouth, Winterset) average similar percentages in primary, secondary, and tertiary flake reduction (Table 5). The pattern shows a steady

Table 5. Percentages of Debitage Categories across Material Types.

Debitage type	Westerville/ Toronto	Plattsmouth	Winterset	Permian	Secondary	Glacial till/ sedimentary/ metamorphic	Unidentified	Totals
Primary flakes	3.4	4.6	3.8	8.7	9.4	12.5	1.8	6.9
Secondary flakes	11.4	16.9	3.8	17.4	16.8	0.0	7.7	13.9
Tertiary flakes	21.6	21.5	24.5	8.7	1.9	0.0	2.4	6.5
Utilized flakes	5.7	4.6	5.7	4.3	0.7	0.0	0.0	1.6
Debitage	58.0	52.3	62.3	60.9	71.2	87.5	88.2	71.1
Totals	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

increase from primary to tertiary flakes, which are more abundant than primary and secondary flakes combined. Utilized flakes of Pennsylvanian cherts are more abundant, and debitage in the form of debris and shatter ranges from 52 to 62 percent. This data confirms a pattern of secondary reduction sequences on lithic material that had undergone primary decortication at another locale and suggests that Pennsylvanian chert bifaces, preforms, and finished tools were retouched more frequently. This pattern is not apparent in the total percentages for all material because the secondary source cherts make up 58 percent of the debitage assemblage.

Ground stone artifacts in the form of hand stones (commonly referred to as manos), hammerstones, celts, abraders, a piece of polished hematite, and a pipe (Figures 8 and 9) total 37 of the remaining lithic tools. Seventeen are broken hand stones or mullers (Table 1). No whole or partial grinding slabs (commonly referred to as metates) were recovered. Three celts, one complete (Figure 8a) and two fragmentary (Figure 8b-c), were made from a diorite that could be sourced locally. One incomplete sandstone pipe (Figure 9e) exhibits fractures on one side, which might have resulted from difficulties during manufacture. It resembles polished hematite or stone platform pipes produced by Hopewell groups during the Middle Woodland period (Figure 9e). A triangular polished hematite object (Figure 9d) is a portion of a larger artifact of undetermined type; therefore, it was categorized as an unknown tool.

Figure 8. Pecked and smoothed celts. Left to right: a) c.1577, b) c.577, c) c.72.62.765.

Typological Analysis Conclusions

The typological analysis reveals that the Hamon site yielded lithic tools and debitage that are diverse in form, function, and raw material. They are an array of dart points, arrow points, knives, scrapers, drills, cores, and hand stones. Ground stone items and celts, used in material processing and/or ceremonial (burial) activities, are represented. The presence of scrapers and drills support the inference of animal processing; however, faunal remains were not found, casting doubt on this idea. Alternatively, the site may have incorporated a workshop for making these tools or the implements served functions other than processing animal carcasses. The workshop hypothesis is substantiated by the primary and secondary lithic reduction patterns and the presence of ground stones, abraders, hand stones, and an unfinished sandstone pipe. Clearly the occupants needed an assortment of lithic tools for a variety of tasks, including hunting and butchering of animals, processing plants, and making additional tools, which are characteristic of the hunter-gatherer lifestyle during the Woodland Period.

Lithic Raw Material Identification and Sourcing Analysis

Lithic raw materials can be sourced from primary and secondary contexts. Cherts, silicified sediments, and quartzites that occur in or in the immediate vicinity of bedrock outcrops are considered primary sources. Chert-bearing river gravels, such as pebbles, cobbles, boulders, and till, that do not occur naturally in the geographic regions in which they are deposited, are considered secondary sources (Morrow 1994:109; Reid 1980:121). They commonly are deposited along the banks of rivers and their tributary systems and in till sediments. Identifying secondary chert sources is challenging, and in most cases not much can be said about them except that they are secondary gravel sources. Diagnostic traits include pebble to cobble in size, round to ovoid in shape, cortexes that are tan to dark brown in color and water polished, and internal slick sheens created by water erosion.

Ambiguity exists in identifying certain lithic raw materials, especially when the compositions of materials from divergent geographic expanses

Figure 9. Ground stone specimens. Top row, left to right: a) hand stone c.2342 & c.3834 & c.1712 refit, b) hand stone c.72.62.769, c) hand stone c.540. Bottom row, left to right: d) polished hematite fragment c.72.62.774, e) sandstone pipe c.72.62.767, f) sandstone abrader c.212.

resemble one another. This problem also hinders attempts to measure how far raw materials were transported. Ultimately, it obscures whether people were highly mobile and obtained stone themselves or acquired it through trade. For the Hamon site lithic assemblage, this difficulty was confronted when endeavoring to differentiate Smoky Hill jasper and Permian cherts from secondary source jaspers and cherts and to isolate Westerville chert from Toronto and certain varieties of Burlington cherts. Plattsmouth and Winterset varieties of Pennsylvanian chert can be distinguished by visual attributes more confidently. The presence of all the above-mentioned raw material types in the 14JF350 assemblage reveals that local and non-local materials were used by occupants, which is indicative of long-distance mobility or medium-distance mobility and trade with other Late Woodland groups. In combination with the varied reduction patterns among the materials, the sourcing analysis reveals that Hamon site inhabitants traded with other Late Plains Woodland people or that diverse raw materials were introduced into the site by multiple groups at separate times.

Macroscopic and microscopic traits of the raw material compositions in the lithic assemblage were cross referenced with KUMA-LCC materials for identification. Ultraviolet fluorescence was attempted, but only a few items reacted in areas that might contain residues from either prehistoric or recent actions (e.g., lab cleaning procedures). The microscopic analysis was conducted with total magnifications up to 430x. As previously explained, the comparison of macroscopic and simple microscope magnification of artifacts with cross-referenced material is not the optimal method for performing lithic raw material identifications because specimens from different geological contexts have compositions that are visually similar to one another. Comparative collections are inherently biased in chert quality and locations from which they were acquired as well. Under these circumstances, comparative samples do not represent the full range of varieties for any given lithic source. Therefore, this analysis adopted the concept of confidence levels, introduced in a similar study of lithic raw materials from the DB site (14LV1071) in Leavenworth County (McLean 1998).

Kansas Geological Systems

The geological systems of Kansas are described below from oldest to youngest. The Archean-Proterozoic system (Precambrian) is composed of igneous, metamorphic, and metasedimentary rocks that underlie the entire state. The most common igneous rock is granite, while quartzite and schist are the most common metamorphic rocks (Goebel 1968a). Around 542 million years ago (mya), the Cambrian-Ordovician system, comprised of a marine sedimentary sequence of arkose sandstone beds, overlain by dolomite beds, was deposited over the Archean-Proterozoic system (Goebel 1968b, 1968c). Overlying the Cambrian system, the Silurian-Devonian system (444 mya), restricted to northeastern and north-central Kansas (Goebel 1968d), incorporates beds of dolomite and limestone. Lee (1943) noted that outcrops of "coarsely crystalline dolomite," attributed to this system, occur northwest of Jefferson County.

The Carboniferous system overlies the Silurian-Devonian system and encompasses the Mississippian (359 mya) and Pennsylvanian subsystems (318 mya) (Kansas Geological Survey 2014). The Pennsylvanian subsystem outcrops in the eastern one-sixth of the state. The Mississippian subsystem outcrops only in extreme southeastern Kansas. The Pennsylvanian system is composed of alternating limestone and shale that contain chert layers in the Missourian and overlying Virgilian stages (Logan 1988:323; Reid 1980:121; Stein 2006:268). Winterset, Westerville, Argentine, Spring Hill, Toronto, and Plattsmouth cherts are found in the Pennsylvanian limestone. Winterset, Westerville, and Argentine cherts are present in what is labeled the Kansas City group limestones (Logan 1988:323; McLean 1998:177–180; Stein 2006:269), and Spring Hill chert is part of the Lansing group (Logan 1988:324; McLean 1998:181). Toronto and Plattsmouth cherts occur in the Shawnee group of the Virgilian stage (Logan 1988:324; McLean 1998:172–176).

The Permian system (299 mya) overlies the Pennsylvanian subsystem and holds chert-bearing limestones of the Herington, Cresswell, Florence, and Wreford members of the Chase group from the Gearyan stage of the lower Permian system (Blasing 1984:1; Haury 1984:89). These limestone members outcrop in the western half of the eastern third of the state. Herrington, Florence A-D, Wreford A-C, and Foraker cherts are varieties that outcrop in parts of the Flint Hills physiographic region (Blasing 1984; Haury 1984).

The Jurassic system (199 mya) is located in the subsurface of northwestern Kansas, and its various shales and red sandstone outcrop only in a small portion of Morton County in the extreme southwest (O'Connor 1968). The Cretaceous system (145 mya) overlies the Jurassic and Permian systems and outcrops in central, north-central, and western regions of the state (Kansas Geological Survey 2014). Sandstone, shale, limestone, and chalk constitute the system (Holen 1989:4; Stein 2006:275). Within the Smoky Hill chalk member of the Niobrara formation are outcrops of silicified chalk, known as Smoky Hill jasper (Holen 1989:3). Native Americans used it for stone tool production as they did Pennsylvanian and Permian cherts. Hematite and limonite deposits occur in Dakota sandstone outcrops. Hematite can be ground into pigment, and denser forms commonly were selected for pipe production (Stein 2006:276–277).

The Neogene system or Tertiary (23 mya) consists of the Ogallala formation in the northwestern portion of the state (Kansas Geological Survey 2014) and contains outcrops of silt, caliche, clay, sand and quartzite (Stein 2006:278). The Quaternary system (2.6 mya) is composed of loess and river valley deposits, sand dunes, and glacial drift deposits (Kansas Geological Survey 2014). Sioux quartzite, granite, basalt, ferric oxides (hematite, limonite, etc.), and diorite are plentiful among the glacial till deposits in the northeastern part of the state (McLean 1998:176; Stein 2006:278). The glacial drift deposits are remnants of the last glacial maximum that extended into northeastern Kansas. Clay, silt, sand, and gravel were deposited in and along stream channels as recently as the early Holocene (Stein 2006:278). Loess deposits exist in the south-central, western, and extreme northeastern regions of the state. Sand dunes are confined primarily to the south-central and southwestern portions of the state (Kansas Geological Survey 2014).

Within the geologic outcrops of the Pennsylvanian, Permian, Cretaceous, and glacial tills of the Quaternary system, chert, silicified chalk, quartzite, granite, sandstone, limestone, metamorphic rocks, and hematite outcrop or were deposited as till. All of these sources were used by cultural groups in the past. Mississippian system outcrops incorporate certain cherts, such as Burlington and Keokuk. As this system outcrops only in extreme southeastern Kansas, Mississippian cherts in Kansas archeological assemblages either originated there or from sources located in Missouri or Iowa.

Jefferson County Geology

The Hamon site is situated in Jefferson County where geological outcrops of the Pennsylvanian system and glacial drift deposits of the Quaternary system occur. The northeastern and east-central portions of Jefferson County are composed of glacial drift from the Neocene system. Glacial drift sediments are sporadic in the western part of the county as well. A large segment of southeastern Jefferson County contains sediments of the Pennsylvanian system. Outcrops of Shawnee and Wabaunsee group limestones, shales, and sandstones are located throughout the county. Quaternary deposits of alluvium, loess, and lacustrine clay from the late Pleistocene and early Holocene are present around the Delaware River and its tributaries (Kansas Geological Survey 2014).

County-level geology indicates that Plattsmouth and Toronto chert could be gathered locally from Shawnee group outcrops in the northeastern and southeastern portions of the county. Plattsmouth and Toronto cherts in both primary and secondary contexts have been recorded in the Stranger Creek drainage, located in western Leavenworth County, which shares a border with eastern Jefferson County (Logan 1988:326, 2008:30; Logan et al. 2007:49). Sioux quartzite, granite, basalt, and greenstone (diorite) could be sourced locally in glacial till deposits. Kansas City and Lansing group cherts (Winterset, Westerville, Argentine, and Spring Hill) are absent from Jefferson County, although outcrops are present in Leavenworth County. Likewise, Permian system outcrops are lacking. However, Jackson and Shawnee counties, which border Jefferson County on the west, do hold Permian-age sediments that potentially contain Foraker and other Permian cherts. They could be intermingled among secondary sources within drainages in these counties (Kansas Geological Survey 2014). Permian chert varieties, known as Florence and Wreford, occur in outcrops farther to the west.

Description of Chert Varieties in the Hamon Site Assemblage

Pennsylvanian, Permian, and other chert types can be identified by specific fossil inclusions and mottling patterns (considered diagnostic), color, grain texture, luster, and translucency (Morrow 1994:110). The following descriptions are not intended as a comprehensive list of all Kansas chert varieties but are limited to the types in the Hamon site assemblage. A total of 1,081 stone tools and debitage from the typological analysis were incorporated. The piece of polished hematite, categorized in the glacial till, metamorphic, and sedimentary materials category (Table 1), could not be assigned confidently to one source category and was omitted from this part of the study.

Pennsylvanian: Shawnee Group Cherts

Plattsmouth chert has a broad and faintly mottled matrix with colors that vary from light gray to medium dark gray or brown (McLean 1998:173; Morrow 1994:127). Medium-sized fusulinids are predominant fossils. They appear as distinct spirals or coiled inclusions and are common in other Pennsylvanian and Permian cherts (Morrow 1994:127). They are typically off-white to light gray and brown and noticeably lighter in contrast to the surrounding chert matrix. Textures are medium to fine, and lusters range from dull to satiny (McLean 1998:173; Morrow 1994:127).

The lithic assemblage has 75 artifacts that match the KUMA-LCC's Plattsmouth specimens #725 and #747 in matrix color, mottling, and fusulinid presence. Two are projectile points, and the rest are bifaces, cores, and reduction debris. All specimens are gray to brownish.

Pennsylvanian: Kansas City Group Cherts

Winterset chert has eight varieties, though only two varieties were available for comparison in the KUMA-LCC. Types one and two have been described extensively (Logan 1988; McLean 1998; Morrow 1994). Type one is light gray, dark gray, tan, or pale brown and has veins of calcite. Thin layers or bands are often present, with colors ranging from gray to brown (Logan 1988:324; McLean 1998:179; Morrow 1994:126; Reid 1980:123; Stein 2006:269). Type two is tan to light gray and can exhibit mottles and faint banding (McLean 1998:179). Some varieties of Winterset chert contain small fossil fragments, including fusulinids and branching bryozoans (Morrow 1994:126). Type two can exhibit characteristics similar to Toronto chert, especially when the banding is very faint.

The lithic assemblage has 60 artifacts that match the KUMA-LCC's Winterset specimens #732 and

#761 in matrix color and banding. Specimen #761 displays attributes described for type one, and #732 compares well with type two. Some of the pieces resemble Toronto chert in color, especially when banding layers are too faint to detect macroscopically but fit well with the Winterset samples when observed microscopically.

Pennsylvanian: Shawnee and Kansas City Group Dilemma

Toronto chert of the Oread limestone formation (Shawnee Group) and Westerville chert of the Cherryvale shale formation (Kansas City Group) have been described as nearly impossible to distinguish from one another (Logan 1988:324). This problem was encountered with the Hamon site lithic material. McLean (1998:175–176) was able to differentiate Toronto chert from Westerville Type A even though microscopic observation reveals strong resemblances. The Westerville specimens were fine grained with calcite inclusions, while the Toronto ones were coarse grained and lacked inclusions. However, the Toronto chert was of poor quality, and McLean (1998:176) recommended that this identification should be checked with better quality specimens.

The Toronto and Westerville examples in the KUMA-LCC are representative of a minority of the variations that these cherts exhibit. None of the Toronto specimens conformed to descriptions of a white to yellowish brown matrix (see Toronto descriptions below). A majority consist of much more cortex than chert. The KUMA curated collections include lithics from excavations at the Nebo Hill site (23CL11), and a majority of those cores, debitage, and points were made from Westerville chert. These were used for comparison with the 14JF350 assemblage to a higher degree of satisfaction. The task of obtaining better samples for the KUMA-LCC should be undertaken.

Toronto chert is characterized as having a matrix that is buff-tan, white to yellowish brown, or pale brown. The texture is fine to medium grained, homogeneous, and fossil free (Logan 1988:324; McLean 1998:175). Only the buff-tan variety is represented in the KUMA-LCC.

Westerville chert is described as pale brown, yellowish brown, or light gray, which can appear homogeneous or in faint banded layers, and lacks fusulinid fossil inclusions (Logan 1988:324; McLean 1998:178–179; Stein 2006:269). McLean noted that two types of Westerville are distinct. Type A is buff-tan, homogeneous, and lacks fusulinid inclusions. Type B is grayer, exhibits mottling, and has more visible fossil inclusions. As previously mentioned, Type A can be hard to differentiate from Toronto chert. Furthermore, both types of Westerville may be indistinguishable from Toronto macroscopically and microscopically. This raises the concern that white-gray Toronto varieties may be unrecognizable from the similarly colored Westerville B variety.

The Hamon site lithic assemblage has 103 artifacts that correspond to descriptions of both Toronto and Westerville chert varieties (Table 1). This material was identified for 15 points, bifaces, and cores, and 88 pieces of debitage. The possibility that some of the specimens could have been manufactured from Burlington chert was explored, but microscopic traits did not match KUMA-LCC samples. In addition, the weathered surfaces (cortex) on numerous items hindered observations of the chert matrix. Without removing the weathered surfaces, thus destroying the artifacts, it is not possible to tell whether Burlington chert is present in or absent from the assemblage.

Permian: Florence Cherts

Four varieties of Florence chert have been identified in Permian-age sediments. Florence A is described as buff, yellow-gray, tan, or brown (Blasing 1984:11; Haury 1984:93). It often contains fusulinids and banding patterns that resemble fingerprints and woodgrain (Haury 1984:93; Stein 2006:271). Florence B is dark gray and blue-gray (steel), exhibits mottling, and fossil inclusions, such as crinoids, fusulinids, and echinoids (Blasing 1984:11; Haury 1984:93; Stein 2006:271). Florence C is light gray, homogeneous, and incorporates very small fossil inclusions that give it a speckled appearance (Blasing 1984:11; Haury 1984:94; Stein 2006:271). Florence D is gray to buff and displays darker bands of slightly more translucent material (Blasing 1984:11; Stein 2006:272).

Eighteen artifacts in the Hamon assemblage match the matrix colors and mottling patterns of the of the KUMA-LCC's Florence B specimens #795 and #796. Five have the same matrix color and slightly translucent dark bands as Florence D specimen #630. Two bifaces coincide with unidentified Permian specimen #829 in matrix coloring, slight banding, and mottling. The specific Florence variety cannot be named at this time, as that KUMA-LCC sample is not identified. All of the 14JF350 items fit the KUMA-LCC examples macroscopically and microscopically.

Mississippian

McLean (1998:186) described two varieties of Burlington chert. The first type exhibits a mottled white matrix or a light gray matrix that may or may not display mottling (McLean 1998:186). The texture is medium to medium-fine with a dull luster. Crinoid columns and fenestrate bryozoan fossil inclusions are common (McLean 1998:186; Morrow 1994:123). The second type contains a higher density of fossil inclusions and has a light gray to cream or tan matrix. The texture is medium-coarse to medium and has a dull luster (McLean 1998:186). Positive Burlington chert identifications could not be made for Hamon site artifacts due to the aforementioned concern that some Toronto and Westerville specimens exhibit Burlington chert characteristics, such as color and mottling. Other pieces have weathered surfaces that conceal the chert matrix, which means the absence of Burlington chert from the Hamon assemblage cannot be inferred.

Cretaceous

Smoky Hill jasper is depicted as having various colors: tan, yellow, and brown, which are common, and white, purple, and green, which are rare (Holen 1989:6). Black streaks, patches, or specks may occur (Stein 2006:275). Concentric banding of colors is occasionally present as well. It is usually opaque but may be translucent (Stein 2006:275).

One scraper from the Hamon assemblage corresponds with the KUMA-LCC's Smoky Hill jasper specimen #802 in yellow matrix color, black specks, and grain texture. Several other artifacts resemble Smoky Hill jasper but are not exactly like the sample under microscopic magnification, and the collection's Smoky Hill jasper material does not represent the diversity described above for adequate comparative analyses. The resemblance to other secondary source materials, which includes jasper, confounds the problem of identifying the Hamon specimens as Smoky Hill jasper.

Quaternary

The diorite (greenstone) celts, hand stones, and ground stones made from quartzite and glacial till (basalt and granite) materials can be sourced from local Quaternary deposits. In fact, all of these materials can be found in any part of the Delaware River and its drainage system in Jefferson County. The KUMA-LCC does not contain glacial till for comparison, but these raw material types are easily identifiable.

Secondary and Unknown Source Material

A total of 603 artifacts in the Hamon site assemblage have secondary source traits of chert-bearing river tills and gravels. These exhibit overall rounded shapes or rounded corners and water-worn polished cortexes. Their chert-bearing interiors feature slick sheens of silica that accumulates from constant water flow. Cortexes are light brown to olive and light to dark gray. A total of 141 specimens show characteristics of extreme heat treatment, including debitage from lithic reduction sequences and larger cobbles that may have been heated in hearth settings.

While several points and bifaces were crafted from chert-bearing river tills and gravels, an abundant amount of the secondary material is in the form of primary and secondary flakes and blocky debris/shatter. Many of these have variable planes that are blocky with numerous undulating ridges and alternating angles insufficient for manufacturing stone tools. A small minority show compact uniformity and are useful tool stone sources. All evidence indicates that people brought these materials into the Hamon site and struck them once or twice with a hand stone to evaluate their potential for tool production. The blocky debris, core fragments, and flakes display attributes that reveal the difficulty in reducing this material. Signs of poor fracturing potential include abrupt hinge and step terminations, and flake scar surfaces that are blocky and undulating due to impurities of the matrix. However, plenty of the specimens have a smooth high quality matrix from which tools could be produced, justifying efforts to collect and test them.

Attempts to match these artifacts with the KUMA-LCC samples failed. Where water-worn cortexes (smooth and cobble-like) had been removed, interior matrices resemble an assortment of identified cherts and jaspers from many geological systems. Some specimens exhibit matrix colors and mottles that look like Permian chert varieties. Others display colors and textures remarkably similar to Smoky Hill jasper. Yet others feature colors and contain veins of calcite characteristic of some Pennsylvanian chert varieties. If water-worn cortexes with tan to brown colors and interior matrices with slick sheens were absent, they easily could be mistaken for Pennsylvanian or Permian cherts and even Smoky Hill jasper. Without conducting more complex elemental composition analyses, these secondary sources cannot be confidently assigned to any other category.

Sourcing Analysis Discussion

Hamon site occupants practiced a high level of local lithic sourcing strategies. This inference is reinforced by two variables. The first is the abundance of secondary raw materials in the form of river and gravel till cobbles found in the banks of the Delaware River and its tributaries. These river gravel cherts and jaspers account for 56 percent of the assemblage. The remaining 44 percent is made up of Pennsylvanian, Permian, glacial till, metamorphic, sedimentary, and unidentified primary sourced materials (Figure 10). Whether primarily reduced to test their suitability for tool production or used in other activities (e.g., hearth lining, cooking), locally retrievable secondary sources of lithics were abundant at the site.

The second variable is apparent when the secondary source and unidentified materials are set aside. The remaining lithics from primary source materials continue to corroborate a high level of local resourcing strategies. Percentages of chert varieties by geologic systems are shown in Figure 11: 78 percent Pennsylvanian, 8 percent Permian, 6 percent glacial till, 5 percent metamorphic, and 3 percent sedimentary. The ambiguous Westerville and Toronto cherts make up 34 percent of the Pennsylvanian material, and the rest is identified as 24 percent Plattsmouth and 20 percent Winterset (Figure 12). However, the Westerville-Toronto problem must be considered in the interpretation of this data. Compounding Westerville and Winterset numbers possibly suggests more non-local chert utilization at 14JF350. The remaining materials are composed of glacial till granites/basalts, quartzites (both glacial till and secondary sourced), and sandstone. This data, combined with the geologic setting of Jefferson County and adjacent glaciated region, reveals that local Shawnee group cherts and glacial till resources were being used at a high frequency by Hamon site residents. The smaller quantity of Permian raw materials further substantiates the focus on local resources. The possibility that Burlington chert is in the assemblage would diminish the overall total of Pennsylvanian chert, although its percentage would still remain the highest among this raw material resource group.

This analysis used the adopted confidence scale

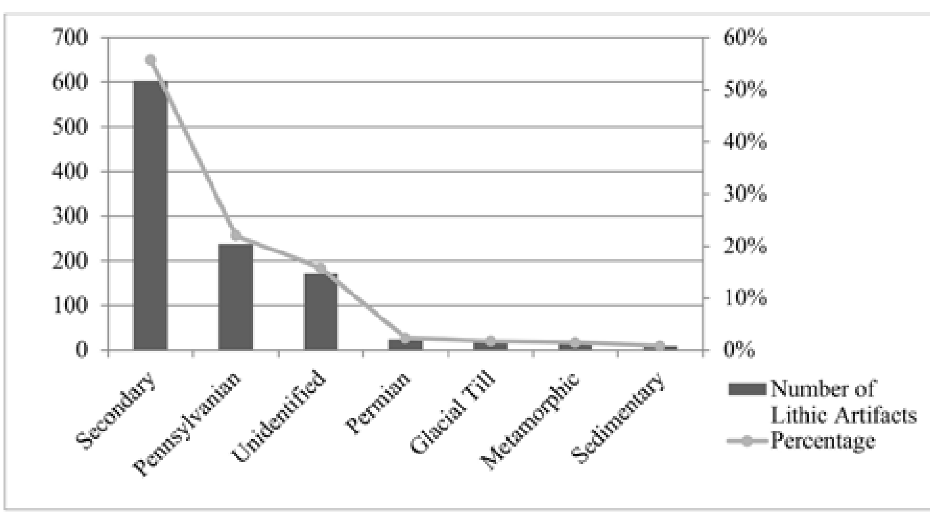

Figure 10. Total primary, secondary, and unidentified raw material sources in the lithic assemblage.

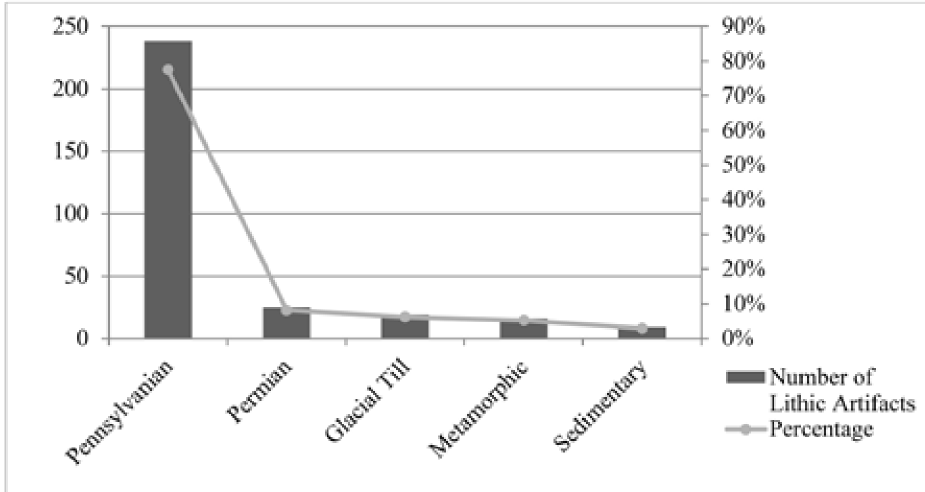

Figure 11. Total primary raw material sources in the lithic assemblage.

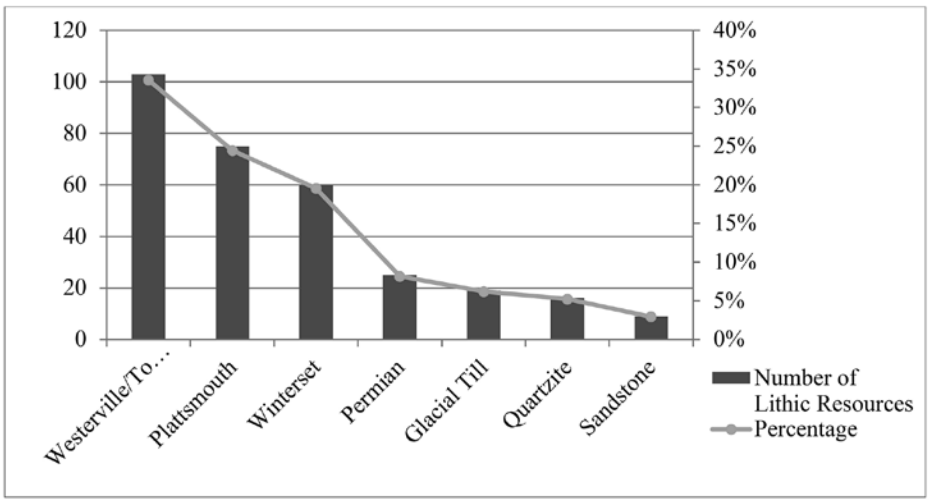

Figure 12. Specific varieties of primary raw material sources in the lithic assemblage.

introduced by McLean (1998). The strength of this method is that it makes the complex nature of distinguishing chert resources, based solely on macroscopic and microscopic attributes, more transparent and reliant on fewer assumptions. Conducting more intense scientific analysis on large collections of chert material would be nearly impossible without investing incredible amounts of time and money. The confidence scale follows McLean's methods, modified with three categories of identification confidence: positive, probable, and indeterminate. Positive confidence characterizes specimens that show a strong affiliation with one chert type. Probable confidence characterizes specimens exhibiting affinities with two chert types but favoring one type over the other. Indeterminate confidence characterizes specimens showing affinities with two or more chert types and no differential leaning toward one over the others.

Westerville, Toronto, and Permian cherts rated the lowest percentages of positive confidence levels, while Plattsmouth and secondary sources ranked the highest (Table 6). This reflects the general ease with which macroscopic attributes of Plattsmouth chert and the rounded water-worn cortexes of secondary sources can be identified in contrast to the difficulties that arise with other varieties of Pennsylvanian and Permian cherts. The tools and debitage of glacial till, metamorphic, and sedimentary materials had 100 percent positive confidence levels, as these

Table 6. Total Counts of Identified Lithic Source Materials with Associated Confidence Levels and Percentages (adapted from McLean 1998).

Confidence level	Westerville/ Toronto	Plattsmouth	Winterset	Permian	Secondary	Totals
Positive	25	40	24	1	484	574
Positive %	24.27	53.33	40.00	4.00	80.27	66.28
Probable	41	23	15	16	112	207
Probable %	39.81	30.67	25.00	64.00	18.57	23.90
Indeterminate	37	12	21	8	7	85
Indeterminate %	35.92	16.00	35.00	32.00	1.16	9.82
Total counts	103	75	60	25	603	866

are not chert-bearing rocks. To avoid skewing the data, those artifacts were omitted from the overall counts and percentages for the confidence levels (Table 6).

The lithic raw material analysis demonstrates that most primary and secondary source materials are local and non-local (some of the Pennsylvanian and Permian cherts) but not from long-distance locations. Hamon site occupants exploited local Pennsylvanian and river gravel bar cobbles at a higher rate than non-local Pennsylvanian, Permian, Cretaceous, and Mississippian sources. This suggests that they had an intimate knowledge of the local environment in the previously glaciated region of present-day Kansas, Nebraska, Iowa, and Missouri. The presence of more non-local Permian (Florence) and Pennsylvanian (Winterset and Westerville) cherts reveals that they also used non-local materials. The ambiguous presence of Burlington cherts and Smoky Hill jasper adds the possibility of long-distance raw material procurement and may signal trade with other groups or different inhabitants of the site through time.

Lithic Analysis Conclusions

The typological and raw material analyses of the Hamon site lithic assemblage reveal diversity in both aspects. The occupation of 14JF350 by more than one group through time could be responsible for this diversity. The points vary in size from small to medium-large, indicative of dart, knife, and arrow functions. Some points resemble Late Archaic forms, while others are similar to Middle Woodland types. The smaller points are regarded as a later technological form associated with the introduction of bow and arrow. However, point typologies are not clear indicators of time or cultural affiliation. Throughout the Woodland period or any past chronological designation unit for archeological components, projectile points share morphological traits over vast regions of the continent. The smaller points, considered to be used with the bow and arrow, do not make a definitive chronological appearance; when they do appear, they are usually in contexts with the medium-to-large dart points or knives judged to be an older technology. However, the Scallorn and Sequoyah varieties more commonly are found at sites dating later in the Woodland period. They are abundant at major sites that rose at the end of the first millennium A.D. and flourished over the next several centuries of the second millennium A.D., including Spiro in Oklahoma and Cahokia in Illinois. The Late Archaic and Early-to-Middle Woodland points of the Motley, Table Rock, Snyders, and Lowe clusters are plentiful at earlier sites, such as Poverty Point in Louisiana and multiple Hopewell sites in Ohio, Illinois, and Kansas City. The mixture of these types, manufactured from various raw materials, may reflect lithic tools used by different Plains Woodland groups over time at 14JF350.

The variety of stone tools in the Hamon assemblage designed to cut, grind, and create other tools, like points, suggests that a lithic production workshop was present at the site. This conclusion is reinforced by the lack of evidence that these tools were used in animal processing. No faunal remains of account were recovered. Very small amounts of animal bone were retrieved but none from mammals of medium to large size. While preservation might be a factor, human bone was recovered.

Two distinct reduction sequences among varying chert materials support the interpretation of at least two activities associated with production workshops at separate times. One group of Hamon site occupants might have relied on primary sources of Plattsmouth and Toronto cherts, yet also engaged in primary reduction of local secondary sources. Possibly this group or another population might have traded with other people and/or migrated from regions where Westerville, Winterset, Permian, Burlington, and Smoky Hill jasper materials were more abundant or preferred. Primary reduction of these materials might have taken place at another location and then blanks fashioned into finished tools at the Hamon site. Overall, the tools and debitage from production activities suggest that different tasks with various raw materials occurred as the result of different groups inhabiting the site through time. These may have been local kinship descendants whose material use, technology, and contact with other people evolved over time or the occupation of a migrant population subsequent to a local one. Discussion of potential multiple occupations will be revisited in the ceramic, spatial, and chronology sections.

Finally, the lithic artifacts reveal that Hamon site residents practiced a semi-sedentary hunter-gatherer subsistence strategy. Their tools are those identified with the hunting and processing of animals. The ground stones and celts indicate the processing of materials other than animals, including grains, seeds, and nuts for subsistence, and wood for construction of structures and possibly other technologies that do not survive in the archeological record. The celts may have functioned as axes for woodworking, but they may have been ceremonial grave goods. The sandstone pipe provides evidence of social interaction beyond that associated with subsistence needs, and it could relate to social bonding, relaxation, or other ritual-ceremonial events. The presence of tools, not connected to their usual functions, raises questions about economic pursuits. Were they manufactured to be used elsewhere or traded with other groups? Or did they enter the site in contexts of other activities? These questions will be addressed in the spatial analysis and chronology section.

CERAMIC ASSEMBLAGE

As with most Eastern and Plains Woodland period ceramic assemblages, vessels recovered from the Hamon site exhibit variations in tempering materials, formal morphologies, vessel size, and surface treatments. Pottery sherds display qualitative and quantitative attributes that can be measured and recorded, including sherd type (base, body, shoulder, neck, rim), sherd thickness, temper material, weight, surface treatment, decoration, lip form, rim form, vessel form, vessel size, and vessel diameter (Rice 1987; Shepard 1956). Grasshopper Falls phase pottery is described as having smooth, cordmarked, and brushed surface treatments—all of which are in the Hamon ceramic assemblage. Exterior sherd surfaces also feature curvilinear, parallel, and v-shaped trailed-line decorations, trailed-over cordmarkings, and orange-red to brown paint/wash/slip treatments. The colored pigments were applied as a general wash on exterior vessel surfaces and sometimes as paint in zones. Surface treatment deterioration often complicated discerning paint applications from washes or slips.

In conjunction with variations of vessel thickness and rim and shoulder forms, the above-noted differences support either ceramic change over time or multiple ceramic wares/types being present contemporaneously at the Hamon site. Regardless of whether one local population produced the ceramic vessels over time or if multiple groups were interacting in the area at the same time, the ceramic variations indicate that the site could have been occupied multiple times during the Late Woodland period. To address this, the 14JF350 ceramic assemblage and Grasshopper Falls Phase ware must be compared to defined pottery wares/types assigned to other Plains Woodland cultural taxonomic units.

Middle and Late Woodland Pottery in the Central Plains Region

The first descriptions and ware/type definitions of Plains Woodland period pottery focused on surface treatments and vessel form attributes. Some of the earliest ceramic types were labeled with the name applied to the cultural designation units with which they were associated, including Valley, Kansas City Hopewell, Loseke Creek, and Sterns Creek (Hill and Kivett 1940; Sterns 1915; Strong 1935; Wedel 1938). Over the course of the twentieth century, archeologists found additional Plains Woodland components, defined them as new taxonomic units, and continued the practice of applying corresponding labels to the taxonomic units and the pottery associated with them. Vessels exhibiting two different surface treatments, such as cord roughening and cord impressions, were identified as variants of the same ware.

Middle Woodland (A.D. 0–500) Valley Cord-Roughened vessels are described as thick walled, with straight to slightly flaring rims, straight necks, weakly curved shoulders, relatively straight-walled bodies, and conical to sub-conical bases. Vessels have been characterized as having a general "bag" shape. Exterior surfaces are cordmarked with vertical to oblique impressions, and simple trailed lines, geometric trailed lines, incised lines, or cordmarked designs also may be present. Rims are mostly plain or may have exterior-protruding bosses, punctate impressions, or tool impressions across flat or rounded lips. Surface colors range from tan to black. Sand and crushed rock, ordinarily called grit, are the most common tempering materials added to Valley vessel pastes (Benn and Green 2000:433–434; Hill and Kivett 1940:173–181; Kivett and Metcalf 1997:151; Ludwickson and Bozell 1994:111).

Middle Woodland Kansas City Hopewell pottery, named for decorations that appeared similar to decorations on Havana Hopewell pottery in Illinois, were first described by Wedel (1938). Decorations are considered the most diagnostic trait for Hopewell ceramic wares/types across eastern North America. Many times decorations were applied to specific portions or zones of a vessel. The best known example is the crosshatched incised rim. Bodies often were impressed with tools that created dentate, punctate, and dentate rocker-stamped patterns, which frequently were bordered by incised lines. This combination of zoned decorations with borders sometimes was repeated around a vessel body to create scrolling geometric patterns and iconic depictions of animals like birds. Temper materials added to Kansas City Hopewell vessels include sand and crushed granitic rocks with natural inclusions of pyrite and mica. Vessel colors range from tan, buff, orange, and gray to black. The original descriptions of Kansas City Hopewell pottery were accompanied by accounts of another ceramic ware, said to be identical to Valley Cord-Roughened vessels from Nebraska and found alongside Kansas City Hopewell pottery at the Renner site (23PL1) (Wedel 1938:101–102, 1959:554, 1974:90). Over time, additional Kansas City Hopewell researchers began to report another ceramic type with less elaborate decorations, smooth surfaces, and crenulated (tool-impressed) rims as well (Johnson 2001:161; Logan 2006:80; Wedel 1974:89).

During the Late Woodland period around A.D. 600–800, and perhaps earlier, new techniques in ceramic technology were introduced. Vessels with thick and rather straight-walled shoulders and necks were replaced by thinner vessels with more pronounced shoulders and constricted necks. Bodies became more sub-globular in contrast to the relatively straight-walled bodies of Valley Cord-Roughened vessels. Bases tended to retain sub-conical shapes. Two of the earliest defined wares in the Central Plains were Sterns Creek and Loseke Creek. Sterns Creek ware was described by Sterns (1915) and Strong (1935) initially. Since then, other researchers have expounded on the description of thin-walled, sub-globular vessels with constricted necks and straight to slightly out-curved or flaring rims. The exterior surfaces typically are cordmarked, paddle stamped, or smoothed over. A straw-roughened or brushed treatment has been noted as well. Rims and lips are plain or tool impressed. Tool impressions on the lip produce a scalloped appearance. Sterns Creek ware is predominantly tempered with crushed rock (Strong 1935; Tiffany 1971, 1977:41–50; Wedel 1959:549). Geographically, the Sterns Creek core area is southeastern Nebraska, but components have been identified in Iowa, Missouri, and northeastern Kansas (Keehner and Adair 2019).

Loseke Creek ware has been described as a thinner and smaller Late Plains Woodland survival of Valley ware (Kivett and Metcalf 1997:151–152; Ludwickson and Bozell 1994:119). Valley ware traits seen in Loseke Creek ware include cordmarked surface treatments, flat lips, and bosses or punctations on the upper rim just below the lip. Temper is crushed rock and sand (Wedel 1959:550). At least five types have been designated for Loseke Creek ware: Feye Cord-Impressed, Feye Cord-Roughened, Scalp and Ellis Cord-Impressed, and Missouri Bluffs Cord-Impressed (Benn 1982; Benn and Green 2000; Hurt 1952; Keyes 1949; Kivett 1952). All of the cord-impressed varieties exhibit similar decorations in tripartite zones with single cord-impressed horizontal and vertical lines and either triangular, zig-zag, or chevron motifs on necks and rims. The Feye Cord-Roughened variety lacks this decoration but displays vertical cordmarking on the body, shoulder, neck, and rim. Sometimes the cordmarking is partially smoothed over (Benn 1982; Benn and Green 2000; Kivett 1952).

In the Willey and Phillips (2001) Culture-Historical Integration approach, the definition of "phase" differed from the previously used "focus" of the Midwestern Taxonomic Method (McKern 1939:308) by emphasizing time and space as strongly as form. The term "component" was important because foci and phases were defined from the component or components at an archeological site. The component itself is a theoretical construct, based upon the material culture assemblages. One component may be distinguished from others based on interpretations of assemblages from other sites; this regularly resulted in the definition of a phase. Willey and Phillips (2001) noted that a single component could provide the basis for defining a phase; however, the specific assemblages associated with that component would be expected to appear in components at other sites in order to affirm the original definition. That a phase could manifest itself in a single component and in a limited geographical area was especially important, as it resulted in newly defined phases for the Plains Woodland period that often were based on ambiguous differences in pottery or the presence or absence of a feature, such as a hearth. Sometimes these new phases were limited to a single site or tributary of a major drainage. One example is the Grasshopper Falls phase.

Reynolds (1979:104) wrote that pottery from Woodland sites in northeastern Kansas was "a uniform type which has been classified as Grasshopper Falls Ware." This classification was formulated on characteristics of 457 pottery sherds from three sites near the Delaware River drainage in northeastern Kansas. He (Reynolds 1979:70–71) elaborated that vessel forms were medium to large jars with thickened conical bases, straight to slightly bulging sides, slightly constricted necks, straight to slightly inverted lips, and globular jars with inverted lips. Simple straight non-thickened rims with round or flat lips, thickened rims with flat lips, slightly and markedly out-curved rims, and inverted rims were reported for 68 specimens. The exterior surface treatments were 39 percent cord roughened, 25 percent smoothed-over cord roughened, 16 percent smoothed, 7 percent brushed, and 1 percent polished. Cord roughening was vertical to oblique, and brushing was typically vertical. Thicknesses of vessel walls ranged from 4 to 17 mm, but the majority measured from 6 to 11 mm. Decorations were limited to rims and occurred as oblique tool impressions on the outside of lips, oblique cord impressions on the top of lips, and exterior bosses, punctates, or perforations on the exterior below the lip.

When discussing the three sites separately, Reynolds (1979:21, 41, 55–56) described a single line-incised sherd from the Malm site, cord-impressed surfaces (distinct from cord-roughened) on artifacts from the Anderson and Teaford sites, and a sherd that had both vertical and horizontal brushing marks on the exterior surface from the Teaford site. Yet incised lines and cord-impressions distinct from cord-roughening were not listed as decorations or exterior surface treatments for Grasshopper Falls ware. Reynolds (1979:41) noted that the vessel interiors were smoothed using two methods: 1) "finger impressions or finger trailing impressions," and 2) wiping the surface with a handful of grass.

Some other notable Middle and Late Plains Woodland phases in the region include Keith, Greenwood, and Cuesta. Middle-Late Plains Woodland Keith phase pottery is judged to be a ceramic ware with one type: Harlan Cord-Roughened. It is very similar to Valley Cord-Roughened ware except it lacks rim decorations and is tempered predominantly with crushed calcite and occasionally with hematite and fine sand (Kivett 1953:131). Calabrese (1967) described Greenwood phase pottery before the Greenwood phase was defined, but Reynolds (1982, 1984) and Witty (1982) contributed to the ceramic and phase definitions. Calabrese (1967:57–62) named two types of pottery: Verdigris and Greenwood. While not specifying whether they were the same ware, he stated that his classification followed the guidelines presented by Albert C. Spaulding at the fifth annual Plains Anthropological Conference in 1948. The Verdigris type was further characterized by Reynolds as having two vessel forms: 1) straight-walled jars with wide orifices, conical bases, vertically cord-roughened exteriors, and horizontal scraping marks on interior surfaces, and 2) jars with constricted orifices, pronounced shoulders, and smooth exteriors. Both were tempered with limestone and occasionally small amounts of bone. The Greenwood type consists of globular vessels with constricted necks, straight or "s" curved rims, and shale or clay material temper (Reynolds 1982:111–113; Witty 1982:208).

Witty (1982:207–208) designated components from the sites that he, Calabrese, and Reynolds had excavated as a phase, using the Culture-Historical Integration approach, and citing the Greenwood and Verdigris pottery "types" as the diagnostic material of the Greenwood phase. He combined Calabrese's and Reynolds' descriptions of the ceramic types without evaluating whether they should be classified differently. The classification should have defined a Greenwood ware and a Verdigris ware as two subtypes because they have contrasting manufacturing techniques, raw materials, and morphologies. Had the Greenwood and Verdigris types differed only in morphology, then combining them into Greenwood phase ware would have been reasonable.

Marshall (1972) described pottery from Cuesta Phase sites as exhibiting Plains Woodland and Hopewell ceramic traits. Considering vessels that shared affinities with Hopewell vessels in the eastern United States as distinct from Cuesta ware, he classified them as Havana ware. To confuse the issue even further, identical pottery is associated with the Cooper Hopewell taxonomic unit in northeastern Oklahoma. This problem has been recognized (Logan 2006:82), and the solution is clear: Cuesta and Cooper belong to the same designation unit and should be combined. They remain arbitrarily split by modern political state borders because archeologists in southeastern Kansas call it Cuesta, and archeologists in northeastern Oklahoma call it Cooper.

Marshall (1972:47–55) defined nine types of Cuesta ware, based on variations in surface treatments and decorations. Surfaces are plain or cord roughened, and decorations are elaborate. He adopted named type designations developed for Illinois Hopewell types, such as Naples Stamped, Netler Stamped, Dentate Stamped, and an "unnamed punctate type." This would not be a problem except that he noted a Havana ware within Cuesta ware in Cuesta phase assemblages and included vessel forms with straight to out-curved rims and conical bottoms. He identified grit and grog (different colored clay, shale, and crushed sherds from other vessels) tempers.

Important to review are two additional ceramic wares, defined for the Plains Woodland period in Iowa: Held Creek and Minotts. Held Creek ware was delineated for pottery from Boyer variant middens at the M.A.D. (13CF101) and Rainbow (13PM91) sites (Benn and Green 2000). It was described as having developed out of Valley Cord-Roughened ware as early as A.D. 200. Vessel forms are elongated jars with conoidal bases, slightly restricted necks, and straight to slightly out-curved rims (Benn and Green 2000:446) and small bowls. Exterior surfaces are plain or exhibit decorations, including tool impressions on lips and shoulders and zones of stamped impressions and punctations. Interestingly, in their discussion of Held Creek ware, Benn and Green (2000:446) stated, "Held Creek ware and Grasshopper Falls Phase ware are so technically and decoratively similar that there may not be a clear distinction between the two."

Minotts ware comprises four types: Minotts Plain, Minotts Cord-Impressed, Minotts Tool-Impressed, and Minotts Decorated-Lip (Benn and Green 2000:472–477). Minotts vessels have highly variable thicknesses and rim heights. Some display decorations akin to Great Oasis pottery, and some have tool impressions (possibly fingernail impressions) on the lips with plain rim surfaces, which are remarkably similar to rim decorations on Held Creek, Grasshopper Falls, and Sterns Creek ware. Notably, oxidized pastes are common for the decorated-lip variety as well (Benn and Green 2000:473).

Hamon Site Pottery

Approximately 46 percent of the artifacts recovered from the Hamon site are ceramic. Tempers are 74 percent crushed rock and 23 percent a mixture of sand and crushed rock; the remaining 3 percent have no temper (Table 7). As mentioned earlier, crushed rock is ordinarily referred to as grit. This term for temper is problematic because grit is quite variable and can derive from numerous types of rock, including limestone, granite, and other igneous, sedimentary, and metamorphic rocks.

Surface Treatment

Hamon site pottery exhibits a variety of surface treatments. Cordmarking is the most common, followed by smoothed-over cordmarking (Table 8). Brushing, trailed lines (alone or in combination over cordmarking), punctation, dentation, and a paint/wash/slip are present in lower frequencies. Most of the deteriorated sherds still have discernible surface treatments with similar proportions as the non-deteriorated sherds (Table 9).

Cordmarked, smoothed-over cordmarked, smooth, and brushed-over cordmarked treatments are abundant on body sherds (Tables 5 and 8). Brushing, identified by parallel or overlapping striations, appears on bodies as often as it does on shoulders, necks, and rims combined. Trailed lines are distinguished from brushing by their presence in isolation, geometric patterns, and zones encompassing parallel, curvilinear, and angled motifs. Trailed lines are created by pressing the pointed, blunt, or rounded tip of a tool into the clay surface and then pulling or pushing it along the surface to create a trail. This leaves raised edges of displaced clay along the sides of the trail and heels (raised bumps of displaced clay) at the ends of strokes (Shepard 1985:195–203). Trailing and trailed-over cordmarking occurs on body sherds in lower frequencies than on shoulders, necks, and rims combined (Tables 8 and 9). Punctation, dentations, and tool impressions appear most commonly on the necks and lower rims of vessels. A malleated treatment (a dented pattern suggestive of being "slapped" with a paddle) occurs on a limited number of sherds, roughly distributed among ambiguous bases, shoulders, and body-and-shoulder sherds. An apparent paint/wash/slip is present in the form of an orange, buff, or brown pigment on numerous bodies, shoulders, and rims (Tables 8 and 9).

Thickness

The percentage of sherds that fall within certain thickness ranges are useful to show the uniformity or diversity of vessel form and size. Thicknesses of sherds in the ceramic assemblage were measured with digital calipers and rounded to whole millimeters. They are reported with counts and averages for each sherd category (Table 10). Measurements were made around the circumference of each sherd and as close to the center as possible. In instances of single sherds with a range of thicknesses that span 1 mm or more, the minimum and maximum ranges were averaged. Rim sherds were aligned vertically and measured at a perpendicular angle 5–10 mm below the lips, depending on the form and size of the lip. A range of 2 mm was chosen to visualize the frequencies in which the thicknesses of various sherds in the ceramic assemblage are distributed (Table 10).

Thicknesses of base sherds range from 8 to 16 mm with nearly 60 percent from 8 to 12 mm. The remaining sherds are distributed almost evenly from 12 to 16 mm with only two that are slightly thicker than 16 mm. Bases and body sherds have the same general distribution from 8 to 12 mm with a slightly higher distribution from 12 to 14 mm. Curvature and thickness of certain sherds make it apparent that they came from either bases or shoulders. A clear

Table 7. Ceramic Artifacts by Category and Temper Material.

Temper	Ceramic sherds	Small vessels & possible pipe fragments	Ceramic waste material	Possible appendages	Totals	%
Crushed rock	1,797	0	13	0	1,810	73.76
Sand & crushed rock	569	3	0	2	574	23.39
No added temper	37	7	25	1	70	2.85
Totals	2,403	10	38	3	2,454	100.00
%	0.9792	0.0041	0.0155	0.0012	100.00	100.00

Table 8. Surface Treatments Present on Ceramic Vessel Section Sherds.

Surface treatment	Base	Base/ low body	Base/shoulder indeterminate	Body	Shoulder	Shoulder/ neck	Neck	Rim	Totals	%
Smooth	12	3	0	117	10	8	2	30	182	7.6
Cordmarked	1	2	1	533	12	10	3	6	568	23.6
Smoothed-over cordmarked	2	2	2	395	4	5	2	6	418	17.4
Brushed	0	0	0	33	9	18	17	9	86	3.6
Brushed-over cordmarked	1	0	0	58	1	2	1	0	63	2.6
Trailed lines	0	0	0	9	9	10	1	6	35	1.5
Trailed-over cordmarked	0	1	0	19	6	5	1	8	40	1.7
Punctate/dentate	0	0	0	7	2	7	1	12	29	1.2
Malleated	0	0	1	1	2	0	0	0	4	0.2
Paint/wash/slip	0	1	0	11	1	0	0	3	16	0.7
Deteriorated	1	4	0	844	45	18	8	42	962	40.0
Totals	17	13	4	2027	101	83	36	122	2403	100.0

Table 9. Discernible Surface Treatments ("D" Traits) Present on Deteriorated Ceramic Vessel Section Sherds and Completely Deteriorated Sherds.

Surface treatment	Base	Base/ low body	Base or shoulder	Body	Shoulder	Shoulder/ neck	Neck	Rim	Totals	%
D smooth	0	0	0	0	1	0	0	1	2	0.2
D cordmarked	0	0	0	322	8	2	2	4	338	35.1
D smoothed-over cordmarked	0	1	0	23	1	2	0	1	28	2.9
D brushed	0	0	0	3	0	0	1	1	5	0.5
D brushed -over cordmarked	0	0	0	2	0	1	0	0	3	0.3
D trailed lines	0	0	0	0	2	2	0	1	5	0.5
D trailed-over cordmarked	0	0	0	0	11	3	2	2	18	1.9
D punctate/dentate	0	0	0	0	0	0	0	1	1	0.0
D malleated	0	0	0	0	0	0	0	0	0	0.0
D paint/wash/slip	0	2	0	41	6	0	0	14	63	6.5
Deteriorated	1	1	0	453	16	8	3	17	499	51.9
Totals	1	4	0	844	45	18	8	42	962	100.0

distinction could not be made, even though they have a distribution from 8 to 12 mm like the base sherds. None is thicker than 14 mm.

Body sherds range from 2 to 16 mm in thickness. The greatest number is from 6 to 8 mm, followed by 8–10, 10–12, and 4–6 mm. Only 28 have thicknesses of 2–4, 12–14, or 14–16 mm. Shoulder and neck sherds have a similar distribution of thickness as the body sherds except there is an increase in the percentage from 2 to 4 mm and 4 to 6 mm. Rims have the largest percentage of thickness from 2 to 4 mm and from 4 to 6 mm. A nearly equal number

Table 10. Thickness Variation of Pottery Sherds.

Ceramic thickness (mm)	Base	Base/ low body	Base or shoulder	Body	Shoulder	Shoulder/ neck	Neck	Rim	Totals	%
2-4	0	0	0	5	0	0	1	7	13	0.5
4-6	0	0	0	143	7	9	6	46	211	8.8
6-8	0	0	0	794	33	26	7	51	911	37.9
8-10	5	4	1	680	40	31	14	13	788	32.8
10-12	5	2	1	208	16	14	5	2	253	10.5
12-14	2	5	1	18	0	1	0	0	27	1.1
14-16	3	2	0	5	0	0	0	0	10	0.4
16+	2	0	0	0	0	0	0	0	2	0.1
NA	0	0	1	174	5	2	3	3	188	7.8
Totals	17	13	4	2,027	101	83	36	122	2,403	100.0
Averages	12.78	12.36	10.93	8.59	8.7	8.82	8.43	6.78	NA	NA

of rims range from 6 to 8 mm, and there is a noticeable decrease in the 8–10-mm range. Only two rims have thicknesses from 10 to 12 mm.

Rim Forms, Vessel Diameters, and Interpreted Vessel Forms/Functions

A total of 127 rim sherds, refits of rim sherds, and sections of vessels (large sherds comprising a significant portion of the original vessel) with the rim region intact, were analyzed with regard to the traits of rim form, lip form, and vessel diameter at the rim, when applicable. A majority of rims (77) are straight with a slight out-curve, 29 are straight, 16 are noticeably out-curving, one rim is inverted, and four are too fragmentary to identify (Table 11). The majority of lips (61) are round, followed by flattened (29). Eight rims have sub-flattened lips, tool impressions appear on 14 rims, and the exterior portion is thickened (sometimes with a noticeable wedge shape) on 10 rims. Five rims are deteriorated in the lip region, making a distinct classification indeterminate (Table 11).

Reconstruction of vessel diameters was conducted by creating a diagram of circles, ranging from 2 to 30 cm, on a large sheet of card stock. Rim sherds, refits, and vessel sections large enough to determine the orifice's curvature (at least 5 percent of the total area) were placed horizontally over the diagram of circles. The rims were aligned to the circles on the diagram until the curvature of the rim matched the circles without curving either outside or inside of the boundaries. The results achieved a 2-cm range of accuracy or more in some cases. Vessel orifice diameter ranges are categorized as small 0–12 cm, medium 13–25 cm, and large 26–31 cm (Trabert 2011:335, after Braun 1980:182). A total of 27 sherds, refits, and vessel portions are of sufficient size to calculate orifice diameters. Seven have small diameters, 16 have medium diameters, and 4 have large diameters (Table 11). Eight of the medium diameters are calculated from refits, of which four were refitted to one vessel and the other four refitted to two vessels. Two of the large diameters were calculated from one group of refits. Due to refits and the possibility of some sherds being from different quadrants of the same vessel, an accurate estimate of the minimum number of vessels is not possible.

Based on the orifice diameters, variations of shoulder emphasis (constriction and lack of constriction at rim-shoulder junctions), thickness, and conoidal to sub-globular bases in the assemblage, vessels appear to range from thick to thin, straight to ovoid, and sub-globular to globular in form, determined by comparisons of rim, neck, shoulder, and body quadrants. Small personal bowls and medium to large vessels, indicative of storage and cooking for several individuals, are reflected in the size of orifice diameters and large sherds that incorporate portions of the shoulders and rims. A cooking function for some vessels is evidenced by charred-food residues adhering to interior sherd surfaces. On some specimens the residue is quite abundant, and it was collected to obtain AMS radiocarbon

Table 11. Rim Forms, Lip Forms, and Reconstructed Diameters of Ceramic Vessels.

	Sherds	Refits	Vessel portions (large sections)	Totals
Rim form				
Straight	26	0	3	29
Straight/slight out curve	66	10	1	77
Out-curving	14	1	1	16
Inverted	1	0	0	1
NA	4	0	0	4
Total				127
Lip form				
Round lip	56	3	2	61
Flat lip	25	4	0	29
Sub-flattened lip	6	2	0	8
Tool impressed	14	0	0	14
Exterior thickened/ wedge	7	2	1	10
NA	3	0	2	5
Total				127
Vessel opening (diameter in cm)				
0-12	2	0	5	7
13-25	8	8	0	16
26-31	2	2	0	4
Total				27

dates. Residue and/or thermal alterations are not observed on other pieces. The functions of these vessels could have been numerous, including water and/or other resource storage, and ceremonial (e.g., grave goods). Importantly, the differences in size and form between a larger elongated vessel and a smaller sub-globular vessel are not clear indications of different wares or types through time. They very likely could be contemporaneous vessels with other purposes.

Vessel Portions, Possible Ceramic Pipe Fragments, and Possible Appendages

Ten large sherds represent vessel sections, including nine small vessels and one that is medium-sized in comparison. Four of the smaller pieces have smooth exterior surfaces and may be incomplete pipes or rims of miniature vessels (Figure 13c-d). Another bears trailed or possibly incised lines on the body. It is broken at the neck and appears to have been globular in form (Figure 13e). Not illustrated are a cordmarked shoulder and smooth rim, another sherd that is cordmarked and possibly malleated, and two others that are smooth. A larger vessel portion has a cordmarked body with trailing or brushing and a punctate pattern on the neck.

Three specimens may be appendage remnants. Two are small, curved, and deteriorated (Figure 13j-k). Another is cylindrical and contains multiple holes that intersect a long perpendicular hole (Figure 13h). One end is smooth, and the other has been broken, suggestive of being larger or attached to another ceramic artifact, possibly a vessel. This same object might be a part of a clay bead, pipe, or clay figurine. Several rims have deteriorated zones below the lip areas and may indicate that appendages once were attached at those spots. One waster may be an appendage remnant but is categorized as ceramic waste due to overall similarities with that material. The cylindrical artifact with holes (Figure 13h) is made of non-tempered clay, and the other two (Figure 13j-k) have temper of sand and crushed rock.

Ceramic Production Material

Production of pottery at the Hamon site is evident from ceramic wasters (Stark and Garraty 2004), limestone artifacts covered in clay, and raw igneous, metamorphic, and sedimentary rocks that were crushed for temper. Identifying ceramic production is important because, as Rice (1996:174–175) notes, pottery is found in abundance in the New World, but kilns or workshops are rarely noted by archeologists. Wasters are deformed pottery sherds that represent flaws in the firing process. They also may be known as "de facto wasters" when the sherds break during manufacture but show no evident signs of deformity (Stark and Garraty 2004:124), making them inherently more difficult to recognize in the contexts of ceramic production. Additional evidence, such as kiln debris, pottery molds, and ceramic production tools, adds strength to interpreting ceramic production activities in the archeological record (Stark and Garraty 2004).

Thirty-eight ceramic artifacts are waste materials: a mixture of wasters (truly deformed), spherical

Figure 13. Left group, top row, left to right: a) small vessel c.1505 & c.3357 refit, b) shoulder/neck c.3136, c) miniature vessel/possible pipe fragment c.1273, d) miniature vessel/pipe fragment c.4253. Bottom row, left to right: e) small globular vessel with trailed lines c.72.62.725, f) body portion c.72.62.722, g) globular base portion c.1349 & c.1490 refit. **Right group**, left to right: h) possible appendage/bead/figurine fragment c.3677, i) small vessel/pipe/waster/appendage fragment c.286, j) possible appendage c.2210, k) possible appendage c.2538.

clay balls, and cylindrical objects that most likely are coil fragments from unfinished vessels. One specimen has a thumb or finger impression in the clay (Figure 14g), a literal fingerprint of a prehistoric occupant of the Hamon site. The appearance of broken coils and finger impressions suggests that coiling was used to form vessels. As stated earlier, nearly 40 percent of the sherds are deteriorated, roughly half to the extent that it is not possible to distinguish surface treatment. Any number of those could be de facto wasters. The difficulty in discriminating de facto wasters from naturally deteriorated sherds makes such an interpretation subjective and best avoided. Crushed rock temper is present in 13 of the ceramic waste materials; the remainder contain no temper (Table 7).

The ceramic waste material includes numerous limestone artifacts covered in clay. Some have remnants of arching smears of clay, indicating that they were used as platforms upon which ceramic production was performed (Figure 14, right group). Numerous hematite and limonite (iron oxides) pieces show signs of having been worked with a tool (Figure 15, left group). One has a deep, circular depression from such alteration (Figure 15b). Hematite is an abundant inclusion in 14JF350 pottery. The possibility that hematite was intentionally added to the clay is complicated by the fact that clay from alluvial sources naturally may incorporate a large amount of hematite (Beck 2001). The paint/wash/slip applied to some of the pottery apparently was derived from hematite and limonite fragments in the assemblage, providing further evidence for production activities.

Numerous igneous, metamorphic, and sedimentary rocks in the assemblage correspond to the grit temper in the pottery sherds. These materials are granite, basalt, schist, gneiss, hornfels, quartzite, arkose, and finely sorted sandstone. Several specimens have characteristics of being crushed (Figure 15, right group). In combination with the other material evidence, it is clear that ceramic production activities took place at the Hamon site.

Ceramic Relations with Other Plains Woodland and Plains Village Pottery Wares

Cordmarked, smoothed-over cordmarked, and smooth surfaces, described by Reynolds (1979) for Grasshopper Falls phase pottery, are abundant in the Hamon site assemblage. Reynolds (1979:71) considered brushing, occasional punctation, and bosses as insignificant and asserted that Grasshopper Falls phase pottery was a utilitarian ware. While he noted that the most similar Plains Woodland pottery type to Grasshopper Falls ware was Valley

Figure 14. Ceramic production material. **Left group**, clay. Top row, left to right: a) spherical ball c.339, b) cylindrical coil fragment c.72.62.728, c) cylindrical coil fragment/possible figurine c.72.62.727, d) spherical ball c.72.62.732. Middle row, left to right: e) elliptical lump c.3249, f) spherical lump c.2579, g) finger-imprinted clay c.1429, h) clay waste c.2409. Bottom row, left to right: i) clay waste c.1262, j) clay waste c.53, k) clay waste c.103, l) finger-imprinted clay c.72.62.729. **Right group**, limestone with clay and hematite. Top row, left to right: m) c.1256, n) c.3816. Middle row, left to right: o) c.1808, p) c.4439, q) c.2856, r) c.382. Bottom row, left to right: s) c.4443, t) c.4435.

Figure 15. Left group, worked hematite. Top row, left to right: a) c.180, b) worked bowl depression c.2123, c) c.2875, d) c.2609. Middle row, left to right: e) c.2223, f) c.1327, g) c.3953, h) c.1660. Bottom row, left to right: i) c.3416, j) c.1659, k) c.2635, l) c.2633, m) unidentified. **Right group**, worked igneous and metamorphic rock. Top row, left to right: n) c.4017, o) c.4244, p) c.1141, q) c.177. Second row, left to right: r) c.2682, s) c.2876, t) c.3552, u) c.2558. Third row, left to right: v) c.4186, w) c.1782, x) c.183, y) c.2390. Bottom row, left to right: z) c.2803, aa) c.1949, bb) c.417, cc) c.1921.

Cord-Roughened, he maintained that brushing and tool-impressed lips of ceramic vessels, coupled with interpreted house forms from Grasshopper Falls phase components, provided distinctions that justified the naming of a new phase and ceramic ware. Upon direct examination some pottery from 14JF350 does resemble Valley Cord-Roughened pottery from the type site 25VY1, but a vast majority of pottery in the assemblage is quite different (Figures 16 and 17).

Given the proximity of the Hamon site to the Quarry Creek Hopewell site, comparisons were made of projectile points, revealing a high degree of morphological and raw material similarities among them. However, no diagnostic Hopewell pottery traits (crosshatched rims, rocker-zoned stamping) exist in the Hamon assemblage. Lineal dentate designs occur, but this decoration alone is not enough to establish a Hopewell connection or manifestation at the Hamon site. Interestingly, the plain vessels from the Trowbridge site (14WY1) do match numerous sherds from 14JF350 in paste, temper, and form.

The hemispherical bodies and crenulated lip forms of vessels from Kansas City Hopewell sites raises the question: Do these vessels represent a

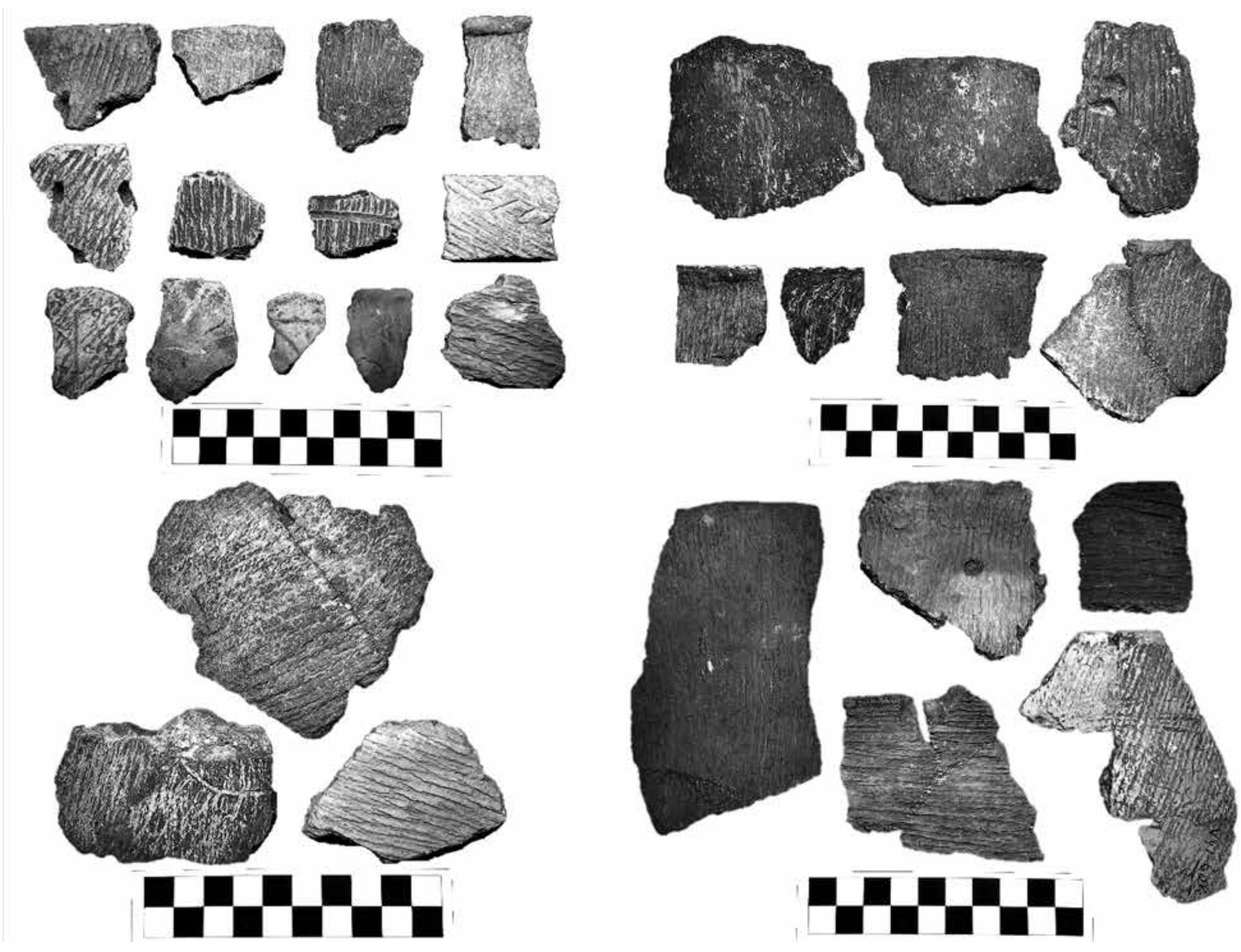

Figure 16. Valley Cord-Roughened sherds from 25VY1 in Nebraska. **Top left group**, top row, left to right: a) VY1-745, b) VY1-1848, c) VY1-1740/2, d) VY1-2334/1. Middle row, left to right: e) VY1-799, f) VY1-531, g) VY1-1155, h) VY1-145/1. Bottom row, left to right: i) VY1-130B?, j) VY1-356/2, k) VY1-2129/10, l) VY1-363, m) VY1-154/2. **Top right group**, top row, left to right: n) VY1-1867/3, o) VY1-1877/2, p) VY1-1822?. Bottom row, left to right: q) VY1-1241/1, r) VY1-1989, s) VY1-304, t) VY1-2136 & VY1-2290/5? refit. **Bottom left group**, top row: u) VY1-1559/4 & VY1-1559/5 refit. Bottom row, right to left: v) VY1-2166/13, w) VY1-2049/5. **Bottom right group**, clockwise from the largest specimen on the left: x) VY1-450, y) VY1-998, z) VY1-639, aa) VY1-2779/3 & VY1-607/1 refit, bb) VY1-48/50/1 & VY1-48/50/2 refit. Question mark (?) denotes faded catalog numbers that are difficult to discern.

Figure 17. Rim sherds and body sherds from 14JF350. **Top left group**, thick and relatively strait rims. Top row, left to right: a) c.4370, b) c.3329, c) c.1726, d) c.283. Bottom row, left to right: e) c.77, f) c.1008, g) c.72.62.415, h) c.868. **Top right group**, thin rims, some relatively straight, others with slight out-curves and distinctly bulging shoulders. Top row, left to right: i) c.1697, j) c.4054, k) c.72.62.434, l) c.496 & c.497 refit. Bottom row, left to right: m) c.81, n) c.1011, o) c.2128,(p) c.966. **Bottom left group**, body sherds. Top row, left to right: (q) c.72.62.447, (r) c.525, (s) c.1584. Bottom row, (t) c.2609, (u) c.1770, (v) c.3390. **Bottom right group**, body sherds. Top row, left to right: w) c.1544, x) c.843. Bottom row, left to right: y) c.3535, z) c.1767.

Hopewell manifestation or did the Late Woodland people who produced pottery with corresponding forms (Grasshopper Falls/Sterns Creek, etc.) inhabit the same areas as the Kansas City Hopewell? In addition, miniature vessels were recovered from both Kansas City Hopewell components and the Hamon site. Even in light of these similarities, there is not enough material evidence to argue for a relationship because plain vessels and miniature vessels have been retrieved from other Plains Woodland and Plains Village site components. Knowledge beneficial to understanding these Plains Woodland groups could be waiting in cross-referencing analyses of curated materials.

Some Hamon site pottery has trailed lines applied on smooth surfaces or over cordmarking. These form abstract geometric patterns, curved lines next to straight lines, and appear in zones (Figure 18). Brushing does not occur in zones but in parallel, usually overlapping, strokes and as a lighter impression or striations on the surface. Trailed-line decorations sometimes are coupled with punctate or dentate patterns on the lower portions of rims, necks, and shoulders. These vessels are thinner and

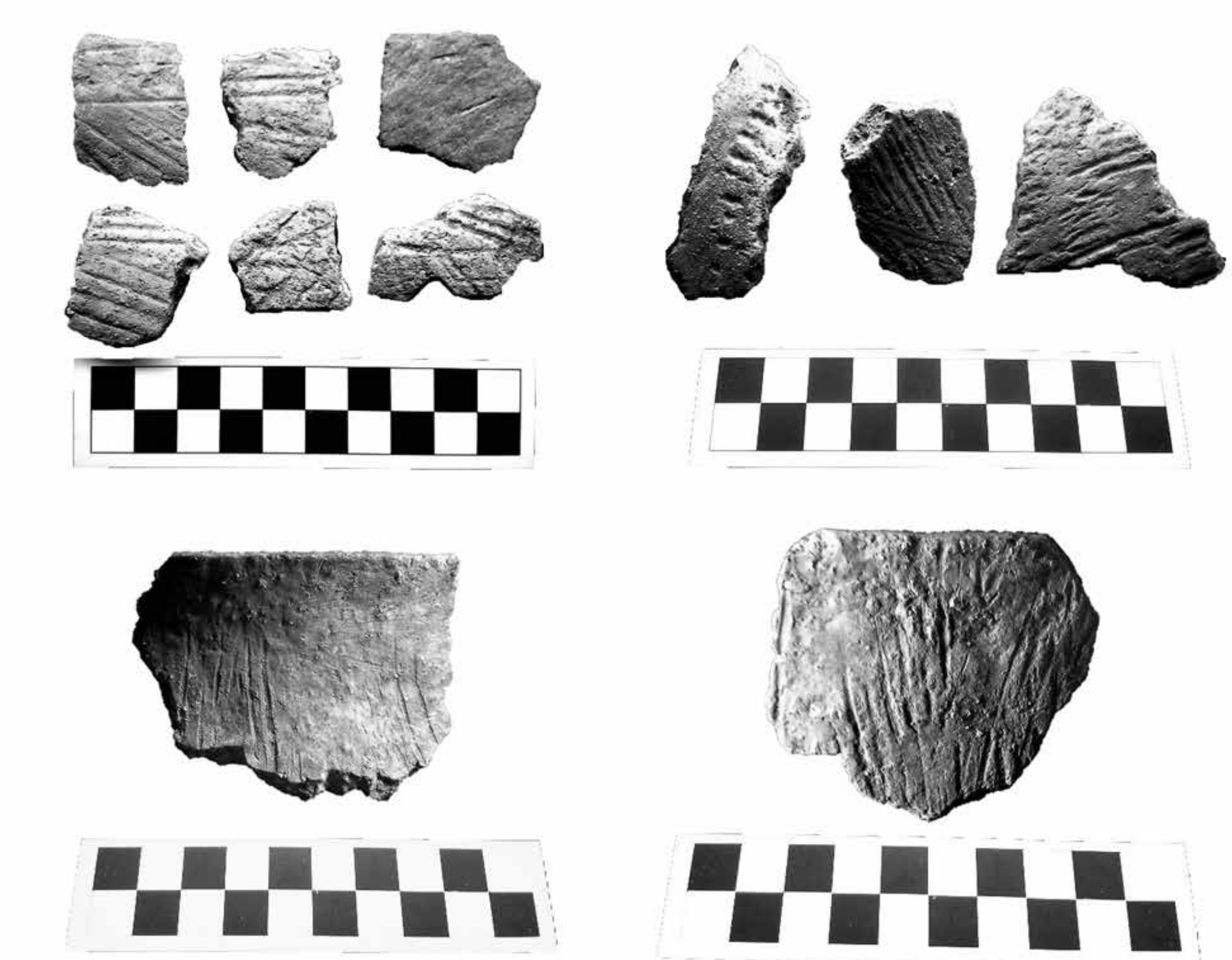

Figure 18. Trailed line motifs with cordmarking and punctates/dentates. **Top left group**, body sherds. Top row, left to right: a) c.72.62.605, b) c.3685, c) c.54. Bottom row, left to right: d) c.1589, e) c.521, f) c.72.62.523. **Top right group**, neck/shoulder sherds. Left to right: g) c.3749, h) c.3472, i) c.2823. Sherds are tilted to enhance visibility of the surface treatments. **Bottom left**: j) rim/shoulder sherd c.3307. **Bottom right**: k) rim/shoulder sherd c.3406.

have more distinct shoulders than are characteristic of Loseke Creek ware vessel forms and in contrast to the straight or relatively weakly defined shoulders of Valley Cord-Roughened vessels. Other than tripartite motifs, displayed by one 14JF350 specimen (Figure 18h), trailed-line designs have not been adequately delineated for Loseke Creek ware. Future research comparing these ceramic wares could prove rewarding. On the other hand, cord-impressed and cordmarked surfaces are thoroughly described for Loseke Creek ware. These attributes are present in the Hamon site assemblage, although the tripartite designs, considered ancestral to Great Oasis pottery decoration, are deteriorated or lacking. Numerous items exhibit the vessel form and the cordmarked and cord-impressed surface treatments associated with the Feye Cord-Roughened and Feye Cord-Impressed types.

Trailed-line decorations in parallel, curvilinear, and zoned forms are characteristic of Steed-Kisker phase pottery that temporally ranges from the terminal Late Plains Woodland into the Plains Village period (ca. A.D. 950–1400). Some place tighter chronological restrictions in the tenth through twelfth centuries A.D. (Logan 2010:229; Roper and Adair 2011:20; Trabert 2009:291). Steed-Kisker ware is described as large and small hemispherical vessels that feature direct-straight or flared rims. Vessels are predominantly shell tempered, but crushed rock and sand inclusions occur in specimens from the Cloverdale and Friend and Foe sites, and these are the dominant temper materials at the former (Trabert 2009:296). Sherds with trailed or incised-line motifs on the shoulders have been reported from three sites in northeastern Kansas: 14LV1082, 14LV1071, and 14LV380 (Logan 2001; Trabert 2009). Logan and Ritterbush (1994) remark that the development of Steed-Kisker, perhaps from a Plains Woodland predecessor or a Mississippian group that migrated into the Kansas City area, is poorly understood. They and other researchers (Logan and Ritterbush 1994:4–5; Trabert 2009:296–297; Wedel 1943:94–97) note Steed-Kisker interactions with other defined units of the Central Plains tradition.

Given associated AMS radiocarbon dates, which are discussed in the next section, the trailed-line designs on some vessels in the 14JF350 assemblage could represent either a Steed-Kisker component or contact with Hamon site inhabitants. Although no intact portions of vessel rims, necks, and shoulders contain appendages or shell tempering, body, shoulder, and low rim segments, clearly similar to Steed-Kisker forms and decorative design, are present in the smaller trailed-line vessels (Figure 13). Two alternative explanations are offered: 1) the designs may be a decoration unique to the Late Plains Woodland period in northeastern Kansas or 2) decorations noted for Valley Cord-Roughened and Loseke Creek ware also manifest in northeastern Kansas because people were moving and interacting with each other across the region. Additional research of trailed-line designs on ceramic wares/types throughout the Central Plains should be pursued because descriptions are lacking in the literature. Current implications for testing hypotheses about group mobility and interaction appear promising.

As noted earlier, lip crenation has been observed in Grasshopper Falls, Held Creek, and Sterns Creek wares. This decoration is also an attribute of Pomona ware. Witty (1967) defined Pomona as a focus, according to the Midwestern Taxonomic Method. The traits of the ceramic ware are globular vessels with vertical to flared rims and occasional collared rims made from “un-tempered” clay. The surface treatment is cord-roughened or smooth with finger-pinched or thickened lips and occasional sub-lip “knobs” (bosses/protuberances). Bowls lacking necks are described for Pomona ware but not differentiated as a separate type.

Brown (1984:442–447) further defined Pomona as a variant (distinct from a focus) with four named phases: Clinton, Wolf Creek, May Brook, and Apple Valley. He added scalloping and lip crenation to decoration styles. Brown inserted temper in the definition, listing a variety of materials, which are distributed geographically. For example, granite is available only in the northern Delaware and Wakarusa drainages. Brown does not emphasize the presence of granite temper in these drainages, whereas he does stress the use of shell temper (Brown 1984:427). He asserts that shell tempering always occurs in the Delaware River drainage, and he places the core geographical location of the Apple Valley phase, which is the latest chronologically (A.D. 1300–1350), there (Brown 1984:444–448).

The definitions of Pomona are confusing to say the least. Sites with two or more radiocarbon dates at different points in the Late Plains Woodland chronology (early A.D. 600 and late A.D. 1000) have been described as consisting of a Plains Woodland component (i.e., Grasshopper Falls phase) and a Pomona component, with the latter considered a Plains Woodland survival in the Plains Village period because the pottery is almost indistinguishable from earlier Plains Woodland types (Brown 1984:429; Williams 1986:44). Confounding the issue of what Pomona ware is are Brown’s (1984:454) descriptions of it as related to Keith and Greenwood phase wares and images of Pomona ware from 14AT2 (compare Williams 1986:Figure 8A) that portray a vessel portion identical to Minotts Tool-Impressed and Minotts Decorated-Lip images provided by Benn and Green (2000:Figures 18.35 and 18.36).

Shadow Glen (14JO21), a Johnson County site reported to include a Pomona component, has materials that may compare to Hamon site pottery. Shadow Glen pottery is characterized as Pomona ware with straight rims, flaring shoulders, and cord-marked or smooth surfaces (Logan and Hedden 1993:22). The images of sherds, which are especially valuable as photographs do not always appear in published ceramic descriptions, reveal that they are remarkably similar to some of the 14JF350 rims. The radiocarbon dates from Shadow Glen, though, are much later than any obtained from the Hamon site. The pottery is predominantly grog tempered with smaller amounts of shell (Logan and Hedden 1993:26), leading the authors to identify problems in associating Shadow Glen with any of Brown's Pomona variant phases. The depictions of Feye Cord-Roughened and the similar cord-roughened variety from sites at Saylorville Lake (Benn and Green 2000:459–463) are almost coincident in form and decoration to Shadow Glen pottery. Acknowledging the temporal differences between 14JO21 and 14JF350, the pottery of this style at the Hamon site may be related more closely to Loseke Creek than Pomona ware.

The scalloped or crenulated rims from the Hamon site appear identical to examples in Held Creek and Sterns Creek wares (Figure 19). As noted earlier, Benn and Green (2000:446, Figure 18.14) commented that Held Creek and Grasshopper Falls wares are so similar that they may not be different at all. Sterns Creek vessels have scalloped or crenulated rims, as well as smooth or plain rims and necks, that are visually indistinguishable from some Hamon site specimens (compare Alex 2000:21, Figure 6.26; Benn and Green 2000:448, Figure 18.14). The geographical extent of sites with identified Sterns Creek phase components overlaps that of Grasshopper Falls phase sites. Recent research has highlighted that Sterns Creek and Grasshopper Falls wares not only appear visually similar but share technological characteristics and raw materials in their compositions (Keehner and Adair 2019).

The painted, washed, or slipped pottery from the Hamon site (Figure 20) is difficult to associate with other components in the region. Slipped sherds occur in the Shadow Glen Pomona assemblage (Logan and Hedden 1993), in Late Plains Woodland assemblages in Missouri, and Nebraska phase assemblages (Billeck 1993; Hoard et al. 2003; Ives 1955; Trabert 2011). Wedel (1943:78, 95–96) notes deteriorating wash or slip on Steed-Kisker vessels. Common to all descriptions of red-slipped or washed sherds is their rarity, as is the case at the Hamon site. However, the deterioration of the paint or wash is clearly evident on 14JF350 material, making it impossible to determine the percentage of sherds that may have had this trait.

Ceramic Analysis Conclusions

Analysis of the Hamon site ceramic assemblage highlights the necessity for detailed studies of relationships among pottery types associated with all of the taxonomic units that have been discussed. These are essential to understand variability and similarities among and within them and to refine archeological units used to interpret broader, more coherent regional adaptations of prehistoric people who inhabited the Missouri River valley and its peripheries.

This analysis also addressed a topic that has been neglected in North American ceramic studies: the kinds of artifacts in Plains Woodland components and/or assemblages that support inferences of ceramic production, providing an alternative hypothesis for the presence of daub or burned earth. In the past the discovery of daub has led directly to assumptions of house structures, the features most

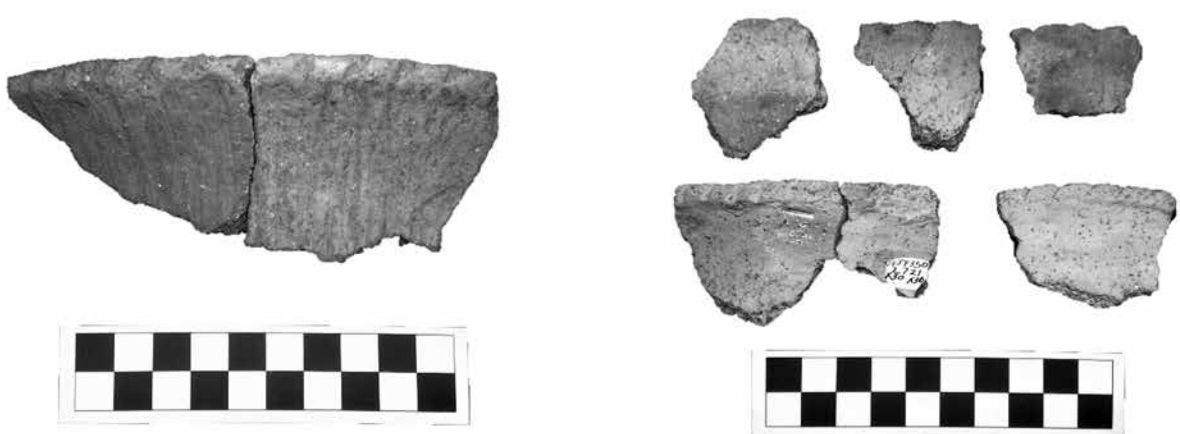

Figure 19. Crenulated, tool-impressed rim sherds. **Left**: a) c.2926 & c.2124 refit. **Right group**, top row, left to right: b) c.72.62.436, c) c.581, d) c.2344. Bottom row, left to right: e) c.455 & c.2721 refit, f) c.582.

Figure 20. Left group, painted/slipped/washed rims with deterioration. Left to right: a) c.583, b) c.4160, c) c.4354 & c.578 refit. **Right group**, painted/washed body sherds with deterioration. Top row, left to right: d) c.545, e) c.1869. Middle row, left to right: f) c.2719, g) c.1970, h) c.1756, i) c.1520. Bottom row, left to right: j) c.3358, k) c.4072, l) c.3860.

often interpreted at Plains Woodland period archeological sites. However, daub could result from numerous activities, including ceramic production. In the simplest open-fire event, fuel was gathered and placed in a location for burning with vessels piled on top. Wood, weighed down by the pots, burned on grass-covered earth and turned the ground surface beneath to burned earth. Wood and vegetation growing in the A soil horizon and penetrating the ground surface left the same impressions on the burned earth as those made in daub as a house burned. Traces in the archeological record would be indistinguishable.

Another form of an open-fire kiln is more complex, allowing for more control of the event. Similar to an earthen oven, a small basin was dug and fuel placed within. To ensure a successful operation, a windbreak or overhanging structure might be constructed over a portion of the basin for greater control and manipulation of the firing and for protection from the elements. In this scenario the odds increase for signs in the archeological record to resemble house daub. This could happen in a multitude of ways: 1) wood pressed against the earthen oven walls as it became burned earth, 2) the structure associated with the kiln was constructed of the same materials as a daub-covered house, 3) clay waste baked on wood, and 4) the upper A horizon soil became burned earth in the manner of the first scenario. Especially at sites where large amounts of ceramic material exist in association with burned earth, daub, and burned stone, ceramic production should be considered as a possible activity that left these traces. In addition, the artifacts used in ceramic production might be present to substantiate the inference of a ceramic production event.

Numerous igneous and metamorphic rocks recovered from the Hamon site show clear evidence of being worked by grinding and other methods of reduction. These rocks are composed of feldspar, quartz, and other associated minerals, including mica, biotite, hornfels, and others. The identifiable minerals that comprise the crushed rock temper in the ceramic assemblage are variable and match those in the modified rocks, supplying conclusive evidence that the rocks were beaten, ground, and broken down to be added as temper to clay paste. Many fragments of raw hematite in the earthy ochre form, in contrast to compact crystalline specular iron varieties (Busbey et al. 1997:167), exhibit distinct signs of human modification from processing and use. The pigment and mineral materials of the paint or wash on some of the vessels appear to have derived from ochre at the site. The abundant large limestone rocks are uniformly covered in clay, and many specimens are smeared with red-brown hematite pigments. Numerous pieces of clay with very minute amounts of temper or no temper are spherical, cylindrical, and oblong. These artifacts reflect clay processing associated with ceramic production. In combination, the clay-covered limestone, hematite-smeared limestone, igneous and metamorphic rocks, raw clay, abundant pottery, burned stone, and burned earth-daub materials recovered from the Hamon site support the activity of ceramic production.

SPATIAL ANALYSIS, AMS RADIOCARBON DATES, AND 2014 SURVEY OF THE HAMON SITE

The 1971–1972 excavation records were examined to reconstruct a spatial distribution map for the collected artifacts. These documents held information about features that did not appear in Reynolds' (1987) discussion of the Hamon site. In addition, abundant charred-food residues were observed on numerous pottery sherds associated with provenience levels. Four samples were prepared and submitted for AMS radiocarbon dating. Two of these were funded by the KAA John Reynolds Memorial Research Fund, and the other two were partially funded by the University of Kansas Carroll D. Clark Research Fund. When the report of the first two samples returned contrasting AMS radiocarbon dates, and reconstruction of the spatial analysis began to show patterns that differed from the original interpretations, a field survey was planned to locate the excavation area and demarcate the site boundaries. The combined results demonstrate that 14JF350 was occupied repeatedly during the Late Plains Woodland period.

The cultural materials recovered during the excavations were recorded in three 6-inch (roughly 15-cm) levels and a partial fourth level, depending on the unit. An artifact provenience database was created and analyzed with Microsoft Excel spreadsheets. The data was projected onto plan view maps of the excavation grid, using a vector-based software program (Inkscape). The outcomes show that artifact densities were high in units on the edges of the open excavation grid, and features that were recorded along the borders of the open grid possibly extended into unexcavated areas. However, the excavations were never expanded with the exception of a limited effort on the last few days attempting to locate post mold patterns.

The samples for AMS dating were taken from pottery found at different locations within the excavations. One (D-AMS 007435) was acquired from a deeper provenience than all others, and another (D-AMS 007434) came from surface-collected material. Two others (D-AMS 007947 and 007948) were retrieved halfway through the excavation depth limits but at various horizontal proveniences. All four were submitted to Direct AMS in Seattle, Washington. The results deviated significantly from one another. When combined with the single conventional date (I-11371), obtained from a piece of charcoal by the original crew, they span a 2-sigma calibrated median probability date range of A.D. 675–1040 (Bronk Ramsey 2009; OxCal 4.2.4; Reimer et al. 2013). The latest median probability date of A.D. 1040 came from sample I-11371, associated with a pit containing an infant burial. This was at a deeper level than the sample with the earliest median probability date of A.D. 675, thus suggesting that the later date is associated with an intrusive feature.

During the October 2014 field survey polyethylene sheeting, left to indicate the location of backfill from the original excavations, was located. Numerous artifacts, ranging from projectile points, lithic debitage, pottery sherds, burned earth, hematite, limonite, quartzite, and sandstone, were collected during the survey. This conclusively demonstrated that some of the original interpretations were inaccurate, particularly the inference that the Hamon site was single-component and confined within the excavation limits.

The Hamon site was described by the original excavators as "mix." They regularly reported in field records that they were still "in the mix," referring to the cultural mix of charcoal, burned earth, and perhaps other indicators of human activity in the soil. This descriptive term was applied not only to plow zones, but to any level within the excavations. The term is confusing because it implies that the recovered cultural material was in a mixed state, and occasionally the term was used in that sense. The crew members assumed that they were uncovering a house feature because daub/burned earth was present.

Reconstructing the Original Excavations

The Hamon site was first excavated as part of a KAA Fall Fling in September 1971. The dig was supervised by KSHS archeologist Tom Barr (Barr 1971; Jim D. Feagins personal communication, January 8, 2014). Toward the end of the first day (September 24, 1971), rain started to fall, and the dig was postponed until the following weekend (October 2–3, 1971). Barr (1971:1–2) noted that 11 people were on hand on the first day, 16 on the second, and 13 on the third.

KSHS archeologists did not employ the metric system in excavations at this time; all provenience data was recorded in feet and inches. Excavation began with a 10 by 40-ft (3.048 by 12.192-m) trench, located 140 ft east of the tree line on the western edge of the field. The trench was oriented north-south on the long axis over the terrace edge that was tested by Witty in September 1971 (KSHS 1971:14JF350 record numbers 19, 26, and 30; Figures 21 and 22). It was subdivided into 10 by 10-ft (2.048 by 3.048-m) squares. By the end of the weekend, the north end of the trench had been extended an additional two squares, and two more had been opened to the west and adjacent to the northern portion of the trench, resulting in a total of eight units, each 10 by 10-foot (3.048 by 3.048-m) (Barr 1971; KSHS 1971:14JF350 record number 26). Soil was removed in arbitrary 6-inch (15.24-cm) levels. The units were designated by numbers north of the datum (N), starting with the second unit to the north: 0-0, N1, N2, N3, N4, and N5 in the main trench. Units west of this center row were labeled with a north and extra "L" designation: N3-L1 and N4-L1, which were adjacent to N3 and N4 on the west (KSHS 1971:14JF350 record numbers 19 and 26; Figure 21).

Barr summarized surface finds as corner-notched dart and arrow points, daub, and grit-tempered cord-roughened pottery sherds, suggestive of a Middle Plains Woodland occupation. Excavators uncovered more cord-roughened pottery, a large but restricted concentration of daub, several

Figure 21. 1971 progress reports, showing the location and excavation grid (KSHS 1971:14JF350 record numbers 19 and 26).

corner-notched arrow points, one corner-notched dart point, and a portion of a single burial (Barr 1971:1–2). No post mold stains were recognized in the lower levels, which at 1.5 ft (45.72 cm) did not reach culturally sterile soil (Barr 1971:2). At the conclusion of the excavations, polyethylene sheeting was laid over the units, and they were backfilled.

Jim D. Feagins, who participated in the 1971 project, provided a memoir of his experience. The following excerpt reveals the digging conditions for the first portion of excavations.

> The site was in a field on the east side of Coal Creek, some miles north of Valley Falls, Ks. I helped open up the site by working with two or three others in one square—we shovel skimmed; although since we were in a plow zone the skimming was done rather thickly and we did not screen the soil (at least not at that level). I am not sure if anything was screened even at lower depths. Below that level the thinner-shovel skimming applied. We found a few flakes and cord-marked pottery and perhaps daub. We were told the site was a Grasshopper Falls focus (the term phase was not used by the society at that date) but at this stage in my learning I would not have known one taxonomy from another anyway.
>
> Just below the plow zone, a child's cranium was discovered after someone's sharp skim shovel had bisected it—probably several times. It was in very poor condition and I don't think the excavator, whose name I do not recall, knew what was being uncovered—until Tom Barr stopped him. I don't recall seeing a mandible or other bones although there might have been some—as I said preservation was very poor. Perhaps the uppermost part also had been damaged by farming activities, as it must have been just below or perhaps protruded slightly into the plow zone—perhaps not—we will never know for sure. The cranium was worked around with trowels to pedestal and then photographed. The light-colored bone was not much more than a powder so I have no idea if it actually made it back to the lab intact or not within that pedestal. I don't recall if the child had been buried inside of a house or adjacent to one (Feagins, personal communication January 8, 2014).

This single account indicated that excavation occurred quickly with shovels and the dirt may not have been screened. A considerable amount of data was lost, as evident from the discussion of the shoveling of a child's cranium into numerous pieces by a crew member who did not realize what he was doing until Barr stopped him.

For three days in April 1972, KSHS archeologists returned to the site with 30 students from a sociology course that Witty was teaching at Washburn University in Topeka. Witty assigned a new number

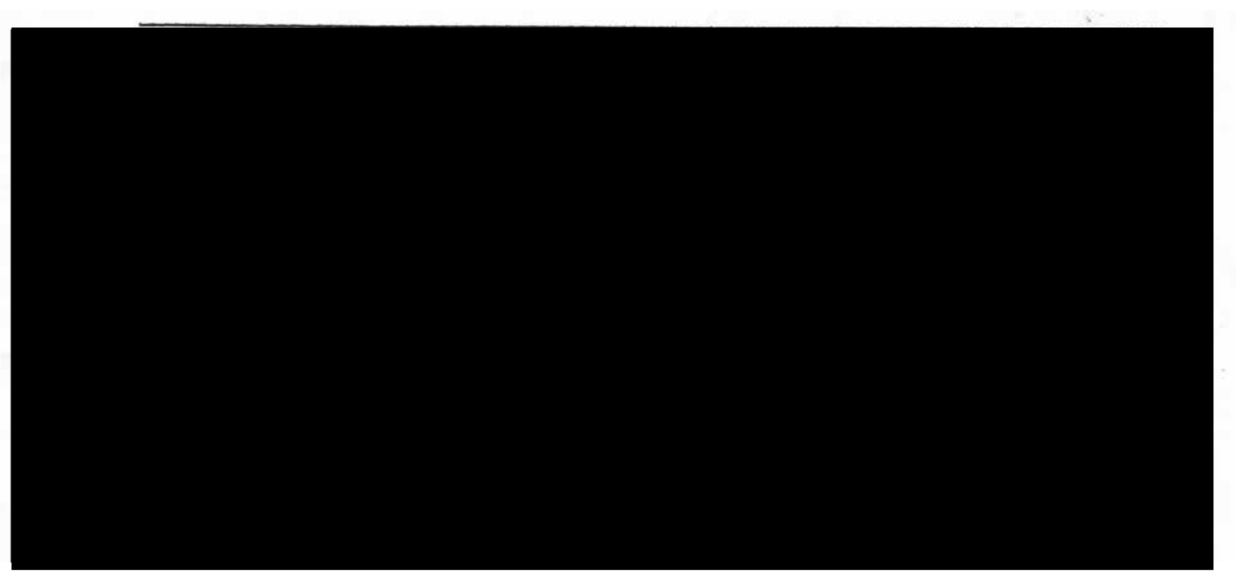

Figure 22. 1971 progress report, depicting the distance of 140 ft between the edge of the field to the west and the main excavation trench (KSHS 1971:14JF350 record number 30).

system for the grid, using the designation "X" instead of maintaining the original "N" (KSHS 1972:14JF350 record number 56). The squares 0-0, N1, N2, N3, N4, and N5 were renamed as X4, X13, X20, X29, X37, and X46 (Figure 23). On April 8, 1972, the first day of the 1972 project, all of the original squares were reopened except X4 (0-0) and X46 (N5). In addition, new squares X14, X19, X31, X35, and X48 were opened. By the end of day one, units X36 and X31 were noted as being near completion, while all other squares were "in some kind of mix" (KSHS 1972:14JF350 record number 58).

April 22, 1972, the second day of excavation, was a shorter work day, as the entire crew arrived late following a test that Witty administered to his class that morning. Several squares were finished or discontinued, including X48, X36, X37, and X14. New squares opened were X38 and X18. Two 10 by 5-ft (3.048 by 1.524-m) half squares were opened on the east side of the grid, adjacent to X29 and X13. Overall, all squares were said to be nearing 1.5 ft (45.72 cm) in depth by the end of the day. Significant finds were stone celts, a portion of a muller, rim sherds, and a small area of relatively large stones against the east wall of X20 (KSHS 1972:14JF350 record number 114).

April 29, 1972, the third and final day with the Washburn students, proceeded with excavation of X12, X13, X18, X19, X20, X28, X29, X30, X31, X35 and X38. Squares that were completed, although not excavated to sterile soil, were X18, X20, and X28. Several balk walls were removed between units X36-X30, X48-X35, X31-X30, X31-X18, and partially between X36-X35. Two significant progress reports noted 1) the coring of mixed soil in X18 that contained burned earth, which was interpreted as a post mold, and 2) the digging of a similar feature in X30 that lacked mix, recognizing variations in compaction and texture. Two additional features in X31 and X20 lacked mix or compaction and were

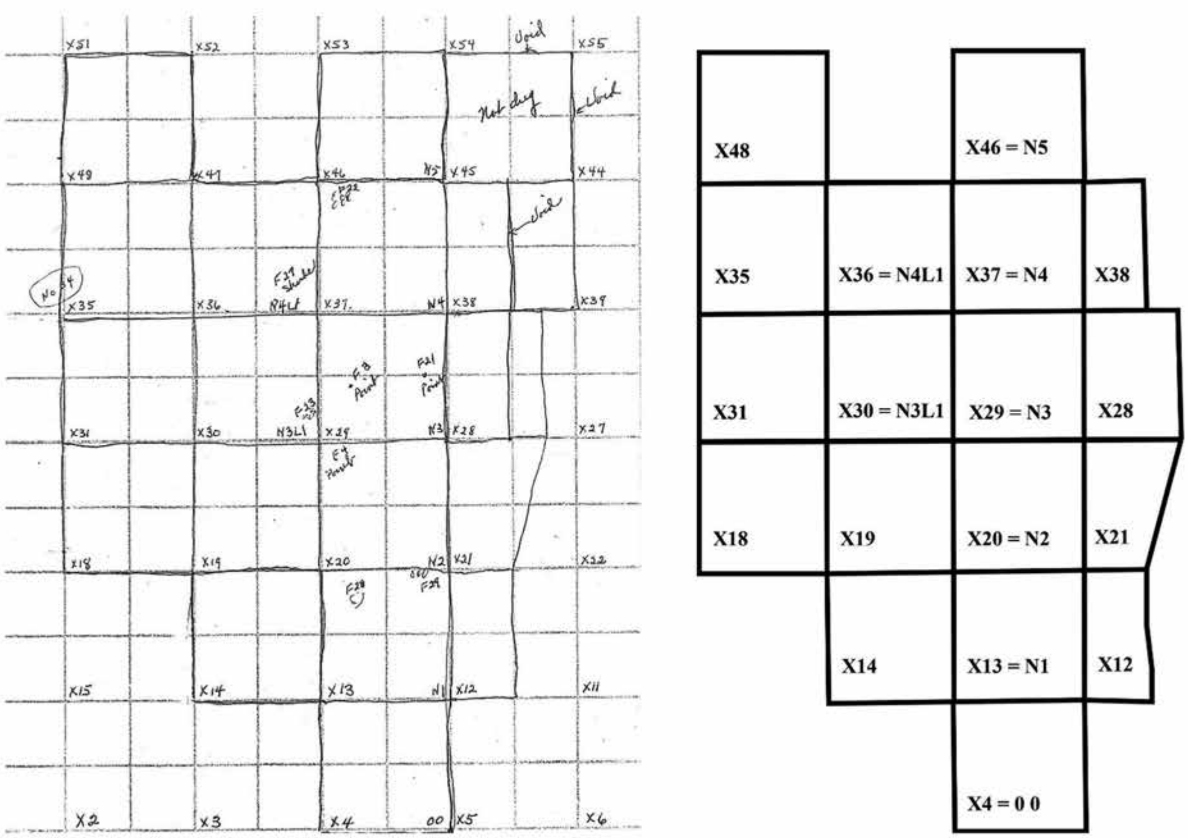

Figure 23. 1972 revised grid number system and excavation limits. Original document on the left (KSHS 1972:14JF350 record number 41); reproduction on the right.

rejected as post molds (KSHS 1972:14JF350 record number 117).

Between April 29 and May 17, 1972, no work was done at the site. From May 17 to 19, Witty, Reynolds, and Reichart returned to remove remaining balk wall segments and locate post mold patterns for the assumed dwelling (KSHS 1972:14JF350 record number 136). The difficulty in locating post mold patterns over these three days is expressed by Witty (KSHS 1972:14JF350 record number 136) in the following excerpt from the second to last progress report.

> The entire problem of post hole locating at the site is as yet satisfactory [sic] resolved. The features that have been dug into and cored and assumed to be post holes are found by the exposing in HX of small areas which have flecks of burned earth and usually flecks of charcoal. The overall soil coloration at a depth of about 1.7 ft beneath the surface is that of dark brown. Little or no discoloration shows to mark post holes or even rodent burrows. It is just the presence of mixed materials that reveal their location. If the mixed material is in a limited area coring is attempted with the mix normally extending only to a depth of about 1 or 2 inches below our excavation floor. From there on down coring is done by texture and moisture content of the soil. In the features which we cored and assumed to be post holes the compaction of the soil was noticeably softer and moisturer [sic] going strait [sic] down.
>
> These features are being found chiefly around the perimeter of the main artifact and detritus concentration.
>
> In two cases the assumed post hole features were vertically cross sectioned. Again, no coloration difference was noted however one could detect compaction differences in the area assumed to be the post hole fill.

Another significant find during these three days was an infant burial between X30 and X29. Reichart noticed a concentration of burned earth and charcoal in the balk wall between these two units as he was removing it. Coring resulted in the discovery of the burial. Interestingly, the mix was noticed in the balk wall and recorded that way by Witty in the May 24, 1972, progress report (KSHS:14JF350 record number 136), but the recording on the feature form specified the depth as starting at 1.7 ft. Barr and Feagins described the occipital bones from the 1971 excavation as located slightly in the plow zone and under it in level 2 (0.5–1.0 ft), while the feature form completed by Reynolds (KSHS 1972:14JF350 record number 22) identified the depth as 1.75–1.85 ft below the surface. The discrepancies in vertical provenience measurements for these burials, recorded upon initial discovery and on later record forms, are problematic.

The final progress report, dated May 31, 1972, is the second reference to three days in May (i.e., May 24–26, 1972), although it is not clear if they were at the site on these days in addition to May 17–19 or if there are typographical errors in the documents. Suffice it to say, they worked for at least three days in May and possibly six. The last progress report reiterates that Witty, Reynolds, and Reichart were at the site "still attempting to locate post holes and gain some information about the assumed dwelling which once stood at the site" (KSHS 1972:14JF350 record number 139). They sought to do this by following a pattern of apparent post molds within the excavation limits and around the main artifact concentration. Witty's (KSHS 1972:14JF350 record number 139) discussion in the progress report revealed that this was not easy, and a whole new interpretation of the pattern took shape.

> We were still attempting to locate post hole patterns and gain some information about the assumed dwelling which once stood at this site. On the first day we continued to skimming (sic) the floor to try and detect evidence of post holes. We worked across the northeast and northwest areas of the floor and located a few more spots marked by burned earth and occasional flecks of charcoal which when cored were found to be soft, cylindrical and had a depth of about 1.1 to 1.2 ft. During this time, we also cancelled [sic] a larger number of spots which failed to have any mix extending below the surface of the excavation floor and/or were firm in texture. It became evident that the arch of features which we interpreted as post holes swung to the east that (sic) it crossed into X38, X28 and through the undug portion of X21. The balk walls between these excavations and the principal excavation were removed. Also, X21 was excavated in what would amount to slightly more than its west half. The house did appear to be roughly circular with the burial, F134, being in the approximate center.

On Friday we mapped the site, cleaned the floor and photographed it. However, the black and white camera broke and it is doubtful if we have any black and white photos of the finished excavation. We filled in the pit, F133, containing the burial and removed all of the grid stakes as well as the balk remnants at the grid corners. When we left the site is was completely clean of any of our material.

Clearly, features that may have represented post molds were being interpreted as such, even though sterile sub-soil had not been reached. Under these circumstances, it can be difficult to differentiate post holes from rodent burrows. To complicate matters even more, weather caused problems during the April excavations. In the progress report from April 29, Witty (KSHS 1972:14JF350 record number 117) stated, "Today work began at the site with the Washburn University class. Rains earlier in the week and during the morning had left the site again wet. However, we were able to work and were not slowed up too much." The site was wet on April 29 and had been previously as well, but this was not noted in any of Witty's other progress reports. On the other hand, progress reports that crew members completed daily for individual units do provide information about the wet conditions.

Finding our square quite saturated with water, we proceeded to further excavate our second level (8" deep). Ann Hawks, April 22, 1972 (KSHS:14JF350 record number 76).

In grid #X31 we continued our excavation of level 0.8'–1.25'. A great deal of water had filled our grid and left a great deal of silt on the floor. Harry W. Lunley, April 22, 1972 (KSHS:14JF350 record number 131).

The second level under the plow zone that had progressed about two feet from the east wall on the 22nd was started again, in the mud (Mother Nature simply isn't cooperating). Ann Hawks, April 29, 1972 (KSHS:14JF350 blank record number).

The reason for leaving X20 square was a lack or near lack of mix and because of the muddy earth it was not possible to make out post holes if any. Don L. Sieve, April 29, 1972 (KSHS:14JF350 record number 150).

The excavation units were saturated with water for at least two of the three days in April. In addition, as was evident with the 1971 project, the work was extremely fast. Pictures from the first day (April 8, 1972) and feature records revealed that excavations had reached level 3 (1.0–1.5 ft [30.48–45.72 cm]) by the end of the day (Table 16; Figure 24).

The 1971 excavation reached a depth up to 1.0–1.5 ft (30.48–45.72 cm) in three days, and the 1972 excavation reached on average a depth up to 1.7 ft (51.82 cm) in three days. A span of three days in May 1972 was spent by Witty, Reynolds, and Reichart removing remaining balk walls and expanding excavations slightly on the eastern edge of the excavation limits in pursuit of post molds. The project covered a total of nine days (possibly 12 if Witty, Reynolds, and Reichart were there for six days) excavating the Hamon site, of which only six had more than three individuals working. The area was wet from rain on at least three of those six days, but work continued in the mud. Excavations took place with a week of exposure of the site between day one (September 24) and day two (October 2) in 1971, two weeks of exposure between day one (April 8) and day two (April 22) in 1972, one week of exposure between day two (April 22) and day three (April 29), and two and a half weeks of exposure between day three (April 29) and the first (May 17) of the few days in May 1972 when Witty, Reynolds, and Reichart labored alone. If X20 needed to be closed down because mud prevented the interpretation of features, then many other units may have been excavated where features could not be distinguished either. In regard to both the 1971 and 1972 excavations, it appears that fast digging with shovels, some inexperienced crew, rainy weather, and not having reached sterile sub-soil may have obscured and lost data, leading to an unintentionally biased site interpretation.

Original Interpretations

A complete analysis of the excavations and material recovered from the Hamon site was never performed and printed, but Barr (1971) did write a brief summary of the 1971 KAA Fall Fling excavation. Fifteen years later Reynolds (1987:162) published data about the house in the form of a map depicting the inferred post molds, the basin

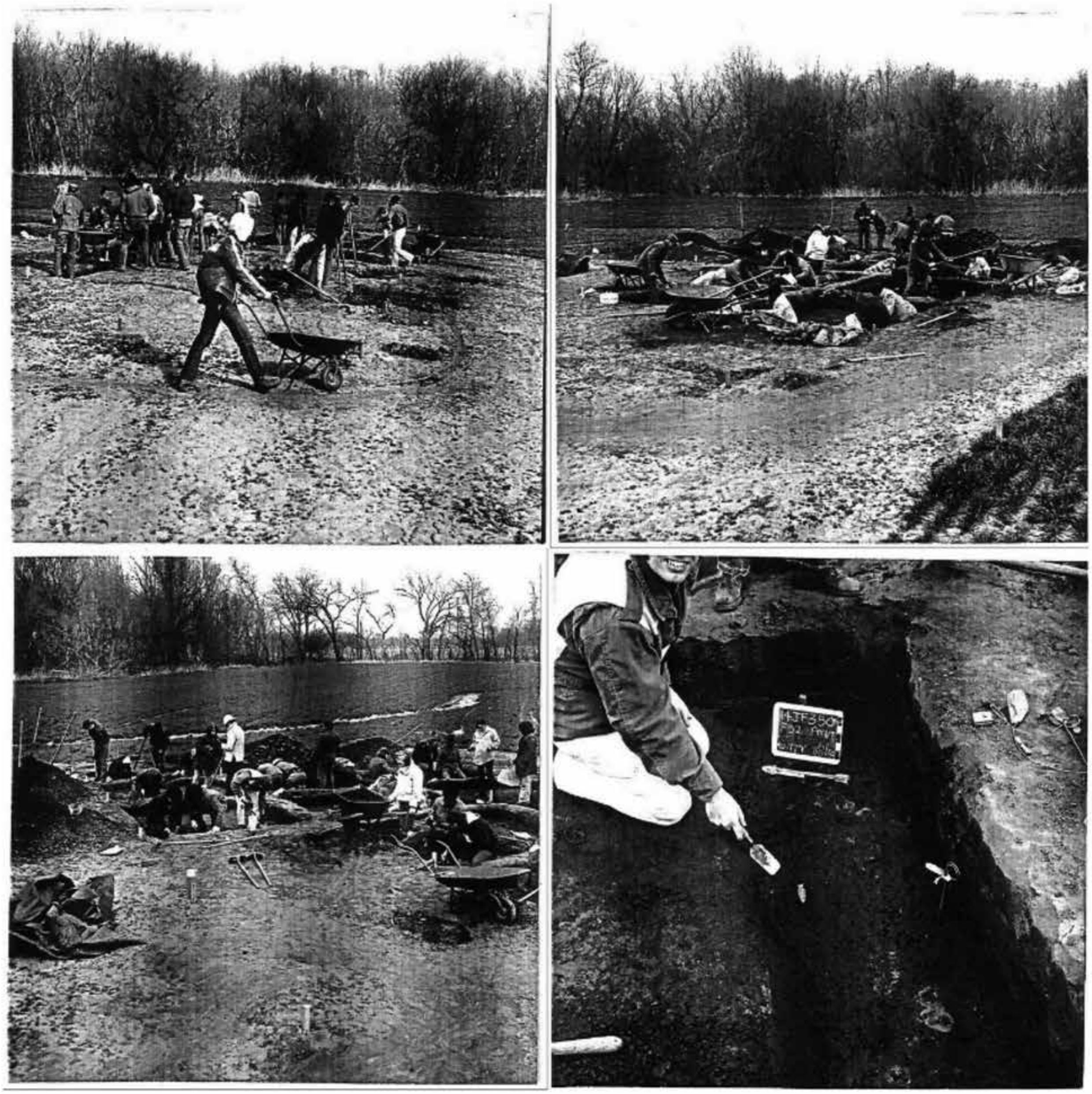

Figure 24. April 8, 1972, excavations at the Hamon site. Progress is shown, starting at the top left and ending at the bottom right. Top left, view slightly to the northwest; top right, view slightly farther to the west than previous view; bottom left, view to the north; bottom right, a point feature. Directional arrow shows that the excavation is aligned to the northwest.

containing the infant burial, and a mass of daub just southeast of that basin in a report about archeology of the Grove Reservoir. The map image is replicated here with the vector-based software that shows the house and feature map, along with the excavation grid and its limits (Figure 25). The house plan is identical to Reynolds' map with the exception of the skew to show true north. The grid was not set to true north during the excavations; it was skewed to the northwest, which was revealed from site records and the black and white photographs from day one in 1972 (Figure 24, bottom right).

In this publication Reynolds (1987:161–179) discussed Grasshopper Falls phase houses. With

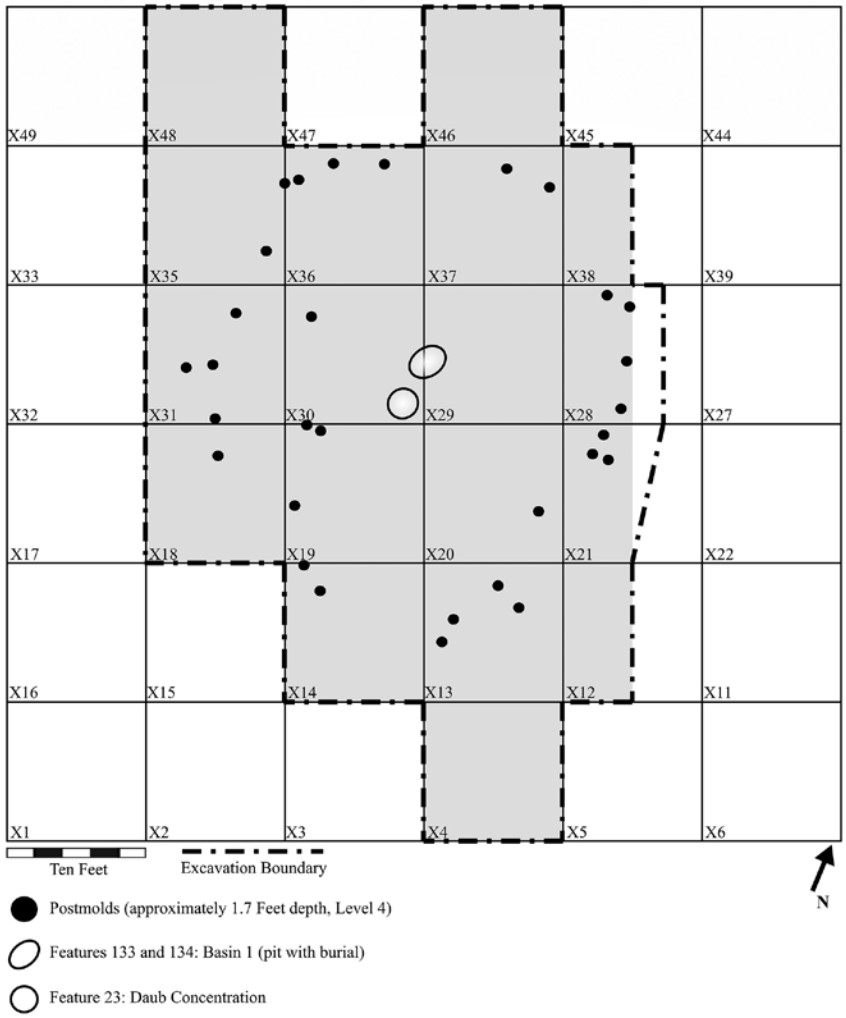

Figure 25. Recreation of Reynolds' (1987:162) map of features and house plan, delineated by post molds. The excavation grid and alignment to true north has been added.

reference to the Hamon site, several discrepancies became apparent between the field records and Witty's progress reports and what was shown and said about the house and associated features. Specifically, Reynolds acknowledged only two features: the pit that contained the infant burial and the daub concentration in the southeast corner of X30, located slightly south of the infant burial. Numerous features from levels 2–4 were either omitted by or unknown to Reynolds.

Another inconsistency pertained to details about the post molds. As noted earlier, Witty said that no discoloration was evident to indicate posts; the general color of the soil was dark brown, and posts and rodent burrows could not be detected by discoloration. His comments correlate with the dark-colored Wabash soil of the terrace where the Hamon site is located. In the Grove Reservoir publication Reynolds (1987:166) stated, "At site 14JF350 the excavated stains which marked the post molds were actually the postholes into which posts had been set." He continued that the Hamon site contained better preserved post molds than other Grasshopper Falls phase houses excavated by Marshall (1987:166) and that trash-filled basins were found at numerous Grasshopper Falls phase house sites, with those from the Hamon site being exceptional because of the infant burial. While Reynolds (1987:167) did not name specific sites, he mentioned that numerous posts from several sites perhaps were not part of house structures but rather auxiliary structural remains from drying racks, windscreens, etc.

The table of Grasshopper Falls phase houses revealed a glaring difference in the interpreted size of

Table 12. Artifacts without Provenience or Recorded with Non-standard Methods.

X unit	Level 1	Level 2	Level 3	Level 4	Totals
Balk walls	NA	NA	NA	NA	654
Surface no unit provenience	NA	NA	NA	NA	640
X31: Level 1-2 non-standard recording methods	?	?	NA	NA	83
X12, X29, X31, X36, X48: Level 2-3 non-standard recording methods	NA	?	?	NA	178
X21, X28: Level 3-4 non-standard recording methods	NA	NA	?	?	39
Backdirt	NA	NA	NA	NA	17
NA	NA	NA	NA	NA	4
Totals	NA	NA	NA	NA	1,615

the Hamon house, compared to the five houses from other sites (Reynolds (1987:164, Table 12). The lengths and widths of the other five houses were 12 by 10 ft (3.6576 by 3.048 m), 13 by 11 ft (3.9624 by 3.3528 m), 15 by 11 ft (4.572 by 3.3528 m), 20 by 18 ft (6.096 by 5.4864 m) and 24 by 21 ft (7.3152 by 6.4008 m). The 14JF350 house was described as having a length and width of 32 by 29 ft (9.7536 by 8.8392 m). In addition, an interpreted Grasshopper Falls phase house at the Avoca site (14JN332) was even larger with dimensions of 15.75 by 10.75 m (51.7 by 35.3 ft) (Baugh 1991:41). Reynolds remarked that the Hamon site represented a single occupation Grasshopper Falls phase house with two features and no internal hearth, similar to other Grasshopper Falls phase houses.

Spatial Analysis and New Interpretations

The original Hamon site excavations were reconstructed by summing the total artifact counts and weights from each excavated unit. Using proveniences from field records, this data was plotted and visually projected on plan view maps for each excavation level. Material categories encompassed chert, rock, pottery, daub, and burned earth. Only 27 items did not belong to one of those categories, including small amounts of metal, burned wood, bark, bone, and one snail shell. The artifacts were separated by counts and weights by unit and totaled for each 0.5-ft (15.24-cm) level, matching the arbitrary level proveniences used in the excavations. Of 5,354 specimens, 1,615 could not be incorporated in the spatial analysis due to poor provenience data (Table 12). Most came from balk walls of the grid, the surface, or backdirt; some were recorded with methods that deviated from the 0.5-ft level system; others lacked specific provenience information. The majority of insufficiently provenienced objects came from units X21, X28, and X31.

After numbers were analyzed in Excel®, spatial data pertaining to the remaining 3,739 artifacts (Table 13) was entered into a vector-based software (Inkscape), and surface area contours were generated for artifact quantities in units for each of the four excavation levels. This data was then cross referenced with weight totals. Level 4 was the only level that was not completed to 0.5 ft (15.24 cm). As seen in Witty's progress reports, the excavation reached an average of 1.7 ft (51.82 cm) below ground surface. The data was combined with the interpreted post mold pattern and recorded features and projected with the vector-based software. The result is a two-dimensional representation of a three-dimensional relief of artifact frequencies in each unit, with interpreted features and post mold locations superimposed (Figures 26–29). Total counts are depicted by pyramid models and total weights by shade scales of the pyramids in each unit. Larger pyramids and darker shades correspond to higher total counts and weights, respectively. This graphic style gives a unique look into artifact distribution in association with recorded features.

The surface of the Hamon site yielded 640 items (Table 12). Level 1 contained 752 artifacts but was considered plow zone and excavated very quickly

Table 13. Total Counts and Weights of Artifacts with Uniform Provenience Data, Used in the Reconstructed Spatial Analysis.

X unit	Level 1 N	Weight (g)	Level 2 N	Weight (g)	Level 3 N	Weight (g)	Level 4 N	Weight (g)	Total counts	Totals (g)
X4	2	6.10	65	206.70	0	0	0	0	67	212.80
X12	4	45.90	1	0.80	8	147.80	7	21.90	20	216.40
X13	19	224.60	164	2,005.10	91	2,069.80	20	426.80	294	4,726.30
X14	21	164.80	68	520.00	62	609.80	7	200.90	158	1,495.50
X18	16	210.00	75	1,137.40	17	147.20	3	108.40	111	1603.00
X19	61	1,027.60	384	5,981.69	9	281.90	6	178.30	460	7,469.49
X20	49	338.20	345	5,440.87	244	5,543.79	40	751.57	678	12,074.43
X21	6	29.30	26	241.80	38	477.40	22	467.90	92	1,216.40
X28	66	582.60	77	977.50	96	2,027.80	4	105.60	243	3,693.50
X29	87	1,106.40	180	4,238.45	86	811.60	14	137.10	367	6,293.55
X30	34	859.51	156	3,003.22	83	1,490.10	0	0	273	5,352.83
X31	0	0	45	1,057.30	52	1,262.10	4	38.70	101	2,358.10
X35	25	100.00	36	323.40	18	228.40	0	0	79	651.8
X36	90	3,027.80	119	2,831.10	0	0	0	0	209	5,858.9
X37	96	1,821.89	63	1,791.68	73	997.67	1	13.90	233	4,625.14
X38	79	1,088.60	54	467.50	87	953.00	0	0	220	2,509.10
X46	67	1,366.80	37	211.50	0	0	0	0	104	1,578.30
X48	30	105.10	0	0	0	0	0	0	30	105.10
Totals	752	12,105.20	1,895	30,436.01	964	17,048.40	128	2,451.07	3,739	62,040.64

without identifications of features (Table 13). Artifact distribution by unit reveals that a significant amount of material was recovered from the central, north, and northeast portions of the excavation limits. Amounts from the southeast and western edges were relatively minor in comparison. Units X13, X14, X20, X35, and X48 had low weights compared to counts. Units X19, X28, X29, X30, X36, X37, X38, and X46 had the highest proportions of total weights to specimen counts (Tables 13 and 14; Figure 26). The overall trend of the artifact distributions suggests that the unopened units (X27, X39, X45 and X47) along with the second half of X38, would have had a high probability of material extending into them.

The second level was still partially in the plow zone. This level had the most recorded artifacts at 1,895 and the first features to be recorded (Tables 13 and 15). Features included single specimens, such as points and pottery rim sherds, as well as configurations of stones, pottery, chert, daub/burned earth, and charcoal. The majority of the 17 features from this level were single objects, essentially piece plots in current terminology, and not actual archeological features (Table 15).

Encountered in this level were the human remains in X37 and the daub concentration in X30, which Reynolds discussed in his 1987 publication. The record form described the daub concentration in the southeast corner of the unit as underlain and surrounded by smaller pieces of daub/burned earth, stone, pottery, and charcoal (KSHS 1971:14JF350 record number 23). The underlying mixture extended to the northwest in a circular arch with a radius of 4.4 ft, and it was assumed that this feature probably extended into adjacent squares. Two modern posts from a historic fence were located in X13 and X21 at this level and metal fence wire in X12 (Table 15). The X21 historic post was shown on the Hamon site house plans on file at the KSHS. Three clusters of pottery with a mixture of chert, daub/burned earth, and charcoal were recorded in the west half of X28, and several interesting features were recorded in X19 and X31.

In X19, 384 artifacts were recovered. Two features, one composed of an aggregation of rock, pottery, and daub, and the other comprised of a configuration of rock, pottery, and burned earth, were recorded. The progress reports of the unit

Table 14. Percentages of Total Artifact Weights (g) by Excavation Unit and Level.

X Unit	Level 1 % (g)	Level 2 % (g)	Level 3 % (g)	Level 4 % (g)	Totals % (g)
X4	0.1	0.7	0.0	0.0	0.3
X12	0.4	0.0	0.9	0.9	0.3
X13	1.9	6.6	12.1	17.4	7.6
X14	1.4	1.7	3.6	8.2	2.4
X18	1.7	3.7	0.9	4.4	2.6
X19	8.5	19.7	1.7	7.3	12.0
X20	2.8	17.9	32.5	30.7	19.5
X21	0.2	0.8	2.8	19.1	2.0
X28	4.8	3.2	11.9	4.3	6.0
X29	9.1	13.9	4.8	5.6	10.1
X30	7.1	9.9	8.7	0.0	8.6
X31	0.0	3.5	7.4	1.6	3.8
X35	0.8	1.1	1.3	0.0	1.1
X36	25.0	9.3	0.0	0.0	9.4
X37	15.1	5.9	5.9	0.6	7.5
X38	9.0	1.5	5.6	0.0	4.0
X46	11.3	0.7	0.0	0.0	2.5
X48	0.9	0.0	0.0	0.0	0.2
Totals	100.0	100.0	100.0	100.0	100.0

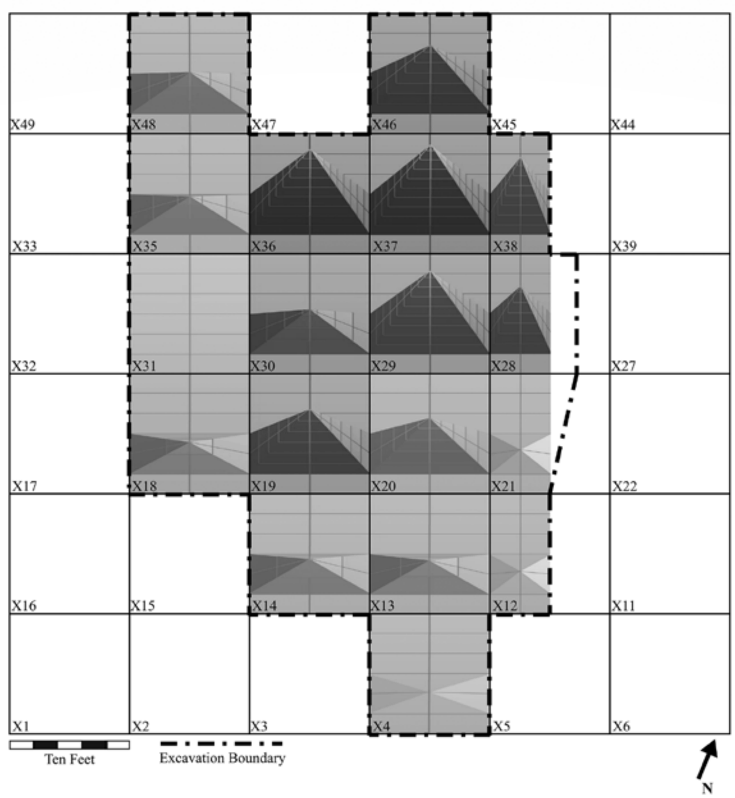

Figure 26. Level 1 (0.0–0.5 ft [0–15.24 cm]) artifact count and weight distributions per unit.

Table 15. Dates and Descriptions of Features Recorded in Level 2 (0.5–1.0 ft [15.24–30.48 cm]).

Feature Number	Date	X Unit	Type/description	Depth	Dimensions/ location
21	10/2/1971	29	Small corner-notched serrated point	0.7 ft (21.3 cm)	5.4 ft N of SE stake/ 0.5 ft W of E wall.
22	10/2/1971	37	Human occipital bone fragments/small bone fragments	0.75–0.85 ft (22.9–25.9 cm)	2.75 ft W of E wall/ 1.0 ft N of S wall
23	10/2/1971	30	Circular arching concentration of daub mix of charcoal/burned earth/pottery/stone	0.8 ft (24.4 cm)	4.4 ft radius, extending from SE corner to NW
24	10/2/1971	30	Rim sherd	0.9 ft (27.4 cm)	1 ft S of N wall/ 5.2 ft W of E wall
25	10/2/1971	30	2 rim sherds, 2 ft apart	0.9 ft (27.4 cm)	3 ft S of N wall /3.5 ft E of W wall & 5 ft S of N wall /4.5 ft E of W wall
27	10/2/1971	36	Pottery concentration; sherds removed prior to record	0.75 ft (22.9 cm)	2.5 ft W of SE stake/ 0.9 ft N of S wall
29	10/3/1971	13	Historic fence post remains	0.9 ft (27.4 cm)	1.75-2.7 ft S of N wall/ 0.9 ft E of W wall
43	4/8/1972	37	Rim sherd	0.7 ft (21.3 cm)	1.9 ft E of W wall/ 0.3 ft S of N wall
62	4/8/1972	19	Cluster of stone/ceramic/daub	0.6 ft (18.3 cm)	2.5 ft E of W wall/ 5.0 ft S of N wall
63	4/8/1972	19	Cluster of stone/ceramic/burned earth	0.7 ft (21.3 cm)	3.4 ft N by S & 1.8 ft E by W in SW corner
64	4/8/1972	19	Rim sherd	0.7 ft (21.3 cm)	7.3 ft E of W line/ 2.2 ft N of S wall
78	4/8/1972	14	Rim sherd with some stone not in situ	1.0 ft (30.5 cm)	3.7 ft W of E wall/ 4.5 ft S of N wall
59	4/22/1972	19	Stone celt in general mix zone	1.0 ft (30.5 cm)	4 ft N of S wall / 3 ft W of E wall
61	4/22/1972	19	Large cord-roughened body sherd in main mix zone	1.0 ft (30.5 cm)	0.7 ft W of E wall/ 3.9 ft N of S wall to center
94	4/22/1972	28	3 clusters of ceramics: mixed soil containing chert/burned earth/daub/charcoal	0.7 ft (21.3 cm)	Complex A: 3 ft N of S/2.5 ft E of W to center Complex B: 5.3 ft N of S/2 ft E of W to center Complex C: 1.8 ft N of S/2.2 ft E of W to center
101	4/22/1972	38	Muller section	0.8 ft (24.4 cm)	2.3 ft E of W wall/ 4.5 ft N of S wall
110	4/29/1972	31	Scattered complex of burned and unburned stone/chert/small sherds in general mix level	0.85–1.0 ft (25.9–30.5 cm)	5 ft E to W/ 3.5 N to S in a circular arch from NE corner

excavators revealed that some controversy took place over some of the material in X19 at this level:

> Began carefully excavating the plow zone, finding mix very concentrated with pottery sherds, flint chips, rocks (primarily limestone), and orange daub. The first feature was made on a cluster of rocks positioned in somewhat of a lineal pattern (located approximately by the east wall in the center. A second feature was made near the first feature and consisted of a cluster of rocks, pottery sherds, and large pieces of daub. Numerous rocks were located toward the middle of the square but did not appear to have any organization and after "professional confrontation" were lifted out of the floor. Ann Hawks, April 8, 1972 (KSHS:14JF350 record number 115).

Another crew member in the unit mentioned this situation, as well as commenting on feature 63, located in the southwest corner.

> Another, larger cluster of rocks was found by the person excavating along the south balk wall. This cluster was up against the west balk wall and consisted of larger rocks and offered the possibility of being part of a hearth. Because the rocks were up against the west balk wall, there is a possibility that a continuation of this cluster might be found when the contiguous excavation to the west of X19 is dug. Mary Wasson, April 8, 1972 (KSHS:14JF350 record number 67).

X20 directly to the east contained a similar number of artifacts (345), the second largest quantity for the level. The spatial distribution shows that the total weight was comparable to X19 as well (Tables 13 and 14; Figure 27). No features were recorded in this unit.

In the northeast corner of X31, feature 110 was recorded as a complex of burned and unburned limestone/chert and small pottery sherds (KSHS 1972:14JF350 record number 110). Like feature 23, it was described as forming a circular arch, radiating southwest from the northeast corner of the unit and probably extending into adjacent units (Table 15; Figure 27). It was recorded as continuing into the balk wall between X31 and X35 (KSHS 1972:14JF350 record number 116). None of the three features with arching complexes of stone that may have been hearths and activity areas (features 23, 63 and 110) was mentioned in the progress reports of adjacent units. Feature 63 appears to have an arch that would suggest a spread into X15, but that unit was never opened (KSHS 1972:14JF350 record number 63).

The spatial distribution for level 2 shows an increase in both artifact counts and weights from level 1 to level 2 in X4, X13, X14, and X18, which indicates that adjacent units X3 and X15 had a high probability for enlarging site boundaries (Tables 13 and 14; Figure 27). X13, X19, X20, X29, X30, X36, and X37 contained the highest total weights and artifact counts, with a shift in frequency to the south in level 2 from the north in level 1 (Tables 13 and 14; Figure 26).

The overall quantity of artifacts decreased from level 2 to level 3 (1.0–1.5 ft [30.48–45.72 cm]); however, a total count of 964 made level 3 the second densest level (Table 13; Figure 28). Although X4 had shown a gain in artifact density from level 1 to level 2, it was not reopened during the 1972 project as were the rest of the units from the 1971 excavation trench. This is important because the adjacent unit X13 to the north continued to grow in material and total level distributions. X46 was not reopened in 1972 either. X4 and X46 were at the extreme ends of the north/northwest aligned grid.

Recorded features from level 3 continued to be dominated by isolated stone tools and pottery rim sherds or clusters of three to five pottery sherds. For example, while more material was recovered from X20 than any other unit in level 3, only one feature, an isolated projectile point, was recorded there (Table 16). A human tooth that had a deteriorated root was recovered from the extreme northern portion of X30 and was recorded as feature 60 (KSHS 1972:14JF350 record number 60). Tooth morphology matches a P3 or P4 premolar, although mandibular or maxillary placement cannot be adequately assessed. Given the development of the root and wear on the crown, the specimen most likely represents an individual in the mid-to-late teenage years at minimum.

X13 and X28 contained features recorded as concentrations or complexes of material. In X13 two features were recorded, one in 1971 and the other in 1972. The 1971 feature 28 was a concentration of stone, pottery sherds, and burned daub at 1.1 ft

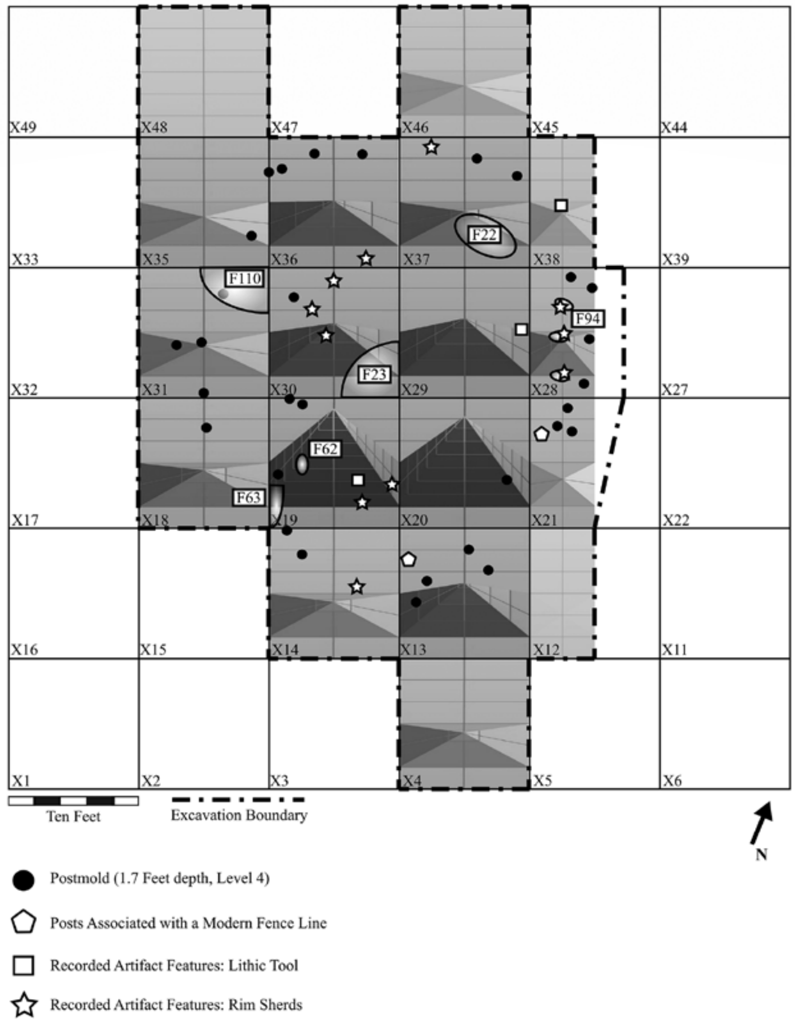

Figure 27. Level 2 (0.5–1.0 ft [15.24–30.48 cm]) artifact count and weight distributions per unit, with recorded features. Post molds associated with level 4 are shown for reference.

(33.528 cm) (KSHS 1971:14JF350 record number 28; Table 16; Figure 28). The 1972 feature 148 was recorded south of feature 28 and aligned more to the center of the square. It was a complex consisting of burned limestone, "featured rock," and potsherds at 1.45 ft (44.196 cm) (KSHS 1972:14JF350 record number 148; Table 16; Figure 28). Feature 149 in X28 was a complex of cord-roughened rim (two) and body sherds, flint debris, burned limestone, and burned sandstone (KSHS 1972:14JF350 record number 149; Table 16; Figure 28). The sketch of feature 149 depicted it as an elongated complex with a circular opening in the center. The sketch of feature 28 in X13 was also somewhat circular but more dispersed than feature 149. It is hard to discern a general shape for feature 148, other than a scatter of material in a relatively confined oval area (Figure 28).

Although overall artifact totals dropped in most of the denser units (X29, X30, and X36) from level 2, a few did see gains. Both X12 and X48, which in level 2 had one artifact and none, respectively, increased in level 3. However, materials recovered from X48 and some from X12, X19, and X36 had proveniences recorded in nonstandard methods. These materials could not be confidently placed in level 2 or 3 and were omitted from the analysis (Tables 12 and 13). The highest total artifact counts and weights in level 3 came from X13, X20, and X28. An upward trend of weight distribution in this level occurred in X14, X21, and X31 (Table 14). The abundance and overall distribution of artifacts increased in southern and eastern edges of the excavation grid (Figure 28). This suggests that adjacent units X4, X15, X27, and X39 would have a high probability of containing additional parts of the site

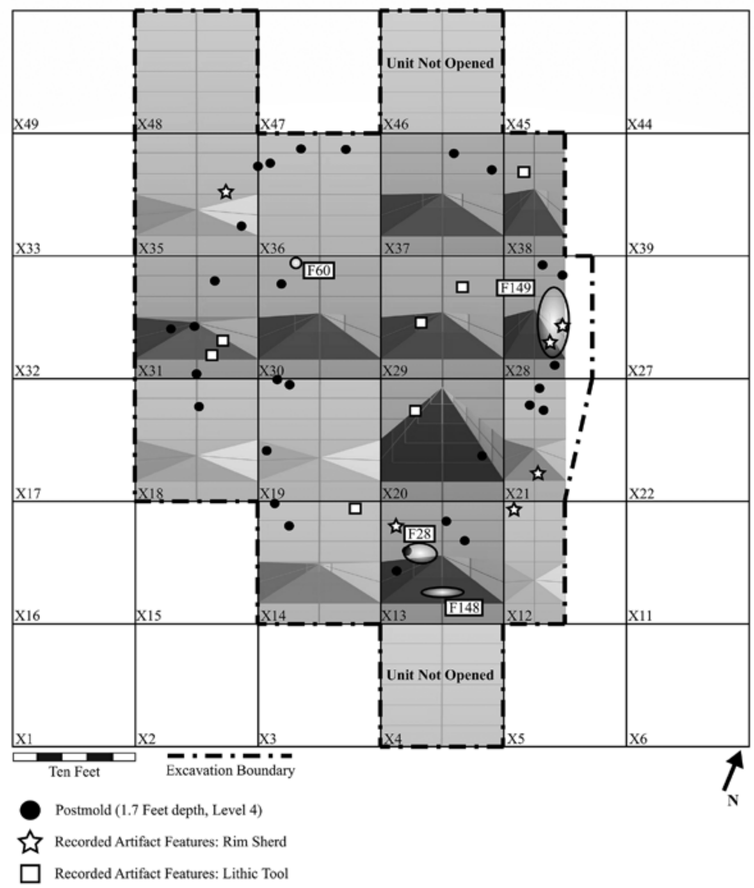

Figure 28. Level 3 (1.0–1.5 ft [30.48–45.72 cm]) artifact count and weight distributions per unit, with recorded features. Post molds associated with level 4 are shown for reference.

had they been opened. The upward trend of counts and weights through X13, X20 and X28 indicates an arching pattern in the southeast portion of the grid that might be distinct from other patterns in the grid. Even though the material recovered from X48 could not be plotted in this recreation and analysis, due to the aforementioned nonnormative recording methods, the possible return of material at this level, located at the extreme northwestern corner of the grid, implies that an extension of the site and possibly a distinct occupation episode might be present in this area.

The final level of the excavation was not the same depth as the previous three levels. Occasionally the unit progress reports stated that excavation stopped at the 1.5–2.0-ft (45.72–60.96-cm) level. However, Witty's progress reports said that the site on average was about 1.7 ft (51.82 cm) at the floor upon which post mold interpretations were made. The artifacts recovered from this level were described as being located on the floors of units. While the total number significantly decreased from the prior levels to only 128, some very important features came from level 4 (Tables 13 and 17).

At this level on April 29, 1972, X20 was closed due to the muddy soil in the unit and inability to interpret post molds, despite that on April 22 an important feature had been recorded in the northeast corner of the unit. Feature 46 was a complex of rocks and pottery sherds on the floor of the unit at 1.6 ft (48.77 cm) below ground surface (Table 17). The rock was identified as sandstone, and charcoal was ubiquitous within the configuration with almost none on the outside (KSHS 1972:14JF350 record number 46). According to a progress report (KSHS 1972:14JF350 record number 96) by the unit excavator, this feature was likely a hearth, and some items in this location had been collected the week before but not recorded.

> Dug 80% of .4 ft of dirt. Uncovered rock configuration (reported) in north corner with three pieces of pottery, and many pieces of charcoal with configuration. Note that this is the exact same

Table 16. Dates and Descriptions of Features Recorded in Level 3 (1.0-1.5 ft [30.48-45.72 cm]).

Feature Number	Date	X Unit	Type/description	Depth	Dimensions/location
28	10/3/1971	13	Concentration of stone/ceramic/daub	1.1 ft (33.5 cm)	2.0-4.6 ft E of W wall/ 3.0-5.2 ft S of N wall
4	10/3/1971	20	Small corner-notched serrated point	1.25 ft (38.1 cm)	2.8 ft E of W wall/ 2.7 ft S of N wall
3	10/3/1971	29	Corner-notched point	1.4 ft (42.7 cm)	3.5 ft E of W wall/ 4.2 ft N of S wall
42	4/8/1972	35	Rim sherd	1.1 ft (33.5 cm)	2.3 ft W of E wall/ 5.3 ft N of S wall
52	4/8/1972	31	Medium/large corner-notched point	1.3 ft (39.6 cm)	2.1 ft N of S wall/ 3.9 ft W of E wall
44	4/22/1972	31	Stone celt	1.15 ft (35 cm)	3.5 ft N of S wall/ 3.0 ft W of E wall
77	4/22/1972	13	Rim sherd	1.2 ft (36.6 cm)	2.3 ft S of N wall/ 0.5 ft E of W wall
60	4/22/1972	30	Tooth	1.4 ft (42.7 cm)	0.6 ft S of N wall/ 3.2 ft E of W wall
45	4/22/1972	14	Stone celt	1.5 ft (45.7 cm)	0.9 ft S of N wall/ 2.6 ft W of E wall
109	4/29/1972	38	Medium corner-notched point	1.1 ft (33.5 cm)	1.8 ft E of W wall/ 3.4 ft S of N wall
149	4/29/1972	28	Concentration of ceramic/chert/burned limestone/burned sandstone	1.35 ft (41.1 cm)	4.6 ft N of SW stake to center/ 4.7 ft E of W wall to first point
147	4/29/1972	12	Concentration of ceramic sherds	1.05-1.35 ft (32–41.1 cm)	9.25 ft N of SW stake/ 1.15 ft E of W wall
148	4/29/1972	13	Concentration of ceramic/stone/burned limestone	1.45 ft (44.2 cm)	2.8 ft N of SW stake/ 4.4 ft E of W wall
57	4/29/1972	29	Corner-notched point base	1.5 ft (45.7 cm)	3.0 ft W of E wall/ 2.8 ft S of N wall
137	5/25/1972	21	Concentration of ceramic sherds	1.5 ft (45.7 cm)	2.0 ft N of S wall to center/ 2.4 ft E of W wall

> place where three sherds were found last week. One was about 2" x 3" but none were [sic] separately recorded, i.e., they were not recorded as to location within our area. Finding these three items together (configuration of rocks, charcoal, broken pottery) would seem to indicate an area where food was cooked.

It is possible to garner from this progress report and others from X19, and even from Jim Feagins' memoir, that communication was an issue during the project. Clearly some features sparked interactions referred to as "professional confrontation."

In X13 a possible hearth feature was discovered and recorded on May 18, 1972, during the last few days of Witty, Reynolds, and Reichart's investigation.

> Feature 118 consists of a pottery sherd found in situ in the floor of this square. The specimen is of an un-tempered and orange clay. It might be a portion of a clay pipe or portion of a small pottery vessel. Chunks (small) of daub and stone fragments and a small grit tempered pottery sherd were found at the same depth in a 1.0 ft. radius around the sherd. Also, charcoal flecks and burned earth noted in

Table 17. Dates and Descriptions of Features Recorded in Level 4 (1.5–2.0 ft [45.72–60.96 cm]).

Feature number	Date	X unit	Type/description	Depth	Dimensions/ location
46	4/22/1972	20	Complex of stone/ceramic/charcoal inside stone complex/dark soil stain within configuration	1.6 ft (48.8 cm)	0.6–2.1 ft W of E wall/ 2.0–3.7 ft S of N wall
103	4/22/1972	14	Rim sherd	1.7 ft (51.8 cm)	3.0 ft S of N wall/ 3.3 ft W of E wall
146	4/29/1972	28	Rim sherd	1.55 ft (47.2 cm)	2.3 ft N from SW stake/ 1.65 ft E of W wall
118	5/18/1972	13	Dark circular stain/small rim & sherds/small stone/daub/burned earth/charcoal	1.6 ft (48.8 cm)	7.4 ft E of W wall/ 7.2 ft N of S wall
133	5/18/1972	29	Mix charcoal/burned earth composing an oval pit, no soil discoloration	1.7-2.5 ft (51.8–76.2 cm)	1.0 ft E of W wall to center/ 5.0 ft S of N wall to center
134	5/19/1972	29	Burial	Lower fill of Feature 133	0.8 ft E of W wall to center/ 5.4 ft S of N wall to center

> this same area. Another rim sherd from a larger vessel was found 0.1 ft. below this first sherd and is included in the feature (as well as a dark circular stain of approximately 1.0 ft. in diameter). John Reynolds, May 18, 1972 (KSHS:14JF350 record number 118).

This feature was recorded at a depth corresponding to that of the feature in X20. The probability of having reached below the general mixed material zone of the site at this depth seems likely. Also apparent is that the mention of a dark stain, and possible dark stains with these features is noted in contrast to what Witty wrote in his progress reports. This could be further evidence that these were areas of open fire for cooking purposes at one time. The final features designated came from a mix of charcoal and burned earth.

> On Thursday the area containing mix was noted in the balk wall between X30 and X29. When this was dug into it was found to be a small pit and as it was being cored a burial was found in it. Tom Witty, May 24, 1972 (KSHS:14JF350 record number 136).

The mix fill of the pit was recorded as feature 133 and the burial within it as feature 134. The location of the pit, detected in the balk wall, is important because no provenience data was kept for balk wall material. On a separate feature form the pit was described as being located at 1.7 ft, coinciding with the general depth of the excavation floor (KSHS 1972:14JF350 record number 133). This recording distracts from the fact that the pit was recognized in the balk wall at a shallower depth and might be part of a more recent occupation component, possibly associated with the other human remains discovered in level 2.

The overall artifact distribution from the thin level 4 excavation suggests that more portions of the site exist outside the excavation limits. The southern and eastern units along the edges of the excavation continued to generate material in contrast to the north and northwest units, which nearly stopped (Tables 13 and 14; Figure 29). X13, X20, and X21 contained the highest counts and weights in this level. Compared with level 3, X14 and X18 also increased in overall level distribution, and several other units still yielded material (Tables 12 and 13; Figure 29). Witty's remarks about the soil still being a dark brown, in which no stains showed post molds or rodent burrows, and features located on the same floor as interpreted post molds, leads to the conclusion that the excavations had not reached culturally sterile subsoil.

The above reconstruction and spatial analysis of the artifact and feature distributions advance a new interpretation for the Hamon site, departing from what appeared in Reynolds' (1987) publication. When all four excavation levels are collapsed to produce an overall plan view of the features (Figure 30), a very different and more complicated

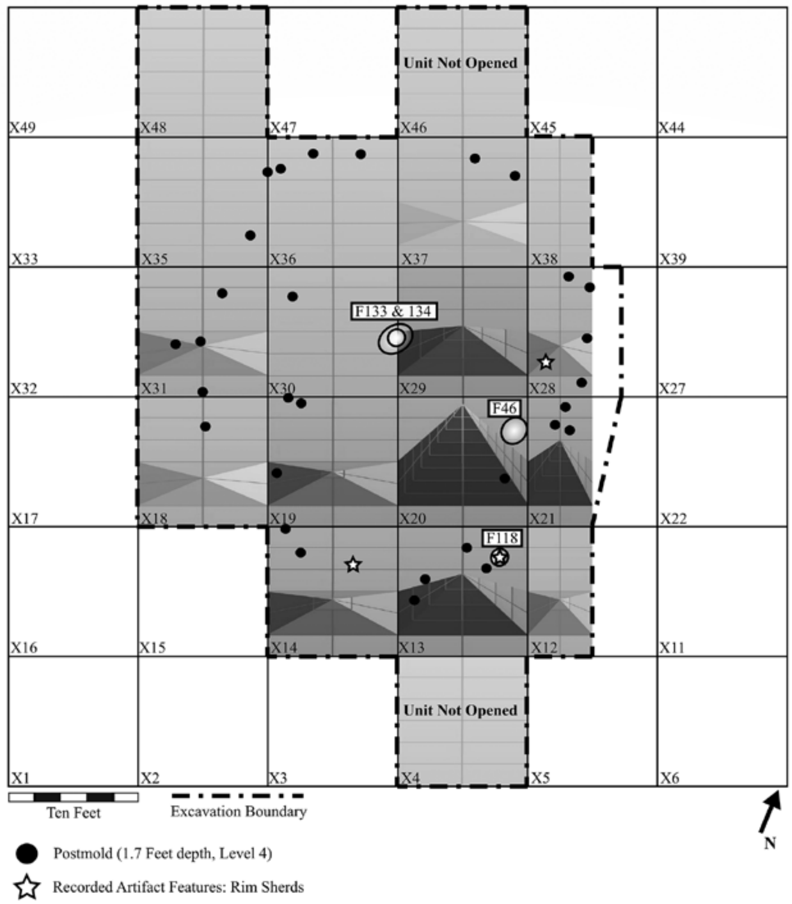

Figure 29. Level 4 (approximately 1.5–1.7 ft [45.72–51.82 cm]) artifact count and weight distributions per unit and recorded features, including interpreted post molds.

picture emerges in comparison to Reynolds' site plan (Figure 22). Foremost, the presence of daub does not necessarily mean that a house stood on the site, although the possibility of some form of structure should not be ruled out. Indications of post molds, confined within the excavation limits except for one slightly expanded area, are too ambiguous in their locations and should not be inferred without solid material evidence in the matrix. Confusion increases if artifacts and features come from the same proveniences as interpreted post molds. In dark soils rodent burrows and post molds are indistinguishable from one another, even when bisected and where stained areas contrast with the lighter colored surrounding soil. As mentioned earlier, hearths, open fire kilns for ceramic production, or similarly constructed structures for drying racks or windbreaks would leave an identical material trace in the archeological record as a house. Only in circumstances with the best preserved materials and features would archeologists be able to discern one from the other.

The Hamon site was plowed into the second excavation level, leaving only one and three-quarters or possibly two whole levels undisturbed. The features reviewed in level 2 of X19, X30, and X31 were circular arching complexes that could have been expected to continue into their adjacent units, but they did not. Some linear features, composed of similar material complexes, might represent disturbance and dispersal by plowing. In addition, the north-northwest portion of the excavations was on the downward slope of the terrace edge toward the shallow slough that cuts through the field. Slope wash was most likely a factor in artifact distribution in the first two levels. The clay-rich soils of northeastern Kansas are susceptible to argilliturbation (clay contraction and expansion) and freeze-thaw processes. The combination of plowing, slope wash, bioturbation, and argilliturbation probably played a significant role in site formation processes.

Hatchery West (11CT10), a Woodland site in south-central Illinois, situated on a terrace equivalent to that of 14JF350, was excavated in the 1960s.

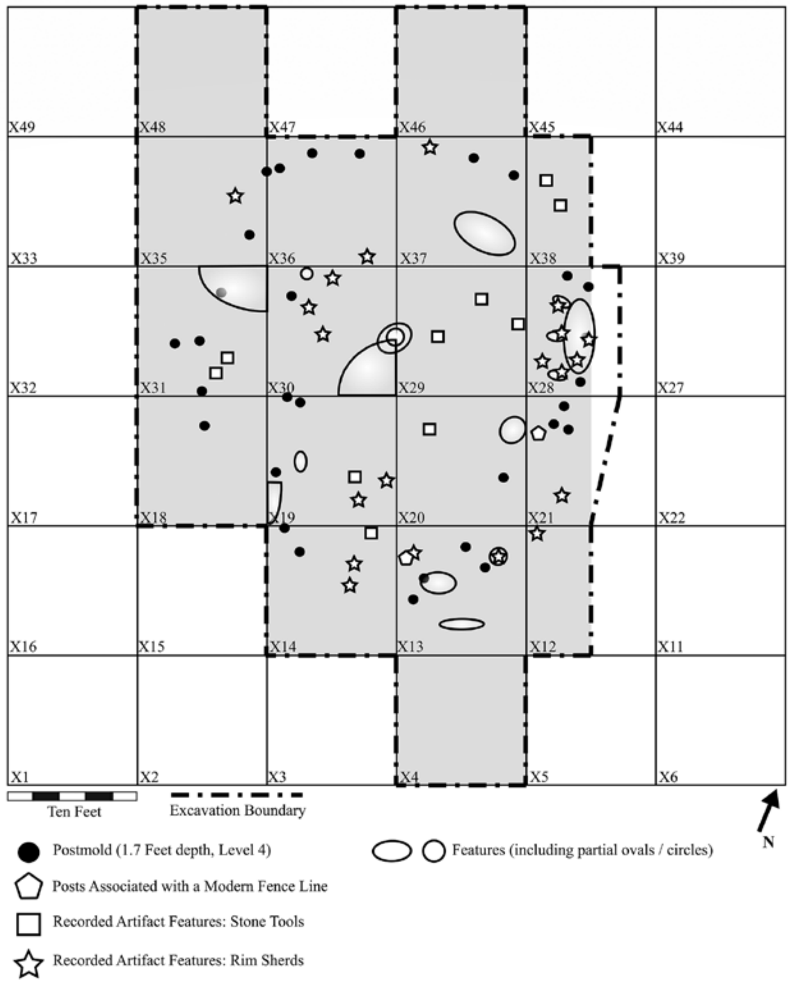

Figure 30. All features recorded during the excavation of levels 2–4.

Conclusions from the analysis emphasized that a surface scatter can reveal details about an archeological site, but it does not always reflect the quantities and locations of subsurface features (Binford 1972:178–180). In that study surface finds were recorded in a grid system before excavations took place. The surface of the Hamon site was not treated this way. Hatchery West also contained complexes of rock, charcoal, pottery, and burned earth, interpreted as hearths and deep earthen ovens (Binford 1972:177). At times these features overlapped, were in disparate locations, and did not reflect the nature of the surface artifact density. The study resulted in the identification of at least four distinct occupations from Archaic through Mississippian periods (Binford 1972:179). Apparently what took place at the Hamon site was exactly what Binford was arguing against: the assumptions that surface material reflects the nature of sub-surface features and that the limits/features can be defined by that surface scatter.

The spatial distribution of artifacts at the Hamon site showed a trend suggesting that the site extended outside the excavation boundaries. The greatest expanse of excavations covered 60 by 37-ft, but the majority of the excavations took place within a 40 (north to south) by 37-ft (east to west) area. Data likely was missed because the grid was not enlarged by opening units adjacent to those that were producing abundant cultural material. The amount of material recorded from the grid's eastern edge units that were expanded using nonstandard methods in the search for post molds supports this premise (Table 12).

Multiple occupations in the past and modern agricultural plowing contributed to the development of a cumulative palimpsest (Bailey 2007:203–204) at the Hamon site. The ceramic variability, two modes of lithic reduction, and diverse varieties of chert are evidence for this. Further reinforcing this interpretation are the four AMS radiocarbon dates from ceramic residue and findings of the field survey that relocated the original excavations and demonstrated that portions of the site are still intact.

Radiocarbon Dates

As mentioned, numerous pottery sherds from the Hamon site assemblage contain charred-food residues on their interior surfaces. Review of provenience data disclosed that several were associated with recorded features. Four samples were extracted from sherds associated with the general surface collection, level 2 of X29, feature 23 in level 2, and feature 148 near the bottom of level 3. These were submitted to Direct AMS in Washington for dating. The results conclusively revealed that the Hamon site was occupied on at least two occasions. The radiocarbon ages were calibrated in OxCal v4.2.4 using the IntCal13 atmospheric curve (Bronk Ramsey 2009; Reimer et al. 2013).

The AMS dates, in combination with the conventional charcoal date from feature 133 in level 4, have a calibrated chronological (2 sigma 95.4 percent) range of A.D. 648–1224 (Table 18). None of the uncorrected AMS radiocarbon ages B.P. incorporated values that implied overlaps with one another. Therefore, to test the probability of this being true, a Bayesian statistical model was applied to the dates.

Radiocarbon ages are probability distributions, and multiple radiocarbon ages can be statistically compared to one another to assess how similar or different they are. This entails complex statistical

Table 18. Calibrated AMS and Conventional Dates (Calibrated Columns) and a Bayesian Model of the Dates as Sequential within the Group (Modeled Columns). 95.4% (2 sigma) and 68.2% (1 sigma) probability ranges are reported with median ages (Bronk Ramsey 2009; OxCal 4.2.4; Reimer et al. 2013).

Lab number/ dating technique/ radiocarbon determination (B.P.)	Sample material/ provenience/ level	Cal B.C./A.D.				Modeled B.C./A.D.				Amodel 105.4 A overall 104.2	C Integral
		From	To	Range	Median	From	To	Range	Median	A(i) Level	C Level
	End Sequence 1					896	1438	95.4	1065		97.8
I–11,371	Charcoal	904	1160	68.2	1040	906	1041	68.2	996	107.8	99.6
Conventional	F133	777	1224	95.4		894	1148	95.4			
1000 ± 95 B.P.	level 4?										
D-AMS 007948	Residue	895	970	68.2	935	891	964	68.2	923	99.9	99.8
AMS	X29	887	986	95.4		885	981	95.4			
1116 ± 23 B.P.	level 2										
D-AMS 007947	Residue	778	885	68.2	834	779	885	68.2	835	102.5	99.9
AMS	F23	771	939	95.4		773	891	95.4			
1183 ± 23 B.P.	level 2										
D-AMS 007434	Residue	691	771	68.2	731	707	773	68.2	738	101.5	99.8
AMS	surface	671	862	95.4		675	821	95.4			
1258 ± 25 B.P.											
D-AMS 007435	Residue	653	689	68.2	675	654	690	68.2	676	97.8	99.7
AMS	F148	648	765	95.4		648	764	95.4			
1334 ± 28 B.P.	level 3										
	Start Sequence 1					311	763	95.4	626		98.7

analyses with which even the average mathematician would struggle, so software programs have been developed to calculate and run these equations and algorithms. OxCal (Bronk Ramsey 2009) is one such program, designed to analyze groups of radiocarbon ages with Bayesian probability models. The program allows users to define how groups of radiocarbon ages are compared to one another or modeled. An archeologist can take a group of radiocarbon ages and scrutinize whether they are statistically distinct from one another. They can order a group of radiocarbon ages randomly or in specific sequences through time to test the probability of assumptions they make about those radiocarbon ages. For example, two radiocarbon ages calibrate to different points in time, suggesting that they are unique dates, yet their overall probability distributions overlap. In another case five radiocarbon ages fall within the same 400-year time frame but at varying points. Bayesian models in OxCal allow the user to ask if the two dates in the first instance are in fact discrete from one another, or in the second example, what the chronological order—from oldest to youngest—is for the five radiocarbon ages. Users also can ask whether those five radiocarbon ages constitute one group of related ages or if two of the ages are significantly different than the other three, representing two distinct chronological groups. These questions and others regarding chronology at a single site or multiple sites can be statistically modeled by applying specific group and boundary rules to the radiocarbon ages being analyzed.

The results of statistically modeling radiocarbon ages must be validated or rejected. In OxCal two measurements are provided to determine whether the model is acceptable or not: agreement indices and convergence integrals. Both are numerical values that must be above a certain level for the model and each radiocarbon age in the model to be accepted according to the group and boundary rules the user applies to them. Each radiocarbon age and the overall model pass the tests if they have agreement values more than 60 percent. Since the models are testing statistical probabilities, the software repeats the analysis of the radiocarbon ages thousands, even millions, of times to determine how often the outcomes are equal. If the results are the same over 95 percent of the time, they are considered to have a high convergence, and they pass the test (Bronk Ramsey 2009:353–354). For any model a user creates to test radiocarbon ages, the results must have agreement values over 60 percent and convergence values over 95 percent. Otherwise, the radiocarbon ages do not statistically fit the group and boundary rules the user created for them, and the model is rejected.

The model used for the Hamon site dates includes a constraint of a one group sequence (ordered dates in separation from one another) with a grouping model that contains start and end boundaries. Since determinations of whether any of the five dates are part of distinct phases (distinct from "phase" in archeological taxonomy) are not evident, this single group model is the most appropriate to apply. To further corroborate the selection of this model, a combine sequence was attempted on all five dates to see if they overlap enough to be considered part of the same event. The combination of the grouping failed a chi-square test (a statistical measurement of how expectations compare to results) and supports the modeling of the dates in sequential order (Figure 31).

The modeled results agree well with the original calibrated data. The agreement model is 105.4 and the overall agreement is 104.2 (Table 18). Agreement indices with values close to 100 provide a positive result, whether slightly below or above that number. When a model places the highest probability into more areas of a radiocarbon date's original distribution plot, the indices can exceed a value of 100. Although the highest maximum agreement values have not been stated specifically in a publication, Bronk Ramsey has advised on the OxCal group question board that 60–140 is the best range. The closer to 100 the agreement values are, the less alteration of the original data has taken place in the model. The multi-plot curves for the original calibrated dates and agreement model for sequential dates reveal a general similarity, which the model refines to enhance the resolution of the different dates through time (Figure 32).

The provenience data for the dated materials is important for understanding the multiple events through time at the Hamon site and how later occupations intruded upon older deposits. The earliest date in the sequence is associated with feature 148 at 1.45 ft (44.2 cm) below ground surface, followed by a date associated with the residue from a surface-collected sherd. This reveals that plowing or

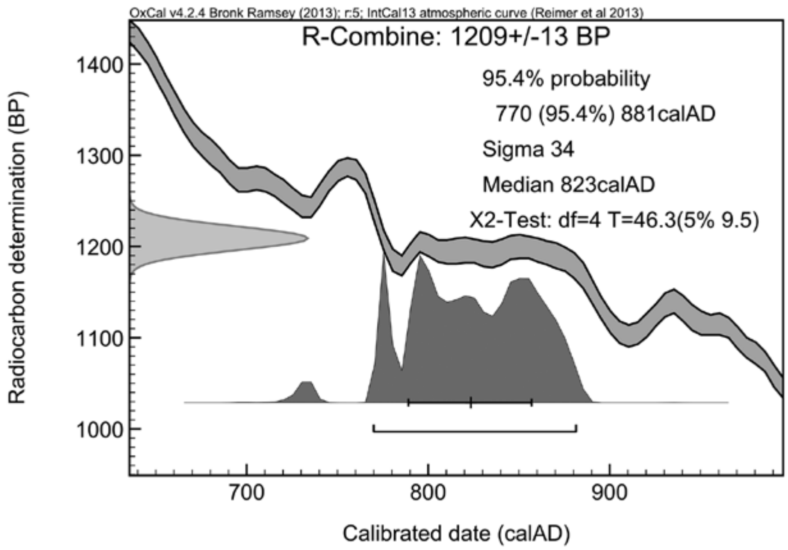

Figure 31. Results of the R-combine analysis tool in OxCal applied to the AMS and conventional radiocarbon dates. The combined determination of 1209 ± 13 B.P. fails a chi square test at the 5 percent level.

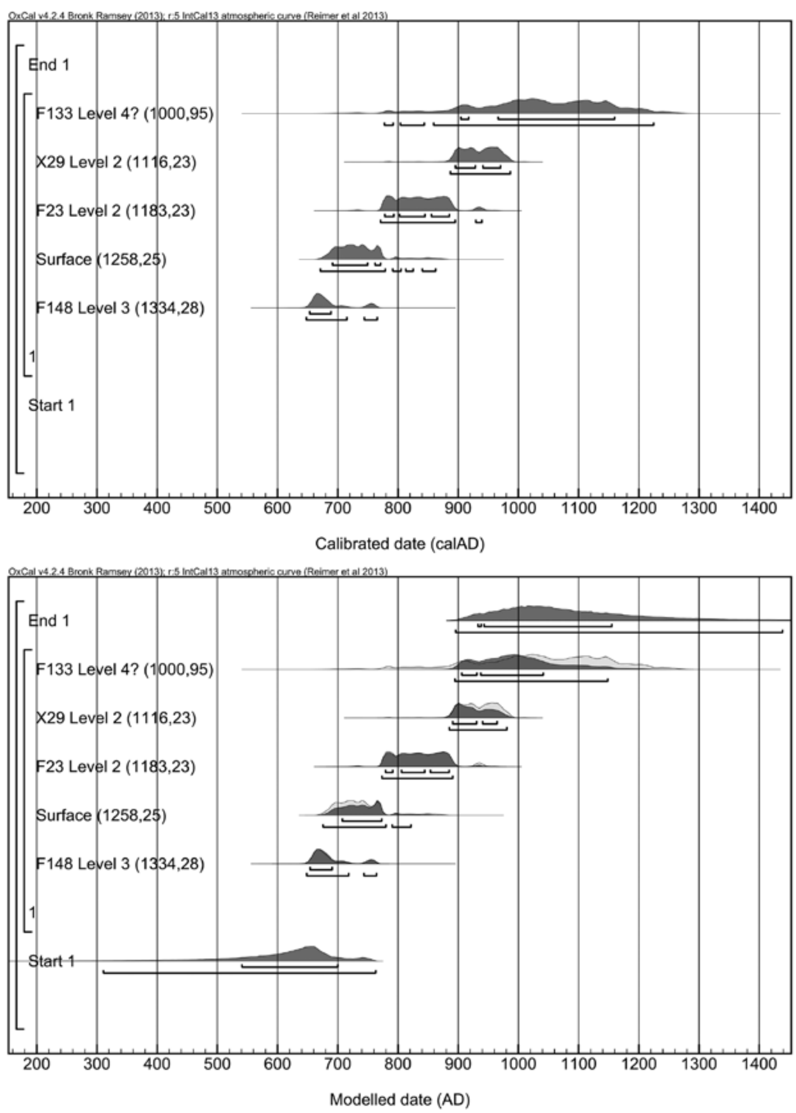

Figure 32. Top: Calibrated B.C./A.D. multi-plots of the radiocarbon dates. Bottom: 1 sequence group model multi-plots. Brackets represent 1 and 2 sigma ranges (Bronk Ramsey 2009; OxCal 4.2.4; Reimer et al. 2013).

other human activity brought older deposits to the surface. The dates from feature 23 (0.8 ft [24.4 cm]) and X29 (0.6–1.0 ft [18.3–30.5 cm]) are younger and from a provenience above the older date from feature 148, as would be expected in a stratified context. The conventional date from charcoal associated with feature 133 is from the deepest provenience at the site: 1.7 ft (51.2 cm). This latest date is from a deeper provenience than the older dates, suggesting that this feature, associated with the infant burial, was a later intrusion into older deposits. This single conventional date has the largest 2 sigma span at nearly 500 years (Table 18). Conceivably, it might be associated with the younger dates from feature 23 and X29 in level 2. As mentioned earlier, the feature was first recognized in the balk wall, but provenience was recorded at the unit floor. An acceptable combine was performed on this date with the dates from feature 23 and X29, but it barely passed the chi-square test and did not pass the combination with the older dates.

Pedestrian Survey to Relocate the Hamon Site and Original Excavations

The grid location, as described in the excavation records (Figures 21 and 22), was used to locate the Hamon site and the original excavations. LiDAR (Light Detection and Ranging) imagery was obtained from the online DASC (Data Access and Support Center) database, maintained by the Kansas Geological Survey, for use in ArcGIS (geographic information system) to evaluate whether surface anomalies are present in the vicinity of the recorded site location. Inspection of the LiDAR imagery revealed a probable spot (Figure 33). The area is nearly 140 ft east-northeast of the tree line in the field, as plotted in the site records. The anomaly shows a disturbance on the terrace edge, which can be seen along the east-west axis of the northern edge of the field next to a shallow slough immediately to the north. Before reaching the slough, the terrace ends, dipping in elevation before slightly rising again at the slough edge. Along the terrace edge a noticeable depression can be seen in the LiDAR imagery (Figure 33).

Using the LIDAR imagery in combination with the excavation records, the site was visited on two afternoons in October 2014. With permission of the landowner, Charles Hamon, a pedestrian survey of the area was performed with no artifacts observed on the ground surface. Upon being informed that the site was recorded atop a terrace to the southeast, Mr. Hamon responded that he did not recall it being located there but remembered it being closer to the depression visible in the LIDAR imagery.

Figure 33. Lidar imagery, showing elevation changes along the terrace edge where the 1971–1972 excavations might have been located.

Mr. Hamon, who had been present during the 1970s excavations, related that the archeologists had placed thick polyethylene sheeting over the site when they finished excavating. He granted permission to attempt to locate the plastic by placing a series of small shovel tests across the area. Starting from the southeast and moving to the northeast from the center of the terrace toward the depression, the first three tests were negative for polyethylene or cultural material. The fourth and fifth tests struck the plastic (Figure 34). Fifteen more tests were placed around the perimeters of the polyethylene sheeting and the depression in the LiDAR imagery to demarcate the excavation limits. No more plastic was found, but five tests were positive for cultural material, while the remaining 10 tests were negative. The positive tests yielded a small corner-notched point, lithic debitage, pottery sherds, burned earth or clay, quartzite, sandstone, and a hematite-limonite-rich stone (Figure 35). Great care was taken during the testing to avoid unnecessary disturbance of the site, as burials had been uncovered during the 1970s fieldwork, and an infant burial had not been removed. No human remains were encountered in the testing, and possibly the polyethylene sheeting covered the filled-in pit where the burial was located. All tests were filled immediately upon completion.

The recovered artifacts were from tests lacking plastic and at depths below the location of the polyethylene sheeting, which was recorded at 10 cm in test 4 and at 20–25 cm in test 5. Neither of these vertical locations were close to 1.7 ft (51.2 cm) in depth. Either excavation in this area did not reach 1.7 ft (51.2 cm) in depth or a considerable amount of soil has eroded away. Corn is grown regularly in the field, which slopes toward the slough to the north, and erosion almost certainly has taken place in the last four decades.

CONCLUSIONS

The Hamon site represents a palimpsest of occupations—a place inhabited on at least two occasions during the Late Plains Woodland period (A.D. 500–1000). The palimpsest formed from the mixing of artifacts not associated with one another prior to entering the site along with numerous features created by activities that took place on multiple occasions. The people who reoccupied the site were either a kinship group or multiple groups with no kinship connections. This study, which incorporated artifact analyses, a spatial analysis, new AMS radiocarbon dates, and a thorough review of field records from the original excavations, reveals that palimpsests can be recognized, even when dealing with a curated collection from excavations that took place more than four decades ago.

Archeological methods continue to evolve and influence how archeologists interpret the past. New computer programs and theoretical approaches, such as acknowledging the potential for palimpsest development, allow for extraction of minute details that were unavailable to archeologists a half century

Figure 34. 2014 field survey shovel tests four (left) and five (right). Flagging pins mark the polyethylene sheet fragments from the original excavations.

Figure 35. Artifacts encountered during the 2014 survey. Top row, left to right: a) sandstone, b) burned earth (clay), c) burned earth (clay), d) hematite/limonite-rich stone. Middle row, left to right: e) lithic debitage, f) lithic debitage, g) ceramic sherd. Bottom row, left to right: h) lithic debitage, i) small corner-notched point, j) ceramic sherd, k) quartzite fragment.

ago. Recent investigations conducted at the Quixote site (14JF420) serve as an excellent example of this (Logan 2019), and the results provide a rather uncanny compliment to the interpretations of the Hamon site. Quixote site data revealed a palimpsest of roasting pits connected to repeated occupations during the Late Woodland period. Radiocarbon dates indicated that the site was inhabited on at least two occasions between A.D. 500 and 1000 and that, like 14JF350, various activities occurred at 14JF420 (Logan 2019).

Analysis of the Hamon site ceramic assemblage demonstrates that several previously defined Late Plains Woodland wares/types, identified from sites located within one geologic region, are actually very similar and might reflect the same ceramic ware/type. This is important because it reveals that 1) pottery may not be as important a cultural designation unit identifier as has been previously emphasized in taxonomy, and 2) if some of the wares/types represent an identical phenomenon, then significant interaction among smaller populations over a larger geographic region is implied. The pottery associated with Valley, Grasshopper Falls, Sterns Creek, and Loseke Creek components, as well as Minotts and Held Creek wares/types, should be further analyzed to explore the above-mentioned interaction among the Plains Woodland groups who produced them. Careful analyses may reveal specific traits that can differentiate the pottery of one designation unit from another or reveal that two defined ceramic wares are, in fact, one and the same technology, as may be the case with Grasshopper Falls and Sterns Creek wares.

The Grasshopper Falls phase can now be put into full perspective. Reynolds (1979) attempted to compare the phase with other Woodland taxonomic units. He (Reynolds 1979:93) said that Grasshopper Falls ware was distinct from other Plains Woodland wares but most similar to Valley ware. He (Reynolds 1979:96) mentioned Sterns Creek ware only briefly, stating that "no trace of Sterns Creek culture has yet been found in Kansas; however, one interesting characteristic of the pottery is that at least a small portion of the exterior surfaces had been straw-roughened," an attribute shared with Grasshopper Falls ware. He thought that this commonality with Sterns Creek ware was insignificant because "vessel shapes, rims, common surface treatments, and other traits differ markedly from Grasshopper Falls Ware." But what are those differences? He did not elaborate. His comparison of Plains Woodland ceramic wares concluded with the assertion that the Grasshopper Falls phase shared similarities with other known complexes, but "no attempt will be made to present a thorough analysis of these similarities" (Reynolds 1979:97). Instead, his focus shifted to a discussion of inferred house forms. The critical details reveal that Reynolds was unaware of the Sterns Creek components that had been identified in northeastern Kansas (Schock 1963) and of the most recent literature on Sterns Creek ware at the time (Brown 1967; Griffin 1958; Nueman et al. 1964; Tiffany 1971, 1977; Willey 1966), which could have been cited.

Beyond ceramic typology issues, the Grasshopper Falls phase is itself tenuous because it was not defined adequately. Recall that Reynolds (1979) defined the phase on the basis of artifact assemblages and inferred features from three sites located along the Delaware River drainage in northeastern Kansas: Malm, Anderson, and Teaford. This was problematic for several reasons. Foremost is the fact that the three site collections lacked vertical provenience records. Reynolds (1979:1–2) acknowledged this, but did not consider it a difficulty. He further assumed that these collections represented single components that were uniform in time, space, and form. Moreover, Reynolds (1979:1) assigned approximately 150 additional northeastern Kansas site components to the Grasshopper Falls phase, admittedly based on speculation rather than formal analysis. While there is no question that extensive Woodland period remains occur in northeastern Kansas, making the supposition that most sites are single component and similar enough to be subsumed under a specific taxonomic unit is methodologically flawed. Late Woodland research in northeastern Kansas has started to evolve. In the past, prior to excavation, sites were presumed to be single component house structures, and recovered data was forced to fit those assumptions. Current research conducted at both Hamon (Keehner 2015) and Quixote sites (Logan 2019) has revealed that these are much more complex.

Interpreting the archeological record to infer peoples' behavior and the multiple dimensions of their lifeways is arguably the most important goal of this or any archeological study. The material evidence from the Hamon site indicates both artifact production and mortuary activities. The possibility that a Late Plains Woodland house once stood at the site has not been rejected by this investigation. However, as discussed previously, alternative actions were responsible for the patterning of the material remains that originally were interpreted as a house. Furthermore, a house may have stood at the site for only one of its various occupations, with different land use during preceding or subsequent occupations.

Despite its palimpsest nature, the archeological record at the Hamon site provides evidence of many recognizable activities. Ceramic production during at least one of the occupations is not inferred from ceramic objects alone; lithic artifacts and raw finger-impressed and rolled lumps of clay supply evidence as well. Abundant lithic debitage and stone tools signal production enterprises. The local and non-local raw materials from which stone tools and pottery temper were acquired reveal that the residents successfully exploited local resources and that some materials might have entered the site via trade or migration of other groups. Several hearth features, containing pottery sherds with residue, testify that cooking took place. The final activity represented is inhumation of the deceased. At least one of the burials is intrusive upon earlier cultural layers. The late date associated with the pit feature is from a charcoal sample that was recovered at a deeper provenience than one of the ceramic residue samples with a date that is three centuries older. However, the similarity of the date from the pit to one of the later AMS dates from a shallower provenience confirms that the burial was intrusive. Evidence suggests that the Hamon site may have been a locale where descendant groups constructed houses or structures with other functions, produced materials important for their way of life, and eventually buried the dead through ancestral remembrance and connection to the land.

The Woodland lifestyle is reflected in the stone tools used for multiple purposes, including hunting, and pottery used for storage and cooking. Agriculture is not directly evident but might have occurred on a small scale. Cooking took place, but the abundance of pottery with clean interiors may reflect use as water or dry resource containers. The Hamon site inhabitants might have interacted with other Late Plains Woodland people and traded pottery with them as well. Considering the indistinguishable pottery from Late Plains Woodland components over the entire region, such social connections might have extended as far north as present-day South Dakota and Iowa, but the most promising comparative materials come from components located in the four-corners region of Kansas, Missouri, Iowa, and Nebraska. Excavated Middle Woodland period Kansas City Hopewell and later Plains Village period Steed-Kisker components contained burials with associated grave goods of celts, pipes, projectile points, and pottery (Wedel 1938:104; 1943:92–93). The Hamon site residents might have interred similar items with the deceased, but, given the palimpsest nature of 14JF350, it has not been possible to determine whether any of the pottery or stone tools were grave goods.

The topic of interaction is relevant for researchers working with Late Plains Woodland ceramic wares. The lines of evidence that support ceramic production at the Hamon site could be applied to similar material assemblages and features from other Late Plains Woodland components in the Central Plains region. The pursuit and interpretations of ceramic production locations would be beneficial as little is known about these types of activities and interactions among Late Plains Woodland groups.

One of the most important lessons highlighted by this project is the significant value of long-term curation of archeological collections and field records from controlled excavations. The Hamon site records were essential in identifying features and their locations, reconstructing original excavation methods, recognizing the palimpsest, and establishing new interpretations from the analyses. The record deficiencies disclosed how crucial it is to practice consistency in excavation methods and record keeping, so that all of the data generated from an excavation can be properly analyzed. Moreover, the records impart a cautionary tale about interpreting components at a site before excavations have taken place or been completed. The artifacts and records had been curated for more than 40 years prior to this project. Many other curated collections have never been studied, and researchers should contemplate the potential of adding to knowledge of past cultures by using these sources. Answers to questions about past peoples' activities, social interactions, overall lifeways, and changes through time are still waiting in unanalyzed collections.

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BOOK REVIEWS

The Ritual Landscape of Late Precontact Eastern Oklahoma: Archaeology from the WPA Era until Today. AMANDA L. REGNIER, SCOTT W. HAMMERSTEDT, and SHEILA BOBALIK SAVAGE. University of Alabama Press, Tuscaloosa, 2019. ix + 380 pp., 105 figures, 25 tables, abbreviations, acknowledgments, notes, references, and index. $69.95 (cloth). ISBN 978-0-8173-2025-6. *Reviewed by* Jim D. Feagins.

The 1930s are remembered for the Great Depression, and in many areas of the plains the infamous Dust Bowl proved disastrous. In the archeological community that decade also is noted for the large volume of excavations that occurred in many states. In the eastern part of Oklahoma, some of the most outstanding Late Prehistoric ritual mound sites were being looted and greatly impacted by years of agriculture. Often artifacts were sold to supply income for down-and-out jobless families. Tragically, the archeological record at Spiro Mounds suffered a tremendous toll, and exceedingly important and irreplaceable information was lost. Spiro was not alone in experiencing such calamities.

During the Depression many government-funded programs were created to provide jobs. President Franklin Roosevelt's administration devised a number of economic relief programs that funded various types of public construction and other projects. The best known of these, and certainly the most important for archeology, was the Works Progress Administration (WPA). WPA work at archeological sites was generally underfunded and poorly equipped, and communication and travel were usually difficult. Most rural areas lacked electricity, telephones were sparse, most roads were dirt and impassable when very wet, and bridges were few. Flooding was often a problem for travel and for work at the sites. The crews were comprised of poor, out of work, untrained men, who simply wished to survive the Depression and put food on their families' tables. More than a few were illiterate. In Oklahoma, as in many other states, archeology was a relatively new branch of study. Field supervisors were usually newly graduated or still in college and lacked much field experience.

Despite these many serious handicaps, useful information was gleaned from the exceedingly important sites in an archeologically rich part of Oklahoma. However, for many discouraging reasons, the WPA excavation data has been slow to be analyzed and published. Among a few notable exceptions are the exciting gleanings from Craig Mound at the famous Spiro site.

The Ritual Landscape of Late Precontact Eastern Oklahoma: Archaeology from the WPA Era until Today (Figure 1) has made an important step toward better organizing and understanding the archeological importance of this WPA work. Regnier, Hammerstedt, and Savage introduce the Great Depression and the various state and federal relief programs designed to combat its negative effects while supplying services useful to the public. They specifically focus on the WPA archeological programs and how Oklahoma benefitted. They discuss mound sites, all located in a portion of the Arkansas River drainage basin in the northeastern part of the state.

As acknowledged several times by the authors, most of this volume is in the words of the WPA archeological supervisors, written during or shortly after the fieldwork was conducted. They summarized their crews' work in quarterly reports. Thus, the book's authors carried out extensive research in the WPA archeological archives, mostly stored at the Sam Noble Museum of Natural History on the University of Oklahoma (OU) campus in Norman.

Chapter 1, The Life and Times of an Oklahoma WPA Archaeologist, is filled with quotations from correspondence and reports from individual project site supervisors to Project Director Forest Clements at OU. Their communications document the tremendous difficulties of conducting archeological work for a government agency under conditions existing in rural Oklahoma during the Depression. Below is an excerpt from one of many letters, illustrating a problem encountered by field supervisor Lynn Howard.

> You know that Carl [Ball] has not got his car out of the repair shop so I came on the bus. I had to get a car from one of the me[n] to get out here and there was no food here and that meant a trip back into town,

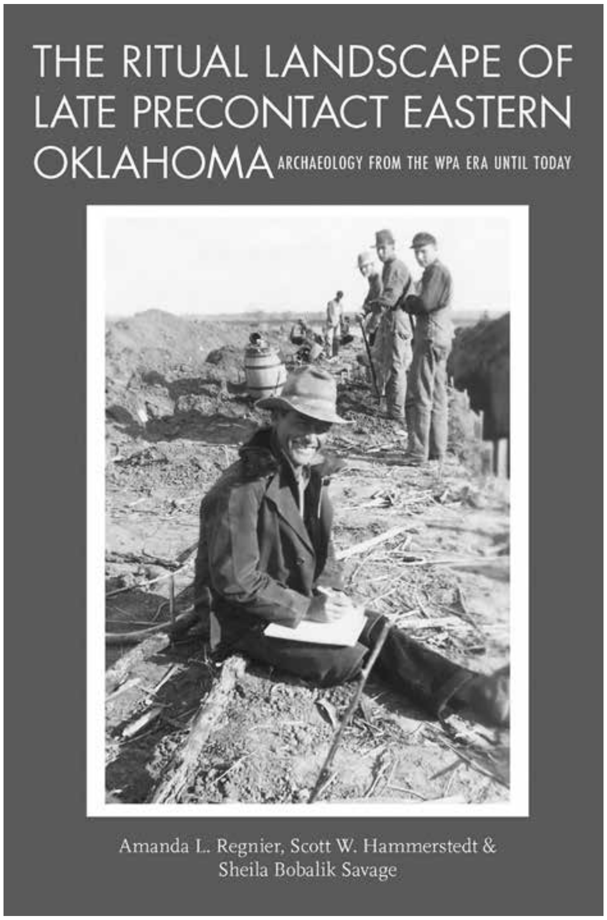

Figure 1. The book's cover.

> that is where the trouble started. Every store that I went to, they grabbed me and ask where Carl was. It seems that he owes every one in town and they don't like it a dam [sic] bit. I would not tell this but it hurts us as much as it hurts them. They don't want to give me credit when they know what he has done.

A passage from another letter was written by supervisor Phil Newkumet, dated March 29, 1938.

> Last night thot I might wake up "floating down the Mississippi to New Orleans" this A.M. but a glance out the window found the same landmarks. Had a small river under the house last nite. Wood pile almost washed away. Had to fish firewood out of the stream as it floated by the door. Things were pretty damp inside and out. Radio aerial blew down, Arlie Ward's barn went with the wind. Small ditch 60 feet south sounded like Niagara.

Field supervisors often had difficulties related to living accommodations, transportation, credit, equipment, workers, entertainment, accidents (even one death on the job from a soil collapse), weather extremes, site flooding, personal and project money woes, social life, public perceptions of archeology, and problems with unreasonable landowners. In 1938 the unskilled laborers (employed to cook, maintain and clean the field houses) made \$.29/hour and the sometimes large crews of skilled laborers (excavators, but unfamiliar with archeological procedures) were paid \$.37/hour. Sarah White ran the WPA archeological laboratory at OU. The eastern Oklahoma field supervisors included Carl C. Ball, David A. Baerreis, Fred Carder, J. Joe Finkelstein (later known as J. Joe Bauxar), Lynn E. Howard, Phil J. Newkumet, and Kenneth G. Orr. A biographical sketch for each is presented. Some readers of this review may recognize several of these names from their later published works.

Much of the archeological work summarized in this volume was conducted contemporaneously with the WPA cleanup investigations at the Spiro site after the terrible mess left there by the artifact looters of the Pocola Mining Company. Because it has been described previously by many other authors, the Spiro site and its artifacts are minimally discussed, primarily used for comparative purposes with the work conducted at eight other late precontact sites: Norman, Hughes, Brackett, Eufaula Mound, Skidgel Mound, Reed, Huffaker, and Lillie Creek (Figure 2). All contained ritual landscapes, such as mounds of various types and other ceremonial features and artifacts.

Chapter 2 is devoted to the field and laboratory methods used by the Oklahoma WPA archeologists and should be of considerable aid to future researchers as they tease apart additional information from these sites. This chapter also discusses the making of the 1938 WPA film, "The Spiro Story," which was shown extensively around the state and served to educate the public about archeology. It was a good public relations tool for the WPA archeology program.

The first site-specific chapter focuses on the Norman site (34WG2), a multi-mound and habitation site along the Grand River in Wagoner County. Although excavation was started in 1934, the site was subjected to numerous field investigations

Figure 2. Map of site locations discussed, drawn by Jim Feagins.

through time and subsequent reanalysis, which were confused by misidentified areas and reassigned labels. "Mound I was a bilobed, conjoined platform mound; . . . Mound II was a bilobed, conjoined burial mound; . . . [and] Mound III was a conical mound with burials" (p. 120). The site also encompassed a habitation and possibly a refuse area. Most of the chapter is composed of words from Finkelstein's field notes, his 1938 quarterly report, and Robert Bell's post-WPA (1948) work at the site. The site was especially rich in regional ritual burial goods and shared many attributes with Spiro. It was occupied during the Harlan and Norman cultural phases (A.D. 1100–1350). As with all the site-specific chapters, the authors conclude by adding their cultural interpretations.

The Hughes site (34MS4/5) is located along the Arkansas River in Muskogee County and contained a pyramidal platform (flat-topped) mound, a residential area, and a burial area. The village surrounded the mound on three sides. Some pothunting had occurred prior to the WPA excavation. Field supervisor Howard directed the excavation in 1938 after he was transferred from Spiro. His report of the investigation comprises most of Chapter 4. His crew excavated 15 houses (all the typical square shape with four central support posts), 31 cache pits, and 18 burials. The storage and/or trash pits were straight walled, and most of the artifacts found in them were broken: ceramic sherds, chipped stone, ground stone, and animal bone. The burials were a short distance from the mound. The skeletal remains, all in a poor state of preservation, were partially flexed and usually lying on the left side. Few grave goods were present—at least relative to what Howard had recovered at Spiro. However, some artifacts, especially those made of copper and the eccentric projectile points, were quite exotic. The Hughes site represented the same cultural phases as the Norman site plus the Fort Coffee/Neosho phases. It seems to this reviewer and others that the most recent site occupations clearly share some attributes with certain late Late Prehistoric cultural phases and complexes in central and southeastern Kansas and southwestern Missouri. Much more work is needed to more fully understand those associations.

After Howard's work was finished at the Hughes site in 1938, he moved to the Brackett site (34CK43) in Cherokee County along the western border of the Ozarks. In 1939 he was joined by Orr to supervise a crew that eventually consisted of 35 men. A significant portion of Chapter 5 is compiled from two of Howard's reports. The WPA crew excavated a platform mound, a sample of the structures, and a burial area in the sprawling village. A low flat-topped primary mound subsequently was covered with a conical secondary cap, giving it a height of 8 feet and a diameter of 100 feet. Some later researchers have argued that there were actually five stages to its construction. The only burial evidence was a badly decomposed skull with no associated artifacts. The Brackett Cemetery was discovered near or within the village area. Fifteen group burials contained 25 individuals. These primary burials were shallow, usually semi-flexed, and incorporated quite a few grave goods. Howard stated,

> Grave materials included copper-covered stone ear spools, projectile points, blades, pottery pipes, and pottery vessels. The pottery vessels were water bottles, curved and carinated bowls. The design elements . . . included incised lines and punctates . . . [along with practical aspects, such as] lip tabs and strap handles. The temper was grog, grog and bone, and shell (p. 189).

The undecorated shell-tempered sherds are considered to be Woodward Plain. Six of the seven excavated houses were square with four central support posts; one was rectangular with a single central support. The Brackett site apparently was occupied during the Harlan phase and a portion of the Norman phase and was abandoned shortly after A.D. 1300, never to be reoccupied.

The Eufaula Mound (34MI45) was located about 6 miles east of the town of Eufaula in McIntosh County. This burial mound was excavated by a crew of 14 men under the direction of Orr from May to August of 1940. The mound investigation was undertaken at the request of the Creek Indian Memorial Association (CIMA), which also paid Orr's salary, while the WPA funded the remainder of the project costs. Funds were tight for both organizations, and the CIMA ran out of money before the work was finished, so Orr agreed to stay on for an additional week without pay. Work on the mound was finished by the end of August just before Orr and his wife left for Chicago and his graduate studies.

When the Eufaula Mound excavation was completed, 101 burial pits containing 139 individuals had been found. Flexed and bundle burials occurred, and artifacts were associated with most of the skeletal remains. Among the artifacts (Figure 3) were copper-covered and stone earspools, projectile points, chert nodules, celts, bone artifacts, hematite, red ocher, pottery vessels and sherds, discs formed from coal, copper-covered wooden knives, rattles, beads, galena balls, elbow and t-shaped pipes, a whetstone, a wooden mask, a copper-covered wooden needle, and caches of river pebbles. Orr speculated that the river pebbles might have come from rattles; if so, he must have been referring to gourd rattles or those made from some other perishable material. The burials were present in four strata. Regnier, Hammerstedt, and Savage argue that these levels resulted from adding a layer of soil after the ritual cleaning of charnel houses, as often occurred at other sites associated with the Arkansas Valley mortuary tradition. They conjecture that the near-surface part of the mound originally may have held a series of non-burial features, possibly the floor of a structure; however, years of cultivation of the mound's surface and limited pothunting had destroyed any evidence. The residential area of the site was not excavated, and nothing is known about it. More than two decades after the mound excavation was finished, the mound and the associated village were buried under the rising waters of Lake Eufaula.

The Skidgel site (34LF70), located in Le Flore County on a ridge in the Arkansas River valley about 2 km west of Spiro, consisted of a 20-foot-high pyramidal platform mound with associated houses. Certainly the site was part of the Spiro landscape. It was excavated intermittently between May 1938 and December 1939. Reports written by Orr (1938) and Newkumet (1939) are included in this chapter. Prior to the WPA excavation of the site, looters had tunneled from three directions into the mound's center, hoping to encounter a rich lode of artifacts, as had happened at the nearby Craig Mound at Spiro. Despite neighborhood tales to the contrary, the pothunters undoubtedly were disappointed in the quantity of artifacts. The WPA crew noted the lack of broken artifacts in the looters' backdirt, as would be expected, considering their methods, had there been a rich trove of cultural items. The looters greatly disturbed the mound's profiles and created a dangerous situation, which directly caused the death of a WPA worker. The WPA crew was unaware of a by-then-hidden tunnel below a bulk wall, which collapsed when the void below caved in, burying the man. Before work could continue, all tunnels had to be shored up with additional large posts. The Archaic projectile points, lightly scattered at random in the mound, suggested

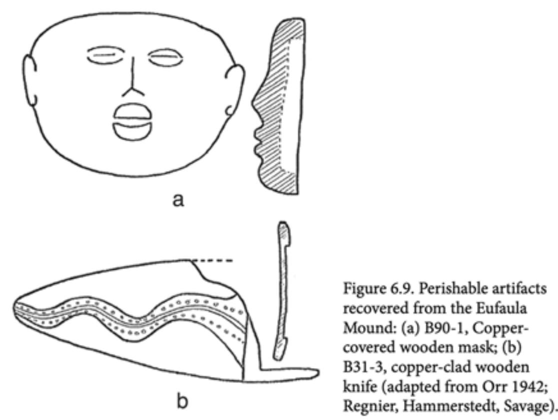

Figure 3. Two artifacts from the Eufaula Mound: a copper-covered cedar mask (part of a probable headdress) and a copper-surfaced wooden ceremonial knife (p. 220), used by permission from the University of Alabama Press.

that it had been constructed from fill dirt obtained from a much older feature than the mound itself. Basket loads of earth had been piled above a square stone pavement laid on a prepared flat surface. The Skidgel Mound is not the only pyramidal mound in the area that lacked many artifacts. "The scarcity of artifacts makes obtaining a more precise date for the mound difficult" (p. 241).

Four nearby under-mound and off-mound houses also were excavated. The two under-mound houses, oriented to semi-cardinal directions, were rectangular with extended entryways. Both were thought to be special-purpose structures. Artifacts, especially the pottery sherds, from within House 4 suggested that this earliest of the houses was occupied during a portion of the Harlan phase (A.D. 1000–1250). The Skidgel Mound itself was constructed sometime between A.D. 1350 and 1450.

Chapter 8 describes the excavations of the Reed and Huffaker sites, located less than a mile from each other. They are now submerged beneath the waters of Grand Lake of the Cherokees in Delaware County. Situated near the edge of the Ozarks, these two sites were near the extreme southwest corner of Missouri and within the second county south of the Kansas border. The WPA worked intermittently at the Reed and Huffaker sites from June 1937 to August 1940. A number of other non-mound sites in the area were excavated during that time.

The Reed site consisted of a conjoined platform and burial mound with nearby/associated habitation areas. Previously vandals had dug into the top of the burial mound, and the Oklahoma Historical Society conducted a somewhat more controlled excavation on about a third of that mound in 1925. Twelve years later the WPA began its excavation. For a brief time Finkelstein was the field supervisor before Baerreis took over that position with as many as 30 workmen at times. The crew dug a number of test pits, fully excavated 12 areas, including the remaining portions of both mounds, several middens, and at least 12 structures. Most of the nearby houses were square with four central support posts. The platform mound was built in four stages but contained few artifacts. Woodward Plain and Williams Plain were the most abundant types of pottery.

The Huffaker site encompassed a burial area on a low ridge located near the Elk River. Many artifacts were recovered with the burials; however, a high percentage had no burial goods. As Baerreis stated, "Copper-covered ear spools, copper bodkins, polished celts, and pottery decorated with the common incised, curvilinear designs on both bowls and water bottles were found" (p.253). At least 25 burials were discovered. One area not far from the burials yielded abundant artifacts on and near the surface, but no evidence of house structures were encountered. Broken projectile points, pottery sherds, and animal bones were numerous. One rare sandstone boatstone came from that area. The Reed and Huffaker sites were contemporaneous and "were likely used by the same group of people" (p.278). These sites were occupied for a significant period of time, but mainly during the Harlan and Norman phases (A.D. 1000–1350). A lighter occupation during the Neosho phase after A.D. 1450 was present.

The Lillie Creek mound (34DL41) and a nearby refuse area (34DL53) were located in Delaware County and were covered subsequently by Grand Lake. Under Baerreis' direction they were investigated sporadically between February 1, 1939, and September 19, 1940. As is often the case with the WPA excavations, not many records concerning the work at these two sites are available. By far most of the work was done at Lillie Creek. Undoubtedly, more could have been accomplished there except for two factors: first, Baerreis was short-handed during this time because of WPA work rules, and second, rising waters due to the closing of the Grand River dam began to flood the mound. A photograph (p. 280) shows water encroaching upon the mound while the crew scrambled to finish excavating features. This platform mound had a height of approximately 2 meters. As with the Reed mound, Lillie Creek had a pre-mound structure clearly marked by post molds. Unfortunately, there was not enough time to determine the complete post pattern. Below the base of the mound, ground stone tools, projectile points, and shell-tempered potsherds with plain surfaces were found.

A short distance northeast of the Lillie Creek mound was the village refuse area (34DL53). Abundant pottery sherds, chipped stone artifacts, animal bone, and shell fragments were present in that area. The vast majority of the pottery was of the Woodward Plain type. No house remains were evident, but one trash-filled storage pit was discovered. In addition to the typical artifacts, the cache contained a large amount of corncobs, other corn fragments, and wood charcoal. More recently, a calibrated radiocarbon date of A.D. 1365–1409 was obtained from the charred corn. If the crew had more time, perhaps houses would have been uncovered in this area. Diagnostic artifacts from 34DL53 are similar to those recovered from the mound. The Lillie Creek mound and the Reed mound are only 14 river miles apart, and they are thought to have been built at the same time and shared the same ritual traditions. Unfortunately, rising lake water curtailed the Lillie Creek mound and village area excavations.

After the onset of World War II, government funding for this aspect of archeology dried up, and the critical economic need for the WPA ceased. By then the nation had a more important need for soldiers and workers to support the war effort. Jobs were abundant. The WPA archeological program ended in 1942.

The final chapter is a synthesis of the WPA archeology program in the Arkansas drainage in Oklahoma. The authors offer a fine summary and analysis of the WPA work and state their purpose for writing the book (p. 297).

> Our goal in this volume has been to introduce the sites, gather the data in one location for the first time, and create a synthesis of the WPA materials from mound sites in the Oklahoma portion of the Arkansas drainage between AD 900 and 1500. The WPA collections from the mound sites and other contexts still have enormous research potential. To conclude, we present summaries of mound construction, mortuary ritual, and architecture at the mound sites, including data from two additional mound sites: Spiro . . . and Harlan . . . . We recognize that our sample of sites represent only points on the landscape where communal expressions of ritual took place. Given the number of buildings at the mound centers, none had substantial numbers of residential occupants. The focus on sparsely occupied mound sites necessarily means that our study lacks data concerning domestic life at smaller residential sites. This is certainly an avenue for further investigation.

Regnier, Hammerstedt, and Savage have done a most credible job of achieving these goals, and they have illuminated the WPA archeological work by placing it in a cultural framework of research and future needs. The authors are to be commended for tackling the job of gathering and untangling the paperwork and then organizing the material and writing a very readable volume. Criticisms of the publication are minor: a few typographical errors were noted, and a list of illustrations would have been helpful.

This work goes a long way toward understanding the various types of mounds in this part of the Arkansas drainage: pyramidal platform mounds, buried structure mounds, and burial mounds. It provides a better understanding of the long-term ritual life of a group of people in various parts of the area's landscape and illustrates that the Spiro phenomena was not isolated. In general the volume should be a tremendous aid to future scholars interested in increasing understanding of the late prehistory in this part of Oklahoma and adjacent areas.

Archeologists have long, and rightly, been critical of WPA archeology's poorly controlled field methods, sparse and inconsistent record keeping, and failure to analyze the features and collections and publish the final results in a timely manner. However, without the WPA's work many extremely important sites would have been destroyed by profit-seeking relic hunters. Could WPA archeologists have done better? Of course! At the same time, judgment of the WPA contributions should be tempered, and reading this account elicits empathy for the hardships that were endured and respect for the pioneering work that was accomplished. Times were hard, problems were many, and the state of archeological "art and science" was far different than today. Consider, for example, that computerized record keeping and the variety of specialized tools borrowed from other sciences, which currently are taken for granted, were unheard of then. Now it is up to present and future archeological researchers to make the most of the information these Depression-era folks compiled.

The Ritual Landscape of Late Precontact Eastern Oklahoma: Archaeology from the WPA Era until Today may be obtained by contacting the University of Alabama Press at Box 870380, Tuscaloosa, Alabama 35487-0380, 800-621-2736, or http://uapress.ua.edu. It also can be ordered online from other book vendors.

Ledger Narratives: The Plains Indian Drawings of the Lansburgh Collection at Dartmouth College. COLIN G. CALLOWAY, editor. Essays by JOYCE M. SZABO, MICHAEL PAUL JORDAN, JENNY TONE-PAH-HOTE, MELANIE BENSON TAYLOR, MARY PETERSON ZUNDO, and VERA B. PALMER. University of Oklahoma Press, Norman, in cooperation with the Hood Museum of Art, Dartmouth College, Hanover, New Hampshire, 2012. vii + 283 pp., 94 figures, 142 color plates, notes, appendix, bibliography, contributors, index of plates, and general index. $49.95 (soft cover). ISBN 978-0-8061-4298-2. *Reviewed by* Jim D. Feagins.

Over the years this reviewer has found ledger art, as drawn by Native Americans themselves, of considerable interest—not just for its artistic appeal but also for its reflection of the past. In depicting actual events, it reveals a great deal about the material culture of the late 1800s and early 1900s and how those items were used by those who knew best their own way of life. Pouring over volumes of this genre, taking notes while making new discoveries, has been a longstanding learning pleasure. Exploring *Ledger Narratives: The Plains Indian Drawings of the Lansburgh Collection at Dartmouth College* has proven no exception.

Native Americans traditionally have made carvings and paintings on rocks, wood, bone, shell, and hides, such as tipi covers, items of clothing, storage containers, and objects used in warfare and as sacred symbols. Also quills and later glass beads were applied, especially to clothing, to create wonderful designs. The artwork found in this volume required the use of pencils, crayons, pens, and paintbrushes. "Ledger art developed from the heritage of Plains picture writing and heraldic imagery into an art form that was unique in comparison to other Plains art" (Szabo 1994:203).

When Native Americans saw Euroamericans writing notes and letters on paper and recording figures (numbers) in ledger (account) books, it attracted considerable curiosity. Is it any wonder that, when ledger books came into their possession, many were quick to adopt the new medium for drawing (writing) their own "accounts"? This was especially true for High Plains tribes. The Cheyenne, Lakota, Kiowa, Arapaho, Crow, and others were quick to develop a style of drawing to record representational imagery: exploits of warfare, hunting, and courtship; ceremonies; items of wealth and religious symbolism; and other aspects of daily life and their cultural systems. This style of drawing/painting is called "ledger art," and the term is applied to almost any practical medium—not just paper account books, although those are by far the most common. Fortunately many ledgers and individual pages from various ledgers have been collected and are available for study and appreciation today.

In volumes from other fields of research, this reviewer has encountered authors who seemed to be more interested in flaunting their word craft and extensive vocabularies, while exhibiting a general lack of new ideas or fresh approaches to old ideas. Such is not the case with these essays. This volume significantly adds to the growing literature on ledger art, which it displays to good advantage in the images of the extensive Lansburgh collection. The project began in the fall of 2010 with a Multiple Narratives Symposium at Dartmouth College, which consisted of contributions by experts on the subject, as well as scholars whose major interest was not ledger art. Their diverse backgrounds contributed some new ideas to the ledger art genre.

Seven essay chapters of *Ledger Narratives*, split into two text sections, are written by various authors. These essays are equally divided in length with an extensive central section that contains 142 color plates, featuring the ledger art in the Lansburgh collection. Using a smaller format, examples of ledger art figures from various sources illustrate certain points of discussion within the chapters.

Joyce M. Szabo, a well-known author on ledger art, wrote the first of the volume's chapters, titled "Battles, Courting, and Changing Lives: The Mark Lansburgh Collection." She presents a biographical sketch of Mark Lansburgh and his donations to the college and discusses the somewhat slow evolution of ledger art to the status of "true art." One of Szabo's (1994) books was reviewed in a previous issue of *The Kansas Anthropologist* (Feagins 1997).

The second chapter, "Striving for Recognition: Ledger Drawings and the Construction and Maintenance of Social Status during the Reservation Period," is an excellent essay by Michael Paul Jordan. Ledger art clearly was biographical, helping men to achieve recognition by rendering their own exploits in warfare, wealth, and spiritual powers. It showcased their social status in art.

Jenny Tone-Pah-Hote, a Kiowa and assistant professor at the University of North Carolina at Chapel Hill, authored the third chapter, "Illustrating Encounter: Trade, Travel, and Warfare in Southern Plains Ledger Drawing, 1875–1880." She focuses primarily on Kiowa and Southern Cheyenne ledger art that depicts tribal and individual encounters during visiting, warfare, courting, and trade. This reviewer is especially interested in her discussion of an unknown Kiowa artist's detailed view of an Osage "war dance." These types of interactions undoubtedly took place multiple times during inter-tribal visitations on various reservations in Oklahoma, long after the Osage and Southern Plains tribal warfare was over.

"The Mark Lansburgh Collection" section of plates is inserted in the middle of the essay chapters. That is exactly where the plates belong, as they are truly the heart of the volume and serve as a most delightful recess from the essays. Readers will want to take time to savor the details in each of these color photographs, as much can be learned about indigenous people from their social, spiritual, and material culture during this historic era, as well as appreciate this art style for art's sake.

The fourth chapter, "Unsettling Accounts: The Violent Economies of the Ledger," is written by Melanie Benson Taylor. Reinforcing Szabo, she discusses ledger art's relatively "recent canonization" as art. The main theme seems to be the violent economies portrayed in the ledgers, i.e., the accumulation and representation of wealth, often associated with warfare. In addition to documenting bravery, the ledgers often catalog riches. Also, drawing in the ledger books seems to provide a way to counter perception of Euromerican exploitation, writing Native American account balances in similar books. Regardless of the speculative meanings behind the use of ledgers, to have these indigenous picture stories from actual indigenous perspectives is fortunate. Taylor (p. 189) sums up her chapter with a quotation from Anna Blume (1996), "Ledger books with their drawings by Native Americans, exist in the interstices between writing, drawing, and violence; their production is a metaphor for history in the Great Plains itself."

The next essay by Mary Peterson Zundo is titled "New Geographies and Surveying Eyes: The Landscapes of Noh-hu-nah-wih (Chief Killer)." Landscapes were extremely important to indigenous peoples' way of life; however, relatively little ledger art has anything to do with landscapes, seldom even including ground lines. The genre usually focuses on the principal actors with an occasional set of horse tracks as a reference to where the action took place or perhaps a little of the landscape in a few hunting scenes. Generally ledger art does not qualify as landscape art, and an artist's perspective concerning environmental setting is not usually relevant. However, the works by Noh-hu-nah-wih (Chief Killer), a Southern Cheyenne warrior, are an exception. Zundo does a most credible job of analyzing his landscapes and at times compares them in varying perspectives with aerial views and maps.

"Tracing the Schoolhouse/Big House Legacy: Ledger Art and Prison Work" by Vera B. Palmer addresses more recent Native American art. Contemporary art created by modern Native Americans serving hard time in prison can be socially and artistically compared with ledger art produced by their ancestors. Art still serves an important function to the Native community within and outside of confinement.

The final chapter,"Reconstructing History from a Fragmented Past," is contributed by Szabo. Her two chapters serve as bookends, introducing the volume and providing concluding thoughts. She points out that the majority of ledger art production took place during times of cultural stress and conflict: warfare, the demise of the bison, imprisonment at Fort Marion, confinement on reservations, and the dominant culture's efforts to force assimilation. She compares ledger art subject matter during the reservation period with the free-roaming, pre-reservation period. For example, during the reservation period women's activities were more likely to be depicted. While heraldry subjects still were commonly illustrated and renowned warriors remembered and celebrated, other activities were increasingly shown. Later warriors could serve as army scouts and then as agency police to gain recognition. Szabo summarizes the collection that the volume so aptly documents.

> Through its breadth of drawings from different cultures, locations, and eras, the Lansburgh

> collection provides an extremely rich resource. The drawings, in conjunction with other sources of information, can tell us much about Plains Indian societies in the late nineteenth and early twentieth centuries. They demonstrate the very real presence and actions of Plains people throughout eras of great stress, their refusal to simply capitulate to the assimilation being demanded of them, and their struggles to uphold values and maintain sovereignty in the face of dramatic change (p. 250).

The authors of the various chapters present multiple nuanced viewpoints. Some duplication of information occurs among chapters. However, the heart of the volume is the ledger art itself. Their careful study can add much to understanding the colorful cultures during the late 1800s and early 1900s, as represented by the various Plains Indian tribes. *Ledger Narratives: The Plains Indian Drawings of the Lansburgh Collection at Dartmouth College* is beautiful to look at and to study. It can be obtained from the University of Oklahoma Press by calling 919-966-7494 or from various online vendors.

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Plundered Skulls and Broken Spirits: Inside the Fight to Reclaim Native America's Future. CHIP COLWELL. University of Chicago Press, Chicago, Illinois, 2017. 336 pp., 10 halftones, notes, index. $23.02. ISBN 978-0226298993. *Reviewed by* Taylor Nickel, Washburn University.

One evening in 1971, Maria Pearson was fixing dinner when her husband John came home with upsetting news. John, a civil engineer for the Iowa Department of Transportation, told her that he had been on the scene that day as archeologists excavated a cemetery that had been discovered in an interstate highway right-of-way. The remains of 28 individuals were unearthed. Twenty-six of them were determined to be Caucasian and immediately were reburied in the local cemetery. However, the other two were identified as a Native American girl and her baby; their remains were taken to the Office of the State Archaeologist in Iowa City for further study. Maria, a Yankton Sioux from South Dakota, was outraged to hear of this blatant discrimination. The following morning she dressed in a white beaded and fringed buckskin dress, put on a pair of matching beaded moccasins, and plaited her hair into two long braids. She then drove to the Iowa capitol building in Des Moines and demanded to speak with the governor. Maria's confrontation with then-Governor Robert D. Ray concerning Native American remains to which she had no ancestral claim resulted in meaningful change for Native American rights in Iowa. This is one of the powerful stories in Chip Colwell's *Plundered Skulls and Stolen Spirits: Inside the Fight to Reclaim Native America's Culture*. Initiating the difficult conversation of repatriation and its impacts, Colwell touches on the central themes of collaboration, cultural education and understanding, ignorance, and dignity.

Colwell's book can be described as part history, part memoir, and part ethnography, as he brings the messy chronicle of repatriation into his own role as senior curator of anthropology at the Denver Museum of Nature and Science. *He il*lustrates the difficulty of weighing the religious freedom of Native Americans against the academic freedom of scientists and museums through the stories of four objects and their repatriation journeys: a Zuni sculpture believed to be a living god, the scalp of an 1864 Sand Creek Massacre victim, a Tlingit ceremonial blanket known as the Killer Whale Flotilla Robe, and a Calusa skeleton from a tribe considered to be extinct. Colwell not only discusses the history of each culturally affiliated item, but also expresses the meaning imbued into the piece and its importance to particular peoples. Each narrative details negotiations over the artifacts and their eventual repatriation to their respective Native American communities. A commonality throughout is the impact of the Native American Graves Protection and Repatriation Act (NAGPRA), critical legislation that went into effect in 1990. Colwell stresses that NAGPRA was essential to creating the structure for repatriation, as it resulted in human remains no longer being considered as data or resources, challenged racist and colonialist underpinnings in the field of anthropology, and shifted power dynamics to facilitate meaningful collaborations between Native American communities and anthropologists.

Colwell is an excellent writer with a unique and captivating approach. He offers balanced perspectives of Native American communities and museums, including museum professionals and anthropologists. He respectfully tells the stories of Native Americans and scientists alike. In general he strikes a middle ground, although he sometimes sways in favor of repatriation and the claims of Native American communities. Foremost among the writer's strengths is his ability to convey the complexities that arise with repatriation, while also providing empathetic material on both sides of the debate that has raged for decades. He has a personal stake within the museum world and in his firsthand repatriation work. Colwell offers a unique accessibility to the general public through the use of his own voice on each page. Rather than approaching the difficult question from an ethical or political perspective, he largely avoids making assertions about what should or should not be done. He instead focuses on telling the stories.

While Colwell presents numerous excellent examples from both sides of the debate, he only touches on additional important arguments in the sphere of repatriation. One issue is the proportion of cultural objects that have been damaged or lost worldwide due to museum and corporation malpractice and accidents. Recent cases include a fire that destroyed the majority of the Brazil National Museum's more than 20 million-piece collection of scientifically and culturally invaluable specimens in 2018 (Almeida 2018) and the thousands of artifacts that were found to have been illegally smuggled in 2010 and 2011 from historic sites in Iraq to retail outlets owned by Hobby Lobby (Green 2017). Such accounts illustrate that the taking of culturally significant objects with the claim of preserving and protecting them is not always justified and in some instances is completely wrong.

In reviewing the history of repatriation, Colwell discusses international repatriation, including Article 12 of the United Nations Declaration on the Rights of Indigenous Peoples, which enables "the access and/or repatriation of ceremonial objects and human remains . . . through fair, transparent and effective mechanisms developed in conjunction with the indigenous peoples concerned" in countries aside from the United States (Indigenous Rights Radio 2017). However, once he mentions the difficulty of repatriation in countries beyond the United States, he drops the matter. The Indigenous Rights legislation and other relevant material would have offered another critical point in the repatriation discourse.

Colwell not only reflects on modern-day repatriation, but his stories collectively tie the history of repatriation into the important theoretical foundations of anthropology. In fact, much repatriation advancement occurred during the same time that several of these theoretical frameworks were formulated. In 1871 English anthropologist Sir Edward Burnett Tylor emphasized the importance of reconstructing history in order to track the evolution of culture through the idea of "survivals," defined as "processes, customs, opinions and so forth, which have been carried on by force of habit into a new state of society different from that in which they had their original home" (McGee and Warms 2017:44). This theory is illustrated (albeit in a fairly negative way) through the various collection methods used to obtain culturally significant artifacts during the 1800s and 1900s, as described in the opening of this book. In 1925 French sociologist Marcel Mauss examined patterns of social interaction through analyzing potlatch and prestations (i.e., ceremonial gift-giving to display status) in Native American communities (McGee and Warms 2017:95), cultural phenomena that Colwell also addresses. In 1920 German-born American anthropologist Franz Boas wrote of the importance of understanding cultures through their unique historical developments, a theme that many of his students echoed and that Colwell maintains throughout his work (McGee and Warms 2017:143).

Colwell's approach to the immense topic of repatriation and the ethics enmeshed within allows readers to see and genuinely feel the importance of the cultural ties each object described holds for people from various backgrounds. The author initiates important communication on repatriation and the waves it has created in Native American communities and in the field of anthropology. While his book opens this discussion, it could have probed further to gain a more holistic understanding. Through his expository writing and reflections, Colwell demonstrates the complexity of repatriation, including its ties to relations, consent, and identity, in a respectful approach. He employs the history of repatriation, the passionate retellings of powerful stories, and the theoretical ties that the repatriation issue has to the very foundation of anthropology. He offers a new perspective on a decades-old debate.

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Debi is a member of the Kansas Anthropology Association and currently serves as president of the state organization. Since attending her first Kansas Archeology Training Program field school at Scott Lake State Park in 2009, she completed requirements for all categories of the KAA Certification Program. She worked with Dr. Jack L. Hofman, associate professor of anthropology at the University of Kansas, on Clovis points in Wilson, Montgomery, and Republic counties in 2011 and on stone arched-ceiling caves in Republic County in 2011–2013. Debi researched and completed a survey of over 900 acres in the Minersville vicinity from 2011 to 2016. She continues to collaborate on projects with professional archeologists at the Kansas Historical Society, recently with State Archeologist Dr. Robert Hoard on Keith phase pottery research and pottery reconstruction. Archeologically speaking, she loves everything from Paleoindian to Historical.

Debi Aaron nee Holtzen was born and raised in Deshler, Nebraska. She has three children: Steven, Kelsey, and Colin. She is employed by the Thayer County Sheriff's Office as a 911 dispatcher for county emergency services and sheriff deputies. In addition to archeology, she volunteers at the Thayer County Museum in Belvidere, Nebraska. She enjoys spending time with her children and grandchildren, camping, canoeing, and exploring anything and everything.

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Barbara Crable received B.A. and M.A. degrees in anthropology from the University of Kansas. Her research interests include zooarchaeology, taphonomy, and Great Plains archeology. In the summer of 2014, she participated in the Kansas Archeology Training Program field school in Osawatomie and the KU field school at the Pawnee Indian Museum State Historic Site, where her passion for fieldwork began.

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Jim Feagins is a retired private archeological consultant who still serves as part of the adjunct archeological staff for the St. Joseph Museum. He received an A.A. degree from Graceland University in Iowa, 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 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.

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Robert Hoard is the state archeologist of Kansas since 2000. He is interested in the identification of traded items, using quantitative methods and determination of exchange routes among human groups through time.

He also studies the technical parameters of prehistoric pottery, especially the earliest pottery in the High Plains of the Central Plains of Kansas, Nebraska, and Colorado.

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Jack Hofman taught archeology in the Department of Anthropology at the University of Kansas from 1991 until 2019. His research interests include lithic technology, zooarchaeology, early prehistoric hunters, large-scale land use practices, and studies of technological change and cultural contact. He has been involved in archeological research in the Great Plains region from Texas to Wyoming, beginning in Oklahoma in 1971. During the past few years he has also been working on historic and Pawnee Nation archeology. The article in this issue is derived from ongoing research with sites and collections in the High Plains region of western Kansas.

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Steven Keehner is a Ph.D. candidate at the University of Iowa. He earned his B.G.S. and M.A. degrees from the University of Kansas. Steven's research interests include archeological method and theory, radiocarbon dating, spatial analysis, artifact analysis, and social dynamics. His current research focuses on social interaction and information exchange between potter communities during the Woodland period in the eastern Central Plains. Steven has been working in a combination of field, laboratory, and museum settings since 2011. He is currently a graduate teaching assistant for World Archeology, Native Peoples of North America, and Museum Studies courses at the University of Iowa.

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The varied readership of the journal should be kept in mind when preparing papers. Jargon should be avoided. Third-person narrative is strongly preferred unless the piece is a personal reminiscence in which first-person voice is acceptable. Contractions should be avoided. The style authority is *American Antiquity* (see https://www.saa.org/publications/american-antiquity).

Manuscripts should be prepared using as little internal formatting as possible. Tables and figures should not be embedded in the text, but each submitted as a separate file. Illustrations are encouraged, and their preparation is the responsibility of the author. Digital photography with original resolution less than 300 dpi is not optimal for print publications. High resolution digital images are preferred, but 35-mm black and white or color prints or slides are accepted. 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. Manuscripts may be submitted on CD/DVD or portable storage device (flash or jump drive), as e-mail attachments, or by Dropbox, OneDrive, or other cloud storage sites. If computer technology is not available, a hard copy may be submitted.

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Publication of *The Kansas Anthropologist* is financed in part with Federal funds from the National Park Service, a division of the United States Department of the Interior, and administered by the Kansas Historical Society. The contents and opinions, however, do not necessarily reflect the view or policies of the U.S. Department of the Interior or the Kansas Historical Society. U.S. Department of the Interior regulations strictly prohibit unlawful discrimination in departmental federally assisted programs on the basis of race, color, national origin, age, or handicap. Any person who believes that he or she has been discriminated against in any program, activitiy, or facility operated by a recipient of federal assistance should write to Director, Equal Opportunity Program, U.S. Department of the Interior, National Park Service, 1849 G Street, Northwest, Washington, D.C. 20240.