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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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First Vice-President: Chris Hord, 413 Southeast Brownfield Drive, Lee's Summit, MO 64063-6020; (816) 809-2737; chord@kc.rr.com
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Historian-Recorder: Mary Conrad, 3900 Nearman Drive, Kansas City, KS 66104-1230; (913) 287-4405; maryec1968@gmail.com
Journal Editor: Virginia A. Wulfkuhle, 840 North 1500 Road, Lawrence, KS 66049-9195; (785) 843-0846; virginia.wulfkuhle@gmail.com
Newsletter Editors: C. Tod and Wendi Bevitt, 12265 Holiday Hills Road, Oskaloosa, KS 66066-5314; (785) 817-7763; bevitt@buriedpast.com
Immediate Past President: Nancy Arendt, 665 Cherokee Drive, Colby, KS 67701-3811; (785) 460-6653; arendts@st-tel.net

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 All manuscripts must be the original, unpublished work of the authors.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

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).

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In Honor of

MILTON REICHART

(1923–2009)



Recipient of the First
Kansas Anthropological Association
Lifetime Achievement Award in 2004

FOLLOWING THE 1724 BOURGMONT ROUTE THROUGH KANSAS TO THE PADOUCA

Craig Crease
Myrtle Beach, South Carolina

From the dawn of the eighteenth century, colonial France, strung along the Mississippi River from the mouth of the Missouri to the Gulf of Mexico, longed to establish trade with Spain's far flung northern colonial outpost of Santa Fe. Numerous attempts were made to reach Santa Fe, all requiring long distances through unknown territory with a belligerent Spanish government awaiting if they did make it. However, the main impediment to reaching Santa Fe were the nomadic and war-like Padouca Indians, who reigned supreme across western Kansas and beyond. Finally, in 1723 the French charged Etienne de Veniard, sieur de Bourgmont, a charismatic and respected French officer, with the task of making peace between the Padouca and all the other tribes of the lower Missouri River basin. Many in the French government were skeptical that such a mission could succeed. Bourgmont did succeed, however; he marched a small group of French soldiers and Native American allies westward across the Kansas plains for a meeting with the Padouca, who traveled eastward to meet with him. Bourgmont's route through Kansas has intrigued historians, archeologists, and scholars for years. This study concerns a recent effort to trace his 1724 path, which resulted in some confirmations and some revelations about Bourgmont and the expedition.

The French banner waved crisply in the early morning breeze. A leather-headed drum beat out the marching rhythm. At 6:00 a.m. the party departed. A thousand-plus Kansa Indians and a handful of French soldiers, seeking peace with a notorious tribe that was the terror of the Kansas plains, moved through the tall grass to the high ground beyond the river. Far to the west at an unknown time and place, they would meet those whom they sought. Only then would they have a chance to open up the plains and the heretofore unreachable Santa Fe to trade with the French. Such was the situation that faced Etienne de Veniard, sieur de Bourgmont on a humid July morning in 1724.

BOURGMONT

Etienne de Veniard, sieur de Bourgmont was born in April 1679 in the village of Cerisy Belle-Etoile in Normandy, son of Charles de Veniard, a successful surgeon. When he was six, his father died. His mother remarried, and Bourgmont and his younger sister Francoise Madeleine, born in 1683, came under the influence of their apparently less-than-honest stepfather. Etienne and his sister got into enough scrapes as adolescents that both appear in the court records of the time.

At age 19 in 1698, Bourgmont and his stepfather were found guilty of poaching on Belle-Etoile Monastery land. A serious offense at that time, the incident probably compelled young Bourgmont to depart for Canada that same year. In Canada he joined the Troupes de la Marine as an ordinary soldier. In 1702 he served in the expedition of Charles Juchereau de Saint-Denis on the Ohio River. He also lived among the Illinois Mascouten Indians for a year and a half as a trader in hides and furs, likely for the tannery owned by his commander Saint-Denis.

By 1706 Bourgmont had been promoted to ensign and assigned to the little French village at Detroit, which was the charge of his new commander Antoine Laumet, sieur de La Mothe Cadillac. Bourgmont arrived at Detroit in January 1706 with orders from

the governor general in Quebec to take command of Detroit's Fort Pontchartrain, while Cadillac was away for an extended period. The 26-year-old ensign walked into an almost impossible situation. The log fort was perilously short of soldiers and gunpowder and was surrounded by encampments of restless and warlike Native Americans. A siege had been going on for some time.

When the siege ended, some blame was assigned to Bourgmont. Believing that his military career was ruined, he deserted into the American wilderness. This ignominious start held no indication of his destiny (Norall 1988:3–5). In the wilderness he married into the Missouria Indian tribe, forged a remarkable exploration legacy by charting the Missouri River from its mouth to the Platte River, established and built a French military fort on the left bank of the Missouri River, and, as the personal envoy of the King of France, undertook a perilous journey deep into the Kansas plains to open trade with the Spaniards in Santa Fe.

In 1724, almost 100 years before William Becknell and his five-man brigade established the Santa Fe Trail, France launched its most ambitious effort to break through the geographic and human barriers of the Great Plains west of the Missouri River and east of Santa Fe. This expedition was conceived in France's consuming ambition to reap the perceived riches of Mexico's northern colonial outpost. Along with miscalculations of time, distance, and viable approaches to Santa Fe, the French faced an intractable problem: the Padouca Indians, Plains Apache or Comanche, who controlled the region west of the Little Arkansas River. The French officer who accepted this important and dangerous mission to the Padouca was Etienne de Veniard, sieur de Bourgmont.

WHO WERE THE PADOUCA?

Bourgmont's expedition journal captured the nomadic and warlike tendencies of the Padouca, described as a huge tribe, frequently on the move and subsisting mostly by hunting and raiding. The important French map by Gulliaume Delisle (1718) denoted a large swath of the Central Plains as *Pays De Apaches Et Des Padoucas*, i.e., Place of Apaches and the Padoucas—two different tribes. Yet many archeologists, including Waldo Wedel (1959), considered the occupants of El Cuartelejo (sometimes spelled El Quartelejo), north of Scott City, Kansas, to have been Plains Apache. Thus, he reasoned that if the Padouca lived at El Cuartelejo, they must have been Plains Apache. The identity of the Padouca compels a cutting-edge investigation.

The idea that the Padouca Indians were not Comanche but were instead Plains Apache started with George Bird Grinnell (1920:260) in the pages of *American Anthropologist*. His article ended with this cautious conclusion: "The evidence is not conclusive as to who were the Padouca, but it convinces me that the Padouca were not Comanche and I am disposed to regard them as Apache."

A contrary position was published in the very next issue by Truman Michelson (1920:101), a linguist and anthropologist with the Bureau of American Ethnology in Washington D.C.: "Without wishing to review his entire article I may point out that the Foxes call the Comanche and no other people Patoka . . . and this is substantiated by my own information. It is obvious that this has an important bearing on who the Padouca were . . . Dr. Grinnell has apparently ignored the fact that other living Indian tribes also know the Comanche by equivalents [sic] of 'Padouca'."

2018 FIELD STUDY AND ANALYSIS OF BOURGMONT'S 1724 ROUTE TO THE PADOUCA

In fall 2017 the author was awarded a grant from the Scholarly Research Committee of the Santa Fe Trail Association to do an up-to-date analysis and field examination of Bourgmont's 1724 path through Kansas to the Padouca. Four goals were established for this study:

- Discover or confirm Bourgmont's route to the Padouca, based on three versions of the expedition journal (Le Page du Pratz 1758; Margry 1886; and Norall 1988) and the itinerary as mapped by Milton Reichart in 1976.
- Demonstrate the relationship, if any, of Bourgmont's 1724 track with the Santa Fe Trail of almost 100 years later.
- Determine if Bourgmont departed from the

Kansa village at Doniphan, Kansas, or from a different point on the Missouri River.
- Identify the location of the Padouca camp where Bourgmont ultimately met the tribe.

FOUR VERSIONS OF BOURGMONT'S JOURNAL

The original manuscript, actually written by Bourgmont's mining engineer Philippe de La Renaudiere, is extant in the Archives Nationales in Paris, France. The different published versions of that journal provide the basis for this project and the author's conclusions. In the eighteenth and nineteenth centuries, several historians wrote about Bourgmont and the 1724 entrada, yet a full biography of the explorer did not appear until 1988.

Two French historians whose writings are important to the study of the Bourgmont expedition were Antoine-Simon Le Page Du Pratz and Pierre Margry. In 1758 Le Page du Pratz published *Histoire de la Louisiane* in which he stated that his version of the 1724 journey was an edited and abridged account of the original journal. However, rather than a shortened variation, it was a narrative, told in Le Page du Pratz's words. He omitted some facts that appeared in the original manuscript and included a few statements that are not in other historians' editions. He must have had an additional source of information, which possibly was Bourgmont himself. Le Page du Pratz emigrated to America in 1718 and lived in and near Natchez, Mississippi, until 1734, when he returned to France. He likely met Bourgmont in America during that time, probably after the Padouca campaign.

In 1883 William G. Culter published a version of Le Page du Pratz in *The History of the State of Kansas*. This English translation of Le Page du Pratz apparently was taken from another English translation, taken from the French publication, taken from a clerical copy of the original manuscript. In 1936 Beatrice Paddock translated Le Page du Pratz for the Wichita City Library and provided important passages that Cutler omitted.

In 1886 Margry published *Relation du Voyage du Sieur de Bourgmont* in *Exploration des Affluents du Mississippi et Découverte des Montagnes Rochesuses (1679–1754),* now often referred to simply as *Découverte*. He presented this as an unaltered rendering of the journal. The English version of Margry was translated from the French publication, apparently taken from a clerical copy of the original manuscript. Paddock also translated Margry for the Wichita City Library in 1936.

In 1988 Frank Norall published the first full biography of the adventurer. *Bourgmont: Explorer of the Missouri, 1698–1725* included the 1724 journal, translated verbatim into English from the original French manuscript in the Archives Nationales. It is the most exact, complete, and reliable translation (Norall 1988:125–161). The original manuscript, written by Renaudiere on the Kansas plains in 1724, was signed by 12 members of the Padouca expedition, including second-in-command Louis Groston de Saint-Ange and mining engineer Renaudiere himself. It contained a statement, missing from both Le Page du Pratz and Margry, which revealed that these other versions likely derived from one of the two clerical copies in the Archives Nationales and not from the original. Norall is the primary journal source for this study.

Various other writers in the first half of the twentieth century also wrote of the entrada to the Padouca. With varying results, some attempted to reconstruct the route from the comfort of their library chairs, rather than physically on the ground. Some had Bourgmont heading west, seeking the Smoky Hill River (Unrau 1971:65), while others placed him at the end of his journey near Ellsworth (Hoffhaus 1984:46; Loomis and Nasatir 1967:49). Henri Folmer (1937:66), a student of the expedition at the University of Denver, wrote, "We hope to be able someday to retrace the steps of de Bourgmont and his men more accurately, with the aid of his journal and the description of the scenery he gives and by traveling ourselves along the trail, it would be possible to locate it more exactly."

Finally, in 1976 someone took these words to heart and set out to find Bourgmont. That person was Milton Reichart (1923–2009), a native of Valley Falls, Kansas, and a long-time member of the Kansas Anthropological Association (KAA) and the Kansas Historical Society (KSHS). In 2017 he was recalled as conversant in "… archeology, history, plants, literature, and his family" (Conrad 2017:7). In 1985 the Society for American Archaeology

nominated Reichart for a lifetime achievement award, quite an honor for an avocational archeologist. In 2004 the KAA presented him with the organization's first Lifetime Achievement Award. Among his many accomplishments Reichart established Bourgmont's general itinerary across Kansas, thus laying the foundation for this 2018 project (Conrad 2017:8).

Reichart approached tracing Bourgmont's route by gleaning all information possible from the Le Page du Pratz (Cutler 1883) and Margry (Paddock 1936) versions of the journal, focusing on material statements of fact that would indicate physical landmarks still extant on the Kansas landscape after 252 years. He (Reichart 1977–1978:1–76) published the results of his study in a 76-page article that included photographs and maps of the proposed trek through Kansas and articulated in detail the protocol that he used to come to his conclusions.

Reichart's undertaking grew out of his archeological survey of Cedar Creek, a tributary of the Delaware River in northeast Kansas. When he learned that Bourgmont had traversed the area, he decided to trace the path from the Missouri River to the Kansas River, which he reported in an earlier article (Reichart 1976). Out of that came Reichart's full investigation of Bourgmont's journey through Kansas and the resulting *KAA Newsletter* article. In 1979 he also wrote a shorter and less academic account for *Kansas History: A Journal of the Central Plains* (Reichart 1979). Reichart (1977–1978:5) wrote of his 1976 attempt.

> I made four trips to central Kansas and numerous ones to lesser distances for the purpose of locating landmarks. Topographic maps of the 1:24,000 and 1:250,000 scale series were pored over again and again as a most necessary concomitant. The delineation of Bourgmont's route was made to hinge upon, but not be limited to, the identification in the field of three pivotal landmarks. The first of these was the crossing of the Kansas River at Rossville, which had already been determined. The second was Bourgmont's reference to "the wood which was nearly two leagues in length," and the third was his reference to "pierres fort claires" (very light stones).

Reichart also considered two elements germane to the route in the journal. Every day for the first five days and inconsistently after that, Renaudiere counted the waterways crossed by the Bourgmont party as they moved west. At the end of most days, he estimated and recorded the French leagues traversed. The designation of each waterway was Renaudiere's subjective judgment of the width, depth, and current; he described them in ascending order as a brook, a stream, a little river, or a river.

In 1724 the French league equated to 2.764 miles; however, on this journey it was established by dead reckoning, simply multiplying the number of hours traveled by a predetermined average hourly rate of movement. Obviously, this time could be affected negatively by heavy grass, rocky terrain, high hills, wet and soggy ground, or the physical weariness of the men. Conversely, the absence of one or all of these adverse factors could increase the rate of speed. With some reservation Reichart estimated the average league distance to be 2.5 miles to the league. Throughout this paper the three calculations, i.e., French, Reichart, and dead reckoning, are reported in abbreviated notation.

As carefully considered as Reichart's fieldwork and analysis were, his study lacked information from two important sources years in the future: Norall's (1988) groundbreaking biography, which included the first truly reliable English translation of the journal directly from the original French manuscript, and the modern marvel of Google Earth and its digital landscape measuring tool. Further complicating Reichart's effort was the fact that he unknowingly chose as his primary journal source an English translation of Le Page du Pratz that was deficient. While Cutler (1883) held out his translation as being "copied entire and verbatim," it lacked several passages that caused Reichart problems on calculating distance and location on a particular day of the expedition. As a supplement, Reichart used Paddock's (1936) reliable English translation of Margry. Why Reichart did not use her translation of Le Page du Pratz is unknown and unfortunate, because Paddock correctly included important sections that were missing from Cutler.

Even with these difficulties facing him, Reichart did a good job of sleuthing the overall trajectory of Bourgmont's westbound campaign to find the Padouca. The author of this paper set out to follow Reichart's deduced route west and southwest across the contemporary Kansas landscape in 2018.

PREPARING FOR THE 2018 FIELD STUDY AND ANALYSIS

In preparation for the fieldwork in spring 2018, I became intimately familiar with Le Page du Pratz, Margry, and Norall, as well as Reichart's writings and maps. The KSHS opened its uncataloged Reichart collection, as well as some obscure French and Kansa files in which colleague Mary Conrad chased down several fugitive documents. Out of the KSHS records search came the discovery of boxes of uncataloged color slides that Reichart had taken of various locations during his 1970s investigation. KSHS Lab Archeologist Chris Garst was instrumental in expediting the sorting, identifying, and loading of the images on a flash drive, so I could study them a month before the field survey commenced.

I designed nine large (11 by 16-inch) sectional maps of the Bourgmont trail, incorporating Reichart's proposed route and my tentative observations. These maps covered in detail the expedition's corridor through Kansas, as well as the water crossings, physical landmarks, and campsites, as noted in the journal and Reichart's reports.

I set the first week of May 2018 as the date for the field survey and enlisted colleague Ross Marshall as co-pilot on the project. A veteran of decades of important work tracking down historic trails all over the West, coupled with the solid good sense of a structural engineer, Ross was the perfect candidate to help. He donated all seven days on the road to the effort. His counsel, as well as his uncanny ability to write clear and concise notes while bumping down innumerable gravel roads, made him indispensable.

I recruited another friend, Steve Schmidt, to scout Marion and McPherson counties before the May fieldwork. He then rode with us for two days in those counties, leading us through some of the most interesting parts of the Bourgmont journey. This area includes one of the most important physical landmarks mentioned in the journal and is near the place where Bourgmont ultimately contacted the Padouca Indians. Steve's background as a surveyor, coupled with mapping skills, sharpened during his important work on the 1825 Sibley route of the Santa Fe Trail, provided a trusted source of common sense advice.

I estimated that the trip would take seven days to do it properly, and that is what it took. Over 500 color pictures were taken. Images in this paper are from the author's collection unless otherwise attributed. Thirty-four pages of handwritten notes document every turn, road, and waterway along our necessarily convoluted itinerary to follow Bourgmont's path—a historic west-southwest trail running through a contemporary landscape of right-angle section line roads.

BOURGMONT'S PREPARATION AND A FALSE START
July–October 5, 1724

Wily, strong-willed, and charismatic, Bourgmont had unique skills that were most suitable for this entrada onto the plains, not the least of which was his deep understanding of and sympathy for the Native Americans whom he befriended and ultimately made into allies. In early eighteenth-century America, not only Bourgmont, but the French in general believed that they had a special affinity for Native Americans, while the British and Spaniards were brutish and clumsy in their dealings (Englebert 2013).

In 1723 Bourgmont built Fort Orleans on the left bank of the Missouri River, most likely on a bluff across from the Missouria Indian village in present-day Carroll County, Missouri. He had married the daughter of a chief from that village about 10 years earlier and had a son from this relationship. His 10-year-old son accompanied him to the Padouca.

With Fort Orleans established as the launch pad for his expedition, Bourgmont set out in July 1724 for the Kansa Indian village. Located on the right bank of the Missouri River around Independence Creek near present-day Doniphan, Kansas, this village of more than 1,000 people was his first destination. Like the Osage with whom they shared an affinity, the Kansa were a substantial and influential tribe in the lower Missouri River basin. They engaged in an extensive trade in horses, many stolen from other tribes, as well as a trade in slaves, some of whom were captured Padouca (Unruh 1971). Renaudiere made it clear that Bourgmont was well known and respected among the Kansa and that they welcomed him with affection. At this

time the Kansa were anticipating their summer buffalo hunt far to the west.

From Fort Orleans Bourgmont sent out an advance party of 5 Canadians and 17 Frenchmen upstream on the Missouri River to the Kansa village. Eight days later he led the main party over land northwest about 95 miles to the Kansa village, arriving there on July 8. Disconcertingly, the other force, sent ahead by water, had not arrived. Without the trade goods carried by those boats, the campaign to the Padouca could not go forward. Word finally came that the river party was stalled; several of the Frenchmen were incapacitated with a fever. Bourgmont dispatched hunters in more boats upstream on the Missouri River to the camp of his distressed soldiers.

Bourgmont then sent four Missouria Indian runners to the Otoe tribe about 140 miles to the north to enlist representatives of that tribe to travel to the Padouca. Now he could only wait for the boats with the trade goods. The Kansa passed the time with dancing, drinking, and feasting, but the July heat was oppressive, and soon the fever was passing through the French camp and the Kansa village. On July 16 the convoy of boats arrived, although many of the men were still sick and unable to work.

The next morning Bourgmont had his men unload some of the goods. Addressing them on behalf of the King of France, he told the Kansa what he expected of them.

> *I have returned on behalf of the great chief of all nations to assure all of you on his behalf that he wished and intended, without refusal on your part, to have all of you at peace and that all tribes should obey him. Those who do not follow his orders he will have destroyed entirely* (Norall 1988:129–130).

Bourgmont told them that he was marching to the land of the Padouca and that he would need the help of the Kansa and other tribes. The goods scattered before them were to trade for horses.

On July 24 the journey to the Padouca began. Several days later Renaudiere posted himself on a hill by the trail and counted the long line of Native Americans as they passed by: 300 warriors, 2 head chiefs, 14 war chiefs, 300 women, about 500 children, and at least 300 dogs dragging loaded travois (Norall 1988:136). The numbers were swelled by Kansa on their way to hunt. However, just days into the trek, Bourgmont fell ill with the fever and could not stay on a horse. Renaudiere's journal entry gave no clue as to the true nature of the fever that wreaked such havoc with the soldiers. In midsummer heat and less than ideal hygienic conditions, it could have been influenza, dysentery, typhus, diphtheria, or almost any bacterial infection.

The ill commander sent an envoy to the Padouca, bearing gifts and confirming that the main French group would be there as soon as the leader was able. For this dangerous mission Bourgmont chose Francois Gaillard, a civilian employee of engineer Renaudiere, who volunteered for the task. Gaillard was accompanied by only two freed Padouca slaves, a teenage boy and a young woman, to guide the way. Continuing to travel as far west as their summer buffalo hunting grounds were the 1,000-plus Kansa entourage that had started out from the Missouri River. Just 8 miles from the Kansas River crossing, Bourgmont on a stretcher turned back for Fort Orleans (Norall 1988:138–139).

The small group of eight Kansa and Otoe and a handful of French soldiers made it back to the Kansa village in just two and one-half days. They immediately set to work making a raft for the downstream trip to Fort Orleans. Fortuitously, a pirogue from the Otoe country arrived at the Kansa village that same afternoon, and Bourgmont and several soldiers left on it for the fort early the next morning, August 4.

While Bourgmont recovered in the comparative comfort of the fort, word came on September 6 that Gaillard and the two guides had reached the Padouca village on August 25. The freed slaves regaled the Padouca head chief with praise for Bourgmont. Gaillard told him that he brought a flag on behalf of his head chief, who was coming with much trade merchandise to make peace. The Padouca head chief was greatly pleased by the return of the two Padouca young people and took Gaillard to meet the other village chiefs (Norall 1988:140–141).

By mid-September, though not fully recovered, Bourgmont felt that he could wait no longer to undertake his peacemaking mission. He left Fort Orleans with his 10-year-old son, an army doctor, Renaudiere, and 9 soldiers, and they made their

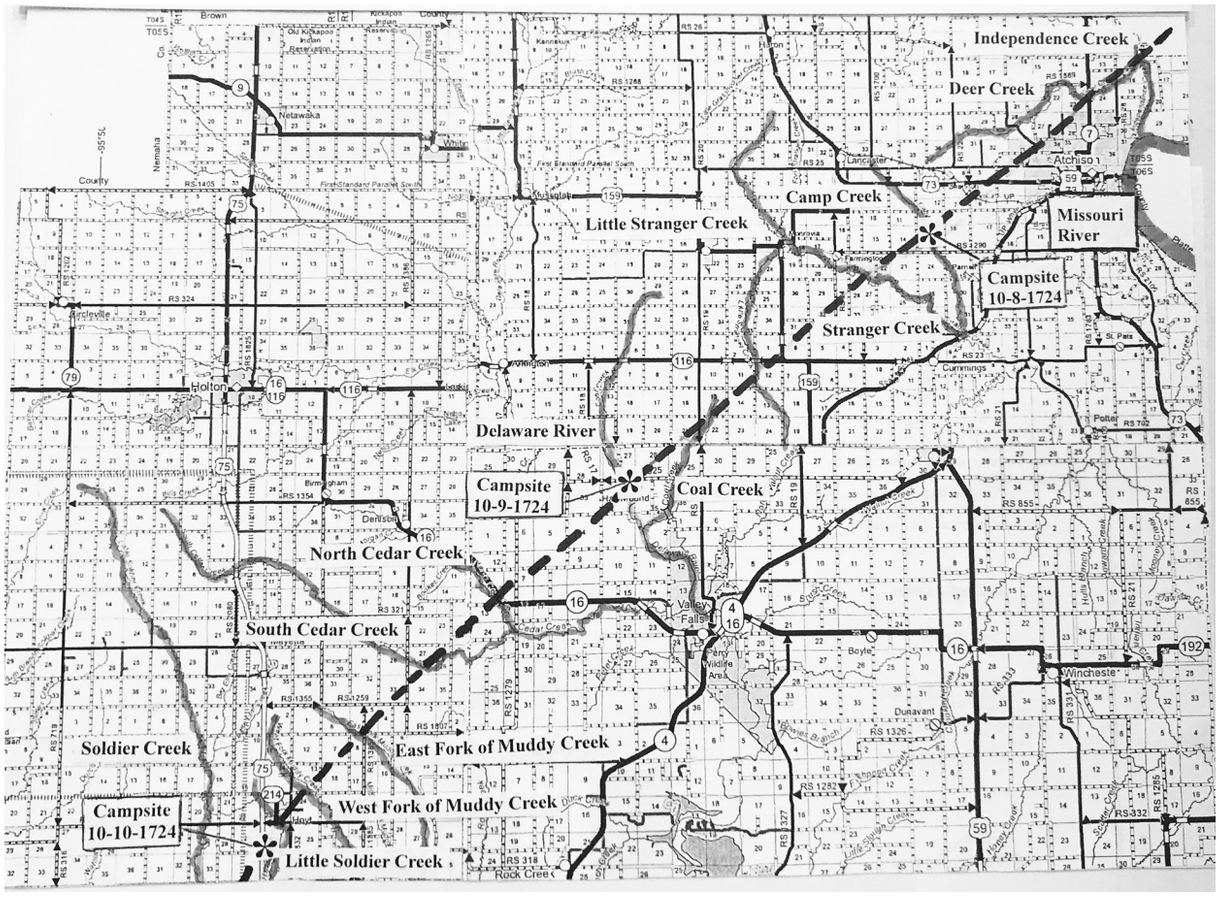


Figure 1. Kansa Village to Little Soldier Creek, October 8-10, 1724.

way by water to the Kansa village, arriving on September 27. He immediately set about gathering representatives of the various tribes, including the Missouria, Kansa, Otoe, and Ioway, who he wanted to make peace with the Padouca. He brought a few Padouca as well.

On October 5 he gathered them together in front of his tent at the Kansa village and addressed them.

> *My friends, I am pleased to see you all assembled here today so that I may speak my thoughts to you. I declare to you that I have come here on behalf of the great chief of all the nations, who is on the other side of the Great Lake, and on behalf of the great chief on the coast to bring you their messages and tell you their sentiments. He has given me full power to make peace with the Padoucas, and, since they are here among us, I desire that we now make an alliance with them and that henceforth you live on good terms with them and that you trade with one another, just as you do with us and with the Otos, Osages, Iowas, Kansas, Skiri Pawnees, the Missouris, and the Illinois* (Norall 1988:144).

The chiefs arose and loudly proclaimed,

> *We wish the same, and we have promised you as much already, and so we have no other will than yours* (Norall 1988:144).

BOURGMONT'S 1724 ROUTE TO THE PADOUCA October 8–10, 1724

At 9:00 on the morning of October 8, Bourgmont once again started west, following in the path that the Kansa Indians had traced in July (Figure 1). Now the group was just 41 people and 10

horses packed with trade goods and merchandise. Moving at a good clip, which only such a small force could maintain, they made about 14 miles that first day, even with the late start and on foot. Nowhere in the journal is an indication that they had horses to ride, though Renaudiere reported that on one day Bourgmont shot a buffalo "on horseback." Perhaps the commander was riding one of the ten pack horses, unloaded of merchandise that day. The journal makes it clear that on the day they met the Padouca the tribe provided mounts for all of the Frenchmen and Native Americans to ride to the Padouca camp. Otherwise, the party marched on foot the entire way across Kansas.

> *On the 8th of October we left the Kansa village at nine in the morning for the Padouca country, with our firearms and baggage, and with the flag flying: M. de Bourgmont, M. de Saint-Ange, M. de Bourgmont's son, M. La Renaudiere, a sergeant and seven soldiers, the Frenchman named Gaillard who had returned from the Padouca country, M. Quesnel, the army doctor, the Canadian named Pichard, and an employee of M. La Renaudiere, with ten horses to carry the merchandise. We have with us five Padoucas who came to the Kansa village; also seven Missouris, the head chief of the Kansa with four war chiefs of his tribe, four Oto chiefs, and three Iowas. We marched about half a league and crossed a small river. Our compass heading is west by a quarter southwest. We have traveled five leagues. During the afternoon, we crossed two streams. It has been cloudy all day. Prairies, hills, clumps of trees in several places. We found some woods along the streams* (Norall 1988:146–147; Figure 2).



Figure 2. Missouri River. Location of Kansa village, October 8, 1724. . . . *we left the Kansa village at nine in the morning for the Padouca country, with our firearms and baggage, and with the flag flying ….*

9 October. We left our camp at 5 in the morning and marched until 4 in the afternoon. We had a drizzle of rain from noon until 5 o'clock. We crossed a little river and three streams. According to our estimate, we traveled seven leagues ...[illegible]. *The compass reading was west-southwest. Frost during the night. This morning, an hour before dawn, Gaillard and M. Quesnel, with two Padoucas, left to advise the Padoucas of our departure and our march toward their village* (Norall 1988:147; Figure 3).

10 October. We left at 5 in the morning. We marched until 5 this afternoon. We crossed two small rivers and three streams. We traveled eight leagues on a compass bearing of west-southwest. Broad prairies, clumps of trees to the right and left of the trail. Several hills with rocks on their surface. Along the streams we find also pieces of slate, and on the prairie some reddish, marbled stones that protrude one, two, and three feet out of the ground. Some are more than six feet in diameter. We have seen many deer today. Frost (Norall 1988:147; Figure 4).

2018 FIELD STUDY
Day One—May 1, 2018

We set out this first day of May to cover the first three days of Bourgmont's October 1724 approach to the Kansas River. At 9:00 a.m. we reached Doniphan, the little Kansas whistle stop with a few modest homes atop the rolling hills and bluffs of the Missouri River. Along these same riverfront hills in 1724 the Kansa Indians had their grand village. In the first example of historical synchronicity that we experienced on our current journey, we found that Lewis and Clark camped very near this spot



Figure 3. Delaware River. Bourgmont's camp, October 9, 1724. *We had a drizzle of rain from noon until 5 o'clock.… Frost during the night.*



Figure 4. Little Soldier Creek. Bourgmont's camp, October 10, 1724. *We left at 5 in the morning. . . . Broad prairies, clumps of trees to the right and left of the trail. . . . Along the streams we also find pieces of slate . . . .*

80 years after Bourgmont came through. William Clark noted the location and the Kansa village of 80 years before in his journal entry for July 4, 1804.

> We came to and camped in the lower edge of a Plain where 2nd old Kanzas village formerly Stood, above the mouth of a creek 20 yards wide this creek we call Creek Independence. As we approached this place the Praree [sic] had a most butifull [sic] appearance . . . at this place the Kanzas Indians formerly lived. This Town appears to have covd. a large Space, the nation must have been noumerous [sic] at the time they lived here . . . (Osgood 1964:66).

We left Doniphan and made our way to the vicinity of Lewis and Clark's campsite near the confluence of Deer and Independence creeks. Along with a monument and exhibit for Lewis and Clark, there is a full-size reproduction of a Kansa lodge. We drove back a short distance to Atchison and 2 miles north to the bridge near the spot where the Bourgmont expedition crossed Deer Creek, having crossed the "small river" of Independence Creek earlier. Turning south, then west, then south, then west, we made our way to Parnell. Through the village about 1.5 miles to another small bridge, this one over Camp Creek, approximates Bourgmont's crossing the last stream of the day and establishment of his camp on the evening of October 8.

Local farmer Jim Bilderback met us on the road. He told us that a spring used to exist on the hill above the creek and speculated that this was the reason Bourgmont camped there. He said that local information and tradition indicated that Native Americans once camped on the hill. Interestingly,

at this same location 42 years earlier, Reichart (1976:11) encountered a different elderly resident, who told him of the same local tradition.

The journal entry for October 8 indicated three water crossings and 5 leagues traveled. The three streams are Independence, Deer, and Camp creeks. As the crow flies, it is 11.69 miles from Doniphan to Camp Creek (i.e., 4.22 French leagues, 4.68 Reichart leagues, 5 dead-reckoning leagues).

We left Camp Creek and went southwest by way of right-angle roads to a steel truss bridge over Stranger Creek. On October 9 Bourgmont had crossed just west of here on flatter ground. We continued our zigzag southwest trajectory to get to Little Stranger Creek, the second of the three streams crossed that day. After going about 3 miles west, we zigzagged south for several miles to reach Coal Creek, the third stream crossed on that October day. Just a few miles farther on, we reached the old village of Half Mound, situated on the east bank of the Delaware River. A farmer came off his tractor to talk to us. This third generation owner of the farm in front of us told us that a feature, which would have existed when Bourgmont came through, was no longer there: a very large mound on the east side of the river. In the 1920s a steam shovel was used to cut it in half in an attempt to straighten the Delaware River; thus, the village was named Half Mound. He gave us directions to the remaining half mound, but trees blocked the view, and we could not identify it with certainty. We did find nearby Bourgmont's likely Delaware River crossing, conveniently marked with modern bridge abutments, indicating that the crossing remained popular into recent times.

Here I insert a postscript. Later in May, after we returned from our reconnaissance, the farmer from Half Mound called to correct what he had told us. After talking to family members, he realized that the attempted channel straightening had nothing to do with creating the half mound. It was formed prior to the 1920s by river erosion. I thanked him for correcting the record and remarked that Bourgmont's Delaware River crossing was close by, and the mound would have looked natural with the water flowing along its base.

The Delaware River is the little river in the October 9 journal entry. Bourgmont's party camped on the west side that chilly October evening. With the departure of Gaillard and his small group very early that morning, the camp was reduced to 37 people that night.

The day's journey included a little river and three streams: Stranger Creek, Little Stranger Creek, Coal Creek, and the Delaware River. The distance traveled was 7 leagues. As the crow flies, the distance from Camp Creek to Half Mound is 16.52 miles (i.e., 5.98 French leagues. 6.61 Reichart leagues, and 7 dead-reckoning leagues).

From Half Mound we headed southwest for North Cedar Creek, the first crossing on October 10. From the North Cedar Creek bridge, which is within a quarter mile of Bourgmont's crossing, we went east and stopped to read a marker describing the old village of North Cedar Creek, Kansas. Near Bourgmont's South Cedar Creek crossing, we found no bridge but a paved low-water crossing. We observed the slate in South Cedar Creek that Renaudiere noted in these stream beds. From there we drove a mile or so to the East Fork of Muddy Creek crossing. The expedition would have crossed about 150 yards from our location. We proceeded to the West Fork of Muddy Creek, a small stream that could have been crossed anywhere, then on to the small town of Hoyt, then 2 miles south and 2 miles west to Little Soldier Creek. This was Bourgmont's camp for the night. Little Soldier Creek is surely one of the two small rivers mentioned in the journal. Continuing for about 7 miles, we encountered Bourgmont's Soldier Creek crossing, just east of Grove. There ended our first day of following the Bourgmont trail of 1724.

This day of October 10, the expedition crossed two small rivers and three streams: North Cedar Creek, South Cedar Creek, West Fork of Muddy Creek, East Fork of Muddy Creek, and Little Soldier Creek. Renaudiere reported that they traveled 8 leagues. As the crow flies, the distance is 18.72 miles (i.e., 6.77 French leagues, 7.49 Reichart leagues, 8 dead-reckoning leagues).

BOURGMONT'S 1724 ROUTE TO THE PADOUCA
October 11 and 12, 1724 (Figure 5)

11 October. We started off at 5 o'clock. At 8 o'clock we crossed two streams, at 10 a small river and at 11 a stream. Thus, we arrived at the Great Kansas

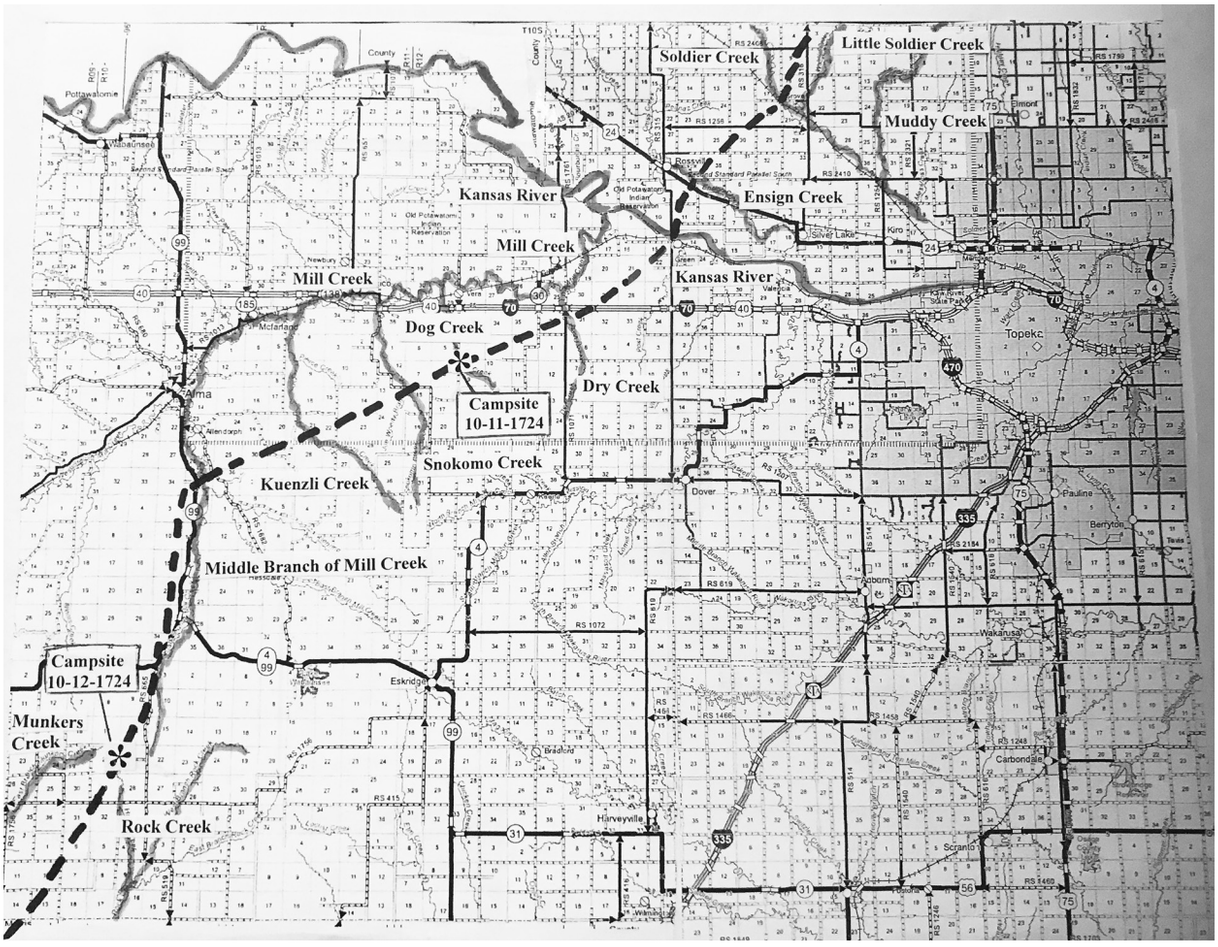


Figure 5. Little Soldier Creek to Kansas River and beyond to Dog Creek. Dog Creek to Rock Creek, October 11 and 12, 1724.

River, which we forded. It is only three feet deep but has a shifting, sandy bed. We were obliged to unload our floundering horses. We made the crossing from north to south. From there we continued west-southwest. There was a little river on the right of our route, and some little hills on the left; then there were another small river and some large hills. The compass direction of this river [the Kansas River] *is straight to the west. It enters the Missouri about 20 leagues from the place where we crossed. When the waters are high, the river looks as big in places as the Missouri. It is very long, according to the Indians. Both sides are wooded, with many deer, turkeys, some canebreaks, and innumerable bison. Our hunters killed two during our crossing. We made camp about four leagues from the said river. A large hill is on our left, where a smaller river runs. We estimate we have traveled eight leagues today. Broad prairies, hills with rocks on the surface and very short grass growing on them. Clumps of trees here and there* (Norall 1988:147–148; Figures 6 and 7).

12 October. We left at 5 in the morning and marched until half-past 11, when we stopped to eat lunch. We marched until six in the evening, covering eight leagues by our reckoning. All day long we skirted large bluffs on our left where there is a little river. We crossed eight streams, all of which flow into the little river on our left. Broad prairies, hills, little valleys where there are many stones, large and small. We see quantities of bison bulls and cows, herds of stags and does, more than 200 all together. There are turkeys along the streams and rivers, clumps of trees here and there, and many hills that



Figure 6. Kansas River. Bourgmont's crossing, October 11, 1724. *It is only three feet deep but has a shifting, sandy bed. We were obliged to unload our floundering horses. . . . many deer, turkeys, some canebreaks, and innumerable bison.*

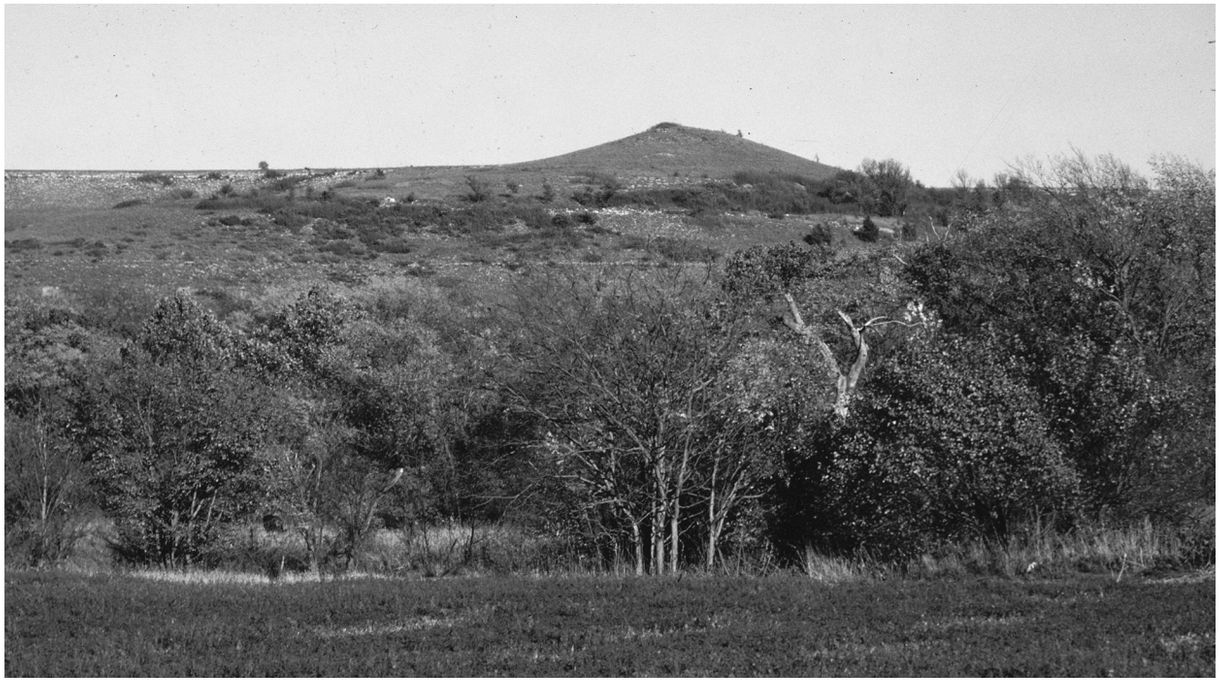


Figure 7. Dog Creek. Bourgmont's camp, October 11, 1724. *We made camp about four leagues from the said river. A large hill is on our left, where a smaller river runs. . . . Broad prairies, hills with rocks on the surface ….* Courtesy of Reichart Collection, Kansas Historical Society.

from a distance appear to us like castles and forts. The grass is very short on the high upland. We have marched all day in a southwesterly direction. Fine weather (Norall 1988:148; Figures 8 and 9).

2018 FIELD STUDY
Day Two—May 2, 2018

We departed our Topeka hotel in the morning and headed back to Grove where we left off the day before. We were tracing Bourgmont's movements of October 11 to the Kansas River and beyond, then tracking his route of October 12. Starting west from Soldier Creek, we came to the almost-vanished village of Grove.

Having dodged a heavy spring rainstorm the night before, we were grateful for a blue sky and cotton candy clouds. Several miles from Grove we turned south on Davis Road, a lightly graveled road that appeared dry and solid. Perhaps we would have been forewarned had we paid attention to the local name for the area: Toad Hollow. We ran about a quarter mile, oblivious to the fact that our tires were sinking deeper and deeper into a gumbo mass, until a glance in the rear view mirror brought us to a sudden halt. Ross jumped out into about a foot of mud and pushed, while I floored it in reverse. Nothing happened at first, but in fits and starts we began to inch our way backwards to the pavement. We finally got there, expressed our good fortune in escaping a trip-delaying fate, and scraped off the mud covering our shoes and halfway up our calves.

We followed paved 62 Street west for several miles and went south on Northwest Rossville Road into Rossville. When we drove down Davis Road, we were attempting to come off the wide ridge that Bourgmont and his party traversed before descending into the Kansas River valley. In the flat valley we searched in vain for Ensign Creek, the last stream to be crossed before reaching the Kansas River. A little sleuthing revealed that farmers had dammed both branches of Ensign Creek to form ponds. Eradication of the streams happened after 1976; when Reichart came through, the branches were still there.

We took Highway 24 south out of Rossville, noting the Oregon-California Trail signs as we approached the Kansas River bridge. There we registered our second piece of historical synchronicity; this location where Bourgmont crossed the Kansas River going southwest in 1724 is the same point where thousands of northwest-bound emigrants crossed, heading for Oregon or California in the 1840s and 1850s. Known as the Union Ferry or



Figure 8. Hills along Mill Creek in Wabaunsee County. Bourgmont's route, October 12, 1724. *There are turkeys along the streams and rivers, clumps of trees here and there, and many hills that from a distance appear to us like castles and forts*. Courtesy of Reichart Collection, Kansas Historical Society.



Figure 9. Fortress-like hills in Wabaunsee County. Bourgmont's route, October 12, 1724. *. . . many hills that from a distance appear to us like castles and forts. The grass is very short on the high upland.*

Union Town crossing, it figures in the extant diaries of many emigrants.

Traversing the river put us into northeast Wabaunsee County. Upon reaching I-70 3 miles farther south, we entered the changed landscape that Renaudiere noted after crossing the Kansas River on October 12: "Broad prairies, hills with rocks on the surface with very short grass growing on them. Clumps of trees here and there." We proceeded west on I-70 for a few miles, as Bourgmont's route kept to the high ground to the southwest. All the time the aptly named eminence Buffalo Mound was in our view, just as it dominated the western skyline in 1724. About half a mile south of I-70, we came to Dry Creek, the stream that Reichart concluded was Bourgmont's camp of October 11.

Here for the first time I must disagree with Reichart's conclusions. The camp of October 11 was surely on Dog Creek, some 4.5 miles west of Dry Creek. Reichart erred when he approximated the distance from Little Soldier Creek to the Kansas River as 15 miles or 6 leagues. It is actually 12.43 miles (i.e., 4.49 French leagues, 4.97 Reichart leagues).

On this day we also see the first example of an error in Reichart's (1977–1978:15, 63) calculations because he did not have the 1988 Norall translation, which stated plainly and unambiguously, "We made camp about four leagues from the said river [Kansas River]." Translating directly from the original manuscript in the Archives Nationales, Norall caught this material statement that Le Page du Pratz and Margry missed because it was omitted from the clerical copies that they used.

When Reichart erroneously estimated the distance from Little Soldier Creek to the Kansas River as 15 miles or 6 leagues, he assigned another 2 leagues to bring the day's travel in line with the journal estimate of 8 leagues, which put Bourgmont's camp incorrectly on Dry Creek. When the correct calculations, using the French standard, of 4.49 leagues from Little Soldier Creek to the Kansas River and 3.57 leagues from the Kansas River to Dog Creek are combined, the total estimated distance is 8.06 leagues, very nearly the dead reckoning of 8 leagues. If the Reichart standard of 2.50 miles per league is used, the distance of 8.92 leagues is still a reasonable variance from the journal's dead reckoning.

Establishing Bourgmont's camp on Dog Creek corresponds with the journal comments on the physical surroundings as well. It puts the party in sight of a large castle-like hill to the left of camp on the neighboring stream [Snokomo Creek]: "A large hill is on the left, where a smaller river runs." Reichart noted this large hill on Snokomo Creek, as did we. It is a good example of the "many hills that from a distance appear to us like castles and forts," as Renaudiere wrote in the next day's journal entry. Perhaps this installment did not include Dry Creek in the day's waterway count, despite the fact that Bourgmont surely crossed it on the way to Dog Creek, because Dry Creek was in a drought period.

The October 11 journey crossed four waterways before reaching the Kansas River: tributary of Little Soldier Creek, tributary of Soldier Creek, Soldier Creek, and Ensign Creek. Renaudiere reported that the travel this day was 8 leagues. The actual distance from Little Soldier Creek to the Kansas River crossing is 4.49 leagues, and the Kansas River crossing to Dog Creek is 3.57 leagues, for a total of 8.06 French leagues (i.e., 8.92 Reichart leagues, 8 dead-reckoning leagues).

From the Dog Creek camp the Bourgmont party crossed eight streams on October 12. All are tributaries of Mill Creek, which flows west just north of I-70 until it crosses I-70 and turns southwest near Paxico. When it reaches Alma, Mill Creek turns south and parallels modern Highway 99 on the east for almost 9 miles. Bourgmont's route took a southwest trajectory and turned left to follow the high ground south along which Highway 99 runs today. We worked our way back and forth from I-70 south to find these water crossings and came across many examples of those same castle- and fort-like hills. Bourgmont's force went southwest, crossing Snokomo Creek, Kuenzli Creek, and Middle Branch of Mill Creek before turning south near the mouth of the East Branch of Mill Creek. Now with Mill Creek to their left instead of their right, the party crossed five more unnamed tributaries of Mill Creek. It was along this south segment that they "skirted large bluffs on our left where there is a little river [Mill Creek]."

Reichart included Dog Creek in his count of eight streams crossed, but now identified as the October 11 camp it cannot be included. Reichart also figured that Bourgmont crossed four waterways that flow

east into Mill Creek off of the ridge that presently carries Highway 99. With Dog Creek removed, the crossing count off of Highway 99 increased to five.

Though the journal indicated that the expedition traversed eight streams that day, after the creeks named above, we crossed an additional eight unnamed tributaries of Mill Creek, as we drove due south on Highway 99. Is it possible that the number of unnamed tributaries along Highway 99 has increased since 1976? Reichart had assigned the southernmost tributary as the October 12 camp, located near the current intersection of Highway 99 and Highway 4. Of course, that was based on Reichart's incorrect conclusion that the party started the day from Dry Creek. Starting from Dog Creek and traveling 8 leagues puts the October 12 campsite farther southwest on the headwaters of Rock Creek, on the high flat divide between Rock and Munkers creeks.

Thus, eight waterways were crossed: Snokomo Creek, Kuenzli Creek, Middle Branch of Mill Creek, and five unnamed tributaries of Mill Creek. Distance traveled according to the journal was 8 leagues. As the crow flies, the distance from Dog Creek to the October 12 camp is 22 miles (i.e., 7.96 French leagues, 8.8 Reichart leagues, 8 dead-reckoning leagues).

At the end of this long day, we took note of Chalk Road near the intersection of Highway 99 and Highway 4. We turned our vehicle west and made our way to our hotel in Council Grove.

BOURGMONT'S 1724 ROUTE TO THE PADOUCA
October 13 And 14, 1724 (Figures 10 and 11)

13 October. We left at 5 in the morning. We marched until 10 o'clock, when we stopped for the remainder

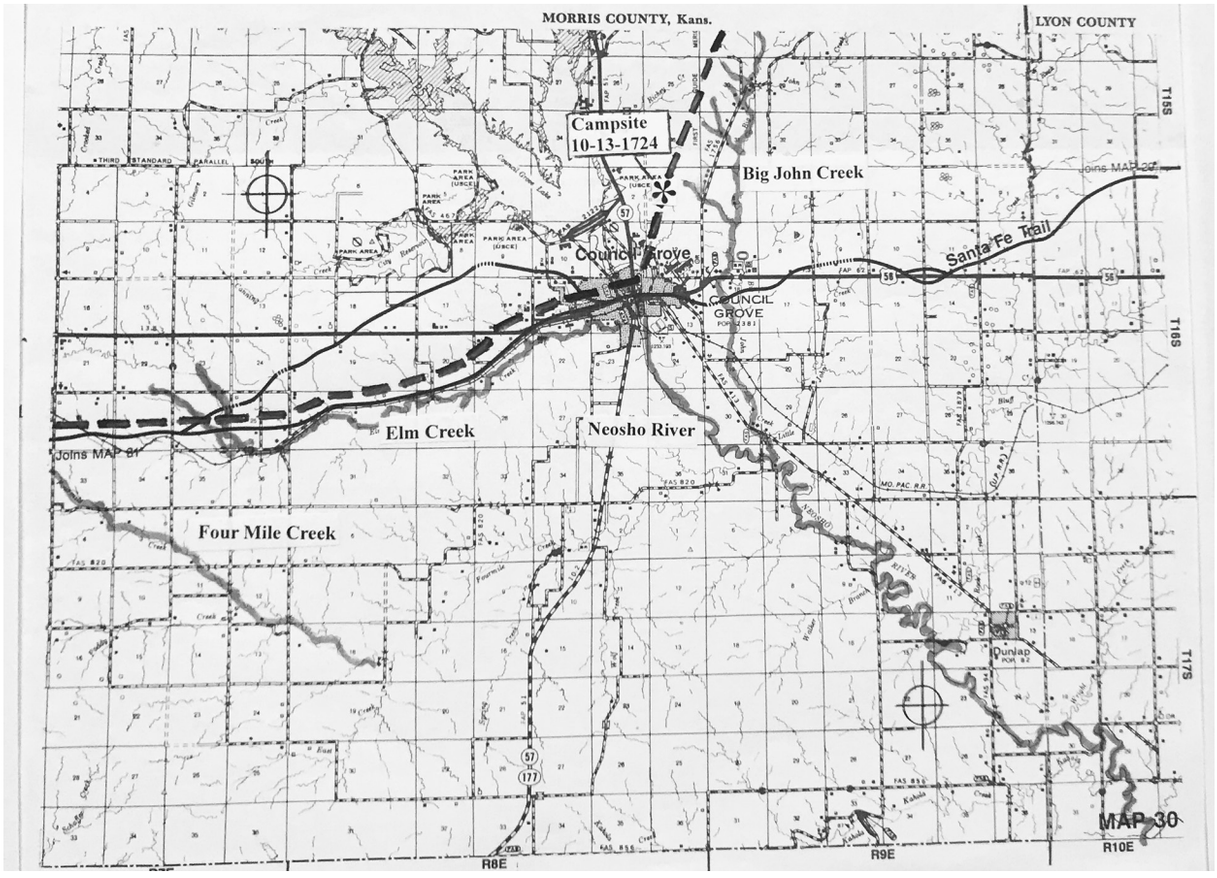


Figure 10. Rock Creek to Big John Creek, October 13, 1724. Big John Creek onward toward Lost Spring, October 14, 1724.

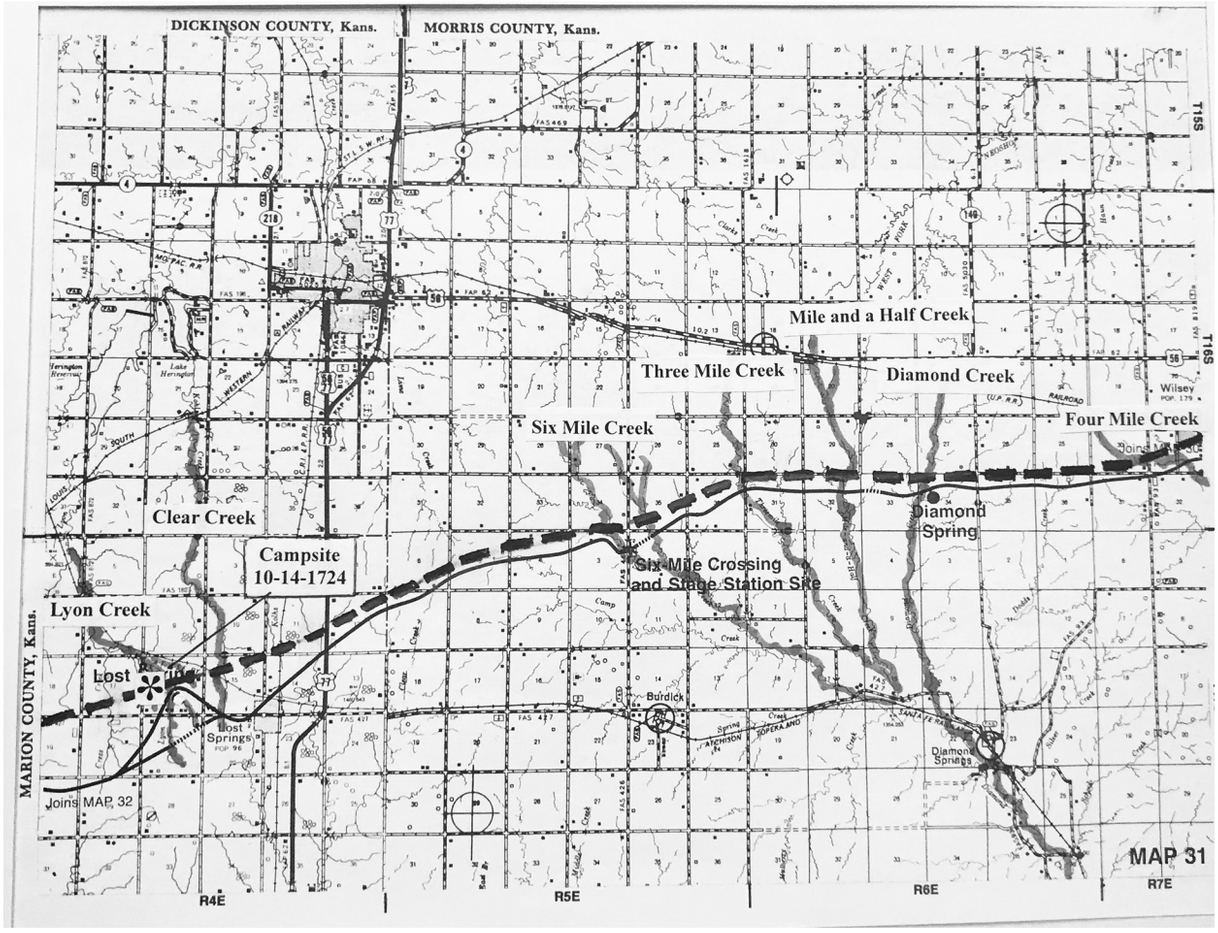


Figure 11. Big John Creek to Lost Spring, October 14, 1724.

of the day to rest the men and the horses. We went a good three leagues. For a league or thereabouts we skirted the little river on our left, and from there we passed onto the high ground where many small streams form. Today, we saw on all sides more than 30 herds of bison. They are so numerous it is impossible to count them. There appeared to be four or five hundred at least in each herd. We see herds of deer that are almost as numerous. Our hunters kill as many as they please and choose the fattest to eat. From the others, they take only the tongue. Continuous prairies, with clumps of trees along the streams and in the little valleys. Our compass bearing is southwest. Fine weather (Norall 1988:148; Figure 12).

October 13 excerpt from Margry: We departed at five o'clock in the morning; we have marched until ten o'clock, where we have stopped in order to sojourn, in order for every one and the horses to rest; we have made three good leagues . . . Continual prairies, thickets of woods the length of the brooks and within the valleys (Paddock 1936:52).

October 13 excerpt from Le Page du Pratz: The same day they passed thro' a wood almost two leagues long, and a pretty rough ascent, a thing which seemed extraordinary, as to then they only met with little groves, the largest of which scarce contained a hundred trees . . . groves too small to afford a retreat to a quarter of the buffaloes and elks seen there (Cutler 1883:5).

14 October. We left at five in the morning. We marched until ten, when we had to pause to let the



Figure 12. Big John Creek. Near Bourgmont's camp, October 13, 1724. *Continuous prairies, with clumps of trees along the streams and in little valleys.*

rain come to an end, which it did at half-past 11. We left at noon and marched until six o'clock. On the high ground we encountered many springs of fine clear water, forming several streams and little rivers that drain into the Kansas River. Broad prairie as far as the eye can see, without trees, for about three leagues. We find some groves along several streams or along some little rivers; herds of bison in great number, as far as we could see.

In some places we found many stones on the ground and strips of exposed rock, resembling from afar tumbledown farm buildings. M. de Bourgmont, on horseback, killed a bison today with his pistol. Our compass bearing all day has been west, quarter southwest. We have made eight leagues today, in fine weather. At every meal we have as many bison tongues as we can eat (Norall 1988:148–149; Figure 13).

2018 FIELD STUDY
Day Three—May 3, 2018

The journal entries above for October 13 contained material information from Le Page du Pratz, likely received from Bourgmont after the Padouca expedition. It supplemented Margry and Norall and confirmed that the party had reached the heavily wooded area around present-day Council Grove.

Because Reichart used Cutler's (1883) version of Le Page du Pratz as his primary source, he unknowingly deprived himself of evidence concerning the activities of that day. This statement was captured in Paddock's (1936) translation of Le Page du Pratz: "The thirteenth they only marched to ten o'clock, in order to give some rest to the troops; during this time the hunters killed as much game as they wished."

The three journal sources agreed that Bourgmont's force stopped on October 13 at 10:00 a.m. after a "good three leagues" of travel and used the remainder of the day to rest the horses and men and give the hunters an opportunity to restock their food supply. Despite evidence provided by Margry, Reichart inexplicably came to the unfounded conclusion that they traveled 8 leagues and ended up in camp some 9 miles west of Council Grove on Elm Creek. Furthermore, he misinterpreted the Le Page du Pratz journal entry concerning the woods, assuming that 2 leagues was the width from east to west rather than north to south. Thus, to make the mileage fit for the day, he had them crossing the Neosho River and traversing the 2 leagues of woods. In reality the woods they passed near



Figure 13. (right and opposite page) Near original Lost Spring on the Santa Fe Trail. Bourgmont's camp, October 14, 1724. *On the high ground we encountered many springs of fine clear water …. Broad prairie as far as the eye can see, without trees …. At every meal we have as many buffalo tongues as we can eat.*





and through were the heavily wooded streams of Rock, Munkers, and Big John creeks, which paralleled each side of the flat ridge that they followed southwest, as they approached the Neosho River. The field notes of Santa Fe Trail surveyor Joseph Brown (1825) in the Neosho River area 101 years later described what Bourgmont would have seen in 1724: "This is the largest body of woodland passed through after leaving Big Blue, 'tis here about a quarter mile wide; above and below are some groves more extensive. The timber and land are superior quality …."

The Norrall translation established undeniably that the Bourgmont party traveled 3 leagues that day, not 8 leagues as proposed by Reichart. For the first time Renaudiere used the phrase "a good three leagues," a confident declaration that they made unusually good time. There were very few impediments to slow them as they moved southwest on the flat ridge that divides Munkers Creek from Rock Creek. They might have been marching under their leader's admonition to give him just 3 good leagues and then they could rest the remainder of the day. What foot soldier would not respond positively to that? Camp for October 13 was 3 leagues from the Rock Creek camp, putting Bourgmont on Big John Creek within sight of the Neosho River crossing a mile or so to the southwest. Here they rested men and horses from 10:00 a.m. until early the next morning.

If Renaudiere's estimate of seeing 30 buffalo herds of up to 500 head each is accurate, Bourgmont's force witnessed about 15,000 bison that day and perhaps as many deer as well. No waterways were crossed. They traveled 3 leagues (i.e., 8.29 French miles, 7.5 Reichart miles, 3 dead-reckoning leagues).

On October 13 the Bourgmont party traversed increasingly flatter ground west of the Council Grove area with fewer trees and physical impediments to their westward march.

Intending to trace Bourgmont's route of October 13 and 14, we got an early start and went east on Highway 56 to the east edge of Council Grove, then turned north-northeast on Old Highway 4. We pursued, in reverse, the ridge that was the portion of Bourgmont's October 13 path that we had not covered the previous day and verified our way back to Chalk Road.

In a few miles we crossed the headwaters of Big John Creek. We proceeded northeast on Old Highway 4 along the ridge on which the Bourgmont party traveled southwest. We negotiated numerous turns and gravel roads until we arrived at the southwest end of Chalk Road, which winds 4 miles northeast to Highway 4, where we ended the night before. Bourgmont probably treked on or near present-day Chalk Road for a short distance until attaining the wide ridge, which now is bisected by Highway 4, and followed the ridge southwest to the October 12 camp on Rock Creek.

We made our way to Highway 177 and took it south into Council Grove and the Neosho River crossing. The October 14 journal entry mentioned nothing about crossing the Neosho River or any other stream. Perhaps Renaudiere started his league count for the day from the west bank of the Neosho River or for some reason simply did not report any water crossings that day, although there were many. As for the numerous streams they might have crossed near and west of Diamond Spring, maybe the chronicler did not consider them important enough to note or possibly he simply lost count.

As we drove out of Council Grove on Highway 56, we noted that for the first time, the Bourgmont route coincided with the Santa Fe Trail. About 2 miles west of town, we angled slightly southwest along Helmick Road, as it parallels Elm Creek to the south, the track followed by Bourgmont in 1724 and the Santa Fe Trail 100 years later. We also noted west of Council Grove recent fence posts and ground cover of the stones described as "many stones on the ground and strips of exposed rock, resembling from afar tumbledown farm buildings."

Reichart (1977–1978:27) made a strong point when he stated, "Springs are not of rare occurrence in the Flint Hills, and the ones mentioned in the Journal must have been extraordinary to elicit notation." Continuing past Elm Creek, we went north for 1.5 miles to Highway 56, then west for 7 miles, then south on 2200 Road for 2 miles to Diamond Springs Ranch. The caretaker gave us permission to visit the famous spring itself, as Bourgmont might have as well, and worked our way by right angles over to One and One-Half Mile Creek, where he crossed it. We found our way to Three Mile Creek, where we observed that Bourgmont probably crossed in the vicinity of a modern sign on the road indicating Santa Fe Trail ruts in the field to the east.

We drove through the town of Lost Springs and 3 miles west to the Lost Spring interpretive site. There we phoned Steve Schmidt and made plans to meet him at this site the next morning, and we headed north to our hotel in Herington.

On October 14 no water crossings were identified or counted in the journal installment, yet Bourgmont's party crossed the Neosho River very early that day and possibly crossed Elm Creek west of Council Grove, as well as One and One-Half Mile, Three Mile, Four Mile, Diamond, Six Mile, and Clear creeks. As proposed above, perhaps Renaudiere lost count and elected not to report any water crossings at the end of the day. He reported that they traveled 8 leagues that day. With the benefit of almost a full day's rest the day before and faced with some of the flattest open land they had yet encountered, "broad prairie as far as the eye can see, for about three leagues," they covered at least 27.5 miles. Dividing by 11 hours, they were moving along at 2.5 miles per hour, their fastest speed yet.

As the crow flies, the distance from the Neosho River at Council Grove to the original Lost Spring is 27.5 miles (i.e., 9.95 French leagues, 11 Reichart leagues, 8 dead-reckoning leagues). Apparently Renaudiere used October 14 as his daily "dead reckoning" standard: 2 miles per hour, multiplied by elapsed travel time. Thus, 11 hours times 2 miles per hour equals 22 miles. Eight leagues at the French standard would be only 22.11 miles; incorrect though it was, that is what Renaudiere recorded. Perhaps his judgment of distance was hampered by the very long distance and a landscape increasingly barren of natural topographic markers by which to estimate.

BOURGMONT'S 1724 ROUTE TO THE PADOUCA
October 15 and 16, 1724 (Figures 14 and 15)

15 October. We left our camp at five, marched until time for a break, then departed at half-past one. We

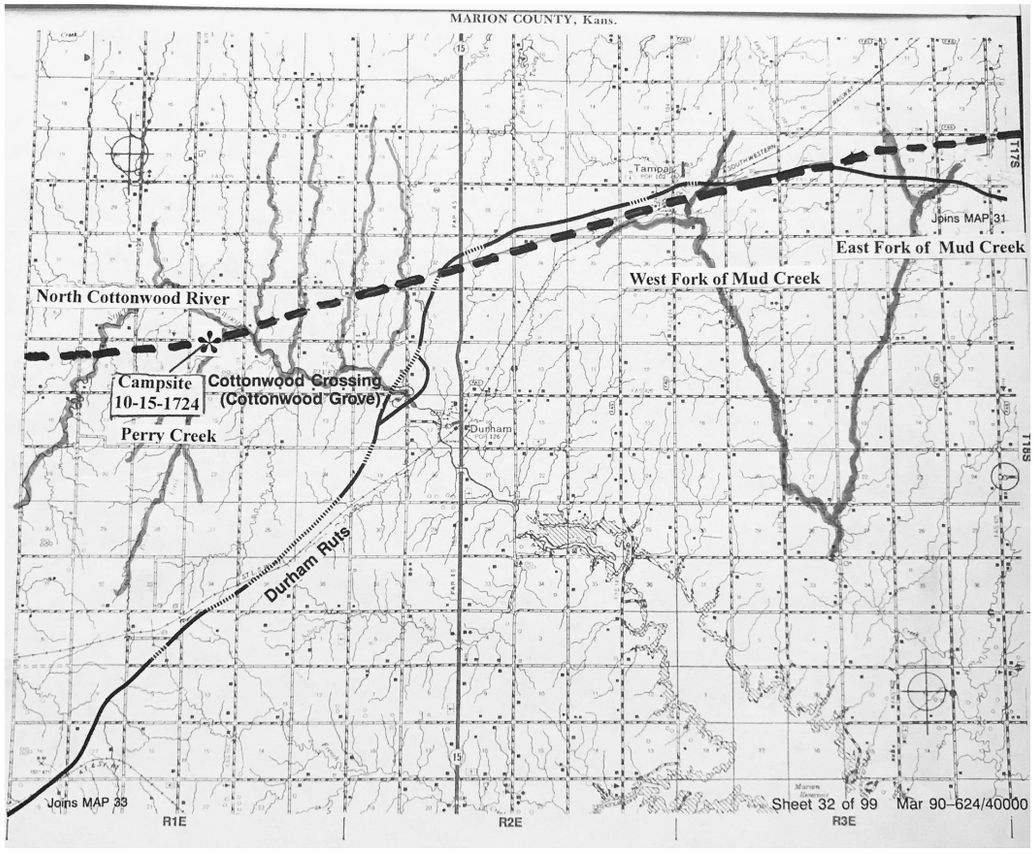


Figure 14. Lost Spring to Perry Creek, October 15, 1724.

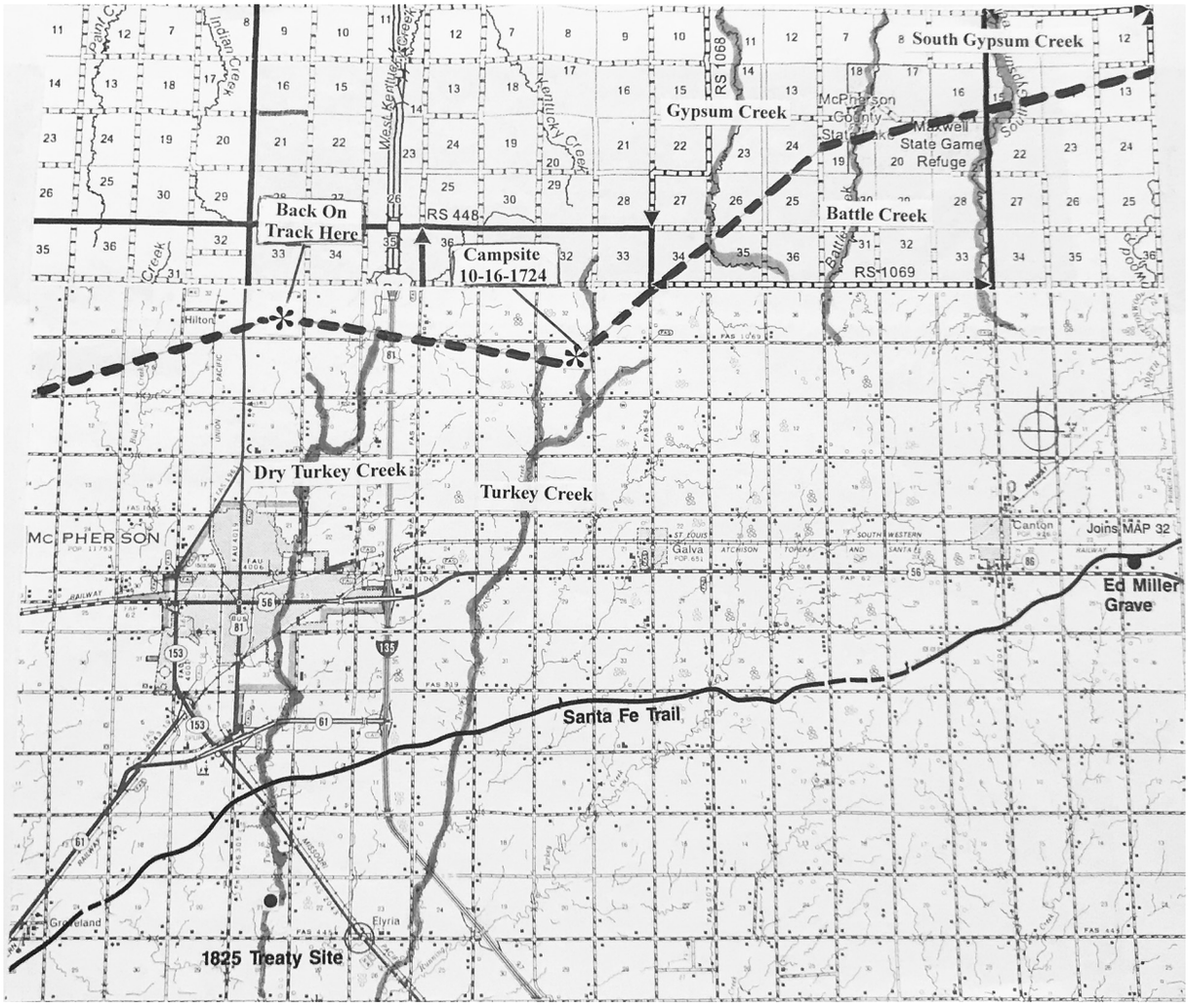


Figure 15. Perry Creek to Turkey Creek, October 16, 1724.

crossed several streams and two little rivers. We march two leagues sometimes without seeing a tree, except for those that grow along the streams and rivers. In certain places there are broad prairies and small hills. Some rocks on the ground. We find, as usual, herds of bison. Our compass bearing has been west-southwest. We traveled seven leagues today. Frost last night but a warm sun during the day (Norall 1988:149; Figure 16).

16 October. We left at five in the morning and marched until 11, when we halted. We left at one and marched until five. We crossed two small rivers and several dry stream beds. We find gray and black rocks on the small hills. Some big ones stick out of the ground; others are rounded and very light in color. We find few large trees now, except along the larger streams in open groves.

Our guide has led us astray. In the afternoon he took us too far toward the south. We have traveled six leagues today. We still find many bison. Fine weather. We camped at five o'clock (Norall 1988:149; Figures 17 and 18).

2018 FIELD STUDY
Day Four—May 4, 2018

Steve joined us this morning for the day. We met at the Lost Spring interpretive site, and he led us to the site of the original Lost Spring about 1



Figure 16. Perry Creek. Bourgmont's camp, October 15, 1724. *We march two leagues sometimes without seeing a tree, except those that grow along the streams and rivers. . . . Frost last night but a warm sun during the day.*

mile northeast. It is located in a little forested area along Lyon Creek. After fording the narrow shallow crossing, we found the old spring about 30 feet west. We fought our way through the trees and undergrowth about 200 feet to an east-west half-section line fence. This would have been near Bourgmont's camp for the night of October 14. The Santa Fe Trail crossing of Lyon Creek is very visible from the east near this half-section line fence. Some traces are also apparent on the west side.

We drove back to 340 Road and headed west. The expedition route continued to follow the general corridor of the Santa Fe Trail. Soon we were heading west on 330 Road, where we crossed the East Fork of Mud Creek about where Bourgmont crossed. We worked our way at angles over to the crossing of the West Fork of Mud Creek, about .25 mile west of Mustang Road.

We took Limestone Road north 1 mile into Tampa to its intersection with 330 Road. On the northeast corner is the Tampa Cemetery with its well-known ruts of the Santa Fe Trail. On the southwest corner is a large stone marker, erected by the Old Settlers and Citizens of Marion County in 1914, and a small metal "Welcome to Tampa on the Santa Fe Trail" sign. A third historical marker could be added, as it is near Tampa that the Bourgmont party left the future track of the Santa Fe Trail and proceeded west to the North Cottonwood River crossing, about 4 miles north of the Santa Fe Trail crossing of the Cottonwood River near Durham. The Santa Fe Trail turns substantially to the southwest about 4.5 miles west of Tampa, heading for its crossing of the Cottonwood River; up to this point Bourgmont's trail followed the general path of the Santa Fe Trail for about the last 42 miles. However,



Figure 17. (above and top of opposite page) Large rock fields at Maxwell Wildlife Preserve, October 16, 1724. *We find gray and black rocks on the small hills. Some big ones stick out of the ground; others are rounded and very light in color.* Courtesy of Reichart Collection, Kansas Historical Society.



Figure 18. Very light stones (Pierres fort claires) on the eastern border of Maxwell Wildlife Preserve, October 16, 1724. *We find gray and black rocks on the small hills. Some big ones stick out of the ground; others are rounded and very light in color.*

Bourgmont's ties to the Santa Fe Trail are not finished yet, as will be seen when we review the last days of the journey to the Padouca.

From Tampa we made our way about 5 miles west and southwest to an unnamed tributary of the North Cottonwood River, the first of four that Bourgmont crossed. Then they crossed the North Cottonwood River and Perry Creek, where they camped for the night. This camp was located about .25 mile south of its confluence with the North Cottonwood River.

Renaudiere noted for this day that they traveled across "several streams and two little rivers." He must have meant several in its most expansive definition. They crossed the East Fork of Mud Creek, the West Fork of Mud Creek, and four unnamed tributaries of the North Cottonwood River before crossing the two little rivers: North Cottonwood River and Perry Creek. So it was actually six streams and two little rivers crossed. Since leaving the Neosho River the day before, the journal entries for October 14 and 15 reflect Renaudiere's growing indifference to the waterway count.

Renaudiere reported 7 leagues traveled on this day. He noted that they might have gone 5 miles or more without seeing a tree except near water. There was nonchalant mention of herds of bison, as usual. Frost appeared on the ground at night. Winter was coming to the Kansas plains. Perhaps this increased Bourgmont's sense of urgency to find the Padouca. It is 17.3 miles (i.e., 6.26 French leagues, 6.92 Reichart leagues, and 7 dead-reckoning leagues) as the crow flies from Lost Spring to the Perry Creek camp.

On October 16 the Bourgmont party came upon a geographic novelty that, like the gigantic hardwood forest along the Neosho River and its tributaries or the castle- and fortress-like hills of Wabaunsee County, excited their interest. Its notation in the journal, like the other two areas, provided on-the-ground proof of Bourgmont's general location that still exists today. Those topographic features are the rocks and stones, many of them huge and extraordinary, that caught their attention on October 16 as "gray and black rocks on the small hills . . . big ones stick out of the ground . . . others are rounded and very light in color."

From the October 15 camp on Perry Creek, we made our way west on 290 Road, crossing Chisholm Trail Road. We worked our way south and west to 260 Road and followed it west to the McPherson County line, which is also both Meridian Road and 30 Street. As well as the county line, it is the sixth principal meridian. We worked our way west and north to Pioneer Road and had a good view of Battle Hill to the north about a mile. We continued to 27 Road and turned north, reaching the intersection of 27 and Pueblo roads. The Bourgmont route is about .5 mile north, trending west-southwest after crossing South Gypsum Creek. Just before we reached it, going north on 27 Road, we passed a low hill on the right, partially covered by evergreen trees and very large whitish rocks. Undoubtedly these are the same extraordinary ones that Renaudiere saw and noted in the journal as very light in color. Reichart observed these huge white rocks here in 1976. A few hundred feet north, we saw some gray and black rocks, adorning the end of a driveway. All of this was within .33 mile west from the South Gypsum Creek crossing. Battle Hill is visible .5 mile south, just as it was in 1724.

We returned south about .5 mile to Pueblo Road and the entrance of Maxwell Wildlife Refuge. As we went west along Pueblo Road, numerous large and very large rocks were evident, ranging in color from brown to gray to black on the low hills along the road. Soon we turned south along Battle Creek, which had been dammed to make McPherson County State Lake. Bourgmont would have crossed Battle Creek at approximately the spot where Pueblo Road would have intersected it, had it not been dammed.

We followed Pueblo Road back north and around the lake to the west side, where again Pueblo Road ran due west. We stayed on it to 24 Road and turned south, taking note of many very large shale rocks sticking out of the ground. We saw no more of these extraordinary rocks, some the size of refrigerators, once we were .5 mile south of Pueblo Road.

We continued south on 24 Road for several miles, west on Pawnee Road 1 mile, south on 23 Road 1 mile, and west on Overland Road. Our field notes here read, "VERY FLAT COUNTRY!" It was a big change from the hilly wildlife preserve and uniquely rocky area we just came from. And that is undoubtedly why, soon after crossing Battle Creek, the expedition lost its way on the afternoon of October 16.

Renaudiere was circumspect about it. He wrote "Our guide has led us astray. In the afternoon he took us too far toward the south." He does not indicate who the guide was, but surely it must have been one of the four Kansa chiefs or five Padouca, who undoubtedly had been this way before. In the afternoon light on a flat and treeless prairie, familiar landmarks were few and far between, and the camp for the evening was south of their intended westward track.

Reichart probably was mistaken concerning their campsite for the night. He placed the lost party on an unnamed eastern tributary of Turkey Creek, speculating that they and their guide mistakenly identified it as Dry Turkey Creek, the stream to the west that they should have been on if they were on the correct route, because it was the same in size, lack of trees, configuration, and terrain. That logic is unconvincing, however; in this terrain all the creeks look very similar. Current directions position Reichart's incorrect campsite 1 mile north and .25 mile west of Galva on an unnamed tributary of Turkey Creek. That would have Bourgmont inexplicably bypassing closer water to get to this farther stream.

The available evidence and logic support a different conclusion. It is much more likely that, after crossing Battle and Gypsum creeks about 3 miles to the southwest, Bourgmont realized that they were off course. The late afternoon sun was sinking low over the flat plains. About 2.5 miles southwest from their crossing of Gypsum Creek was the nearest water, Turkey Creek, a full-sized stream. Gypsum Creek was very likely one of the three dry channels crossed. They perceived Turkey Creek soon after crossing Gypsum Creek. Knowing they must reach water and shelter before nightfall, especially for the pack horses, they decided to stop and correct their course the next morning. Contemporary directions put the correct location of the campsite on Turkey Creek, 3 miles north and 1.25 miles west of Galva. These directions are from the present center of Galva; in 1976, when Reichart came through, that was the northern city limit. We left Turkey Creek and drove a few miles west into McPherson and our hotel for the night.

On October 16 Bourgmont's party crossed two small rivers and several dry stream beds: North Cottonwood River, South Gypsum Creek, an unnamed tributary of Battle Creek, Battle Creek, and Gypsum Creek. Based on the extant drainages, North Cottonwood River and Battle Creek were the two small rivers, and the rest were dry beds in 1724. The journal estimate for the day's travel was 6 leagues. As the crow flies, the distance from the Perry Creek camp to the Turkey Creek camp was 15 miles (i.e., 5.43 French leagues, 6 Reichart leagues, and 6 dead-reckoning leagues).

BOURGMONT'S 1724 ROUTE TO THE PADOUCA
October 17, 1724 (Figure 19)

17 October. We left our camp at five in the morning. We marched about two leagues, roughly west-northwest, to regain our route; then we marched more or less due west. We halted from noon until half-past one. We marched all day toward the west, and camped at six in the evening by a small river where we found, about 400 paces from our camp, a Padouca campsite that had been abandoned about eight days earlier. We were very glad to find it because we judged that we would soon locate them by following their trail. We covered six leagues. We set fire to the prairie as a signal, so that they would reply to us at once. Our two Frenchmen who had returned have answered us by setting fire to the prairie. Thus we learned that our two Frenchmen had arrived at the Padouca encampment (Norall 1988:149–150; Figure 20).

2018 FIELD STUDY
Day Five—May 5, 2018

Surely Bourgmont and his party felt elated on this day of October 17. While they had been off track and lost the previous day, now they found signs that they were nearing the Padouca. They serendipitously discovered a recent Padouca camp only 400 paces from the place where they bedded down on South Sharps Creek. In addition, they made contact by smoke signal with Gaillard and Quesnel, the two Frenchman who had been sent ahead to make contact with the Padouca.

Ross, Steve, and I left our McPherson hotel and made our way back to the October 16 camp. The current location is on Turkey Creek .5 mile south of Overland Road and .25 mile west of 20 Avenue.

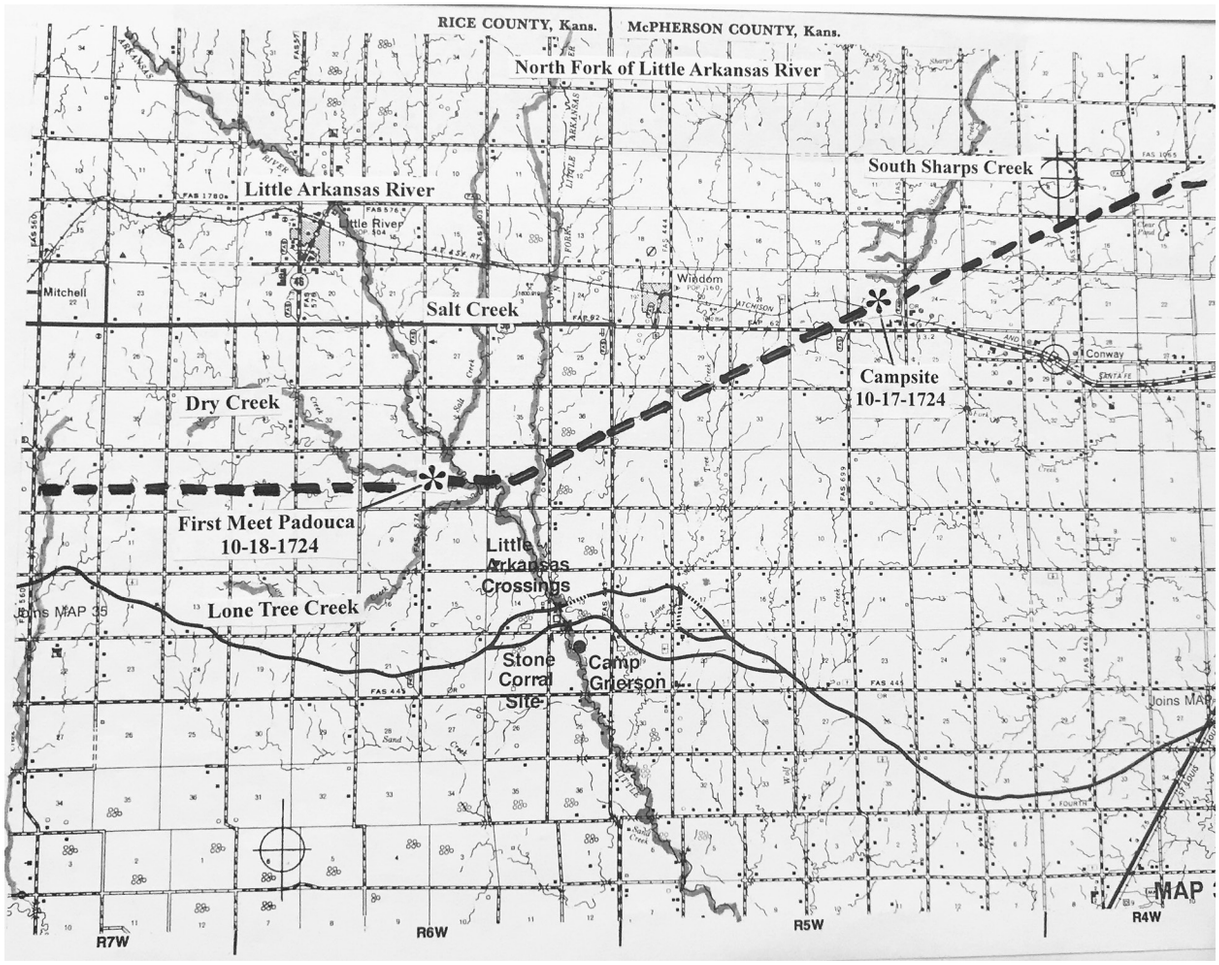


Figure 19. Turkey Creek to South Sharps Creek, October 17, 1724. South Sharps Creek to Little Arkansas River and beyond to the Padouca, October 18, 1724.

From here we zigzagged west-northwest, crossing Dry Turkey Creek to the point where Bourgmont's force regained the correct route, about 5 miles from the Turkey Creek camp. From the intersection of Overland Road and 15 Avenue, the spot is .25 mile west and .25 mile north, presently in the middle of a cornfield. Ironically, 10 miles south and 101 years later, the Kansa met on Dry Turkey Creek in 1825 with Commissioner George Sibley and others to sign a treaty, giving unrestricted access to traders and others on the four-year-old Santa Fe Trail.

We drove west on Overland Avenue past 14 Avenue to the new Sunflower Bike Path. Bourgmont crossed essentially here, heading west-southwest. Perhaps this is yet another good place for a historical marker. The land here is flat for many miles in all directions. With virtually no physical landmarks to guide them, they relied on the position of the sun and the compass needle to keep them on course.

We zigzagged southwest on section line roads to intercept Bourgmont's path as he approached South Sharps Creek. We went west on Mohawk Road, passing the point that they would have crossed, heading slightly southwest. Continuing 1.5 mile west to 5 Avenue, we turned south and saw South Sharps Creek running in a gully 100 yards to the west. The area of the Padouca camp, abandoned just eight days before Bourgmont's arrival, and the October 17 camp for the French, was located on the banks of South Sharps Creek a stone's throw in front of us. Bourgmont's men probably executed their smoke signal to Gaillard and Quesnel from the ridge about .5 mile west of this camp.

This day they crossed no waterways. Renaudiere



Figure 20. South Sharps Creek. Bourgmont's camp, October 17, 1724. *. . . we found, about 400 paces from our camp, a Padouca campsite that had been abandoned about eight days earlier.*

estimated their day's travel at 6 leagues. As the crow flies, the distance is 15.30 miles (i.e., 5.35 French leagues, 6.12 Reichart leagues, and 6 dead-reckoning leagues) from Turkey Creek to South Sharps Creek.

BOURGMONT'S 1724 ROUTE TO THE PADOUCA

October 18, 1724 (Figures 19 and 21)

18 October. We left at five in the morning. We marched until nine, when we found a small river of brackish water. On the bank of this river we found a Padouca campsite about four days old. We marched about half a league along this river. Then we halted to eat. No sooner had we unloaded our horses than we saw a large cloud of smoke starting to rise in the west. It was our two Frenchmen, who were coming toward us with 80 Padoucas and the head chief of their tribe.

We replied at once to their signal by setting fire to the prairie. Half an hour later we saw the Padoucas, with our two Frenchmen, galloping toward us, carrying the flag that the Frenchman had brought them. M. de Bourgmont at once had his troops shoulder arms, with his flag flying.

First, upon their arrival, we saluted them three times with our flag, and the Indians accompanying us saluted them three times with their robes by raising them three times over their heads. The Padoucas saluted us as well, and we all shook hands. Afterward, M. de Bourgmont invited them to

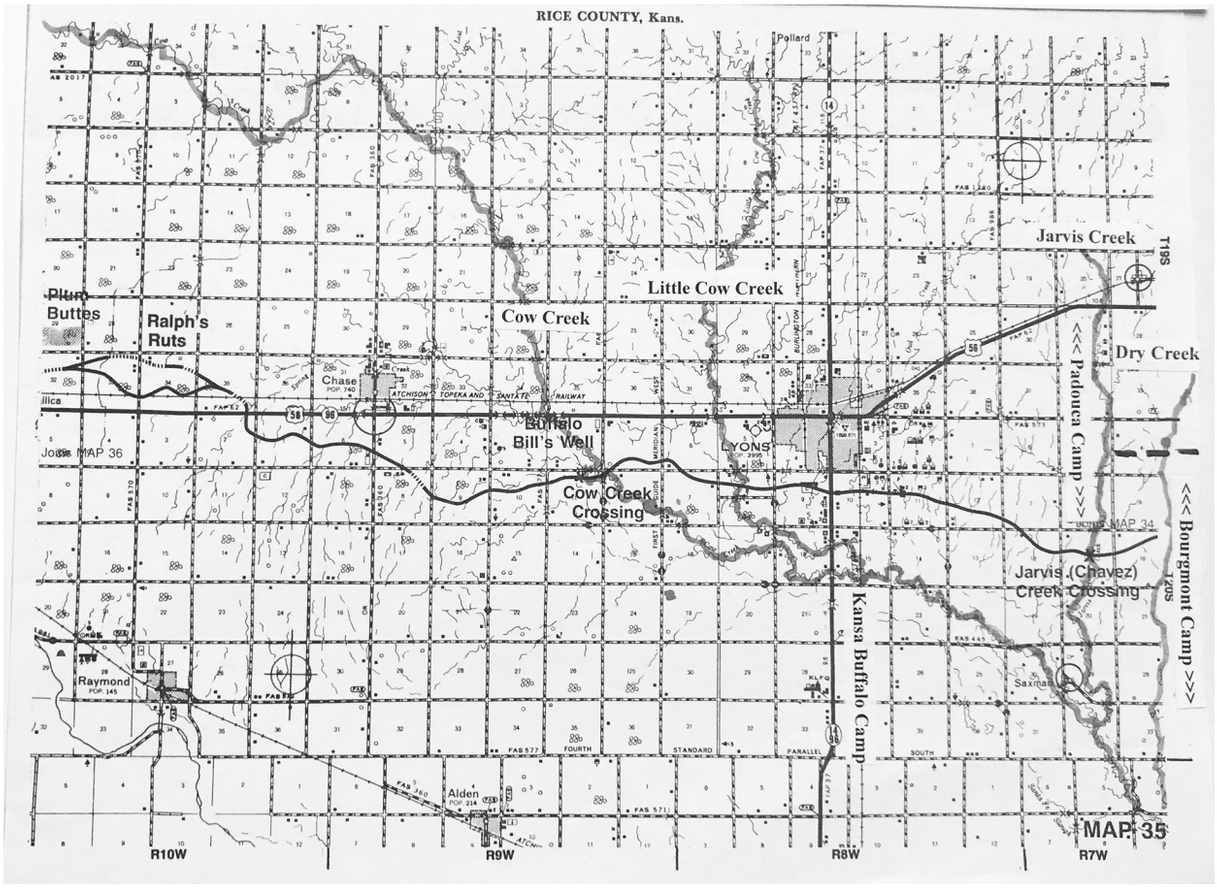


Figure 21. Little Arkansas River to the Padouca camp on Jarvis Creek, October 18, 1724.

sit down and to smoke the peace calumet pipes, with great rejoicing on both sides. Then they mounted all our Frenchmen on their horses—some alone, others riding pillion. They also gave mounts to the Indians who were with us to ride to the Padouca camp, three leagues away from where we met them.

M. de Bourgmont called a halt about a pistol-shot away from their camp, ordered his tent put up, and had his Frenchmen stack their arms, with a single sentinel to guard them, at the entrance to his tent. The head chief of the Padoucas began at once to harangue in his camp, and a large number of warriors appeared. They spread a bison robe on the ground and place M. de Bourgmont on it with his son, M. de Saint-Ange, and M. La Renaudiere. Fifteen men then bore them to the dwelling of the head chief of the Padoucas. Then they had us feast with them, with great rejoicing, and as night fell we returned to our camp. We had traveled six leagues today, still toward the west (Norall 1988:150; Figures 22–24).

2018 FIELD STUDY
Day Five—May 5, 2018

At last the French had found the Padouca, on a "small river of brackish water." This little passage led numerous writers prior to Reichart to conclude that Bourgmont must have been on the Saline River, some 40 miles to the north. George Hyde (1951:142) suggested that it is "probably the Saline Fork of today." Wedel (1959:13) proposed that it "may be one of the saline streams west and north of Salina." William Unrau (1971:65) believed it was "some point on the upper Saline or Smoky Hill."

Reichart (1977–1978:37) himself stated, "The Saline river has been a red herring dragged across the trail of Bourgmont ... I shall now attempt the task of laying the ghost of the Saline." Based on the



Figure 22. Little Arkansas River. Bourgmont's likely crossing, October 18, 1724. *We marched until nine, when we found a small river of brackish water. On the bank of this river we found a Padouca campsite about four days old.*

route that he documented from the Kansas River southwest, Reichart offered irrefutable evidence that the brackish water that Bourgmont encountered was the Little Arkansas River. This was substantiated by the currently recognizable hard points of the castle-like hills of Waubansee County, the hardwood forest of the Neosho River and its tributaries, and the display of huge and novel rocks northeast of McPherson. Reichart established that the waters of the Little Arkansas River and its affluents are salty enough to be considered brackish. He noted that in recent times considerable salinity exists in the Little Arkansas River basin, especially in the aptly named Salt Creek. Reichart also confirmed that Salt Creek had been named since at least 1887, many years before any early twentieth-century activity might have affected the salinity level (Reichart 1977–1978:38).

The distance from South Sharps Creek to the Little Arkansas River is 8.25 miles as the crow flies. Because the Little Arkansas River trends eastward as it flows south, it creates an arc of four possible spots where Bourgmont could have crossed; all are at or very near 8.25 miles from the camp on South Sharps Creek. The most likely crossing of the Little Arkansas River, considered probable by Reichart as well, is between the confluence of Dry Creek with the Little Arkansas River and the junction of Lone Tree Creek with the Little Arkansas River. The distance between the mouths of the two creeks is about .25 mile, and both run west from the Little Arkansas. Here the Little Arkansas flows east for about .5 mile. This is the only crossing that corresponds with the journal in that it provides a westward-coursing stream from the Little Arkansas for Bourgmont to "march about half a league along this



Figure 23. Tree line along Jarvis Creek. Padouca camp, October 18, 1724. . . . *we saw a large cloud of smoke starting to rise in the west. It was our two Frenchmen, who were coming toward us with 80 Padoucas and the head chief of their tribe.*

river." Though Renaudiere does not mention that they crossed the North Fork of the Little Arkansas before arriving here, it is likely that counting waterways was irrelevant to him now that their meeting with the Padouca was virtually at hand. This crossing is best positioned for the party to continue about 3 leagues west to the heart of the Padouca camp.

We considered three other possible crossing points:

- the Santa Fe Trail crossing of the Little Arkansas River, located about 2.5 miles downstream from the most likely site described above. This might have been the traditional Kansa crossing, which in turn became the Santa Fe Trail crossing.
- the confluence of the North Fork of the Little Arkansas and the Little Arkansas rivers, located about 2 miles downstream from the most likely site. This would require no water crossings other than the Little Arkansas itself and thus would match the journal entry, which reported no crossings that day.
- just south of the confluence of Salt Creek and the Little Arkansas River. This crossing is located about .75 mile upstream from the most likely site. Its attribute as perhaps the most brackish in the area lives up to its name of Salt Creek.

Surprisingly, Reichart drew no conclusion about the location of the Padouca camp, other than that it might be at or near Lyons. Material and physical



Figure 24. Chavez marker on the west side of Jarvis Creek. Padouca camp, October 18, 1724. *The Padoucas saluted us as well, and we all shook hands. Afterward M. de Bourgmont invited them to sit down and to smoke the peace calumet pipes, with great rejoicing on both sides.*

evidence exists that supports the most likely location of the Padouca camp. Furthermore, empirical evidence from the journal supports the conclusion that the place where Bourgmont encountered the Padouca was not their permanent village. The permanent village, where Gaillard first found the Padouca and told them that Bourgmont was coming, was located far to the west, probably at El Cuartelejo, located about 12 miles north of present-day Scott City. El Cuartelejo was built by the Pueblo Indians in the late 1600s. Today there is a reconstructed wall outline of the pueblo that was built there. Surely the pueblo would have been extant in 1724, if and when the Padouca might have occupied it. However, John Michael Wallen (2018) and a few writers before him propose that the location of El Cuartelejo is in eastern Colorado rather than western Kansas. The Padouca head chief himself told Bourgmont that the main Padouca village was 12 days from the Spanish settlements. From El Cuartelejo, at perhaps 25 miles a day on horses, generating a 300-mile trek, puts the Spanish settlements somewhere at or near Taos. The contemporary Lyons area, which is some 480 miles from Taos, would not be a 12-day trip but more like a 20-day journey in 1724.

When Gaillard returned to the Kansa village after meeting the Padouca at the main western village, he reported that there were 600 Padouca warriors coming with their families from eight different villages, on their way east to meet Bourgmont. Averaging a two-child family, that is 2,400 people on the move

east. By the time Bourgmont arrived, the Padouca camp near Lyons had swelled to 4,300 people: 800 warriors, 1,500 women, 2,000 children, 800 or more horses, and innumerable dogs. For the several weeks that the tribe must have spent there, the Padouca needed reliable wood, water, grass, and shelter, and for a large group they needed a linear camp. The waterway that meets all those criteria and coincides with the journal distance of 3 leagues west of the Bourgmont-Padouca meeting place on the Little Arkansas, is Jarvis Creek. This long and substantial stream flows relatively straight north to south for 8 miles from its mouth to its head. It is capable of sustaining 4,300 people in an 8-mile linear camp. For these reasons, Jarvis Creek is the most likely location of the Padouca camp.

Reichart lamented that no archeological evidence existed of a large permanent Padouca village in the Lyons area. Yet empirical evidence from the journal clearly indicated that the Padouca traveled from their main village at El Cuartelejo some 155 miles west and from elsewhere and that this camp on Jarvis Creek was a temporary one. As noted above, Gaillard told of 600 Padouca warriors and their families moving east to rendezvous with Bourgmont even before the French reached the area. Once they met, they settled into their respective camps. Bourgmont kept his relatively small camp a "pistol-shot away," probably at Dry Creek, a smaller but similarly north and south-coursing stream about 1 to 1.5 miles east of Jarvis Creek.

We spent that Saturday afternoon in May running up and down the Little Arkansas River zigzagging on section line roads, chasing down the most likely site where Bourgmont would have crossed. After we were satisfied that the most likely crossing was established, we made our way several miles west toward Lyons in search of the Padouca camp. As we ran south on 21 Road, Jarvis Creek matched us mile for mile on the right. We crossed the Santa Fe Trail just south of Avenue P, then turned around and headed north to Avenue M, then west to find the traditional site of the buffalo hunt camp of the Kansa at the confluence of Cow Creek and Little Cow Creek south of Lyons. We came upon it by walking along a railroad track for about .25 mile north from Avenue P. From there we made our way to our Lyons motel, after making a note to ourselves to run along Jarvis Creek the next day and further investigate its possibilities.

BOURGMONT WITH THE PADOUCA
October 19–21, 1724

Bourgmont spent three full days with the Padouca. At 6:00 a.m. on October 19, his men unloaded the trade goods that their 10 horses had carried across the Kansas plains:

> *one pile of fusils, one of sabers, one of pickaxes, one of axes, one of gunpowder, one of balls, one of red Limbourg cloth, another of blue Limbourg cloth, one of mirrors, one of Flemish knives, two other piles of another kind of knives, one of shirts, one of scissors, one of combs, one of gunflints, one of wadding extractors, six portions of vermillion, one lot of awls, one of needles, a pile of kettles, one of large hawk bells, one of beads of mixed sizes, one of small beads, one of brass wire, another of heavier brass wire for making necklaces, another of rings, and another of vermillion cases* (Norall 1988:151).

Norrall (1988:71) captured the importance of what had been accomplished.

> As every single item, from needles to pickaxes, had had to be transported from France to Louisiana by ship, then laboriously transshipped a thousand miles upriver in boats, and finally packed overland on horses for about another 250 miles—all at a time when the colony was virtually destitute—the safe delivery of this treasure at its intended destination in central Kansas was a little short of a miracle. It was also tangible evidence of the tenacity, toughness, and attentiveness of the expedition commander.

Bourgmont summoned to his camp all the Padouca chiefs and influential people of the tribe, about 200 people. In his first peacemaking speech, he emphasized some important points.

> *I come here to bring you the message of the king, my master, who is the great chief of all the Indian nations, in order to make peace with you and to persuade you to make peace also with all the tribes you know to be our allies; the Missouris, the Osages,*

the Kansas, the Otos, the Skiri Pawnee . . . I declare and give you notice also that when the French come to your village to trade, or wish to pass through it to the homelands of the Spaniards, you are to make no trouble nor present any obstacle. On the contrary, I wish you to allow them to pass and return, to come and go, and that you serve them as guides whenever necessary, for which you will be paid for your efforts (Norall 1988:151–152).

At the conclusion of his speech, Bourgmont gave the French flag to the Padouca head chief. He told the stunned Padoucas, who were staring at the treasures before them,

My friends, the merchandise you see displayed here is for all of you; you have only to take it. It is the king, our master, who gives it to you, and who has sent me here expressly to bring you his message and to give this flag to the head chief of the Padoucas (Norall 1988:152).

The head chief responded,

My father, I accept the flag which you present on behalf of the king and yourself. I receive it with great pleasure . . . And to you, my father, we promise that we shall keep our word, and when the French come to see us, we shall welcome them, and, if they should wish to go to the Spaniards to trade, we will take them there. It is only 12 days' travel from our village. They come visit us every spring. They bring us horses and a few knives and some awls and axes, but they are not like you, who give us a quantity of merchandise such as we have never seen before. We are unable to reciprocate for so many presents (Norall 1988:152–153).

Bourgmont replied,

Take all the merchandise; the King gives it to you. As for me, I ask nothing from you in return (Norall 1988:153).

Later that day, when all the merchandise had been distributed to the astonished Padouca, the head chief sent a gift of seven horses. Soon after, the head chief and a dozen chiefs and several of his warriors came to Bourgmont's camp to smoke a calumet pipe. The head chief provided dinner.

Here, my father, accept the food which the women of our village bring for you and your warriors (Norall 1988:153–154).

On October 20 the head chief of the Padouca and about a dozen of his war chiefs showed up at the break of day to greet Bourgmont. They sat, Bourgmont gave them some tobacco to smoke, and the head chief spoke,

My father, I come to invite you and the most prominent Frenchmen to my dwelling to have a feast.

Renaudiere's journal entry stated,

M. de Bourgmont, accompanied by M. de Saint-Ange and M. La Renaudiere, went to the dwelling of the head chief, where we ate the food which had been prepared for us. There was bison meat cooked in a pot, and some meat that had been dried in the sun, with dried plums pounded up with their pits and cooked in a pot. There were also others that had been dried in the sun (Norall 1988:154).

After the feast the head chief and several hundred warriors and women and children accompanied Bourgmont and his two lieutenants back to their camp, where the head chief made another speech expounding on his new-found love for the French and the gratitude the Padouca should feel for what had transpired from this meeting. He concluded his speech with a diplomatic flair.

Thus, my children—he said, speaking to his tribe—we are now at peace. Come, take all these men, our friends, whom the great chief has brought with him to your dwellings and feast them.

Renaudiere recorded this account.

They invited all the Indians whom M. de Bourgmont had brought with him, and some of these slept in their dwellings. During our stay with them our soldiers were also feasted, with permission, one after another. They [the Padoucas] *gave them a thousand*

caresses and offered them their daughters (Norall 1988:155).

Apparently, such was frontier diplomacy in 1724. Reichart referred to it euphemistically as "adult entertainment."

Later that day the speeches commenced again. The head chief began.

My father, you see here a great number of warriors, but these are only a fourth of the number that are under my command. Nevertheless, I have informed them all of your arrival; you see here the 12 villages that are all obedient to my will . . . Henceforth, they will obey you, just as I will; they have no other will than yours . . . I declare and promise that if you should ever need 2,000 warriors, you have only to ask . . . I repeat, we are at your disposal.

Bourgmont replied,

My friend, I am very much obliged to you for this proposal. We are at peace with all the tribes of the region, but if any should turn quarrelsome, I shall not refuse you (Norall 1988:155–156).

Later, after smoking tobacco that the French provided, the head chief grabbed a handful of dirt, leaped to his feet, and dramatically exclaimed,

Now I regard the Spaniards as I do this dirt.

Turning to face Bourgmont, the chief said,

And you, I regard as the sun (Norall 1988:156–157).

At that moment Bourgmont must have felt secure that he had achieved his mission to make peace with the Padouca and open the way from the Missouri River to Santa Fe.

Bourgmont invited the chief to sit down and smoke with him. He took in hand a brass tobacco box that opened by means of small hidden springs. The chief tried to open it but could not. Bourgmont showed him how, and, seeing the chief mesmerized by the trick box, gave it to him as a gift. The chief then asked to trade for Bourgmont's blue coat, which was lined with red and had brass buttons on each side, and greatly admired his pistol. Bourgmont gave both to the chief, who later sent a horse in return (Norall 1988:157).

On October 21 rain started around midnight and continued until noon. Early in the afternoon it began to sleet. Bourgmont realized that their luck with October weather on the plains was probably about to end. He told the head chief that he and his group would be leaving in the morning. The chief said,

Very well my father, I am going to announce it in my village, so my people will bring food for you and your warriors. . . . I pray you, remember me and all our people. . . . if the French should wish to go there, I will arrange for them to be conducted to the Spaniards' village (Norall 1988:158).

2018 FIELD STUDY
Day Six—May 6, 2018

Steve left us on Saturday evening. On Sunday morning Ross and I made our way west of Lyons on Highway 56 to Buffalo Bill Mathewson's well and the Cow Creek crossing of the Santa Fe Trail. Back north to Highway 56, we stopped and noted that the field across the highway was one of the purported locations of the fabled Quivira that Coronado, on behalf of Spain, came from the southwest to search for in 1541. Just 9 miles east and 183 years later, Bourgmont, on behalf of France, came from the northeast to contact the Padouca.

We came back east through Lyons, turned north to find the head of Jarvis Creek, and followed it south. It is almost 8 miles long and consistently runs a north-south course. Well wooded all the way, it has softly sloping banks that create a slight valley, both prerequisites for a good camp for a large group of people. In 1724 it would have held substantial fresh water, more than enough to sustain 4,300 people, 800 or more horses, and innumerable dogs. Significantly, Jarvis Creek corresponds with the journal entry stating that the Padouca camp was 3 leagues from the place where the Padouca met the French on October 18.

If Bourgmont crossed the Little Arkansas River at the most likely spot between the confluence of Dry and Lone Tree creeks and traced the meanders west on Dry Creek for a half league, the distance from there to about the midpoint of Jarvis Creek is

7.13 miles (i.e., 2.58 French leagues, 2.85 Reichart leagues, and 3 dead-reckoning leagues). In this instance dead reckoning was done on the back of a fleet horse with its rider excited about meeting the Padouca at last.

BOURGMONT'S RETURN TO THE KANSAS RIVER CROSSING
October 22–27, 1724

22 October. We left the Padoucas at ten in the morning. We marched until five in the afternoon, traveling five leagues, on a course of east-northeast.

23 October. We left our camp at five this morning. We have traveled ten leagues today. Compass bearing, east-northeast. Fine weather.

24 October. We left at five and covered ten leagues, going due east. We found large herds of bison.

25 October. We started at five and covered ten leagues due east. Fine weather.

26 October. We left camp at five and covered ten leagues during the day, still traveling due east. Fine weather. Frost.

27 October. We started at five. We arrived at the Kansas River at three in the afternoon and crossed it. We camped on the other side. We have covered six leagues. Compass bearing, due east (Norall 1988:158,160).

2018 FIELD STUDY AND ANALYSIS OF BOURGMONT'S RETURN TO THE KANSAS RIVER CROSSING
Day Six—May 6, 2018

Judging by the very short journal entries, coupled with what appear to be estimates of distance and direction for the four middle days, Reichart reached the surprising conclusion that Bourgmont took a different route back to the Kansas River. Without apparent evidence, Reichart (1977–1978:49–50,66) charted a specific return that ran somewhat north of the track that the party had taken west.

Evidence and logic support a different conclusion: the explorers retraced their route back east to the Kansas River crossing that they had followed west to the Padouca. The short and sparse entries, omitting water crossings, geographic observations, daily hours spent on the trail, indicate that they had no need to document these details because they already had done so on the way west. Perhaps Renaudiere did not keep a daily league count for the four middle days and simply entered 10 leagues as an average and "due east" as an approximate direction. It would have made no sense for Bourgmont to strike out on a different path east from the Padouca. Even the few Native Americans accompanying him on the return trip probably would not have known a different way, its crossings, and other difficulties.

With that in mind, at about 2:00 p.m. on Sunday afternoon, we turned our car north and headed for I–70 to take us back to the Kansas River crossing near Rossville. North of that crossing Reichart had established a reasonable due east route for the Bourgmont party back to the Missouri River and the mouth of the Kansas River. Due east meant something in these entries, because now they must truly go due east just north of the Kansas River in order to reach its mouth in present-day downtown Kansas City.

BOURGMONT'S RETURN TO THE KANSAS RIVER MOUTH
October 28-November 2, 1724

The 28th, we left at five in the morning and traveled eight leagues during the day, going due east. Fine weather.

The 29th, we left at five, and in our days travel we covered six leagues. On the way we saw many bands of wolves. Compass bearing, due east.

The 30th, we started at five and traveled six leagues during the day. We went due east. We had rain during half of the day.

The 31st, we started at five, and we are half a league from the Kansa. We camped to let the rain pass. We made four leagues today.

1 November. We started at five and arrived at the edge of the Missouri River [mouth of the Kansas River] where we halted at three. At noon, we swam the horses across, and M. de Bourgmont had

bullboats made to carry part of our people and the Missouri Indians down the river to Fort d'Orleans.

2 November. M. de Bourgmont has embarked in a pirogue, accompanied by six Frenchmen. The Indians, with four Frenchmen, are in bullboats. M. de Saint-Ange is under orders to travel by land with the remaining Frenchmen to take the horses to Fort d'Orleans (Norall 1988:160–161).

2018 FIELD STUDY AND ANALYSIS OF BOURGMONT'S RETURN TO THE KANSAS RIVER MOUTH

Day Six—May 6, 2018

On October 27 Bourgmont camped on the north side of the Kansas River. He would have camped on October 28 on the main branch of Muddy Creek east of Rossville, Kansas, at about 48 Road. From the Muddy Creek camp we drove the eastward route 15 miles to the October 29 campsite, located on the high ground between Buck and Stonehouse creeks. From here we wrapped up the day and headed for Overland Park.

Day Seven—May 7, 2018

We started this morning a few miles south of the October 29 campsite where we ended the day before. We followed Bourgmont's due-east itinerary through present-day Tonganoxie to Stranger Creek, the October 30 campsite. We zigzagged our way, capturing the route to Bonner Springs, and found ourselves there almost on the north bank of the Kansas River. We turned north off of Highway 32 at the sign indicating Camp Nash, the long-time local Boy Scout camp. Bourgmont's October 31 camp was probably on Camp Nash land, nestled between two north-south-running streams on either side of the ridge. We worked our way slightly north to I-70 and 15 miles east through downtown Kansas City, Kansas, to the mouth of the Kansas River at Kaw Point. This is where the land trip to the Padouca ended for Bourgmont on November 1, 1724, and so it ended for us on May 7, 2018. At 2:45 p.m. on Monday, we turned toward home.

On the 5th of November at midday, M. de Bourgmont arrived at Fort d'Orleans, where he had left the father of M. Saint-Ange as commander in his absence. He had cannons and muskets fired upon his arrival, and had the flag flying over the fort. Afterward, the Te Deum was sung in honor of the peace with the Padoucas (Norall 1988:161).

AFTERWORD AND CONCLUSIONS

Was Bourgmont the *Pere de la Santa Fee' Trace*, i.e., the Father of the Santa Fe Trail? If the only criterion were motivation for the trip, he certainly would be in the running as the whole reason for his journey to the Padouca was to clear the plains of that impediment and open trade among the French settlements of Missouri and Illinois and Santa Fe and Taos. Did he establish the route to the southwest that he took through Kansas? No, Bourgmont did not know where he was going beforehand. The trail was blazed years before by the Kansa Indians; he simply followed the track that they had established from their village on the Missouri River southwest to their buffalo camp and hunting grounds west of the Little Arkansas River.

Did Bourgmont in 1724 proceed on or near the general course of the Santa Fe Trail of 100 years later? He did journey near and sometimes on the Santa Fe Trail for 42 miles from Council Grove to Lost Spring and on past Tampa. The Bourgmont party camped near Lost Spring on October 14. They likely crossed the Little Arkansas River a few miles north of the later Santa Fe Trail crossing. When Bourgmont contacted the Padouca at last, it was most likely on 8-mile-long, north-south Jarvis Creek. The Santa Fe Trail later crossed that waterway in the southern third near its mouth, the place where Mexican trader and Jarvis Creek namesake Antonio Chavez was murdered in 1843 (Figure 24).

Jarvis Creek was most likely the camp of the Padouca. When Bourgmont returned east, the Padouca moved west, many probably to their main village near El Cuartelejo north of present-day Scott City and others to any of the 12 villages that the Padouca chief claimed.

Reichart did a good job in 1976 of establishing Bourgmont's overall westbound route to the Padouca, although, as outlined in this report, there are several areas of interpretation on which he and this author differ. Several of Reichart's

factual errors are attributable to his lack of access to Norall's (1988) translation. This study could not have been done without Reichart laying the basic foundation in the field.

Bourgmont started from the Doniphan location on the Missouri River. The water crossings and league counts in the journal fit hand in glove, starting at Doniphan only. By Renaudiere's dead reckoning, they traveled 72 leagues to get to the Padouca. By the French standard of 2.764 miles per league, they covered 199.01 miles. By Reichart's standard of 2.5 miles per league, they traveled 180 miles. As the crow flies, the total point-to-point mileage was 191.72 miles or 69.36 French leagues.

After returning to Fort Orleans, Bourgmont wasted no time in setting into motion plans to return to France. He set out in late November 1724 on the river trip to New Orleans. Accompanying him were nine chiefs of various tribes and a Missouria "princess," all meant to make the voyage to France. When they arrived in New Orleans, the group was reduced by the French colonial government because of cost to four chiefs and the Missouria chief's daughter. In about February the ship started for France, but the voyage was delayed when the boat sank while still in harbor in Mobile Bay. The party eventually made it to France on another ship, arriving in Paris on September 20, 1725.

In Paris the Native Americans were welcomed and entertained across the city. They performed at the opera, attended theater parties, and were received at Fontainebleau by 15-year-old King Louis XV. When they prepared to return to their homes across the ocean, each received gifts, including a medal on a gold chain, a gun or rifle, a game bag, a sword, a watch, and a painting of their audience with the king.

Bourgmont received universal accolades for his accomplishments with his Padouca expedition. In recognition for his service on the Kansas plains, Louis XV elevated him to French nobility with the rank of squire. With nobility came a newly designed coat of arms, "On azure background, a naked savage reclining on a mountain of silver" (Norall 1988:88). Forty-six-year-old Bourgmont retired to his small family estate in Normandy and never returned to America.

Back on the Kansas plains, the intertribal peace that Bourgmont had negotiated on behalf of the French held for a year or so. Then the Kansa and Osage and other Missouri River basin tribes decided that trading in stolen horses and slaves was too lucrative to give up and reverted to a state of undeclared war. The closest French military presence was Illinois. It was 1739 before another serious French attempt to trade with Santa Fe was undertaken and 1744 before a French fort was placed on the lower Missouri River on the bluffs of the Salt Creek valley near present-day Leavenworth. Yet Bourgmont's legacy persists, and the day is still remembered when he found the Padouca and accomplished what was thought at the time to be practically impossible. Viva la France!

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THE QUIXOTE SITE: LATE WOODLAND IN NORTHEASTERN KANSAS

Brad Logan
Kansas State University

With contributions by David Maki, Carl R. Falk, John R. Bozell, and Gina S. Powell

Quixote (14JF420) is a Late Woodland site in the Delaware River drainage, a tributary of the lower Kansas River in northeastern Kansas. Investigations by the Kansas Archeology Training Program in 2017 incorporated geophysical survey of the site, excavation of a 64-m² block on one of two low mounds that dominate it, and exploration of two magnetic anomalies that revealed two features interpreted as roasting pits. Radiocarbon dates of the latter indicate use ca. A.D. 650–680, significantly earlier than a series of such dates from the block excavation between the features that attest activity ca. A.D. 890–980. Thus, the site was occupied during at least two separate times, apparently for different purposes.

The block revealed a cultural horizon ~10–60 cm below surface that is relatively undisturbed by modern agricultural activity, due to use of the area as pasture. (The other mound had been disturbed by construction of a windmill.) Spatial analysis of block data indicate a palimpsest of dismantled or disturbed hearths and associated areas of debris that represent chipped stone tool maintenance, food preparation, and cooking. All ceramics are Grasshopper Falls ware, typical of Late Woodland in the region. Stone tools, dominated by Scallorn arrow points, include biface fragments, drills, scrapers, hammerstones, grinding stones, abraders, and an axe preform. Animal remains are of deer, beaver, rabbit/cottontail, intrusive rodents, birds, a variety of fish, turtles, and mussels. Macrobotanical remains are of various wild plants and cultigens, the latter including squash, sunflower, maygrass, chenopods, marshelder, little barley, erect knotweed, and perhaps amaranth, purslane, barnyard grass, and panic grass. These signal late spring to summer site occupation.

Both pits had been filled with limestone that rested on beds of timber. Lipid analyses of selected stones from each suggest roasting of large herbivores, probably deer, and fish. The role of feasting during Woodland periods (A.D. 1–1000) is discussed in the context of these and burned rock features at other regional sites. It is argued that such activities were an integrative mechanism that forged social ties and mitigated resource uncertainties among dispersed nuclear or extended families during Late Woodland time (A.D. 500–1000).

Milton Reichart discovered the Quixote site (14JF420), a Late Woodland occupation on Cedar Creek, a tributary of the Delaware River near his hometown of Valley Falls, Kansas, in 1972 (Reichart 1974, 1976) (Figure 1). He named it for the character created by Miguel de Cervantes. He was inspired by the remnants of a windmill, albeit one of different function than those that figured in the fantasies of the *Man of La Mancha*, that he found on one of two low mounds that dominate the site. In 1988 I was principal investigator of a project subcontracted to the Museum of Anthropology at the University of Kansas by Kaw Valley Engineering, Inc. of Junction City, for the Kansas City District, U.S. Army Corps of Engineers (COE) that required National Register of Historic Places (NRHP) evaluation of 17 sites in the Perry Lake Project Area (Logan 1990a). These included

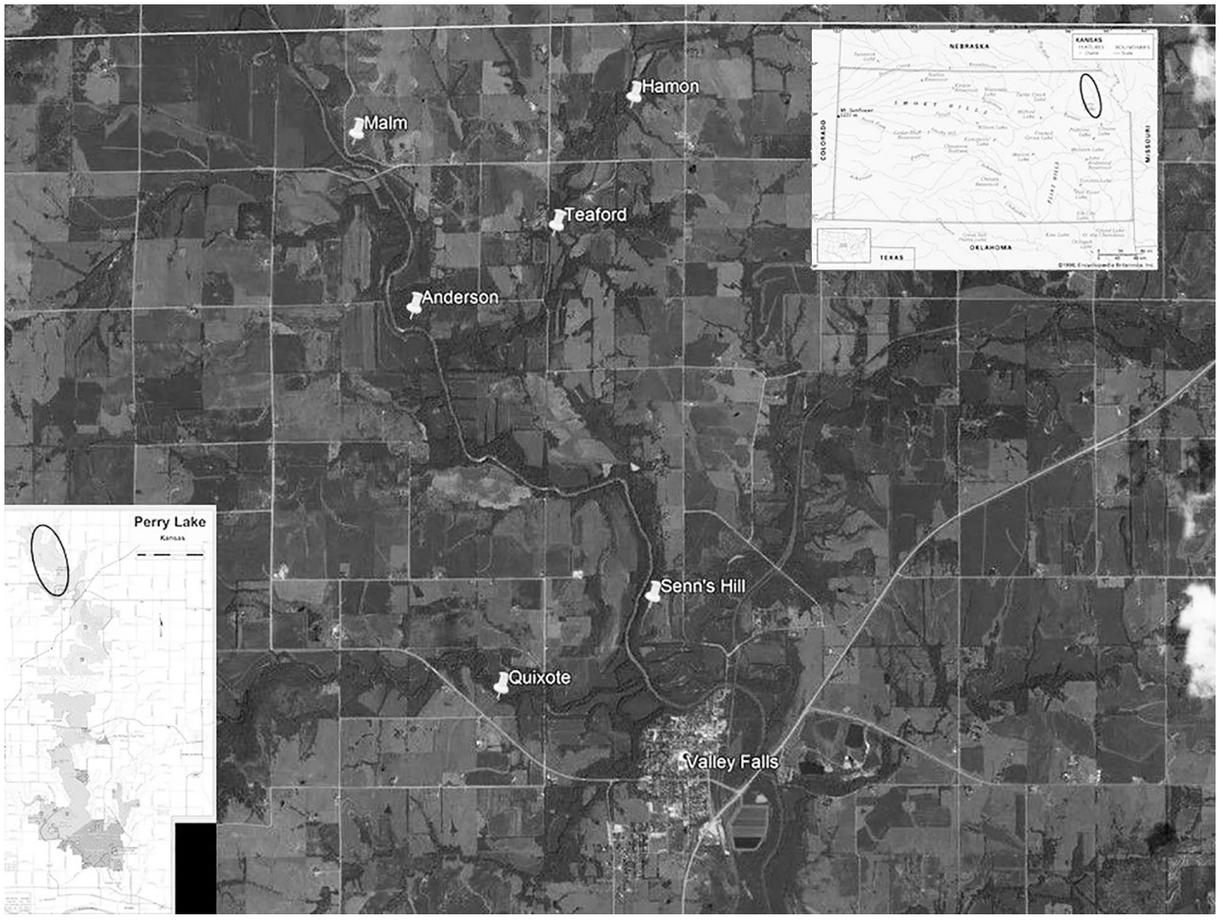


Figure 1. Location of the Quixote site and other excavated Grasshopper Falls phase sites in the Delaware River drainage near Valley Falls, Kansas. In this article the term "Valley Falls reach" refers to this part of the Delaware River watershed, including its tributaries.

several sites that had been recorded by Reichart, then known to me only as a life member of the Kansas Anthropological Association (KAA) and a stalwart perennial participant in that organization's Kansas Archeology Training Program (KATP).

I contacted Milton and asked him to take me to each of the sites that he had recorded and to inform me about them prior to our fieldwork. I was impressed, though not surprised, by his knowledge of the area that covered not only its prehistoric human past but its biological and geomorphological aspects. When he asked if I would be willing to look at two promising sites not specified in the Kaw Valley Engineering contract, I was happy to do so. One of these was Bowies Branch (14JF423); the other was 14JF420. It took little reconnaissance at either to be convinced that both warranted NRHP evaluation more than two others included in the contract (14JF438 and 14JF497). My request to substitute these sites was granted by the COE. Both the Bowies Branch and Quixote sites eventually were recommended for NRHP nomination, along with the Cut-Bank (14JF409) and Reichart (14JF448 and 14JF449) sites. I named the latter for Milton after asking if he had ever been honored in that way, and he told me that he had not (Logan 1990a:251–267). I was pleased when Milton acquiesced to adding him to the Kaw Valley Engineering payroll for testing of 14JF420 in particular, and it was an honor to work with him on September 24, 1988, during excavation of TU3, one of three test units there. My field notes confirm that he worked

with the crew on October 1–2, during which he helped dig TU2. The reader will learn at the end of this report how he documented his work there later that month.

Soon after investigations at the Quixote and Reichart sites, the latter also a Late Woodland occupation (Logan and Fosha 1991), I asked the COE if it would be possible to conduct more extensive work at them with the Kansas Archaeological Field School, then a research and educational program of the University of Kansas and Kansas State University. The request was denied. I was pleasantly surprised to learn in 2016 that the COE was permitting the 2017 KATP field school at 14JF420 and that the KSHS and KAA were soliciting proposals from archeologists to serve as principal investigator. Then about two years from retirement, I welcomed the chance to finish my career with an endeavor that held great research potential concerning ceramic-age adaptations in the Kansas City locality, that area along both sides of the Missouri River valley from the Kansas-Nebraska border to the Fishing River confluence in Clay County, Missouri, that extends westward to include the Delaware River valley. The locality had been the focus of my doctoral research (Logan 1985) and of several projects thereafter. The KATP field school offered the chance to address questions, presented below, that I had formulated long ago for future work at the Quixote and Reichart sites (Logan 1990a:263–264; Logan and Fosha 1991). It offered the first opportunity for extensive investigation of a Late Woodland habitation in northeastern Kansas since excavation of the Avoca site (14JN332) in Jackson County in 1983 (Baugh 1991). Given my prior experience with the site, I was selected as principal investigator with the responsibilities of directing the excavation, subsequent data analyses, and report preparation. This article fulfills one obligation of that agreement. Contributing authors are credited at the beginnings of their sections; I wrote the balance of the report.

BACKGROUND

The Quixote site covers an estimated 2,025 m^2 and is dominated by two knolls or "mounds" 50–60 cm in height, ~17 m in diameter, and 20 m apart. In 1988 these were designated Mound A to the north and Mound B, terms used throughout this report. During the NRHP evaluation they were suggested either to be middens or to mark remains of lodges comparable to those at other sites in the Perry Lake area assigned to the Grasshopper Falls phase, a local manifestation of the Late Woodland period (Reynolds 1979, 1981, 1987).

During one of his visits to 14JF420, Reichart dug a 12 by 16-inch trowel test in each mound, recovering from Mound A "4 waste flakes; 3 body sherds (Grasshopper Falls phase); 3 very small lumps burned clay; 1 burned bone fragment; a few miscellaneous stones." From the Mound B test he acquired "3 body sherds …; 6 waste flakes, 8 lumps burned clay, daub; 3 fragments of bone; 1 broken chert cobble; 2 pieces burned limestone; a few miscellaneous stones" (Reichart 1974:54). In describing the site in the context of these finds, he stated that "the field is blue grass pasture, and as far as known has never been cultivated" (Reichart 1974:54). Interestingly, prior to his tests, he had included Quixote among other sites along Cedar Creek as having "nothing (intact sub-surface features unlikely)" (Reichart 1974:36, 41).

The 1988 investigation, conducted over four weekends (seven days) from September 10 to October 1, entailed excavation of 16 shovel tests that indicated the horizontal limits of the site and three 1 by 1-m test units that revealed its depth: TU1 on Mound A, TU2 on Mound B, and TU3 in the intervening area where one shovel test exposed possible evidence of a hearth in the form of a few chunks of burned limestone (Figure 2). Both mound units yielded artifacts from the lower few centimeters of the first level (0–10 cm) to ~60 cm, at the B horizon. The greatest density of cultural material was in the fourth level (30–40 cm) where large flat-lying limestone slabs were found that, it tentatively was suggested, might correspond to lodge floors. Five-gallon samples of soil were collected from the two lowest levels (40–50 cm and 50–60 cm) of each mound unit for flotation.

Recovered from all test units and shovel tests were 3 Scallorn arrow points, 6 biface fragments, 5 retouched/utilized flakes, a variety of chipped stone debris (debitage, tested pieces, potlids, etc.), 1 hammerstone, 7 rim and 264 body sherds of

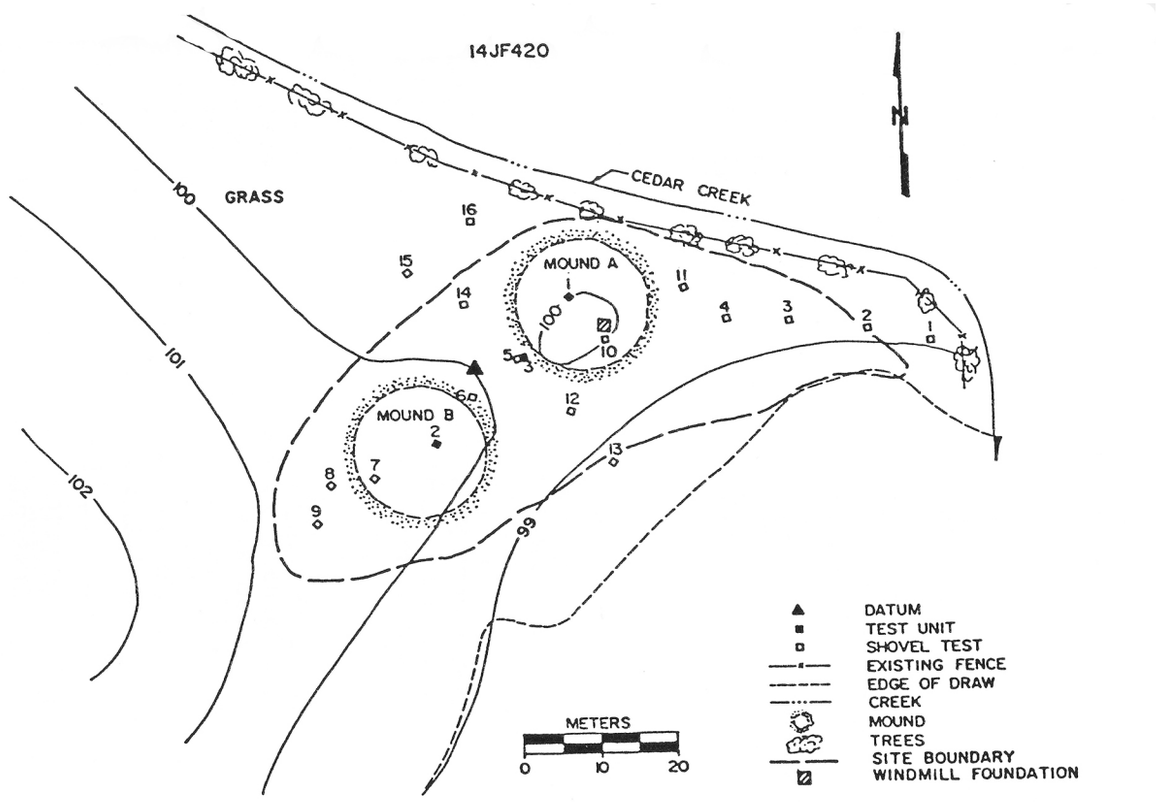


Figure 2. Map of 14JF420, showing locations of Mounds A and B, horizontal extent of the site, and 1988 shovel tests and test unit excavations (Logan 1990a:139).

Grasshopper Falls ware, the stem of a ceramic pipe, 56 bone and teeth fragments (an additional 259 small pieces of bone were retrieved from flotation samples), 3 pieces of mussel shell, and material assumed to be hearth-related debris (i.e., burned limestone, fire-cracked rock, burned earth, and charcoal) (Logan and Fosha 1991). Geomorphic inspection of TU1 disclosed that the cultural horizon is essentially within an A2 horizon from 8 to 48 cm in depth and the upper portion of the 2AB horizon below it (Fosha et al. 1990:137–138).

All finds in 1988 supported the site's assignment to the Grasshopper Falls phase of the Late Woodland period, assuming that taxon is valid (see Cultural Context section) and its temporal placement ca. A.D. 500–1000. Based on those findings, the following research questions were presented, restated with a slight change in #7, which reflects more recent research concerning Late Woodland in northeastern Kansas, in the proposal to the KSHS and KAA; they are addressed in more detail in the Conclusions section.

1. Does the site represent continuous or periodic occupation?
2. Do the two mounds reflect social organization, population size or both?
3. What do any floral and faunal remains reveal about subsistence and season or duration of occupation?
4. How well does the biological assemblage as a whole reflect subsistence and seasonality?
5. Does the site have structural remains that permit reconstruction of house form?
6. What are the form, function, and location of associated features (e.g., cache pits, hearths, etc.)?
7. Does the Grasshopper Falls phase merit taxonomic distinction when compared to contemporary regional cultures?

8. Chronology: When did occupation of the Quixote site occur within the broad temporal range of Late Woodland time (A.D. 500–1000)?

ENVIRONMENTAL CONTEXT

Environment is more than a backdrop to the societal adaptations of a given population. The physical environment is a critical factor in the broader adaptation that anthropologists call culture. An ecological stance grants considerable, if not deterministic, weight to the role of the environment in human lifeways. While a graduate student at the University of Nevada, Reno (1974–1977), this author was schooled in the ecological perspectives of Julian Steward (1955, 1970) and Donald Hardesty (1977).

Hardesty was a member of his M.A. committee and offered his first opportunity to serve as crew chief on an archeological project. Then and during subsequent doctoral work at the University of Kansas (1977–1985), the author was steeped in the New Archaeology of Lewis Binford and others, who emphasized the systemic, dynamic nature of hominid adaptations to environmental changes across Quaternary time. Thus, the natural world does not just surround humanity, defining parameters for behavior within which are alternatives for adaptation; to a significant extent it shapes human beings.

Northeastern Kansas was covered in ice during what in classical geology had been called the Kansan glaciation. Given evidence of greater complexity with regard to advances and retreats in till and paleosol stratigraphy in that area and elsewhere, including a significant exposure in a quarry near Doniphan (Dort 1966), that term was abandoned in favor of "pre-Illinoian" for the period from 2.5 million to 200,000 years ago (Attig and Mickelson 1999; Johnson 1990) (Figure 3). Traces of at least two periods of glacial stasis (there were more; see Dort 1966) are found today in the eastward-draining Kansas River, formed when ice stalled long enough for outwash to carve its valley, and in the Wakarusa River valley, shaped during a southward surge of an ice lobe. Glacial retreat after pre-Illinoian time created southward-draining

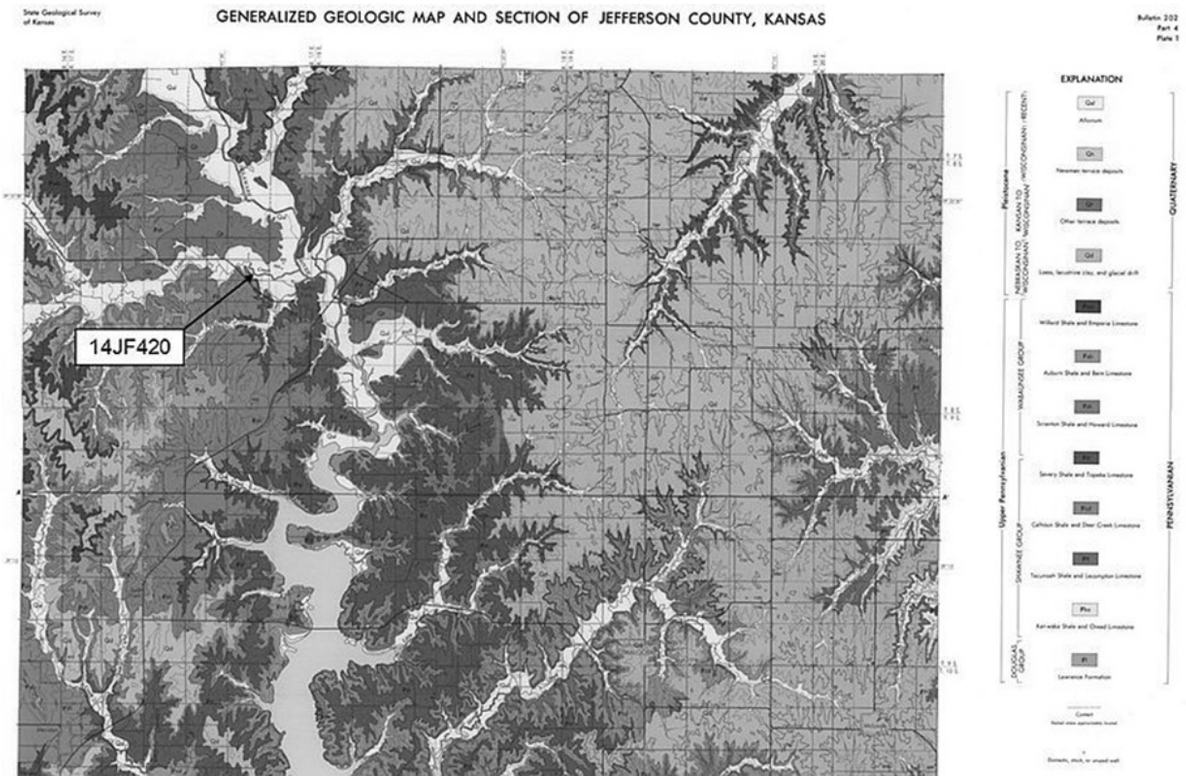


Figure 3. Geology of northern Jefferson County, showing the location of 14JF420 (modified from Winslow 1972). The Oread Limestone that contains chert-bearing Plattsmouth and Toronto Limestones does not outcrop in this area.

tributaries of the Kansas River, including the Delaware River and Stranger Creek. Loess and glacial till, the latter consisting of a variety of metamorphic stones transported from regions well to the north, cap sequences of native limestones, shales, and sandstones of Pennsylvanian age. Cobbles of such till as Sioux quartzite provided indigenous groups with the raw material for axes, celts, manos, and metates. Gravel cherts with brown weathering rinds occur in alluvial and upland deposits along the Kansas River and around Atchison (Honderich 1970; Logan 1985:45; Loosle 1990; McLean 1998; Reynolds 1957). Referred to as Tertiary and alluvial cherts, examples appear in the Quixote cultural horizon as cores, debitage, and tools, suggesting local acquisition, though the nearest sources have not been identified. Pennsylvanian bedrocks provided sandstone for abraders and grinding slabs and cherts in the Plattsmouth and Toronto members of the Oread Formation (Shawnee Group) as knapping material for chipped stone tools (see Lithics section). Notably, the latter were more readily available in the Stranger Creek basin, east of the Delaware River drainage and here are considered near-local sources (Logan 1988; McLean 1998). The Delaware River valley, inundated along its lower reach by Perry Lake, is broad, like that of its sister drainage Stranger Creek, reflecting the misfit nature of the primary streams that drain basins of glacial origin. The uplands are rolling hills, some capped with glacial till, that attain the highest elevations at divides with adjacent waterways: Stranger Creek and Stone House Creek to the east and Soldier Creek, Nemaha River, and Prairie Creek to the west. The maximum elevation in the Delaware River watershed is 351 m (1,152 feet); the lowest is 199 m (653 feet) (https:// www.anyplaceamerica.com/directory/ks/jefferson-county-20087/).

The soil assigned to the area by the USDA Soil Conservation Service is the Kennebec series, "deep, nearly level soils on flood plans . . . [that] formed in silty alluvium" (Dickey et al. 1977:11). However, in 1988 William C. Johnson of the University of Kansas Department of Geography inspected the 60-cm-deep profile of TU1, revealing stratigraphy inconsistent with Kennebec. He observed that anthropogenic input combined with colluvium and alluvium had developed an A2 soil underlying a thin (0–8 cm) post-occupational horizon (Fosha et al. 1990:137). This interactive process was confirmed during more extensive excavation in the block area during the KATP field school (see the Methods section). An important observation made during the latter was of a large boulder of Sioux quartzite exposed at the peak of the hill southwest of 14JF420. This suggests terrain more like the Pawnee-Grundy-Shelby association where Pawnee soils formed in till deposits on hills and slopes adjacent to Kennebec soils along tributary streams (Figure 4). Obviously, coring should be done at the site and the adjacent hill to corroborate this, but it also might verify the inference of local procurement by prehistoric groups of cobbles from till deposits for ground stone tools, like those described in the Lithics section.

The climate of northeastern Kansas is continental with wide seasonal variations in temperature (Bark 1977; this is the source for data presented in this section). Thornthwaite (1941) classifies the region's climate as moist subhumid. Average annual precipitation in Jefferson County is from 36 to 38 inches, the great majority of which falls during the growing season that averages 180 days from late April to early October. While more than sufficient for rain-based agriculture, periods of drought are not unusual, and such events would have had more impact on prehistoric agriculturalists with less recourse to long-term storage. Most rainfall in the area comes in the form of late-day summer thunderstorms with consequent runoff. One can envision the effects of these if ground cover on the hill near the Quixote site had been reduced by traffic or prairie fires. Slope wash would have contributed finer-grained till-derived material, which would explain the relatively sandy nature of the soil there. During the year, as expected with strong seasonality, temperatures can range from below zero to greater than 100 degrees Fahrenheit.

While the modern climate cannot be applied indiscriminately to the time of human prehistory in the lower Missouri River region, it is probably fair to do so with regard to the Late Woodland period. All of the faunal and floral remains recovered thus far are common to the region today. There is no evidence of the extremes of the Altithermal episode, a time of significantly greater aridity that coincided with the Middle Archaic period (6000–3000 B.C.). Droughts occurred in some parts of the

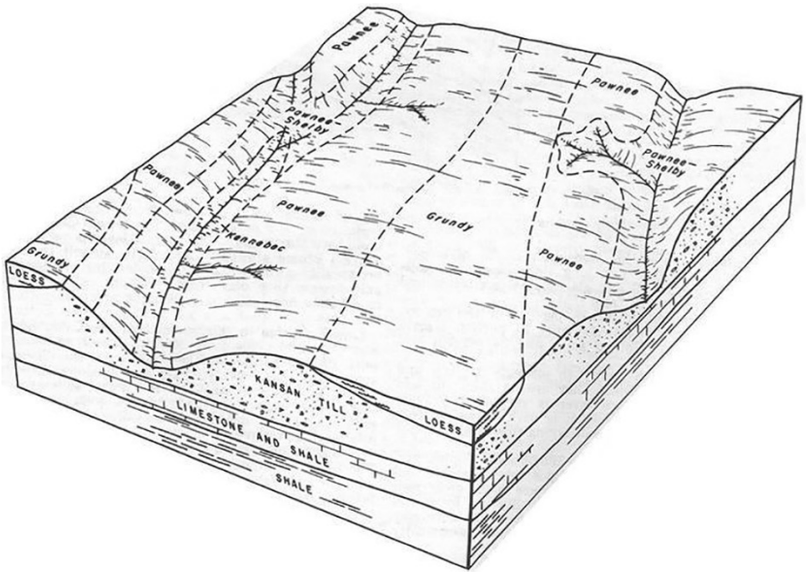


Figure 4. Pawnee-Grundy-Shelby soil association, showing Pawnee soil formed in glacial till on the hill adjacent to Kennebec soil along the tributary stream (Dickey et al. 1977:4).

globe during the Medieval Warm Period, whose origin is dated by various sources from the ninth to mid-tenth centuries A.D. and persisted until the mid-thirteenth century (A.D. 950–1250) (Fagan 1999), and the Little Ice Age, the subsequent period of climate extreme that prevailed with varying intensity until A.D. 1700 (Fagan 2000; Mann et al. 2009). The latter two regimes would have had more influence on occupants of the central Plains during Late Prehistoric (A.D. 1000–1500) and Protohistoric (A.D. 1500–1700) times.

Given the comparable climatic regime, the model of pre-modern settlement vegetation in northeastern Kansas, described by Kuchler (1974), is applicable to the Late Woodland period (Figure 5). Two primary communities, tallgrass prairie and oak-hickory woodland, intermingled as an ecotone or mosaic, in the lower portion of the Delaware River drainage, while the former covered much of the terrain around the upper reach that encompassed 14JF420. Dominant genera of the tallgrass prairie community were big and little bluegrass (*Andropogon* and *Schizachyrium*), switchgrass (*Panicum*), and Indiangrass (*Sorgahastrum*); those of the forests were hardwoods, including white, red, and black oak (*Quercus*) and shagbark and bitternut hickory (*Carya*). Softwoods, such as cottonwood (*Populus*) and willow (*Salix*), formed galleries along primary streams, specifically the Delaware River, and wetlands with marsh grass (*Spartina*) developed in poorly drained areas in valleys. This type of ecotone is climatically sensitive, the relative areal coverage of grasses and woodlands shifting with episodes of prolonged dryness or increased precipitation, respectively. The pattern illustrated in Figure 5 is an apt model for the Quixote site occupation. However, it would be misleading to assume that the predominance of grassland in the area, implied by the model, precludes the presence of hardwoods. That they were used for fuel and food is evident in the botanical remains recovered during the KATP investigation and discussed in Dr. Gina Powell's comprehensive analysis in the Macrobotanical Remains section.

The vegetation communities of the riverine environment were habitats for rich and varied assemblages of animals and other wild plants that would have figured in the subsistence pattern of Woodland populations. Powell also describes a variety of non-woody plants that attest the harvesting of wild fruits and nuts by the site occupants. In the Animal Bone and Shell section Falk and Bozell present evidence of the procurement of a greater diversity of fauna than heretofore has been documented at Late Woodland sites in northeastern Kansas. Deer bones and teeth testify to preference for that large game animal; other species in the region were bison and wapiti. Fur-bearing animals other than beaver, remains of which were found at 14JF420, included fox, mink, otter, skunk, and weasel. A variety

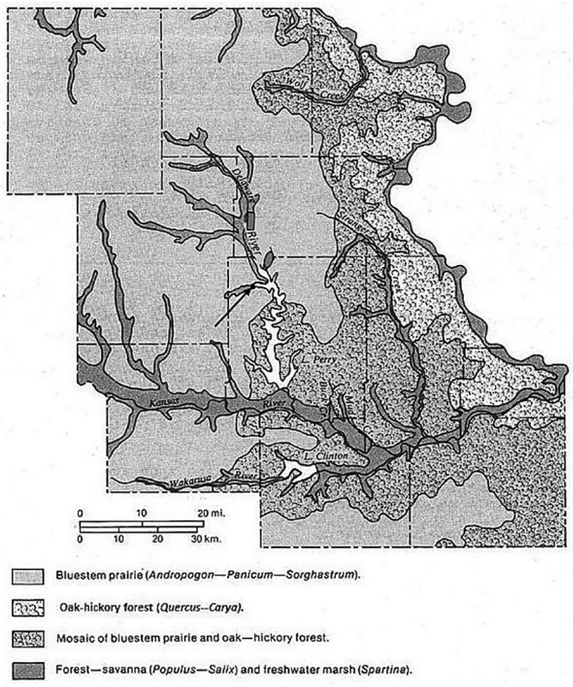


Figure 5. Map of the potential natural vegetation in northeastern Kansas based on (based on Kuchler 1974).

of avian subsistence resources could have been acquired in upland (grouse) and aquatic (ducks, geese, etc.) habitats. A variety of fish and mussels demonstrate that Quixote site occupants tapped other aquatic resources. Predators, most extirpated during early modern settlement, included bears, mountain lions, wolves, coyotes, and lynx. The 14JF420 assemblage contains a lynx bone. For a more comprehensive listing of potential fauna in the Kansas City locality, see Logan 1985:Appendix 6 and 1990a:19–21.

CULTURAL CONTEXT

Woodland Adaptations in the Kansas City Locality

After at least 10 millennia of the predominantly mobile settlement pattern followed by small groups of hunter-foragers in the Kansas City locality, a marked shift toward sedentism took place ca. A.D. 1. Groups banded together in larger numbers at a limited number of sites near the mouths of tributaries of the lower Missouri River, namely Brush Creek, Line Creek, and the Platte River on the eastern side of the major valley and Quarry Creek and Brenner Heights Creek on the western side (Logan 2006a, 2006b). Prolonged year-round occupation of these sites is indicated by middens with abundant biological remains that reflect acquisition during all seasons and whose good preservation suggests relatively quick burial (Adair 1977; Bell 1975; Johnson 1972; Johnson 1976b). These generally cap trash-filled cache pits, which attest the production of surplus foods by their greater number, concentration, and volume in contrast to those of Late Archaic (3000–500 B.C.) and Early Woodland (500 B.C.-A.D. 1) times. While these storage features occasionally contain burned seeds and other remains of such cultivated plants as chenopods, amaranths, marshelder, sunflowers, and more rarely, maize (Adair 2006), the overall subsistence pattern reflects greater efficiency in obtaining and processing wild plants and animals to support a more concentrated population than before. That at least some of this shift was attributable to influence from Middle Woodland populations near the mouth of the Lower Illinois River and Mississippi River valleys is reflected by striking parallels in ceramic and chipped stone tool assemblages in the two localities. Archeologists recognize these as the Hopewell culture: the Havana tradition in the latter area and Kansas City Hopewell in the Kansas City locality (Johnson 1976a, 1976b, 1979, 2001; Johnson and Johnson 1998; Logan 2006a, 2006b; Wedel 1943).

After about five centuries of relative sedentism, the Middle Woodland adaptation was replaced during Late Woodland time (A.D. 500–1000) by a return to population dispersal, characterized by the occupation of smaller encampments throughout tributary valleys. The significantly greater number of Late Woodland sites in valleys of the Delaware River, Stranger Creek, and other streams that drain into the lower Kansas River attests a growing population. Adair (1988:95) described this process as an example of "population packing" and applied the term to the subsequent Late Prehistoric period as well. These sites probably were inhabited by one or two nuclear or extended families that relied on wild and domesticated foods with a notable increase in the cultivation of maize. Prolonged or repeated site occupations are less frequently indicated by middens, household deposits, or palimpsests of hearths

and associated activity areas like those at the Quixote site that have been spared agricultural disturbance. They generally have more impoverished biological assemblages than Middle Woodland sites. Cache pits, while present, are less numerous and of smaller volume, suggesting briefer stays, reduced food surpluses, or both. This development is discussed in greater detail in the following sections.

The archeological record of the Late Prehistoric period in the area drained by the lower Missouri River (Kansas City locality) is not covered in detail here but is distinguished from the Late Woodland period by an increase in sedentism, signaled by substantial lodge remains of wattle-and-daub construction with central hearths, more capacious intramural and extramural cache pits, and evidence of increased farming, especially of maize, among populations recognized as the Steed-Kisker phase (Logan 1996, 2010, 2011; Roper 2006). The causes for this shift are not yet well known but probably can be attributed to a synergy of population growth and continued interaction, albeit more limited than once suggested by some archeologists (e.g., O'Brien 1978a, 1978b, 1981, 1988, 1993; Shippee 1972; Wedel 1943), with Mississippian populations in what is now the St. Louis area. Notably groups assigned to the archeological culture called Pomona, who seem to have entered the area from their southeastern Kansas area of origin, maintained a lifeway more comparable to the Late Woodland adaptation from which Pomona clearly was derived (Logan 1996, 2010; Logan and Hedden 1993).

Middle Woodland: Kansas City Hopewell

Whatever its origins in the region—migration, indigenous development, or some combination thereof (Logan 2006a, 2006b)—the Kansas City Hopewell tradition that appeared ca. A.D. 1 was characterized by a significantly different settlement-subsistence pattern than preceding populations. While pottery was part of Late Archaic (i.e., Nebo Hill phase) and Early Woodland inventories in the Kansas City locality, evidence of that technology is markedly scarce compared to those of succeeding populations. Indeed, the term "ceramic age" distinguishes the adaptations of groups after that time from those that came before, better described as more strictly "stone age." Elsewhere in the world archeologists have documented ceramic technologies, particularly vessel construction and use, dating to the Late Pleistocene, so it is not surprising that hunter-foragers were making earthen containers before year-round site occupation became the norm. Yet the amount and variety of pottery found at Hopewell sites in the region of interest is extraordinary and signifies a marked investment in the construction and use of large jars for cooking and storage. Pottery correlates with the production of food surpluses needed to maintain group aggregates at more extensive base camps (Johnson 1976b; Logan 2006a, 2006b, 2019). Much of what is distinctive about Kansas City Hopewell reflects interaction, including the movement of population segments as agents of diffusion, between Middle Woodland groups in the Havana and Kansas City localities and the adoption of a suite of adaptations, including long-term sedentism in base camps like Quarry Creek (14LV401), Aker (23PL43), Renner (23PL1), and Young (23PL4). This may be exemplified by ceramic decorative treatments, such as punctates, rocker stamping, and cross-hatching in zoned areas of jars (compare Fortier 2006:333; Seeman 1995).

Interaction with Middle Woodland groups as distant as those in the lower Illinois River valley is apparent in ceramic styles, a variety of stone tool types (e.g., corner- notched dart points, blocky scrapers, drills, blades, axes, and celts), and a small number of exotic objects (platform pipes, copper needles, miniature "celts," Gulf Coast shell, obsidian, etc.) (Johnson 1979; Logan 2006b, 2011). As with groups in that area, those in the Kansas City locality practiced a kind of "primary forest efficiency" (in the sense of Caldwell 1959) that permitted long-term site occupancy and consequent population growth, as well as increasing pressure on locally available resources. This early phase, called Trowbridge, succeeded until the mid-third century A.D. By that time it had come to require the exploitation of wild plants and animals from more expansive catchment areas, necessitating the establishment of ancillary camps during the Kansas City phase (ca. A.D. 250–400) to sustain base camps like Aker, Quarry Creek, Renner, and Young (Johnson 1976b:11–14; Logan 1993, 2011). Eventually the success of that system proved

unsustainable, and Middle Woodland groups, recognized as the Edwardsville phase, had to disperse across more of the landscape, a settlement pattern that came to characterize regional Woodland groups until at least A.D. 1000.

Late Woodland

Continuity from the Edwardsville phase is evident in several aspects of all Late Woodland manifestations in eastern Kansas, particularly in the northeastern part of the state. In addition to the aforementioned settlement pattern is the general form of pottery—large conical-based, wide-mouthed jars with decoration, when rarely present, confined to the lip and upper rim and including crenellations on the former or a row of punctates or bosses on the latter. Projectile points more frequently are arrow points of the Scallorn type, corner-notched with elongate, often serrated blades that first appeared during the late Edwardsville phase, ca. A.D. 500. Some sites also have yielded larger corner-notched points of the Steuben type that typify the Kansas City and Edwardsville phases (Logan 2006b). It is not clear why Late Woodland groups would maintain two forms of projectile propulsion. Perhaps what appear to be dart points were either made or recycled from Middle Woodland contexts for use as knives. Subsistence remains are indicative primarily of hunting and foraging of wild resources, though some sites suggest a growing reliance on cultivated plants, including maize (Adair 1996, 2006).

The most significant innovation during this time is lodge construction of which there is very little evidence at Kansas City Hopewell sites. A hint that Hopewell groups built shelters with pole supports surfaced at the Renner site, where Brenner (1990) uncovered an arc of stone-lined post supports. Earlier excavation there by the Smithsonian Institution did not find house remains (Wedel 1943:18). This does not mean that Middle Woodland people did not make lodges. While absence of evidence is not evidence of absence, what is not apparent cannot be discussed. Scattered post molds that constitute no discernible pattern, found at sites such as Deister (23PL2) (Katz 1974:6–8, 38, 44), may represent drying racks rather than shelters. In contrast, excavations at Malm (14JF304), Anderson (14JF331), and Teaford (14JF333), type sites of the Grasshopper Falls phase of the Late Woodland period revealed house remains with circular to oval floor plans, outlined by relatively small (~5–10 cm) post molds that enclose areas from ~9 to 37 m^2 (Reynolds 1979, 1981, 1987; but see Keehner 2015 for critical reevaluation of the lodge inferred from "postmolds" at the Hamon site in that area). None had interior fireplaces; rather, concentrations of burned limestone interpreted as hearths were found outside them (but see Features section). Pits were common. However, in contrast to those at Middle Woodland (A.D. 1–500) and Late Prehistoric (A.D. 1000–1500) sites in the region (Logan 2006b, 2010, 2011), they are relatively shallow basins rarely greater than 40 cm in depth. Their function as storage facilities is problematic; however, an exception occurred at the Avoca site in Jackson County, Kansas, where post molds outlined an exceptionally large lodge (169 m^2) with 12 internal pits and a central hearth complex (Baugh 1991).

The problem of taxonomy in the region with respect to Late Woodland cultures is complicated by the fact that the traits on which archeologists rely show little variation in artifact and biological assemblages, as well as such general site characteristics as topographic setting, areal extent, and the nature of associated features. The dilemma is best exemplified by Reynolds' (1979, 1981) definition of the Grasshopper Falls phase, pertinent to the Quixote site, which he established apparently without being aware of the previously described Wakarusa phase, defined by Johnson (1968), based on data from the Kampschroeder site (14DO27) in the Wakarusa watershed opposite the Delaware River basin from the Kansas River into which both drain. They are identical with regard to lodge form, ceramic ware, and lithic tools. These similarities, other than house remains that were lacking at the Anderson site, also apply to Johnson's (1968) tentatively defined Deer Creek phase (1966; compare Logan 1990b; 2006a). More recently Keehner (2015) has criticized the legitimacy of the Grasshopper Falls phase in comparison to other Woodland taxa of the eastern Great Plains, including Valley, Loseke Creek, Held Creek, Sterns Creek, and Minotts. For this reason throughout this report, 14JF420 is referred to with respect to its temporal placement rather than a particular taxon.

GEOPHYSICAL SURVEY

David Maki
Archaeo-Physics, LLC

Archaeo-Physics, LLC was contracted by the Kansas Historical Society (KSHS) to conduct a non-invasive geophysical investigation of 14JF420, situated on Cedar Creek, ~10 km northwest of Valley Falls (Figure 6). The survey was conducted prior to the KATP field school, which took place June 1–15, 2017. The objective of this work was to employ non-invasive methods to search for buried features and inform the archeologists ahead of the planned test excavations.

A grid reference system was established by KSHS personnel prior to the survey using an electronic total station. The grid was aligned with UTM north and the coordinate reference system used throughout was NAD 83/UTM Zone 15N. Units are meters. The survey grid, which had a maximum extent of 60 m east to west and 42 m north to south, encompassed two known mounds (Figure 7). A third possible mound was identified in the LiDAR data (Figure 7). This previously undocumented mound is located ~110 m west- northwest of the geophysical survey area and has a diameter of ~20 m and a height of 30 cm. Geophysical data were collected by David Maki, Geoffrey Jones, Andy Wise, Joseph Wise, and Bryce Keola on April 20–21, 2017 (Maki 2017).

Methods and Survey Design

A brief description of the methods and survey design parameters used during the geophysical investigation is presented below. A more comprehensive introduction to geophysical survey methods as applied to archeology can be found in Clark (1996), Johnson (2006), and Gaffney and Gator (2003).

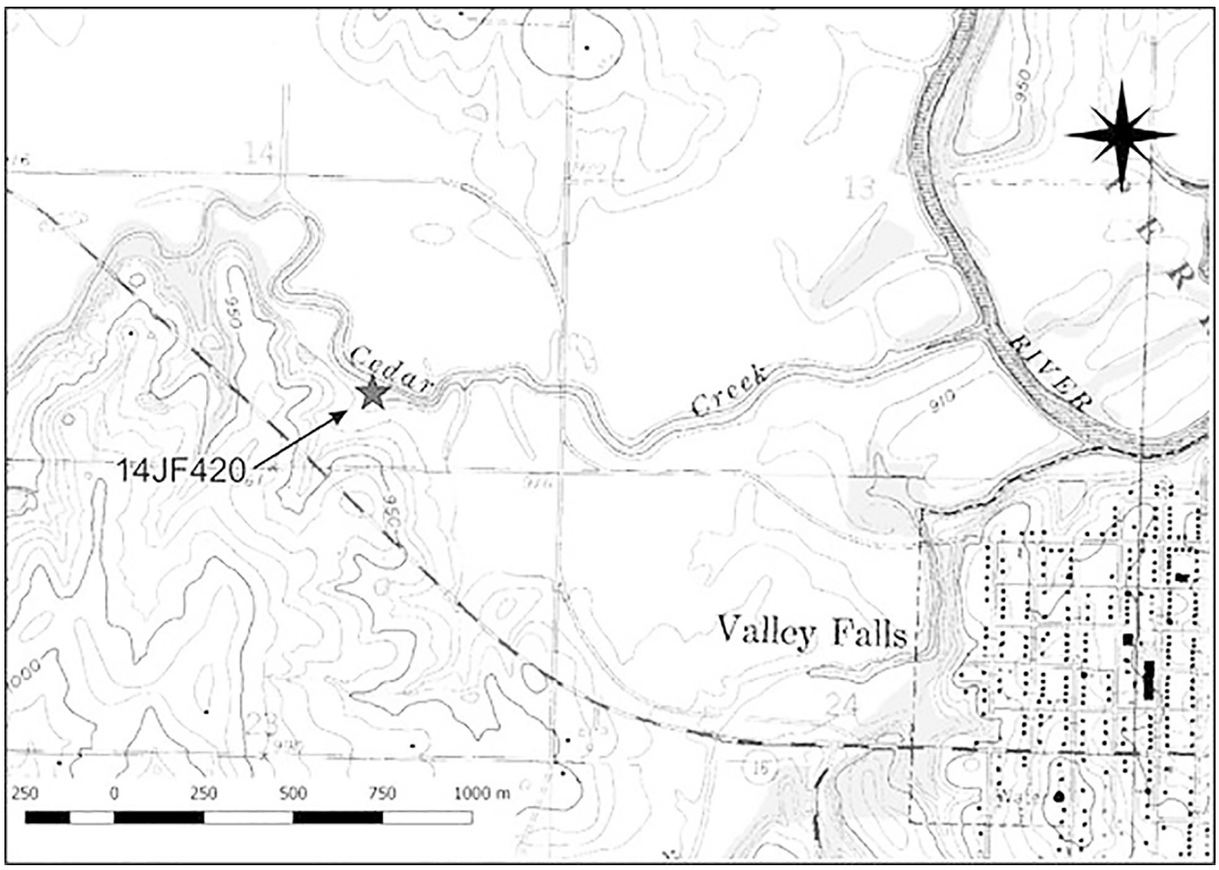


Figure 6. Location of 14JF420 on a 1:24,000 USGS topographic map.

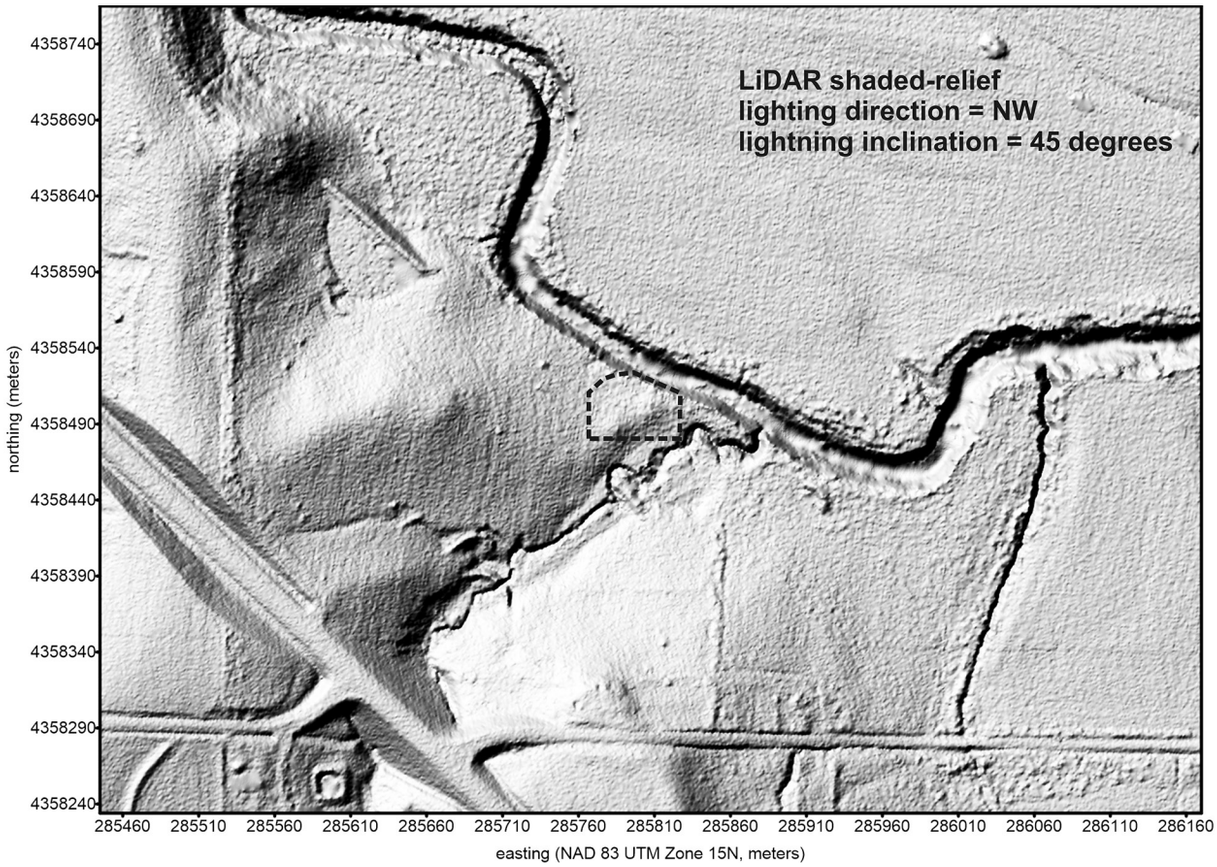


Figure 7. LiDAR shaded relief image of 14JF420, with the geophysical survey grid outlined in black.

LiDAR Data Analysis

The LiDAR investigation began by downloading raw discrete-response LiDAR data in LAZ format from the Kansas Data Access and Support Center web portal (http:// www.kansasgis.org/resources/lidar.cfm). The LAZ point cloud was parsed to eliminate responses classified as other than bare ground and building locations and exported as an x,y,z data file using LAStools (http://rapidlasso.com/lastools/). Data sample density is of medium quality, with a laser pulse spacing of 1.15 m, resulting in an overall point density of .75 laser pulses per m^2. The projection of the LiDAR data is NAD 83/UTM Zone 15N (https://epsg.io/26915).

The x,y,z data file was gridded to a uniform density of one sample per m^2, using the gridding method known as kriging. Gridding was accomplished using SURFER surface mapping software by Golden Software. The search radius was 20 m.

After appropriate processing, the gridded data were used to create imagery using LiDAR visualization and analysis methods tailored for archeological prospection (Bennett 2011; Bennett et. al. 2012; Challis et al. 2008, 2011; Hesse 2010). The following LiDAR visualization methods were used: 1) Shaded-relief, using multiple light-source azimuths, is common and intuitive, but visibility of features can vary depending on their orientation with respect to light source direction and terrain. Examination of more than one light-source azimuth is recommended. 2) LiDAR-derived elevation contours are useful for understanding relative variations in elevation and surface topography.

Local Relief Modeling

This method utilized a high-pass background subtraction filter to suppress large-scale topographic variation while enhancing small-scale micro-topographic patterning. A smoothing filter replaced

each elevation point in the grid file with the average value within a 15-m radius surrounding each point. The smoothed data were then subtracted from the original data to produce a residual representing the local relief. This method works well in relatively gentle terrain but can introduce artifacts (artificial features) in steeply sloping terrain or in areas surrounding abrupt topographic features.

Electrical Resistance Survey

Electrical resistance survey responds to differences in the electrical resistivity of subsurface materials. The instrument responds to differences in grain size, organic content, moisture content, air void ratio, and soil chemistry. Many types of features are detectable if sufficient contrast exists between them and the surrounding matrix.

A Geoscan Research RM15 resistance meter operated in twin electrode configuration was used to perform the resistance survey. A mobile probe spacing of .50 m was employed, resulting in a nominal depth of investigation of ~.50 m. A potential of 40V and a current of 1mA (1 milliAmpere or one-thousanth of an Amp) were applied.

Resistance data were collected at measurement stations, located every 50 cm along transects spaced at 50-cm intervals. This strategy resulted in an overall data sample density of four samples per m^2.

Electrical Resistance Data Processing and Display

Resistance survey data processing included five steps: removal of extreme statistical outliers; interpolation to uniform sample densities in the x and y directions (.25 by .25 m); low-pass filtering to suppress small-scale noise and enhance the detectability of cultural patterning; high-pass background subtraction filtering (10-m radius) to suppress large-scale geologic variation and to enhance the visibility of small low-contrast anomalies; and clipping the data range used to construct imagery in a manner that would best display cultural features.

Magnetic Field Gradient Survey

Magnetic field gradient survey responds to local variations in the earth's magnetic field that are created by subsurface materials. The instrument responds most strongly to highly magnetic materials, such as iron artifacts, ferrous metal, brick, and igneous or metamorphic rock. It can also detect very subtle anomalies caused by burned, organically enriched, disturbed, or compacted soils. It is rapid and capable of very high resolution.

The magnetic field gradient survey was performed using a Geoscan Research FM256 fluxgate gradiometer. The FM256 has two fluxgate sensors, vertically separated by .50 m. The data represent the difference or vertical gradient between the two sensors. While gradient measurements lack the absolute sensitivity of single-sensor measurements, they have the advantage of more precise spatial resolution, while suppressing geological phenomena and minimizing the effects of ferrous metal and other high-amplitude "clutter."

Magnetic data were collected in linear transects, spaced at .50 m, with 8 samples per m recorded along each transect, resulting in an overall data sample density of 16 samples per m^2.

Magnetic Field Gradient Data Processing and Display

Processing of magnetic data proceeded in three steps: 1) a zero mean traverse filter was applied to compensate for defects caused by instrument drift and sensor orientation (heading error). Data exceeding a threshold value were excluded from the transect mean value calculation; 2) Data were interpolated to a uniform number of data points in both the x and y directions (.25 m by .25 m); and 3) A .5-m low-pass filter was used to suppress small-scale noise and enhance the detectability of cultural patterning.

Magnetic Susceptibility Survey

Magnetic susceptibility surveys measure the concentration of magnetic minerals in subsurface soils and sediments. The distribution of magnetic minerals within archeological sites can be changed due to anthropogenic enhancement (e.g., burning or biological activity associated with midden deposits) or by mass transport of A horizon soils. Typically the topsoil (A horizon) of a soil has higher magnetic susceptibility than the underlying subsoil. When these soils are transported during earthwork construction, the resulting redistribution of magnetic minerals may be mapped.

A GF Instruments Multi-Kappa magnetic

susceptibility survey instrument was employed to collect magnetic susceptibility data. Data were collected in linear transects spaced at .50 m. A reading was taken every half second, while the pace was controlled using a metronome to obtain four samples per linear meter. This strategy resulted in an overall data sample density of eight samples per m^2.

Magnetic Susceptibility Data Processing and Display

Magnetic susceptibility survey data processing included four steps: removal of extreme statistical outliers; interpolation to uniform sample densities in the x and y directions (.25 by .25 m); low-pass filtering to suppress small-scale noise and enhance the detectability of cultural patterning; and clipping the data range used to construct imagery in a manner that would best display cultural features.

Results and Interpretations

Interpretations offered here are focused on those anomalies thought most likely to represent archeological features of interest. Because anomalies can vary in their strength and definition, grading into ambiguity, no attempt is made to interpret every anomaly. The purpose of these initial interpretations is to serve as a starting point for discussion and ongoing interpretation; it should be considered likely that some interpretations may be in error, and quite certain that features exist that have not been interpreted or even detected.

LiDAR Data Analysis Results

Results of the LiDAR analysis are displayed in Figure 8. The two previously documented mounds at the site are readily visible, as is a possible third mound located ~110 m west northwest of the geophysical survey area.

Geophysical Results

Results from the geophysical investigation were delivered as an interactive geographic information system (GIS) application. The GIS application allows viewers to compare geo- referenced geophysical survey results with LiDAR-derived topographic imagery. Careful comparison of the subsurface geophysical data and the topographic features visible in the LiDAR image aids understanding of the survey results. Magnetic field gradient survey results are presented at two different contrast levels in Figure 9. Figure 10 compares electrical resistance data before and after high-pass background subtraction filtering.

Magnetic susceptibility data are shown in Figure 11.

Geophysical Interpretations

Graphic interpretations of the geophysical survey results are provided in Figures 12–14. The anomalies identified in those figures are discussed in Table 1.

Summary and Conclusions

A non-invasive geophysical investigation was conducted at the Quixote site. It consisted of analysis of publicly available LiDAR data and collection of subsurface geophysical data. Three different

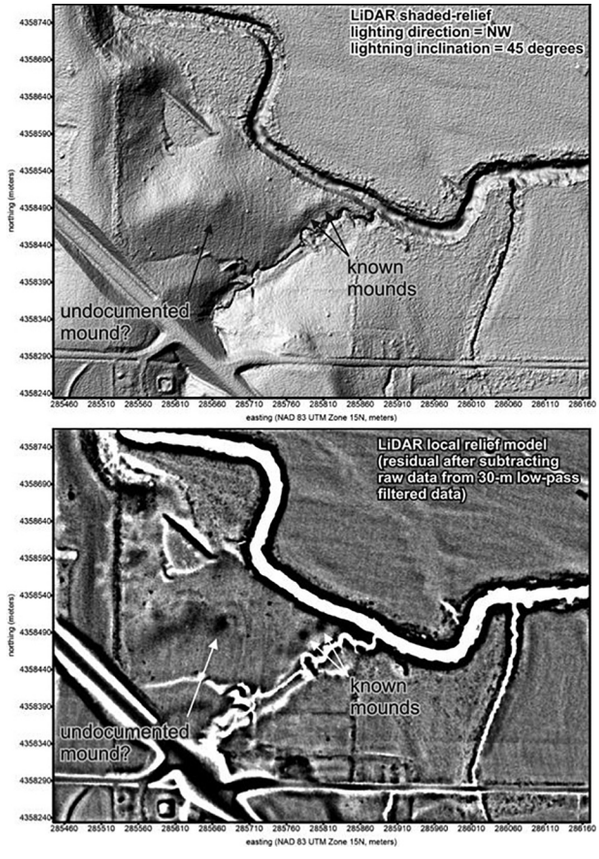


Figure 8. LiDAR data interpretations. Editor's note: The area of the possible undocumented mound was explored during the 2017 KATP field school, and no mound was found.

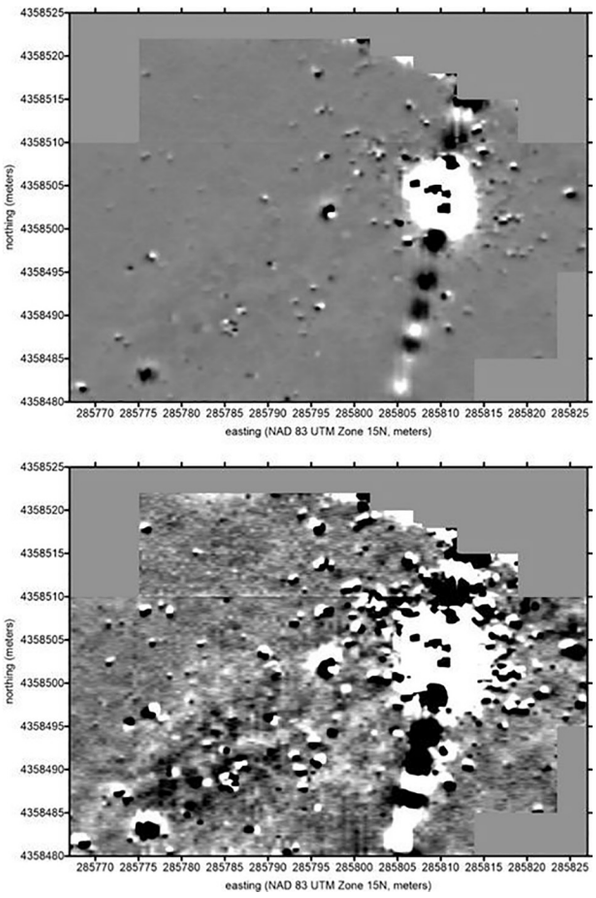


Figure 9. Magnetic field gradient survey results. Data presented at a contrast level of ± 25 nT (above) and ± 2 nT (below).

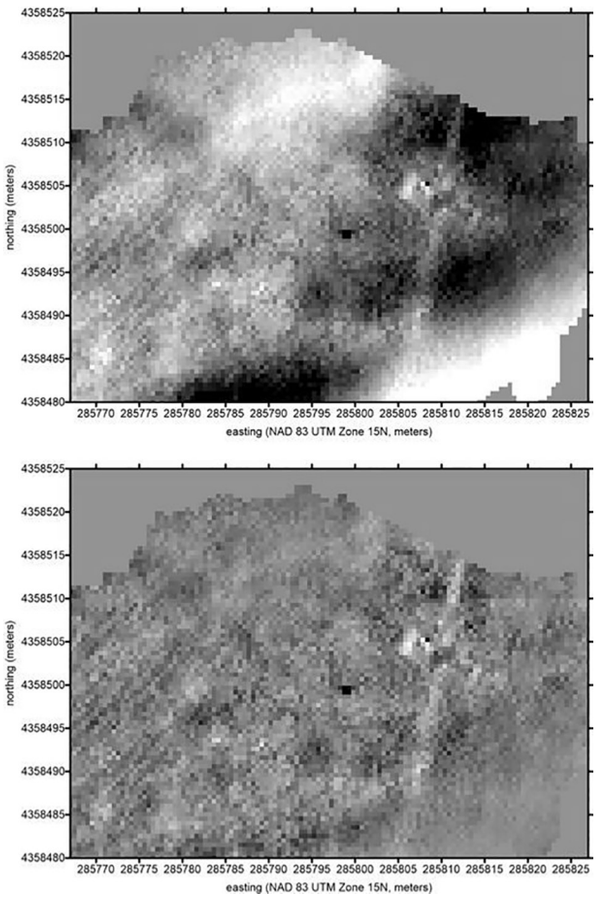


Figure 10. Electrical resistance survey results (above); resistance data after high-pass background subtraction filtering (below).

geophysical survey methods were employed: electrical resistance; magnetic field gradient; and magnetic susceptibility.

The LiDAR analysis identified the two known mounds at the site, plus a possible third mound that was previously undocumented. The subsurface geophysical survey detected several anomalies thought to represent discrete buried features, including two possibly fire-altered (m2 and m3) and one potentially composed of a low magnetic susceptibility material, such as sandstone or limestone (m4/r1). The survey also located general regions containing soil with enhanced magnetic susceptibility, often indicative of culturally modified soils (e.g., fire-altered or midden soils) or mass transport of A-horizon soils used during earthwork construction.

In addition, the geophysical data documented site disturbance. The easternmost mound was impacted

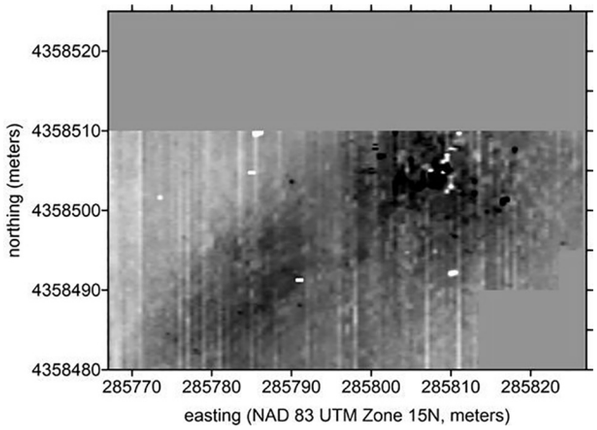


Figure 11. Magnetic susceptibility survey results.

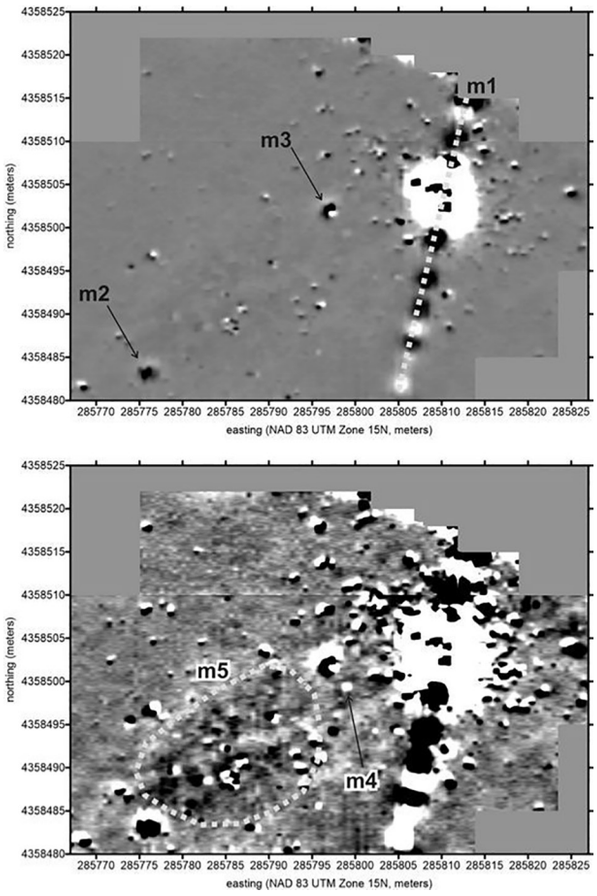


Figure 12. Interpretations of the magnetic field gradient data.

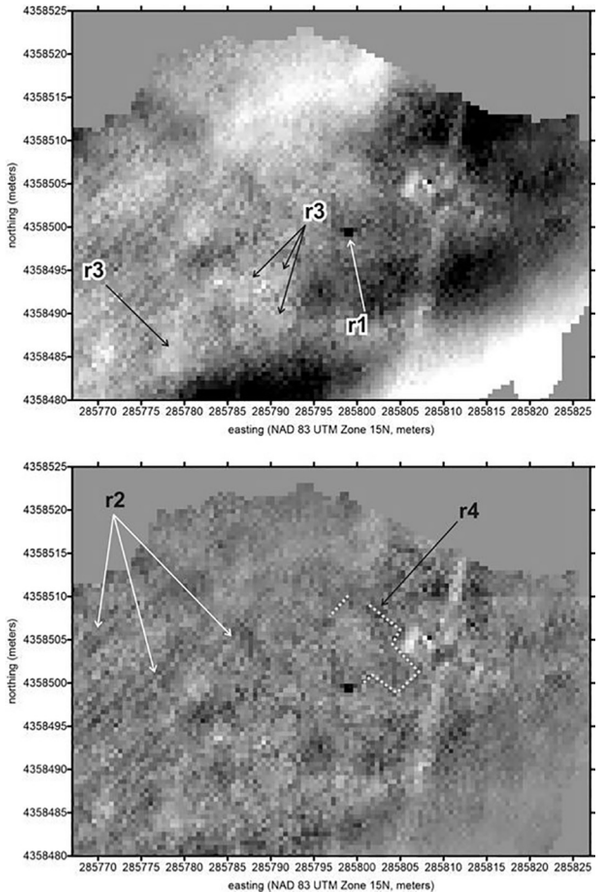


Figure 13. Interpretations of the electrical resistance data.

by a windmill and associated buried water pipe, and the disturbance complicated interpretation of the geophysical data in the vicinity. Plow scarring is visible in the electrical resistance data in the western half of the survey grid. Magnetic susceptibility data suggests that plowing redistributed some of the mound soils from the westernmost mound.

METHODS

This section describes field and laboratory methods of the project. The latter includes work at different times and venues: 1) the field lab at the Valley Falls School (USD 338), directed by Chris Garst (Director, Archeology Lab, Cultural Resources Division, KSHS) and Mary Conrad (KAA), 2) the KSHS Archeology Lab in Topeka, directed by Garst in conjunction with three KAA volunteer

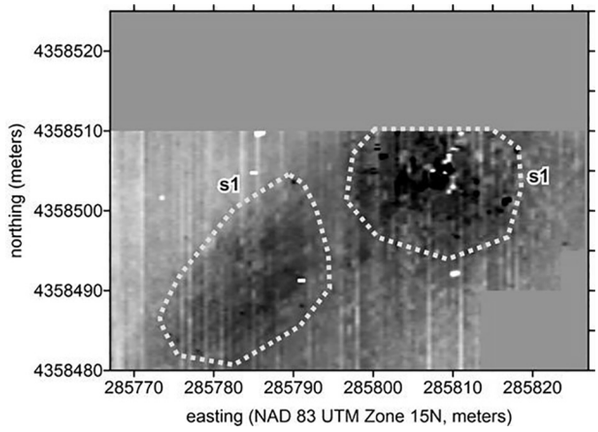


Figure 14. Interpretations of the magnetic susceptibility data.

Table 1. Geophysical Survey Interpretations.

Anomaly	Coordinates	Discussion
m1	N/A	Magnetic field gradient signal from an iron pipe and scattered iron artifacts, associated with the location of the former windmill, dominates the signal response from near the easternmost mound. Unfortunately this signal clutter obscures archeological signal of interest. Disturbance from the windmill and buried pipe is also visible in the electrical resistance data.
m2	285775.76E, 4358483.07N	The geometry and intensity of this anomaly are consistent with a fire-altered feature. The anomaly has a maximum intensity of about 35 nT, which is quite strong. If the source of the anomaly is archeological, it may represent an intensely fired feature.
m3	285796.97E, 4358502.04N	This geometry and intensity of this anomaly are consistent with a fire-altered feature. This may be a composite anomaly that is composed partially of signal from a buried archeological feature and partially from signal clutter, caused by historic iron debris.
m4/r1	285799.01E, 4358499.39N	This negative magnetic anomaly has a strong spatial correlation with a discrete high resistance anomaly. The diameter of the anomaly is approximately 1 m. This may represent a buried feature that is composed of a material that has less magnetic susceptibility than the surrounding soil. Unfired sandstone or limestone rock or a pit filled with sand are possible sources.
m5	285778.13E, 4358488.02N, 285781.12E, 4358485.78N, 285790.40E, 4358491.61N, 285785.86E, 4358495.20N	A general region of increased magnetic field strength is associated with the westernmost mound. This likely represents induced magnetization, associated with regions of enhanced magnetic susceptibility. Some areas within this general region have higher magnetic field strength values than others and may represent discrete features. The coordinates of four of these areas are listed.
r2	N/A	Parallel lines, faintly visible in the western portion of the survey grid, are likely caused by modern agricultural plow scarring. Alternatively, this patterning could represent terracing or other evidence of pre-contact agriculture.
r3	285789.70E, 4358489.12N 285791.10E, 4358494.34N 285788.04E, 4358493.70N 285778.35E, 4358485.55N	Four relatively indistinct areas of lower electrical resistance are located immediately adjacent to the westernmost mound in the survey area. The relationship between these poorly defined anomalies and the mound may be explored using the accompanying GIS project file. The anomalies are 2-4 m in diameter and are circular to oval in shape.
r4	N/A	Very faint and poorly defined linear and rectilinear patterning in the resistance data could represent walls or alignments of post molds. Coordinates of points on these linear anomalies can be obtained from the accompanying GIS project file.
s1	N/A	Areas of enhanced magnetic susceptibility associated with both mounds are outlined. The increased magnetic susceptibility is likely associated with topsoil used in mound construction, fire-altered soils, and/or soils that have a higher organic content that supports biogenic magnetite-producing bacteria. Magnetically enhanced soils from the westernmost mound may have been redistributed in a southwest-to-northeast direction by agricultural plowing.

programs: Summer Spree (August 3–6, 2017), Fall Fling (September 16–17, 2017), and Winter Wing Ding (January 19–20, 2018), and 3) the KSU Archaeology Lab where material was processed by the author or under his direction from August 2017 to September 2018.

Excavation

While the strategy was guided in part by findings of the geophysical survey, particularly anomalies indicative of fire-related features that bracketed Mound B, the intent to focus a block excavation on that area was only reinforced by Maki's description

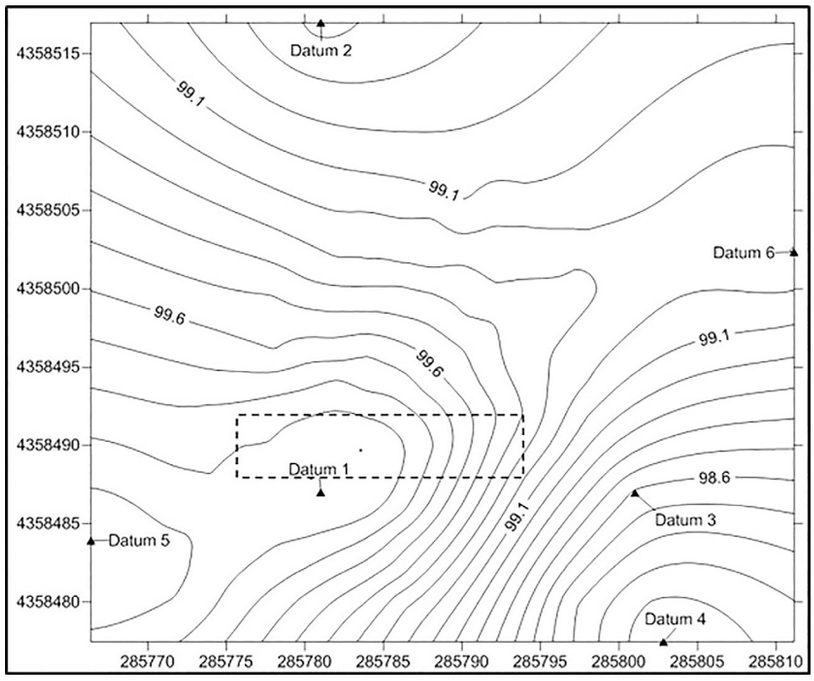


Figure 15. Topographic map of the Quixote site area, showing locations of target area at Mound B and datums 1–6.

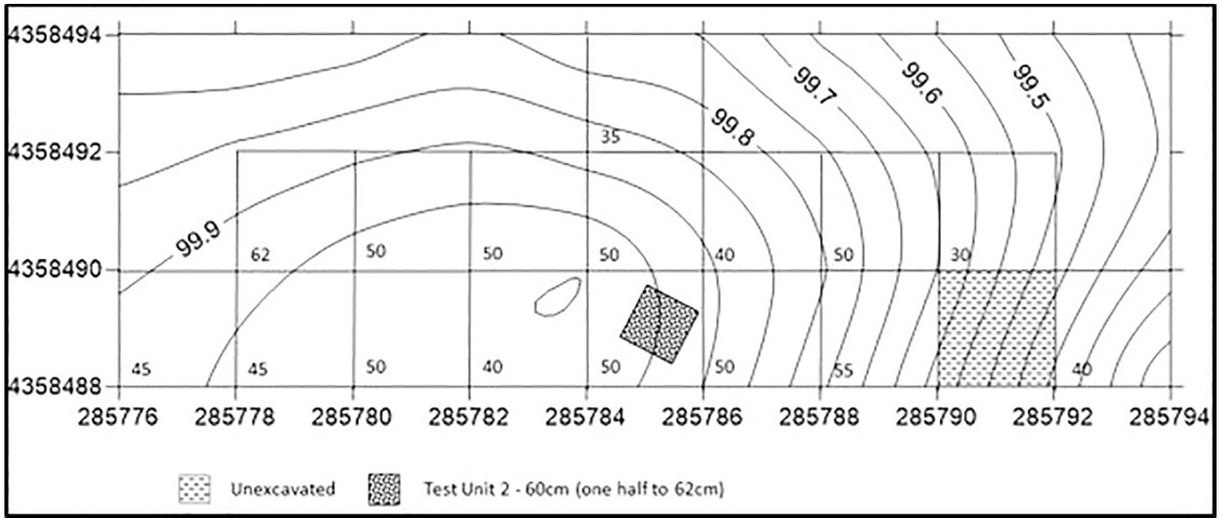


Figure 16. Topographic map of the block excavation with final unit depths and the location of TU2.

of it as "a general region of increased magnetic field . . . [that] likely represents induced magnetization associated with regions of enhanced magnetic susceptibility. Some areas within this general region have higher magnetic field strength values than others and may represent discrete features" (Figure 12; Table 1). There was no intention to excavate in the Mound A area, given evident disturbance by the windmill and the masking of any prehistoric features by magnetic noise attributable to it. Certainly future investigators will want to explore that area despite these drawbacks, as 1988 testing (TU1) revealed a thick cultural horizon comparable to that at Mound B.

Prior to excavation the site area was mapped topographically with a total station. Use of a high



Figure 17. Block excavation, showing piece-plotting process.



Figure 18. Water-screen station at maximum of 12 persons, view east.

precision GPS receiver (accuracy <1 cm) at Datum 1 (N4358487.00 E285781.00; assumed elevation –100 m) permitted adoption of UTM coordinates (WGS84) for all site mapping (Figure 15). All shots within the block and feature excavations were made from Datum 5, one of six established at the site. Each was marked with a brass plate set in concrete for future reference.

Block

The KATP field school targeted an area at Mound B that eventually consisted of 16, 2 by 2-m units that totaled 64 m^2. These formed a trench through the cultural horizon of the mound, 4 m north-south (with one unit that extended northward another 2 m) by 18 m east-west and 35–62 cm deep (mean unit depth = 45.6 cm). Figure 16 shows its final configuration and unit depths. The goal of the block excavation was to expose an area across the mound of sufficient area and depth to determine if it contained evidence of a house, activity areas, middens, or a palimpsest of these. Unit size was determined by personnel logistics, specifically the need to accommodate crews of three or more people for each under the supervision of the most experienced project registrants.

Units were dug in 10-cm levels, though a few units were terminated at shallower depths due to time constraints or paucity of cultural material. Artifacts ≥5 cm in any dimension were plotted in three dimensions with a total station for more precise vertical control (Figure 17). That method resulted in 228 plotted items in the block: 23 rim sherds, 130 body sherds, 18 chipped stone tools, 3 flakes, 3 cores, 2 pieces of unmodified chert, 11 ground stone tools, 1 piece of fire-cracked rock, 2 pieces of burned earth, 8 pieces of ferric oxide, a charcoal sample, a cluster of aluminum, flakes and burned rock, and 25 fragments of bone and mussel shell.

Given the site's proximity to a pond on COE property, permission was obtained from the COE to water screen block excavation fill at a station established there that had a maximum of 12 screens with $^1/_{16}$-inch (1.6-mm) mesh hardware cloth. Water was drawn by two five-horsepower transfer pumps through hoses with spray nozzles (Figure 18). As the effort to reach the greatest possible depth in the block excavation increased, the number of

people at the station was eventually reduced to six. Water screening fill, primarily sod, from the first level (0–10 cm) proved too slow. Given its relative cultural sterility, based on all units dug in 1988 and during early work at the station, the decision quickly was made to dry screen fill from that level through ¼- inch (6.4-mm) mesh hardware cloth. Fill was collected in sandbags. By the end of fieldwork on June 15, a total of 1,350 of 3,084 bags had been processed. Screening of slightly less than 1,000 of the remaining 1,734 bags was done by volunteers at two KAA-sponsored events in Topeka. Water screening of the balance of about 750 bags required several day's work between March 21 and April 24, 2018, at the North Farm of Kansas State University by the author and anthropology student volunteers.

For maximum recovery of the smallest of cultural items, particularly plant remains, 10-liter flotation samples were taken from the southwestern corners of all block unit levels except the first by or under Powell's supervision. Sixty-three samples were gathered. All were processed with modified Shell Mound Archeological Project (SMAP) model devices on KSHS property by autumn 2017. Four non-standard volume samples, associated with two putative grinding slabs and two soil stains thought to be cultural features but subsequently canceled, also were collected.

Features

The two geophysical anomalies, identified by Maki as m1 and m2 (Figures 12 and 19), were explored. As stated in the Geophysical Survey section, the magnetic field gradient method detected the anomalies that were indicative of potential archeological features. Of the southern anomaly (m2), Maki said that its signal was "consistent with a fire-altered . . . [or] intensely fired feature." The northern anomaly (m3) he interpreted as possibly "a composite anomaly that is composed partially of signal from a buried archeological feature and partially from signal clutter caused by historic iron debris" (Table 1). In both cases the excavations revealed pits with massive concentrations of burned limestone that are inferred to have been roasting pits, described in detail in the Features section. Both were eventually found off center from the exploratory units. F362 (m2) was in the northeastern quadrant of N482 E774; F363 was just beyond the southeastern edge of N502 E794 and only exposed within N501.5 E796. Both exploratory units were dug in 10-cm levels, all fill was dry-screened through ¼-inch mesh hardware cloth, and no flotation samples were taken. Once the features were defined, all fill associated with them was collected for flotation. All stones associated with them were weighed, and those not retained for lipid analysis were discarded in the field.

Lab

At the field lab KATP participants sorted cultural material from water-screened samples. General classes recognized at that time and during subsequent lab sessions are given in Table 2. Despite many hours devoted by KAA volunteers and KSHS staff to sorting, most non-flotation samples had not been completed after those events. All material recovered during the KATP field school was transported to the KSU Archaeology Lab where most of the water-screened material was sorted. Some

Table 2. Artifact Classes and Codes Used by 2017 KATP Field School Lab.

Code	Definition
BAT	Batter stone; hammerstone
BDE	Burned earth; daub
CER	Ceramic objects (prehistoric)
CMB	Culturally modified bone
CMR	Culturally modified rock
CMS	Culturally modified shell
CST	Chipped stone tool
CTR	Culturally transported rock
DEB	Debitage
FAU	Faunal remains
FLO	Floral remains
GST	Ground stone tool
HIS	Historic period artifact
HUM	Human remains
NMR	Non-modified rock
OTH	Anything identifiable but not described elsewhere on list
PIG	Pigments
SAM	^{14}C; soil; charcoal; ash; comparative materials, samples
UNK	Unknown

sorting was done by students enrolled in the 2017 fall semester class, Archaeological Lab Methods (Anth 562), under the author's supervision. Catalog numbers were assigned to all water-screened and piece-plotted material, labels completed for individual or lotted items, and all material bagged in 4-mil zip-lock bags for curation. The author supervised volunteer KSU student Kyler Reith in determining the mass of each grade for the geoarchaeological interpretation presented in the Block Excavation section.

Eventually, all unit level and feature samples were sorted according to a hierarchy of classes followed at KSU (Table 3) and cataloged 14JF420-0001 et seq., a system established after consultation with Dr. Mary J. Adair, Curator, Archaeology Research Center, Biodiversity Institute, University of Kansas, where all project collections are curated. Some material classes assigned by KATP lab workers were not retained because they were quickly recognized as non-cultural (e.g., pigment, applied to ubiquitous unmodified pieces of ferric oxide, a glacially derived material, redeposited from till that caps the terrain southwest of the site; all non-modified rock/colluvial pebbles that remained after excavators had weighed and discarded larger pieces on site). Others are semantic substitutions to conform with codes long used at KSU (e.g., CSD [chipped stone debris] for DEB [debitage], bone for FAU [fauna], vegetal for FLO [flora]).

At KSU all water-screen residue was sorted through nested geological sieves of .131-inch (.33-cm) and .065-inch (.17 cm) mesh. Without regard to time, larger grades were sorted; base pan matter (<.065-inch) was not inspected. It is stated with confidence that artifact recovery from the .131-inch grade was total. As for the smaller grade, inspected under lighted magnification, a small amount of material of inconsequential mass and number may have been overlooked. Cultural material from both grades was combined, placed in lots, and cataloged according to the object classes in Table 3. Piece-plotted items, chipped stone tools, cores, tested pieces, and most rim sherds were cataloged individually. Rim and body sherds, chipped stone tools, chipped stone debris, cores, tested pieces, daub, and historic artifacts were counted and weighed. Aside from pottery, other material was naturally or culturally (i.e., by burning) generated, not purposefully

Table 3. Final Artifact Classes Used by KSU.

Material	Object	Comment
Ceramic	Rim sherd (lip must be present)	e.g., Decorative treatment
	Body sherd	
Lithic	Chipped stone tool (CST)	Dart point
		Arrow point (complete, base, tip, midsection)
		Drill (complete, base, tip, etc.)
		Biface
		Biface fragment (base, tip, etc.)
		Scraper
		Retouched/utilized flake or blade
	Chipped stone debris (CSD)	
	Core	
	Tested piece (chert)	
	Ground stone	Axe, celt, hammerstone, mano, metate/grinding slab, etc.
	Sandstone abrader	
	Fire-cracked rock (FCR)	
	Ferric oxide (modified)	
	Limestone	
	Burned limestone	
Faunal	Unburned bone	
	Burned bone	
Vegetal	Charcoal/burned seeds	
	Burned wood	
Sediment	Burned earth	
	Daub (grass-impressed BE)	
Historic	Aluminum	
	Buckshot	
	Glass	
	Metal	
	Plastic	
	Screw	
	Shotgun shell	
	Slag	
	Square nail	
	Wire	
	Wire nail	

produced. Thus, counts would not be as informative as mass.

Flotation fractions, both light and heavy, were sorted by KAA members with participation and supervision of KSHS archeologists at the KSHS Archeology Lab. Light fractions from the block excavation samples and both pit features were inspected by Powell (see Macrobotanical Analysis section).

BLOCK EXCAVATION

Goals, Strategy, and Constraints

The KATP field school focused on the block excavation of Mound B, assuming that it held the greatest prospect of undisturbed features, such as post molds found at other Late Woodland sites in the Valley Falls reach. The decision also was guided by the findings of TU2 in 1988 and of the geophysical survey (Maki herein).

No evidence of lodges, either post molds or daub, was found. While this goal was not achieved, the alternative hypotheses, that excavation might uncover a midden or discernible activity areas, met with more success. Documentation of the ~40–50-cm thick cultural horizon, systematic piece plotting of artifacts, fine-grained data recovery through water screening, and radiocarbon dating of different levels support the inference that the deposit developed within a relatively brief period. It likely resulted from the following processes: 1) the discard of debris, particularly hearth-related material (i.e., burned limestone, fire-cracked rock, burned earth, and charcoal), as well as damaged or broken stone tools and pottery, that formed a midden, 2) a palimpsest of debris from in situ camp activities, or 3) a combination of both processes over several years or seasons that entailed the discard of trash and dismantling or scattering of once-intact extramural hearths (assuming that house remains exist elsewhere at the site) and associated activity areas in the block area. Validation of these alternatives requires more extensive excavation at Mound B and certainly at Mound A, where different processes may have occurred, in order to determine if cultural debris in the block area had been associated with lodge occupation. Following presentation of radiocarbon dates is an analysis of the spatial distribution of various artifact types to discern how the cultural horizon developed and what site activities the objects reflect.

Prior to that discussion, however, it is acknowledged that the potential for house remains in the block area cannot be ruled out. Recognition of post molds at sites in the lower Missouri River valley generally requires a contrast between the yellowish-brown B horizon and the organically enriched A horizon or transition AB horizon that developed above it, soil from which filled cavities made in the former for posts that burned or decayed. The interface between those horizons at the Quixote site, based on cores taken at the base of terminated units, was generally at 60–70 cm. Excavations in 1988 encountered a transitional 2AB horizon at ~50 cm where most 2017 block units were terminated (Fosha et al. 1990:137–138). The color contrast at that depth was not ideal for post mold detection. A few examples found during the KATP field school invariably proved to be krotovinas (filled rodent burrows). Only two units in the block were dug below 50 cm, and their field forms remarked only slight color change. Similarly, while excavators noted increasing clay in the lowest level of those terminated at 50 cm, little color change was perceived.

A fair amount of cultural material was recovered from the lowest level (50–62 cm) of N490 E778. The Oakfield core extracted from its base revealed the B horizon 18 cm lower, indicating the well-developed A-AB soil horizons and the benefit to archeology of no agricultural disturbance. However, the 50-cm base of units in the eastern half of the block contained flecks of charcoal, burned earth, and protruding stones attesting deeper occupation. The excavators of N488 E788 recognized a transition in color to B horizon soil at its base of 55 cm, where they found in horizontal position the largest rim sherd of the project, mapped deeper limestone and fire-cracked rock, and recorded “charcoal still abundant.” Yet here, too, the core from that depth showed a sharper contrast in color and texture at 77 cm (i.e., 22 cm below the unit floor). Thus, the possibility that the lowest part of the cultural horizon in the block area holds evidence of a lodge cannot be negated. Had more time been available during the KATP field school, that hypothesis might have been refuted. Excavation of TU2 at Mound B in 1988

suggested that the base of the cultural horizon was likely 60–65 cm, a target attained by only one of the block units. In addition to a more thorough search for house remains, had time permitted excavation to sterile soil, the nature of the cultural horizon in that area could be described with confidence. To facilitate future investigation and such a search, the base of the block excavation was covered with geo-cloth to mark the extent of the work on the final day of the project.

Chronology

Four samples (1–2 g) of burned hazelnuts were submitted to DirectAMS Radiocarbon Dating Service (D-AMS) for radiocarbon analyses (Table 4). To test whether the cultural horizon developed during different occupation periods, these came from different levels of two units in different areas with at least one level between them to limit the chance of cross-level contamination. While natural disturbance still might result in mixing across levels, this would reduce that chance. D-AMS 029295 was from 30–40 cm, and D-AMS 029296 was from 50–55 cm of N488 E788. The assays were statistically similar (t = .09 χ^2 = 3.84), and combined they yield a calibrated, two sigma range of A.D. 867–993. Averaging is justified, and calibration of that age (A.D. 1114±18) gave a narrower range of A.D. 892–980, attesting formation of the lower half of the horizon in the eastern area during the tenth century A.D. The assays from N488 E784 are problematic. D-AMS 033264 from 10–20 cm is of historic age and irrelevant to the Late Woodland component. It attests natural burning of nuts well after prehistoric occupation and prior to recent agricultural use of the site. However, D-AMS 033265 is of Late Woodland vintage. While close to both assays from N488 E788, statistical testing shows they are different (t = 7.9 χ^2 = 5.99). The difference may reflect later activity in the western part of the block, though that seems unlikely given the short distance between the units and similar sample depths from each. If two sigma ranges for all three dates are applied to compensate for the precision of AMS assays, they are similar (t = 1.97 χ^2 = 5.99), and averaging yields a date of 1085±15. Calibration results in a range slightly younger than that of the averaged assays from the eastern unit: A.D. 937–1016 (68.6 percent probability). The three Late

Table 4. AMS Radiocarbon Dates from Block Excavation.

Provenience	D-AMS lab number	Mean	1 sigma	Calibrated 2 sigma range	Highest probability (%)
N488 E788 30–40 cm	029295	1109	24	**A.D. 889–988**	100.0
N488 E788 50–55 cm	029296	1120	28	A.D. 779–789 A.D. 830–837 **A.D. 867–993**	98.1
Average	029295–029296	1114	18	A.D. 892–980	100.0
N488 E780 10–20 cm	033264	265	26	A.D. 1521–1577 A.D. 1583–1591 **A.D. 1624–1668** A.D. 1782–1797	61.0
N488 E780 40–50 cm	033265	1025	26	A.D. 972–1037	100.0
Average*	029295 029296 033265	1085	15	A.D. 894–931 **A.D. 937–1016**	68.6

*2 sigma

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

Woodland dates indicate two aspects of Mound B occupation: 1) the cultural horizon developed over a relatively short period, and 2) that period was essentially the tenth century A.D., perhaps the waning years of Woodland adaptation in the region. The implications of this chronological placement, particularly with regard to radiocarbon dates from the features that spatially bracket the block excavation (see Features section), are discussed in the Conclusions section.

Spatial Aalysis

The interpretation of artifact distribution that follows is impressionistic and does not rely on statistical tests. Both approaches have been used elsewhere (Logan 2011:61–68; Logan and Hill 2000), but in this case visual and general numerical information are sufficient for reliable inferences. Piece-plotted artifacts are shown in Figures 19–29, and density distribution by counts or mass as appropriate are displayed in Figures 30–41. As noted in the Methods section, artifacts in general were scarce in the upper 10 cm of each unit, and only two exceptions were made to the protocol of not plotting artifacts there (Figure 22). All types of cultural material were meager in that level, attributable to only a minor extent to the different recovery methods applied (i.e., dry screening

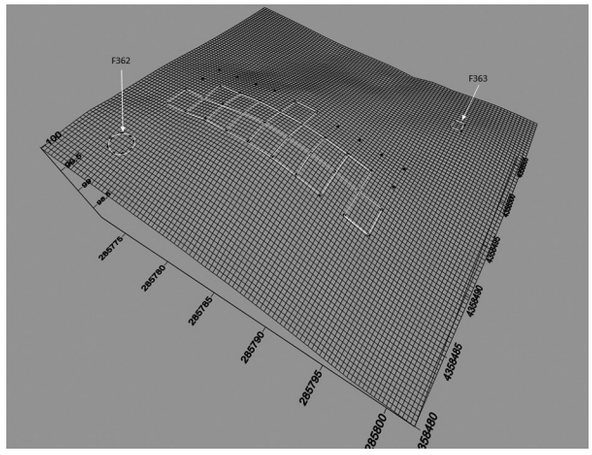


Figure 19. Wireframe topographic map of 14JF420, showing the relationship of F362 and F363 to the block excavation.

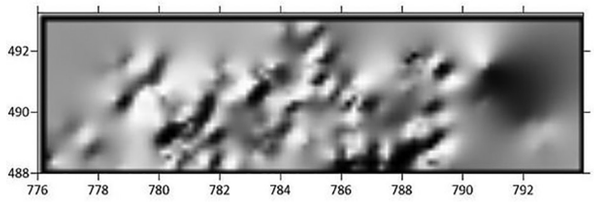


Figure 20. Shaded relief map of piece-plotted artifacts. Note the greater density of artifacts from E780 to E789.

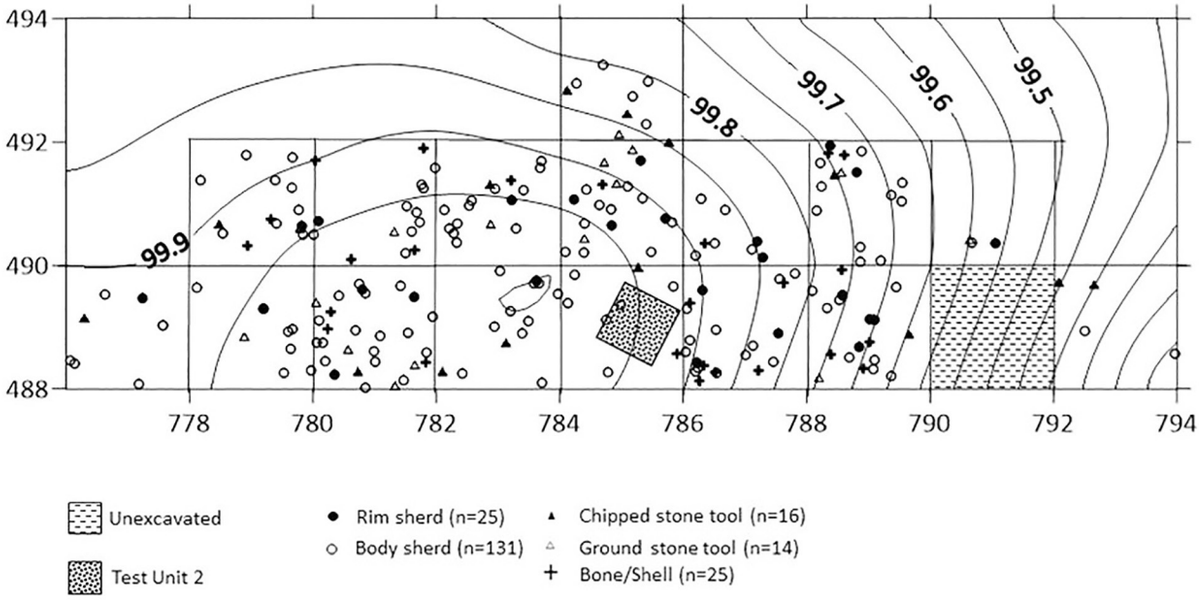


Figure 21. Distribution of piece-plotted artifacts in plan view (n = 211 plots or 88 percent of 240 recorded in block excavation).

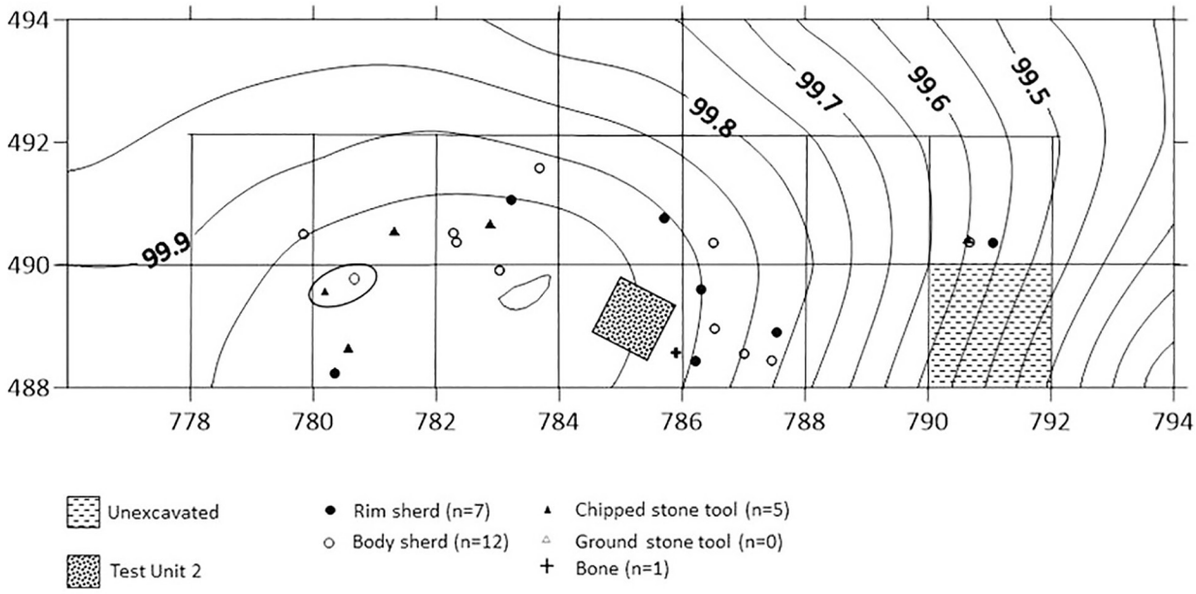


Figure 22. Distribution of piece-plotted artifacts, 0-20 cm (n = 25). The two items within the oval in N488 E780, a body sherd and an arrow point, were the only items mapped in the 0-10-cm level.

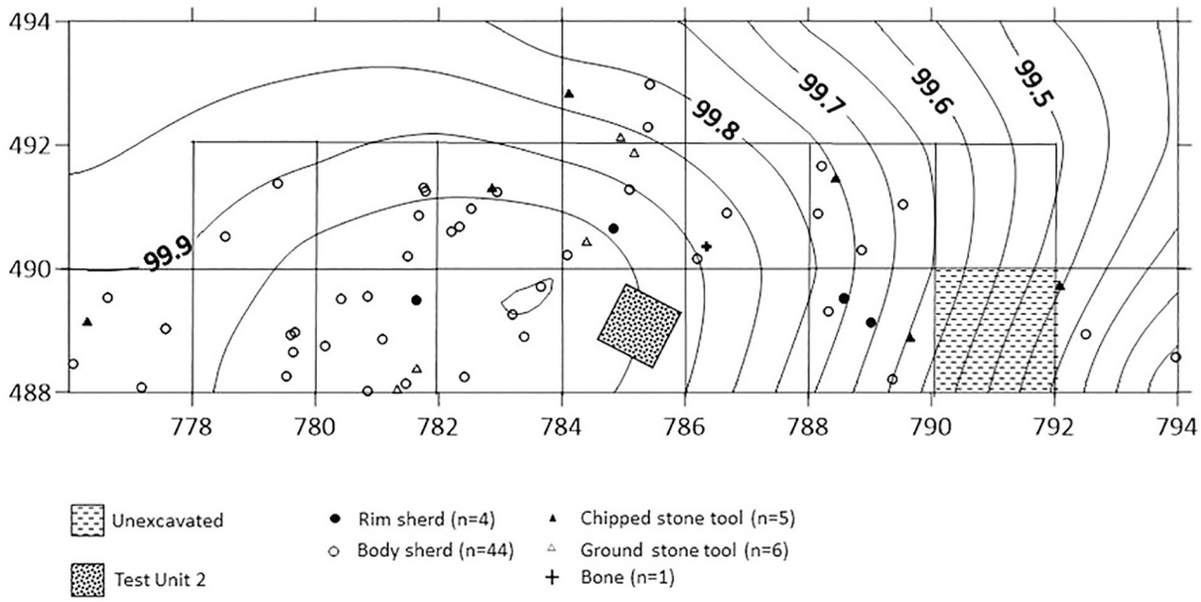


Figure 23. Distribution of piece-plotted artifacts, 20-30 cm (n = 60).

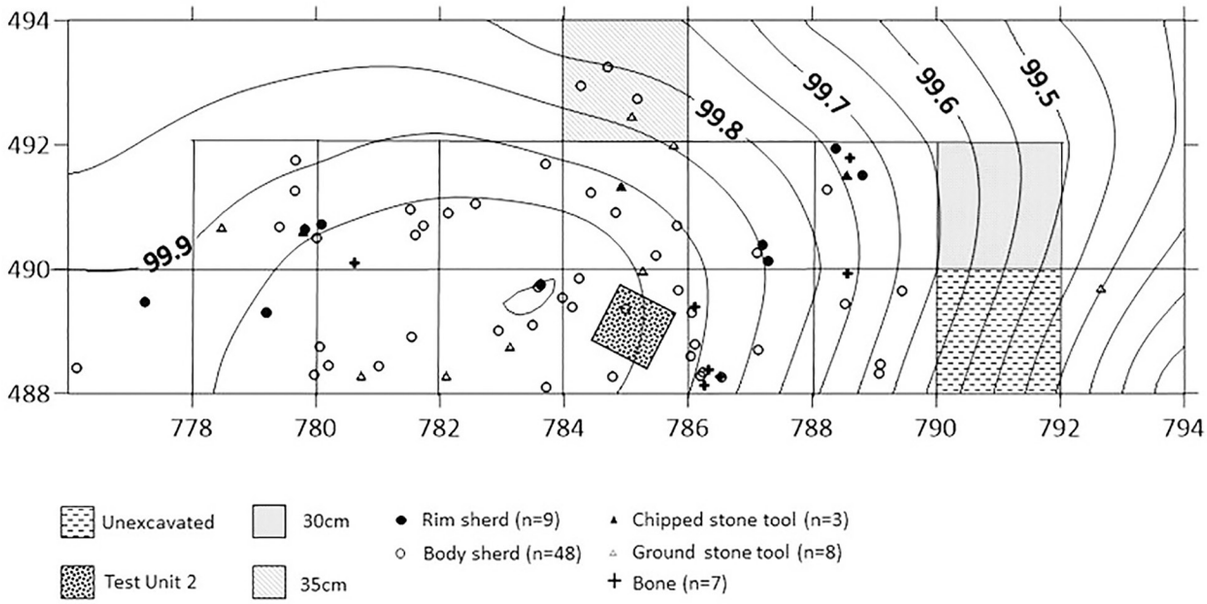


Figure 24. Distribution of piece-plotted artifacts, 30-40 cm (n = 75).

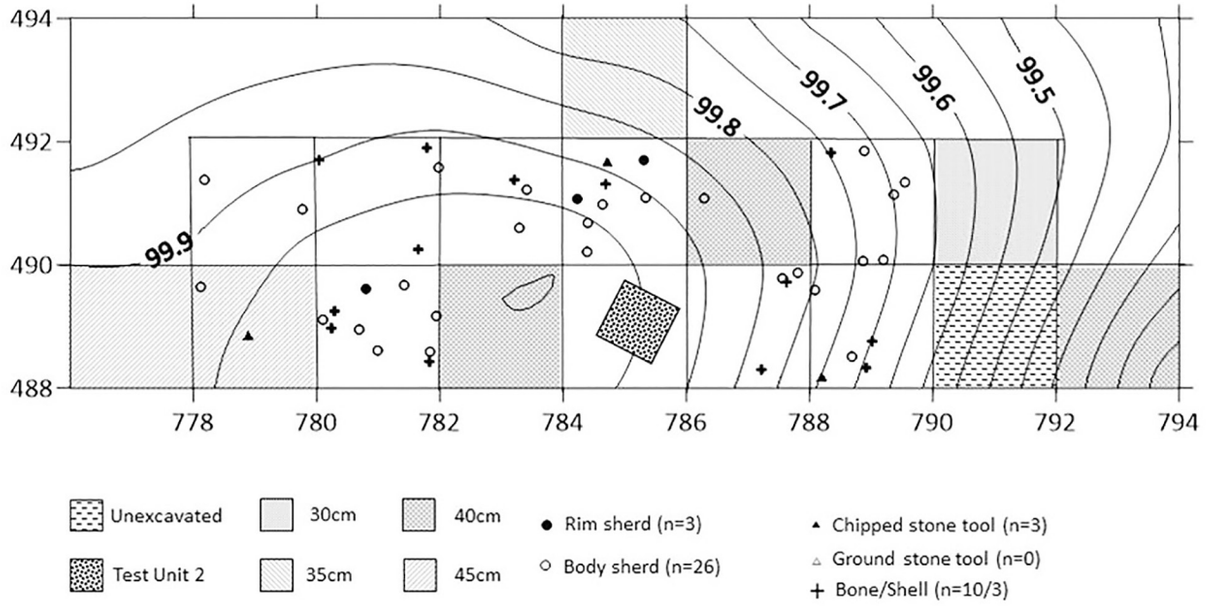


Figure 25. Distribution of piece-plotted artifacts, 40-50 cm (n = 45).

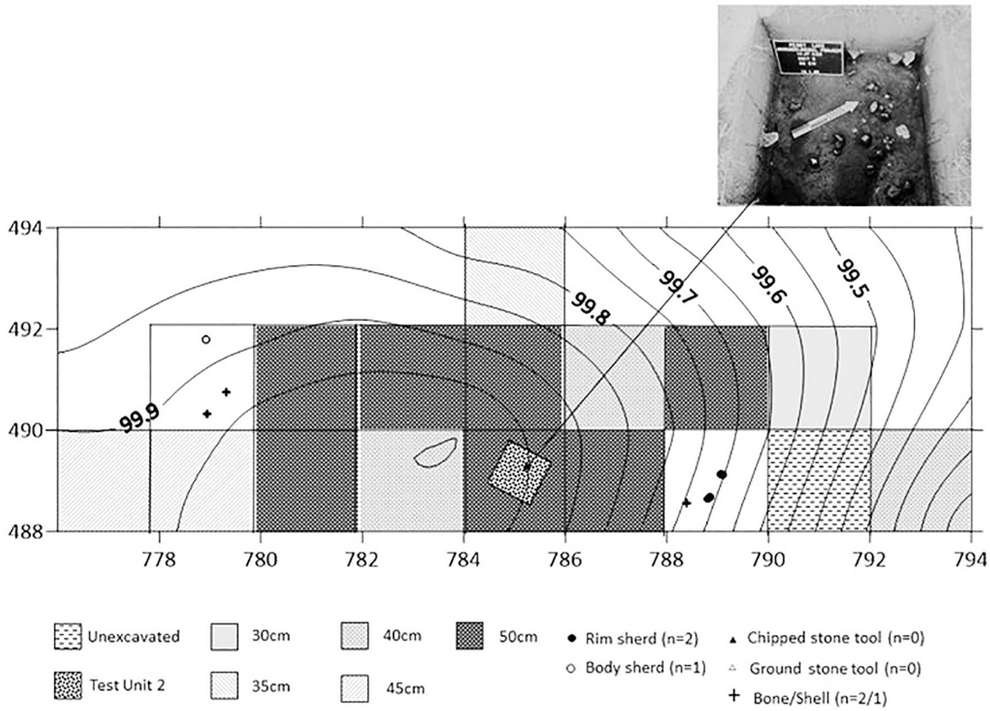


Figure 26. Distribution of piece-plotted artifacts, 50+ cm (n = 6). Inset photograph is TU2 from the 1988 excavation at 60 cm, showing depth of cultural horizon in this area.

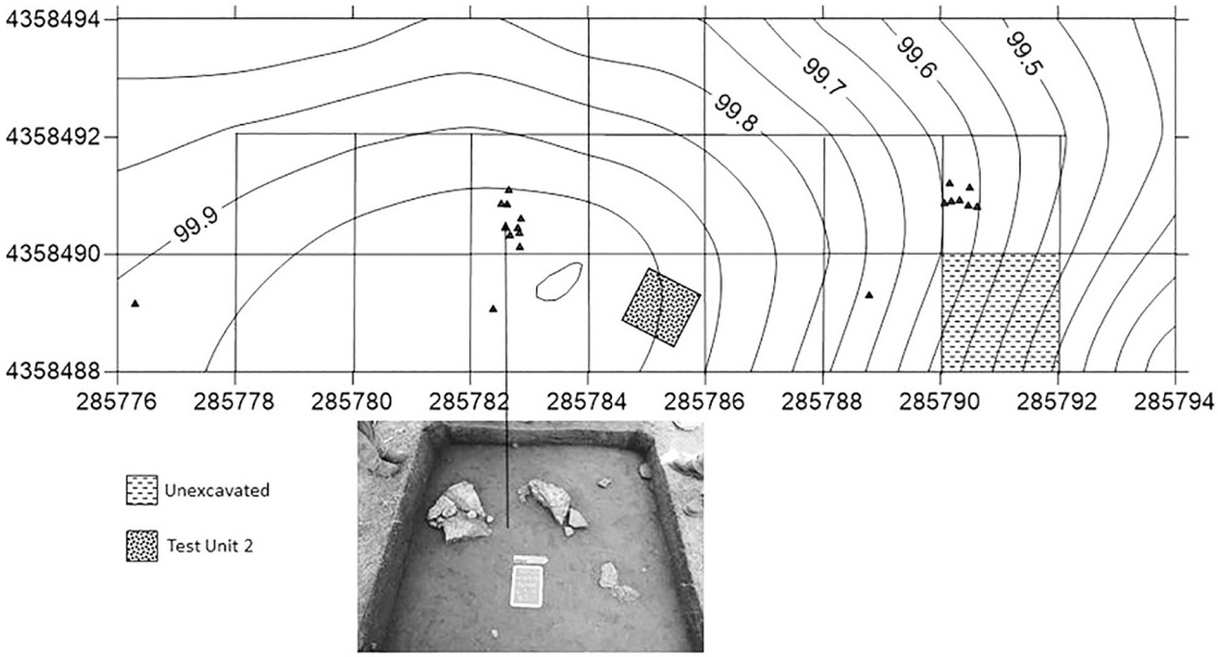


Figure 27. Distribution of piece-plotted stones in the block excavation, 20-30 cm. Stones greater than 10 cm along any dimension were plotted. Inset photograph shows stones exposed at this depth in N490 E782.

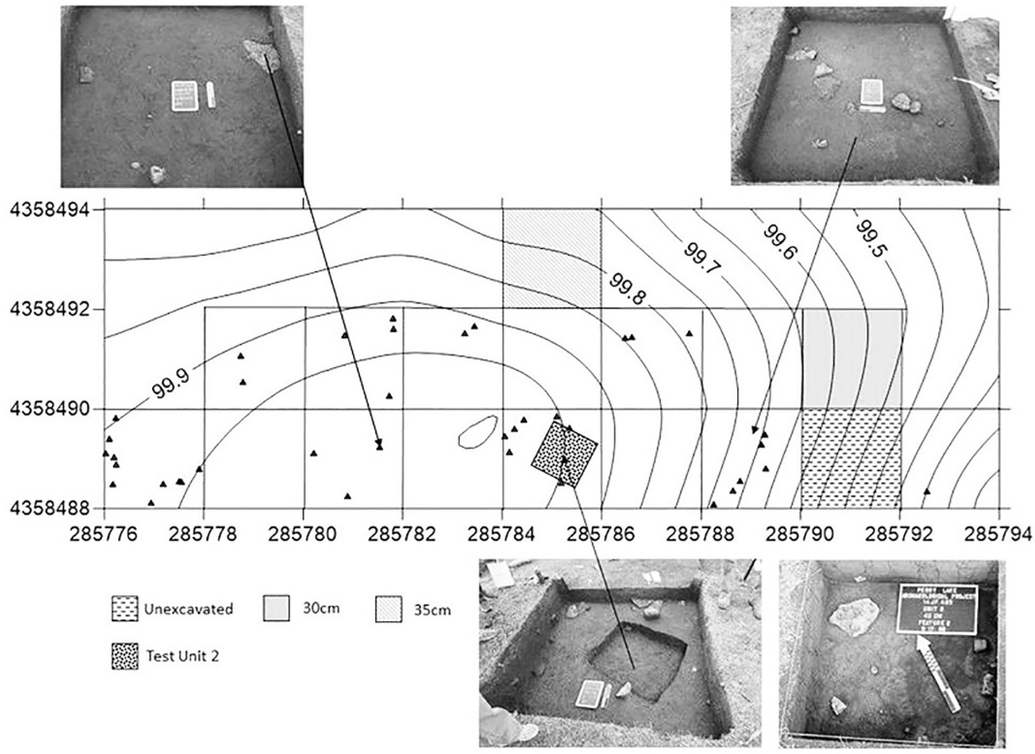


Figure 28. Distribution of piece-plotted stones in the block excavation, 30-40 cm. Inset photographs (below) show TU2 at 40 cm (right) and as identified in 2017 (left). Inset photographs (above) show stones exposed in 2017.

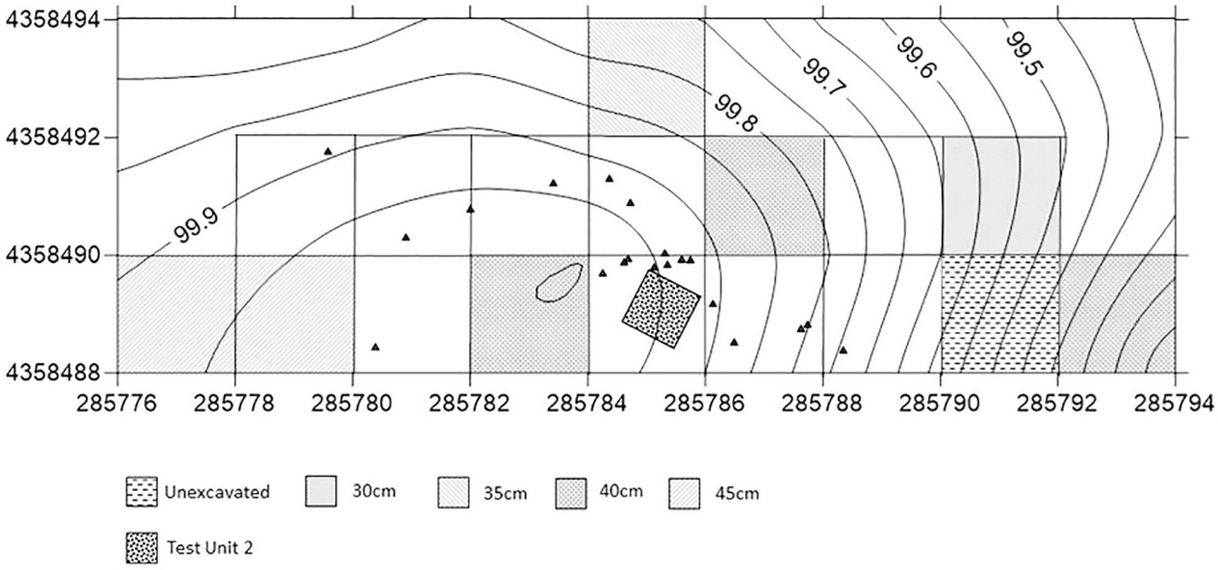
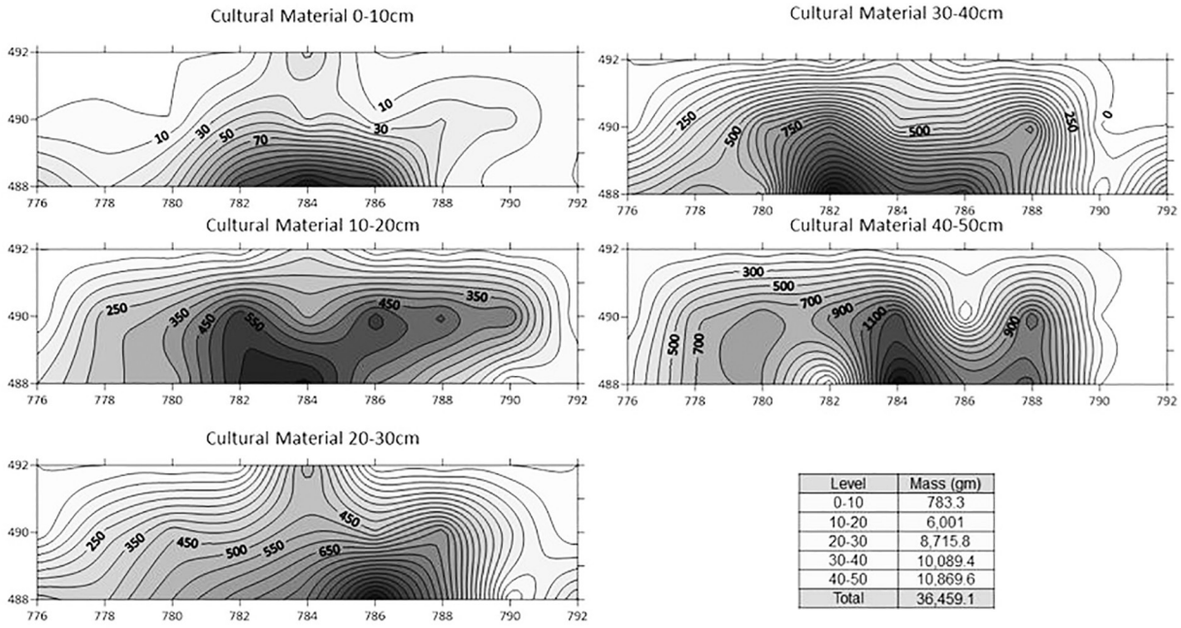
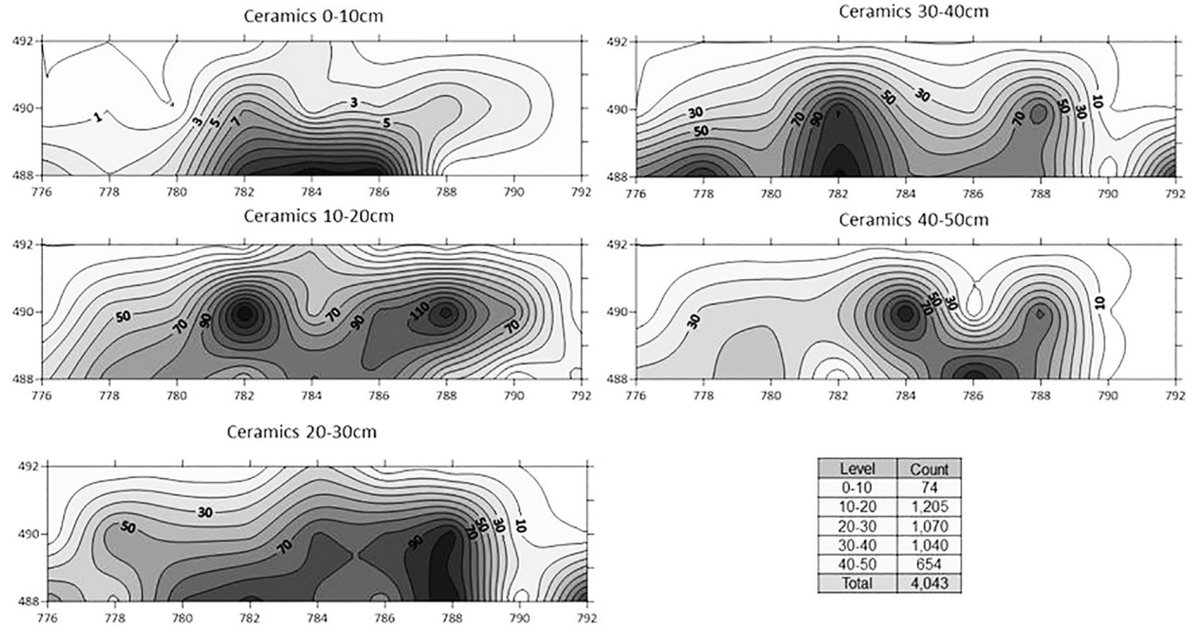


Figure 29. Distribution of plotted stones in the block excavation, 40-50 cm.



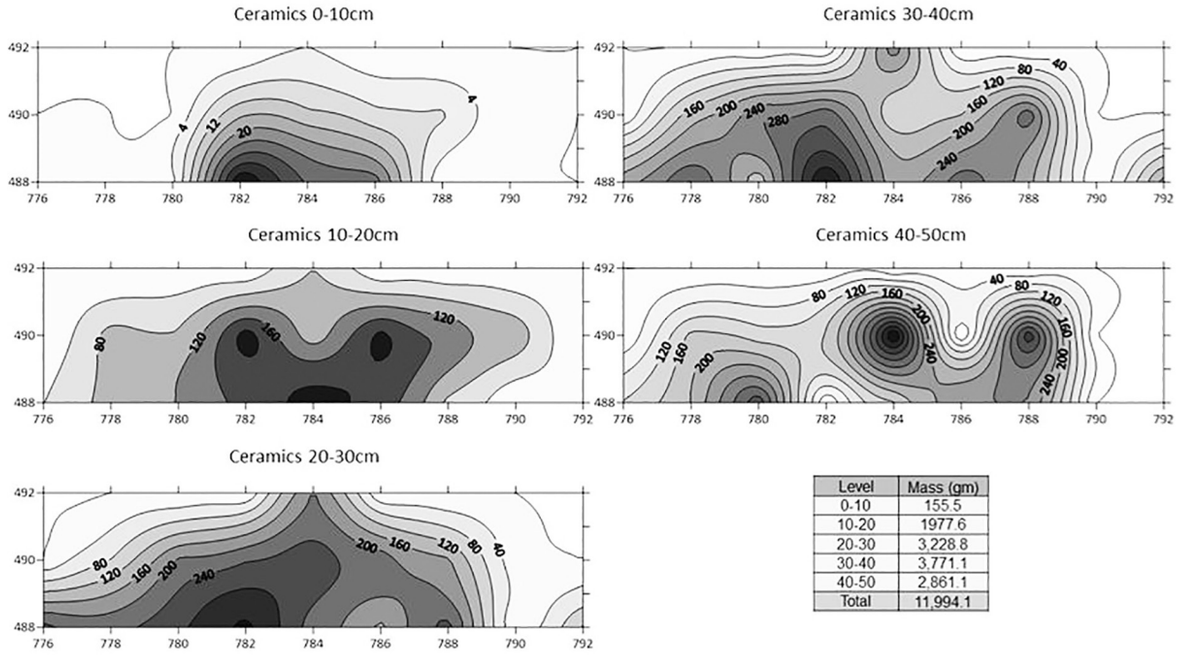
Level	Mass (gm)
0-10	783.3
10-20	6,001
20-30	8,715.8
30-40	10,089.4
40-50	10,869.6
Total	36,459.1

Figure 30. Distribution of cultural material by mass (g). Material includes chipped stone tools and cores, as well as artifact types in Figures 31-42, but excludes ground stone tools and manuported stones.



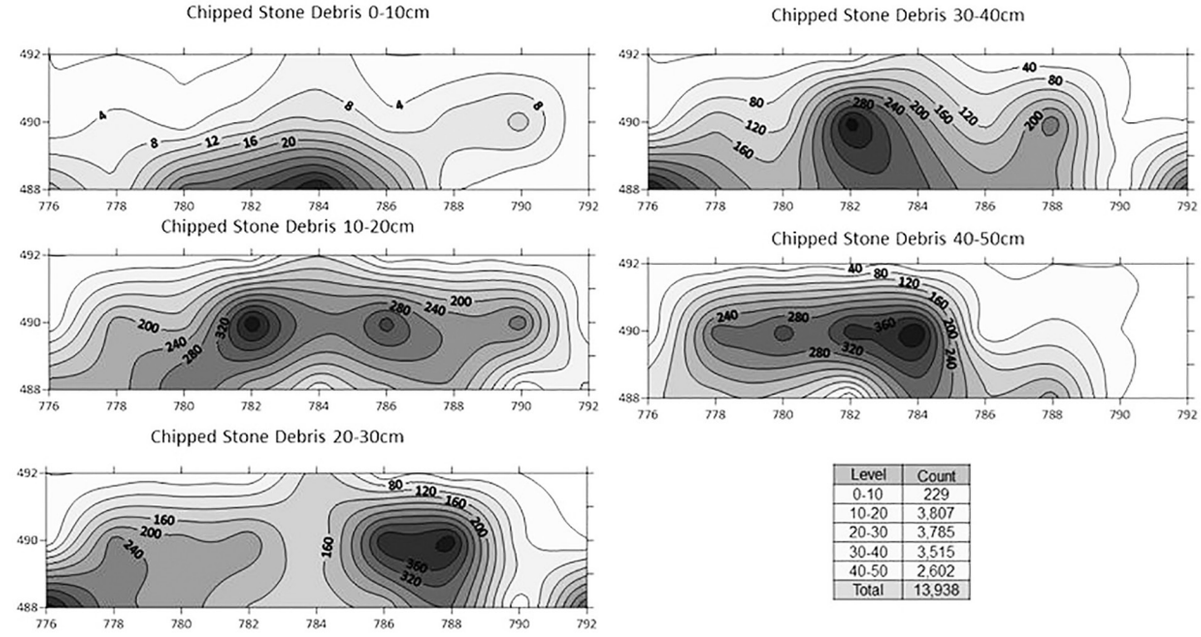
Level	Count
0-10	74
10-20	1,205
20-30	1,070
30-40	1,040
40-50	654
Total	4,043

Figure 31. Distribution of rim and body ceramic sherds by count. Note the concentration of this artifact type in two or three foci in the lower four levels of the block area.



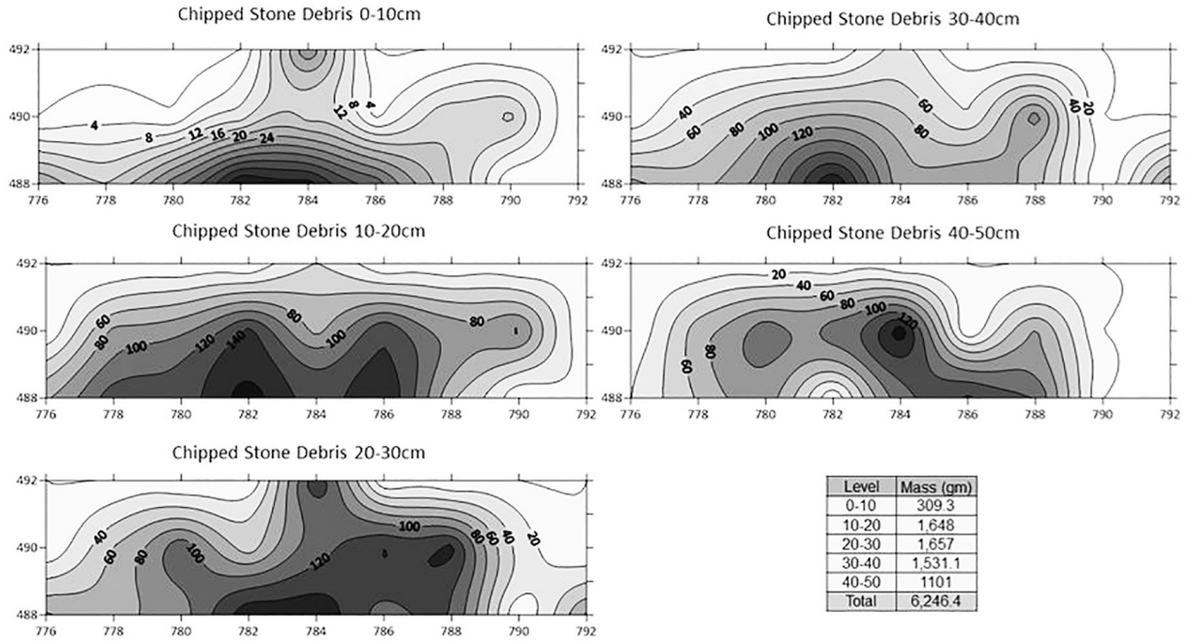
Level	Mass (gm)
0-10	155.5
10-20	1977.6
20-30	3,228.8
30-40	3,771.1
40-50	2,861.1
Total	11,994.1

Figure 32. Distribution of rim and body ceramic sherds by mass (g). Note how pottery approximates foci of concentration in Figure 31.



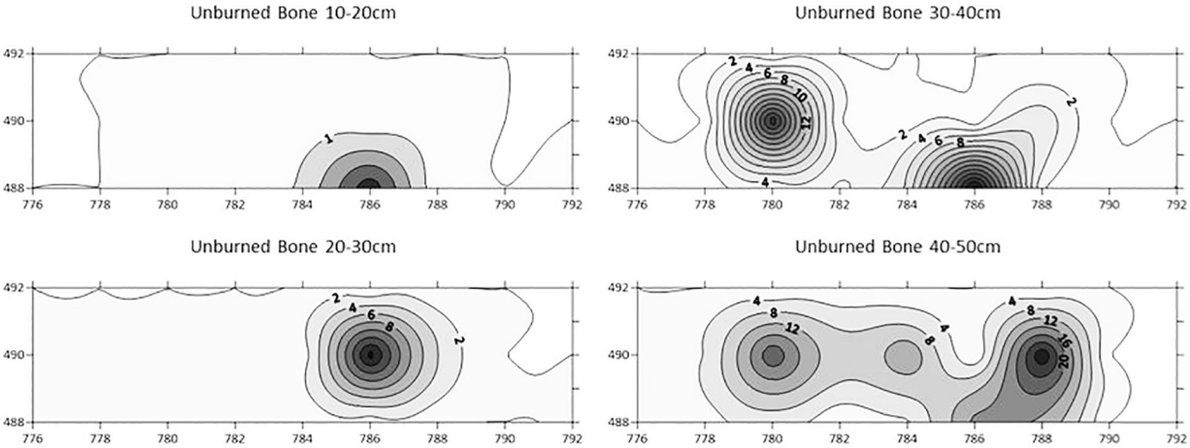
Level	Count
0-10	229
10-20	3,807
20-30	3,785
30-40	3,515
40-50	2,602
Total	13,938

Figure 33. Distribution of chipped stone debris by count. This artifact type is concentrated in areas comparable to pottery in Figures 31 and 32.



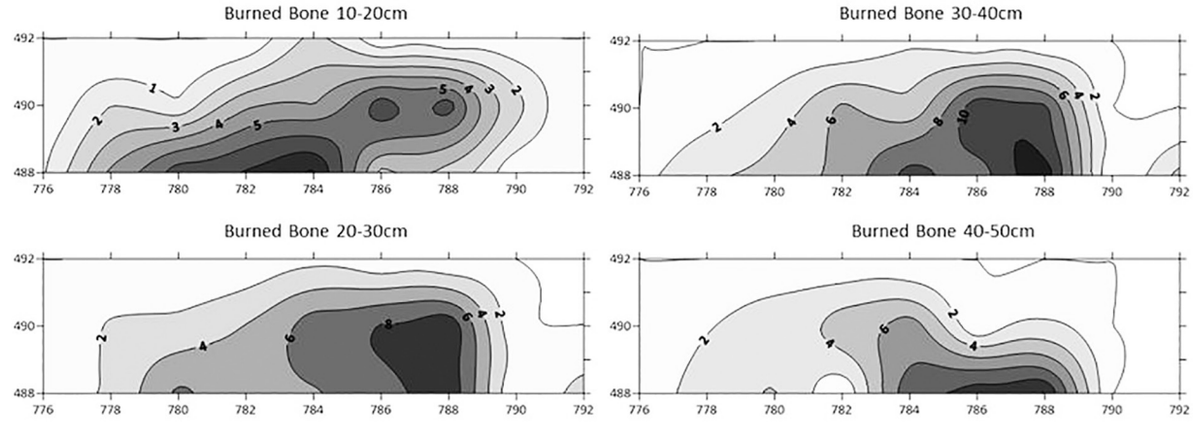
Level	Mass (gm)
0-10	309.3
10-20	1,648
20-30	1,657
30-40	1,531.1
40-50	1101
Total	6,246.4

Figure 34. Distribution of chipped stone debris by mass (g).



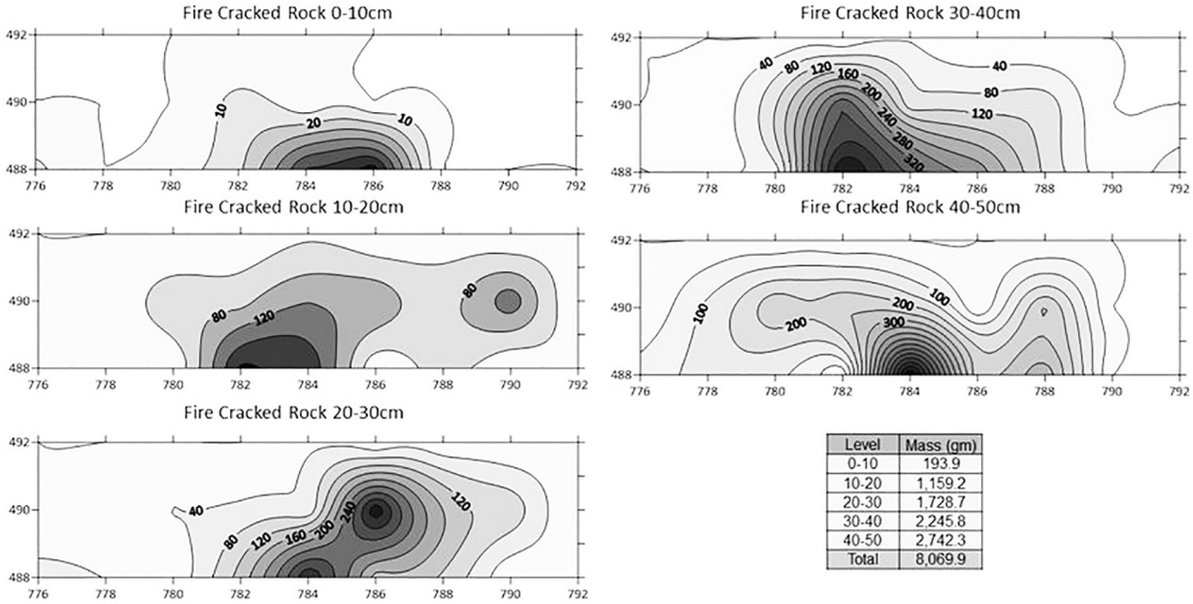
Level	Mass (gm)
0-10	0
10-20	8.2
20-30	24.8
30-40	81.6
40-50	128.6
Total	243.2

Figure 35. Distribution of unburned bone by mass (g). Though much more sparse than other material, unburned bone increased in mass with depth and, in the lower two levels shown here, appears in the same foci as pottery and chipped stone debris.



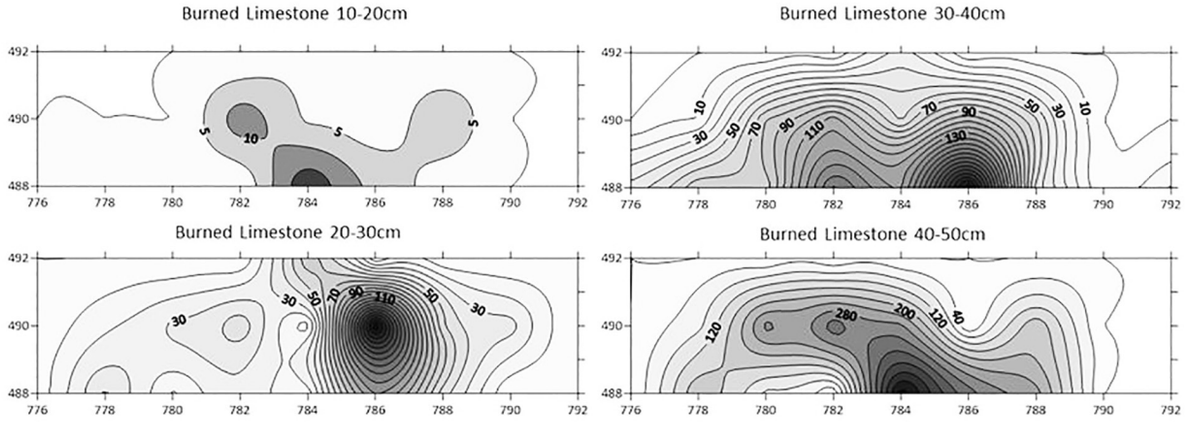
Level	Mass (gm)
0-10	0.1
10-20	61.2
20-30	79.8
30-40	123.4
40-50	60.7
Total	325.2

Figure 36. Distribution of burned bone by mass (g).



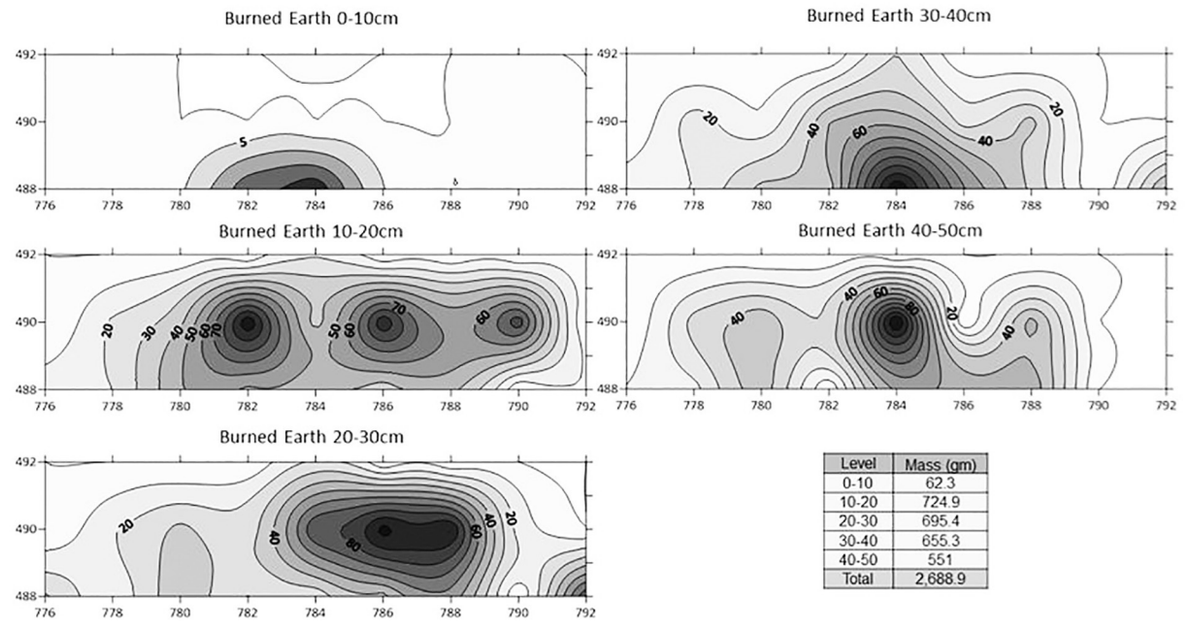
Level	Mass (gm)
0-10	193.9
10-20	1,159.2
20-30	1,728.7
30-40	2,245.8
40-50	2,742.3
Total	8,069.9

Figure 37. Distribution of fire-cracked rock by mass (g).



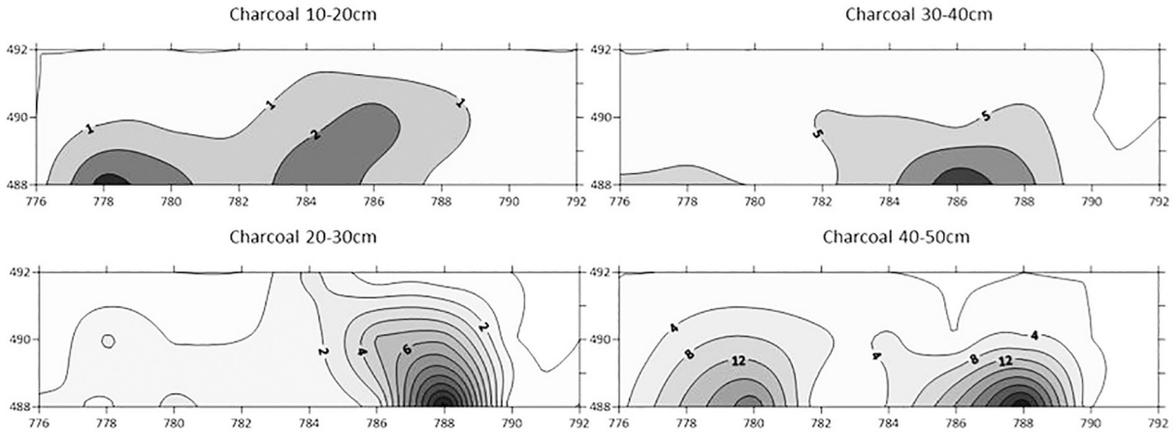
Level	Mass (gm)
0-10	1.8
10-20	67.6
20-30	714.3
30-40	1254.7
40-50	2594.9
Total	4,633.3

Figure 38. Distribution of burned limestone by mass (g).



Level	Mass (gm)
0-10	62.3
10-20	724.9
20-30	695.4
30-40	655.3
40-50	551
Total	2,688.9

Figure 39. Distribution of burned earth by mass (g).



Level	Mass (gm)
0-10	0.1
10-20	22.5
20-30	43
30-40	89.5
40-50	124.7
Total	279.8

Figure 40. Distribution of charcoal and burned seeds by mass (g).

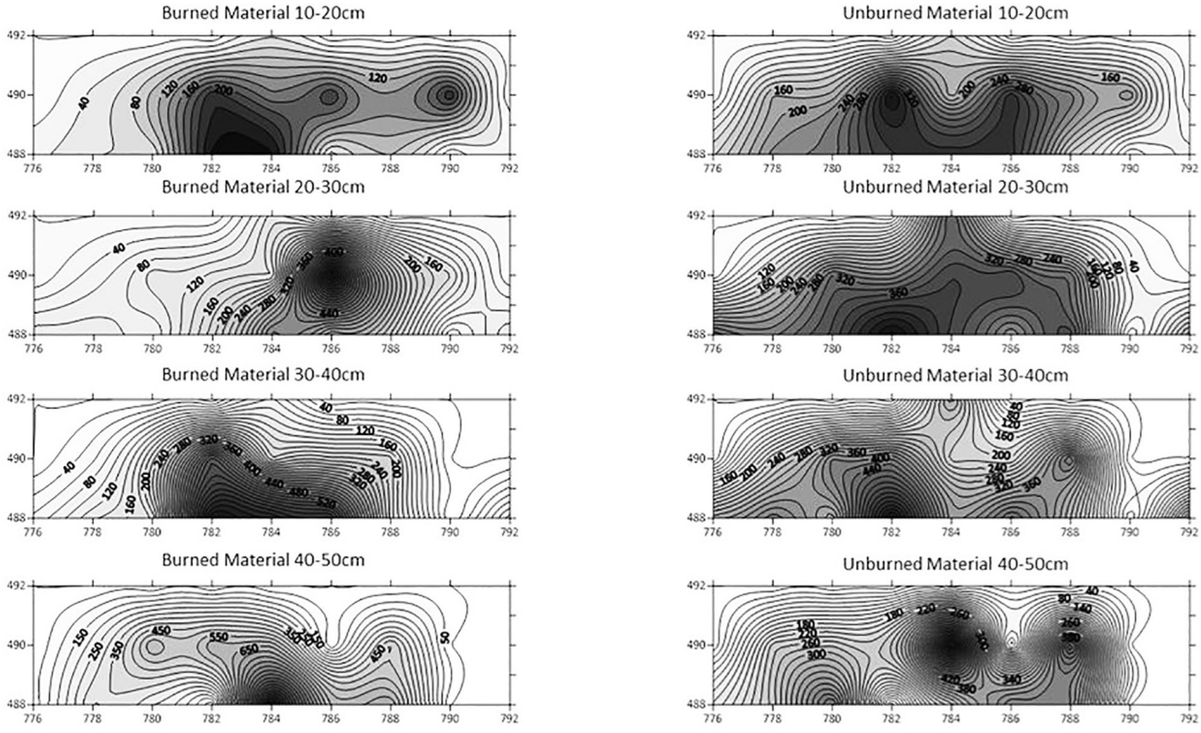


Figure 41. Distribution of burned and unburned material by mass (g). Chipped stone tools are included, though in no case do contour patterns change when they are omitted.

through ¼-inch mesh rather than water screening through 1/16-inch mesh). The paucity is consistent with the findings of the 1988 NRHP project, where geomorphological inspection of TU1 at Mound A, comparable to both other test units, identified an A1 soil at 0–8 cm that had "developed in response to post-occupational pedogenesis, but the A2 reflects . . . anthropomorphic influence" (Fosha et al. 1990:137; compare Logan and Fosha 1991).

Piece plots as a whole appear in shaded relief and plan view in Figures 19–21. Both depict artifact concentrations in the central portion of the block, the last with topographic contours demonstrating that the density corresponds to the highest part of the excavated area. The relative paucity of piece plots at the western, eastern, and northern edges of the block cannot be credited entirely to shallower excavations there. Indeed, those units were terminated because artifact density declined noticeably with depth. For example, no piece plots were made in the upper 20 cm of N492 E784 (Figure 23), only four in 20–30 cm (Figure 24), and four in 30–35 cm, where excavation ceased (Figure 25). Similarly, only one object was plotted in 30–40 cm of N488 E776, the westernmost unit, and none was plotted in the final level (40–45 cm); in the easternmost unit (N488 E792) only a single item was mapped (Figure 25). The number of piece plots increased at 30–40 and 40–50 cm in units N488 and N490 from E780 to E786. Undoubtedly, Figure 26 would show a number of piece plots in N488 E782, comparable to that in N488 E780, had the former been excavated below 40 cm. When the density of all cultural material types is considered with respect to the total mass in each level, concentration in the central portion of the block, that is, on the highest ground, is consistent (Figure 27). The density is greater along the N488 line of units than those along the N490 line nearer the northern edge of the mound. Clearly, any future investigation should be done southward of the block and within a narrower east-west range: E778 to E790.

As cited above, geomorphological interpretation in 1988 attributed development of the 2A horizon in TU1 at Mound A to anthropogenic input, which also occurred at Mound B that has similar stratigraphy. While overbank flow inundates lower ground to the north, the area south of Cedar Creek at 14JF420 was safe from floods. Therefore, there may not have been mounds to occupy during Late Woodland time, at least not as they appear today. More likely both were accretions, the result of trash accumulation combined with continual colluviation from higher ground to the west.

Formation of Mound B had both cultural and natural input; that is, the mound is not entirely anthropogenic. To support that inference it is necessary to demonstrate the process, in this case slope wash, that contributed natural material (e.g., till-derived sands, pebbles, and Fe2O3) and artifacts. As noted above, water-screened material was sifted through sieves of mesh sizes shown in Table 5, which presents the mass of natural material of each grade by unit level. The range of mean mass of each size grade/level is narrow—none exceeds .35 kg. Similarly, the combined means of residue sizes for all levels is narrow—from 2.48 kg (40–50 cm) to 3.37 kg (20–30 cm). Thus, there was little depositional variation across the block through the cultural horizon. However, as the following discussion reveals, the human contribution to mound formation did vary both horizontally and vertically. Slope wash might have resulted from reduction of vegetation and erosion of higher ground west of the site. The cause of ground cover loss is not known, but one could postulate that it resulted from the creation of trails or garden plots by site occupants.

One measure of variation in artifact density across the block is provided by piece-plots, which in this case serve as proxies for the density of smaller items in a cultural horizon. The relative frequency (count) of the piece plots follows roughly that of the mass of all cultural material through the levels (Table 6). This excludes the first level (0–10 cm) that consisted mostly of post-occupation soil, where plotting was not the protocol, and the last level of the two deepest units (recall that the 40–50-cm level of two units in the central part of the block were not dug). Thus, both the frequency by number of piece-plotted artifacts and that by mass of non-plotted artifacts in the lower two levels combined (30–50 cm) is greater than that of both in the upper two levels (10–30 cm).

A pattern in the block that differentiates the lower two levels from the upper two in Table 6 is the presence of large stones in the lower levels of most units (Figures 27–29). When these four levels are paired (10–20 with 20–30 cm and 30–40 with

Table 5. Mass and Mean (kg) of Non-Cultural Residue in Unit Levels after Water Screening and Sorting.

North	East	Depth	0.131 in	0.065 in	<0.065 in	North	East	Depth	0.131 in	0.065 in	<0.065 in
488	776	10–20	0.85	0.80	0.65	488	776	20–30	0.85	0.90	0.55
488	778	10–20	1.10	1.15	0.75	488	778	20–30	0.60	0.70	0.45
488	780	10–20	0.65	0.75	0.50	488	780	20–30	0.80	1.10	0.85
488	780	10–20	0.55	0.65	0.40	488	782	20–30	1.55	1.60	1.20
488	782	10–20	1.40	1.20	0.80	488	784	20–30	1.05	1.30	1.00
488	784	10–20	1.40	1.40	1.00	488	786	20–30	1.65	1.75	1.35
488	788	10–20	0.85	0.85	1.05	488	788	20–30	1.85	2.00	1.40
488	792	10–20	0.25	0.25	0.50	488	792	20–30	1.05	1.15	1.00
490	784	10–20	1.30	1.25	0.90	490	778	20–30	0.75	0.90	0.60
490	786	10–20	1.55	1.55	1.20	490	784	20–30	1.25	1.40	1.00
490	788	10–20	1.20	1.25	1.00	492	784	20–30	1.15	1.40	0.90
490	790	10–20	0.90	0.90	0.70			Mean	1.14	1.29	0.94
		Mean	1.00	1.00	0.79						

North	East	Depth	0.131 in	0.065 in	<0.065 in	North	East	Depth	0.131 in	0.065 in	<0.065 in
488	776	30–40	0.80	0.70	0.50	488	776	40–50	0.30	0.25	0.20
488	778	30–40	1.05	0.95	0.60	488	784	40–50	0.95	0.85	0.65
488	780	30–40	1.00	0.95	0.75	488	786	40–50	1.50	1.55	1.05
488	780	30–40	0.80	0.85	0.85	490	780	40–50	0.90	0.95	0.75
488	784	30–40	0.60	0.60	0.55			Mean	0.91	0.90	0.67
488	784	30–40	0.80	1.15	1.00						
488	786	30–40	1.65	1.75	1.40						
488	788	30–40	2.10	2.25	1.65						
488	792	30–40	1.30	1.40	0.95						
490	778	30–40	0.70	0.75	0.65						
490	784	30–40	1.00	0.80	0.80						
490	788	30–40	1.60	1.80	1.35						
		Mean	1.12	1.16	0.92						

Table 6. Frequencies of Piece-Plotted Artifacts and Cultural Material.

	10–20 cm (%)	20–30 cm (%)	30–40 cm (%)	40–50 cm (%)
Piece plots	11.8	28.4	35.5	21.3
All cultural material	16.8	24.4	28.3	

40–50 cm) and compared with regard to the frequencies of both kinds of data in Table 6, the contrast is heightened. Thus, the relative frequencies of piece plots in the upper and lower pairs are 40.2 percent and 56.8 percent, respectively, and those of all cultural material are 41.2 percent and 58.8 percent, respectively. This indicates more intense activity during the earlier time of occupation (for which radiocarbon dates exist) with regard to discard or abandonment of artifacts common throughout the cultural horizon and to the use of manuported stones that are distinctive of the lower levels. The purpose of the latter is not obvious. Only two larger sandstone slabs exhibit evidence of grinding; all other mapped rocks are limestone or quartzite, larger examples of which were not burned. Not all mapped stones (Figures 27–29), were associated with hearths. They may have served as weights to hold something in place or have been collected for, but not used in, features like the roasting pits

described in the Features section. Thus, they are distinguished here from those sorted in the lab that were clearly burned or fire cracked and assumed to have been part of fireplaces (Figures 37–39).

Artifacts whose distributions are displayed in Figures 31–40 can be divided into two categories: unburned material (ceramic sherds, chipped stone debris/tools, unburned bone) and burned material or hearth-related debris (burned limestone, fire-cracked rock, burned bone, burned earth, and charcoal). In Figure 41 the distribution by mass and level of all burned material is shown with that of all unburned material. Figure 42 is the same map but with high density nodes that are suggested to indicate hearths and related activity areas. The spatial nature of these various distributions is discussed first by artifact type and then by burned/unburned categories.

In most levels pottery by count and mass is concentrated in two or three areas, centered approximately at N488/490 E782 and N488/490 E788 (Figures 31–32). It is not apparent whether the sherds reflect accumulation and abandonment after vessel use and breakage there or preferred zones of disposal from other activity areas.

Interestingly, and perhaps supporting the former inference, chipped stone debris by count and mass are concentrated in the same general areas (Figures 33–34). In this case the foci show little change, shifting slightly westward in 40–50 cm to 784E, which in upper levels marked an area of lower density. The vast majority of debitage is quite small (mean mass = .45 g), indicative of secondary, or more often tertiary, reduction, retouching, and resharpening, though the block area contained six hammerstones, generally associated with primary flake removal. Notably, five hammerstones were in the 30–40-cm level, and the sixth was in the 40–50 cm. Debris of that size is often overlooked during cleanup by site occupants, exemplifying what us called the McKellar Principle (Logan 2010; Logan and Hill 2000), which suggests that much of it came to rest where it was produced, contradicting the proposition that the block area developed as a midden. While flintknappers might have worked on hides or some other material that caught debitage and allowed it to be carried to a trash area for disposal, the clustering of both pottery and lithic debris at the same general areas in these levels more likely represents a cumulative palimpsest of material from continued flintknapping and food

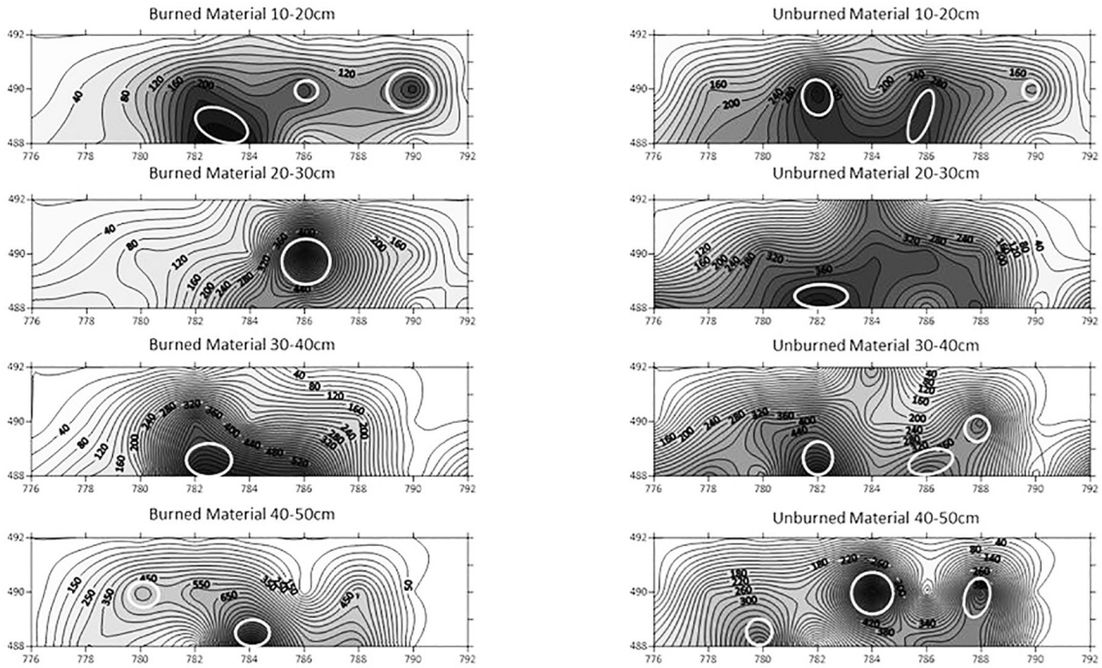


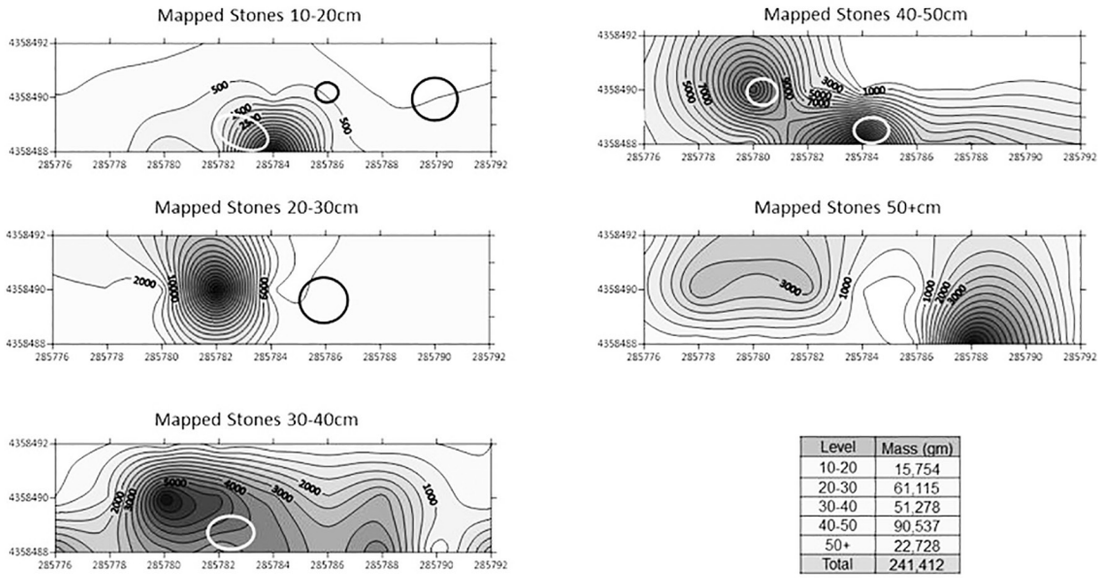
Figure 42. Distribution of unburned and burned material with density nodes suggested to indicate hearths (left) and related activity areas (right).

preparation near hearths with periodic dismantling, shifting of campfires, or treading that dislocated debris within relatively restricted areas. This also could account for chipped stone tools, including arrow points, being mostly broken or damaged, attesting discard during retooling events. Bailey (2007:204) described such an archeological formation (among a variety of types with regard to natures of formation and scale) as one "in which the successive episodes of deposition, or layers of activity, remain superimposed one upon the other without loss of evidence, but are so re-worked and mixed together that it is difficult or impossible to separate them out into their original constituents." While difficult at Mound B at the Quixote site, some activity areas can be recognized within the cultural horizon as discussed below.

Unburned bone tracks the two-foci pattern as well but only in the lower half of the excavated portion of the cultural horizon (Figure 35). In the upper two levels (10–20 cm and 20–30 cm) this material is concentrated at N488–490 E786. Given the paucity of unmodified bone with a total of 243.2 g through these levels, perhaps it should not be given much weight (pun intended). However, it is notable that the contrast in the relative mass of such bone in the hypothetically paired levels is consistent with the difference in relative mass of other artifact types.

The distribution of material directly related to fire places is concentrated in slightly different areas than pottery, chipped stone debris/tools, and unburned bone, particularly in the lower three levels (20–50 cm) (Figure 41). While fire-cracked rock and burned limestone cluster in both upper and lower level pairs, in all cases there is clearly a dominant area around N488–490 E784–786, near but not at the foci of other artifact types. This is most evident in 20–30 cm and 40–50 cm (Figure 41). Figure 42 shows density nodes that are inferred to be hearths and associated activity areas. Figure 43 depicts the highest density areas of mapped stones, with nodes from Figure 42 imposed. That they do not always correspond is likely a reflection of the use of the largest (greatest mass) stones for non-hearth purposes; that is, they were part of the various activities that occurred in proximity to the hearths.

Arguably the best scenario for these varying densities is that they track the formation of a palimpsest of debris from activities that included cooking (pottery), flintknapping and tool refitting (chipped stone tools, debitage, hammerstones, abraders), and



Level	Mass (gm)
10-20	15,754
20-30	61,115
30-40	51,278
40-50	90,537
50+	22,728
Total	241,412

Figure 43. Density map of mapped stones, assumed to be manuports, weighed and discarded at the site. Note the greater mass of stone in the fourth level. Stones exposed at 50 cm in units terminated at that depth were excavated and weighed. Total mass of discarded stone in 50+ level does not reflect the amount that would have been found at 50–60 cm.

food preparation (grinding stones, unburned bones) that took place in proximity to a series of hearths, located for the most part in the south-central part of the block (compare Keehner 2015; Logan 1998a:336; Logan and Hill 2000:242). A midden, if developed over sufficiently short time, likely would contain more and better preserved faunal material than found at 14JF420. Such a model is presented by the Middle Woodland Quarry Creek site, where similar mounds with a 50–60-cm cultural horizon yielded considerably more debris, including well preserved animal bones (Logan 1993, 2011).

Given the greater mass of hearthstones in the lower of the paired levels (Table 7), the hearths plausibly were constructed and used more often during the early occupation of what is now Mound B. Domestic activities diminished in frequency or intensity for an undetermined amount of time thereafter. It would be interesting to know if radiocarbon dates from the upper paired levels of the cultural horizon indicate a significantly later time.

The method employed here for the spatial distribution of different material types is like that applied to the block excavation at the DB site (14LV1071), a multi-component occupation on an upland ridge overlooking the lower Missouri River valley on the Fort Leavenworth military reservation (Hill 1998; Logan and Hill 2000). In that case the investigators were able to infer hearth-centered activities during the Late Prehistoric (Steed- Kisker phase) occupation, though the presence of a considerable amount of daub indicated that these were related to one or two lodges. At the Quixote site only four pieces of burned earth exhibit grass or stick impressions, a very low number, suggesting that they were incidental vegetal impressions of soil fired or oxidized around a hearth rather than house plaster. While burned earth was pervasive in the block, the total mass (2,688.9 g) is relatively small. Even so, it is notable that in the lower part of the horizon most of it was in the central part of the block where hearthstones were concentrated (Figure 40). Smaller clusters were found on either side of that zone in association with the pottery and debitage foci, attributable to the dismantling of hearths or scattering by treading. Charcoal, not surprisingly the least dense cultural material in the block (279.8 g), is coincident with hearthstones in the third (20–30 cm) and fourth (30–40 cm) levels, less so in the lowest level discussed in this analysis. However, this is due to the fact that N488 E782 was not dug below 40 cm, resulting in the gap between clusters shown in Figure 41.

In sum, the spatial distribution of cultural material in the block reflects construction and use of a series of hearths of locally derived limestones and till-derived quartzites and perhaps the planning for others, if larger unburned stones found there were intended for such a function. Dates from the lower half of the cultural horizon indicate that this activity occurred ca. A.D. 890–980, essentially during the tenth century near the generally accepted end of the Late Woodland period. Evidence that these were associated with a lodge is lacking, which is not surprising given the lack of intramural hearths at type sites of the Grasshopper Falls phase in the Valley Falls reach (Reynolds 1979). In the vicinity of the hearths, suggested to have been centered at N488–490 E784–786 where TU2 was dug in 1988, the site's inhabitants carried out a variety of tasks that included cooking, which resulted in the breakage and accumulation of pottery sherds, and chipped stone tool production and maintenance. These activities generated a fair amount of secondary and tertiary debitage, as well as a modest tool assemblage, predominantly arrow points. Nearly all of the lithic tools had been damaged during hunting events (impact fractured or broken Scallorn arrow

Table 7. Relative Mass of Hearthstones in Upper and Lower Parts of Cultural Horizon.

	Burned limestone		FCR		Combined stones	
	mass (g)	%	mass (g)	%	mass (g)	%
10-30 cm	781.9	16.90	2887.9	36.67	3669.8	29.34
30-50 cm	3849.6	83.10	4988.1	63.33	8837.7	70.66
Totals	4631.5	100.00	7876.0	100.00	12507.5	100.00

points) or broken by other actions (fragments of larger bifacial implements, such as knives, scrapers, and drills). Continued occupation of the area resulted in a palimpsest of debris, primarily in the lower half of the cultural horizon that contained most of the manuported stones (Figures 27–29). This activity declined during the time of deposition that resulted in the upper ~20 cm of the horizon.

The only subsequent happenings, which took place during historic time and primarily were related to construction, maintenance, and use of the windmill in the Mound A area, resulted in the deposition of a minor amount of material (n = 95, 94.7 g): glass fragments (n = 48, 17.7 g), hardware, ammunition and other metal objects (n = 35, 63.3 g), plastic, and slag. Most of these items (n = 76, 78.6 g) were found in the A1 soil, characterized during the 1988 NRHP project (Fosha et al. 1990:137–138) as a 10–12-cm veneer in the Mound B area that mantles the Late Woodland component. Modern use of the area as pasture preserved the site and its fortuitous inclusion on federal land provides archeologists with the prospect of more insight into adaptations in the Kansas City locality during the second half of the first millennium A.D.

FEATURES

Excavations in two areas of magnetic anomaly, detected during geophysical survey and interpreted as indicative of intensive burning, revealed features composed of dense concentrations of burned stones within pits, described and interpreted here as roasting pits. They are interpreted in a broader cultural context as evidence of feasting behavior and its integrative effect on dispersed Late Woodland groups in the Kansas City locality, particularly those of northeastern Kansas. The feature found at magnetic anomaly m2 was designated F362 and that at anomaly m3 as F363. These were 4 m south/2 m west of the southwestern corner and 8 m north/2 m east of the northeastern corner of the block excavation, respectively, in effect straddling that area (Figure 19). The 2 by 2-m units excavated over the centroids of the magnetic signals yielded relatively sparse amounts of cultural material in all levels (Tables 8 and 9). This suggests that activities contemporary with construction and use of the features and thereafter, at least in the excavated areas to their west, were brief and/or entailed loss, discard, and abandonment of little non-perishable material.

Discovery and Description

F362 was uncovered at a depth of 38–40 cm in the northeastern quadrant of N482 E774 as an area of darker soil that embraced a few stones (Figure 44), the uppermost of what proved to be a dense mass of burned limestone (Figure 45). Its extent eastward of the unit was determined by coring with an Oakfield tool. Fill above the eastern portion was removed for later dry screening, the feature was fully exposed, photographed, and elevations taken on stones at selected points across it (Figure 46). The stones formed a dense mass (321.226 kg [708.182 lbs]), measuring 30–35 cm thick, within a pit 1.9 m east-west by 1.7 m north-south that had been dug into the B horizon (Figure 47). Rocks in the 2 by 2-m unit that composed the western one-third of the feature were removed to document its cross section, which revealed a steep-sided (~70 degrees) basin with a more gradual slope toward the base (Figure 48). Selected stones were plotted and collected for lipid and starch residue analyses in order to determine the plants or animals that had been prepared (Figure 47). A summary, based on the complete analysis by Malainey and Figol (Logan 2019:Appendix), is given in the Lipid Residue Analyses section. Fifteen burned timbers of varying length and from 4 to 8 cm in diameter were exposed (Figure 49). A few formed an apparent lattice, suggesting that the stones had been laid on a pallet of timbers to serve as fuel for the fire that heated the stones. All lay directly above the B horizon into which the pit had been dug (Figure 50). Powell identified them as hardwoods: slippery elm, American elm, red oak, white oak, and maple.

All fill directly above, within, and below the burned stones was collected for flotation with reference to those zones. Faunal and floral material associated with them are described in the Animal Bone and Shell and Macrobotanical Remains sections. Table 10 presents a summary of all cultural material recovered from the floated soil. A complete drill of gray (Permian?) chert, a rim sherd of Grasshopper Falls ware (slightly everted rim, vertically brushed exterior, dense sand temper, and 10 mm thick), and a few small body sherds were

Table 8. Cultural Material from Magnetic Anomaly Test Units Associated with F362.

North	East	Depth (cm)	Elevation (m)	Cultural material	Count	Mass (g)
482.00	774.00	0–10		Chipped stone debris	6	3.8
482.00	774.00	10–20		Body sherd	10	13.6
482.00	774.00	10–20		Chipped stone debris	36	19.0
482.00	774.00	10–20		Fire cracked rock		7.9
482.00	774.00	10–20		Burned earth		11.1
482.00	774.00	10–20		Glass	1	.3
782.00	774.00	10–20		Slag	2	1.1
482.00	774.00	20–30		Body sherd	7	13.8
482.00	774.00	20–30		Chipped stone debris	50	26.6
482.00	774.00	20–30		Fire cracked rock		9.3
482.00	774.00	20–30		Burned earth		12.2
482.28	775.08	20–30	99.70	Chipped stone tool	1	3.0
482.40	775.65	20–30	99.65	Body sherd	1	14.4
482.91	775.79	20–30	99.64	Body sherd	1	11.7
482.00	774.00	30–40		Body sherd	7	14.6
482.00	774.00	30–40		Chipped stone debris	57	48.7
482.00	774.00	30–40		Fire cracked rock		9.8
782.00	774.00	30–40		Charcoal/burned seed		.8
482.00	774.00	30–40		Burned earth		6.6
482.00	776.00	10–20		Rim sherd	1	7.4
482.00	776.00	10–20		Body sherd	2	3.3
482.00	776.00	10–20		Chipped stone debris	23	18.1
482.00	776.00	20–30		Body sherd	3	30.6
482.00	776.00	20–30		Chipped stone debris	24	20.4
482.00	776.00	20–30		Burned earth		3.7

discovered above the stones (Figure 51). Neither the drill nor the rim sherd were piece plotted, but they were found in soil sample bags numbered sequentially during excavation, indicating that the former was in the upper third of the soil just above the stones and the latter in the middle of the "above rocks" level. Given this context, they cannot be associated with the feature with certainty; they may have been discarded soon after its abandonment. Fill within and below the stones yielded only 1.2 g of debitage, faunal remains were scant, and burned seeds were so varied and sparse that they cannot be interpreted as associated with any intentionally roasted plants. The seeds are assumed to date to the time of feature use and may have been burned at that time. They are valuable because annual plant parts can produce relatively precise radiocarbon dates. Thus, hazelnut seeds were selected for dating by two laboratories for chronological information presented in the Conclusions section.

F363 was anticipated in the 2 by 2-m unit laid out over the center coordinates of the northern magnetic anomaly with its southwestern corner at N502 E794. Here the offset between the coordinates provided by Maki and the feature was greater than that at F362, though in similar direction. As in the test unit associated with anomaly m2, that at m3 yielded relatively little cultural material: a total mass of 152.3 g of pottery, debitage, burned rock, and burned earth (Table 9). Despite the paucity of artifacts, the number and mass of ceramic and chipped stone debris increased with depth through the three levels. Thus, body sherds numbered 2 (4.4 g) in the first level (0–10 cm), 4 (7.1 g) in the second, and 16 (43.5 g) in the third; debitage increased from 1 (0.3 g) in the first level to 43 (15.2 g) in the second

Table 9. Cultural Material from Magnetic Anomaly Test Units Associated with F363.

North	East	Depth (cm)	Cultural material	Count	Mass (g)
502.00	794.00	0–10	Body sherd	2	4.4
502.00	794.00	0–10	Chipped stone debris	1	.3
502.00	794.00	0–10	Burned earth		.2
502.00	794.00	10–20	Body sherd	4	7.1
502.00	794.00	10–20	Chipped stone debris	43	15.2
502.00	794.00	10–20	Fire cracked rock		1.0
502.00	794.00	10–20	Burned earth		3.9
502.00	794.00	20–30	Body sherd	16	43.5
502.00	794.00	20–30	Chipped stone debris	131	75.7
502.00	794.00	20–30	Charcoal/burned seed		.3
502.00	794.00	20–30	Burned earth		.7

North	East	Depth (cm)	Elevation (m)	Cultural material	Count	Mass (g)
501.50	796.00	0–10		Chipped stone debris	1	11.7
501.50	796.00	10–20		Core	1	13.0
501.50	796.00	10–20		Chipped stone debris	4	8.4
501.50	796.00	20–30		Body sherd	6	16.4
501.50	796.00	20–30		Chipped stone debris	17	5.4
501.50	796.00	20–30		Fire cracked rock		8.5
501.50	796.00	20–30		Burned earth		2.1
501.50	796.00	30–40		Body sherd	4	20.6
501.50	796.00	30–40		Irregular form	1	5.6
501.50	796.00	30–40		Chipped stone debris	9	8.7
501.50	796.00	30–40		Burned bone		.1
501.50	796.00	30–40		Charcoal/burned seed		.2
501.50	796.00	30–40		Burned earth		6.2
501.60	796.62	30–40	98.91	Unburned bone	1	7
502.23	796.28	30–40	98.90	Body sherd	1	7.9
501.50	796.00	40–42		Body sherd	1	1.3
501.50	796.00	40–42		Chipped stone debris	3	4.4

Table 10. Flotation Cultural Material Associated with F362.

Material	Above rocks	Among rocks	Below rocks
Drill	3.70	0	0
Chipped stone debris	35.50	1.10	1.0
Rim and body sherds	61.80	0	0
Faunal	8.60	2.80	1.8
Floral	4.95	36.78	216.1
Burned earth	147.20	123.40	246.0



Figure 44. F362 at initial definition in the northeastern quadrant of N482 E774. Scored line follows darker soil. Note the uppermost stones of the feature.



Figure 45. Burned stones exposed in the western portion of F362, showing soil profile.



Figure 46. Bird's eye view of western portion of F362. Note in situ fracturing of some stones, indicative of burning.



Figure 47. Exposed stones of F362, showing those collected for potential lipid residue analysis (ribboned) and two sampled and analyzed for that process (arrow).

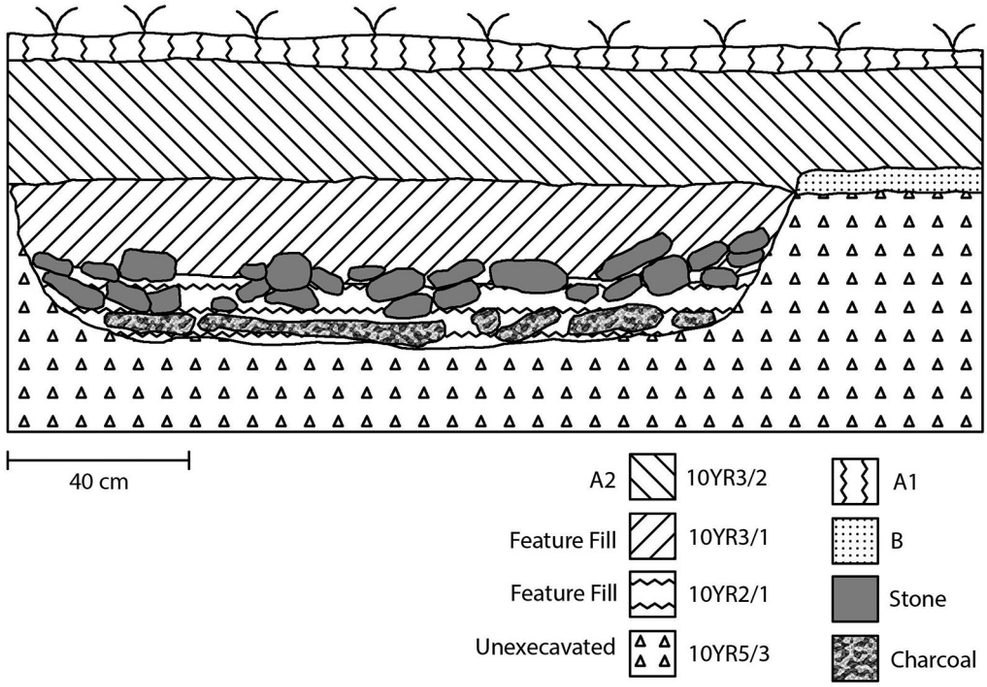


Figure 48. Cross section of F362.

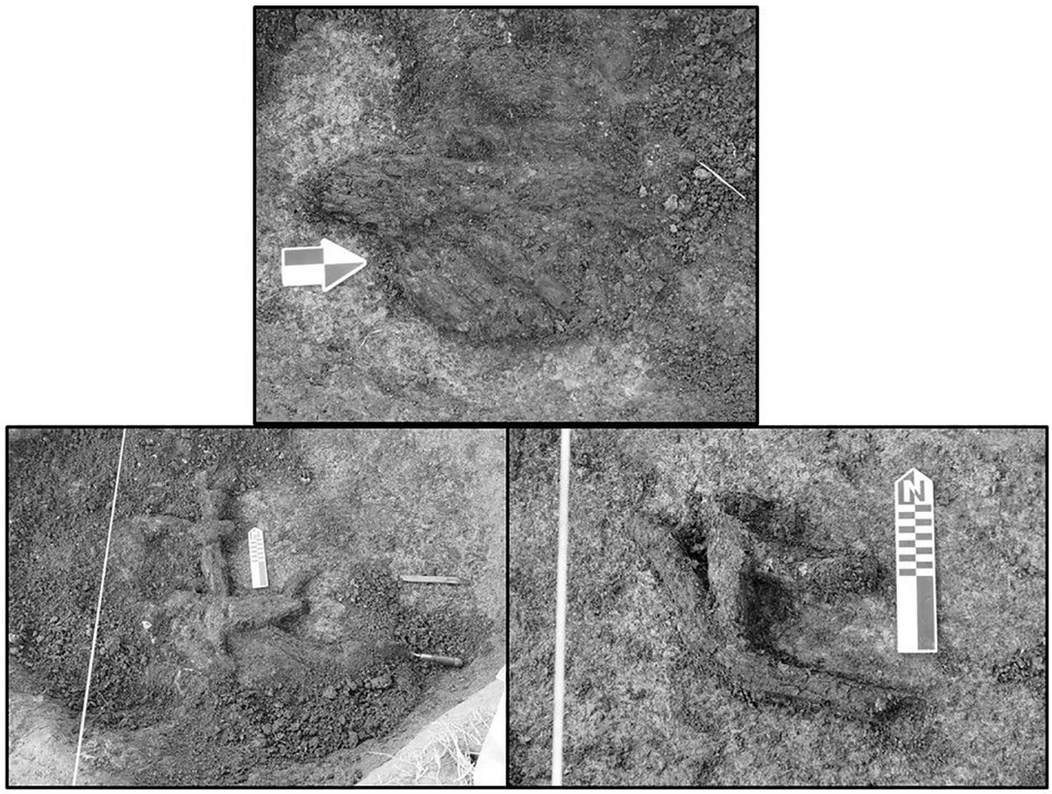


Figure 49. Montage of charred timbers exposed at the base of F362. Note the lattice-like nature of those in lower photographs.

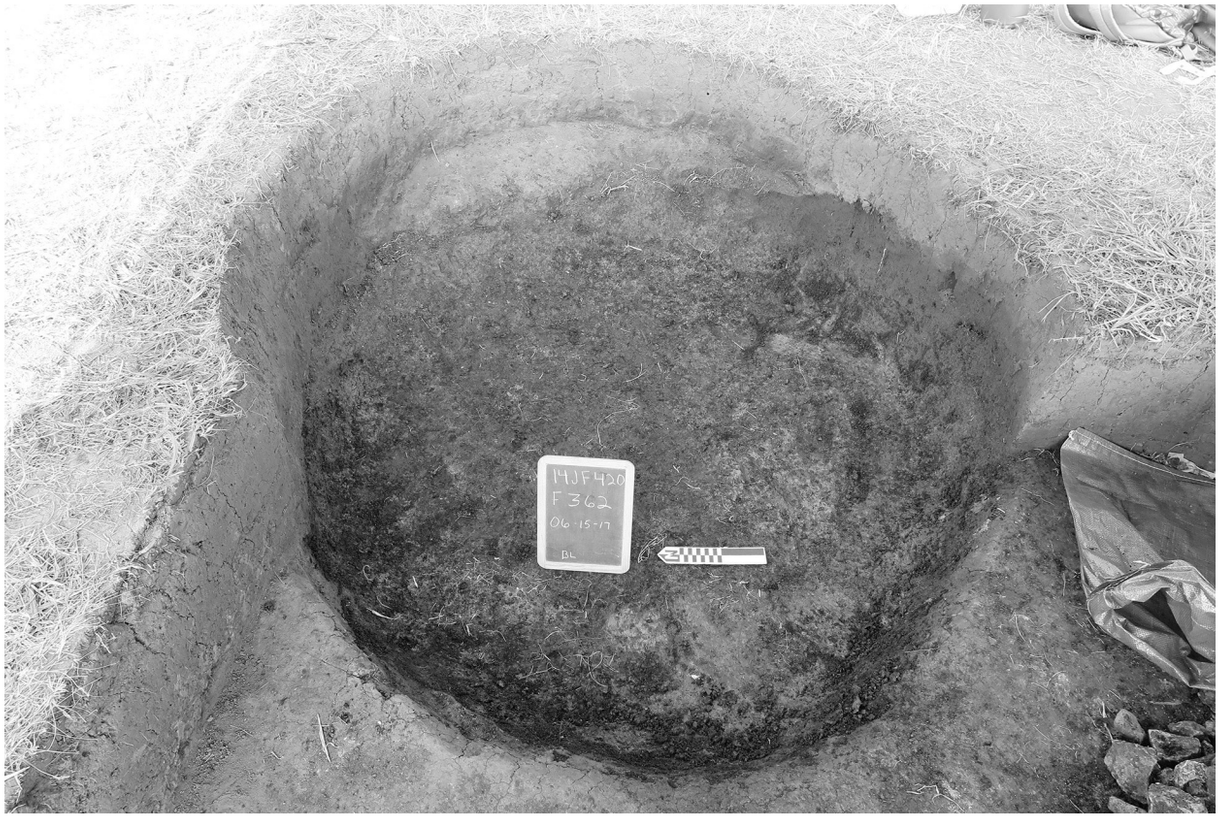


Figure 50. Base of F362, showing charcoal staining of B horizon soil.

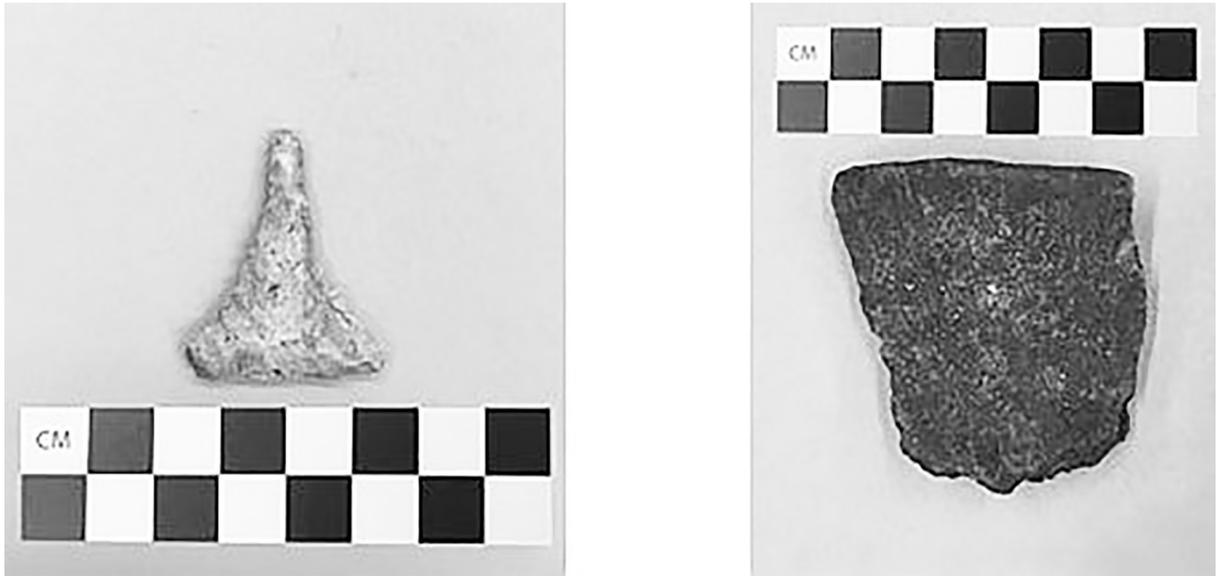


Figure 51. Drill and rim sherd found above the stones of F362.

and 131 (75.7 g) in the third. When B horizon soil was found throughout the test unit at a depth of 30 cm and no feature had been encountered, excavation was terminated. Whatever had registered the magnetic anomaly was then suspected to lie to the east, which was verified by Oakfield cores that hit stones or charcoal at ~40 cm depth. A 1 by1-m unit was laid out with its southwestern corner at N501.5 E796. Because time was limited, exploration was confined to that unit. In effect some of the feature has been preserved for future investigation.

A mass of burned limestone was uncovered in the unit at a depth of ~40 cm. The aggregate filled a 10–30-cm-deep basin that had been dug into the B horizon (Figures 52–55). The western edge of the basin was exposed in the unit. Stones from the excavated part of the feature had a total mass of 138.144 kg (304.5 lbs). Six were collected for lipid residue analysis. Oakfield cores were extracted at intervals beyond the unit, and they encountered either stones or B horizon soil, indicating that the stones extended no more than 20–25 cm to the north, east, and south. That portion of the feature's perimeter revealed in the unit provided sufficient arc to infer its diameter that, assuming symmetry, was ~1.73 m, comparable to the estimate of 1.77 m, determined by the cores recorded on the feature form and also comparable to the north-south axis of F362. A single deer bone was associated with the feature among a distinct paucity of cultural material within and below the stones (Table 11). While charcoal was abundant, no burned timbers like those in F362 were present. See the Macrobotanical Remains section for a detailed analysis of plant remains from the floated fill.

The most salient aspect of the two roasting pits is their good preservation; that is, there is no evidence of reuse, dismantling (i.e., recycling of stones), or incidental cultural disturbance. In both cases it is apparent that a great mass of local limestone was gathered and carefully placed upon timbers, at F362 arguably on a pallet of timbers, within a specially dug basin for what must have been a special occasion. In effect, both seem indicative of what in modern parlance would be called "one-off events," which differed from the more habitual or daily use

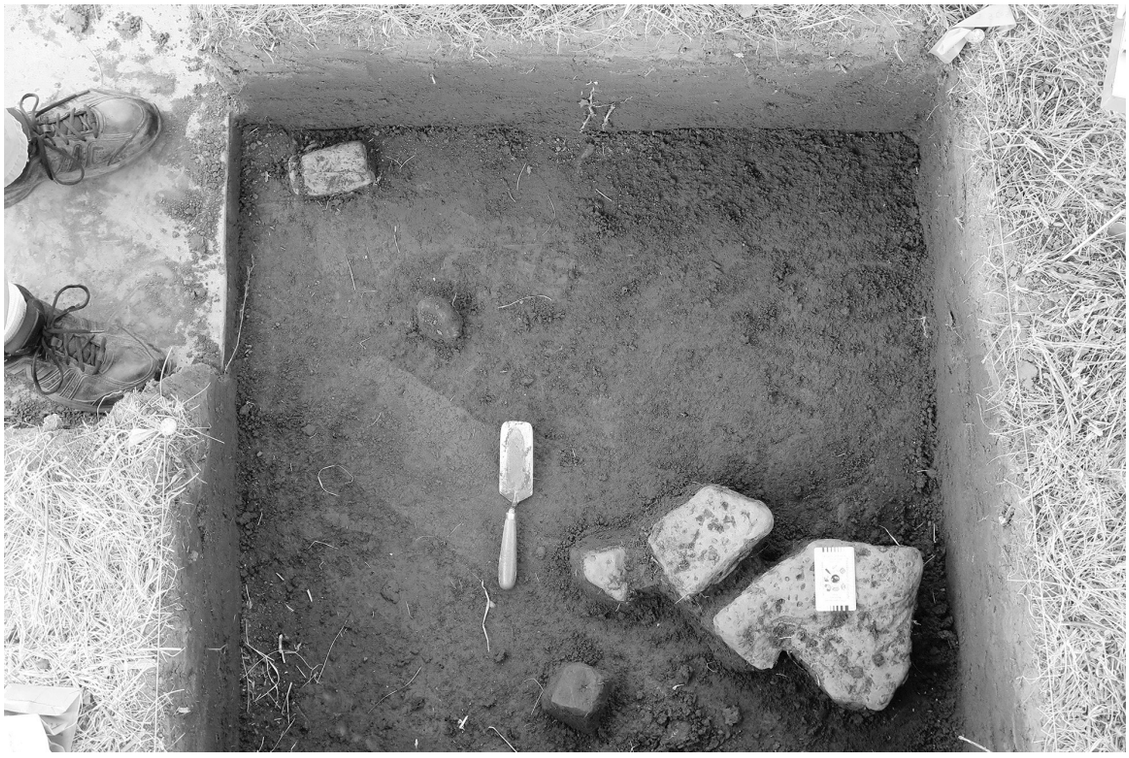


Figure 52. Burned limestone at initial exposure of F363 in N501.5 E796. North is at the top of the photograph.



Figure 53. F363 as exposed in N501.5 E796.

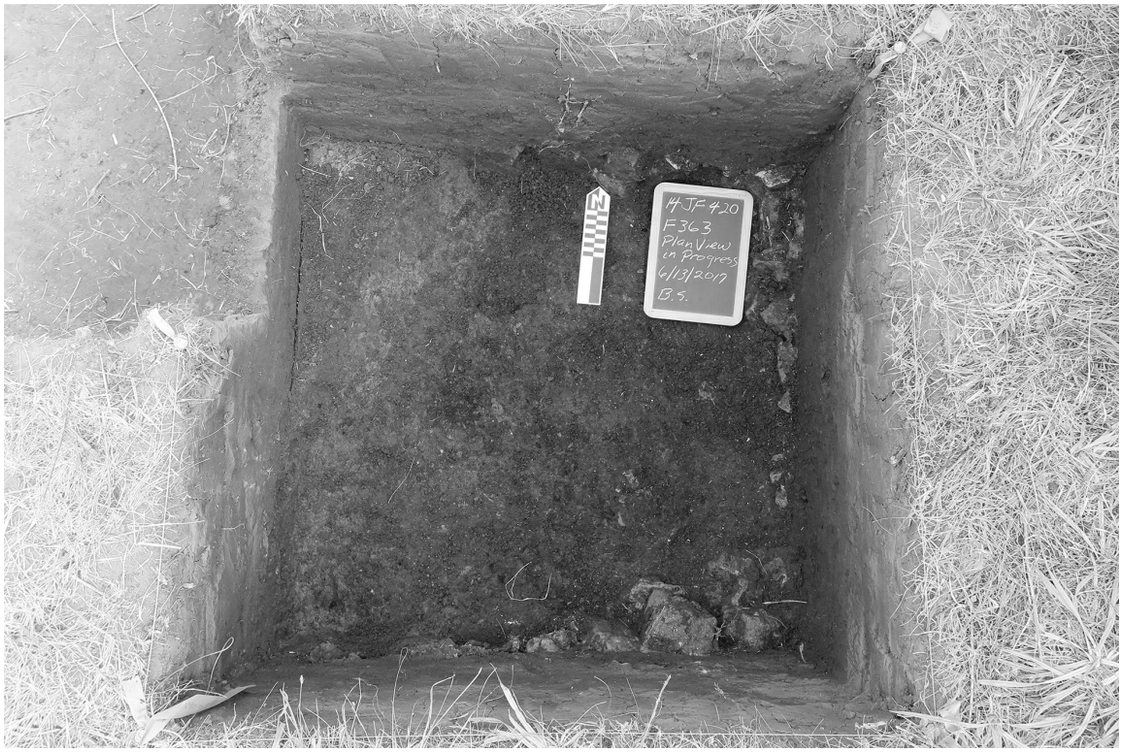


Figure 54. Base of F363. The B horizon is exposed in the western part of the unit at 40-45 cm.

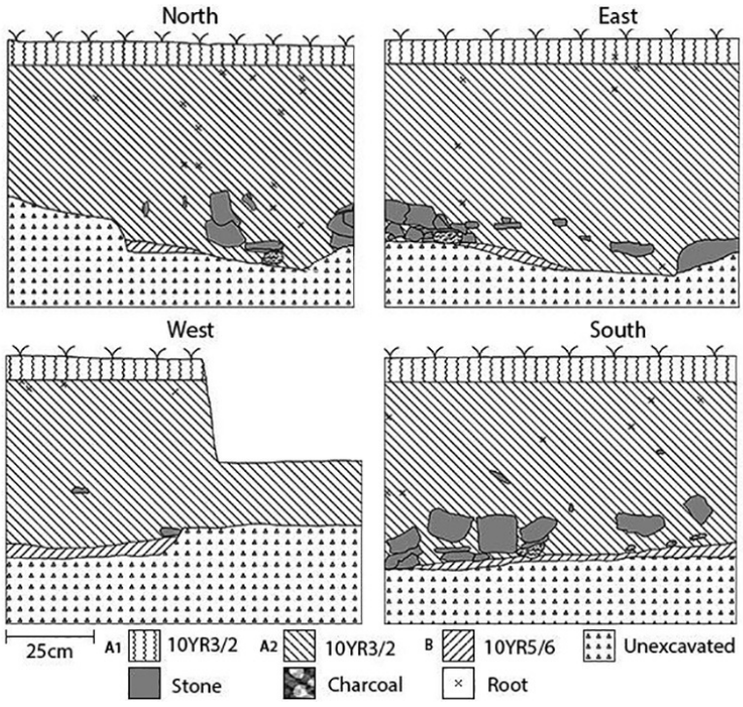


Figure 55. North, east, south, and west profiles of N501.5 E796.

of hearths, represented by the scattered, seemingly discarded, fire-related debris (burned limestone, fire-cracked quartzite, burned earth, and charcoal) in the area of the block excavation.

The paucity of animal remains roasted in the features might be attributed to the cooking of bone-free meat packages or the encasement of animal parts in some kind of cover, though one that did not prevent seepage of fat onto the stones (see Lipid Residue Analyses section). Their absence cannot be explained as the cleaning of the pits for reuse, as there is no indication that was done. On the High Plains cooking of animal parts in stone-lined pits is suggested to have entailed putting them "in a green hide, animal paunch, or fiber bag, placed directly on the hot stones, covered with earth or some sort of mulch, and left for a period of time, which could have been several hours or even a day. With practice, this can be done without burning or contaminating the food with the surrounding matrix" (Kornfeld et al. 2010:358). At the Wardell Bison Trap (48SU301) in Wyoming, an unopened roasting pit still contained bison parts.

The absence of bones is not unusual in roasting pits elsewhere in the Great Plains. For example, of many found at Head-Smashed-In Buffalo Jump, UNESCO World Heritage Site #158 (DkPj-1), in Alberta, Canada, some of which had served for roasting and others for bone grease production, only one example of the latter held its original contents. In others primary contents were lacking. At DkPj-1 pits had been reused because the stone (an

Table 11. Flotation Cultural Material Associated with F363.

Material	Among rocks (g)	Below rocks (g)	Totals (g)
Body sherd	2/.2	2/.3	4/.5
Chipped stone debris	113/8.6	65/3.6	178/12.2
Bone	5.8	3.7	9.5
Burned limestone	7.9	3.7	11.6
Burned earth	25.4	10.6	36.0

estimated total of 4,000,000 kg!) had to be transported several kilometers, promoting removal of animal remains to recycle the pits (Brink and Dawe 2003; Robert Dawe, personal communication 11 October 2017).

Given their proximity to limestone bedrock in the channel of Cedar Creek, the Quixote occupants would have found cleaning and reuse of roasting pits unnecessary. The significance of the roasting pits as they reflect feasting activities and the role they played as an integrative force among Late Woodland populations in the Kansas City locality is explored in the Conclusions section.

Lipid Residue Analyses

Lipid analyses of two stones from each of the pit features were conducted by Mary Malainey and Timothy Figol (2019). Relative fatty acid compositions of residues extracted from all stone samples are similar in that they have high levels of the fatty acid C18:0. This attests the preparation of products from large herbivores that would have been bison, deer, or elk in the eastern portion of the central Plains. Based on faunal remains from the site in general, deer is the most likely of these to have been processed. The level of C18:1 isomers in the residue from the central stone of F362 (Figure 7) were higher than all others and "may indicate the rock either absorbed residues from fattier meat or from a combination of large herbivore meat and medium fat content foods" (Malainey and Figol 2019:169).

Medium fat content residues can be supplied by both plant and animal foods, the former including maize, mesquite, and cholla, of which only the first is regional. Among animal matter that could yield medium fat content residues, freshwater fish are most likely, based on fish scales associated with F362. The fatty acid compositions and the presence of the animal sterol cholesterol are common to most of the stones to varying extents and support the inference that roasting large herbivores was the primary activity. Malainey and Figol attribute the biomarker dehydroabietic acid, found in stones from both features, to conifer products. The only such plant in the region is cedar, and no other evidence of this was identified in the feature or elsewhere in the prehistoric components. It is hoped that future analyses of lipid and starch residues on other samples from the roasting pits will clarify that aspect of their function.

Chronology

Samples of burned hazelnut shells, each ~2 g, from both features were submitted to the National Ocean Sciences Accelerator Mass Spectrometry Laboratory at the Woods Hole Oceanographic Institution (NOSAMS) and DirectAMS Radiocarbon Dating Service (D-AMS) for radiocarbon analyses (Table 12). NOSAMS assay OS-142976 from F363 is aberrant, reflecting contamination or natural burning during Late Archaic time. OS-142975 from F362 is statistically the same as D-AMS 024953 from F363, suggesting relative contemporaneity of the features (t = .79 χ^2 = 3.84). A standard t-test shows that the dates from F362 are statistically different. However, if the two sigma range of both is used to compensate for AMS precision, they are the same (t = 2.54 χ^2 = 3.84). There is statistical similarity among the three dates of Woodland age when the two sigma range of those from F362 is tested with the one sigma range of D-AMS 024953 from F363 (t = 4.82 χ^2 = 5.99). The calibrated average of OS-142975 and D-AMS 024953 (A.D. 647–677; 100 percent probability) is essentially the same as that of all three Late Woodland dates (A.D. 650–683; 100 percent probability), reinforcing the inference that the use of both features occurred during the third quarter of the seventh century A.D.

Interestingly, that range differs about 200 years from the calibrated average of AMS radiocarbon dates from the block excavation between the roasting pits (see Methods section). They indicate at least two distinct occupations of 14JF420 during Late Woodland time. The implications of this difference are explored in the Conclusions section.

Individual Stone Features

Five relatively large stones (F361, F364, F365, F367, and F369), some tentatively identified in the field as grinding slabs, and one small concentration of stones (F358) were treated as features. They were mapped, piece plotted (including the range of elevations of the surfaces upon which they rested), and flotation samples of associated soil matrix were collected. These stones remain unwashed for lipid,

Table 12. AMS Radiocarbon Dates from F362 and F363.

Feature	Provenience	Lab number	Mean	1 sigma	Calibrated 2 sigma range	Highest probability (%)
F362	below rocks-east half	D-AMS 024952	1243	27	**A.D. 683–779**	72.0
					A.D. 789–872	
F362	above rocks-east half	OS-142975	1350	20	A.D. 647–684	100.0
Average F362*			1312	16	A.D. 661–712	80.6
					A.D. 745–764	
F363		D-AMS 024953	1394	45	**A.D. 564–690**	98.8
	below rocks				**A.D.** 751–760	
F363		OS-142976	2460	20	**B.C. 756–679**	37.5
	among rocks				**B.C.** 671–606	& 37.2
					B.C. 599–475	
					B.C. 446–430	
Average F362 & F363		OS-142975 & D-AMS 024953	1357	18	A.D. 647–677	100.0
Average F362 & F363**		all but OS-142976	1346	17	A.D. 650–683	100.0

*2 sigma range of both dates

**2 sigma range of D-AMS 024952

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

pollen, phytolith, and other possible analyses. Their proveniences are presented in Table 13, and those confirmed as grinding stones are discussed in the Lithics section.

F366 and F368, were soil stains, tentatively thought to be post molds. These designations were canceled when closer examination proved that they were the result of natural disturbance by rodents (i.e., krotovina).

CERAMIC ARTIFACTS

All pottery recovered at the Quixote site during preliminary inspection by Reichart, 1988 NRHP evaluation, and the 2017 KATP field school excavation conforms to that defined by Reynolds (1979:70–71) as Grasshopper Falls ware. While no large vessel fragments were found, most rim and body sherds appear to have derived from relatively large jars with wide mouths. A specimen from N490 E784,

Table 13. Feature Stone Provenience Data.

Feature number	North	East	Elevation (m)	Maximum depth* (cm)
358	497	782	not taken	30
361	492.73–492.83	784.85–785.12	99.62–99.53	35
364	489.97	785.27	99.59	39
365	490.94–490.89	782.09–782.12	99.67–99.59	40
367	489.34–489.29	781.88–781.76	99.69–99.63	37
369	488.58	789.11	99.43–99.35	41

*from SW corner



Figure 56. Rim and body sherds. From left to right and top (decorated rims and conoidal base) to bottom row, the corresponding numbers of rim sherds in Table 15 are 0828, 0937, 0089, 0260, 0716, 0779, 0348b, 0176, 0390, 0441, 0387, 0730, 0312, 0348a, 0440, 0586, and 0780. Prefix 14JF420 is omitted from these and subsequent catalog numbers.

40–50 cm (14JF420-0716) clearly came from the base of a conoidal vessel (Figure 56, upper row, right). In general the fabric contains dense amounts of sand or grit (the former rounded, the latter angular) that, combined with open firing of pots at relatively low temperatures, resulted in friable sherds that crumble easily. Unfortunately, ceramics of this nature are particularly vulnerable to the region's temperate climate, characterized by strong seasonality with varying temperatures, precipitation, and freeze-thaw fluctuations (compare Reid 1984a). Few sherds exceed 10 cm in any dimension with consequent small surface area. The body sherds recovered (n = 4,120) have an aggregate mass of 11,629 g but a mean of only 2.86 g. The minute size of the many "sherdlets" is evidence of their fragility and susceptibility to seasonal extremes. Among many benefits of fine-mesh water screening during the KATP field school is the more gentle treatment of these sherds.

That Quixote jars were relatively thick-walled is demonstrated by the range of maximum thicknesses within a sample of 142 piece-plotted body sherds, augmented by 28 that met the size criterion but had escaped mapping. The sample does not include six small sherds from unit pedestals with 0–50-cm depth provenience and a missing sherd. The 170-sherd sample has a mass of 3,866.5 g or 32.2 percent of all body sherds. Not surprisingly, given their greater surface size, their mean mass (22.6 g) is greater than that of the total assemblage. Thicknesses range from 6.0 mm to 13.6 mm with a mean of 9.09 mm and standard deviation of 1.7 mm, the latter a measure of slight variation in

this regard. In contrast Late Prehistoric pottery in eastern Kansas is generally thinner, indicative of a change in ceramic technology that might have enhanced cooking maize (Braun 1983; Logan 1981, 1998b; compare Bowen and Harry 2019).

Surface treatments of the 170-sherd sample also conform to Grasshopper Falls ware. The relative frequencies of these attributes are listed in Table 14. A few sherds, too small for surface treatment analysis, were among those found in vertical orientation and mapped to document post-depositional disturbance of the horizon. Exterior surfaces were either brushed (n = 35), cord roughened (n = 23), or smoothed over (n = 61), apparently to obliterate the junction of coils used during vessel construction. In 31 cases smoothing did not entirely obscure brushing or cord roughening. Interior surfaces do not exhibit the same variety of treatments. The majority (n = 114) were smoothed, probably by the stone or "anvil" employed in conjunction with the tool applied to the outside. Only three have some evidence of brushing, and these likely were from the necks of vessels. In most sherds where surfaces had eroded or exfoliated, dense sand temper was exposed.

Rim sherds generally provide more information about ceramic variability, particularly in decorative techniques, or their rarity in the central Great Plains, and that is the case with pottery from the Quixote site. The KATP and NRHP projects combined provided 69 rim sherds with a mass of 844.5 g. Here, too, the mean mass of 12.2 g reflects their relatively small size. Of these, 43 (mass = 754.9 g, mean = 17.6 g) have sufficient surface area (5 cm^2) for analysis (Table 15). Rim thicknesses (the maximum above the point of neck inflection, if the latter is present) range from 4.6 mm to 13.7 mm. While this is slightly greater than that of the body sherds, it reflects the relative thinness of a few specimens that taper to the lip in this attribute. The mean rim thickness of 8.4 mm differs from that of the body sherds by only 1.2 mm. Only a dozen specimens have sufficient arc for determining mouth diameters, which range from 14 to 30 cm; eight of these range from 25 to 30 cm, indicative of generally wide-mouthed Late Woodland jars. The smallest vessel represented may have been a small jar rather than a bowl. Rims are generally high and everted.

Surface treatment of rim as compared with body sherds varies in the predominance among the former of exterior vertical brushing (n = 23), combined in 12 specimens with interior horizontal brushing (Figure 57). This probably reflects the need to switch from a cord-wrapped paddle to another implement that could fit within the curvature of the neck. The transition from cord roughening to brushing is seen on one of the body sherds in the 170-sherd sample, perhaps from that part of the vessel where tools were switched. In some, brushing had been partly smoothed over (nine vertically brushed; three horizontally brushed). Nine exteriors and 16 interiors are completely smoothed. Lips are more often rounded (n = 24), with flattening the only non-decorative option (n = 9); in two specimens the latter resulted in slight exterior protrusion of the clay.

The surface treatment appears to have been more carefully executed on some vessels than others. This is particularly evident in specimens 0779 and 0176 (Figures 56–57), which have more distinct narrow brush impressions. These seem to be from the same vessel, given their similar vertical curvature, surface treatment, lip form (flattened), and thickness (7.1 and 7.2 mm) (Table 14). With regard to the last attribute, which does not vary much on either sherd, the vessel from which they came was

Table 14. Surface Treatment of Body Sherds.

Surface treatment	Exterior	Interior
Brushed	26	2
Brushed/eroded	1	0
Brushed/eroded exposing dense sand	1	0
Vertically brushed	7	0
Horizontally brushed/eroded	0	1
Cord roughened	23	0
Vertically brushed/cord roughened	1	0
Smoothed	61	114
Smoothed-over brushed	14	0
Smoothed-over cord roughened	16	0
Smoothed-over vertically brushed	1	0
Smoothed-over/eroded	0	1
Eroded	2	18
Obscured by carbonized residue	0	1
Eroded exposing dense sand temper	14	28
Totals	167	165

Table 15. Rim Sherd Data.

Catalog number	Rim thickness (mm)*	Mouth diameter (cm)	Exterior surface treatment	Interior surface treatment	Lip form	Decorative treatment	Mass (g)
14JF420-0260	10.6	Indeterminate	Eroded	Smoothed over	Round	Dowel impressed	9.2
14JF420-0814	10.5	Indeterminate	Eroded	Eroded	Round		17.0
14JF420-0862	6.2	Indeterminate	Smoothed over	Eroded	Flat-protrudes		5.3
14JF420-0348b	9.2	Indeterminate	Smoothed over	Horizontally brushed	Round		10.2
14JF420-0752	6.7	Indeterminate	Smoothed over	Smoothed over	Flat		7.0
14JF420-0280	6.8	Indeterminate	Smoothed over	Smoothed over	Round	Oblique impressed lip	3.6
14JF420-0852	8.1	Indeterminate	Smoothed over	Smoothed over	Round		6.8
14JF420-0464	8.7	~30 (cf. 0440)	Smoothed over	Smoothed over	Round		17.3
14JF420-0501	4.6	Indeterminate	Smoothed over vertically brushed	Horizontally brushed	Flat-protrudes		3.6
14JF420-0348a	7.9	23.0	Smoothed over vertically brushed	Smoothed over	Round		27.1
14JF420-0937	5.9	Indeterminate	Vertically brushed	Horizontally brushed	Decorated	Punctated lip	7.4
14JF420-0390	6.3	19.0	Vertically brushed	Horizontally brushed	Round		13.2
14JF420-0700	7.0	Indeterminate	Vertically brushed	Horizontally brushed	Round		5.5
14JF420-0779	7.1	Indeterminate	Vertically brushed	Horizontally brushed	Flat		21.1
14JF420-0176	7.2	25.0	Vertically brushed	Horizontally brushed	Flat		30.6
14JF420-0387	8.9	25.0	Vertically brushed	Horizontally brushed	Round		42.8
14JF420-0441	9.1	Indeterminate	Vertically brushed	Horizontally brushed	Round		12.5
14JF420-0730	10.2	14.0	Vertically brushed	Horizontally brushed	Round		30.2
14JF420-0828	7.5	Indeterminate	Vertically brushed	Horizontally brushed	Decorated	Oblique impressed lip	16.4

14JF420-0684	5.3	Indeterminate	Vertically brushed	Smoothed over	Flat		5.0
14JF420-0408	7.3	Indeterminate	Vertically brushed	Smoothed over	Round		8.4
14JF420-0312	7.3	30.0	Vertically brushed	Smoothed over	Flat		12.8
14JF420-0646	8.5	Indeterminate	Vertically brushed	Smoothed over	Round		16.3
14JF420-0740	9.0	Indeterminate	Vertically brushed	Smoothed over	Round		8.0
14JF420-0142	9.0	Indeterminate	Vertically brushed	Smoothed over	Round		13.0
14JF420-0089	10.8	Indeterminate	Vertically brushed	Smoothed over	Round	Punctated	20.8
14JF420-0586	11.5	~30 (cf. 0440)	Vertically brushed	Smoothed over	Round		24.9
14JF420-0780	12.5	~30 (cf. 0440)	Vertically brushed	Smoothed over horizontally brushed	Round		27.3
14JF420-0440	13.7	30.0	Vertically brushed	Smoothed over horizontally brushed	Round		141.1
14JF420-0698	9.9	Indeterminate	Vertically brushed/eroded	Smoothed over	Round		12.8
14JF420-0210	6.1	Indeterminate	Vertically cord roughened	Eroded	Round		12.1
880027	8.2	28.0	Vertically brushed	Smoothed over	Round		47.0
880045 & 880055	7.5	15.5	Vertically brushed	Smoothed over horizontally brushed	Round		18.9
880125	8.5	Indeterminate	Vertically brushed	Horizontally brushed	Flat		35.0
880279	8.8	Indeterminate	Smoothed over vertically brushed	Smoothed over	Flat		39.4



Figure 57. Interior surfaces of selected rim sherds, showing horizontal brushing.

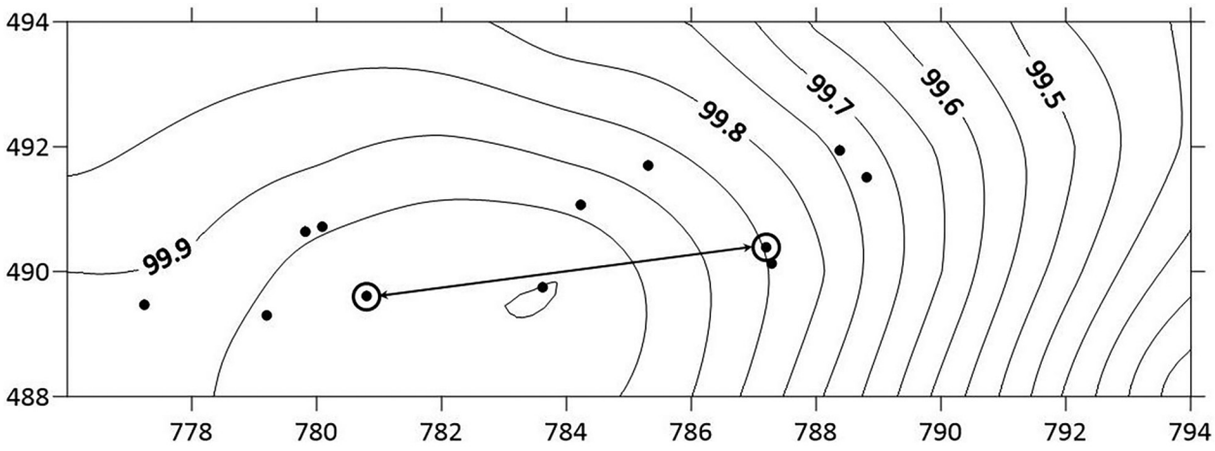


Figure 58. Cross-mend of sherds 0176 and 0779 across the block (above) with accompanying coordinates (below).

probably rather thin walled as well, assuming it did not thicken significantly from shoulder to base. If they are from the same jar, they came to rest in the lower half of the cultural horizon with notable horizontal difference. While there was only a 2-cm difference in their elevations, the smaller specimen (0779) was 78 cm farther north and 6.4 m east of the larger, near or in distinct nodes of ceramic density (Figures 31–32). The image of plotted rim sherds in the fourth and fifth levels of the block illustrates their relationship (Figure 58).

As in the case for Grasshopper Falls ware (Reynolds 1979), decoration is rare and confined to the lip or a short distance below it (Table 15; Figure 59). Only five specimens in the Quixote collection exhibit some form of decorative treatment, and even this small sample shows some variation. Two have closely spaced oblique tool impressions on the lip, and a third has punctates in that area. Of the other sherds one has a single row of punctates below the lip, and the other (0260 in Figure 59) has what was likely a single row of dowel impressions

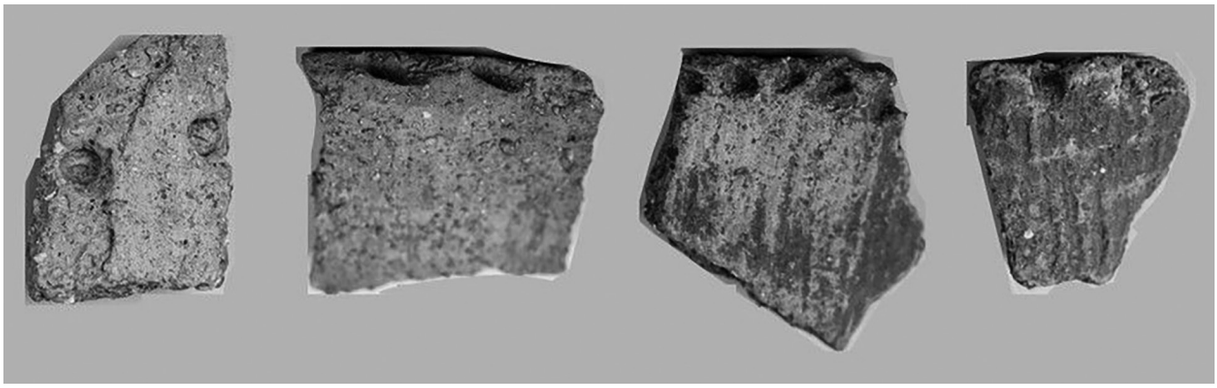


Figure 59. Decorated rim sherds. From left to right: 0260, 0828, 0937, and 0089.

that left holes but no embossing on the opposite surface.

The overall impression is that of utilitarian ware used for cooking. One body sherd with carbonized residue on the interior supports that stage of food preparation (Table 14), and it may merit componential analysis. If any vessels served for storage, there is no evidence for it, contextual or otherwise.

LITHIC ARTIFACTS

This analysis focuses on the chipped and ground stone tool assemblages. Although the most ubiquitous lithic material across the site (block and feature excavations) was, not surprisingly, debitage (n = 14,705; mass = 6,622.2 g), that debris was not analyzed with regard to reduction strategies or raw material frequencies, though both would reward future research. The impression based on mean flake mass (.45 g) is that the great majority resulted from secondary and tertiary reduction. Recovery of hundreds of examples of the latter was enhanced by fine-mesh water screening and sorting of the smallest chips from the two size grades described in the Block Excavation section. While the block excavation yielded 24 cores and 3 others were found in 1988 (see below), large flakes were rare. Only seven were of sufficient size for mapping, and the largest is just 16.7 g, slightly more than half the mass of all (32.2 g). The generally small size of chipped stone debris makes distinguishing raw materials difficult, but subjective inference is that knappers preferred local alluvial cherts (see McLean 1998) and near-local Plattsmouth and Toronto cherts from outcrops in the Stranger Creek basin east of the Delaware River watershed (Logan 1988). While this hypothesis requires testing with detailed identification of debitage, it is supported by data from cores, as well as formal and informal tools.

The chipped stone tools (n = 73), including 6 from the 1988 NRHP project, consist of 40 arrow points, preforms, and fragments, a projectile point/knife, a knife fragment, 3 drills, 17 bifaces or fragments, 3 scrapers, and 7 edge-modified flakes. It does not count an artifact listed in the KATP field lab catalog as a "point preform" that was lost before the collection was transported to KSU.

Figure 60 shows the distribution by overall plan view and by 10-cm levels of arrow points, preforms, and fragments, the most numerous lithic tool type in the block excavation. Three points enumerated in Table 16 were not from the block excavation; two were from TU1 and TU3 of the NRHP project, and the third was from 20–30 cm in the unit above F362. The numbers increase notably in the third (n = 11) and lower levels (nine in each of the latter two), despite the fewer units excavated to 50 cm. This is consistent with the overall pattern of cultural material distribution (see Block Excavations section, Figure 30). A conspicuous concentration of 19 arrow points occurred in 4 central units of the block, N488 780–784E and N490 E784; 8 of these were in the fourth level (30–40 cm). This may reflect an area of periodic refitting during the tenth-century A.D. occupation.

Nearly all arrow points are of the Scallorn type or variations of it, which appeared in the Kansas City locality ca. A.D. 500 (Table 16; Figure 61; Logan

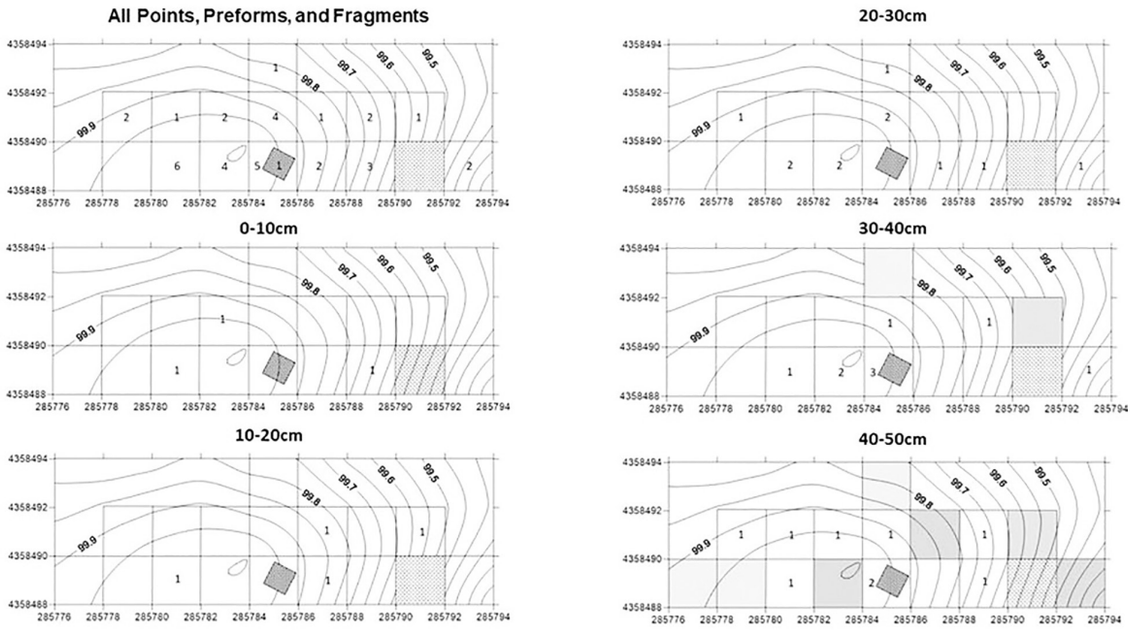


Figure 60. Distribution of arrow points in plan view by levels (n = 37). The point in TU2 was at a depth of 50–60 cm, a level not depicted. Shaded units were not excavated to depths of each map in which they appear.

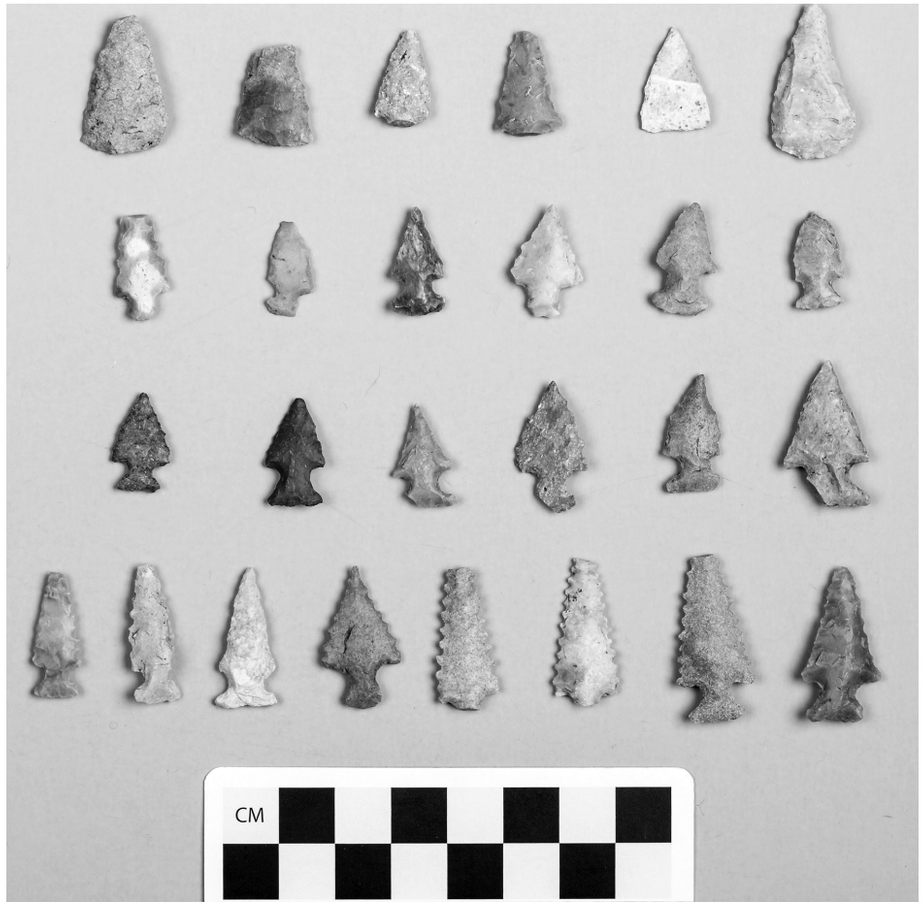


Figure 61. Arrow points. From left to right and top to bottom row, the corresponding numbers in Table 16 are 0213, 0594, 0298, 0263, 0697, 0609, 0113, 0491, 0702, 0466, 0149, 0902, 0864, 0262, 0282, 0138, 880148, 0196, 0145, 0686, 0661, 0212, 0361, 0163, 0124, and 880046. Unnotched points in top row may be preforms.

Table 16. Arrow Point Data.

Catalog number	Length (cm)	Width (cm)	Notch width (cm)	Thick-ness (cm)	Mass (g)	Chert type	Comment
14JF420-0298	17.45	10.42	5.41	3.40	.55	Plattsmouth	Less base & very small amount of tip
14JF420-0124	30.41	14.47	5.52	4.43	1.20	Light gray	Less very small amount of tip; serrated blade
14JF420-0742	18.77	20.11		3.68	1.50	Light gray	Triangular unnotched less tip; preform?
14JF420-0864	18.13	1. 65	4.50	2.48	.40	Plattsmouth	Complete
14JF420-0361	26.12	11.50	4.95	3.55	1.00	Light gray	Less base & small amount of tip; serrated blade
14JF420-0113	19.39	9.94	4.61	2.92	.50	Alluvial	Less tip; serrated blade
14JF420-0609	28.15	15.65		5.42	2.20	Light gray	Triangular unnotched; preform?
14JF420-0929	18.49	23.72		6.07	3.00	Light gray	Unnotched base only; heat treated; preform?
14JF420-0196	26.77	15.70	8.12	4.57	1.90	Plattsmouth	Small portion of base gone
14JF420-0197	14.07	11.22	?	2.46	.30	Toronto	Less tip & base; heat treated
14JF420-0316	12.85	6.52		2.29	.14	Plattsmouth	Tip; serrated
14JF420-0375	9.86	5.54		2.35	.10	Gray	Tip
14JF420-0451	8.29	7.66		3.14	.10	Plattsmouth	Tip
14JF420-0145	22.94	8.97	4.51	3.18	.50	Light gray	Complete; serrated blade; less very small amount of tip
14JF420-0138	23.85	13.38	5.05	3.42	.70	Plattsmouth	Complete; serrated blade; slight basal damage
14JF420-0491	17.38	8.52	4.20	2.22	.31	Toronto	Complete; barely retouched flake
14JF420-0686	25.37	8.72	4.96	5.31	.90	Toronto	Less very small amount of tip; serrated blade
14JF420-0697	19.08	12.74		2.33	.50	Toronto	Complete triangular unnotched; preform?
14JF420-0902	17.80	9.25	5.50	3.88	.60	Toronto	Complete; retouched tip
14JF420-0149	20.49	11.55	5.95	4.02	.60	Toronto	Complete
14JF420-0212	26.08	14.51	4.92	3.53	1.60	Toronto	Complete; serrated blade; heat treated
14JF420-0213	25.14	16.40		4.74	.90	Light gray	Complete unnotched; preform?
14JF420-0262	19.74	11.08	5.50	4.02	.60	Very dark gray	Complete
14JF420-0263	19.12	12.25	6.72	4.17	.60	Alluvial	Less base
14JF420-0264	9.14	5.37		2.07	<.10	Alluvial?	Tip
14JF420-0466	20.66	13.15	5.54	3.11	.80	Alluvial	Complete; slightly serrated blade
14JF420-0702	19.73	9.95	5.41	3.14	.50	Dark glossy gray	Complete
14JF420-0831	15.11	7.78		3.12	.30	Plattsmouth	Tip; serrated
14JF420-0163	26.96	11.98	4.89	3.32	1.00	Light gray	Less base & small amount of tip; serrated blade
14JF420-0282	19.19	10.95	5.45	3.30	.50	Alluvial	Complete; slight base damage
14JF420-0283	13.97	11.54	5.37	2.60	.40	Dark gray	Less base
14JF420-0410	13.37	11.59		3.06	.50	Plattsmouth	Less upper half; unnotched; barely retouched flake
14JF420-0519	18.02	11.95		3.46	.60	Toronto	Complete; barely retouched flake; burned
14JF420-0594	18.48	13.95		4.43	1.00	Light gray	Triangular unnotched; less tip; preform?
14JF420-0661	25.45	11.35	6.59	3.18	.80	Plattsmouth	Complete
14JF420-0717	9.74	4.94		1.56	.10	Plattsmouth	Tip; serrated
14JF420-0833	13.95	13.99		3.46	.60	Toronto	Tip
880017	13.22	10.56	5.28	2.41	.30	Alluvial	TU1; less base; potlidded
880046	28.30	15.02	6.88	5.07	1.00	Alluvial	TU1; complete
880148	21.24	10.69	5.63	3.53	.70	Toronto	TU2; complete



Figure 62. Selected chipped stone tools. From left to right and top to bottom row: projectile point/knife 0102; biface 0627; knife fragment 0422; edge-modified flakes 0547 and 0732; biface fragments 0514, 0613, 0783, and 0002; drills 1044, 0561, and 0069; scrapers 0326, 0648, and 0576.

2006a). The type is characterized by an elongate blade, often serrated, and a corner-notched hafting element. A few with blades of equilateral triangular form and no basal notching are comparable to some Late Prehistoric point types. However, these may be preforms of unfinished Scallorn points. While 17 points are complete or nearly so, the absence of tips on several and the presence of tips and basal fragments suggest that the majority are discards from refitting activities. There is no significant stratigraphic variation in the types; those with classic serrated blades occur in levels from the first (0–10 cm) to the fifth (40–50 cm).

Of 26 points with identifiable raw material types, 6 are alluvial chert, 10 are Plattsmouth, and 10 are Toronto, demonstrating exploitation of local and near-local sources. Thirteen points and fragments of varying gray color may be Plattsmouth, though their surface areas are too small to include fusilinids or other Pennsylvanian-age fossils common in cherts in that geological member. If these are Plattsmouth chert, it might signal greater preference for that raw material, which is more widely accessible in limestone outcrops east of the Delaware River watershed (Logan 1988; McLean 1998).

Notably, only one possible dart point, perhaps better classified as a projectile point/knife (PPK), as it might have served either purpose, was found at 14JF420 (Figure 62). Late Woodland sites in the region often yield both Scallorn arrow points and corner-notched PPKs, arguing a long period of transition in propulsion technology from atlatl

Table 17. Non-Arrow Point Chipped Stone Tool Data.

Catalog number	Artifact type	Length (cm)	Width (cm)	Thickness (cm)	Mass (g)	Chert type	Miscellaneous information
14JF420-0265	Biface	44.40	38.00	15.60	20.90	Plattsmouth	Crude marginal retouch
14JF420-0627	Biface	72.83	25.14	13.28	24.50	Plattsmouth	Complete
14JF420-0520	Biface fragment	15.08	17.59	5.90	1.90	Plattsmouth	Midsection
14JF420-0718a	Biface fragment	20.17	24.18	7.30	3.70	Alluvial	Base; preform?
14JF420-0718b	Biface fragment	28.17	19.05	12.23	6.20	light gray	Midsection?
14JF420-0002	Biface fragment	22.13	23.70	8.07	4.10	Winterset	Midsection
14JF420-0377	Biface fragment	24.70	28.42	8.57	5.70	Plattsmouth	Crudely retouched piece
14JF420-0214	Biface fragment	23.67	20.49	6.47	2.04	Winterset	Tip
14JF420-0514	Biface fragment	28.09	22.29	6.87	3.30	Plattsmouth	Tip
14JF420-0188	Biface fragment	20.18	14.86	5.44	1.20	Toronto	Tip; heat treated
14JF420-0376	Biface fragment	17.17	13.17	4.86	.80	Winterset	Tip
14JF420-0299	Biface fragment	10.06	23.50	7.02	1.51	Toronto	Small midsection
14JF420-0613	Biface fragment	30.43	26.61	8.54	6.50	Light gray	Tip
14JF420-0783	Biface fragment	24.11	22.19	6.99	2.90	Light gray	Tip; heat treated
14JF420-1044	Drill	35.34	28.36	5.87	3.70	Permian?	Complete
14JF420-0561	Drill	26.38	19.45	6.11	2.50	Alluvial	Base
14JF420-0069	Drill	14.06	11.28	5.86	.80	Light gray	Midsection
14JF420-0492	Edge-modified flake	14.46	17.82	4.47	1.50	Light gray	Length along axis of force; width perpendicular to axis
14JF420-0547	Edge-modified flake	53.08	23.03	7.65	6.80	Toronto	Length along axis of force; width perpendicular to axis
14JF420-0710	Edge-modified flake	38.59	25.46	8.89	6.00	Plattsmouth	Axes indeterminate; max length and width
14JF420-0816	Edge-modified flake	32.22	25.30	6.69	4.20	Toronto	Length along axis of force; width perpendicular to axis
14JF420-0128	Edge-modified flake	33.63	16.12	5.08	2.20	Toronto	
14JF420-0614	Edge-modified flake	41.27	25.08	9.89	4.40	Toronto	Axes indeterminate; max length & width
14JF420-0732	Edge-modified flake	47.32	28.16	11.88	11.50	Plattsmouth	
14JF420-0326	End scraper	41.89	28.99	13.37	13.30	Dark gray	Incipient distal retouch
14JF420-0576	End scraper	33.75	23.71	13.45	12.60	Light gray	
14JF420-0648	End scraper	30.94	29.60	13.02	10.70	Plattsmouth	Distal portion
14JF420-0422	Knife fragment	72.96	22.64	10.03	12.10	Light gray	Tip portion of long narrow knife
14JF420-0699	Point preform?				.40		Missing from collection prior to cataloging
14JF420-0102	Projectile point/knife	29.48	23.89	6.17	4.20	Light gray	Less tip; notch width = 17.6 mm
880088	Biface fragment	55.94	29.42	16.38	21.00	Plattsmouth	TU2
880160	Biface fragment	30.38	21.15	4.44	3.00	Alluvial	TU3; tip
880106	Biface fragment	25.62	32.07	8.55	6.00	Plattsmouth	TU2; midsection



Figure 63. Biface 0627 *in situ*.



Figure 64. Selected cores. From left to right and top to bottom row: 0104, 0164, 0577 (center and right), 0687, and 0771 (center and right).

and dart exclusively to bow and arrow prevalent during Late Prehistoric time (Logan 2006a, 2007; Reynolds 1979, 1987:132–133). Radiocarbon dating of the cultural horizon in the block area to the tenth century A.D. may substantiate the interpretation that the scarcity of PPKs reflects occupation of that part of the Quixote site during a time when the atlatl was being abandoned.

Other formal and informal chipped stone tools are relatively few in number and, particularly with regard to larger bifaces, are too fragmentary to infer function. A complete biface without a hafting element was encountered in vertical orientation that implied post-depositional displacement (Figure 63). It and a long blade fragment might have served as knives during butchering activities. Drills attest to perforating tasks; the only complete specimen was recovered just above F362 (Figure 51). Three scrapers indicate hide processing (Figure 62). A few marginally retouched flakes likely were discarded after expedient cutting or scraping work. Of these with regard to raw material type, 3 are alluvial cherts, 6 are Toronto, 10 are Plattsmouth, and 9 are shades of gray that also may be Plattsmouth. While these support use of local or near-local cherts, the assemblage contains two examples of Winterset chert, a material found in the Kansas River valley downstream from Stranger Creek and more abundantly in Jackson County, Missouri (McLean 1998; Reid 1984b). Here that is considered exotic (i.e., more than a day's trek from the site). The complete drill associated with the southern roasting pit, used during earlier occupation of the Quixote site, may be Permian chert. If so, it implies forays or trade relations with groups in the Flint Hills farther west of the site.

Raw material preference may be gleaned from the small sample of cores (n = 34) and tested pieces (n = 8) of chert (Table 18; Figure 64). Of these, 27 are alluvial chert, 6 or 7 are Plattsmouth, and 1 may be Toronto. These items may be reliable indicators of proximity to source, rather than preference, as

Table 18. Raw Material Types of Cores and Tested Pieces of Chert.

Catalog number	Artifact type	Chert type	Count	Mass (g)	Comment
14JF420-0095	Core	Alluvial	1	27.4	
14JF420-0104	Core	Plattsmouth	1	52.9	
14JF420-0164	Core	Plattsmouth	1	53.2	
14JF420-0266	Core	Alluvial	4	51.8	Applies to three; smallest Plattsmouth?
14JF420-0317	Core	Alluvial	1	34.5	
14JF420-0327	Core	Alluvial	1	20.4	
14JF420-0395	Core	Alluvial	1	32.8	
14JF420-0411	Core	Alluvial	2	50.8	One Toronto?
14JF420-0427	Core	Plattsmouth	1	15.5	Heated
14JF420-0503	Core	Alluvial	1	6.3	
14JF420-0522	Core	Alluvial	2	57.2	
14JF420-0548	Core	Alluvial	2	47.6	
14JF420-0577	Core	Alluvial	2	52.1	
14JF420-0687	Core	Alluvial	1	23.9	
14JF420-0771	Core	Alluvial	2	69.8	
14JF420-0787	Core	Alluvial	1	14.8	
14JF420-0800	Core	Alluvial	2	39.5	
14JF420-0817	Core	Plattsmouth	1	21.1	
14JF420-0890	Core	Alluvial	1	27.6	
14JF420-0955	Core	Alluvial	1	13.0	
880007	Core	Alluvial	1	12.0	TU1
880048	Core	Plattsmouth	1	34.0	TU1
880062	Core	Alluvial	1	37.0	TU1
880089	Core	Alluvial	2	31.0	TU2
14JF420-0284	Tested piece	Alluvial	1	30.6	
14JF420-0396	Tested piece	Alluvial	1	51.5	
14JF420-0428	Tested piece	Alluvial	1	17.3	
14JF420-0498	Tested piece	Plattsmouth	1	69.6	
14JF420-0754	Tested piece	Alluvial	1	29.7	
14JF420-0818	Tested piece	Alluvial	1	30.3	
14JF420-0891	Tested piece	Alluvial	2	47.6	

the site occupants were less likely to haul a greater mass of stones, rather than preformed or completed tools, from distant areas. If so, these confirm that alluvial cherts occurred near 14JF420, probably in stream beds or banks where glacial till was exposed, that Plattsmouth was second in frequency because it is considerably more abundant in local limestone formations, and that Toronto was more rarely procured during eastward treks.

Ground stone tools are few (n = 21, including a single hammerstone found in one of the shovel tests dug during the 1988 NRHP project) (Table 19). Seven till-derived cobbles served as hammerstones during the primary stage of flintknapping. All have one or more battered ends (Figure 65). A massive granitic cobble (2,700 g) is the presumed preform of an axe. Most of its surface is rough textured, the result of incipient pecking that resulted in a symmetrical shape. One end shows the initial shaping of a bit, and the opposite end has the rough form of a poll (Figure 65). A shallow groove, made about half way across the central portion of one

Table 19. Ground Stone Tool Data.

Catalog number	North	East	Level (cm)	Elevation (m)	Artifact type	Mass (g)	Comment
14JF420-0393	488.89	789.66	20–30	99.47	Abrader	88.2	Sandstone
14JF420-0250	488.00	784.00	20–30		Abrader	16.5	Sandstone
14JF420-0507	490.00	778.00	30–40		Abrader	24.8	Sandstone
14JF420-0913	492.00	785.77	30–35	99.42	Axe preform	2,700.0	
14JF420-0598	490.00	780.00	40–50		Bead?	4.0	Sandstone
14JF420-0475	489.69	792.66	30–40	99.15	Grinding slab	564.5	Sandstone; unwashed
14JF420-0813	491.47	788.45	20–30	99.49	Grinding slab	326.0	Fragments; soil matrix
14JF420-1011	489.97	785.27		99.59	Grinding slab?	2,350.0	Sandstone; unwashed
14JF420-1010	492.84	784.12		99.62	Grinding slab	3,700.0	Limestone; unwashed
14JF420-0463	489.73	792.09	20–30	99.19	Grinding slab?	175.4	Sandstone; unwashed fragment
14JF420-0643	491.31	782.87	20–30	99.69	Grinding stone	551.8	Sandstone; unwashed
14JF420-0034	489.15	776.30	20–30	99.63	Grinding stone?	524.5	Limestone; unwashed
14JF420-0232	488.75	783.13	30–40	99.48	Hammerstone	481.4	
14JF420-0916	492.46	785.09	30–35	99.49	Hammerstone	238.3	
14JF420-0226	488.28	782.10	30–40	99.55	Hammerstone	33.7	
14JF420-0515	490.67	778.48	30–40	99.56	Hammerstone	439.4	
14JF420-0157	488.28	780.73	30–40	99.64	Hammerstone	224.5	Broken
14JF420-0720	490.00	784.00	40–50		Hammerstone	176.5	
880212					Hammerstone	335.8	Shovel test 7



Figure 65. Selected hammerstones (paired stones at left), showing battered ends in lower photographs (left 0232 and right 0226) and axe preform (right; pecked end at center).



Figure 66. Sandstone grinding slab fragments. Left 0475 more clearly exhibits a concave surface; right 0643 has a shallower concavity. Both are unwashed.



Figure 67. Limestone grinding slab, showing longitudinally concave surface. The artifact is unwashed.

broad face, hints that an axe was the intended final product. Perhaps the implement was not completed because it was too thick (8.0 cm), despite considerable pecking, and too much effort was necessary to achieve the desired outcome.

Four slabs of local fine-grained sandstone were used for grinding, and a fifth may be a fragment of such a tool (Figures 66 and 68). The former range in maximum thickness from 19.5 to 28.7 mm, and three of those have one concave surface characteristic of grinding, presumably for plant food processing. Small thin tabular pieces of the same kind of sandstone were not uncommon among the stone debris of water- screen samples, and those lacking evident modification were not considered artifacts.

Their presence suggests that this material outcropped in the vicinity of the site. A large tabular limestone slab with a maximum thickness of 56.3 mm also served as a grinding stone, judging by a broad concavity on one face (Figure 67). All of these stones remain unwashed for inspection of phytoliths, pollen, or other plant residues that might confirm their function. Three smaller sandstone pieces were used for abrasive purposes that left shallow narrow grooves (Figure 69). Whether this was to hone arrow shafts is not clear. A sandstone



Figure 68. Possible sandstone grinding slab (1011). The surface is not clearly ground. The artifact is unwashed.



Figure 69. Sandstone abraders, left 0507 and right 0393.

disc with a central natural perforation may be a bead, though this is not definite.

All of the ground stone tools were in the richest part of the cultural horizon from the lower part of the third level (20–30 cm) to a depth of 50+ cm (Table 19). Fourteen were piece plotted, and their relative elevations are informative in this regard. All but two had come to rest within a vertical range of 27 cm (99.42–99.69 m); two others were found at even lower elevations (99.15 and 99.19 m). This suggests that use or loss, discard, and abandonment of these implements, at least in the block area, declined during the later time of activity when the upper 15–20 cm of the horizon was formed.

ANIMAL BONE AND SHELL

Carl R. Falk
Paleocultural Research Group
John R. Bozell
History Nebraska

This section provides description and analysis of animal remains collected from the Quixote site. The principal sample was derived from 2017 field investigations (Logan 2017), and a small bone sample acquired during 1988 test excavations (Logan 1990a) was included. A preliminary report on a partial sample of materials was completed in 2018 (Falk and Bozell 2019).

Laboratory Preparation

Sampling design and recovery procedures, involving water screening over 1/16-inch mesh and 10-liter flotation samples, are detailed elsewhere in this publication. Dry screening through ¼-inch mesh was limited to the uppermost 10-cm level in all units, given the relative lack of cultural material. Laboratory processing of archeologically recovered materials was initiated by student and volunteer workers under Logan's supervision. Bone and shell specimens from each catalog lot were separated into burned and unburned portions, quantified by mass (g) and placed in appropriately labeled plastic storage bags.

The partially processed animal remains were submitted to Bozell and Falk in mid- October 2018 and in early January 2019. Bozell continued the initial processing of faunal samples, following a standard protocol. Each catalog lot was passed over graduated screens fitted with square mesh openings, resulting in five size-graded samples: grade 1 (>1.0 inch [25.4 mm]; G1), grade 2 (>.5 inch [12.7 mm]; G2), grade 3 (>.25 inch [6.35 mm]; G3), grade 4 (>.125 inch [3.17 mm]; G4), and grade 5 (>.0625 inch [1.59 mm]; G5). For this study G4 and G5 samples were combined. The mass of each graded sample was determined to the nearest .1 g; mass less than .1 g was recorded as .05 g. Weighed materials were further sorted by vertebrate class, and potentially identifiable specimens were separated for analysis. Generally, a specimen was considered identifiable if the skeletal element could be established with reasonable certainty. This was accomplished with the aid of modern comparative collections, maintained by the authors and supplemented by reference materials curated by the Nebraska State Archeology Office (History Nebraska) and the Division of Zoology (University of Nebraska State Museum), Lincoln. Freshwater mussels were identified by Paul R. Picha of Bismarck, North Dakota. All samples were checked for the presence of culturally modified objects, and these are covered in the Modified Bone section.

Bone and Shell Mass

A total of 1,209.7 g of material, including both unmodified and modified bone, as well as shell, was submitted for examination. Bone preservation is mixed; many remains are fairly well preserved, but larger pieces may be chalky, eroded, and somewhat fragile. Shell is in poor condition, with most specimens heavily eroded and many effectively pulverized through decay. The 1988 and 2017 bone samples total 1,026.3 g (Table 20); burned bone comprises just over 38 percent of the combined sample. The 2017 sample, constituting 88.8 percent of the combined collection, holds 911.85 g of bone; 33.4 percent is burned.. Of the 1988 sample 114.45 g is bone; 74.8 percent is burned. The shell sample consists of 183.4 g of unmodified freshwater mussel.

Freshwater Mussel Shell

Identifiable freshwater mussel shell was found in three catalog lots from the main block excavation. A single species, threeridge or blue-point (*Amblema plicata*), is represented by four eroded specimens. Left and right valves from the same excavation unit are a probable paired set. The other items are not sided, but a minimum of three individuals is present. Threeridges are among the most common thick-shelled mussels in drainages in northeastern Kansas (Couch 1997) and might be expected in a Late Woodland faunal assemblage. Threeridge valves are known from a number of sites in northeastern Kansas, described as *Amblema costata*, a synonym, in earlier reports (Wedel 1959:119, 143,192; Widga and Hofman 2003:46). None of the Quixote specimens show indications of modification or use, though their eroded condition precludes certainty.

Table 20. Bone and Shell Mass by Excavation Year and Site Area.

Year	Site area	Unburned bone (g)	Burned bone (g)	Shell (g)	Totals
1988	Mound A	10.45	.60	0	11.05
1988	Mound B	18.40	84.30	0	102.70
1988	Non-mound or unknown	0	.70	0	.70
Subtotals		28.85	85.60	0	114.45
2017	Mound B (block excavation)	577.15	299.45	180.8	1,057.40
2017	Mound B margin (F362)	7.00	3.75	0.1	10.85
2017	Mound B margin (F363)	23.00	1.50	2.5	27.00
Subtotals		607.15	304.70	183.4	1,095.25
Totals		636.00	390.30	183.4	1,209.70

Vertebrate Specimens

By count 313 specimens, representing a variety of fish, reptiles, birds, and mammals, were recognized in this study; amphibian remains were not recorded. Table 21 summarizes numbers of identified specimens (NISP), organized by vertebrate class and size grade. Fish scales and scale fragments are considered separately in the text.

Mammals dominate; 123 specimens make up 39.3 percent of the total. Ninety-seven fish bones constitute 31.0 percent of the total. Eighty-eight pieces of reptile bone contribute an additional 28.1 percent, while five bird specimens account for only 1.6 percent. Nearly a third of the reptile sample is burned, while burned fish and mammal bone comprise 7.2 percent and 7.3 percent, respectively. The bird remains are not burned. Taxonomic and element identifications are detailed in following sections. Discussions of geographic distributions for taxonomic groups are based on late historic, twentieth century, and more recent compilations.

Fish

The sample includes 97 fish specimens: 61 vertebrae and 36 non-vertebral elements. Seventy-six G4/G5 pieces contribute 78.4 percent of the total, and 21 G3 specimens (21.6 percent) complete the sample. Six family groups are represented by the identified remains.

Table 21. Counts for Identified Vertebrae Specimens, Organized by Size Grade and Taxonomic Group.

		Size grade					
Taxonomic identification	Common name	1	2	3	4-5	Total	% burned
Osteichthyes	bony fish				24	24	
Lepisosteus sp.	gar			2		2	
Cyprinidae	carps and minnows				5	5	
Catostomidae	suckers				18	18	11.1
Carpiodes sp.?	carpsucker				1	1	
Moxostoma sp.	redhorse sucker			3	7	10	
M. carinatum	river redhorse			2		2	
Ictaluridae	North American catfish			3	6	9	
Ameiurus sp.	bullhead				6	6	33.3
Ictalurus sp.?	channel or blue catfish			1	3	4	50.0

Table 21. continued

Taxonomic identification	Common name	Size grade 1	2	3	4-5	Total	% burned
Pomoxis sp.?	white or black crappie				1	1	
Percidae	perch and darter family				4	4	
Sander sp.	sauger or walleye			10	1	11	9.1
Subtotals				21			7.2
Testudines	turtle		1	21	12	34	50.0
Emydidae	pond and box turtles		2	5	1	8	
Chrysemys picta	painted turtle		1	3		4	
Terrapene ornata	ornate box turtle			2		2	50.0
Kinosternidae	mud and musk turtles			1	1	2	
Apalone sp.	softshell turtles		1	15	10	26	34.6
Subtotals			5	47	24	76	35.5
Colubridae	colubrid snake			1	6	7	
Heterodon sp.?	hog-nosed snake				1	1	
Coluber constrictor	North American racer				2	2	
Pituophis catenifer	gophersnake			1		1	
Viperidae?	viper				1	1	
Subtotals				2	10	12	0.0
Podicipedidae	grebe			3	1	4	
Tympanuchus sp.	grouse			1		1	
Subtotals				4	1	5	0.0
Blarina sp.	short-tailed shrew				1	1	
Scalopus aquaticus	eastern mole				1	1	
Sylvilagus floridanus	eastern cottontail			4	12	16	12.5
Sciuridae	squirrel				3	3	
Poliocitellus franklinii	Franklin's ground squirrel				3	3	33.3
Castor canadensis	American beaver	2	2	2	1	7	14.3
Geomys bursarius	plains pocket gopher				23	23	
Arvicolinae	microtine rodents				15	15	
Microtus sp.	vole			1	1	2	
M. ochrogaster	prairie vole				7	7	
Synaptomys cooperi	southern bog lemming				1	1	
Ondatra zibethicus	common muskrat			2		2	
Peromyscus maniculatus	N. American deer mouse				2	2	
Canidae	canid			1		1	100.0
Canis sp.	coyote, domestic dog		1		1	2	50.0
Procyon lotor	common raccoon			1		1	
Lynx rufus	bobcat			1		1	100.0
Odocoileus sp.	deer	9	16	10		35	8.6
Subtotals		11	19	22	71		7.3
Totals		11	24	96	182		13.7

Lepisosteidae. The gar family (Lepisosteidae) is represented by two unburned specimens, a caudal vertebra and a small cranial fragment, the latter recognized by the distinctive surface ornamentation. It may be from longnose gar (*Lepisosteus osseus*) or shortnose gar (*L. platostomus*), species found throughout eastern Kansas. The spotted gar (*L. oculatus*) is restricted to the southeastern corner of the state (Cross 1967:40–46; see also Kansas Fishes Committee 2014). Based on comparisons with modern reference specimens, the vertebra is from a fish weighing ~.5–1.0 kg.

Cyprinidae. Five unburned specimens are assigned to the family Cyprinidae (carps and minnows): four vertebrae (one prethoracic [cervical], two thoracic [abdominal], and one caudal) and a near complete lower pharyngeal (left/1,4-). Based on recorded dental formulae and published geographic distributions (Cross 1967; Kansas Fishes Committee 2014), the pharyngeal may represent any of the following species: sturgeon chub (*Macrhybopsis gelida*), sicklefin chub (*M. meeki*), silver chub (*M. storeriana*), river shiner (*Notropis blennius*), bigmouth shiner (*N. dorsalis*), and possibly the red shiner (*Cyprinella lutrensis*).

Catostomidae. The sucker group (Catostomidae) is represented by 31 specimens. Eighteen are referred to the family. Elements include three lower pharyngeal fragments, a partial supracleithrum, a fragmented pleural rib, two ribs, two pterygiophores, and nine vertebrae (five thoracic and four caudal). The supracleithrum and one pharyngeal are comparable to reference examples of white sucker (*Catostomus commersoni*), a common species in northeast Kansas (Cross 1967:193–196), but the identifications are not certain. Two of the three pharyngeal elements are burned.

The genus *Carpiodes* is represented by the dorsal portion of a supracleithrum. Three members of this genus are recorded for northeastern Kansas (Cross 1967; Kansas Fishes Committee 2014), including the river carpsucker (*C. carpio*), quillback (*C. cyprinus*), and highfin carpsucker (*C. velifer*). Of the three the river carpsucker is the more widely distributed and abundant (Cross 1967:178). Identification of the single element below the genus rank is uncertain; it is unburned.

Twelve unburned specimens are assigned to the genus *Moxostoma*, the redhorse suckers. Two fragments of the posterior portion of the lower pharyngeal arch, can be confidently classified as river redhorse (*M. carinatum*), based on the presence of diagnostic large molariform teeth. The remaining 10 items (2 prethoracic vertebrae, neural spine, dentary, parietal, pharyngeal arch fragment, opercle, and 2 basipterygia) are referred to the genus. In addition to the river redhorse, the shorthead or northern redhorse (*M. macrolepidotum*) and possibly the golden redhorse (*M. erythrurum*) might be expected in the Kansas River drainage system (Metcalf 1966; Cross 1967; Kansas Fishes Committee 2014). Multiple comparative reference specimens were available for the three species, as well as for black redhorse (*M. duquesnei*), but identification beyond the genus rank could not be achieved with certainty.

Ictaluridae. The North American catfish sample consists of 19 specimens. One pectoral spine shaft fragment, two thoracic vertebrae, and six caudal vertebrae are referred to the family rank, Ictaluridae. A minimum of two species are represented. Six specimens, including hyomandibular, two coracoids, ceratohyal, second dorsal spine, and first prethoracic vertebra or atlas, are attributed to the bullhead group, *Ameiurus* sp. The dorsal spine and ceratohyal are burned. A near complete coracoid is cautiously identified as black bullhead (*A. melas*). The black bullhead and yellow bullhead (*A. natalis*) are common in the Kansas River system (Metcalf 1966:148–149). The brown bullhead (I. nebulosus), introduced in eastern Kansas in the twentieth century, is not considered a native fish in the state (Cross 1967:201–202; Kansas Fishes Committee 2014; see also Metcalf 1966:149–150).

Assigned to the genus *Ictalurus* are four specimens: lateral ethmoid, two pectoral spine shaft segments, and one thoracic vertebra; the pectoral spine segments are burned. Two members of the genus, channel catfish (*I. punctatus*) and blue catfish (*I. furcatus*), are found in the Kansas River drainage, with the channel catfish most commonly reported (Kansas Fishes Committee 2014). In addition, several specimens attributed to the family rank are likely *Ictalurus*, but flathead catfish (*Pylodictis olivaris*), a species established throughout eastern

and central Kansas, could not be excluded as a possibility.

Centrarchidae. The sunfish family is represented by a near complete hyomandibular. This is referred to the genus *Pomoxis*, which includes two species: white crappie (*P. annularis*) and black crappie (*P. nigromaculatus*). Both fish currently are found throughout eastern Kansas, but the black crappie is generally not considered native to Kansas (Metcalf 1966:158). Although the Quixote specimen compares favorably with white crappie, identification below genus is uncertain.

Percidae. Fifteen specimens represent the family Percidae (perches). Four thoracic vertebrae are identified to the family rank. The genus *Sander*, which encompasses sauger (*S. canadensis*) and walleye (*S. vitreum*), is represented by 11 specimens. Elements include the basioccipital, atlas, seven thoracic vertebrae, opercle, and quadrate. The basioccipital, atlas, and six of the thoracic vertebrae, all from F363, appear to be from the same individual, a fish weighing ~1–2 kg. Based on relative piece sizes and comparison to modern reference specimens, at least one additional fish is indicated by the opercle and quadrate; both items are from a smaller fish weighing ~.7-.8 kg. A single thoracic vertebra from the main excavation block is burned. The basioccipital and atlas compare well with modern sauger, but walleye could not be excluded as a possibility. Cross (1967:286) noted, "The sauger occurs fairly commonly in the Missouri River and rarely in the Kansas River Basin westward to the Blue River," suggesting that the species might be found in the lower reaches of the Delaware River basin. Metcalf (1966:159) indicated that sauger was reported from the "… eastern part of the Kansas River Basin by several early workers" during the late nineteenth century. The evidence for walleye is less conclusive and complicated by stocking of walleye in the late nineteenth century and possible misidentification of sauger as walleye by earlier investigators, but Metcalf (1966:158) held out the possibility that this species might have been native to the Kansas River Basin.

In addition to fish remains tabulated in Table 21, 82 scales and scale fragments were recovered during the 2017 investigation. With the exception of one G3 specimen from the main block, all specimens are from the G4/G5 fraction. Over three-quarters of the scale fragments are judged too small to allow reliable separation of cycloid and ctenoid scale types, though a single ganoid scale is readily recognizable. Eighteen other scales retain sufficient remnants of the anterior and posterior fields to warrant tentative assignment to the family rank. Specimen counts are one Lepisosteidae, six Catostomidae, six Centrarchidae, and six Percidae. A centrachid scale compares well with a sample of *Pomoxis* sp. (black or white crappie), and two scales, representing the perch family, are near identical to modern examples of sauger. Scales are consistent with taxonomic identifications, based on recovered bone, but do not contribute additional taxa.

Reptile

Reptile remains include 76 turtle and 12 snake bones. The turtle sample is dominated by shell debris, primarily carapace but a few plastron fragments as well. Cranial and limb elements are absent with the exception of a single phalange. Aside from dorsal vertebrae fused to identified neurals, vertebrae are absent. Turtles are well represented in the G3 sample (61.8 percent) but also found in G2 (6.6 percent) and G4/5 (31.6 percent). Thirty-four comparatively small carapace and plastron fragments are classified simply as turtle (Testudines); 18 of these are burned. The other 42 specimens represent three of the four turtle families reported from the Kansas River drainage. The family Chelydridae (snapping turtles) is not present in the sample, which is somewhat surprising, given the near-ubiquitous presence of common snapping turtles (*Chelydra serpentina*) in the major river systems of the central and southern plains.

Emydidae. Pond and box turtles (Emydidae) are represented by 14 specimens. Four unburned pieces (two neurals, one peripheral, and one costal) are tentatively identified as painted turtle (*Chrysemys picta*). Two others, a nuchal fragment and one peripheral, are assigned to the genus *Terrapene*, the box turtles; the nuchal is burned. The ornate box turtle (*T. ornata*) is found in suitable habitat throughout Kansas, including the Delaware River drainage, and the common box turtle (*T. carolina*) is reported from the east-central and southeastern

parts of the state, generally to the south of the immediate project area (Smith 1956:137–143; Taggart 2019). The Quixote nuchal is recognized as ornate box turtle, based on comparison of scute lines with modern examples of both species. The peripheral is classified as ornate box turtle, based on reported geographic distributions for the two species and comparisons to modern specimens.

Kinosternidae. The family Kinosternidae includes the mud and musk turtles. Two unburned peripheral bones are referred to the kinosternids group, based on the pattern and location of marginal scute lines described by Sobolik and Steele (1996:22) as well as comparisons to modern examples of eastern mud turtle (*Kinosternon subrubrum*) from Missouri and Tennessee. Two kinosternids are found in Kansas: the common musk turtle (*Sternotherus odoratus*) and yellow mud turtle (*Kinosternon flavescens*). The yellow mud turtle is not extant in the northeastern quarter of the state. Common musk turtles are documented from counties immediately south of the Delaware basin (Smith 1956:126–130; Taggart 2019). The Quixote specimens are likely common musk turtle, but the identification beyond the family rank is uncertain.

Trionychidae. Soft-shell turtles are represented by two species that are found throughout the state: the smooth soft-shelled turtle (*Apalone mutica*) and spiny soft-shell turtle (*A. spinifera*) (Smith 1956:157–162; Taggart 2019). Twenty-six specimens (1 nuchal, 3 neurals, 4 costals, 5 plastron fragments, 12 shell fragments, and 1 phalange) are referred to the genus Apalone, but species is not determined. Identifications of Apalone shell fragments were based on the distinct surface texture characteristic of the genus. Nine pieces are burned.

Serpentes. Twelve unburned snake vertebrae were recovered from excavated deposits; cranial and rib materials were absent from the samples submitted for analysis. The majority of snake bone is from the G4/5 fraction (83.3 percent); two G3 specimens (16.7 percent) complete the sample. Given variability in the morphology of snake vertebrae among and within taxonomic groups, identifications should be considered with caution (see, for example, Holman 1995:98). The Quixote specimens were compared to examples in a synoptic vertebra collection that represents 24 species found in central and eastern Kansas and central and western Missouri. Based on range maps and records of occurrences, presented by Smith (1956) and Collins et al. (2017), a minimum of 26 species might be expected in the general project area. With one exception specimens are assigned to the family Colubridae (colubrids). Single vertebrae are classified provisionally as hog-nosed snake (*Heterodon sp.*) and gopher-snake (*Pituophis catenifer*). Two specimens are North American racer (*Coluber constrictor*), and seven are attributed to the family Colubridae. A twelfth vertebra fragment may represent the family Viperidae (vipers), but more specific determination is not possible. Northeast Kansas vipers include copperhead (*Agkistrodon contortrix*), massasauga (*Sistrurus catenatus*), and timber rattlesnake (*Crotalus horridus*).

Birds

Birds are poorly represented in the combined assemblage, which is somewhat of a surprise, given the diverse and rich avifauna in eastern Kansas (see, for example, Thompson et al. 2011). Five specimens, representing two family groups, comprise the identified bird sample.

Podicipedidae. Recognized as grebe are four unburned specimens: proximal femur, distal femur, distal tibiotarsus, and tarsometatarsus. All are from F363 and appear to be from the same individual. Five members of the family Podicipedidae are reported for Kansas (Johnston 1964): red-necked grebe (*Podiceps grisegena*), horned grebe (*P. auritus*), eared grebe (*P. nigricollis*), western grebe (*Aechmorphorus occidentalis*), and the pied-billed grebe (*Podilymbus podiceps*). The Quixote specimens are nearly identical to pied-billed grebe materials from eastern Nebraska. However, comparison to skeletal remains for other grebe species was not possible, and identifications are at the family rank. Pied-billed grebes are uncommon to occasional breeders in Kansas (Johnsgard 1979:11) and are considered locally common summer residents and common transients in the state (Johnston 1964:602, 1965:7–8).

Phasianidae. A single unburned distal tarsometatarsus is referred to the genus *Tympanuchus*. Two

resident species are listed for Kansas: the greater prairie chicken (*T. cupido*) and lesser prairie chicken (*T. pallidicinctus*), the former more common in eastern Kansas and the latter in western and southwestern Kansas (Johnston 1964:609–610, 1965:18–19). Johnsgard (1979:112–113) considers the species conspecific and uses the common name pinnated grouse.

Mammals

Mammal bone dominates the Quixote sample with the NISP of 123, representing a minimum of 11 family groups. Table 21 includes the following specimen counts: 71 from G4/5, 22 from G3, 19 from G2, and 11 from G1.

Soricidae. The shrew family is represented by a complete left mandible. Based on modern distributions (Schmidt et al. 2018), the mandible might be either northern short-tailed shrew (*Blarina brevicauda*) or Elliot's short-tailed shrew (*B. hylophaga*). It is not burned.

Talpidae. A nearly complete radius is from an eastern mole (*Scalopus aquaticus*). This G4/5 specimen is not burned. Eastern moles are common throughout eastern and central Kansas and are found in suitable soil conditions elsewhere in the state (Hall 1955; Schmidt et al. 2018).

Leporidae. The leporid family is represented by 16 specimens, identified as eastern cottontail (*Sylvilagus floridanus*) based on size, general morphology, and records of occurrence (Hall 1955; Schmidt et al. 2018). Four are from the G3 fraction with the rest from the G4/5 fraction. Eastern cottontails are established throughout Kansas and are well documented in the eastern and northeastern portions of the state, including Jefferson County. The desert cottontail (*S. audubonii*) is found in the western third of the state, and the swamp rabbit (*S. aquaticus*) is known from only three counties in the extreme southeastern corner. Black-tailed jackrabbits (*Lepus californicus*) are statewide in distribution but are not present in the sample, based on the size comparisons between cottontail elements and those of the larger jackrabbit. The eastern cottontail sample consists of seven teeth, maxilla, atlas, scapula neck fragment, distal humerus, two distal femora, distal astragalus, and two metapodials. One distal femur and the astragalus are burned.

Sciuridae. The squirrel family is represented by six G4/5 specimens. Three of these (proximal femur, distal femur, and astragalus) are ground squirrel, based on comparisons to modern reference specimens; the proximal femur is burned. Two species of ground squirrel are found in eastern Kansas: Franklin's squirrel (*Poliocitellus franklinii*) and the much smaller 13-lined ground squirrel (*Ictidomys tridecemlineatus*) (Hall 1955:90–97; Schmidt et al. 2018). The Quixote specimens are Franklin's ground squirrel, based on size comparisons between elements of the two species. Three additional pieces (two isolated teeth and a cervical vertebra fragment) are referred to the family rank Sciuridae.

Castoridae. Seven specimens, including four isolated teeth, a mandible fragment, distal tibia, and a proximal phalange, are readily classified as American beaver (*Castor canadensis*). The phalange is calcined; the other six items are unburned. Beaver inhabit suitable aquatic habitat throughout the state (Hall 1955; Schmidt et al. 2018).

Geomyidae. Twenty-two isolated teeth and a single distal femur from the G4/5 fraction are pocket gopher; none is burned. Thirteen upper incisors show two parallel grooves on the anterior face of each tooth and confirm identification as plains pocket gopher (*Geomys bursarius*), a species found throughout much of the state, including the Delaware River basin (Hall 1955:105). The pooled sample represents a minimum of seven individuals. A second gopher species, the yellow-faced pocket gopher (*Cratogeomys castanops*), occurs only in the southwestern quarter of the Kansas (Schmidt et al. 2018).

Cricetidae. The cricetid family is represented by 29 unburned specimens, nearly all from the G4/5 fraction. The subfamily Arvicolinae, which includes voles, lemmings, and common muskrat, dominates the sample with 27 specimens. Four mandibles, each retaining m_1 or m_1 and m_2, along with three unsocketed m_1s, are further distinguished as prairie vole (*Microtus ochrogaster*), based on comparisons to modern specimens and descriptive characters

presented by Semken and Wallace (2002). Prairie voles are found throughout Kansas (Hall 1955:150), with Schmidt et al. (2018) noting 57 records for Jefferson County. Additional microtine materials include a mandible fragment and broken m_1, both referred to the genus *Microtus*, as well as 15 specimens, primarily tooth fragments, referred to the subfamily Arvicolinae.

An unsocketed m_3 is identified as southern bog lemming (*Synaptomys cooperi*), based on a distinctive cusp morphology, similar to that illustrated by Chomko (1980:87) for the northern bog lemming (*S. borealis*). The southern bog lemming is reported in the central and northeastern portions of the state (Hall 1955:144; Schmidt et al. 2018).

Two G3 specimens, a mandible fragment and ilium, are common muskrat (*Ondatra zibethicus*). As with beaver, muskrats are found in suitable aquatic habitat throughout the state (Hall 1955:145–147). Neither specimen is burned.

A second subfamily within the Cricetidae, Neotominae (packrats, deer mice, harvest mice and grasshopper mice) also is represented in the Quixote sample. Two mandibles retaining m_1 and m_2 and a second mandible with m_2 are recognized as deer mouse (*Peromyscus maniculatus*), based on comparison of cusp patterns to modern reference specimens. The deer mouse is common throughout Kansas (Hall 1955:130–131).

Canidae. Three specimens are assigned to the canid family. Two pieces, a near complete zygomatic and an unsocketed p_3, are referred to the genus *Canis*. Both compare well with coyote (*Canis latrans*) or similarly sized domestic dog (*C. familiaris*). Coyotes are found throughout Kansas (Hall 1955:173, Schmidt et al. 2018). The remains of an apparent domestic dog burial (adult female and five fetuses) were reported from Late Woodland levels at the Walker Gilmore site (25CC28) in southeastern Nebraska (Falk and Angus 1983). The bones of large to medium-sized canids have been described in a number of Middle Woodland and Late Woodland contexts in Kansas and Nebraska (e.g., Hoard and Bozell 2016; Johnson 1975; Martin and Brand 2011). A third canid bone, a burned proximal phalange, is morphologically similar to examined gray fox (*Urocyon cinereoargenteus*) phalanges, but small-bodied domestic dog cannot be excluded, and the specimen is identified only to the family rank Canidae.

Procyonidae. An edentulous mandible fragment is common raccoon (*Procyon lotor*), the only member of the raccoon family in Kansas (Hall 1955:194–196). The mandible is unburned.

Felidae. A proximal third metatarsal is bobcat (*Lynx rufus*), a species formerly found statewide (Hall 1955:225). This specimen is burned.

Cervidae. Three cervids occur in Kansas: wapiti, or elk, (*Cervus elaphus*), mule deer (*Odocoileus hemionus*), and white-tailed deer (*O. virginianus*). Based on historic and modern distributions for these species, wapiti and white-tailed deer could be expected in the Delaware River basin, while mule deer would be expected in the western and central areas of the state (Hall 1955; Schmidt et al. 2018). Based on comparative specimen size and morphology for deer and elk, 35 pieces are assigned to the genus *Odocoileus*. Based primarily on geographic distributions noted above, they are classified as white-tailed deer. Careful examination of three near-complete astragali from 14JF420 offers some support for this assessment. Although each item is damaged (one burned, two carnivore gnawed), review of descriptive characters detailed by Jacobson (2003, 2004), paired with comparisons to modern reference materials representing both species, substantiates identification as white-tailed deer. Table 22 summarizes identified specimens. Three deer bones are burned, and two show clear tool marks. Carnivore gnawing is recorded for six with four examples of rodent gnawing.

A G2 bone fragment from 30–40 cm in N490 E780 may represent elk or bison (*Bison bison*). It is identified tentatively as a scapular border portion, but heavy rodent gnawing precludes certain determination of both the element and the taxon. A second specimen, a G2 fragment of dental enamel from 30–40 cm in N488 E784, is similar to equine and bovid molars but cannot be confidently designated as either. These pieces are significant as they constitute the only evidence of animals larger than white-tailed deer in either the identified specimens or unidentified mammal debris.

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

					Gnawing	
Element	Portion	NISP	Burning	Tool marks	Carnivore	Rodent
Tooth	Complete	2				
	Crown	2				
Hyoid	Posterior	1				
Lumbar vertebra	Centrum	1				
Rib	Shaft	1				
Humerus	Diaphysis	1			1	
Radius	Proximal	1			1	1
	Diaphysis	2		1		1
Carpal 2+3	Complete	1				
Innominate	Acetabulum	1				
Femur	Proximal	1			1	
	Diaphysis	3				1
Tibia	Distal	3				1
Astragalus	Complete	3	1		2	
	Medial	1				
Cuboid	Complete	1		1		
	Medial	1	1			
Tarsal 2+3	Cranial	2				
Phalange 1st	Complete	1			1	
	Proximal	1				
Phalange 2nd	Complete	1				
	Proximal	2	1			
	Distal	2				
Totals			3	2	6	4
%			8.6	5.7	17.1	11.4

Modified Bone

The modified bone sample is limited to nine artifacts: the remains of two awls, an antler flaking tool, a segment of an indeterminate spatulate tool, a modified bird element of unknown function, two modified turtle bones, and two fragments of scored bone. With a single exception recovered during the 1988 tests, these specimens are from the 2017 Mound B investigation.

Awl

This group is represented by two small thin pointed bone slivers that appear to be the broken distal tips of bone awls. Both exhibit striations and heavy polish. One object from N488 E776 (30–40 cm) consists of three calcined pieces that seem to be from the same tool. The estimated length is 48.3 mm, the width is 4.4 mm, and the thickness is 3.2 mm. The second piece from N488 E788 (50–55 cm) is a small unburned awl tip, measuring 6.0 mm in length, 2.6 mm in width, and 2.2 mm in thickness.

Flaking Tool

A charred antler tine fragment is tentatively identified as the distal end of a flaking tool. The blunted end of the tine displays polish and slight striations. The specimen from N488 E780 (10–20 cm) is 19.9 mm in length and 6.9 mm by 6.3 mm in width. However, striations and polish can result from a buck's behavior, as antlers are rubbed against trees or other vegetation, starting with removal of the "velvet" and continuing through the breeding

season (Schwartz and Schwartz 1981:335). These natural processes often confuse identification and interpretation of antler tine found in an archeological context.

Spatulate Tool

A burned fragment from an indeterminate spatulate tool consists of a thin flat piece of compact mammal bone, which is heavily ground and polished on all sides with striations apparent on opposing faces. It is 11.7 mm long, 9.1 mm wide, and 2.7 mm thick. This artifact of unknown function came from N488 E788 (40–50 cm).

Modified Bird Bone

Recovered from N488 E788 (40–50 cm), this thin-walled hollow specimen was manufactured from what very tentatively is identified as the proximal ulna of a large-bodied bird (e.g., large goose or swan). The proximal end of the element was modified to produce a cone-shaped piece, tapering to a blunt slightly dish-shaped surface that shows little modification. The convex outer surface exhibits cuts, striations, and evidence of scraping that has exposed cancellous tissue. The cone-shaped piece is broken in half lengthwise and is 28.8 mm long, 12.6 mm wide, and 6.0 mm thick. The diaphysis wall is 1.4 mm thick. The intended function of this object is uncertain.

Modified Turtle Bone

Two pieces of modified turtle bone were recovered. The first of these from TU1 (50–60 cm) in 1988 is a small calcined fragment with clear striations resulting from cutting and/or sawing with a stone implement. It is likely discard from the manufacture of a tool or ornament of some kind. Measurements are 12.3 mm by 11.9 mm with a thickness of 4.5 mm. The second item is a carapace fragment (peripheral) from N490 E782 (30–40 cm). It shows some smoothing and polish on the ventral surface of the shell. The dorsal surface also is slightly smoothed with remnants of scute lines and a section of the original shell edge. Measurements are 15.5 by 11.8 mm with a thickness of 2.5 mm. The lightly burned piece appears to be a shell tool or ornament fragment, perhaps a bowl or cup. Neither specimen can be identified more specifically than turtle.

Scored Bone

Two pieces of mammal (deer?) bone display multiple long parallel cuts and striations. The first is from N490 E778 (50–60 cm) and is a section of an undetermined long bone, 92.5 mm in length, 14.9 mm in width, and 4.5 mm in thickness. The second specimen, a highly fragmented rib, was found in the 40–50 cm level of N488 E780. It is 35.1 mm long, 13.1 mm wide, and 6.1 mm thick. These artifacts may be unfinished tools, non-utilitarian objects, and/or debris discarded during the manufacturing process.

Distribution of Identified Remains

Table 23 records specimen counts, organized by depth, for the main excavation block, F362, F363,

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

	Level depths (cm) for main block excavation						Roasting pits			
Identified taxon	0–10	10–20	20–30	30–40	40–50	50–60	F362	F363	Test Unit 1	Totals
Osteichthyes			2		10	7	1	3	1	24
Lepisosteus sp.					1	1				2
Cyprinidae					1	2		2		5
Catostomidae				5	6	7				18
Carpiodes sp.?					1					1
Moxostoma sp.					7	3				10
M. carinatum			1			1				2
Ictaluridae			1	1	6	1				9
Ameiurus sp.				1	5					6

Table 23. continued

	Level depths (cm) for main block excavation						Roasting pits			
Identified taxon	0–10	10–20	20–30	30–40	40–50	50–60	F362	F363	Test Unit 1	Totals
Ictalurus sp.?					4					4
Pomoxis sp.?					1					1
Percidae				1	2	1				4
Sander sp.				1		1		9		11
Subtotals			4	9	44	24	1	14	1	
Testudines		1	1	9	11			11	1	34
Emydidae						1		7		8
Chrysemys picta			1		2	1				4
Terrapene ornata				1	1					2
Kinosternidae					1	1				2
Apalone sp.		2		8	3	9		2	2	26
Subtotals		3	2	18	18	12		20	3	
Colubridae			2		3			2		7
Heterodon sp.?					1					1
Coluber constrictor					2					2
Pituophis catenifer					1					1
Viperidae?				1						1
Subtotals			2	1	7			2		12
Podicipedidae								4		4
Tympanuchus sp.						1				1
Subtotals						1		4		5
Blarina sp.		1								1
Scalopus aquaticus				1						1
Sylvilagus floridanus			1	3	8	3		1		16
Sciuridae					2	1				3
Poliocitellus franklinii					2	1				3
Castor canadensis				4	3					7
Geomys bursarius		1	1	5	6	2		8		23
Arvicolinae		6	9							15
Microtus sp.	1		1							2
M. ochrogaster		1	3	1			2			7
Synaptomys cooperi								1		1
Ondatra zibethicus					1			1		2
Peromyscus sp.							2			2
Canidae				1						1
Canis sp.					1	1				2
Procyon lotor						1				1
Lynx rufus			1							1
Odocoileus sp.	1	2	2	9	11	1	2	5	2	
Subtotals	2	11	18	24	34	10	6	16	2	
Totals	2	14	26	52	103	47	7	56	6	

and TU1 from 1988. TU2, also completed in 1988, was situated within the excavation block, and materials from this unit are included with the 2017 sample. Recovered from the excavation block were 244 items. Identifiable bone was present in each of the 10-cm levels but was concentrated within 40–50 cm, which yielded 42.2 percent (NISP = 103) of the excavation block sample. Deposits above (30–40 cm) and below (50–60 cm) yielded 21.3 percent (NISP = 52) and 19.3 percent (NISP = 47) of the excavation block sample, respectively. Identified specimens were found from the surface to 30 cm but in low frequency with 2 in the upper 10-cm, 14 in 10–20 cm, and 27 in 20–30 cm. Fragments of bone tools and other pieces with purposeful modification were absent from the upper 30 cm but were encountered within the lower levels: two at 30–40 cm, three at 40–50 cm, and four at 50–60 cm.

Table 24 gives distributions for identified specimens within two large features filled with burned limestone and conjectured to be roasting pits. F362 produced seven specimens: one fish bone and one deer bone from above the rock concentration, four cricetid bones within the concentration, and a single deer bone below the rocks. The deer bone from above the rock concentration, a naviculo-cuboid, is burned. Faunal remains were more plentiful within F363. Twenty-seven specimens were found within the rock concentration, and 29 were recovered below the rocks. A turtle shell fragment from below the rocks in F363 is the only burned specimen.

Table 24. Distribution of Identified Specimens within Roasting Pits.

	F362			F363		
Identified taxon	Above rocks	Among rocks	Below rocks	Above rocks	Among rocks	Below rocks
Osteichthyes	1				1	2
Cyprinidae					1	1
Sander sp.						9
Subtotals	1				2	12
Testudines					7	4
Emydidae						7
Apalone sp.					1	1
Subtotals					8	12
Colubridae					2	
Subtotals					2	0
Podicipedidae					4	
Subtotals					4	0
Sylvilagus sp.						1
Geomys bursarius					8	
Peromyscus sp.		2				
Microtus ochrogaster		2				
Synaptomys cooperi						1
Ondatra zibethicus					1	
Odocoileus sp.	1		1		2	3
Subtotals	1	4	1	0	11	5
Totals	2	4	1	0	27	29

Discussion

The Quixote faunal collection is not a large one despite routine employment of systematic sampling using flotation and fine-mesh water-screen recovery techniques. The bone does not appear to have been ravaged significantly by carnivores; just over 17 percent of the identified deer bone showed evidence of gnawing, perhaps signaling a somewhat rapid burial. Furthermore, with many specimens eroded and friable, the size and character of the sample may reflect issues with bone preservation or other taphonomic factors not considered here. Possibly bone refuse was not regularly dumped or concentrated in the areas that were excavated during the 1988 and 2017 investigations. However, the identified assemblage, consisting of 313 fragments of bone and 4 pieces of shell, provides an opportunity to contribute to an evolving understanding of Central Plains Woodland subsistence practices and the general nature of past environments.

A sketch of the modern environmental setting for 14JF420 offered in the Environmental Context section of this report is broadly consistent with habitat preferences for micromammals represented in the excavated sample; habitat data are taken from Hall (1955) and Schmidt et al. (2018). Franklin's ground squirrel, for example, can be found in high vegetation, shrubby forest edge, and weedy fields. The deer mouse frequents open grasslands but also woods and forest edge. The prairie vole is found in protective grass cover, shrubby areas, and forest borders. The southern bog lemming is associated with the edges of bogs and marshes, as well as upland stands of bluegrass, thick matted ground cover, springs, and damp wet grasslands. Gophers are associated with deep loamy soils, treeless environments, and wastelands–basically, places where they are able to burrow. Identified micromammal remains cannot be confidently linked to Late Woodland activities, but they do support a suggestion that environmental conditions during and subsequent to the period of site occupancy varied little from today: tallgrass prairie with associated oak-hickory woodlands, forest, marsh, and wetlands.

Most, though not all, materials recovered from the Quixote site are present as the result of Late Woodland subsistence activities. For example, each of the identified snake vertebrae is an isolated find, some from feature samples and others from general excavation units, with nearly all from the 40–50 cm level. Although from contexts that yielded cultural remains, none of the snake bones clearly can be linked to human activities. Two specimens, showing erosion, polish, and smoothing characteristic of partially digested remains, suggest a scatological origin. While human actions may account for the presence of some or all of the snake bones, it is more likely that they entered the deposit through unknowable but natural means. Shrew, mole, vole, mouse, and gopher remains also are likely non-cultural intrusions, the animals perhaps attracted by human activity but entering the deposit through natural processes; however, almost certainly some of these intrusions were contemporaneous with human occupations.

Fresh-water mussels, fish, turtles, birds, larger-bodied rodents (i.e., ground squirrel, beaver, and muskrat), along with the cottontails, canids, raccoon, bobcat, and deer undoubtedly played multiple roles in the economy of Late Woodland peoples, contributing to the subsistence base and providing raw material for the manufacture of clothing, tools, and ornaments. When tabulated by NISP, the most common subsistence remains, in order of descending frequency, are fish, turtle, deer, cottontail, and beaver. Grebe, grouse, canids, raccoon, bobcat, and mussel are present but in low frequency. Although not formally tabulated, the greatest dietary contribution unquestionably is provided by deer. Much of the unidentified and heavily fragmented bone is presumably deer, and well over a third of this material is burned or calcined. Some of the observed fragmentation is a function of preservation conditions, but Woodland peoples doubtless processed deer carcasses to retrieve marrow and/or manufacture bone grease.

While the primary focus seems to have been on deer, the presence of fish, aquatic turtle, beaver, muskrat, and raccoon attests that Woodland peoples were taking advantage of aquatic and riparian habitats in and near Cedar Creek and the Delaware River. However, the low frequency of mussel shell may be noteworthy, given higher frequencies for mussels in regional Late Woodland sites. The absence of bison and/or elk bones might indicate that the site's occupants were not hunting in the

upland prairies, or if they were, meat packages containing bone were not returned regularly to the site. The botanical remains from 14JF420 argue for a warm weather occupation (see Macrobotantical Remains section). Unfortunately, the recovered faunal sample lacks suitable deer mandibles or dentition with which this idea might be evaluated. Fish scales and vertebrae can contribute to a study of seasonality, but preservation of these materials, especially the scales, is not optimal for such studies. The relatively common occurrence of fish and turtles at the Quixote site is generally consistent with a warm season occupation.

While deer, fish, and turtle bones comprise the largest fraction of the sample, the bones of these animals are not abundant in the fill from F362 and F363. Analyses of lipid residues from stones in F362 and F363 appear to demonstrate that the flesh of these animals was prepared in the exposed roasting pits (Malainey and Figol 2019). Lipid data indicate that large herbivore meat (presumably deer) was prepared in F363. Further, lipid residue from F362 supplied evidence of not only large herbivores but also of meat with medium fat content, such as fish and turtle, as well as plant material.

Looking beyond the Quixote site, a number of faunal samples provide useful comparison. Additional Late Woodland assemblages from the northeast Kansas-southeast Nebraska area include materials from the Walker Gilmore site (Falk and Angus 1983; Steinacher 1983) and the Avoca site (Flynn 1991). While a number of other Late Woodland sites have been investigated in the region, they have yielded very sparse faunal remains, generally fewer than 20 specimens, judged to be of limited comparative value. Excavations at Middle Woodland (Kansas City Hopewell) components have generated larger faunal samples, specifically Trowbridge (14WY; Johnson 1975), Quarry Creek (Logan and Banks 1993), and Renner (Martin and Brand 2011) sites. Plains Woodland sites, located to the west in central Kansas, typically produce larger faunal collections; for example, Forrest (14PA303; Hoard and Bozell 2016), Wallace (25GO2; Winfrey 1991), and Kraus I (14EL313; Bozell 2019 and Miller 2019) sites. Wallace is a Middle Woodland component, while Forrest and Kraus I contain Late Woodland (Keith Phase) components.

Faunal assemblages from each of these components are compared in Figure 70, using percent of NISP within each case. However, these data and remarks below should be considered of only very general utility as these collections represent a varying array of recovery and sampling strategies, specimen identification, and reporting criteria. Despite the difficulties, several broad trends are evident that may be pertinent to overall assessment of the Quixote sample and form a basis for future analysis and interpretation of Central Plains Woodland faunal samples.

During the Middle Woodland period very limited use of fresh-water mussels is apparent, both in the east (Renner, Trowbridge, and Quarry Creek) and to the west (Wallace), though fish and turtles are present somewhat more regularly. Mussels occur more often at the Late Woodland components in both the east and the west. At 14JF420 fish make up the largest proportion for all samples considered. The frequent harvesting of mussels by Late Woodland peoples also corresponds with production of shell beads and other ornaments and tools found in both domestic and mortuary contexts (Bozell 2006:100–101; Kivett 1953). Birds

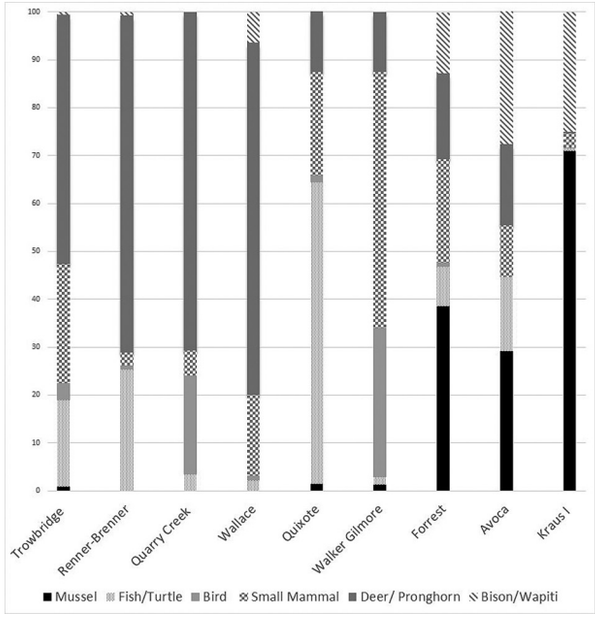


Figure 70. Percent of NISP for select Central Plains Woodland faunal samples.

generally are not common at most of these sites but exist in elevated numbers at Quarry Creek and Walker Gilmore sites. Small mammals appear in all samples but with no discernible pattern, based on temporal period or geographic region.

The most notable pattern is that deer (and deer and pronghorn from the Wallace site to the west) dominate all the Middle Woodland samples where they comprise between 50 and 80 percent of the combined NISP values. While still likely the dominant source of meat during the Late Woodland period, given the comparative large body size, NISP contributions average less than 20 percent. Bison or wapiti do not occur often in any of the Middle Woodland samples, but their bones are recovered with increasing frequency during the Late Woodland period, particularly to the west.

Summary

The faunal sample from the Quixote site is comprised of 1,209.7 g of material. Slightly over 9 percent was acquired during limited testing in 1988, but the majority was collected in 2017 as the result of larger block excavations using consistent fine-screen recovery protocols. The combined sample consists of mussel shell (183.4 g), burned bone (390.3 g), and unburned bone (636 g). Much of this material is heavily fragmented unidentifiable debris for which the element and taxon could not be determined. The fragmentation is doubtless a product of both preservation conditions and intentional processing of animal remains, chiefly during food preparation. Nine modified specimens were found: awl tips, a possible antler flaking tool, a spatulate tool fragment, and various pieces of cut, polished, and striated bones of unknown function.

Three-hundred-thirteen unmodified bones and four pieces of mussel shell were identified to element. These items were assigned to 45 taxonomic groups, including mussel (1 taxon), fish (13 taxa), turtle (6 taxa), snake (5 taxa), bird (2 taxa), and mammal (18 taxa). Most of the identified remains are believed to be present in site deposits as a direct result of subsistence and related cultural activities. Small mammal (i.e., insectivores, gophers, voles, and mice) and snake bones likely entered the deposit through various natural processes, and their temporal associations are problematic. The most common animals in the assemblage are deer, softshell turtle, and fish, particularly members of the sucker family, all of which played a significant role in the local economy. Occasionally contributing to the diet or providing needed raw materials were beaver, pond/box turtle, catfish, crappie, perch, grebe, grouse, cottontail, muskrat, ground squirrel, canid, raccoon, and bobcat.

The identified sample is consistent with a meat-based subsistence economy focused on locally available animals, particularly deer, fish, and turtle. These animals were harvested in addition to a variety of plant materials, such as hazelnut and a variety of domestic and wild seeds and fruits (see Macrobotanical Remains section). Season of habitation is not directly apparent in the faunal sample, but the presence of significant numbers of fish and turtle bone is consistent with botanical evidence that points to a warm weather occupation. Finally, micromammal habitat preferences, reflected in the limited Quixote sample, suggest that environmental conditions during and subsequent to the period of site occupation varied little from today: tallgrass prairie with associated oak-hickory woodlands, forest, marsh, and wetlands.

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MACROBOTANICAL REMAINS

Gina S. Powell
U.S. Army Corps of Engineers, Kansas City District

This section presents the analysis of plant remains from flotation samples taken during the 2017 KATP field school investigation at 14JF420. Sixty-nine samples from excavation units and features were analyzed, resulting in the identification of wood, bark, nut shell, squash rind, and seeds of cultivated and wild plants. The occupants of the Quixote site were farmers, as well as hunters, gatherers, and fishers.

Previous Research

The Grasshopper Falls phase of the Late Woodland/Early Ceramic period in eastern Kansas was a time of increased reliance on native cultivated plants. Through the hard work of archeologists and archeobotanists, it is now known that native plants were domesticated, cultivated, and encouraged in gardens before maize, a tropical domesticate, became predominant in the midcontinent (Adair 1988, 2006). The timing of the adoption of maize varies in the midcontinent, but begins around A.D. 600, with maize becoming dominant around A.D. 900. Common beans and new varieties of squash and other crops came later.

The earliest directly dated maize in Kansas was recovered at the Avoca site in nearby Jackson County and dated to 1220±40 B.P. (corrected) with a median probability of A.D. 799, and a second maize fragment dated to 1165±40 B.P. (corrected) with a median probability of A.D. 889 (Adair 1991, 2006). The Avoca site consisted of an unusually large house with associated interior and exterior pits, also attributable to the Grasshopper Falls phase.

Radiocarbon dates on hazelnut shell from F362 and F363 are reported in the Features section (Table 12). These dates are slightly earlier than the Avoca site dates, and no unequivocal maize was found during the analysis of the Quixote samples. It is quite possible that microremains, such as pollen, phytoliths, or chemical traces of maize, could be present on the artifacts and should be sought in the future.

Sampling

As part of the KATP field school, flotation samples were collected from two types of proveniences. Soil was "chunked out" of the provenience, using a trowel or small square shovel and placed into a graduated 10-liter bucket. Removing soil in small chunks (2–4 cm thick), instead of scraping with a trowel, is preferred because it is more likely to preserve, rather than shave, charcoal. Artifacts were retained within the soil sample, but large rocks were removed. Once the bucket was full to the 10-liter mark, the soil was transferred into a plastic sandbag along with two labels, each sealed inside a small zip-top bag. One of these labels followed the light fraction, and the other accompanied the heavy fraction after flotation. Each flotation sample was assigned a record number.

One 10-liter sample was removed from each 10-cm level (excluding the 0–10 cm) from the southwest corner of each 2 by 2-m excavation unit, resulting in a series of column samples across the main excavation block (Table 25; Figure 71). One 10-liter sample was removed from each of Features 358, 361, 364, 365, 367, and 369, which were found during excavation. Large roasting pits, F362 and F363, were collected entirely, using 10-liter bags, resulting in 25 samples from F362 and 96 from F363. A total of 193 samples, representing 1,850 liters of sediment, was collected and processed. Sixty-nine of these, representing 674 liters of sediment, were analyzed for this report (Table 25).

Processing

The samples were processed at the KSHS in Topeka after the field school was finished. A small team of experienced flotation technicians assisted the author. Each sample was remeasured prior to flotation.

Table 25. Summary of Analyzed Samples.

	Columns	Features	Total
Number of samples	45.00	24.00	69.00
Volume (L)	448.50	225.50	674.00
Charcoal >2 mm, weight (g)	17.51	309.53	327.04
Identified seed number estimate	473.00	474.00	947.00

506N											Totals
504N										F363 6/25	6
502N											
500N											
498N											
496N											
494N											
492N						F361 1/1 10-40 cm 0/3					1
490N			10-60 cm 5/5	10-50 cm 4/4	F365 1/1 F358 1/1 10-50 cm 1/4	10-50 cm 4/4	10-30 cm 0/2	10-50 cm 4/4	10-30 cm 0/2		20
488N		10-50 cm 4/4	10-50 cm 0/4	F367 1/1 10-50 cm 4/4	10-40 cm 3/3	F364 1/1 10-50 cm 4/4	10-50 cm 4/4	F369 1/1 10-60 cm 5/5		20-40 cm 0/2	27
486N											
484N											
482N	F362 12/96 10-40 cm 3/3										15
480N											69
	774E	776E	778E	780E	782E	784E	786E	788E	790E	792E	794E

Figure 71. Distribution of analyzed flotation samples at the site. Coordinates of the southwest unit corners are along the left and bottom margins. Shaded cells had no sorted samples. Sorted sample tallies are in the right column.

A SMAP (Modified Shell Mound Archeological Project) machine, using ordinary water pressure, was used to separate the heavy fraction, which sinks, and the light fraction, which floats to the top and pours over the machine's spout into a geological sieve. Heavy fractions were gathered in ordinary plastic window screen, with opening measuring 1/16-inch; light fractions were caught in a No. 40 geological sieve, with openings measuring .425 mm (.0165 inches). Light fractions were transferred from the sieve to sheer cloths, tied into bundles, and dried in the shade along with the heavy fractions.

The efficiency of the flotation process was tested by adding 50 partially charred poppy (*Papaver somniferum*) seeds to 10 flotation samples. Poppy seeds are not native to Kansas but are the size of commonly recovered archeological seeds and should be retrieved at the same rate as charred archeological seeds. The seeds were added to the samples while they were in the large pile waiting to be floated. A list of the test samples was compiled and then filed until most had been floated. Fortunately, several of the floated test samples were sorted before flotation was completed, revealing that the recovery rate of the KSHS SMAP machine was unacceptable. Thus, the last 12 samples were bucket floated.

Bucket flotation is more labor intensive but allows greater control over recovery and eliminates contamination among samples. Each was remeasured in a 12-liter graduated bucket and then divided into two or three 10-liter buckets for ease of processing. Each bucket of sediment was filled halfway with water and stirred to break up the lumps. The floating material was decanted through a No. 40 geological sieve. The process of filling the bucket, stirring, and decanting was repeated until

no more floating items were observed. The light fraction was transferred to a chiffon cloth. After the two or three buckets from a provenience had been decanted in this manner, the remaining contents were passed through the plastic window screen. This material, referred to as the heavy fraction, was gathered in the window screen and hung to dry.

The 10 samples that contained poppy seeds were sorted; three had been bucket floated. Table 26 shows the results of the poppy seeds tests. The samples that were floated with the SMAP machine returned between 4 and 16 of 50 poppy seeds (8–32 percent), while those that were bucket floated returned 38, 39, or 40 seeds (76–80 percent). It is a troublesome mystery where the 10–12 poppy seeds were lost during bucket floating; perhaps they stuck to and were discarded with large rootlets. The 68–92 percent of poppy seeds lost during flotation with the SMAP machine probably were lost through the 1/16-inch heavy fraction mesh during flotation. Even if the seeds floated, they might have been pushed through the mesh at the sides of the barrel and lost. This hypothesis is supported by the recovery of a single poppy seed in sample 62.001 (Table 26) to which none had been added. The 12 bucket-floated samples returned 461 identified seeds, while the 57 SMAP machine-floated ones returned 658 identified seeds. This SMAP machine should not be used again without significant modification and additional testing.

Analysis

The heavy and light fractions were analyzed in slightly different manners. Because the entire bulk of sediment from the two large roasting pits was sampled for flotation, it was imperative to retrieve the artifacts from them for analysis by Principal Investigator Logan. The heavy fractions were sorted and cataloged by volunteers during a KAA winter event. The heavy fractions were passed through 1/4-inch and 1/8-inch screens, and objects of interest, including debitage, pottery, animal bone, fish scale, burned earth, and other artifacts, were sorted from the natural pebble residue. Anything recognized as plant material in the >1/8-inch fractions was pulled, bagged, and set aside with the light fraction for further analysis.

Archeobotanical analysis began with the previously sorted heavy fractions. The author passed each sample through a set of geological sieves of the following size meshes: 1/4 inch, 2 mm, 1 mm, .5 mm, and the pan. An attempt was made to retrieve all of the charcoal from the heavy fraction to be analyzed with the light fraction charcoal. Each light fraction, along with the charcoal pulled from the heavy fraction, was then passed through the same set of sieves. Large rootlets were pulled and discarded. Charred botanical specimens from the >2-mm sieve (large fraction) were fully sorted using a Bausch and Lomb binocular microscope

Table 26. Summary of 50-Seed Poppy Recovery Test.

Record number	Provenience	Depth (cm)	Bucket floated	Poppy seeds recovered
107.001	N490 E784	30–40	No	6
119.001	N488 E782	10–20	No	7
143.001	N488 E786	40–50	No	5
362.005	F362	Above rocks	Yes	38
362.014	F362	Above rocks	Yes	39
362.031	F362	Above rocks	No	4
362.042	F362	Above rocks	No	10
363.001	F363	40–45	No	5
363.024	F363	55–60	No	16
364.002	F364	40–50	Yes	41
62.001*	N488 E788	10–20	No	1

*Poppy seeds were not added to this sample, so it represents contamination from another sample.

with a zoom range of 10–70X into categories, such as wood, bark, stem, nut shell, indeterminate, etc., and then counted and weighed; all weights are in grams. Items weighing less than .01 g are marked as .01 g.

The fractions from the <2-mm sieves (small fractions) were searched for seeds and seed fragments. For simplicity the term "seeds" is used here as a catch-all term for grass caryopses, chenopod fruits, achenes, and all other small hard disseminules. Those items usually pulled from the >2-mm fractions, such as nut shell, but present only in the <2-mm fractions are marked as present in the tables. Seeds were counted but not weighed. The four samples from the lowest stratum of F362 were not fully sorted due to their large size. In those cases the large fractions were scanned for non-wood items, and the small fractions were scanned for seeds, following the usual method.

Seed Number Estimates (SNE) are estimates of the number of whole unbroken seeds, calculated from the broken pieces. Ubiquity indices for the seeds were calculated to ascertain if a seed type was limited to a single provenience or common and spread around the site. The index is simply the ratio of the number of samples that contain an item divided by the total number of analyzed samples, in this case 69. Densities are calculated to control for sample sizes by dividing the weight or count of an item of interest by sample volume.

Specimens that could not be identified with confidence by the author were sent to Dr. Neal Lopinot, archaeobotanist and Director of the Center for Archaeological Research at Missouri State University in Springfield, Missouri, for a second opinion.

Results

Overall, the plant remains were in good condition with only moderate evidence for erosion due to post-depositional processes. It is important to note that, due to the problems with the flotation method, it would not be prudent to directly compare the amount of remains in the Quixote samples with other sites.

Only summary tables are published in this report. The full data analysis tables are on file at the KSHS.

Fuel and Construction

Wood was common (Table 27) and particularly abundant in the samples from F362, the southern roasting pit. These contained 79 percent by weight of the wood from all analyzed samples.

Identification to taxon was not performed for the wood in the flotation samples but was carried out for the large fragments found in a layer of charcoal and small charred logs (Figure 72) below the layer of burned rocks (Figure 50). Based on sizes alone (Table 28), the specimens appear to be small limbs, measuring 2–9 cm in diameter. The fuel selected for the carefully constructed fire at the base of the feature was oak, maple, and elm. The former two taxa are high-quality firewoods, and elm is a medium-quality firewood (Wallace 2013).

Bark, twigs, stems, and fungus were not particularly abundant (Table 28). Bark was more common in the lower strata of F362 where wood was very common, indicating that the limbs were burned with attached bark.

Nuts

Hazelnut was by far the most commonly recovered wild plant remain in both the flotation (Table 29)

Table 27. Summary of >2mm Remains.

Fuel & Construction	Column counts	Mass (g)	Feature counts	Mass (g)	Total counts	Total mass (g)
Wood	1,317	15.55	1,302+	307.17	2,619	322.72
Bark	5	.04	85	.53	90	.57
Twig	1	.01			1	.01
Twig/vine	1	Trace	1	.03	2	.03
Grass stem	Present		Present		Present	
Herb stem	1	Trace			1	Trace
Fungal tissues	1	.01	17	.07	18	.08
Totals	1,326	15.61	1,405	307.80	2,731	323.41

and the water-screen samples. It has been hypothesized that a drastic increase in hazelnut at Middle and Late Woodland sites in Illinois and Missouri might have been the result of hazelnut cultivation, possibly via selective burning (Lopinot in Nixon et al. 1984). Hazelnut was a common understory shrub, cited during General Land Office surveys in the Topeka area (Powell 2018). Hazelnut is underrepresented on the landscape today due to farming and burning practices and competition from invasive shrub species, such as Asian bush honeysuckle.

Other nut taxa—hickory, black walnut, and acorn—are represented by only a few fragments each.

Maize

Two possible maize cupule remains were recovered during analysis and sent to Lopinot for a second opinion. One is sample 363.024, which came from F363 below the thermally altered rocks. Lopinot agreed that this might be a maize cupule fragment, but it is too small to be certain. The second fragment (Figure 73) was from F367 under one of the large limestone slabs from the main excavation block. Lopinot confirmed that it was a good candidate for maize. To test this, the specimen was sent for isotope analysis to D-AMS, which in turn submitted the sample to the Stable Isotope and Geochemistry Lab at Washington State University, Vancouver. The result stated that the specimen had a δ13C value of –24.42. Therefore, it was not maize with the chemical signature typical of a tropical plant but part of a C3 plant with a chemical signature typical of a temperate plant.

While people living at the Quixote site might have known about maize, they may have used it in such a way as not to leave recognizable macroremains. However, maize microremains might be preserved in the form of phytoliths, pollen, or chemical residue.

Other

Squash rind (*Cucurbita pepo*) large enough to be recovered in the >2-mm fractions was present in

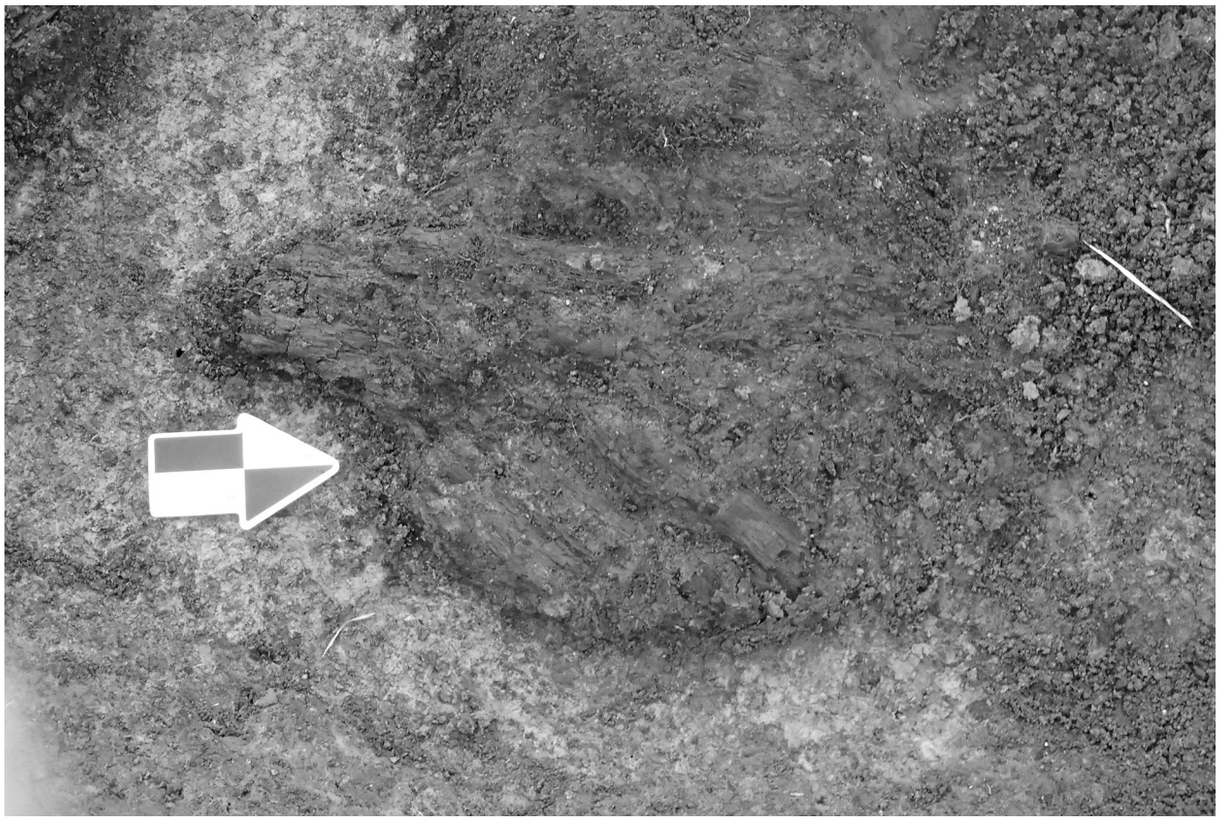


Figure 72. Large fragments of wood at the base of F362.

Table 28. Taxon Identification of Large Piece-Plotted Wood from F362 and F363.

Piece-plot number	Length (cm)	Width (cm)	Thickness (cm)	Taxon	Notes
362.500	20+	6.0	5.0	Oak, indeterminate, & elm, probably American	
362.501	8	4.0	4.0	Maple	
362.502	10	3.0	2.0	Oak, red group	Wide rings
362.503	10	2.5	2.5	Elm, possibly American	Very tight rings
362.504	10+	6.0	4.0	Oak, red group	
362.505	20+	5.0	4.0	Oak, red group	Large chunks
362.506	25	9.0	6.0	Elm, possibly American	1-2 early wood pores
362.507	8	4.0	4.0	Oak, white group	Not well preserved
362.508	Unknown	3.0	2.0	Elm, probably slippery	12+ rings
362.509	20+	4.0	3.0	Oak, white group	Wide rings
362.510	15+	4.0	3.5	Oak, red group	Ca. 11 rings
362.511	13	3.0	3.0	Oak, white group	Very tight rings, crevices in limb stuffed with worm castings
362.512	Unknown	2.0	2.0	Elm, possibly American	Small diameter branch in many pieces, 7 or 8 rings
362.513	Bag of charcoal			Oak, red group, & elm, American	Only looked at 2 pieces
362.514	10+	4.0	3.0	Oak, red group	Wide rings
363.030	12+	4.0	3.0	Oak, red group	

Table 29. Summary of Nut Remains.

	Column		Feature		Totals	
Other	Count	Mass (g)	Count	Mass (g)	Count	Mass (g)
Hazelnut	162	1.50	50	.51	212	2.01
Thick hickory nut shell	6	.05	4	.06	10	.11
Black walnut	2	.08	5	.09	7	.17
Hickory family	5	.04	5	.05	10	.09
Acorn nut shell	2	.01			2	.01
Nut shell, indeterminate	4	.01	3	.03	7	.04
Totals	181	1.69	67	.74	248	2.43

only 3 samples (Table 30), but it was retrieved from the <2-mm fractions of 22 additional samples in both the columns and the features. All specimens were highly eroded and in only one instance was the thickness measured. A fragment from 40–50 cm in N490 E788 measured .55 mm thick. Squash was probably a common food and tool plant regardless of its scarcity in the samples.

A pedicel, some rhizomes, a seed head or stem, and some kind of twisted stem were found in low numbers.

Indeterminate material, described here as dense lobe-like objects, were found only in feature samples and mostly from within and below the rock stratum of F362.Numerous quantified fragments occurred in the large fractions (n = 58), and many more were noted in the small fractions; in many cases the large fractions were not fully sorted because they



Figure 73. Fragment thought to be a maize fragment from Feature 367.

are so big. The substance looks like plant material that is very dense, like nut shell, and is eroded with rounded edges. Lopinot suggested that it might be hickory nut husk, which has a dense and homogeneous interior. None of the items have distinctive surfaces and, as eroded as they are, identification might not be possible. Whatever it is, the material seems to be limited to F362, except for a single specimen from F367 in the excavation block.

Unidentified starchy fragments are bubbly and shiny, as if they represent a charred sugary substance (n = 3) like fruit flesh, or are thin and sheet-like, which could be nut hull (n = 1).

The rest of the items, labeled as indeterminate (n = 39), are too small or eroded to assign to any other category.

Seeds

Nearly all members of the Eastern Agricultural Complex (detailed in Adair 2006; Fritz 1990, 2019) are represented in the Quixote site samples (Tables 31–37). This suite of plants native to the midcontinent was cultivated and domesticated centuries prior to the introduction of maize. The domesticated, cultivated, and possibly ("equivocal") cultivated plants at the site are squash (discussed above), sunflower (*Helianthus annuus* var. *macrocarpus*), marshelder (*Iva annua* var. *macrocarpa*), chenopod (*Chenopodium berlandieri*), maygrass (*Phalaris caroliniana*), erect knotweed (*Polygonum erectum*), and little barley (*Hordeum pusillum*). Several possible cultigens also are represented commonly:

Table 30. Summary of Other Remains >2mm.

	Column		Feature		Totals	
Other	Count	Mass (g)	Count	Mass (g)	Count	Mass (g)
Squash rind	2	.01	1	.01	3	.02
Pedicel	Present				Present	
Rhizomes	Present		Present		Present	
Seed head or stem	1	.01			1	.01
Twisted stem	Present		Present		Present	
Dense, lobe-like			58	.73	58	.73
Totals	3	.02	1	.01	4	.03

Table 31. Starchy Seed Summary.

Common name	SNE	Identified SNE (% of 947)	Ubiquity index
Chenopod	98	10.3	62.3
Little barley	314	33.2	59.4
Little barley, possible	5	.5	5.8
Maygrass	429	45.3	72.5
Maygrass/little barley	4	.4	2.9
Erect knotweed	4	.4	5.8
Erect knotweed, possible	1	.1	1.4
Sorghum, domesticated	1	.1	1.4

Table 32. Little Barley Measurements of Complete Specimens Only.

Provenience	Length (mm)	Width (mm)
N488 E788 30–40 cm	2.9	1.5
	2.6	1.3
	2.3	1.3
N488 E784 40–50 cm	2.5	1.3
N488 E780 40–50 cm	2.5	1.1
N488 E786 30–40 cm	2.9	1.4

Table 33. Oily Seed Summary.

Common name	SNE	Identified SNE (% of 947)	Ubiquity index
Sunflower kernel	6	.6	7.2
Sunflower/ marshelder kernel	1	.1	1.4
Marshelder kernel	2	.2	2.9

Table 34. Equivocal Cultigen Summary.

Common name	SNE	Identified SNE (% of 947)	Ubiquity index
Amaranth	4	.2	5.8
Barnyard grass	1	.4	1.4
Panicgrass	32	.1	15.9
Purslane	2	3.4	2.9

Table 35. Fleshy Fruit Seed Summary.

Common name	SNE	Identified SNE (% of 947)	Ubiquity index
Black nightshade	1	.1	1.4
Cherry	1	.1	1.4
Cherry/plum	1	.1	1.4
Plum	1	.1	1.4
Grape	4	.4	4.3
Hawthorn	5	.5	7.2
Raspberry/ blackberry	2	.2	2.9

amaranth (*Amaranthus* sp.), purslane (*Portulaca oleracea*), barnyard grass (*Echinochloa muricata*), and panic grass (*Panicum* sp.). Tobacco (*Nicotiana* sp.) is not present in the samples.

Archeobotanists recognize that seeds from domesticated plants exhibit morphological changes that distinguish them from their wild relatives. For example, sunflower seeds increased dramatically in size via the prehistoric selection process; another similar example is marshelder. With domestication other seeds also changed size or shape, or underwent a decrease in seed coat thickness. Plants in these categories are chenopod and erect knotweed. Seeds from plants that do not display observable

Table 36. Grass and Miscellaneous Seed Summary.

Common name	Latin name	SNE	Identified SNE (% of 947)	Ubiquity index
Grass family	Poaceae	13	1.4	14.5
Bean family	Fabaceae	1	.1	1.4
Bedstraw	*Galium* sp.	1	.1	1.4
Knotweed	*Polygonum* sp.	2	.2	2.9
Pokeweed	Phytolacca americana	4	.4	5.8
Ragweed	*Ambrosia* sp.	3	.3	4.3
Smartweed	*Polygonum* sp.	2	.2	1.4
Star grass	*Hypoxis* sp.	1	.1	1.4
Sunflower family	Asteraceae	1	.1	1.4

Table 37. Uncharred Seed Summary.

Latin name	Common name
Acalypha sp.	Copperleaf
Amaranthus sp.	Amaranth
Ambrosia sp.	Ragweed
Asteraceae	Sunflower family
Chamaecrista fasciculata	Partridge pea
Chenopodium berlandieri	Chenopod
Convolvulus sp.	Bindweed
Cornus drummondii	Roughleaf dogwood
Cyperaceae	Sedge family
Desmodium sp.	Ticktrefoil
Eleocharis sp.	Spikerush
Euphorbia maculata	Spotted spurge
Euphorbia sp.	Spurge
Fabaceae	Bean family
Galium sp.	Bedstraw
Helianthus sp.	Sunflower
Lespedeza sp.	Bush clover
Mollugo verticillatus	Carpetweed
Penstemon sp.?	Beardtongue
Physalis/Solanum	Groundcherry/nightshade
Poaceae	Grass family
Polygonum sp. (biconvex)	Smartweed
Portulaca oleracea	Purslane
Rubus sp.	Raspberry/blackberry
Setaria sp.	Bristlegrass
Silene sp.	Campion
Solanum ptychanthum	Black nightshade
Solanum rostratum	Buffalo bur
Teucrium canadense	Canada germander
Verbena sp.	Verbena

morphological changes but are in consistent association with domesticated plants and commonly found in large numbers or in storage contexts are considered to be cultivated or at least encouraged in gardens.

Squash, sunflower, and marshelder are all oily seeded crops that were domesticated during Archaic times. Marshelder fell from favor during prehistory, but the others continue to be grown and harvested to this day. Chenopod, maygrass, erect knotweed, and little barley are all starchy seeded crops that were developed during the second and first millennia B.C. Quinoa is chenopod's more famous cousin from South America. As agriculture became more widespread and intense through prehistory, the types and numbers of garden weeds and plants used for greens and medicine increased.

Starchy Cultigens. Chenopod represents 10.3 percent of the identified seeds and is present in 62.3 percent of the samples. No pattern of deposition is discernible. The chenopod seeds themselves are morphologically intermediate between wild types, with thick seed coats and biconvex margins, and domesticated types, with thin seed coats and truncated margins. They vary in diameter and most have intermediate to thin seed coats and rounded margins. Seed coats of chenopod seeds decreased in thickness in conjunction with a change in the shape of the seed (as viewed in cross section). This decrease in seed coat thickness facilitated synchronous germination through the domestication process (Smith and Cowan 1987; Smith and Yarnell 2009). The type of chenopod at the Quixote site

probably is a cultivated type of chenopod that is not undergoing much selective pressure from the farmers.

Little barley and possible eroded little barley are present in 59.4 percent and 5.8 percent of the samples, respectively, and together they make up 33.7 percent of the identified seeds. Many of the seeds are in very good condition and retain their embryos, measuring from 2.0 mm long (mostly 2.5–2.6 mm) to 1.4 mm wide (Table 32). Several specimens are so badly preserved that they could not be distinguished from maygrass. Where cultivated, little barley would have been a spring crop harvested around June (Asch and Asch 1985a:370; Hunter 1992:97–98).

Maygrass occurs in 72.5 percent of samples and accounts for 45.3 percent of the SNE estimate. Maygrass is often the most abundant seed at Middle Woodland and later sites in eastern and central Missouri (Simon 2000:Figure 2.9). Maygrass seeds, much like little barley, do not seem to change morphologically through time, so archeobotanists cannot say they have been domesticated, but they are consistently associated with seeds from other domesticated plants, such as chenopod, marshelder, and sunflower.

Four or five erect knotweed seeds were identified in five samples. Two are only kernels, and two retain a fragment of smooth-morph seed coats. Erect knotweed is abundant at Woodland and Mississippian sites in the Mississippi River valley and previously as far west as the Kansas City Hopewell Renner site (23PL1; Schroeder 2012). Erect knotweed can occur in two morphs: the smooth morph and the rough striate-papillose morph. Both are in wild stands of erect knotweed, though the smooth morph is more common late in the harvest season (November). With only a small sample, the seeds at 14JF420 could have been harvested any time from July to November (Asch and Asch 1985). A single charred sorghum seed was intrusive from the nearby food plot.

Oily Cultigens. An estimated six sunflower seeds are represented by whole and fragmentary kernels. Two kernels are measurable: one is 5.9 by 2.3 mm (Figure 74) and the other is 6.7 by 2.3 mm. After applying correction factors to approximate the sizes of the whole achene before charring (see Yarnell 1978:296), the original uncharred whole achenes are estimated to have measured 7.7 by 3.7 mm and 8.8 by 3.7 mm. These reconstructed achene sizes would exceed the accepted minimum achene length of 7 mm for domesticated sunflower (Heiser 1985:60). Although evidence for domesticated sunflower is sparse at the Quixote site, several other Late Woodland sites in the region have produced domesticated sunflower (Simon 2000:51–52). Sunflower remains tend to be rare except in extraordinary circumstances.

Two marshelder kernel fragments and one kernel that could be either marshelder or sunflower were recovered. One fragment from 40–50 cm in N488 E784 measures 3.6 by 3.4, and the other from F362 is at least 3.0 by 2.6 mm. Application of correction factors, presented by Asch and Asch (1985b:163), results in uncharred achene dimensions of 5.0 by 4.7 mm for the whole kernel and at least 4.2 by 3.6 mm for the fragment. Given that the minimum hypothesized length for domesticated marshelder is 4 mm (Yarnell 1978), the kernel and kernel fragment represent a domesticated plant.

Equivocal Cultigens. Seeds in this category occur in archeobotanical assemblages with some regularity, and sometimes are the most common seeds found. These plants are weedy, that is, they proliferate in disturbed locations, such as around prehistoric farmsteads, but these species also have ethnobotanically recorded uses. At 14JF420 they might merely be tolerated weeds in farm fields or cultivated plants.

Fleshy Fruits. Several fleshy fruit taxa appear in both the column and feature samples (Table 35): black nightshade (*Solanum ptycanthum*), cherry and plum (*Prunus* spp.), grape (*Vitis* sp.), cockspur

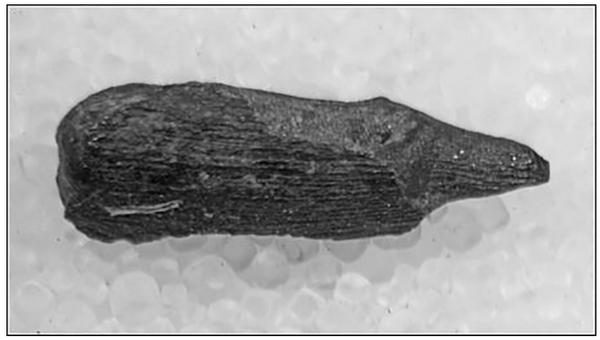


Figure 74. Sunflower kernel from N490E784, 10–20 cm.

hawthorn (*Crataegus crus-galli*), and blackberry/raspberry (*Rubus* sp.).

Cockspur hawthorn is not shown as native to Jefferson County, Kansas (United States Department of Agriculture, Natural Resources Conservation Service 2018), but is documented in several of the surrounding counties. Thus, it probably is not common or has been extirpated from the county. In fact, Yatskievych (2013) noted that edge-loving hawthorns in Missouri are much less common than they were 100 years ago. Cockspur hawthorn has an edible berry with several stony seeds inside and ripens in fall. Fragments of plum, cherry, and indeterminate cherry or plum seeds were found. These fruits, gathered in late summer, would have been highly prized by prehistoric people. Charred, uncharred, and partly charred blackberry/raspberry seeds were present only in the higher levels of the column samples, so they are presumed to be recently introduced remains.

One black nightshade seed came from 40–50 cm in F364 and is assumed to be cultural. Nightshade fruits ripen in late summer and are edible when ripe. Grape seeds were retrieved from deep in columns and in features so likely are cultural in origin. Grapes ripen in late summer or early fall.

Grasses. Seeds are identifiable only to the grass family, Poaceae (Table 36). They are not common nor concentrated in any specific provenience so probably represent natural inclusions.

Miscellaneous. A few seeds were recovered and assigned to the Miscellaneous group, though the plants might have medicinal or other uses. Bedstraw stems and seeds are sticky, adhere to clothing and hair, and get carried into sites. The other plants represent naturally occurring weedy plants that would have been common around a disturbed farmstead.

Indeterminate. Indeterminate seeds are those that are too fragmented or eroded to identify even to the family level. Ten whole seeds and 650 seed fragments were quantified in this category.

No Charred Seeds. Six samples from the tops of unit columns contained no charred seeds at all.

Uncharred Seeds. Table 37 lists uncharred seeds from the flotation samples. They are considered to be natural inclusions and not the result of archeological behaviors. The seeds do tell the story of the Quixote site since the Corps of Engineers bought the land and took it out of grazing and into wildlife management. Dogwood trees have invaded and created a thicket, while a wide variety of forbs and grasses populate the surface.

Roasting Pits

Feature 362

F362 was carefully made, contains a stratum of thermally altered limestone rock, and is presumed to be a roasting pit. The excavators defined three zones to which samples can be assigned: above, within, and below the rocks (Table 38). Twelve of the 96 samples were sorted for this analysis, 7 from above the rocks, 2 from within the rocks, and 3 from below the rocks. The samples from below the rocks were enormous because of the copious wood fragments; they were not fully sorted and quantified but scanned for non- wood inclusions.

The above-rock samples have similar inclusions to the ones from the excavation block. Thus, the fill above the rocks likely washed in after the use-life of the roasting pit and represents general midden fill. Wood, nut shell, squash rind, and a variety of seeds came from these samples. In contrast, the within-rock samples had a few pieces of wood, one nut shell portion, and a few seeds. The below-rock samples had thousands of wood fragments, some bark, nut shell, and only a few seeds. What are unique are unidentified objects characterized as dense and lobe-like. These items might be extremely eroded nut shell fragments or something entirely different. Whatever they are, as they are confined mostly to the lowest levels of F362, they are related to the feature's purpose.

Feature 363

F363 is the partially investigated roasting pit north of the excavation block. Fill from the excavated part was entirely collected for flotation in 24 samples. Sorted samples from the three described strata are two from among the rocks, one from below the top rocks, and three from below the rocks (Table 39). The F363 samples do not follow the same pattern as those from F362, but the samples from below the rocks are the most diverse and contain copious

Table 38. Summary of Remains >2 mm from F362.

	Above rocks		Within rocks		Below rocks		Totals	
Fuel & Construction	Count	Mass (g)	Count	Mass (g)	Count	Mass (g)	Count	Mass (g)
Wood	383	4.51	100	36.42	Not counted	215.36	483	256.29
Bark			3	.01	33	.25	36	.26
Grass stem	Present						Present	
Fungal tissues					Present		Present	
Nuts								
Hazelnut	29	.27	1	.01	6	.09	36	.37
Thick hickory nut shell	1	.01					1	.01
Hickory family					2	.02	2	.02
Other								
Squash rind	Present						Present	
Rhizomes	Present						Present	
Twisted stem	Present						Present	
Indeterminate								
Dense, lobe-like	1	.01	8	.33	48	.38	57	.72
Indeterminate	8	.15	1	.01			9	.16
Totals	422	4.95	113	36.78	89	216.1	624	257.83

Table 39. Summary of Remains >2 mm from F363.

	Among rocks		Below top rocks		Below rocks		Totals	
Fuel & Construction	Count	Mass (g)	Count	Mass (g)	Count	Mass (g)	Count	Mass (g)
Wood	69	.72	208	3.38		39.22	277	43.32
Bark	0				49	.27	49	.27
Fungal tissues	1	.01	Present		15	.06	16	.07
Nuts								
Hazelnut	3	.02	Present		2	.02	5	.04
Black walnut	2	.04			2	.03	4	.07

wood fragments. No dense lobe-like objects were found in F363.

Excavation Block

Column Samples

Forty-five column samples from the main excavation block and three from above F363 were sorted for this analysis (Table 40). In general, the density of charred plant remains (charcoal weight/sample volume) increases with depth below the surface and peaks in the 40–50-cm level. While the numbers and densities of seeds (seed number estimate/sample volume) also peak in this level, suggesting that the original occupation surface might have been 40–50 cm below the present ground surface. Remember that TU2 in the block area demonstrated

Table 40. Charcoal Density in Excavation Block by Depth.

Sample depth (cm)	Samples	Liters	Total charcoal (g)	Charcoal/ liter (g)
10-20	12	123.0	1.81	.15
20-30	11	112.0	1.90	.17
30-40	11	106.5	4.59	.43
40-50	9	88.0	8.00	.91
50-60	2	19.0	1.21	.64

Table 41. Summary of Remains >2 mm from Features in Excavation Block.

Feature	358		361		367		365		364		369	
Depth (cm)	20-30		35		37		40		39		41	
	Count	Weight	Count	Weight	Count	Weight	Count	Weight	Count	Weight	Count	Weight
Fuel/Construction												
Wood	16	.19	15	.14	51	.92	16	.20	139	1.94	227	2.04
Twig/vine					1	.03						
Fungal tissues	1	.01	Present				Present					
Nuts												
Hazelnut	1	.01	2	.01	1	.02	1	.02	0		2	.02
Thick hickory nut shell		1	.01			2	.04					
Black walnut					1	.02						
Nut shell, indeterminate										1	.01	
Other												
Squash rind	Present								Present		Present	
Twisted stem			Present		Present		Present					
Indeterminate												
Dense, lobe-like					1	.01						
Indeterminate			1	0	1	.01						
Totals	18	.21	19	.16	56	1.01	19	.26	139	1.94	230	2.07

that cultural material extends to a depth of at least 60 cm.

Features in Block

Features 358, 361, 364, 365, 367, and 369 are all large limestone slabs in units in the main excavation block. A 10-liter sample was removed from below each for flotation. Features were defined in levels 20–30 cm (F358, F361, and F367), 30–40 cm (F365), and 40–50 cm (F364 and F369). As is the pattern in the columns, the deeper samples contain more charcoal. In Table 41 the depths given are based on the lowest feature elevations relative to that of the datums at the southwestern corners of the units within which they occurred.

Seasonality

Using the presence of certain plant remains, the season of site occupation can be surmised. However, if the site had been reoccupied in different seasons or over many years, the seasonal indicators can blur together. For example, hickory nuts gathered in the fall can be stored over the winter to be processed in the spring. A site occupied seasonally in the spring and again in the fall might appear to be occupied over the entire year.

Two of the cultigen plants from the samples are winter annuals, that is, they germinate in the fall and are quick to grow and ripen in the spring. Maygrass, as its name implies, ripens in May and June. Little barley ripens at about the same time. Together, maygrass and little barley account for 78 percent of the identified seeds at the Quixote site. In contrast, late summer- and fall-harvested chenopod and erect knotweed together comprise only 10 percent of the identified seeds. Late summer-harvested hazelnut dominates the nut assemblage instead of fall-harvested hickory, acorn, or black walnut. The lack of hearths in most Grasshopper Falls phase houses, including 14JF420, seems to hint that these were warm-weather dwellings and supports the idea that the site was occupied mainly in the spring and summer during the growing season.

Summary and Conclusions

Sixty-nine flotation samples from the Quixote site were analyzed. They were from two large roasting pits and a series of columns from the excavation units in the main block. Wood was especially abundant at the bases of features where the meat of large herbivores was roasted. The nut assemblage is dominated by hazelnut but also has hickory, black walnut, and acorn. A number of domesticated and cultivated plants are represented: chenopod, little barley, maygrass, erect knotweed, sunflower, marshelder, and squash.

Possible cultigens are amaranth, barnyard grass, purslane, and panic grass. Fleshy fruits include hawthorn, cherry, plum, raspberry/blackberry, and grape. The season of occupation seems to be confined to the growing season with emphasis on spring and summer crops and wild plants.

Only through systematic flotation and analysis can archeologists assert that occupants of sites like Quixote were fully invested in a farming-gathering-fishing-hunting economy, like their contemporary neighbors to the east.

CONCLUSIONS

These conclusions are divided into two parts. The first addresses research questions posed in the report introduction, and the second focuses on the role of feasting, inferred from the two burned stone features, among people who maintained a hunting and foraging subsistence, supplemented by small-scale farming.

Research Questions

Does the site represent continuous or periodic occupation? When did occupation of the Quixote site occur within the broad temporal range of Late Woodland time (A.D. 500–1000)?

The first and final questions posed are combined, as radiocarbon dating resolved both. The dates discussed in the Block Excavations and Features sections clearly demonstrate that the site was occupied during at least two different times of the Late Woodland period: the third quarter of the seventh century A.D. and the tenth century A.D. Thus far the only activities for which evidence of the earlier occupation survives are the roasting pits, whereas formation of the palimpsest exposed in the block excavation began during the later period. More extensive excavations around the features and, more importantly, at Mound A are needed to ascertain whether the site was occupied at any time during the interval between those times. Lacking such evidence at this point, the inference is that 14JF420 is an example of periodic occupation.

Oddly, at present no evidence exists for any activity at the Quixote site during the third quarter of the seventh century other than construction and use of two roasting pits. One could infer from the data that an aggregate of Late Woodland groups chose the site solely for that special function at that time. The lack of any evidence for contemporaneous use of the intervening space in the block area, where a series of hearths and hearth-related activities occurred during the tenth century, is intriguing. It implies that the same terrain was selected by Late Woodland groups at two widely separated times for different activities. There is no reason to discount the three Late Woodland radiocarbon dates from the block, though obtaining more from different units and depths would test the reliability of those at hand. Exploration of that area at greater depth than was reached during the 2017 KATP field school to determine the age of the deepest (earliest) part of the horizon would be desirable. In short, the window into Mound B was large enough to see what transpired at the site within an area of 64 m^2 to a depth of ~50 cm and to answer this question and others to a certain extent. But as is true of many archeological projects, it has raised even more questions. The reward of archeology is that while one excavation may provide insight in some regards, it creates challenges in others. The latter can be seen as opportunities to address more specific questions and to tailor hypotheses to suit them.

Do the two mounds reflect social organization, population size, or both? Does the site have structural remains that permit reconstruction of house form?

Here again, two questions are combined, both derived from evidence of lodges at four sites (Malm, Anderson, Teaford, and Hamon) in the Valley Falls reach and the suggestion that paired houses at two of them might indicate contemporary occupation by nuclear or extended families,

reflecting social organization and population size, the latter being inferred from floor area (Logan and Fosha 1991). As no house remains were found in the block excavation at Mound B and no work was done at Mound A, this question cannot be answered. If future investigation at Mound A produced evidence of a lodge and adequate radiocarbon dating of contemporaneity were obtained, it could be inferred that the activities at Mound B were associated (extramural), perhaps seasonally, with house occupation at Mound A.

If the hypothesis presented above were affirmed, that is, if tenth-century occupation of a lodge at Mound A were contemporary with the hearth-centered activities, inferred from spatial analysis of data from the block at Mound B, it would only enhance the perplexity of evidence for feasting at the pit features near both mounds that predates them by at least two centuries. It would support an inference that 14JF420 was selected for a specialized function of brief duration.

What do any floral or faunal remains tell us about subsistence and season or duration of occupation? How well does the biological assemblage as a whole reflect subsistence and seasonality?

These questions are related, though they address different aspects of the biological assemblages from the Quixote site. Faunal remains are dominated by deer, apparently the most important game in the subsistence practices of the occupants, and a variety of fish and turtles with minor evidence of cottontail, beaver, duck/geese, and mussels. Although the faunal collection is small compared to that from most Middle Woodland sites in the Kansas City locality (Adair 1977; Logan and Banks 1993; Johnson 1972; Martin and Brand 2011; Wedel 1943:26–29), water screening through fine mesh demonstrated that this method can greatly increase understanding of animal exploitation by Late Woodland populations. It yielded dozens of small and fragile elements, revealing a greater range of species than recognized heretofore. These would have been lost or severely damaged by dry screening through ¼-inch mesh, which was the method applied during previous work at sites in the region. Thus, 182 of 313 specimens (58.1 percent), identified by Falk and Bozell, came from their combined G4/G5 size grades (.125 inch and .0625 inch) and likely would not have been recovered from traditional dry screening. In particular, this had a major impact on recovery of fish remains, where 76 of 97 specimens (78.4 percent) came from the G4/G5 size grades. Prior to work at 14JF420, only a single fish element had been identified at any site assigned to the Grasshopper Falls phase (Flynn 1991), and only a small sample of fish came from contemporaneous Late Woodland sites in southeastern Nebraska (e.g., Falk and Angus 1983). The role of aquatic (riverine and wetland) resources in Late Woodland foraging has certainly been enhanced, not only by the variety of fish but by beaver, duck/geese, and mussels.

The number of faunal remains and, therefore, insight concerning subsistence practices, probably would have been increased by excavation of the central units of the block to at least 60 cm, not just because of the greater volume of matrix that would have been processed but because apparently the richest part of the cultural horizon was also the lowest. Thus, 53 percent of the mass of unburned bone (243.2 g) was retrieved from 50 cm, and all mussels were recovered at that depth. As noted by Falk and Bozell, of 244 NISP from the block, 103 (42.2 percent) are from the fifth level (40–50 cm in depth). The levels above (30–40 cm) and below (50–60 cm) produced 52 (22.3 percent) and 47 (19.3 percent) of NISP respectively. Given that only 2 of 16 units in the block were dug below 50 cm, the NISP in the sixth level likely would have equaled or perhaps exceeded that in the fifth. In contrast, only 43 NISP (17.6 percent) came from the upper three levels (0–30 cm) combined.

Faunal material associated with the roasting pits that might inform subsistence, thus excluding 15 specimens of rodents and snakes, was sparse. F362 yielded two deer elements and one of fish. F363 held slightly more numerous and varied elements: 5 of deer, 1 each of muskrat, rabbit, and bird, 20 of turtle, and 14 of fish. Lipid residues from stone samples in both features indicated roasting of a large herbivore, here assumed to have been deer. Bones and teeth of that animal, as well as specimens of smaller mammal (i.e., canid, raccoon, lynx, beaver, and muskrat), bird, turtle, and fish were found in the block excavation, suggesting similarity in hunting and foraging patterns between the two components represented in that area and

the features, despite a separation in time by slightly more than 200 years.

Seasonality can be inferred from fish and turtle remains and a variety of plant remains, specifically maygrass, little barley, chenopod, erect knotweed, and hazelnut. These argue for occupation during warmer seasons of late spring and summer, which also might explain the absence of houses that would be expected at a cold season occupation. Other charred plants point to harvesting of other nuts (hickory, black walnut, and acorn) and fruits (hawthorn, cherry, plum, raspberry/blackberry, and grape). Cultivated plants include the aforementioned seasonal non-woody species, as well as sunflower, marshelder, and squash. To these might be added amaranth, barnyard grass, purslane, and panic grass. Surprisingly, thus far there is no evidence from 14JF420 that maize played a role in the agricultural component of Late Woodland subsistence, though the presence of that cultigen varies widely at Late Woodland sites in the central Plains (Adair 2006). This assertion is supported by findings at sites such as Avoca (Adair 1991).

What are the form, function, and location of associated features (e.g., cache pits, hearths, etc.)?

While there was substantial evidence that fireplaces had been used at the Quixote site, no intact hearths were found. Rather, the presence of one or perhaps a series of them in the block area was inferred from the spatial distribution of heat-modified limestones, metamorphic rocks, burned bone, and charcoal. That their use might have coincided with camp activity, including cooking and chipped-stone tool maintenance, was suggested by concentrations of lithic debris and pottery on either side of the fire place(s). Hearth cleaning, foot traffic, and bioturbation have combined to blur the boundaries of these activity areas during prolonged use that resulted in a cumulative palimpsest.

As noted previously, no evidence of a lodge was found. Nor did the investigation uncover storage pits. While not evidence of absence, their evident absence is discussed later with regard to feasting. Perhaps the most significant discoveries of the project, in that they had no known precedent, are F362 and F363; retroactive recognition of similar features at other sites is addressed below. Concentrations of burned rock in these pits, which had been dug into the subsoil, in at least one case were placed on what might have been a lattice work of hardwood timbers that served as fuel. The mass of stones and one-off nature of their use, combined with lipid analyses of selected stones from both by Malainey and Figol (2019), indicate cooking of large game, perhaps shared by members of other regional groups. However, the most disconcerting aspect about them is their temporal disconnect of some 200 years from the palimpsest exposed in the block area on Mound B. At present speculation continues about what other site activities were associated with F362 and F363. It is difficult to imagine that the location was chosen around A.D. 650–680 solely for one, assuming that the pits were used simultaneously, or two feasting events. Resolution of this problem would require exposure of the area around the block, deeper excavation there, where all units should have been dug to the apparent depth of the cultural horizon at 60–65 cm, and exploration of Mound A. Feasting as an integrative mechanism, inferred from these features, is discussed in broader context below.

Does the Grasshopper Falls phase merit taxonomic distinction when compared to contemporary regional cultures?

Taxonomy is a bullet that archeologists just cannot seem to dodge. Scientific classification is a means to organize data and serves an essential purpose in that regard, particularly when comparison of data sets is necessary. It is critical during the early years of professional research in any region, when assemblages must be organized with regard to space, time, and form, and it is interesting from the historical perspective of North American archeology. Some of the earliest attempts, those of W. C. McKern (1939, 1956) and Gordon Willey and Philip Phillips (1958), were applied to archeological "cultures" of the Great Plains. Those who came of age during the New Archaeology were considerably less inclined to embrace the topic, given the greater reward of answering questions about why cultures appear as they do in the archeological record and why they changed (the processual approach), rather than with the when, where, how, and hence who (compare Swartz 1996:6).

Elsewhere this author has been critical of those who defined an archeological phase or any taxon

based on slight differences in some attributes of a particular kind of artifact, e.g., the predominant kind of temper or surface finish on a ceramic ware, particularly with regard to Late Woodland adaptations in the Kansas City locality (Logan 2006a:85–88; Logan and Beck 1996:60–64). Recently Keehner (2015) addressed this issue with specific reference to the Grasshopper Falls phase, discounting its taxonomic validity when comparing an assemblage from such a site as Hamon in the Valley Falls reach of the Delaware River to those of others assigned to the Valley, Loseke Creek, Held Creek, Sterns Creek, and Minotts taxa. Given the existing collection, there is no reason to ascribe the Quixote site to any particular phase of the Late Woodland period. The assemblage conforms to what Reynolds defined as the Grasshopper Falls phase; however, that term currently has little more than geographical value, that is, as a general reference to Late Woodland sites in the Delaware River drainage.

Woodland Feasting in the Kansas City Locality

The presence of two pits with massive amounts of burned rock, samples from which yielded lipid residues indicative of large herbivores, raises many questions. Three are addressed here: 1) does evidence of such features occur at other Late Woodland sites in the region, 2) are there Early and Middle Woodland antecedents, and 3) what do the inferred feasting activities reveal about social relations and other aspects of the people who participated in them?

Late Woodland Burned Stone Features

In his inventory of archeological sites in the Perry Lake Project Area on the Delaware River, Schmits (1987:207) recognized 115 sites with Late Woodland components, slightly fewer than the 124 components designated by Reynolds (1979:65) as the Grasshopper Falls phase of that period. Both noted that this time saw the most extensive prehistoric settlement of the Delaware River basin. A similarly greater number of Late Woodland sites were documented in the Stranger Creek watershed that drains the area between the Delaware and Missouri rivers in northeastern Kansas (Logan 1985). This contrasts with the relatively few sites of Middle Woodland age (Kansas City Hopewell) in these areas and suggests the dispersal of smaller groups after A.D. 500, which has implications for changes in social organization during Late Woodland time.

Excavated Late Woodland sites in the Delaware River drainage, specifically in the Valley Falls reach, include Anderson (14JF331), Malm (14JF304), Teaford (14JF333), Hamon (14JF350), and Senn's Hill (14JF414) (Figure 1). All but the last of these were investigated by the KSHS under the direction of Thomas Witty and James Marshall. Subsequently, Reynolds (1979) selected the first three as type sites of the Grasshopper Falls phase. Hamon, long inadequately reported, was critically interpreted by Keehner (2015). Senn's Hill, an upland ridge site with a Late Woodland component among others, was the subject of more limited study during the 1988 NRHP evaluation project (Logan 1990a). It contained a burned rock feature that deserves comparison to those at the Quixote site.

Malm, Anderson, and Teaford sites had preserved floors of circular to oval lodges, marked by peripheral and interior post molds, the latter for support or storage of gear (Reynolds 1987:166) (Figure 75). They lacked not only intramural hearths but the deep storage facilities common at sites of the preceding Middle Woodland and succeeding Late Prehistoric periods. Those at the type sites were shallow, rarely exceeding 40 cm in depth. They did not suggest the food surplus indicated by the greater volume of caches used by earlier and later ceramic-age peoples. This is notable, given that storage of surplus foods was one of several strategies "emphasized by complex hunter-gatherers [that] included manipulation of plants and animals …, exchanges of wealth for food, improved subsistence procurement and extraction technologies, feasting, and possibly centralized redistribution" (Hayden 2009) to offset the risks of food shortages.

Extramural concentrations of burned limestone, disturbed to some extent by plowing, were exposed at 14JF304 and 14JF331 and were interpreted by Marshall and Reynolds as hearths (Figures 76–77). Upon review of field notes from the excavation of the "hearth" near House 2 at the Malm site (Figure 76), Reynolds (1979:17) believed that the stones might have been redeposited, as the feature had a "minimal amount of burned earth and charcoal."

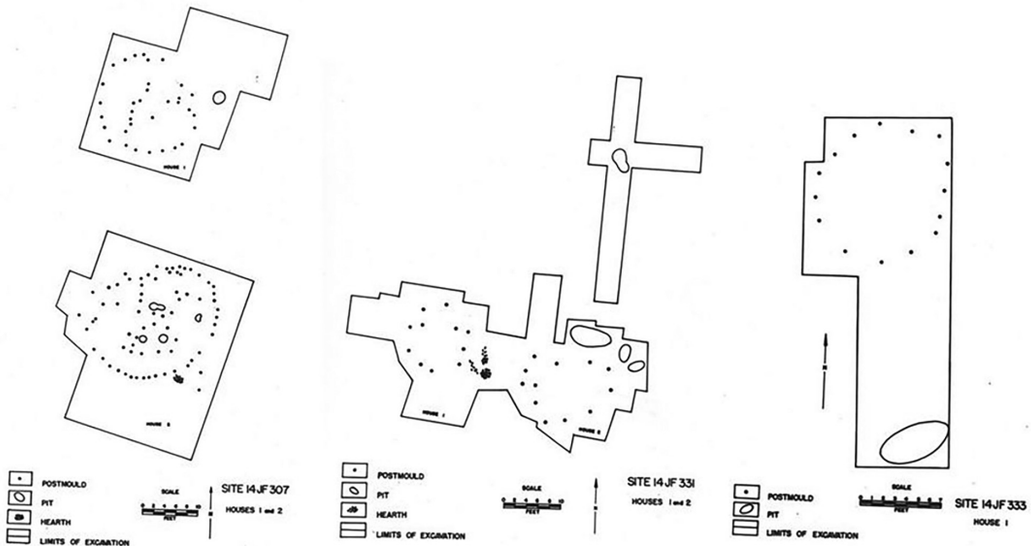


Figure 75. Lodge plans and features at the Malm (14JF307), Anderson (14JF331), and Teaford (14JF333) sites (combined from Reynolds 1979). Note stone features at Malm and Anderson.



Figure 76. Lodge and adjacent burned stone feature at the Malm site.

He stated that "it was not in use for any prolonged period of time," if it were indeed a hearth. This would apply to a single event, such as a roasting pit, as well.

A similar feature was found during testing at Senn's Hill, a multicomponent site on an upland ridge, the interfluve of the Delaware River and its tributary Walnut Creek, rather than on an alluvial terrace like these others (Fosha et al. 1990:102–131). This concentration of burned limestone, which lined a shallow basin, was uncovered only partly to preserve the remainder for future research (Figure 78). Plowing had displaced several stones, a surface scatter of which led to closer exploration of the area. Excavation and flotation of feature fill yielded 11 sherds of Late Woodland ware, 469 pieces of chipped stone debris, 552 small bone fragments, and an abundance of burned earth, burned seeds, and charcoal. Charcoal samples provided two standard radiocarbon dates, one of



Figure 77. Burned stone feature at the Anderson site (Cultural Resources Division, Kansas Historical Society). The scatter of rocks beyond the circular concentration in the lower part of the photograph may have been displaced by plowing from a larger mass comparable to the features at the Quixote site.

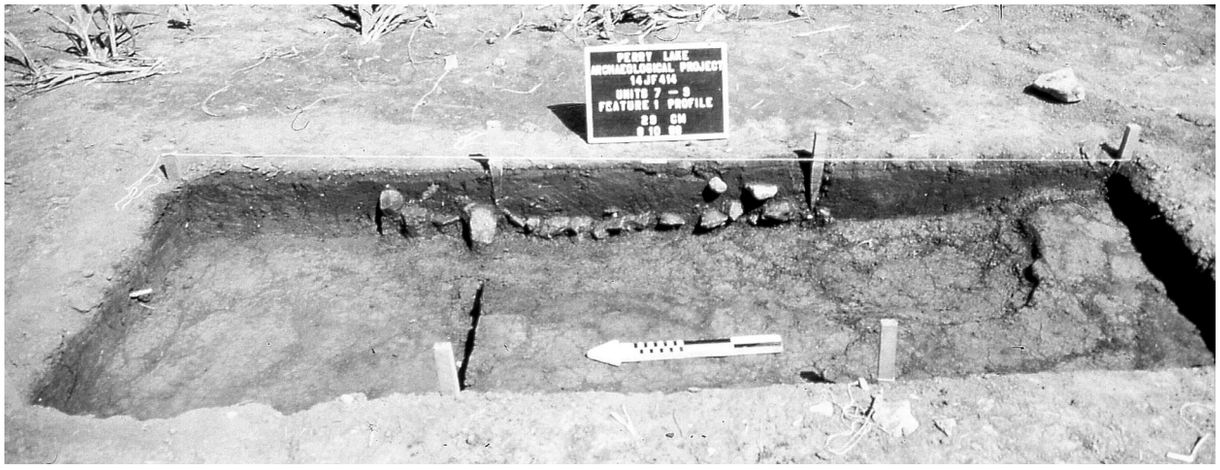
Late Archaic age that was incompatible with associated pottery. The more precise assay supported a younger Late Woodland affiliation. Originally interpreted as a hearth, the exposed part was estimated to be about half of the feature, equaling a total area of ~3 m^2, comparable to the burned rock features at the Anderson, Malm, and Quixote sites. Given the current interpretation of roasting pits for single-use feasting events at 14JF420, the 14JF414 feature is now believed to have served that function as well.

Early and Middle Woodland Burned Stone Features

Did feasting centered on roasting pits occur during earlier Woodland time in eastern Kansas? Burned rock features, often less intact than those at 14JF420, have been documented at several Late Archaic and Early Woodland sites in southeastern



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 Wooland age (A.D. 683-908, 912-968; older span 87.6 percent probability), which is compatible with associated sherds of Grasshopper Falls ware.



Kansas. Consistently, they have been interpreted as structures for cooking plant or animal foods without regard for their function as feasting areas (Tomasic et al. 2012; Williams 1988). These interpretations should be reevaluated in light of the burned stone features at the Quixote site. Burned stone concentrations, recorded at some Middle Woodland (Kansas City Hopewell) sites in the Kansas City locality, also warrant discussion in this regard. The two best documented are at the Quarry Creek site (14LV401) on a tributary of the Missouri River on the Fort Leavenworth military reservation (Logan 1993, 2011) and the Aker site (23PL43) near the confluence of the Platte and Missouri rivers and the town of Farley, Missouri (Pullen 1976).

Excavations at Quarry Creek by the Kansas Archaeological Field School in 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). The more extensive feature covered ~4 m^2 and supplied 152.3 kg (335.8 lbs) of burned limestone (Figure 79). Several attributes suggested that it differed functionally from those at Quixote and other Late Woodland sites in the Valley Falls reach: its outline was not as distinct, few stones showed fracturing in place, and there was no evidence of in situ burning. No ash was found, and the associated fill, all of which was floated, yielded relatively little charcoal/burned seeds (6.2 g) and burned earth (362.8 g). While many bones, burned and unburned, were present throughout the fill, their condition, size, and variety (i.e., deer, small mammal, turtle, snake, and fish) reflect general trash discard. Other artifacts, not directly associated with the roasting pits at 14JF420, were recovered from Feature 11 at 14LV401, including pottery, chipped stone tools, and debitage. Given their presence and random distribution throughout the fill, the feature as a whole was judged to be from dumping, perhaps in a natural depression, of material more diffuse but ubiquitous at the site. Most likely, it is indicative of periodic hearth cleaning. In contrast, it is unlikely that people who made a one-event roasting pit would waste time moving a quantity of burned stone and charcoal from it to another area; digging another pit for another feast was easier than recycling one previously used.

The stone feature at the Quarry Creek site is like one at the Aker site, excavated by the Kansas Archaeological Field School of the University of Kansas in 1975 and analyzed in a senior honors thesis by Pullen (1976). It was specifically targeted for better documentation of similar stone features at other Kansas City Hopewell sites, such as Kelley (Katz 1969) and Deister (Katz 1974), interpreted as fire areas or fire-related features (Pullen 1976:40–41). Covering an area 4 by 5 m, it also held non-hearth-related debris (i.e., debitage and broken stone tools) that led Pullen (1976:44) to interpret it as the result of "hearth-related" activity, residue from the cleaning of hearths: "On the bases [sic] of the lack of patterning, parallel examples from other sites, lack of certian [sic] fireproduced [sic] materials, and experimentation, the function of the feature was concluded to be related to a hearth, either as a



Figure 79. Burned stone feature at the Quarry Creek site (14LV401). Southern portion (below) and northern portion (above), showing cross section of shallow refuse pit or natural depression used for discard of stone (Logan 2011).

refuse area for hearth cleaning or as a hearth area with debris from cleaning surrounding it."

More recently, Dougherty (2012) ascribed three concentrations of burned limestone in the Middle Woodland component at 14MO403 in Morris County to "hearth clean-out" activity. Unfortunately, these received essentially no analysis. Indeed, the areas of these features are not provided, though that of two can be inferred from photographs, and both are considerably smaller and with less stone than those at Quarry Creek and Aker. Flotation of feature fill and water screening in general was dismissed by Dougherty (2012:89), who considered the latter method "unproductively elaborate . . . very little data was recovered at a tremendous cost of labor" and feature samples treated by the former method as having "minimal potential for paleoethnobotanical analysis because the concentrations probably were exposed to one or more flood events and were no longer in situ." The latter inference is not substantiated by any argument.

The burned stone features at these sites could be the result of secondary discard of material, some of which might have originated in features like those at the Late Woodland sites in the Delaware River drainage. However, there is no direct evidence of roasting pits, and one wonders why collecting stones from them for discard elsewhere would have been worthwhile. A more likely interpretation is that larger populations occupying base camps characteristic of Kansas City Hopewell groups over the long term required a great amount of stone to support conical based jars during cooking. Continued use of such fireplaces required periodic cleaning and discard elsewhere of stone no longer considered serviceable.

Feasting among Woodland Populations

Lacking roasting pits or other direct evidence of feasting at Middle Woodland sites, archeologists can hypothesize that the construction and use of features like those at Quixote and other sites after A.D. 500 attests greater need for communal activity to bind a dispersed population and mitigate food scarcity. Significantly, the capacious storage pits common at Kansas City Hopewell sites (Logan 2011:124) are not found at Late Woodland sites. Interestingly, the same applies to Late Woodland populations east of the Kansas City locality during the Boone phase of central Missouri, exemplified by a "scarcity of sites with deep storage pits" and where any preceding Middle Woodland presence was "inconsequential" (Hoard 2000:228). It may be premature to state that no cache pits of sufficient volume to store surplus foods are present at 14JF420, though geophysical survey did not detect any. Possibly such features exist in the Mound A area, where magnetic noise from the ruins of a windmill and associated pipe would have obscured them. Still, information at hand, as well as the presence of relatively small shallow pits at other Late Woodland sites in the Kansas City locality, point to a significant change in this regard from Middle Woodland subsistence practices.

The fewer shallower pits at Late Woodland sites suggest reduction in food storage, perhaps the inability of smaller groups dispersed across the landscape to produce Middle Woodland-like surpluses of the kind that Hayden (2009:599) asserted were essential to the feasting complex of transegalitarian cultures that transformed them "into other useful goods, services, debts or relationships." He proposed that feasting served this role among such populations, becoming "a new, powerful force that relentlessly pushes food production to its maximum limit under favorable technological and environmental conditions." Yet there is no evidence at sites like Quixote of a need to "push" a subsistence pattern to any comparable limit, if the lack of adequate storage facilities is any indication.

The critical question about Middle and Late Woodland societies in the Kansas City locality is whether they qualify as transegalitarian, defined by Hayden (2014:21–22) as "societies that can be expected to produce some surpluses on a dependable basis, generally hold feasts or other competitive displays, recognize private ownership of products and resources, use food in competitive ways, use prestige items, and have a hierarchy of poor and wealthy families that do not form permanent classes due to the limited and unstable nature of surpluses." Viewing Kansas City Hopewell as meeting all of these criteria, particularly that of social inequality, is a stretch. Hayden identified such in feasting related to shell middens in Middle and Late Archaic societies of the Southeast and suggested that "mounds" that appear in the latter period in "the Ohio and adjacent river

valleys . . . are probably related to feasting for local or regional aggregates" of groups that would develop into Hopewell culture. This author doubts that populations adapted to the lower Missouri River valley in the Kansas City locality had achieved the density and level of resource exploitation necessary to develop social hierarchies and the sustained "aggrandizement" of power-seeking individuals, invoked by Hayden, as part of the processual development toward transegalitarian society. Perhaps Kansas City Hopewell groups were on the threshold of that evolution, as demonstrated by the rare "prestige item," more often found in non-mortuary contexts, i.e., so-called Interaction Sphere-like items (Johnson 1979; Logan 2006b, 2011), and differential treatment of the dead in stone-lined mortuary mounds, comparable to those in the Havana tradition of Illinois. Sadly, mounds in the region have often been too vandalized to yield the required archeological data to support such an inference. Even so, rather than continue that trend, Late Woodland adaptations in the locality took the option of population dispersal and egalitarian social relations, denying the determinism some might see in cultural ecological systems that foster development toward greater social complexity.

Alternatively, there may have been other means of generating and sustaining a surplus economy among Late Woodland groups in the Delaware River drainage that did not require subterranean storage facilities. With regard to the development of agriculture among late Natufian (Neolithic) cultures in the Levant, Kuijt (2009) argued that sufficient archeological information is lacking about the storage of surplus resources generally considered essential to that process. He suggested that this inadequacy applies to the status of understanding in other regions and in this sense Woodland populations of the Kansas City locality may be seen as comparable. Despite this, it is difficult to see in the subsistence remains at Quixote and other sites discussed here anything beyond a family-level subsistence practice. Perhaps as the result of population growth and resource stress, Late Woodland people in the Kansas City locality reversed a trend toward farming by the Kansas City Hopewell (Adair 2006) or maintained a marginal dependence on cultigens. Even so, evidence must be explained of a special event, interpreted as feasting, that was repeated at least once at 14JF420 and that appears to have been done at other sites in the region. Among seven areas that require more exploration on this front, according to Hayden and Villeneuve (2011:443), their final three are pertinent:

5. Substantially more needs to be known about feasts among generalized hunter/gatherers (if feast can even be said to exist) and what their distinctive characteristics are.
6. We need more information on the material correlates of feasts: the types, quantities, and preparations of foods used; the items and features used for preparing and consuming foods including their sizes and especially their locations.
7. Much more attention is also required in most areas in order to document the faunal and botanical remains associated with suspect feasting features. This has been a major deficiency in most areas, sometimes with the exception of funerary deposits….

Much has been written about the interaction of Middle Woodland populations, including the exchange of exotic items and communication via ceramic decorative motifs that were shared across broad areas for a variety of socially mandated purposes (Braun 1985, 1986; Fortier 2006), particularly as a resource "risk reduction" strategy (O'Brien and Wood 1998:219–221). While surplus food production and storage technology may have been critical to dependent populations as means to hedge against resource depletion, such was not necessary for Late Woodland groups composed of scattered nuclear or extended families for whom farming was a minor supplement to hunting and foraging, examples of what Bruce Smith (2001) has called "low-level food producers" or "nonagricultural societies with domesticates." For them feasts, which entailed roasting venison from the occasional dispatch of deer that otherwise might have been processed and stored to allay cold-season scarcity, served a different purpose. It entailed the assembly of otherwise dispersed groups for an event that had less to do with "subsistence insurance" (Brose 1979) than with the formation of alliances and cementing of other social ties. Though speculative, perhaps the forging of bonds during such an event entailed use



Figure 80. Ceramic pipe stem from TU1, Mound A, in 1988 (left). Pipe stem in situ in west profile of TU1, Mound A (below). Courtesy of University of Kansas Biodiversity Institute and Natural History Museum.



of a ceramic pipe, like that recovered from TU1 at Mound A during the 1988 NRHP evaluation of the Quixote site (Figure 80).

Finally, with regard to what followed Late Woodland adaptations in the Kansas City locality, it is intriguing that no pits or other features composed of dense concentrations of burned stone, such as those at Quixote and other sites in the Valley Falls reach, or areas of massed or scattered rocks like those at Middle Woodland sites, have been found at Late Prehistoric sites in the region. What appears to be the absence of roasting pits, and by inference their use for feasts, during the tenth century A.D. occupation of 14JF420 might indicate a trend toward something more widespread thereafter: an expansion of farming that culminated in greater sedentism and the adoption of other integrative mechanisms during Late Prehistoric time. Food for thought.

POSTSCRIPT

It is fitting to end with reference to the man who discovered the Quixote site and whose belief in



Figure 81. Author with Milton Reichart's jar from TU2.

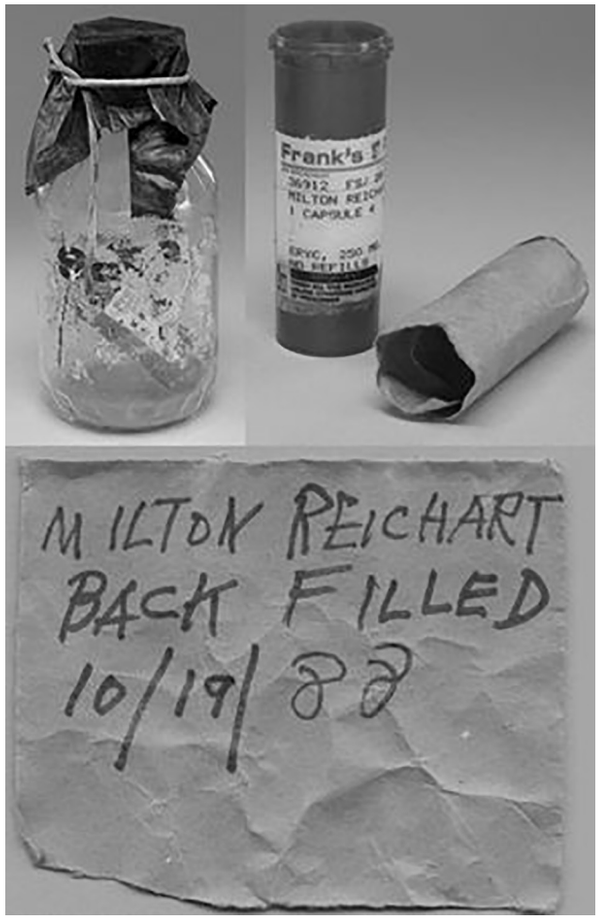


Figure 82. Milton's jar and contents. Courtesy of kansas memory.org/item/444338, Kansas Historical Society.

its research potential led him to take me to it in 1988. We would not have had the opportunity to learn what is presented here were it not for Milton Reichart. How appropriate, then, to have "heard" from Milton during the KATP field school in a manner so surprising that it left me with the look of astonishment, captured in Figure 81.

On June 8, 2017, excavators of N488 E784 uncovered at a depth of 30–40 cm part of a black polyethylene sheet that had been used to line the base of TU2 prior to backfilling in 1988. Once it had been fully exposed, they asked me what should be done with it. I decided to discard the sheet but first to unroll and dry it in the sunlight. Upon unfurling it, I found a jar that contained a prescription vial within which was a rolled scrap of paper sack (Figure 82). The vial's label bears Milton's name and the date of June 8, 1988, showing that he had his prescription filled 29 years to the day before its discovery at 14JF420. You can't make this stuff up! I was ready to open the jar, but my wife, Prof. Lauren W. Ritterbush (KSU), by chance visiting the dig that day, suggested it be opened at the banquet on the final evening of the project.

At the project summary on the evening of June 14, 2017, I took the opportunity to point out to KATP participants, without whom we would not have the information here, that we were "feasting." Then 28 years, 7 months, and 26 days after Milton buried it, his unearthed missive was shared with members of the KAA, an organization that had honored and cherished him as he had cherished and honored it (Figures 83 and 84). Given Milton's appreciation for literature and his appellation for the site, I had expected something appropriate from Miguel de Cervantes' novel. Any reference to Camacho's wedding feast in Don Quixote would have been too prescient, though I did mention that in a presentation to the Plains Anthropological Conference the following year (Logan 2018).

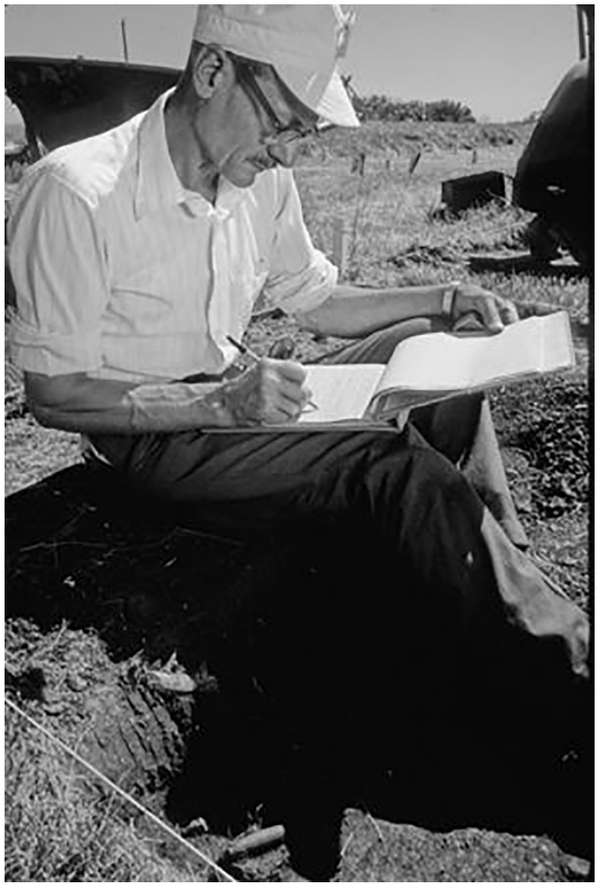


Figure 83. Milton Reichart at 14SC1, location of the 1976 KATP field school. Courtesy of kansasmemory.org, Kansas Historical Society.

Instead, reflecting both pride and humility, Milton simply had documented his performance of the last task of fieldwork at the site that long preceded the 2017 KATP field school.

This report is dedicated, with admiration and gratitude, to Milton Reichart.

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I am deeply grateful to 179 members of the KAA, who registered and participated in the 2017 KATP field school, far too many to list individually here. I must single out a few, first among them Nancy Arendt, who supervised the excavation with dedication, professionalism, and a winning attitude. My thanks to her compatriot in supervision, Melanie Naden, who directed work at the block, and to Tod Bevitt and Deb Aaron for guiding the teams that exposed and documented the roasting pit features described here; thanks in particular to Tod for suggesting that we collect stones from



Figure 84. Milton's gravestone near Valley Falls, the back of which records his Lifetime Achievement Award from the Kansas Anthropological Association in 2004. Courtesy of kansasmemory.org, Kansas Historical Society.

them for lipid residue analysis. Sharon Sage supervised work at the water-screening station, where Chris Hord maintained 2 transfer pumps that kept as many as 12 people busy at any time, processing hundreds of bags of excavated fill throughout the project. Thanks also to Rose Marie Wallen, who assigned field documents, and to Mary Conrad, who ably directed cleaning work at the field laboratory in Valley Falls.

The KATP has been an (SAA) award-winning program because of the critical role played by personnel of the Cultural Resources Division, Kansas Historical Society. A giant among them is Virginia Wulfkuhle, who (in a mixed metaphor with regard to size) is like sub-atomic particles that via quantum entanglement can seem to be in more than one place at the same time. Bob Hoard loomed large not only in his indefatigable professionalism in the field, but also by encouraging geophysical survey that detected the roasting pit features, supporting my desire for water screening and helping to make it work, funding radiocarbon and lipid residue analyses, and reviewing the technical report from which this article is derived. Gina Powell oversaw work at the water-screening station during the dig. Trisha Waggoner captained the total station crew of Mike Wallen and Julie McClenahan. I appreciate their vital work in recording the site's topography and piece-plotted artifacts. Chris Garst directed critical work in the field lab and continued to work with me during the early phase of my post-field work, insuring that all data were organized and documented prior to transport to KSU.

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BOOK REVIEW

Dubuque's Forgotten Cemetery: Excavating a Nineteenth-Century Burial Ground in a Twenty-First-Century City. ROBIN M. LILLIE and JENNIFER E. MACK. University of Iowa Press, Iowa City, 2015. 229 pp., 18 figures, acknowledgments, appendix, notes, recommended reading, and index. $27.50. ISBN 978-1-60938-321-3 (paper) or ISBN 978-1-60938-322-0 (e-book). *Reviewed by* Jim D. Feagins.

A surprising number of early family and pioneer burial sites are scattered across rural landscapes, many of which contain from one to a couple of dozen burials. Over the years this reviewer has recorded more than a few as archeological sites; many were overgrown with weeds, grass, and trees—long forgotten. Likewise, "discoveries" of historic human skeletal remains at construction sites in large cities are not that uncommon. However, in 2007 it was noteworthy when a man walking his dog began to find scattered human remains from a long-forgotten cemetery that contained thousands of burials. How had this extensive historic cemetery been forgotten in a town of about 58,000 people? The rediscovery was made when a developer acquired property from the Dominican Sisters of Sinsinawa and started moving earth for a condominium complex on a bluff top overlooking the Mississippi River in Dubuque, Iowa.

This northeast Iowa location was originally settled in 1785 by John Dubuque's family. The land was not officially opened to the public until 1833, shortly after the end of the Black Hawk War. Lead mining in the area, first undertaken by the indigenous occupants, soon gained the attention of European Americans. Located near the junction of Iowa, Illinois, and Wisconsin, Dubuque attracted numerous German, Irish, and other immigrants. Many were Roman Catholics, and churches of that faith sprang up in the community. The Third Street burial ground was established and used between 1833 and 1880, even two decades after newer cemeteries were established by the Catholic dioceses. It became neglected and eventually forgotten, especially after a convent was built there in 1948 and the surviving grave monuments were relocated. Apparently at that time and until recently, the few residents who remembered it thought that the graves (not just the grave markers) had been relocated to newer cemeteries; they thought that the massive Third Street Cemetery no longer existed!

What is to be done with thousands of burials in the path of modern development? Clearly compliance with state and federal laws is required. Over a four-year period, 939 burials were carefully excavated by staff from the Burials Program of the University of Iowa Office of the State Archaeologist. This was a Herculean endeavor. Burial and other records were few, and most of the headstones had been removed long ago. Initially the developer and Catholic dioceses created many stumbling blocks to the research, putting the archeologists in the unenviable position of dealing with parties with vastly different interests. Even so, the procedure obtained much of historical and scientific value, while allowing construction to move forward. The technical report, followed by this more popular account, is a testimony to what professional methods, hard work, careful analysis, and writing can accomplish toward shedding light on the socioeconomic status (as reflected by the material culture and meager historic records), ethnicity, and health of nineteenth-century Dubuque.

A few chapters are devoted to skeletal analysis methods. While that is necessary and interesting, this reviewer would have appreciated a greater effort to describe the recovered burial furniture and other artifacts.

In Chapters 7-11 the authors make a special effort to show the human side of the generally middle-to-lower-class people buried in the Third Street Cemetery. Here the cooperative forensic efforts of archeology and history are at their best. Fascinating glimpses into the everyday lives of a few individuals and their families show that living in that era was a challenge. The volume respectfully records and summarizes much of the history, archeology, skeletal biology, and other scientific data, as it illustrates the necessity of mediating for the dead. About one-fourth of the Third Street Cemetery grounds was excavated, and those individuals have since been re-interred at another city cemetery. The vast

majority of the burials were Catholic. The research results are of international importance, as this is thought to be the largest Roman Catholic cemetery in the Americas investigated archeologically.

Dubuque's Forgotten Cemetery: Excavating a Nineteenth-Century Burial Ground in a Twenty-First-Century City is well organized and written by skeletal biologist Robin Lillie and archeologist Jennifer Mack. They clearly articulate the difficulties of grappling with the legal and ethical obligations of the living toward the dead—responsibilities shared by all. The archeological team regretted not getting the local community more involved at the start of the project rather than at the end.

Those interested in history and archeology or simply fascinated by old cemeteries will want to read this book. It may be obtained from the University of Iowa Press, c/o Chicago Distribution Center, 11030 South Langley Avenue, Chicago, Illinois 60628, by phone at 800-621-2736, or from a variety of Internet vendors.

ABOUT THE AUTHORS

John R. Bozell
History Nebraska, 131 Centennial Mall North, Lincoln, Nebraska 68508;
rob.bozell@nebraska.gov

Rob Bozell is the Nebraska state archeologist and an associate director with *History Nebraska* (formerly the Nebraska State Historical Society). He received B.A. and M.A. degrees in anthropology from the University of Nebraska-Lincoln and has been actively involved in archeological research and cultural resource management in Nebraska and surrounding states for 40 years. His professional and research interests have focused on the central and northern Great Plains and include late pre-contact and post-contact Native American archeology, subsistence and environmental change, fur trade archeology, repatriation, and tribal consultation. He has authored numerous technical reports, journal articles, and book chapters on these subjects.

Craig Crease
1607 Berkshire Avenue, Myrtle Beach, South Carolina 29577

Craig Crease is a noted historian of the Santa Fe Trail and the American West. A native Kansan now living in coastal South Carolina, he is past-president and current executive board member of the Kansas City Area Historic Trails Association. For several decades he has been an independent historical consultant to the National Park Service. His award-winning writing on the Santa Fe Trail has appeared in *Wagon Tracks*, *Overland Journal*, *Kansas City Star*, and more.

Carl R. Falk
Paleocultural Research Group, 9 Sunrise Trail, Fairfield, Pennsylvania 17320;
crfalk1943@gmail.com

Previously with the National Park Service's Midwest Archeological Center and the Department of Anthropology, University of Nebraska-Lincoln, in 1996 Carl co-founded Paleocultural Research Group, now headquartered in Broomfield, Colorado. Over the past 55 years he has worked in Baja California, California, and throughout the Midwest and Great Plains. As a zooarchaeologist, his research centers on changing subsistence strategies of Late Prehistoric, Protohistoric, and Historic period Plains villagers. Recent studies also include projects in the San Luis Valley and central Colorado. He is author/co-author of numerous technical reports, published chapters, journal articles, and presentations for regional, national, and international conferences.

Jim D. Feagins
800 Sunset Lane, Belton, Missouri 64012

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.

Brad Logan
Department of Sociology, Anthropology and Social Work, 204 Waters Hall, Kansas State University, Manhattan, Kansas 66506

Brad Logan is research associate professor emeritus of anthropology at Kansas State University. He received his M.A. at the University of Nevada, Reno (1977) and his Ph.D. at the University of Kansas (1985). His field and research experience over a period of 45 years occurred in Kansas, Nebraska, Missouri, Colorado, Nevada, Wyoming, southern France, and lower Austria. Prior to his position at KSU, he was senior curator at the University of Kansas Museum of Anthropology and director of its Office of Archaeological Research. In the latter position he directed the investigation of the Quixote site that preceded by 29 years the project described in this volume of TKA. A native of Clay County, Kansas, where his great-great grandparents Isaac and Harriet Logan homesteaded in 1872, he is also a life member of the KAA.

David Maki
Archaeo-Physics, LLC, 4150 Dight Ave. #110, Minneapolis, MN 55406

David Maki earned his degree in civil engineering from the College of Science and Engineering at the University of Minnesota after completing a four-year stint in the USMC as an infantry squad leader. He started his career in archeology as a staff scientist with the Institute for Minnesota in 1991 and left in 1998 to co-found Archaeo-Physics. The firm specializes in non-invasive sub-surface geophysical survey for archeological research and the cultural resource management community.

Gina S. Powell
U.S. Army Corps of Engineers,* Kansas City District, 635 Federal Building PMP-C, 601 East 12th Street, Kansas City, Missouri 64106-2824*; Gina.S.Powell@usace.army.mil

Gina Powell is currently an archeologist at the Kansas City office of the U.S. Army Corps of Engineers. At the time of the Quixote site excavation, she was a contract archeologist at the Kansas Historical Society. She earned her Ph.D. at Washington University in St. Louis with a specialty in archeobotany, the study of archeological plant remains.

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CUNNINGHAM	AMY & DONALD	315 S 32ND ST	PARSONS	KS	67357-3901
DALE	FRANK	1630 AVE L	COLDWATER	KS	67029-5641
DANIELS & A LUDLUM	JESSICA	1914 SW WARNER CT	TOPEKA	KS	66604-3267
DAVIS	LELAND	101 DYER ST	WELLS	KS	67467-5002
DEBOLD	PAT	3777 OHIO RD	OTTAWA	KS	66067-8423
DEINES	WILLIAM E	23033 T RD	WAKEENEY	KS	67672-2759
DRESBACH	RUSSELL	250 E DANIEL ST	COLUMBIA	MO	65202-0096
DYE	NORMAN & NANCY	19014 R RD	MEADE	KS	67864-9513
EDENS	JACK	101 S 7TH ST	FREDONIA	KS	66736-1819
EINSEL	EUGENE	DECEASED			
ELLISON	KATE	1330 SUMMERTON PL	YUKON	OK	73099-5450
FEAGINS	JIM D	800 SUNSET LN	BELTON	MO	64012-4922
FINCH & M S MILLER	STEVEN	PO BOX 52	PATAGONIA	AZ	85624-0052
FINKE	JERRY & MARILYN	835 NORTHPARK RDG	NEW BRAUNFELS	TX	78130-8319
FLOYD	MORRIS	813 E HEMPHILL AVE	HAYSVILLE	KS	67060-1823
FOSHA	MICHAEL	3710 W SAINT LOUIS ST	RAPID CITY	SD	57702-2141
FREIWALD	AMY & MICHAEL	1700 NE STONEWOOD DR	LEE'S SUMMIT	MO	64086-3551
FULK	DAVE	12406 WEDD ST	OVERLAND PARK	KS	66213-1841
GAINES	W BRANDON	4820 SW 36TH TER	TOPEKA	KS	66614-3832
GARST	CHRISTINE	4304 SW 23RD ST	TOPEKA	KS	66614-1160
GENTINE	LYNN	2920 N 155TH TER	BASEHOR	KS	66007-9236
GEORGE	F SUSAN	2309 PLUM ST	HAYS	KS	67601-3034
GIBSON	WESLEY	7685 E GEMINI DR	FLAGSTAFF	AZ	86004-1150
GIPSON	TAMMY & BRENNAN	915 S ELM ST	MCPHERSON	KS	67460-5738

GODDARD	ASHER	11306 183RD PL NE APT H2022	REDMOND	WA	98052-7286
GODDARD	DANIELLE	18818 EL BELLO PASEO	MONROE	WA	98272-8828
GOEBEL	PAUL	DECEASED			
GOERING	MARK & SHEILA	57 OLD POST LN	ENID	OK	73703-2209
GOOD	ELIZABETH	4414 UNITY AVE N	ROBBINSDALE	MN	55422-1146
GREER	JILL	17837 TIGER RD	STARK CITY	MO	64866-8247
GRIEM	MADELINE	608 BRENTWOOD DR	LAWRENCE	KS	66049-1880
HAMILTON	CASI	217 E ELM ST	OXFORD	KS	67119-8247
HANNA	CASSIE	10413 NOEL AVE	CUPERTINO	CA	95214-1250
HARRIS & J M VINCENT	ELIZABETH	112 E 16TH ST	HAYS	KS	67601-3635
HARVARD LIBRARY ITS	TOZZER LIB SERIALS ACQUISITION	625 MASS AVE LOWER LEVEL	CAMBRIDGE	MA	02139-3357
HEASTY	DON & CAMILLA	237 RAINBOW DR #13791	LIVINGSTON	TX	77399-2037
HEATH & H COVEY	TARYN	7338 GODDARD DR	SHAWNEE	KS	66203-4476
HICE	JAREB & QUINTON	905 STONECREEK DR	LAWRENCE	KS	66049-8509
HICKS	GARY & LOUISE	12105 WESTGATE ST	OVERLAND PARK	KS	66213-2268
HILL	LARY	243 N LAKESIDE DR	ANDOVER	KS	67002-9014
HILL	MATTHEW	114 MACBRIDE HALL	IOWA CITY	IO	52242-0653
HINTZ & S HARRIS	PAULINE	211 SHORELINE DR	LOUISBURG	KS	66053-6431
HOARD	ROBERT	6425 SW 6TH AVE	TOPEKA	KS	66615-1099
HORD	CHRIS	413 SE BROWNFIELD DR	LEE'S SUMMIT	MO	64063-6020
HORWATH	KATHRYN & JOHN	235 S 89TH ST	OMAHA	NE	68114-4027
HOWELL	JEAN & BILL	90244 SW 130TH AVE	COATS	KS	67028-9441
HUBER	DON	1071 DARLOW DR #302	MCPHERSON	KS	67460-2741
HUTSON	RUTH	PO BOX 248	WESTMORELAND	KS	66549-0248
JACKSON	VICKI J	1310 N 3RD ST	ARKANSAS CITY	KS	67005-1560
JOHNSON	PAUL & ROBIN	2567 23RD AVE	GYPSUM	KS	67448-9022
JOHNSON CO LIB	ACQUISITIONS	PO BOX 2901	SHAWNEE MISSION	KS	66201-1301
JONES	MICHAEL & BRAYDEN	124 S BROOKWOOD DR	DERBY	KS	67037-2406
KAISER	PEGGY & BOB	6549 COTTONWOOD DR	SHAWNEE	KS	66216-2204
KANSAS HIST SOC	PERIODICALS	6425 SW 6TH AVE	TOPEKA	KS	66615-1099
KANSAS STATE UNIV	HALE LIB TECH SERV	1117 MID-CAMPUS DR N	MANHATTAN	KS	66506-0110
KAUL-HURST	LUCY	1795 E 400TH RD	LAWRENCE	KS	66049-9102
KECK	DICK & CYNTHIA	2709 W 74TH ST	PRAIRIE VILLAGE	KS	66208-3222
KECK	SETH	7396 FLUSH RD	SAINT GEORGE	KS	66535-9405
KENNEDY	CRYSTAL	6528 SE CALIFORNIA AVE	BERRYTON	KS	66409-9772
KENNEDY	SAM	DECEASED			
KETCHUM	TONYA	24960 HOLLINGSWORTH RD	MCLOUTH	KS	66054-3117
KINDT	NADIA & JUSTIN	5206 NW OLD PIKE RD	GLADSTONE	MO	64118-4333
KLARMANN	NICOLE	1142 SW HIGH AVE	TOPEKA	KS	66604-3951
KRAUS	HAROLD & VIRGINIA	1303 E 33RD ST #16	HAYS	KS	67601-2032
KREISSLER	ALICE	6709 W O'NEIL ST	WICHITA	KS	67212-6332
KURTZ	CHRIS	5508-C POMPANO DR	MINNETONKA	MN	55343-8910
LEE	KIP	3117 LUNDIN DR #7	MANHATTAN	KS	66503-2223
LEMASTER	LARRY	PO BOX 652	MEADE	KS	67864-0652
LICKTEIG	ALICE & JAKE	13595 NW 2300 RD	GARNETT	KS	66032-8839
LIFE	MICHAEL	3746 S HWY K-57	JUNCTION CITY	KS	66441-8256
LINCK	RANDY	PO BOX 264	HORTON	KS	66439-0264
LOGAN & L RITTERBUSH	BRAD	3331 NEWBURY ST	MANHATTAN	KS	66503-0303
LUNDEEN	GAIL	604 NE SHORELINE DR	LEE'S SUMMIT	MO	64064-1382
MADDEN	LOU	PO BOX 12354	DENVER	CO	80212-0354
MALLOUF	ROBERT J	5 SIERRA VISTA RD	ALPINE	TX	79830-1012
MAXWELL	MARY ELLEN & RAY	25094 160TH CT	LEAVENWORTH	KS	66048-8369
MAYHEW	JIM	105 WESTWOOD DR	ABILENE	KS	67410-9260
MCCHESNEY	KAROL	2220 FIR RD	MUNDEN	KS	66959-0098
MCCLENAHAN	JULIE	1298 N 550 RD	BALDWIN CITY	KS	66006-7254
MCDANIELS	TERESA	7226 PFLUMM RD	SHAWNEE	KS	66216-4110
MCKINNEY	SHARON	15329 S LONE ELM RD APT 428	OLATHE	KS	66061-6205
MCLEAN & R CONARD	JANICE	1034 WELLINGTON RD	LAWRENCE	KS	66049-3029
MCMILLON	PEGGY	36 NW 48 RD	GREAT BEND	KS	67530-9087
MCMILLON	DAVID E	DECEASED			
MCSWEENEY	DEBORAH & NOEL	11017 NE 72ND ST	PEABODY	KS	66866-9023
MENDENHALL & B FUNKE	LAURA	7014 REDBUD DR	MANHATTAN	KS	66503-9125
MERCER	JASON	PO BOX 973	OXFORD	KS	67119-0973
MILES	ANTHONY	6325 W 73RD TER	OVERLAND PARK	KS	66204-2032
MISSOURI ARCH SOC	MISSOURI STATE UNIV	901 S NATIONAL AVE	SPRINGFIELD	MO	65897-0027
MOORE	CAROL	PO BOX 187	ST GEORGE	KS	66535-0187
MOORE	MARGARET	221 N CAMPBELL AVE	BELOIT	KS	67420-2427
MOSIER	JOSEPH	1904 TULIP TER	MANHATTAN	KS	66502-4958
MULDER	CLEVE	721 UNIVERSITY PL	SALINA	KS	67401-2574
MURRAY	KENT & GLENNA	29146 NE 1830 RD	GARNETT	KS	66032-8344
MYERS	CARL	1902 N SEDGWICK ST	WICHITA	KS	67203-1530

NADEN	MELANIE R	4272 EAGLE LAKE CT	BEL AIRE	KS	67220-1719
NETT	DWIGHT	112 W CHEYENNE ST	HOISINGTON	KS	67544-1507
NEUFELD	STANTON	441 ARAPAHO RD	INMAN	KS	67546-8680
NICHOLAS	JOE, ADAM & ZACK	10344 CHEROKEE LN	LEAWOOD	KS	66206-2511
NIOCE	MARVIN & BECKY	4023 SW DRURY LN	TOPEKA	KS	66604-2414
NORLIN	DAVID & JAYNE	321 N MAIN ST	LINDSBORG	KS	67456-2010
O'BRIEN	DR PATRICIA J	DECEASED			
OLIVA	BONITA	3095 F RD	WOODSTON	KS	67675-9004
OLSON	BILL & BETH	203 W COLUMBUS ST	LINDSBORG	KS	67456-1527
PAGE	LANIE	514 N KANSAS ST	OXFORD	KS	67119-8236
PATTON	COLBY	507 N MICHIGAN ST	OXFORD	KS	67119-8060
PERRY	KAMRIE	578 N MT ZION RD	BELLE PLAINE	KS	67013-8282
PETZ	AL	819 BANNOCK BURN RD	HUTCHINSON	KS	67502-2033
PFANNENSTIEL	MELINDA	15 PIN OAK DR	ARKANSAS CITY	KS	67005-8981
PITTSBURG STATE UNIV	AXE LIBRARY	1701 S BROADWAY ST	PITTSBURG	KS	66762-5856
POLSON	DAVID	15890 GARDNER PL	GARDNER	KS	66030-9669
POWELL & T MEADE	GINA	4025 HOLMES ST	KANSAS CITY	MO	64110-1125
RACK	KIM, JAKE & MASON	5113 KINGSMILL RD	LAWRENCE	KS	66047-1897
RAINBOLT	ROBERT & WENDY	600 S 6TH ST	BURLINGTON	KS	66839-2006
RALSTON	JAMES	15603 W 81ST ST	LENEXA	KS	66219-1831
REED	EVELYN	PO BOX 1068	NEWTON	KS	67114-1068
REED	MARGIE	2635 DEBORAH DR	SALINA	KS	67401-3567
REED	TERRY, ALEXA, TYTUS & TAYTUM	403 S CORONADO AVE	LINDSBORG	KS	67456-2736
REXROAD	VIRGINIA	3712 ALDERSGATE DR APT B	HUTCHINSON	KS	67502-2367
REYNOLDS & C JONES	KIMBERLY	2406 LANCASTER DR	LAWRENCE	KS	66049-1877
RILEY	ZELLA	6109 W 76TH TER	PRAIRIE VILLAGE	KS	66208-4544
ROBERTS	JAMES	1036 ARROWHEAD RDG	INDEPENDENCE	MO	64056-1179
ROECKERS	HENRY	106 PARK PLAZA N	GARNETT	KS	66032-2303
ROEHRICH	LORENE	33595 W 135TH ST	OLATHE	KS	66061-9075
ROHR	ROBERT	801 CATHEDRAL	VICTORIA	KS	67671-9413
ROWLINSON	DANIEL & JIMMETTE	2911 SW WHITNEY LN	TOPEKA	KS	66614-4814
ROWLISON	DON	RT 1 BOX 57M	STUDLEY	KS	67759-9326
ROYCE	CLARE H	8837 LONG BEACH CIR	ATLANTA	GA	30350-2208
RUDKIN	JANN & TOM	15000 BLACKBERRY HILL RD	LOS GATOS	CA	95030-7504
RUIZ & M BERENDSEN	ANGELO	913 CONNECTICUT ST	LAWRENCE	KS	66044-3035
RUSSELL & W IVERSON	NATASHA	8 S NELSON ST	HUTCHINSON	KS	67501-3043
SAGE	SHARON	9130 SW 97TH ST	AUBURN	KS	66402-9610
SALLEE	KENT	109 E GORDON ST	INMAN	KS	67546-0592
SAPP	WILLIAM	520 SE HACKAMORE DR	LEE'S SUMMIT	MO	64082-8221
SCHMIDT	JANIE & REX	14026 U ST	WILMORE	KS	67155-9508
SCIACCA	JOSH	126 S MISSION ST	COUNCIL GROVE	KS	66846-1833
SHERIDAN	ALAN	656 OLD HWY 40	WILSON	KS	67490-8777
SHIVELY	BARON	823 N ELM ST	MCPHERSON	KS	67460-2813
SICHTER	JAMES	10809 W 123RD ST	OVERLAND PARK	KS	66213-1957
SIELERT	DAVID & SUE	2766 BURLINGAME RD	READING	KS	66868-9222
SMITH	SUZANNE	8392 LOWER MCDOWELL RD	ALTA VISTA	KS	66834-9293
SMITH	SUSAN	232 SUMMERTREE LN	LAWRENCE	KS	66049-1830
SOTHAN	MEGAN	PO BOX 12	STEELE CITY	NE	68440-0012
SPELLMAN	BECKY	3515 N WALDRON ST	HUTCHINSON	KS	67502-1429
ST HIST SOC OF WI	LIB ACQUISITIONS SEC	816 STATE ST	MADISON	WI	53706-1417
STEIN	MARTIN	4399 OGAN MESA LOOP	LAS CRUCES	NM	88011-8373
STEPHENSON	STAN	1428 HOMESTEAD PL	MCPHERSON	KS	67460-2637
STIPPICH	JULIE A	1556 N DELLROSE ST	WICHITA	KS	67208-2219
STITES	DEAN & VALORIE	405 W BUFFALO ST	GIRARD	KS	66743-1407
STRICKLER	BRENDA	ADDRESS UNKNOWN			
STROM	BYRON	632 E DOUGLAS AVE	DES MOINES	IA	50313-4567
STUBBS	MICHAEL	PO BOX 5040	SANTA BARBARA	CA	93150-5040
SUDBURY	BRYON	PO BOX 2282	PONCA CITY	OK	74602-2282
SULLIVAN	MELONIE	1720 PRESTWICK CIR	LAWRENCE	KS	66047-2086
SWANEK	ED	12779 HEADWATERS RD	HARVEYVIILLE	KS	66431-9319
THURMOND	J PETER	RT 1 BOX 62B	CHEYENNE	OK	73628-9729
TREMBLAY	LELAND	316 N MIDDLE ST	HILL CITY	KS	67642-1740
TSUKAMOTO & S McGREGOR	KATHLEEN	PO BOX 112	BERRYTON	KS	66409-0112
TUCKER	VITA	7015 W 133RD ST	BURLINGAME	KS	66413-8778
UNIV OF KANSAS	WATSON LIB RETRIEVAL SERV	1425 JAYHAWK BLVD R 210S	LAWRENCE	KS	66045-7594
UNIV OF OKLA	BIZZELL MEM LIB SERIALS	401 W BROOKS ST	NORMAN	OK	73019-0528
VEHIK	DR SUSAN	2622 S PICKARD AVE	NORMAN	OK	73072-6922
WAGGONER	TRICIA & DERECK	1416 SW JEWELL AVE	TOPEKA	KS	66604-2733
WAGNER	TAMMY	PO BOX 248	ARKANSAS CITY	KS	67005-0248
WALDSHMIDT	ARIEL	PO BOX 661	OXFORD	KS	67119-0611
WALKER	DANNY	1687 COUGHLIN ST	LARAMIE	WY	82072-2321

WALLACE	DENISE	1418 S CEDAR AVE	INDEPENDENCE	MO	64052-2139
WALLEN	ROSE MARIE & MIKE	116 E MILL ST	LINDSBORG	KS	67456-2815
WARD	ROGER	828 AUDREY DR	EL DORADO	KS	67042-2220
WEDEL	DALE	2675 MONROE ST	LARAMIE	WY	82070-6551
WELTY	DAVID	210 S BONE SPRINGS RD	ABBYVILLE	KS	67510-9570
WERNER	NORBERT	2302 POST AVE	DODGE CITY	KS	67801-2556
WEST	BONNIE	5837 BIRCHWWOD DR	GREAT BEND	KS	67530-2814
WHITE	JOE	952 LIMESTONE RD	UNIONTOWN	KS	66779-8036
WIECHERT	ALLEN	DECEASED			
WIECHERT	SANDRA	1501 INVERNESS APT 330	LAWRENCE	KS	66047-2063
WILDGEN	MIKE	801 LOUISIANA ST	LAWRENCE	KS	66044-2649
WILLIAMS	BARRY & HEDY	1720 N CENTER VALLEY RD	SANDPOINT	ID	83864-7154
WING	EUGENE	9751 PINE KNOLL RD	MOBILE	AL	36608-9239
WITTY	THOMAS	DECEASED			
WULFKUHLE	VIRGINIA A	840 N 1500 RD	LAWRENCE	KS	66049-9195
YARMER	ROBERT E	PO BOX 158	ELLINWOOD	KS	67526-0158
YOUNG	A L	PO BOX 467	BELOIT	KS	67420-0467
ZENS	CLIFFORD	933 N POPLAR ST	WELLINGTON	KS	67152-3571