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The **KANSAS** Anthropologist

Journal of the Kansas Anthropological Association

KANSAS ANTHROPOLOGICAL ASSOCIATION

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WHAT'S THE POINT? A FLINTKNAPPER'S ATTEMPT AT REPLICATING CALF CREEK TECHNOLOGY

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The Calf Creek horizon is a cultural phenomenon that occurred between 5950 and 5700 radio-carbon years before present (RCYBP). Research conducted by Don G. Wyckoff (Lohse et al. 2021) indicates that the horizon's origins can be traced to the Southern Plains. Volcanic activity in the northern hemisphere around 6000 RCYBP may have caused worldwide climate change, creating conditions that caused Calf Creek people to spread out over an area encompassing approximately 500,000 square miles. The hallmark of the Calf Creek horizon is its expertly crafted basally notched projectile points. A great deal of strategy and patience goes into making one. This article documents and discusses the production of a Calf Creek point.

Calf Creek projectile points and their variants are some of the most distinctive point types in existence. Their elaborate deep basal notching sets them apart from the plethora of other styles made worldwide throughout prehistory. Specimens are typically very thin and exhibit well-controlled flaking that, in my opinion, qualifies them as works of art. Calf Creek points are quite difficult to fashion, taking much dedication and extreme patience to produce. Half the battle is getting a biface thin and wide enough to accept the deep and oftentimes very narrow notching that makes these items unique. Each percussion strike during bifacing has to be perfectly executed to push flakes far enough to thin the objective piece without snapping it. The notching, however, is undeniably the trickiest part. One bad strike and the flintknapper risks breaking off an ear, shattering the entire object, or stalling out the notch. These artifacts are very fragile and have a high failure rate during manufacture. The overall design is not a very good one.

The Calf Creek horizon lasted from approximately 5950 to 5700 cal B.P. (Lohse et al. 2021:4) and likely originated in the Southern Plains. In its 250-year span, the technology spread over an area covering some 500,000 square miles that includes Texas, Oklahoma, Kansas, Arkansas, and Missouri (Figure 1) (Lohse et al. 2021:3). Why this technology spread so quickly over such a large distance is

a mystery and perhaps always will be. One theory proposes that its rapid expansion may be partly in response to major climate change. Around 6000 RCYBP volcanic eruptions in the northern hemisphere spewed particles into the stratosphere, creating insulation from the sun's rays. Reduced solar heat resulted in cool and dry conditions across North America (Lohse et al. 2021:8).

Climate change is important to archeologists studying the Calf Creek horizon, or any other time period in history because it potentially can shed light on why certain events took place. Calf Creek hunters were primarily in pursuit of bison. The cooler and drier conditions allowed C3 grasses (i.e., those that thrive in cooler temperatures) to expand farther south from the Northern Plains, and bison herds likely followed, drawing Calf Creek people out of the Southern Plains to exploit these animals (Lohse et al. 2021:10). Walker (1986) suggested that multiple species of bison existed in North America at the end of the Pleistocene, including *Bison antiquus* and *Bison occidentalis*. These species were differentiated largely by the size and shape of their horn cores (Walker 1986:159). For example, the horns of *Bison antiquus* grew outward, while *Bison occidentalis* had horns that swept upward. *Bison antiquus* was roughly 25 percent larger than modern bison and became extinct around 10,000 RCYBP. *Bison occidentalis* was slightly smaller, weighing up to



Figure 1. Map showing the approximately 500,000 square mile area that the Calf Creek horizon encompassed during its short-lived time span between 5950 and 5700 RCYBP.

2,000 pounds, and was approximately 20 percent larger than modern bison. This species died out 4000–5000 RCYBP (Nicholas J. Czaplewski, personal communication 2016). Modern *Bison bison* individuals weigh about 1,500 pounds (Leland C. Bement, personal communication 2023) and have horn cores that are much shorter than either of the aforementioned extinct species (Lohse et al. 2021:17).

A find that strongly supports the proposition that Calf Creek people were focused primarily on bison is a partial *Bison occidentalis* skull with a shattered Calf Creek point lodged just below its right horn. The skull was recovered in 2005 from a gravel bar on the Arkansas River near Tulsa, Oklahoma (Bement et al. 2005:221). Much controversy surrounded the specimen's authenticity at first; however, CT scans and radiocarbon dating proved the find to be genu-



Figure 2. Five examples of authentic incomplete Calf Creek horizon points are pictured. From left to right: a nearly exhausted Calf Creek point made from heat-treated Reed Springs chert that appears to have broken in the haft; a Calf Creek base with partial barb and lateral edge made from heat-treated Florence C (a flaw in the stone directly above the barb remnant likely aided in the breaking of this specimen); a nearly exhausted Calf Creek made from an unidentified fossiliferous chert, possibly heat-treated Burlington (this piece appears to have been utilized as a hafted knife, as evidenced by the blunted tip and blade angle); a Calf Creek point made from heat-treated Burlington chert; a Calf Creek mid-section made from Flint Hills Permian chert, possibly Florence C.

ine. CT scans showed that the projectile fragmented on impact and that the bone healed around it. The point itself is multiple pieces; the stem is missing, and impact fractures radiate down both sides. The tip also broke off, but it remains embedded in the skull. The stone from which the point was manufactured was not identified conclusively due to heavy patination, but it is likely from the Ozark region of eastern Oklahoma (Bement et al. 2005:223).

I do not like to use the word “always” when referring to anything in archeology, but original Calf Creek points are almost always made of high-quality material, determined by how finely grained it is. Finer grain allows flakes to travel much farther with less force, thus making it easier to fashion a biface thin and wide. It also aids in the most crucial part of Calf Creek tool production: deep basal notching. Calf Creek flintknappers in Kansas and surrounding states commonly used Florence, Burlington, and Reed Springs cherts. They are almost always heat treated to render the stone even easier to manipulate (Ray 2016:12). Figure 2 shows examples of authentic Calf Creek horizon points, and Figure 3 depicts examples of authentic Cossatot River points. Often found in association with Calf Creek

points, Cossatot River points are distinguished by a small notch on the base of the stem, giving them a lobed appearance (Lohse et al. 2016:322-323).

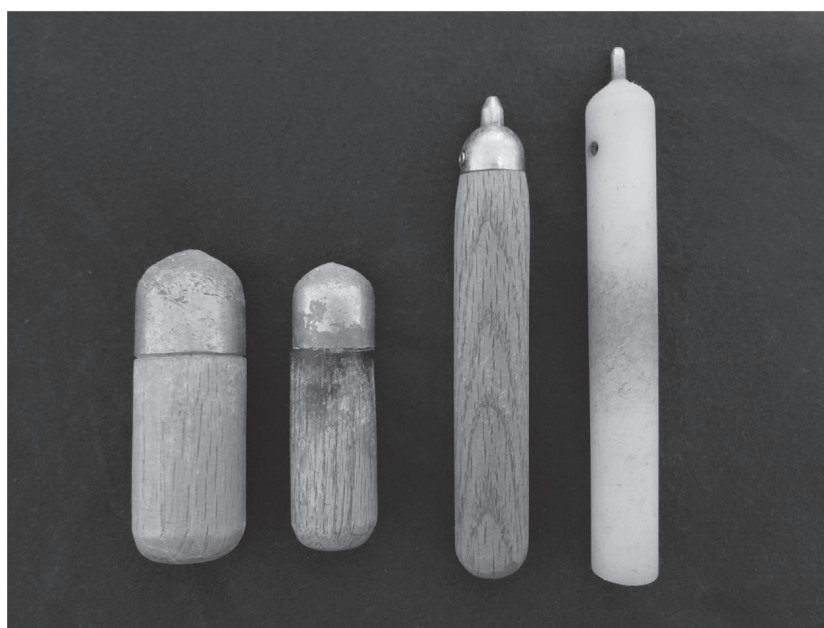
For my replication I chose a piece of Crescent Quarry chert that had been heat treated at 550 degrees for eight hours. This material from the Saint Louis, Missouri area is part of the Burlington formation. It is of excellent quality and gets very slick after being heated. As a side note, Crescent Quarry was highly valued by prehistoric populations in the Saint Louis area. Native Americans who occupied Cahokia Mounds were very fond of it (Collins 1990:32). This may be due to the outcrop’s relative proximity to the site, but I believe that they also favored it because it is very easy to chip after heat treatment. That being said, some nodules of Crescent Quarry are of such high quality that they can be worked raw.

Before going any farther, I want to mention that I use copper tools, as do most modern knappers (Figure 4). They are much more cost effective and hold up longer than antlers and hammerstones. They require less maintenance, thus allowing a person to knap longer without having to resurface the implements. Billet sizes used for this experimental arche-

Figure 3. Three examples of authentic Cossatot River points are pictured. From left to right: a Cossatot River point made from heat-treated Keokuk chert from northeastern Oklahoma; a Cossatot River point made from an unidentified fine-grained chert, possibly Reed Springs (the serrations and blunted tip indicate use as a hafted knife); a Cossatot River point made from heat-treated Keokuk chert from northeastern Oklahoma.



Figure 4. I used these flintknapping tools for this experimental archeology project. Both boppers or billets have lead-filled copper caps, which allow them to remove larger flakes. The pressure flaker second from the right is fitted with #2-gauge copper wire, and the one on the far right is set up with #6-gauge copper wire.



ology project included a 1-inch bopper for large thinning flakes, a $\frac{3}{4}$ -inch bopper for more detailed percussion shots, and two sizes of pressure flakers. One is set up with #2-gauge copper wire for edge trimming and larger pressure flakes. The second one is set up with #6-gauge copper wire for more detailed pressure flakes and finish work. I keep the ends on both somewhat rounded off because in my experience a rounded tip mimics antler flake scars better than a sharply pointed one.

One thing that made this piece a good candidate for a Calf Creek point, apart from being high-quality chert, was its broad shape (Figure 5). With a few rounds of controlled percussion flaking, it easily was transformed into a wide, thin biface. There were some issues starting out, though. During early stage bifacing a few hinge fractures occurred, which can be problematic as they can dive into the stone, creating a stack. This can cause loss of both length and width when removed. Stacked areas must be dealt



Figure 5. An appropriately sized stone must be selected when replicating a Calf Creek. If the preform is too long and narrow, it will not be able to accept the deep notches needed to make the point.

with as soon as possible so that a uniform biface can be produced, preserving as much length and/or width as possible. Sometimes stacks are configured in such a way that it takes a round or two of percussion flaking to reach them. However, mine were relatively shallow, and I was able to dispatch them fairly quickly (Figure 6).

Upon removal of the first hinge fracture, I decided to redress the edge and take a round of major thinning shots in the same spot. I chose to do this because the edge was already low enough that it made sense to continue thinning that side, and there were also high spots present that needed to be thinned. Reversing the edge so that thinning shots could be taken from the opposite face would have caused an unnecessary loss of width, which is crucial to maintain when manufacturing Calf Creek points (Figure 7). My strategy was that the edge was already below center line and would be a good candidate for major removals after being properly set up. This entailed



Figure 6. This picture shows the platform I struck to blend into one of the hinge fractures, with the "X" indicating the approximate spot where my billet made contact. A high angle strike allows the flake to undercut more mass, thus producing a larger thinning flake.



Figure 7. The edge shown in Figure 6 has been redressed, so another round of percussion flakes can be removed. Redressing entailed removing weak spots around negative bulb scars that would crush if struck.

removing any thin spots and the little triangles that occur on the sides of negative bulb scars. Most flintknappers refer to these triangles as "deltas" (Figure 8). In theory they should be trimmed following a flake removal. They are weak spots that can either

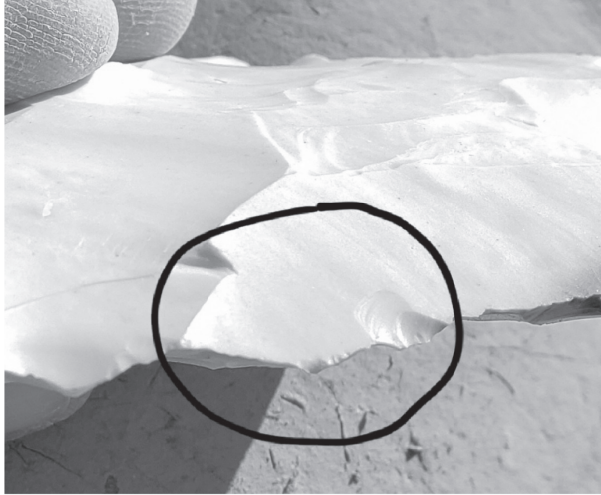


Figure 8. “Deltas” are the small downward-pointing triangular segments left on either side of a negative bulb scar.

fail upon a strike or cause step fractures after being struck. Removing them also exposes high spots that need to be leveled. Nevertheless, I am not always adamant about practicing this method. Copper tools allow knappers to get away with less than perfect platforms due to their mass and the way they grip the edge.

After a round of percussion, the biface was beginning to take shape (Figure 9), but one problem was evident: near the center on the lower half was a stack. This happens when a strike is not powerful enough, and a flake terminates early. Usually this results from flintknapper error. Fortunately, this was early enough in the game that it could be removed without losing too much length or width. By this stage I stepped down in size to the $\frac{3}{4}$ -inch bopper to have a bit more control. The biface was thin enough that it was best to decrease billet size to avoid breaking it.

I have found that the key to replicating CalfCreek-style bifaces is a high angle strike, bringing the billet up high and hitting the biface pretty hard. The higher angle removes larger and longer percussion flakes in my experience. Large flakes that extend at least half way across the biface are crucial, as you have to thin quickly in order to have room to refine the edge and execute the notching. What I mean by this is that large percussion flakes must be removed early in order not only to thin the biface, but also to



Figure 9. The biface approaches the final stages of percussion flaking. A few more major flake removals are needed to level the remaining high spots and eliminate the central stack.

keep as much width as possible. Removing smaller percussion flakes will thin the biface, but if they are too small, by the time the desired thinness is reached, the room remaining for notching will be insufficient. If the angle is too low, the energy will not be there to produce a large flake or carry it far enough. This requires some practice, as the strike must be very accurate. The hit has to be high on the platform to undercut mass, but not so high that the biface shatters. At least this is what works for me. Techniques vary from knapper to knapper.

Following the removal of the stack, I continued using the $\frac{3}{4}$ -inch bopper to take carefully placed thinning shots until I reached the desired shape (Figure 10). After this round of percussion, no more major removals were needed (Figure 11). Unlike many flintknappers, I leave most of the edge refinement and final shaping until after I do the notching. This allows for more mass along the edge, which can help should a notching flake cut too deeply. It



Figure 10. The 3/4-inch bopper was the best tool for removing the stack, as anything with a larger diameter might have shattered the biface.

provides a safety net of sorts in that the possibility of breaking off an ear is minimized.

Up next was the operation that greatly tests the bravery of any flintknapper: notching. An individual really has only a single shot at getting it right; one bad flake and the point is ruined. I imagine that ear breakage during manufacture happened fairly regularly in prehistoric times, but I highly doubt that stopped a Calf Creek hunter from using the tool. The people were, after all, trying to survive. While a one-eared Calf Creek may not be as pleasing to the eye, it still will cut and pierce hides. Another potential notching pitfall is stalling the notch, which results when the platform gets too rounded off or becomes too steep due to improper dressing. After stalling out, a notch can no longer be advanced—unless a rotary tool is employed to file down the stalled area. I am proud to say that I did not use one in the making of this point.

Sharp and well-dressed implements are criti-



Figure 11. A side view of the biface shows that most of the high spots have been leveled, and the preform has a relatively uniform appearance. The next step, at least for the way I knap, is notching.

cal in notching. My punch-notching setup consists of a short copper nail and a hickory paddle that I made from an axe handle (Figure 12 below). The nail inserted into the dowel rod is used to clean up the thin spots after taking a punch flake (Figure 12 above). That “bite” is needed in order to properly transfer energy onto the platform to successfully remove a notching flake. If the punch becomes chewed up or rounded off, removing a predictable flake becomes more difficult. In my experience a sharp punch greatly helps in keeping the notches narrow, as it concentrates the force on the platform.

To begin the daunting process of notching a Calf Creek, I used the pressure notcher pictured in Figure 12 to mark where the notches would go (Figure 13). My guess is that Native Americans did the same thing, except with something like a sharp sliver of bone or maybe a segment of rib. Also, starting notches with a pressure notcher, as opposed to marking them with a punch, lessens the risk of the

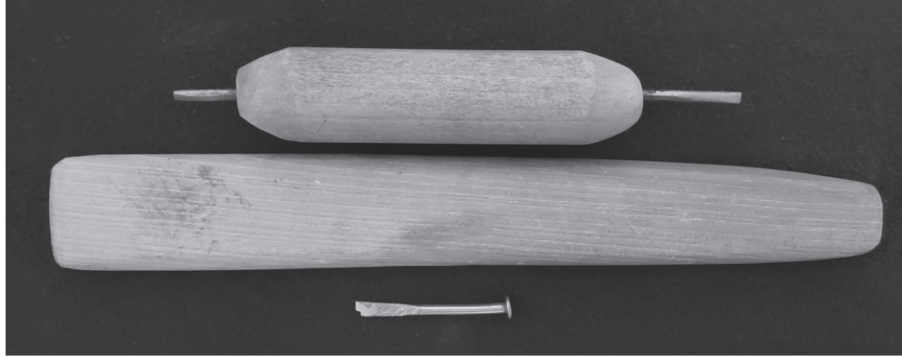


Figure 12. My punch-notching tools consist of a short copper nail and a hickory paddle (below). The pressure notcher (above) is simply a nail inserted into a dowel rod and filed down like a flathead screwdriver. I like this tool for cleaning up thin spots after a notching flake removal and for setting up the next platform. I also like a shorter punch around 2–2¼ inches in length. In my experience this gives a greater concentration of force, as it lessens the vibrations produced when struck with the paddle. A longer punch seems to vibrate too much during the energy transfer, which can cause the ears to break off. This is not to say that a longer punch cannot be used. As with any flintknapping, it is personal preference. I also like to file a 90-degree angle on the end of the punch, as shown on the nail at the bottom. The 90-degree angle rests on the platform, giving the punch a better grip that, in turn, causes more efficient energy transfer when removing notching flakes. Leaving the nail filed to a point has not worked well for notching Calf Creeks in my experience. A thin flathead screwdriver configuration seems to work best, as Calf Creek notches are deep and narrow. This shape is conducive to attaining both attributes.

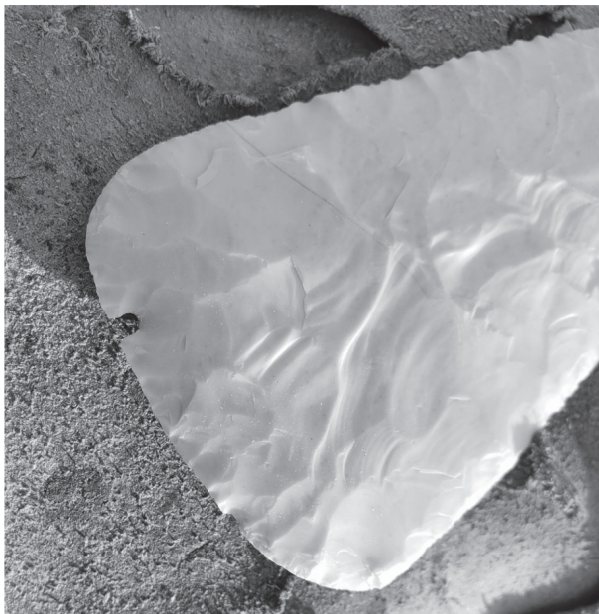


Figure 13. Initiating Calf Creek notches with pressure works best for me. Some flintknappers start theirs with a punch; however, I have found this to be too unpredictable. Sometimes the flake will wrap around and take part of the base with it. This necessitates redressing the base, thus losing length.

flake diving backwards and taking off part of the base. I have had this happen numerous times, which is quite frustrating, as the base must be completely redressed, thus losing a slight amount of length. It is even worse if the misstep takes place after completing one ear.

After starting the notches with a pressure notcher, I switch to the punch. This is where it gets dicey. Despite the biface being thin, the flintknapper must hit the punch hard—much harder than one would think. Speed is required as well. A light tap at a low angle will not produce enough force to transfer energy. Instead, it will either stall out the notch, which is big trouble, or cause a stress fracture in the platform. Stress fractures oftentimes are not visible to the naked eye. They occur when a platform is hit but the flake does not release. When hit again, a larger flake than originally wanted could come off or the point might shatter (Figure 14).

After a punch flake removal, the thin edges have to be cleaned up to advance the notch. This is fairly easy to do when the notches are shallow, but it becomes more challenging once some depth



Figure 14. This shows the first of the many punch-notching flakes to be removed, as well as the flake scar produced from the strike.

is gained. Too much pressure on the side of the ear will cause it to snap off. I like to use the same pressure notcher shown in Figure 10 to clean up the sides. Even so, care should be taken going forward not to remove too much, because the platform will become rounded off and stall out. The key is finding that balance between having the platform beefed up enough to strike without it failing while not being so rounded that excess force is needed to advance the notch.

Some Calf Creek replicators punch both notches in at the same time, meaning that they alternate flake removals from one notch to the other. The rationale behind this is that, in the event that one of them stalls out, one notch will not be deeper than the other. I do not do this, however. I complete one notch then move on to the next. This way I can concentrate on the notch's symmetry as best I can, which I find hard to do if I bounce back and forth. It is simply a matter of flintknapper preference (Figure 15). A characteristic worth noting on many original Calf Creek points is that their notches exhibit a slight outward flare near their terminations. Obtaining this shape involves slightly angling the punch outward toward the lateral edge on the final two or three flake removals. This is another danger zone, as the force is now being directed more toward the lateral edge. Like anything with flintknapping, it takes practice to achieve the maneuver without failure.

The point was now complete (Figure 16). A total of 15 notching flakes were removed (Figure 17). I



Figure 15. One notch has been completed and the second begun. This is a risky way to notch because, if the second notch stalls out, they will be uneven.



Figure 16. My attempt at a Calf Creek point is finished. There is room for improvement in some areas. One of these would be to make the notch entries a bit narrower, a trait commonly seen on authentic artifacts.

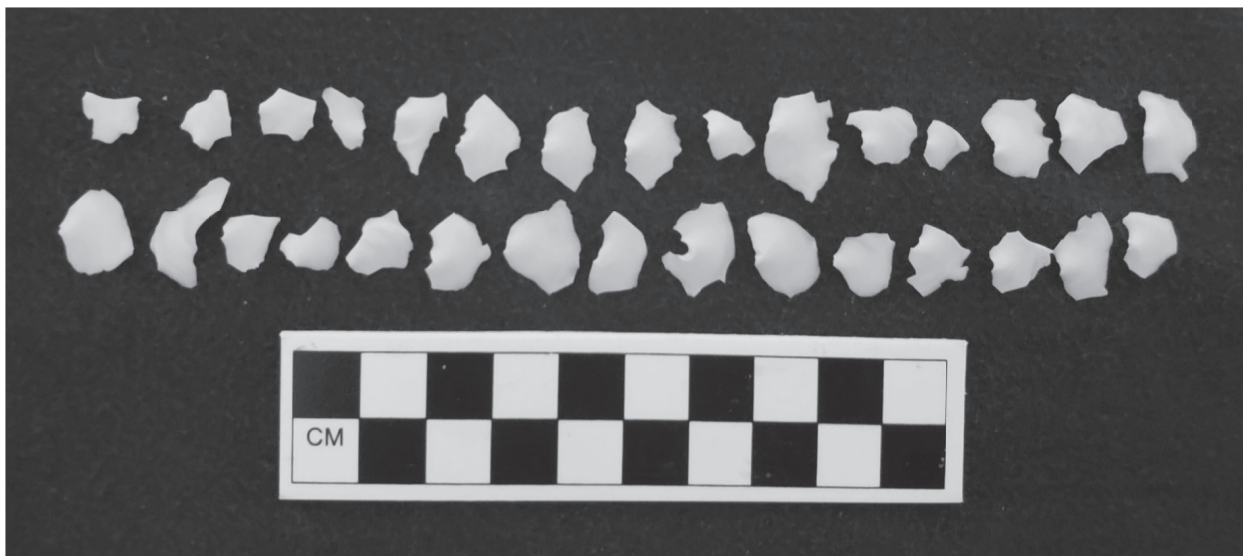


Figure 17. All flakes from each notch are displayed. The number of notching flake removals needed to create a Calf Creek is one thing that makes them so daunting. Not only is patience required, but platforms must be as flawless as possible.

wanted to drive in the notches slightly deeper, but the biface contained a healed crack that potentially could cause it to shatter should I advance any farther. The healed crack can barely be seen about a quarter inch above the left notch. The crack had healed long ago by minerals seeping into it, but it still could be a weak spot. The risk was not worth it.

Just for fun, I decided to try my hand at an Andice point, also out of Crescent Quarry chert. The piece I chose was an angular chunk about the size of a softball. Andice points are part of the Calf Creek horizon, but there are some subtle differences between the two (Figure 18). The preforms are more or less the same, but the stem often starts out much narrower than a Calf Creek and expands outward the farther up it goes. Another notable difference is how the notches flare more outward toward the lateral edge. Andice points usually are notched even deeper than Calf Creek points; however, my preform was too small to accomplish the deeper Andice-style notching, so I made a mini version.

As stated initially, Calf Creek points are very difficult to replicate. I personally think that they are more challenging than a Clovis or other fluted types, except perhaps for a Cumberland. That said, I do not consider myself a flintknapping guru. I took up this hobby simply for fun and to better understand chipped stone artifacts. I enjoy passing along any insights that I gain along the way to keep alive



Figure 18. Andice (right) notching is slightly different than that of Calf Creek (left). Andice notches are usually deeper and tend to have a more dramatic outward flare. The trick to achieving this flare is to angle the punch more outward. Extreme caution must be practiced when doing this, as an improper strike can result in a broken point.

the spirit of both flintknapping craft and prehistoric lifeways.

ACKNOWLEDGMENTS

I would not be an archeologist or flintknapper today if it were not for Virginia Wulfkuhle. She got me interested in this field at age seven. In addition, she organized a knap-in as a KAA event in April 2017 that I attended. At that gathering I realized that I was a knapper for life.

I also want to thank my flintknapping mentors, Bryan Hodkins and Bob Hunt. They are two of the best knappers out there, as well as two of the greatest guys you would ever hope to meet. I will always be grateful for all three of these individuals.

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EXPERIMENTAL PROCESSING OF HACKBERRIES AND IMPLICATIONS FOR ARCHEOLOGICAL STUDIES

ROBERT J. HOARD

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Whole or nearly whole hackberry seeds are commonly found in archeological sites. While hackberries can be eaten whole, the seeds are surrounded by a pit or stone that makes chewing them unpleasant. Ethnographic accounts indicate that native people in North America did eat them, often grinding them first. This paper discusses the archeological and ethnographic evidence for the use of hackberries as food and also presents the results of an experiment to determine what it may have been like to process, store, and eat them.

My interest in hackberries as a source of food for prehistoric people in Kansas started with the excavation of a human burial in northwest Kansas (Hoard et al. 2005). The burial (Figure 1) was discovered by a hunter, who saw something unusual in the wall of a deeply eroded cattle trail, leading to Museum Creek in Sheridan County. A little investigation ascertained that this was a human burial. The hunter called the sheriff, and the sheriff called the Kansas Historical Society (KSHS). The Kansas Unmarked Burial Sites Preservation board, which has representatives of tribal nations, met and agreed that the burial should be excavated before it eroded out and was trampled by cattle. Excavation by KSHS staff took place promptly.

Subsequent analysis included a radiocarbon age determination of 1370 ± 70 on charcoal associated with the burial. The adult male was associated with two artifacts: a long thin piece of worked bone of unknown function and a large grinding slab that had been laid on top of the burial (Hoard et al. 2005:266). This individual lived during the Early Ceramic period, roughly 1,000-2,000 years ago. During this time High Plains people, referred to as the Keith phase, are not known to be farmers. So, what were they grinding on that large grinding slab?

Steven Bozarth of the University of Kansas did a wash of the grinding slab to look for phytoliths (Greek for plant stone), which are very small structures in plants made of silica. The shapes of phytoliths are unique for different plant species, and phytoliths from the leaves, stems, and fruits of a species also may differ from each other. Because

of this, phytoliths on pottery and grinding stones in archeological contexts can be used to identify what kinds of plants or even what parts of plants were being processed.

Bozarth (2004) found hackberry fruit (as opposed to leaf) phytoliths on the grinding slab that covered the burial. This makes sense. Keith phase people probably were not farmers, although this is the subject of ongoing research, but they did use wild plants. From this analysis we now know that at least some Keith phase groups processed and presumably ate hackberries, which raises the question of what it is like to gather, prepare, store, and eat hackberries.

DISTRIBUTION AND USE OF HACKBERRIES IN NORTH AMERICA

Food Value

Hackberry trees are common throughout the Plains and are a dominant tree along waterways of the High Plains and abundant in the eastern part of Kansas (Figure 2). Both *Celtis occidentalis*, the common hackberry, and *Celtis reticulata*, the netleaf hackberry, are found in the state. The common hackberry is more plentiful in central and eastern Kansas and into the eastern prairies, and the netleaf hackberry predominates in northwestern Kansas, including Sheridan County, where the burial was located (Kindscher 1987:242; Little 1980:414-416).

Both Kansas hackberry species produce small, edible, red to purplish drupes in the fall (Figure 3). A drupe is a type of fleshy fruit with hard inner layer (i.e., a stone or pit), surrounding the seed (Little

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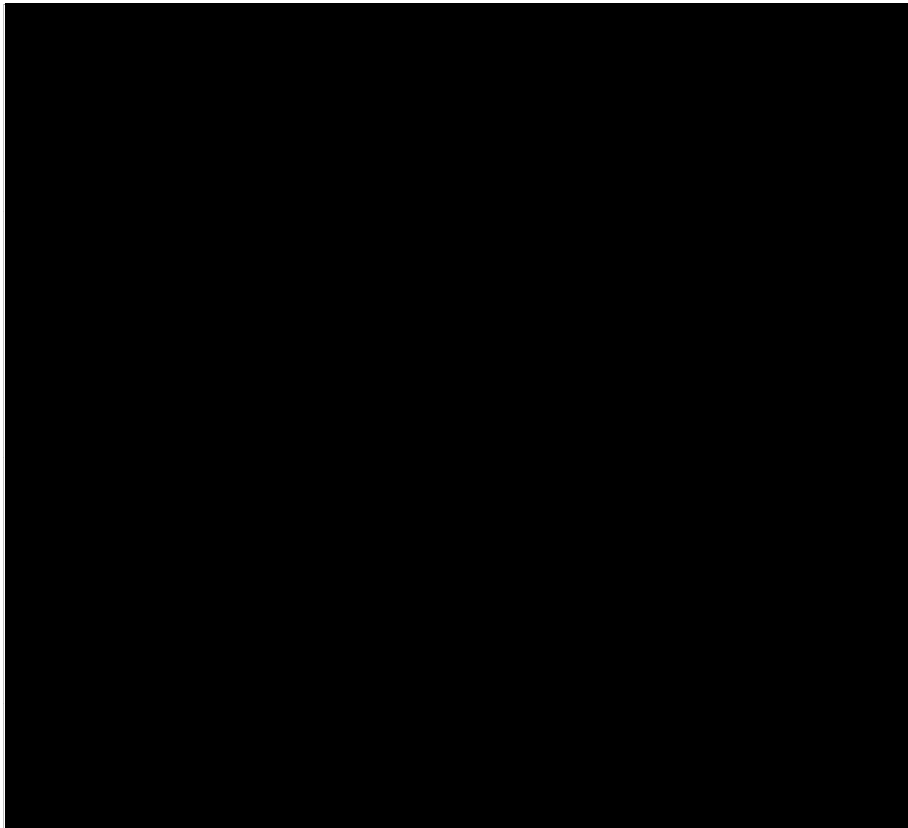


Figure 1. Site 14SD351, showing the exposed burial covered with a grinding stone.

1980:683). Familiar drupes include peaches, plums, nectarines, apricots, cherries, and olives. Hackberry drupes are quite small, about 8 mm in diameter, and they are more stone than flesh. The weight of five whole drupes is 1.3 g; with the pulp removed, they weigh .6 g, so an entire drupe is about half pulp by weight. If you trust your teeth, you can crunch them whole to enjoy their prune-like flavor.

Hackberries are desirable food for animals and humans alike. Birds eat them in great quantities (Little 1980:414-415). According to Gina Powell (Hoard et al. 2017:86), larger animals eat the whole drupes, while smaller animals may hoard them in burrows and eat both the flesh and kernel inside the hard seed. Humans can eat them fresh or process large amounts of the whole drupes for storage by pounding and drying (Hoard 2014; Hoard et al. 2005).

Hackberries have measurable amounts of food value. They also contain sodium, potassium, phosphorus, manganese, calcium, boron, barium, magnesium, and selenium (Demira et al. 2002). Quantities of sodium, potassium, phosphorus, manganese, calcium, magnesium, zinc are higher than in peanuts,



Figure 2. Netleaf hackberry tree, species *Celtis reticulata*, most common in western Kansas.

Figure 3. Ripe hackberries among the fall foliage of *Celtis occidentalis*, the common hackberry, most common in eastern Kansas. This tree is in Topeka, Kansas, and is the source of hackberries used in the experimental studies reported here.



for example. Hackberries also are sweet and similar in flavor to prunes. Jack Hofman (personal communication October 18, 2021) pointed out that few wild foods are sweet and that prehistoric people probably enjoyed a sweet treat when they could get it. Considering that hackberries abound in Kansas, are both edible and sweet, and have nutritional value, it is reasonable to assume that they were incorporated in the human diet in prehistoric times. Ethnographic evidence supports this.

Ethnographic Reports of Use in the Great Plains

Gilmore (1977:24) stated that the Pawnee, Dakota, Winnebago, and Omaha-Ponca ate hackberries. He reported that the Dakota word for hackberries means “to crunch,” and the Winnebago word translates as “raccoon food.” The Pawnee ground the drupes and added fat and parched corn that they said tasted very good. While the Omaha ate hackberries only occasionally, they and the Dakota ground the entire fruit into a fine paste used to flavor meat.

The Kiowa prized hackberries, which they pounded into a paste, molded onto a stick, and baked over a fire (Vestal and Schultes 1939:23). Hackberries were eaten fresh or were ground, formed into cakes, and dried for the winter by the

Mescalero and Chiricahau Apache. Sometimes jelly was made (Castetter and Opler 1936:46). The puebloan Acoma and Laguna made extensive use of hackberries for food (Swank 1932:35).

Archeological Evidence of Use in Kansas

Powell (Hoard et al. 2017:85-86, 90) found evidence of hackberry use, both *Celtis occidentalis* (common hackberry) and *C. laevigata* (sugarberry), in her analysis of materials from the 2015 KATP field school excavations at the Kraus 1 site (14EL313). Hackberries were represented by uncharred light brown specimens and charred or calcined white, black, or bluish specimens. Uncharred seeds preserve for a long time in the archeological record due to their high calcium content, which is also why they, like bone, can turn blue when heated.

Excavations of the Early Ceramic Keith phase Forrest site (14PA303) were conducted by amateur archeologist and KAA member Earl Monger intermittently between 1957 and 1967. Monger noted 162 hackberry seeds (Figure 4) from all parts of the site but did not specify whether any or all of these were in concentrations. However, he stated in his personal notes that some of the seeds were burned and some had been opened by rodents (Hoard and Bozell 2016:12).

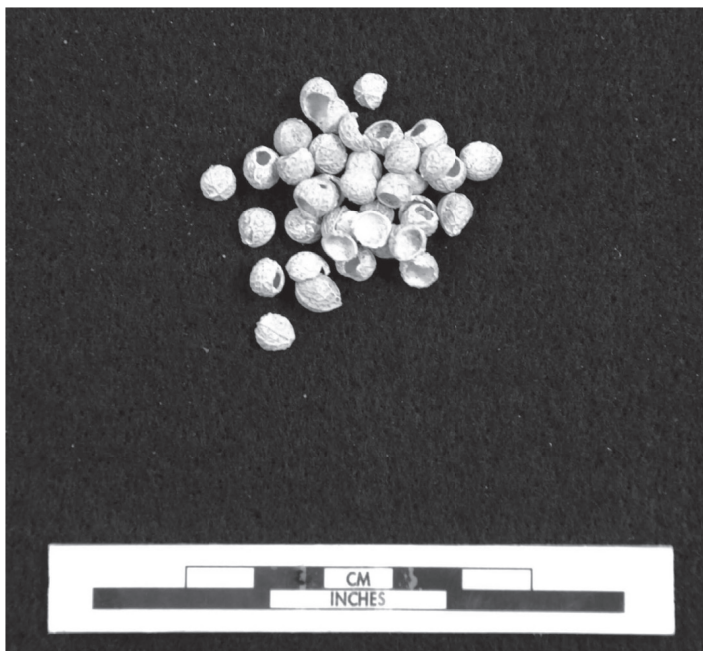


Figure 4. Hackberry stones recovered from the Forrest site (14PA303) in Pawnee County by Earl Monger. Note the holes chewed by rodents to access the contents of the hackberry stones.

Hackberry phytoliths were recovered in relatively high frequencies from two Lower Walnut Great Bend aspect sites: 14CO1 (from the fill of a bell-shaped pit) and 14CO501 (from a metate wash) (Bozarth 2012:480-481). The fruit stone phytoliths from the 14CO501 metate wash suggested that the drupes were ground or pounded, an important observation because Bozarth (2012:480) referred to the stones as inedible.

Other Plains sites have yielded hackberry seeds (Adair 1988:23, 31; 2003:281-308): the Archaic period Coffey (14PO1) and Nebo Hill (23CL11) sites, the Middle Woodland Kansas City Hopewell Quarry Creek site (14LV401), 14BU9 (Late Woodland), 14JO21 (Pomona phase), and 14SD305 and 14FT70 (Upper Republican).

EXPERIMENTAL PROCESSING

Grinding Hackberries

In 2013 I conducted an experiment to determine how practical it is to gather and prepare hackberries, based on ethnographic accounts (Hoard 2014). I collected a half pound of hackberries in 30 minutes by picking them from low branches and from the ground (Figure 5). From observing a tree in my yard, I learned that hackberries have a tough skin and do not rot easily; they can sit on the ground for

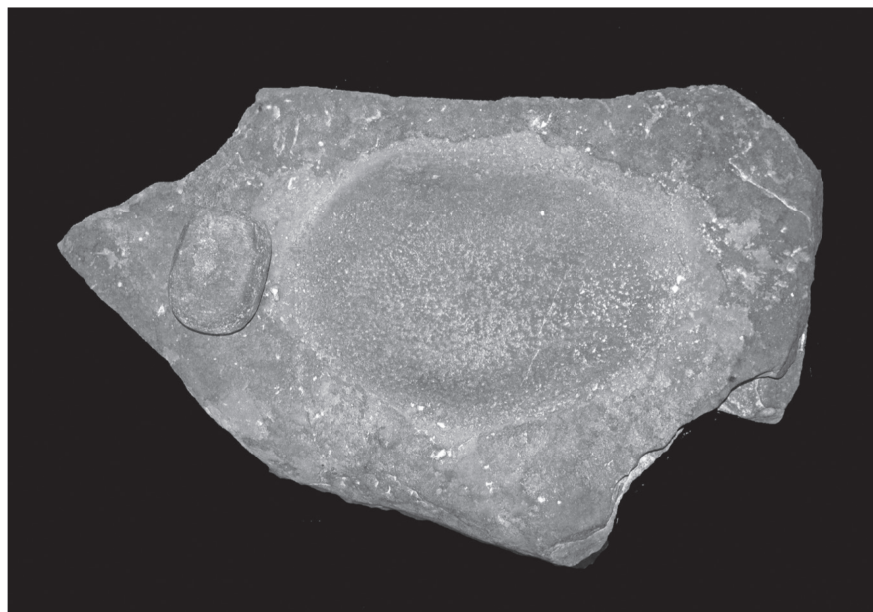


Figure 5. Hackberries collected and used in the experiments recorded in this report.

quite a while and still be good to eat. We know that they can be eaten fresh, but several ethnographic reports contended that people processed them by grinding, so I set out to understand that procedure.

I started with a fairly flat grinding stone that was readily available. My initial grinding attempts were thwarted because the hackberries rolled everywhere. The grinding stone recovered from the burial site that initiated this investigation had a fairly deep trough, so I found a grinding stone with a more pronounced concavity (Figure 6). However, grinding

Figure 6. Grinding stones used in this study. This is the second, deeper grinding slab.



on this metate remained unsuccessful, and I resorted to pounding the hackberries instead. While they still tended to roll away, pounding and using a grinding stone with a deeper trough made a significant difference. I can see why some individuals mixed the drupes with fat—not only did it make the paste more nutritional, it probably kept them from rolling as much.

Making and Storing Cakes

Once most of the pits were cracked, it was possible to grind them into a paste that was palatable (Figure 7). It is important to crack the seed. While a person can crack seed with his/her teeth, it takes a bit of force and is not advised. Even the fragments remain as crunchy reminders in your mouth, so pounding the berries fine is desirable. A mortar would be best for grinding hackberries, such as the wooden mortars documented ethnographically for grinding maize by Native Americans on the Plains (Bamforth 2021:350). Still, it does not take long to produce a sticky paste that can be formed into cakes (Figure 8). I dried the cakes on a sunny window sill to prevent mold (Figure 9). After a month I ate one. It was dry and not as sweet as the fresh fruits but clearly edible. The cakes remained on a file cabinet in my office for a year and a half with no sign of spoilage or textural change. At the end of 18 months, the last cake was eaten.

Lessons Learned

I learned several things from this project. Hackberries taste pretty good. They can be eaten right off the tree, though they are crunchier than most people accustomed to refined foods would appreciate. While it is not easy to pound them into a paste, which breaks down the stone and makes them a lot more pleasant to eat, it is not that hard either. It probably takes less effort than grinding corn. A very deep grinding slab or a mortar facilitates the operation.

The dried cakes are effectively nonperishable. They are a bit tough but make a nice addition to boiled foods. Because hackberries are simple to harvest, plentiful during the late summer and into winter, sweet, and relatively easy to prepare, they would have been an attractive food for variety and for times when other plant foods were scarce.

Still, finding hackberry seeds at an archeological site does not necessarily mean that they were saved for food. Based on the information presented, I assert that any relatively large harvest would have been processed by grinding, thus leaving little recognizable trace. Furthermore, a handful of hackberries is not worth storing. A fist-sized bunch of seeds buried in a site is less likely to be storage by humans and more likely to be hoarding by rodents. Evidence of hackberries as food in an archeological context will most readily be detected by examining microscopic remains.

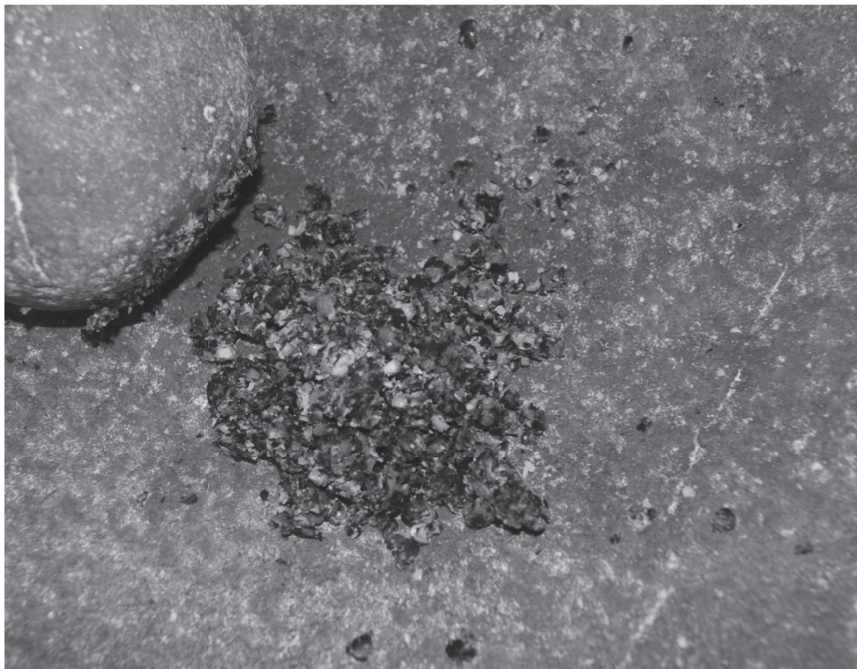


Figure 7. Hackberries pounded into paste.

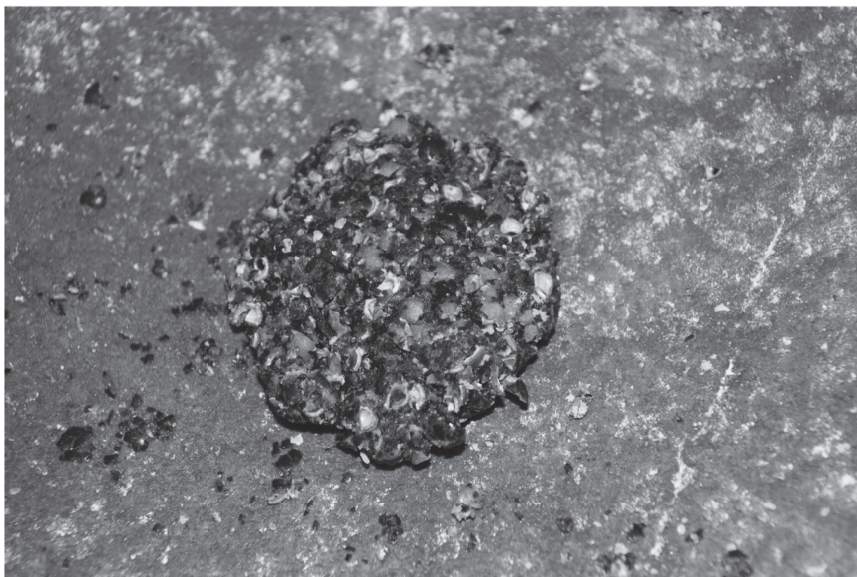


Figure 8. A hackberry cake.

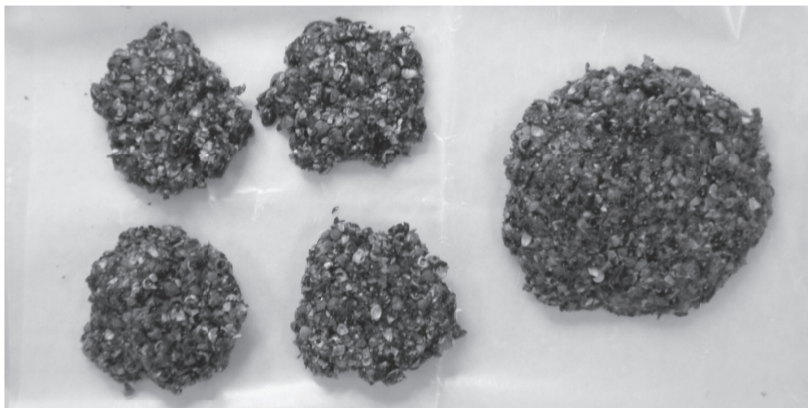


Figure 9. Dried hackberry cakes.

Hackberries undoubtedly were used prehistorically as a supplemental food, flavoring agent, or starvation food, and they are documented as a popular seasonal food. They are easy to collect and not too difficult to process, and they keep very well. So, next fall, if you make a certain identification of a hackberry tree and can collect some drupes from its branches or from the ground, give them a try. They might become a new favorite treat on your autumn hikes.

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BREAKING BONES ON WHITE ROCK CREEK: EVALUATING EVIDENCE FOR BONE GREASE PRODUCTION AT THE WHITE ROCK TYPE SITE (14JW1)

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The White Rock phase is the archeological expression of Siouan-speaking Oneota groups who migrated into the Central Great Plains, beginning in the late thirteenth century A.D. An ongoing question about the White Rock migrants is whether they practiced different subsistence strategies from the earlier Central Plains tradition peoples in this area. Using the faunal remains from the 1935 and 1937 Nebraska State Historical Society's excavations of the White Rock type site (14JW1), this paper evaluates whether the occupants practiced a specialized bison-hunting economy, including intensive bone grease extraction. An overview of ethnographic and archeological information about bone grease manufacture from across North America is used as a framework for interpreting the results of a taphonomic-based zooarcheological analysis of the White Rock faunal assemblage.

The White Rock phase is the archeological expression of Siouan-speaking Oneota groups that occupied the Lovewell locality along White Rock Creek, a tributary of the Republican River, in north-central Kansas between A.D. 1250 and 1450 (Logan 1995, 1998a, 2022; Ritterbush 2002; Ritterbush and Logan 2000). The movement of Oneota peoples into the Central Plains appears to correspond to the temporary displacement of the existing Caddoan-speaking population living in this portion of the Central Plains, identified archeologically as the Central Plains tradition (CPT) (Logan 1998a; Ritterbush and Logan 2000; Ritterbush 2002, 2022). The Oneota affiliation of the White Rock phase is based on the presence of diagnostic attributes of Midwest Oneota ceramics, including smoothed-surfaced globular jars, tool-impressed and incised decorations on the lip, and distinct shoulder decorations of parallel trailed lines or nested chevrons (Logan 1995; Padilla and Ritterbush 2005; Ritterbush 2001; Ritterbush and Logan 2000). Other artifacts that distinguish White Rock from CPT assemblages and are shared with other Oneota assemblages are small triangular unnotched projectile points, grooved mauls, discoids, and Catlinite disc pipes (Padilla and Ritterbush 2005; Ritterbush and Logan 2000).

The nature of interaction between Oneota and CPT groups on the central Great Plains is not entirely understood, but apparently relations varied among peaceful trade and exchange, violent conflicts, and co-residence and intermarriage (Bamforth 2021; Gover et al. 2021; Hollinger 2005; Logan 2010; Pugh 2010; Ritterbush 2007, 2022). The Lovewell locality has yielded minimal evidence that White Rock phase peoples interacted directly with CPT populations. The White Rock groups apparently chose the region to take advantage of the seasonal abundance of bison in this part of the mixed-grass prairie (Ritterbush and Logan 2000).

Unfortunately, few well-dated stratified White Rock sites exist. Key sites, such as those around Harlan County Lake in south-central Nebraska, Glen Elder Dam, and Waconda Reservoir in north-central Kansas (Adair et al. 1987; Blakeslee et al. 2001; Rusco 1960) have been destroyed or poorly preserved. One of the most intensively investigated localities is Lovewell Reservoir, which encompasses the White Rock type site (14JW1). The University of Kansas Museum of Anthropology (KUMA) and Kansas State University (KSU) (Logan 1993, 1995, 1998a, 2022; Logan and Banks 1994; Logan and Hedden 1992; Ritterbush and Logan 2000) have conducted extensive excavations there. While thor-

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ough, only a small portion of White Rock sites within Lovewell Reservoir have been examined.

The White Rock site is situated on Pawnee Point, an upland ridge on the north bank of Lovewell Reservoir (Logan 1998a, 2022) (Figure 1). Archeological interest in the area began in April 1935. A. T. Hill, then director of the Nebraska State Historic Society (NSHS)¹, requested that George Lamb travel to Jewell County, Kansas, to visit the site and view George Warne's artifact collection from the nearby White Rock phase Warne site (14JW2). After inspecting the Warne material, Lamb

made a quick reconnaissance of 14JW1, which was located approximately a mile east of 14JW2.

Lamb returned to Jewell County in August 1935 to survey the White Rock site. During this visit Lamb made a surface collection of artifacts and faunal remains, delineated the traces of two possible houses, and excavated a small storage pit near the center of one of the structures. In 1937 a NSHS field crew, consisting of Paul Cooper and George Lamb, spent six days mapping and photographing the site, identifying 7 features that were not tested, and examining 27 subsurface features: 2 "house"



Figure 1. Location of White Rock site (14JW1) at the Lovewell Reservoir in Jewell County, Kansas.

structures (H1 and H2), delimited by a series of post molds; a hearth; and 14 trash-filled pits (C1-C14) (Cooper 1937; Rusco 1960). Work continued at the site in following decades, including formal recording by the Smithsonian Institution River Basin Survey in 1951 and further limited excavations in 1956 (Cooper 1955; Fenenga and Cooper 1951; Neuman 1963).

Little of the 1935 or 1937 work was reported until 1960, when Mary Rusco (1960:49-54) analyzed portions of these NSHS assemblages, as well as other White Rock phase sites, as part of her Master's thesis. Rusco assigned unique numbers (F1-F28) to all the subsurface features identified by Cooper and Lamb. As Rusco's designation system was retained in later investigations at 14JW1 (Logan 1995), it was adopted for this study to reduce confusion.

Between 1991 and 2009 Brad Logan and Lauren Ritterbush conducted a multi-year research and salvage program at 14JW1 and nearby localities that involved archeologists from the University of Kansas and Kansas State University (e.g., Logan 1993, 1995, 2022; Logan and Hedden 1992). This more recent exploration expanded knowledge of the size, nature, cultural affiliation, and age of the White Rock sites.

Based on the faunal collections from the 1935 and 1937 NSHS excavations, this article evaluates the hypothesis that White Rock peoples utilized a specialized bison-hunting economy, which incorporated high-intensity bone processing directed toward grease extraction (Hill 1998). White Rock culture reflected a significant change in the subsistence strategies of Late Prehistoric groups in the Central Plains (Bozell 1991, 1995; Brown 1982; Koch 1995; Mick 1983). This analysis considers two research questions. First, is there evidence that 14JW1 occupants had a specialized bison-hunting economy? Second, is there evidence for intensive processing of bison bones for extracting grease?

A preliminary overview of ethnographic and archeological information about bone grease production focuses on key activities and stages in its manufacture, as well as primary and secondary archeological evidence for bone grease extraction. With this data as a baseline, the results of a taphonomic-based zooarcheology of the NSHS faunal assemblages are offered. Subjects discussed are 1) prey species recognized at the site, 2) bison remains

present, and 3) bone modification and preservation to assess the human role in assemblage formation. The paper concludes with an evaluation of evidence for a specialized bison-hunting economy and bone grease production at the White Rock type site.

ETHNOGRAPHIC AND ARCHEOLOGICAL EVIDENCE FOR BONE GREASE PRODUCTION

Bone processing extracted within-bone fats (Morin and Soulier 2017: 97). The rendered grease was either consumed directly as a liquid stew or soup (Saint-Germain 1997) or separated, cooled, then commonly formed into loaves or combined to make pemmican for later consumption. The fat also had a number of non-dietary applications, such as hair gel, candle making, bow string preservation, skin tanning, and leather waterproofing (Binford 1978; Kehoe 1967; Outram 2001; Saint-Germain 1997; Vehik 1977). Based on ethnohistorical accounts of bone grease production by Native Americans and others, archeological evidence for the activity, and experimental results, the manufacture and use of bone grease is described.

Humans have been breaking bones to obtain fat for much of history. Strong archeological evidence exists for bone grease extraction at European Upper Paleolithic sites, and a number of researchers have asserted that the practice appeared much earlier during the Middle Paleolithic (Castel et al. 2017, Costamagno 2013; Morin and Soulier 2017; Speth 2015; Stiner 2003). For North America the best estimate is that bone grease rendering has been undertaken for at least 5,000 years (Fawcett 1985; Forbis 1992; Reeves 1990; Walker 1992).

Most ethnohistoric or ethnographic accounts came from Indigenous groups across North America and northeastern Siberia (e.g., Brackenridge 1904; Bradley 1923; Catlin 1857; Denig 1930; Densmore 1929; Denys 1908; Dorsey 1884; Georgi 1780; Grinnell 1892, 1962; James 1823; Kidd 1986; Le Clercq 1910; Linderman 1932; Mandelbaum 1941; Nordenskiöld 1882; Schoolcraft 1851-1857; Turney-High 1941; Uhlenbeck 1912; Verbicky-Todd 1984; Wallace and Hoebel 1952; Weltfish 1965; Wissler 1910; Zierhut 1967). Yellen's (1977) ethnoarcheological work with the !Kung bushman was one exception. As Outram (2001:402) dis-

cussed, stories of this activity generally were confined to populations in northern latitude regions, likely because fat can survive longer without going rancid in temperate or cold climates.

The first step in bone grease production was the selection of the fat source. Body size is proportional to the amount of grease that can be extracted from an animal's bones, so large-bodied artiodactyls were preferred consistently. Among Great Plains Indigenous groups, bison was the sought-after species (Lowie 1909, 1924; Mandelbaum 1941; Turney-High 1941; Vehik 1977; Weitzner 1979; Wilson 1924). However, depending on availability, other species also were targeted. For example, the Blackfeet (*Siksikaitsitapi*), while favoring bison, regularly obtained fat from deer and elk (Wissler 1910:28). In more northern latitudes the Cree (*Naskapi*), Inuit communities, and Dene people used the bones of caribou (Binford 1978; Cameron 1890; Kinietz 1947; Leechman 1951; Losey 1971; Nagy 1990; Stefansson 1913). Finally, Denys (1908), Le Clercq (1910), Peale (1871), Skinner (1911) and Zierhut (1967) reported that various northern populations regularly pounded and boiled moose and deer bones.

Seasonality has not been considered thoroughly, but apparently bone grease production occurred throughout the year (Brink 1997; Leechman 1951; Saint-Germain 1997; Vehik 1977:169–170). Historic narratives of the Hidatsa (*Hiraacá*), Assiniboiné (*Nakota*), Ojibwe (*Anishinaabe*), Crow (*Apsáalooke*), and Blackfeet (*Siksikaitsitapi*) described bone grease manufacture following large winter hunts (Denig 1930; Kehoe 1967; Kinietz 1947; Lowie 1924, 1956; Skinner 1913; Wilson 1924). This timing coincided with the season when animals were most robust (Saint-Germain 1997). Binford (1978:159) recorded that the Nunamiut extracted bone grease after caribou kills in the winter, late spring, and early summer (see also Burch 1972). Archeologically, McKee (1985, 1988) contended that the activity took place at the River Bend site in southwestern Wyoming in the fall (September to December). Then again, Nagy (1990) estimated that bone grease rendering happened during the summer (May or June) at an ancestral Mackenzie Inuit site (NgVh1).

While there is no reason to doubt that bone grease could be manufactured during warm months,

in those instances bones likely were processed as soon as possible within a day or two after a kill (Leechman 1951). Throughout the cold season cooks could be more flexible in dealing with carcasses, even waiting weeks or months. For example, Burch (1972:362) stated that Inuit communities in northwestern Alaska often chose not to produce bone grease immediately after an early winter kill. Instead, after removing available meat, the caribou bones were cached and processed in the spring. Binford (1978) explained that this strategy took advantage of the cold climate to preserve within-bone nutrients and fat.

Facing food stress or otherwise in immediate need, other Indigenous groups foraged for sources of bone to process for grease. Wilson (1924:302) said that on at least one occasion Wolf-Chief's (Hidatsa) father gathered bones from a nearby Sioux (*Oceti Sakowin*) camp with a recent kill, broke up and boiled them, and made a soup that incorporated wild mushrooms. Schoolcraft (1854:68) attested that the Sioux "do collect old bones if they have at least appearance of marrow or fat in them, and boil them to get the fat out of them." Similarly, Denig (1930:584) wrote of the Assiniboiné, "in times of great scarcity, old bones are collected . . . [and] . . . pounded and the grease extracted by boiling." Wilson's and Denig's accounts clearly indicated that scavenging occurred during the winter, when spoilage was not a concern due to cold temperatures.

When the time came for carcasses to be handled, elements to be processed for grease were chosen. Based on their own actualistic studies, Brink (1997) and Binford (1978) emphasized that grease amount, bone density, and bone size were important variables for making this selection. The quantity and quality of fat is highest in the spongy proximal ends of the upper leg bones and lowest in lower limb bones, especially the carpals and tarsals, and axial skeleton (Brink 2002; Emerson 1990). Blackfoot elder Jim Weasel Tail reported to Kehoe (1967:70) that "the femur and humerus were best for 'bone butter' (grease)." Other portions targeted for their within-bone fat were the innominate (Bonnichsen 1973; Zierhut 1967) and scapula (Wilson 1924). However, Vehik (1977:170) and others (Dorsey 1884; Jenness 1922) noted that skeletal components with lower volumes of grease, such as vertebrae,

ribs, and foot bones, regularly were processed. The Cree broke the ramus of the mandible into small pieces to extract grease (Zierhut 1967:35). Almost all body parts contain fat, but that does not mean that grease from different carcass sections was valued equally. The Hidatsa (Wilson 1924) and Nunamiut (Binford 1978) processed the low-quality axial bones separately from the high-quality upper limb bones because they yielded different quantities and qualities of grease (see also Outram 2001).

Once skeletal elements were selected and skin and meat removed, the bones were broken to remove the marrow and further process for fat. Based on ethnohistoric accounts, the job of manufacturing bone grease, like cooking, butchery, and other reproductive labor activities, usually was the responsibility of women (e.g., Binford 1978; Leechman 1951; Losey 1971; Vehik 1977). In a few instances men were observed to assist with crushing bones (Baker 2009:20; Bonnicksen 1973).

Based on information provided by Káinaikoā (Blood) and interpreted by Joseph Tatsey, Uhlenbeck (1912:11) documented that Blackfoot women prepared to extract grease from bison bones by gathering firewood. Once that was accomplished,

... she began to put her leg-bones together. She pulled out her stone to hammer the bones on, [and] her stone hammer Then she began to hammer them. She had already put her real pot on the fire. She would make the soup with one of the leg-bones. She had done hammering them. Then she would put the mashed bones in [the pot]. When it boiled a long time then she would pull it from the fire. ... She took a horn-spoon. With that she skimmed grease in a big real (wooden) bowl.

This basic scenario of placing bones on a stone anvil and smashing them into tiny bits, using a hammerstone or metal tool, if available, seemed to be a standard approach to bone processing (e.g., Binford 1978; Leachman 1951; Mandelbaum 1941; Turney-High 1941; Zierhut 1967; see also Morin and Soulier 2017).

To ensure that grease was extracted efficiently, the fragmented bones were boiled on a low simmer; a more vigorous boil interfered with skimming fat off the top of the water (Binford 1978; Kidd 1986; Lowie 1909; Saint-Germain 1997; Vehik

1977:170-171; Weitzner 1979; Wissler 1910). After European contact many Indigenous groups used metal pots to boil bones (e.g., Densmore 1929; Lowie 1909, 1924), but skin containers or ceramic vessels functioned equally well for this task (Brink and Dawe 1989; Chomko and Gilbert 1991; Frison 1967; Quigg 1997; Quigg and Peck 1995). Maintaining constant water temperature was desirable. Leechman (1951:355), Kehoe (1967:70), and Binford (1978) reported snow or cold water being added to the cooking pot to slow simmering and facilitate the solidification of the fat.

After the grease rose to the surface, a ladle or scoop, often made of bone or wood, was used to skim it off. Several accounts indicated that the skimmed fat was placed to cool and solidify in containers, such as prepared bladders, muscular coats of stomachs, or large intestines (Peale 1871:391; Weltfish 1965:218). It also could be mixed with pounded meat, other rendered fat, and berries to form pemmican (Denig 1930; Lowie 1924). In solid form the grease lasted up to three years without spoiling (Leechman 1951).

Eating a congealed block of fat was not the only way to ingest the food. Occasionally the grease was consumed as a soup by drinking the water in which the bones had been boiled (e.g., Georgi 1780:162). Apparently a few groups skipped boiling the bones entirely and simply ate the fine powder, created by pulverizing the bones (Morin 2020). However, the direct consumption of bone powder was more common when the bones were from small-bodied animals, like fish, birds, and small rodents. Based on information from Mary Warren English, Densmore (1929:44) remarked that the *Anishinaabe* caught rabbits near their camp during the winter, and then

... the meat was cut into pieces and dried, the bones being dried also. The bones were pounded to a powder and mixed with the dry meat and any available grease. This was eaten dry, and not boiled at the time of using.

Some variations in the steps for bone grease production have been described. For example, Bonnicksen (1973) noted that, before crushing the bones, the periosteal sheath had to be removed by scorching the bone over a fire or scraping it off (see also Peale 1871). Zierhut (1967:34) watched Cree

women from Calling Lake throwing bones, from which marrow had been extracted, onto or near a fire briefly before breaking them. The explanation for the quick heating was that it made the bones easier to split. Other ethnohistoric accounts suggested that grease could be rendered by boiling only the marrow and ignoring the bones themselves or by using the marrow and boiling the bones without dividing them beyond what was needed to fit into the cooking container (Frison 1967; Grinnell 1961:106-107; Henry 1897; Kidd 1986:108; Lowie 1954:24; Thompson 1962; Vehik 1977).

Most of the ethnographic literature was not particularly precise about how much fat was obtained by Indigenous cooks. Ethnographic studies recognized that bone grease manufacture was a lot of work for relatively modest returns and that the caloric value of meat and subcutaneous fats from butchered animals likely exceeded that from marrow and grease (e.g., Lupo and Schmitt 1997; Outram 2001; Saint-Germain 1997). An exception is Losey's (1971:4) interview with a male Dene (*Tlicho*) informant from the Northwest Territory, who estimated that the long bones of a caribou yielded about 2,300 g of grease after 4 hours of boiling; however, the individual acknowledged that his estimate might be incorrect because this was a female activity. Denys' (1908:423) observation of a Mi'kmaq group indicated that the bones of a single moose provided approximately 2,700 g of grease.

Experiments in producing bone grease under controlled conditions demonstrated a wide variation in output and effort invested. Saint-Germain (1997:155) reported that her efforts to smash, boil, and collect grease from 7.5 kg of bone took 20 hours and supplied just 160 g of fat. Binford (1978:159) measured 200 g of grease from the average caribou long bone after 110 minutes of boiling. Church and Lyman's (2003) study of deer established that the average deer bone furnished only about 9 ml (7.5 g) of fat after more than 3 hours of cooking, which implied that at least 900 g of fat could be acquired from the major limb bones of a deer. Baker's (2009) attempt to replicate the Church and Lyman experiment found that the bones of a large buck generated 539 g of grease after 8 hours of boiling. Lupo and Schmitt (1997) estimated that total returns from limb bones of African impala, wildebeest, and

zebra were 142.5, 387.2, and 653.8 g, respectively. Brink's (1997) study of bison bone grease did not attempt to replicate aboriginal bone processing and boiling; instead it utilized a laboratory extraction system to measure absolute amount of bone fat. His experiment determined that all long bones from a single animal produced a maximum of 2,360 g of grease.

Converting the grease yields to kcal is helpful to contextualize the total dietary contribution of fat. Using Brink's (1997) high quantity of 2,360 g of grease from a single large-bodied animal and McCullough and Ullrey's (1983) estimate that 1 g of white tailed deer marrow contains 9.37 kcal/g, all the grease from the bison limbs would satisfy the caloric needs of an active adult (2400–3000 Kcal/day) for about eight days. While not an insignificant caloric output, it is quite a modest proportion of the calories provided by meat and the more easily accessible sources of carcass fat available from prey animals.

Primary Evidence

Quigg (1997; Quigg and Peck 1995) provided direct evidence for bone grease production through the analysis of carbon and nitrogen isotopes from organic residue removed from the interior of ceramic vessels. While this method can support the presence of bone grease manufacture, most investigators must rely on other archeological indicators, primarily 1) presence of numerous ($n > 100$) unidentifiable small bone fragments, 2) high incidence of human-induced breaks in the faunal collection; 3) effects of natural and modern taphonomic processes on assemblage formation, and 4) low occurrence of burned bones (e.g., Baker 2009; Bethke 2022; Binford 1978; Chomko and Gilbert 1991; Church and Lyman 2003; Frison et al. 1978; Leechman 1951; Morin and Soulier 2017; Peterson et al. 1993; Smith and McNees 2000; Vehik 1977).

Because many agents, such as carnivores, weathering, burning, sediment compaction, can reduce bone into small scraps, it is necessary for archeologists to determine that the bones were broken soon after the animal's death and show signs that humans were responsible for the breakage (i.e., specimens with green bone fractures and impact scars) rather

than other non-cultural processes and agents. As discussed by Bethke (2022), while researchers can readily agree that the intensive fragmentation of bone into small pieces is a good indicator of grease extraction, defining “small pieces” is more difficult (see also Church and Lyman 2003; Lyman 1994; Morin and Soulier 2017; Outram 2001). Most ethnographic accounts simply described bone as broken into small pieces or even ground into a powder but were not specific about actual size (e.g., Denys 1908; Le Clercq 1910; Skinner 1911). One of the few quantitative statements was Leechman’s (1951:355) observation of Loucheux (Dene) people in the Yukon. Based on information received from Julia McDonald, the Loucheux broke caribou and moose bones into fingernail-sized (approximately 1 cm²) chips.

Archeological remains are more efficacious for determining the expected size range for bone grease production. Vehik (1977:175–179) argued for grease rendering at the Quast (32LM234), Millville (41GT53), and Huff (32MO11) sites, based on the abundance of small bone bits that were unidentifiable to taxon or element. The identifiable specimens were primarily bones thought to have minor quantities of marrow and consequently low fat content. The Quast assemblage, for example, totaled more than 4,000 fragments, weighing approximately 3 kg, more than 70 percent of which were smaller than 2 cm². Ninety-six percent were unburned (Vehik 1977:176). The low percentage of burning was expected because bone grease extraction did not expose bones directly to fire.

Salvage work at a Lower Loup hunting camp (25HW75) in Nebraska uncovered a bone-boiling feature that consisted of 1,897 bison bone fragments. Approximately 85 percent of the material in the pit measured between .5 and 3 cm. Similar to Vehik’s findings, only 6 percent of the faunal assemblage was burned (Peterson et al. 1993:6-8).

Quigg and Peck (1995:117) reported that approximately 93 percent of the roughly 12,000 bones recovered from the Toyah phase Rush site (41TG346) in central Texas were unidentifiable and less than 3 cm long with a very low frequency (2 percent) of burning. Chomko and Gilbert’s (1991:680–681) exploration of a bone-filled pit from a Late Prehistoric period site (48PA262) in the Bighorn

Basin, Wyoming, retrieved approximately 7.5 liters of highly fractured bison rib and thoracic vertebra with a mean size between 5 and 7 cm. These pieces were slightly larger than other archeological examples of bone grease refuse and appeared to signal reliance on less preferred skeletal sections. While noting that these remains were smaller than expected for ribs and vertebra used in a meat stew/soup, the authors acknowledged that occupants might have resorted to larger units of lower quality bone in times of stress (see also Bonnicksen 1973).

Grease extraction experiments have demonstrated that the size of bone fragments could vary greatly and still effectively produce grease. Morin and Soulier’s (2017) study, rendering grease from modern red deer, resulted in approximately 93 percent of the nearly 86,000 residual bone scraps being less than 2 cm in length. However, such tiny fragments were not necessary for extracting fat. Church and Lyman (2003) fractured modern deer bones into several size categories: hammerstone-crushed bits less than 5 cm, sawed segments 1, 2, and 4 cm long, and a limb bone broken into two articular ends and a shaft. All bones less than 5 cm long released more than 80 percent of their accessible grease within two or three hours of boiling. (Lupo and Schmitt [1997:139] had similar outcomes with different species.) However, the procedure for the bone divided into only three pieces (articular ends and shaft) was significantly less efficient. The large bone sections required at least five hours of boiling to render 80 percent of their fat. A follow-up experiment using cattle bones supported Church and Lyman’s findings on grease yields. However, Janzen et al. (2014) calculated that the amount of water and fuel needed to produce the grease was appreciably less for the smaller pieces. This suggested that the labor required to break bones into smaller units might be a trade-off for the effort to gather fuel and water (Janzen et al. 2014:525). Regardless, bone grease extraction was shown to be a low-return activity that must be considered a form of resource intensification (Morin 2020).

Secondary Evidence

The equipment and facilities used in bone grease production provide secondary evidence for this

behavior (Vehik 1977:172; see discussion in Church and Lyman 2003). Commonly associated artifacts included mauls/hammerstone, anvil stones, and fire-cracked rock. Bone-boiling pits and fire hearths were key features in bone grease manufacture.

However, these objects and features were multifunctional, so their presence at a site is not sufficient to verify bone grease production. Mauls, for example, which have been discovered archaeologically (Frison 1967; Frison et al. 1978:21) and ethnographically (Grinnell 1962:210–211; Lowie 1924:214; Opler 1941:385) as being employed to break bones into small fragments, also were used for processing plants and extracting bone marrow. Likewise pits have multiple functions, such as boiling meat and cooking plants. When no longer serviceable for their intended purposes, they often became trash dumps. According to Brink and Dawe (1989:58), “the best clues to pit function are the nature and character of the stones and faunal material recovered, when they can be observed to represent a primary association in the pit.”

Based on their own experiments of making and using pits for various functions and on excavations of numerous prehistoric features at the Head-Smashed-In site (DkPj-1), Brink and others (Brink and Dawe 1989; Brink et al. 1986) developed models expedient for inferring function from the composition and condition of the fill and surrounding matrix. They (Brink and Dawe 1989:58–60) examined three distinct features for grease rendering, meat boiling, and roasting. The following discussion assumes that boiling pits were lined with hides. Cooking techniques that used direct heating of ceramic vessels are not addressed here but were expected to be associated with simply constructed multifunctional hearths (e.g., F7 and F8 at the Rush site; Quigg and Peck 1995:172).

Bowl-shaped boiling pits often were lined with hides to hold water. Heated rocks were added to the water until it boiled. Grease-rendering pits ordinarily were associated with large amounts of bone fragments, usually from fat-rich elements, and highly fractured rocks, which often were quite substantial in number. For example, F85-4 at the Head-Smashed-In site contained 153.6 kg of fire-cracked rocks (Brink and Dawe 1989:74). Binford (1978:159) reported that the Nunamiut used up

to 700 kg of rock in a single bone-boiling pit, and Frison et al. (1978) uncovered 112 kg of fire-cracked rocks from a pit at the Big Goose Creek site (48SH313).

The type of rocks selected for these pits might provide further hints to their functions. Sandstone was not preferred, not due to its poor thermal properties or its high incidence of fracturing, but because it disintegrated when placed in water, and the grit would become incorporated into the fat (Brink and Dawe 1989; Brink et al. 1986). Harder rocks, such as quartzite, granite, and limestone, were better suited. Rocks used for bone grease extraction exhibit rectilinear fractures, caused by the rapid cooling of the hot rocks when they were placed in the water-filled pit.

Meat boiling pits were similar in form and construction to those for bone grease extraction, but their contents were somewhat different. A wider variety of skeletal packages were effective for meat cooking, and that usually resulted in fewer broken bones, as the purpose was cooking meat rather than removing the fatty acids from within the bones.

Because the water temperature was lower and the cooking time was less for meat boiling than for bone grease extraction (see Wandsnider 1997), these pits undoubtedly had fewer and less fractured rocks. Also, as the water was heated by an outside source (i.e., heated rocks), neither meat- nor bone-boiling pits should contain charcoal, ash, or burned bones in primary association within the fill. Oxidation stains, caused by intensive heating of the bottoms, were lacking.

Roasting pits, used for either cooking plants or roasting meat, were designed differently than boiling pits (Hayden and Cousins 2004; Wandsnider 1997). First, they were large and deep, frequently greater than 1–2 m in diameter and 30–70 cm deep. They were lined with hot rocks that were heated within the pit, by either constructing a fire directly on top of the rocks or heating the rocks outside and placing them in the bottom (Brink and Dawe 1989:59–60). These could be sandstone or some other raw lithic material—anything with good heat retention and radiation properties (Brink et al. 1986). Such features commonly were associated with large quantities of ash, charcoal, burned bone, and oxidation rinds.

As the preceding has shown, the ubiquity of

small bone fragments at a site is not irrefutable evidence for within-bone fat extraction. Neither is the recovery of certain artifacts or the identification of grease-rendering features. The context of the evidence for bone grease production is important for inferring site function. The type and duration of occupation, as well as the amount of post-activity disturbance, influenced the degree of association between artifact proveniences and the locations where activities took place (Schiffer 1987). Vehik (1977: 174) concluded,

... it is most likely that by-products of bone grease manufacturing would not be left in the area in which the activity occurred. Probably this material would be disposed of in some trash area, and this would be found either scattered through a general midden fill or else deposited in trash pits and/or used storage pits. Even if these objects were left in the area their spatial locations and interrelationships would probably be disturbed as a result of continuing and not necessarily related activity.

The byproducts of bone grease manufacture were discovered only in primary contexts when the site was abandoned immediately after the last use of the bone-boiling pit (Vehik 1977) and post-depositional disturbance was minimal, as reported by Logan (1995, 1998b) and Brink and Dawe (1989).

FAUNAL ANALYSIS OF THE WHITE ROCK SITE ASSEMBLAGE

As discussed above, a detailed understanding of the faunal assemblage's cultural and non-cultural taphonomic history is necessary to corroborate bone grease production. A detailed taphonomic analysis of the White Rock fauna was performed, using a system first developed by Todd (1987) and later refined by Hill (1994, 1997, 2006, 2010; Hill and Boehm 2017). Bones were coded for 39 discrete variables, including basic species, element, side, and epiphyseal fusion. Each specimen also was coded for eight taphonomic attributes: sub-aerial weathering, animal gnawing, burning, rootlet etching, bone breakage, human-induced impacts, human butchery, and wear from use as a tool. To quantify skeletal element frequency more precisely,

anatomical landmarks were recorded, using a system adapted from Morlan (1994).

Five basic zooarcheological quantification units were used in this study: NSP, NISP, MNE, MAU, and MNI (Grayson 1984; Klein and Cruz-Urbe 1984). NSP (number of specimens) can be both unidentifiable and identifiable specimens. NISP (number of identifiable specimens) refers to all bones or fragments that are identifiable to a specific element or taxon. A specimen that could not be classified to either species or element was not included in the calculation of NISP or any other metrics. To calculate frequencies and number of individuals present, landmark quantification was used to estimate MNE (minimum number of skeletal elements) for various taxons. The same measurement was used to derive the MAU (minimum number of animal units) and MNI (minimum number of individuals), following the procedures outlined by Lyman (1994: Table 1).

In order to differentiate between the effects that human butchery and transport decisions and non-cultural taphonomic processes had on skeletal component representation, element frequencies for the bison remains were compared with three utility models: Emerson's (1990) standardized modified average total products utility index [(S)MAVGTP], Emerson's (1990) modified average skeletal fat index [(S)MAVGSKF], and Brink's (1997) %Fat index. In addition, two models for natural processes were employed: Kreutzer's (1992) volume density model (VD) and Todd's (2003) standardized settling velocity index (Vs). The total products index considers the utility, measured in caloric yield, of bison body parts, based on their combined protein and fat. On the other hand, Emerson's modified average skeletal fat index measures and evaluates the caloric yield for marrow and both yellow and white types of grease (Emerson 1990). Brink's %Fat index is similar to Emerson's in that Brink's model measures bone grease; however, it focuses on the grease within the bone fibers instead of inside the medullary cavities. These models can assess whether skeletal element abundance was a consequence of human transport and butchery decisions. Kreutzer's model uses the mineral density for specific skeletal elements as a proxy measure for a bone's ability to withstand density-mediated

attrition, which might result from both cultural and natural processes. Todd's standardized settling velocity index was derived by measuring the time bones took to settle to the bottom of an experimental water tank. Bones with low settling velocities are subject to high transport potentials when introduced into fluvial (water-transport) environments, meaning that the bones travel far; the reverse is true for bones with high settling velocities (Todd 2003). The Spearman rank order correlation coefficient (r_s) tested the relationships between skeletal element frequencies and the various models.

Faunal Assemblage Composition and Site Formation History

Approximately 485 faunal specimens were listed in the NSHS catalog for the 1935 and 1937 field seasons at the White Rock site (Table 1). The faunal remains were reported from 13 different features and 2 separate surface collections. Items from the same feature were marked with a unique catalog number that denoted their provenience. However, this study identified just 423 specimens in the extant collection and could verify the provenience for only 406 of these (i.e., 84 percent of the original assemblage). Catalog numbers were missing from an additional 17 objects. The circumstances of the other 62 specimens are unknown, but they are presumed lost. The remainder of this paper considers only the 423 specimens in the current collection.

Of the 423 specimens 75 percent ($n = 319$) were identified to taxon (Table 2), and of those approximately 95 percent were bison. Other species represented are deer (cf. *Odocoileus virginianus*; NISP = 6), an unidentifiable form of canid (NISP = 4), raccoon (*Procyon lotor*; NISP = 2), pronghorn (*Antilocapra americana*; NISP = 2), freshwater mussel (NISP = 2), and softshell turtle (*Trionyx* sp.; NISP = 1). A fossilized mammoth tusk segment was unforseen, but this animal obviously was not hunted by the White Rock inhabitants. However, the presence of this fossil might indicate that occupants collected from a Pleistocene deposit, maybe the nearby Eckles site (14JW4) (Holen 1989). An additional 104 specimens could not be identified to taxon. Based on bone thickness and size, 93 of these were likely from large-bodied mammals and compare favorably with bison. Eleven lack any diagnostic

Table 1. Total Number of Specimens (NSP) in University of Kansas Museum of Anthropology (KUMA) Collection, Original Count of Faunal Remains from Nebraska State Historical Society (NSHS) Catalog, and Difference in Counts.

Feature	KUMA		Difference
	Collection	NSHS Catalog	
2	77	76	+1
5	2	2	0
13	70	110	-40
14	34	43	-9
15	13	19	-6
17	0	1	-1
18	55	59	-4
25	2	6	-4
27	2	3	-1
28	55	56	-1
1935 pit	7	9	-2
Pit 5	9	12	-3
Pit NW of F13	44	48	-4
1935 surface collection	32	37	-5
1937 surface collection	4	4	0
Unknown provenience	17	0	+17
Totals	423	485	-62

Table 2. List of Identifiable Specimens (NISP).

Species	Common name	NISP	%NISP
<i>Bison bison</i>	Bison	301	94.6
<i>Odocoileus virginianus</i>	White-tailed deer	6	1.9
<i>Canis</i> sp.	Canid (dog/wolf/coyote)	4	1.3
<i>Procyon lotor</i>	Raccoon	2	.6
<i>Antilocapra americana</i>	Pronghorn	2	.6
<i>Mollusca</i> sp.	Freshwater mussel	2	.6
<i>Trionyx</i> sp.	Softshell turtle	1	.3
<i>Mammuthus</i> sp.	Mammoth	1	.3
Totals		319¹	100

¹ An additional 104 specimens that could not be identified to taxon are in the assemblage, including 93 specimens from an unknown large mammal and 11 unidentifiable to taxon or body size category.

attributes for a species or body size determination. Table 3 provides the skeletal element frequencies for each of the major prey species. Most are bison, while other species are represented by a small number of axial or appendicular components.

Table 4 summarizes indications of potential human modification to 14JW1 fauna. Specimens with green bone breakage, burning, impact marks, and cut marks are plentiful in the bison remains. The bones of an unknown large mammal, which could be bison, also display clear characteristics of human alteration. In addition, eight scapulae, one rib, and one unidentified piece were made into tools. The scapulae were fashioned into hoes or knives. The other species that show signs of human-induced cut

marks or other shaping into implements are deer and canids. This is not definitive proof of human utilization of any of the other taxa. Possibly these remnants were brought to the site by a non-cultural agent, unrelated to the human occupation.

Considering the low frequency (other than scapulae) and fragmented condition of most of the collection, it was not feasible to ascertain seasonality of site occupation through eruption and wear of teeth or herd demographics through osteometric analysis.

Bison Remains

Bison remains are the only constituent of the assemblage of adequate size to examine analytically,

Table 3. Frequency (NISP) of Identifiable Skeletal Elements by Taxon.

Element	Bison	Pronghorn	Canid	Deer	Raccoon	Mammoth
Crania	2			2	1	1
Mandible	1				1	
Atlas						
Axis						
Cervical	2					
Thoracic	5	1				
Lumbar	2			1		
Sternum						
Rib	19					
Scapula	126					
Humerus	3	1	2			
Radius	7					
Ulna	2					
Carpals	3					
Metacarpal	2		2			
Innominate						
Femur	4			1		
Patella						
Tibia	7					
Astragalus	1					
Calcaneus	4					
Tarsals	1					
Metatarsal	7					
First phalanx	14					
Second phalanx	11			1		
Third phalanx	4					
Sesamoids						
Totals	227	2	4	5	2	1

Table 4. Evidence for Cultural Modification to Taxon.

Taxon	NISP Green Breaks	NISP Tools	NISP Burned	NISP Impacts	Total Impacts	NISP Cut-marks	Total Cut-marks
Bison	50	10	25	15	45	24	263
Unknown large mammal	8	4	5			2	10
White-tailed deer	1	1				1	4
Canid						2	32
Raccoon	1						
Pronghorn							
Freshwater mussel							
Softshell turtle							
Mammoth							
Unidentifiable to taxa	2	4					

and non-bison remains exhibit minimal evidence of human modification; therefore, the rest of this paper deals exclusively with bison. Even though they comprise most of the faunal collection, not all portions of the bison skeleton are represented equally. Based on MNE values, approximately 30 percent (MNE = 21; %MAU = 100) are scapulae (Table 5). The rest of the skeleton is minimally present. The only other elements with any notable frequency are limb sections: calcanei (MNE = 4; %MAU = 14), first phalanges (MNE = 9; %MAU = 11), second phalanges (MNE = 9; %MAU = 11); humerus (MNE = 2; %MAU = 10); tibia (MNE = 2; %MAU = 10); and metatarsals (MNE = 2; %MAU = 10). Other skeletal components are exemplified by only a few specimens and have %MAU values of less than 6.

As bison skeletal parts are not equally represented in White Rock assemblages, it is necessary to evaluate whether this pattern resulted from human transport decisions, which would promote transport of high utility elements (Binford 1984; Metcalfe and Jones 1988; Speth 1983), or differential expression of skeletal units, which was determined by their ability to withstand attrition or fluvial transport (Grayson 1989; Lyman 1984, 1985, 1993; Todd 2003). Table 6 shows the statistical relationship between bison skeletal part frequency and Kreutzer's volume density index, Todd's standardized settling velocity index, Emerson's total product model, Emerson's bison skeletal fat index, and Brink's grease content values for bison. No correlation exists between bison element frequency and

Table 5. Skeletal Part Frequency for Bison. Tool-modified specimens are not included.

Portion	MNE	MAU	%MAU	MNI
Crania	1	.5	5	1
Mandible	1	.5	5	1
Hyoid	0	.0	0	0
Atlas	0	.0	0	0
Axis	0	.0	0	0
Cervical	2	.4	4	1
Thoracic	2	.1	1	1
Lumbar	1	.2	2	1
Sacrum	0	.0	0	0
Caudal	0	.0	0	0
Sternum	0	.0	0	0
Rib proximal	1	.1	1	1
Rib distal	0	.0	0	0
Costal cartilage	0	.0	0	0
Scapula	21	10.5	100	11
Humerus Proximal	2	1.0	10	2
Humerus shaft	0	.0	0	0
Humerus distal	0	.0	0	0
Radius proximal	1	.5	5	1
Radius shaft	1	.5	5	1
Radius distal	1	.5	5	1
Ulna	1	.5	5	1
Metacarpal proximal	0	0	0	0
Metacarpal shaft	0	0	0	0
Metacarpal distal	0	0	0	0
Fifth metacarpal	0	0	0	0
Carpal	3	5.0	5	1
Innominate	0	0	0	0
Femur proximal	1	5.0	5	1
Femur shaft	1	5.0	5	1

continued

Table 5. *continued*

Portion	MNE	MAU	%MAU	MNI
Femur distal	0	0	0	0
Patella	0	0	0	0
Tibia proximal	1	5.0	5	1
Tibia shaft	2	1.0	10	1
Tibia distal	0	0	0	0
Lateral malleolous	0	0	0	0
Metatarsal proximal	1	5.0	5	1
Metatarsal shaft	0	0	0	0
Metatarsal distal	2	1.0	10	2
Second metatarsal	0	0	0	0
Calcaneus	3	1.5	14	3
Astragalus	1	.5	5	1
Tarsal	0	0	0	0
First phalanx	9	1.1	11	2
Second phalanx	9	1.1	11	1
Third phalanx	4	.5	5	1
Sesamoids	0	0	0	0

any of the indices considered in this study; thus, skeletal part frequency must be explained some other way.

In a series of articles, Lyman (1991, 1993, 1994) discussed statistical correlations between %MAU values and estimates of bone density and food utility indices for a series of ethnoarcheological and archeological artiodactyl assemblages. More than a third of the 184 collections examined “correlates

with neither bone density nor utility index.” No reason was provided for this outcome; however, for the 14JW1 assemblage this lack of correlation may be a consequence of the high number of missing elements. Almost 30 percent ($n = 12$) of the skeletal elements that could be present are, in fact, absent. The Spearman rank correlation test may not be powerful enough to reveal a correlation with so many missing variates. Eliminating those variables from the calculations does not change the correlations between skeletal element frequency and Kreutzer’s volume density index, Todd’s standardized settling velocity index, Emerson’s bison skeletal fat index, and Brink’s grease content values; however, it does demonstrate a significant negative correlation ($r_s = -.66$, $n = 14$, $p = .01$) between %MAU and Emerson’s total product model for bison, indicating a bias against bison body portions with high total protein and fat content.

The overall conclusion of this statistical comparison suggests that skeletal part frequency was not simply a function of either density-mediated destruction or the preferential selection of certain bones based on their fat content. However, the reanalysis that eliminated missing variables indicates that there might be a lower than expected frequency of protein and fat-rich body parts. This assemblage is characterized by low frequencies of high food value bones and stronger than expected representation of skeletal elements with low food

Table 6. Spearman Rank Order Correlation Coefficients (r_s) of Bison Remains, Comparing %MAU Values with a Variety of Taphonomic and Economic Utility Indices.

Utility or Taphonomic Index (r_s) (probability)	Correlation Coefficient
Kreutzer’s (1992) bison bone mineral density (VD)	.10 ($p = .23$)
Todd (2003) standardized settling velocity index (Vs)	-.21 ($p = .40$)
Emerson’s (1993) bison total products utility index [(S)MAVGTP]	.01 ($p = .95$) ¹
Emerson’s (1993) bison skeletal fat index [(S)MAVGSKF]	.24 ($p = .23$)
Brink’s (1997) bison %Fat	.28 ($p = .26$)

¹When correlations were calculated without missing variables (i.e., %MAU = 0), the Spearman’s correlation was significant ($r_s = -.66$, $p = .01$).

value. An alternative explanation is that the bone breakage and boiling for skeletal grease extraction degraded some highly valued bones to such an extent that they were unidentifiable or disintegrated completely. Logan (1995:45, 1998b) proposed that F10, uncovered during a KUMA excavation at 14JW1, was a bone-boiling pit used for bone grease production. Evidence for this practice in the NSHS assemblage is assessed below.

EVALUATING EVIDENCE FOR GREASE EXTRACTION AT THE WHITE ROCK SITE

As discussed above, archeological evidence for bone grease manufacture is by no means straightforward (Binford 1984; Brain 1981; Lyman 1994). As stated before, the primary archeological indicators for this activity are copious small unidentifiable bone fragments, a high incidence of human-induced breaks, and a low frequency of burned bones. Secondary artifactual evidence includes mauls/hammerstones, anvil stones, and fire-cracked rock, as well as the necessary site features: bone-boiling pits and fire hearths.

Primary Evidence

Substantiating bone grease production on the basis of numerous small bone pieces requires an understanding of bone fragmentation patterns; the probable causes of those patterns can be examined. The NSHS White Rock assemblage contains an abundance of small bone pieces, but the agents of fragmentation are varied, and much of the damage undoubtedly occurred after the human occupation of the site.

Of the 368 specimens coded for modern breaks, 157 (42.6 percent of the total collection) show signs of post-excavation modification. While most alterations are small chips off the edges, extensive modern breaks on 84 specimens obscure evidence for any other type of breakage. Figure 2 depicts the percentages of different breakage types for the 284 specimens that could be coded. Dry bone (70 percent; $n = 199$) is the dominant breakage type, while only 22 percent ($n = 62$) appear to have been damaged during the site occupation. A small number of specimens show intermediate breaks (4 percent; $n = 12$) or are unbroken (4 percent; $n = 11$).



Figure 2. Percentages of different breakage classes for the White Rock faunal assemblage.

A common outcome of bone grease extraction is the presence of numerous very small (less than 3 cm in length) bone fragments (Peterson et al. 1993; Quigg 1997; Vehik 1977). The mean bone segment length for the NSHS assemblage is 6.5 cm. This is nearly twice as large as expected for assemblages modified by fat rendering. There are several explanations for this pattern that do not eliminate the possibility of bone grease production. First, collection bias selected for larger components. The available field notes did not explicitly describe the recovery techniques used by the NSHS crew. However, considering standard procedures in the 1930s, they undoubtedly shoveled and did not screen any of the back dirt, precluding the retrieval of smaller pieces. Several times the field notes recorded that poorly preserved bones were abandoned in the field because they were too fragile. Likely the workers preferentially acquired large, stable, identifiable bones over either badly preserved bones or unidentifiable fragments (Payne 1972, 1975). In other words, small bone bits should be even more plentiful than is currently the case.

Second, mean fragment length differs, depending on breakage type (Figure 3). Most breakage categories have similar mean lengths; however, the mean value for green breaks is almost twice that for the other categories. The major reason is that most scapula sections exhibit green breaks. Many of the scapulae served as hoes or knives, artificially increasing the overall mean fragment length. The distribution of bone fragment lengths (Figure 4) reveals that a majority of pieces (62 percent) are less than 5 cm in length, which makes this comparable to assemblages resulting from fat extraction, especially exacerbated by collection bias.

Taphonomic processes that might have influenced breakage patterns, such as subaerial weath-

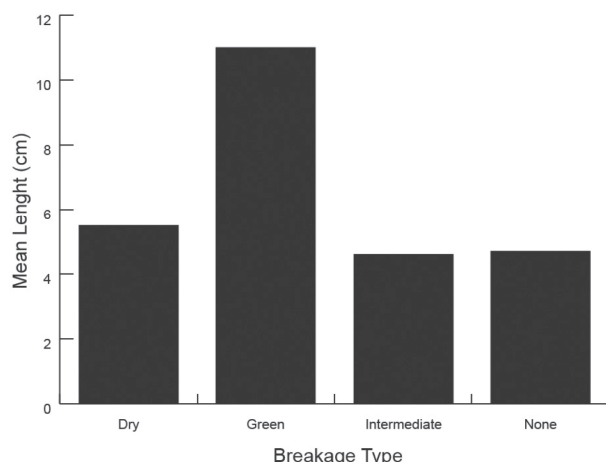


Figure 3. Mean length of bone fragments by breakage type for the White Rock faunal assemblage.

ering, rootlet etching, carnivore gnawing, and burning, had a minimal impact on the White Rock assemblage. Of the 301 specimens coded for sub-aerial weathering, approximately 84 percent ($n = 251$) show minimal weathering, i.e., weathering stage 1 or 2 (Todd 1987). The same is true for rootlet etching and carnivore gnawing. Roughly 89 percent ($n = 277$) of the 310 specimens coded for root etching exhibit erosion on more than 50 percent of their exteriors. Of the 316 specimens coded for gnawing, approximately 92 percent ($n = 289$) lack mastication scoring; only 13 specimens (~4.1 percent) display signs of carnivore chewing. The combined effects of non-cultural taphonomic damage probably did not contribute significantly to overall fragmentation. Prehistoric or modern human action was probably the primary cause of broken bone.

Furthermore, because of unrefined excavation techniques, one would expect that the actual quantity of small bone scraps at the site was far greater than is reflected in the current collection.

Secondary Evidence

The types of artifacts in the 14JW1 assemblage are suggestive of bone grease extraction. Three grooved mauls and one ungrooved maul were recovered by the NSHS crew. Morphologically, these mauls are very similar to implements from the Piney Creek sites (48JO311/312) and the Big Goose Creek site (Frison 1967; Frison et al. 1978). Also, several large quartzite slabs were found that could have been anvils for bone crushing (see Vehik 1977).

Multiple artifact-filled pits excavated at the White Rock site by the NSHS resemble bone-boiling features discovered elsewhere in the Plains. These pits are described below and evaluated as to the possibility that they were used for bone boiling.

F13

A 64-m² area, surrounding a hearth identified by Lamb in 1935 and excavated during the 1937 field season, was believed to be a house structure. Located along the axis of the ridge top, the “house” was defined by nine post molds (F3-F12) that surrounded a shallow 50-cm wide basin-shaped patch of burned earth (F1). The post molds were filled with burned earth, charcoal, and occasional cultural material, such as lithics, bones, and ceramics. The edges of the “house” were poorly delineated, differentiated

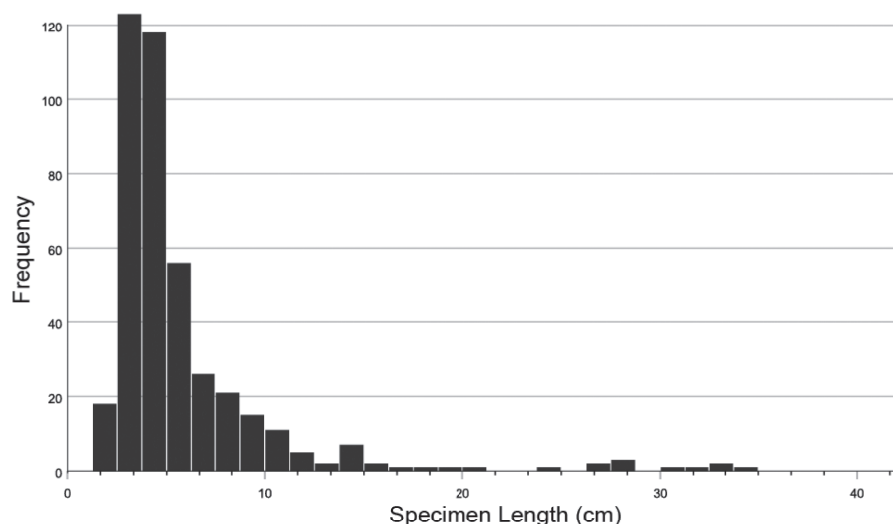


Figure 4. Distribution of fragment length for the White Rock faunal assemblage.

by decreasing artifact density and lighter soil color (Rusco 1960:50). The lack of distinct boundaries for the “house” and the scattered distribution of the post molds does not match other Oneota house footprints and has caused some researchers (Logan 1995:95; Marshall 1969:36) to question if F13 represented a habitation. Alternatively, the post molds might be remnants of some free-standing structure, perhaps a meat-drying rack.

The NSHS catalog indicated that 110 bones were gathered from the bottom of F13, but only 70 specimens in the current collection can be attributed to this feature. Most of the material came from an artifact-rich layer 35-50 cm below ground surface that the excavators thought constituted the floor of the structure. Most bones (59 percent; $n = 41$) are unidentifiable fragments. Identifiable elements are cervical vertebra (1), radial carpal (1), lumbar vertebra (1), second phalanx (3), rib blade segment (1), scapula sections (19), radius (1), and thoracic vertebra (1). Rather than a residential structure, a more credible interpretation is that this material was trash, produced by activities associated with the hearth.

F2

Within F13 was a 1.2-m wide by 1-m deep refuse-filled pit, located approximately 2.4 m north of F1. The fill was very compact and incorporated burned earth, ceramic sherds, lithic debitage, and charcoal pieces. Most of the artifacts were uncovered near the top, whereas the charcoal and burned earth were encountered largely at the bottom.

The NSHS catalog listed 76 bones from F2, while the current collection has 77 specimens. The reason for the additional item is unknown, but it is likely a cataloging mistake. Nearly 65 percent of the bones are identifiable and include both upper and lower limb parts. The few axial elements comprise one thoracic vertebra fragment and six rib blade segments. That most of the faunal remains and artifacts were exposed at the top indicated that these materials were deposited following the last use of the pit.

No large quantity of fire-cracked rocks was recovered, as would be expected from a boiling pit. The lower charcoal and oxidation layer attested that a fire was built within F2, which might suggest that it functioned as a roasting pit or cooking hearth rather than a boiling pit.

F14

Approximately 9 m west of F13 was a refuse-filled pit, approximately 1 m wide and 1 m deep. The base diameter of F14 was approximately 1.2 m. Consistent with F2, the bottom was filled with charcoal and burned earth, while artifacts and faunal remains were found near the top.

Only 34 of 43 (79 percent) bones recorded from this feature were recognized in the current collection. Seven specimens are unidentifiable. Lower limb elements, specifically seven carpal/tarsal fragments and nine phalanges, dominate the identifiable bones. Most of the major upper limb bones are represented by one piece each. As with F2, the bones and artifacts probably were dumped in the pit as trash sometime after its last use.

F15

A shallow circular pit was excavated approximately 18 m northwest of F13. It measured 1 m wide at the surface and 20 cm deep. F15 was filled with black soil, containing charcoal, burned earth, ash, burned and unburned bones ($n = 19$), 13 pottery sherds, and 6 unworked stone shatter.

Eight of the 13 (62 percent) available bones are unidentifiable. The other five are scapula sections. The feature’s shallow nature and the abundant charcoal, ash, burned earth, and burned bones suggest that it served as a cooking hearth. The scarcity of bone argued against fat rendering at this hearth.

F17

A small circular pit, containing light-colored fill and numerous bits of burned earth and charcoal, was excavated approximately 76 m northwest of F13. F17 was 1 m deep and had a top diameter of 81 cm and bottom diameter of 1.1 m. Only three lithic pieces, a few ceramic sherds, and one bone fragment were recovered. Because of the paucity of artifacts and faunal remains, the function of this feature is indeterminate.

SHALLOW PIT OUTSIDE “HOUSE” 1

At some unrecorded distance northwest of “house” 1 (F13), a shallow bone-filled pit was investigated but not assigned a feature number. Lamb and Cooper did not discuss it in the 1935 or 1937 field notes, nor did Rusco (1960) refer to it. Thus, nothing beyond

the pit's contents was registered, and its function is unknown.

Other than 44 bones, the only artifact is a small ceramic body sherd. The faunal remains comprise 23 unidentifiable bone fragments, 17 scapula sections, 3 rib segments, and a portion of a spinous process from a thoracic vertebra.

F25

Approximately 95 m northwest of F13, another "house" structure was encountered. F25 was a centrally located hearth (F18), surrounded by five post molds (F20-F24). The extent of the "house" (36 m²) was poorly defined and demarcated the edges of the excavation rather than the actual area of the structure. Numerous artifacts were retrieved from the floor, but only a small number ($n = 6$) of bones were collected and only two unidentifiable bone fragments remain. This feature, analogous to the other "house" (F13), probably does not represent a residential structure (Logan 1995; Marshall 1969). The post mold pattern differed significantly from those of other house structures on the Central Plains. Like F13, F25 may be a more temporary structure, used with the nearby hearth and pit (F19).

F19

A straight-sided pit, 60 cm in diameter and 23 cm in depth, was excavated within F25. F19 was located approximately 2 m southeast of the central hearth (F18). It contained many ceramic sherds, lithic artifacts ($n = 113$), and 55 pieces of bone.

Of the 55 bone specimens 56 percent are unidentifiable small fragments. The rest of the collection consists of 12 scapula sections, 3 rib half blades, 3 humerus segments, 4 tibia portions, a broken metacarpal, and part of a second phalange. These identifiable faunal remains are dominated by fat-rich bones. The large number of artifacts would not be expected in a bone-boiling pit. The last function of F19 was likely as a trash receptacle.

OUTSIDE CACHE 5

A small pit 3 m north of F25 was explored during the 1937 field season. Rusco (1960) did not discuss this unnumbered feature, and the NSHS field notes only briefly mentioned that it was excavated but did not describe its size, shape, or composition.

The NSHS catalog listed 1 rim sherd, 37 body

sherds, 2 pieces of Dakota quartzite, and 12 bones. The feature's composition was similar to F15; however, the small quantity of faunal remains seems to preclude the possibility that it was used for grease extraction.

F27

A small basin-shaped pit, 46 cm in diameter and 21 cm deep, was excavated approximately 76 m northwest of F25. F27 yielded one of the smallest artifact collections from any of the features. Materials included three animal bones and a chunk of burned limestone but no charcoal or burned earth. It was not a cooking pit, and the lack of pottery and minimal faunal remains argues against its use for bone boiling.

F28

A basin-shaped pit, 97 cm in diameter and 30 cm deep, was located approximately 30 m north of F27. F28 supplied a rich variety of artifacts: 118 ceramic sherds, some burned earth, 2 scrapers, 12 flakes, and 56 animal bones of which 55 are in the current collection.

Approximately 42 percent ($n = 23$) of the available faunal remains are unidentifiable. A similar number of specimens are scapula sections. The rest of the collection consists of a second phalange and fragments of a calcaneus, two metatarsals, a tibia, a radius shaft, and three rib blades. This feature was similar in composition to F15. The faunal material may have resulted from fat rendering; however, other uses of the pit are credible. The presence of daub indicated burning in the bottom, while the inclusion of the ceramic sherds and lithic debitage points to multiple deposition episodes.

EVALUATING EVIDENCE FOR BONE GREASE PRODUCTION

Even though the condition and size of the faunal remains are suggestive of bone grease extraction, none of the features or their contents fit the expectations for bone-boiling pits outlined by Brink and Dawe (1989) or detected archeologically by Frison (1967; Frison et al. 1978). However, several speculations regarding this deviation do not preclude fat rendering as a major activity at 14JW1.

The faunal assemblage lacks the high frequency of broken bones commonly associated with grease

extraction. For example, Logan (1995, 1998b) identified 1,066 bone fragments from F10 during the KUMA investigations at 14JW1. The NSHS faunal collection was less than half that number. As stated previously, the 1930s excavation techniques were responsible for the poor recovery of faunal remains. Had the feature fill been washed through fine screen or processed by flotation, the number of specimens would have been much greater. In fact, considering the number of features excavated by the NSHS, the size of that faunal assemblage would have far exceeded the amount of material acquired by the KUMA.

The White Rock assemblage also lacks a high quantity of fire-cracked rocks commonly associated with bone-boiling pits. The NSHS work recovered only a few pieces of quartzite or sandstone. Although a few of these appeared to be burned or thermally fractured, the overall quantity of rocks was very small. Perhaps the NSHS crew observed a lot of rock but did not bother to collect it. However, this explanation seems unlikely, as the field notes contain no mention of such material. Furthermore, the more recent KUMA excavations did not encounter much stone. Logan (1995, 1998b) reported that F10 yielded only 13.7 g of burned rock (i.e., limestone). This is not surprising, as the loess deposits in north-central Kansas do not contain much in the way of rocky inclusions. Acquiring metamorphic rock (i.e., quartzite) would have required site occupants to travel several kilometers (Brad Logan, personal communication 1997).

The absence of thermally altered rock does not preclude bone grease manufacture. However, it does indicate that the source of heat was not stone boiling. Quigg (1997; Quigg and Peck 1995) argued for on-site bone grease extraction at the Rush site, even though investigations did not confirm any classic rock-filled boiling pits. At 41TG346 fat was extracted from the interiors of ceramic vessels that had been heated directly over fire. Direct heating within ceramic pots may account for the lack of fire-cracked rock at 14JW1. Alternatively, highly valued quartzite rocks, which are rare in the vicinity, might have been reclaimed after use in boiling pits for recycling in other features.

In situ breakage of ceramic pots during cooking might explain the presence of numerous pottery sherds mixed in the feature fill. While the contents

of F2 and F14 from NSHS excavations clearly represented trash thrown into open pits, the fill from F19, F27, and F28 from the later KUMA excavations demonstrated that ceramics were scattered throughout the feature matrix. The association of these artifact classes was not simply the outcome of trash disposal; in each feature other artifacts (e.g., lithic tools and debitage, unmodified rock, etc.) were uncommon, while fragmented bones and broken ceramic sherds dominated.

If ceramic vessels were used for bone grease production at 14JW1, these pits do not signify in-situ extraction (contra Logan 1995, 1998b). Instead, they represent the disposal of the contents of ceramic vessels and perhaps broken pots after cooking was completed. The actual fat rendering would have occurred around the cooking hearths: F1, F2, F14, F15, F18, F19, F28, and outside cache 5. All of these pits had well-defined oxidation layers and were filled with ash and charcoal.

CONCLUSIONS

Much of this paper focused on bison exploitation by the inhabitants of the White Rock site. Based on overall frequency of specimens, bison was probably an important component of the site residents' subsistence strategy. However, it must be acknowledged that only a modest number of bison are represented in the collection. Nine animals at most were identified, and this number was derived from scapulae, many of which might have been hoes. Perhaps bison did not contribute a great deal to the total diet of the site's occupants, who might have relied more heavily on plants and animals other than bison.

The abundance of appendicular elements and paucity of axial elements would be expected if bison were procured some distance from the site, as hunters often defleshed bones of unwanted carcass components before transporting the rest to their residence (Burger et al. 2005; Schoville and Otárola-Castillo 2014). The most common bison element in the 14JW1 assemblage was the scapula, which was a highly prized package due to its large associated meat mass. However, the economic value of this bone, measured by associated marrow or grease, is quite modest (Emerson 1990). The high frequency of scapulae more likely reflects their use as hoes or digging implements, a pattern seen at other Oneota

sites in the Great Plains and Midwest (Blakeslee et al. 2001; Ritterbush 2002). The other plentiful skeletal parts are limb elements, especially humerus, tibia, and metatarsal. All these large bones with substantial marrow and grease content appear to have been heavily processed to extract within-bone fat. This hypothesis is supported by the presence of the fat-rich portions and the size of the bone fragments.

Clearly much effort was expended in the procurement and processing of bison. Does this imply that bison were the most important faunal resource in the diet of the inhabitants? In addition to bison, at least six other species were present. However, except for a single deer antler made into a punch or flintknapping tool, there is no solid evidence for human usage of the non-bison remains. Collection bias probably resulted in the under-representation of small-bodied animals, such as small mammals, fish, and birds. Consequently, it is difficult to evaluate the contribution of non-bison species on the 14JW1 subsistence strategy. Recent studies (Bozell 1991, 1995; Koch 1995; Logan 1995, 1998b; Ritterbush 2002) attest that other White Rock assemblages reflected a focal bison-hunting strategy that differed from the strategies of earlier CPt groups. However, this view could be the effect of collection bias against small-bodied animals, common in earlier excavations, namely the 1930s NSHS investigations.

Various researchers have asserted that bison was a critical resource for Oneota peoples across the mid-continent, particularly those in western Wisconsin, and have hypothesized that these groups made regular trips to the Plains to hunt bison (e.g., Arzigian et al. 1989; Boszhardt and McCarthy 1999; Sasso 1993). However, Ritterbush (2002) pointed out that the eastern Oneota sites regularly contained only bison scapulae that were fashioned into hoes or digging sticks. Therefore, trade in select bison products (e.g., scapulae and hides), might better explain bison remains found at eastern Oneota sites. Despite ample scapulae in the White Rock assemblage, this site and many of the western Oneota sites clearly document bison hunting. In fact, Ritterbush (2002:266) speculated that the demand for bison products and the perceived differential abundance of bison in the eastern plains motivated some Oneota populations to migrate into the Central Plains in the first place. Once established in the Plains, White Rock people might have

traded their surplus bison products, including meat, pemmican, scapulae, and hoes, to eastern Oneota communities.

Logan (1998a) argued strongly that a primary focus on bison at 14JW1 and nearby sites was for bone grease extraction. He based this theory on the numerous highly fragmented bones from meat-poor lower appendicular elements (e.g., metapodials and phalanges). Baker (2009) claimed that bone grease production, while not a common practice, was a factor in the broader Oneota subsistence economy. His work with Oneota village assemblages from the area of La Crosse, Wisconsin, suggested that many village occupants traveled west into Minnesota to hunt bison during the fall and winter (Arzigian et al. 1989; Boszhardt 2000), leaving behind some people, mostly likely the old or infirm. Baker (2009:145-146) proposed that these less active individuals produced grease from deer and elk bones, not as a regular activity, but instead periodically as a supplemental dietary strategy.

Unfortunately, the apparent lack of backdirt screening and high frequency of modern breaks complicate judgments about bone grease extraction for the NSHS White Rock assemblage. Post-excavation bone damage was common and obscured prehistoric cultural modifications, such as impact fractures or butchery marks. Moreover, collection fragmentation probably was increased artificially, making the assemblage resemble material degraded by bone grease extraction. Archeologists face this persistent problem: the diagnostic signature for bone grease manufacture is an abundance of small fragmented bones, which also can develop from various post-depositional processes or other human activities (Costamagno 2013; Morin and Soulier 2017; Outram 2001).

While conclusions about the NSHS assemblage are limited because of collection bias and post-depositional taphonomic damage, the results of this study do not challenge the existing interpretations for the White Rock type site. Logan (2022:52) contended that radiocarbon dating at 14JW1 and adjacent White Rock sites in the Lovewell locality substantiate prolonged or repeated Oneota occupation. Moreover, the recovery of numerous bone tools, particularly scapula hoes and squash knives, implies that local gardening was a key activity. The KUMA/KSU excavations, which screened unit

backdirt and floated feature fill, yielded definitive evidence for bison remains far outnumbering the bones of other species. Likewise, Blakeslee et al.'s (2001) evaluation of faunal remains from the Glen Elder site (14ML1), located along the Solomon River, indicated that heavy reliance on bison hunting was a broader pattern for White Rock groups. Logan (2022:53) was unable to determine season of occupation based on materials from the KU/KSU excavations, and unfortunately the current analysis does not add any pertinent information on that topic.

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ENDNOTE

In 2018 the Nebraska State Historical Society officially changed its name to History Nebraska. Because the discussed archeological materials were collected more than 80 years ago, this paper refers to the institution by its designation at the time of site excavation.

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A Late Prehistoric Hunting Camp on the Marais Des Cygnes, Eastern Kansas

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A small collection of artifacts, found in close association on a late Holocene terrace of the Marais des Cygnes River in Osage County, Kansas, is interpreted to represent a single kill-butchery event. Diagnostic artifacts suggest an age of A.D. 1450–1750. All except one chipped-stone item are manufactured from Burlington-Crescent (undifferentiated Osagean) Mississippian-age chert, with the nearest sources located about 200 km to the east and southeast. A few historic objects also were encountered in the site vicinity and are believed to be from a mid-1800s, possibly Sac and Fox, occupation.

The Bevel site (14OS64) was discovered during the Sac and Fox Reserve documentation project, which began in 2018, although it is believed to predate the time of the Sac and Fox Reserve, which was established in 1845 (Hagan 1958). Most likely the site dates to the terminal prehistoric or protohistoric period (Ray and Lopinot 2008), after A.D. 1400 but prior to the common use of metal tools. A small lithic assemblage, recorded during two visits when surface visibility was excellent, was found within a limited area. The chipped-stone artifacts include two beveled knife fragments, two impact-damaged projectile points, a large flake tool, a smaller flake tool, and a broken flake. All except one knife were manufactured from Burlington-Crescent chert. The beveled knives and unnotched triangular arrow points substantiate the assessment of a very late prehistoric or very early historic age. A few whiteware sherds and a porcelain button are believed to be of more recent, possibly Sac and Fox, origin.

SITE SETTING

The Bevel site is situated on a late Holocene terrace of the Marais des Cygnes River in Osage County, Kansas (Figure 1). This portion of the terrace is extensive and relatively level, but old meander scars and cutoff channels are discernible on the surface. The current river channel is highly circuitous

in this stretch, and 14OS64 is within a large meander bend or oxbow on a relatively high part of the terrace, adjacent to lower ground that commonly holds water. It is only a few meters from the present river bank. Based on surface manifestations, the total site area extended for about 55 m by 40 m when the historic objects are included; however, the chipped-stone artifacts were in a smaller space, measuring 40 m north-south and 20 m east-west, in two concentrations about 35 m apart (Figure 2).

The surface soil is mapped as Verdigris silt loam (Dickey and Penner 1985). No fire-cracked rock, bone, burned bone, limestone, or other rock was recognized with the chipped stone. Noted in the vicinity, one piece of reddened limestone was culturally introduced and might indicate the presence of a fire. Whether this small fire-reddened stone relates to the prehistoric or historic activity is unknown. The lack of substantive evidence for a hearth or fire suggests that the site was not occupied for an extended time or during a severely cold period.

EARLY HISTORIC ACTIVITY

A few historic artifacts, three small sherds of undecorated ceramic whiteware and a small four-hole porcelain or white glass button, were found on the eastern portion of the site. These might relate to Sac and Fox Reservation-era occupations that occurred

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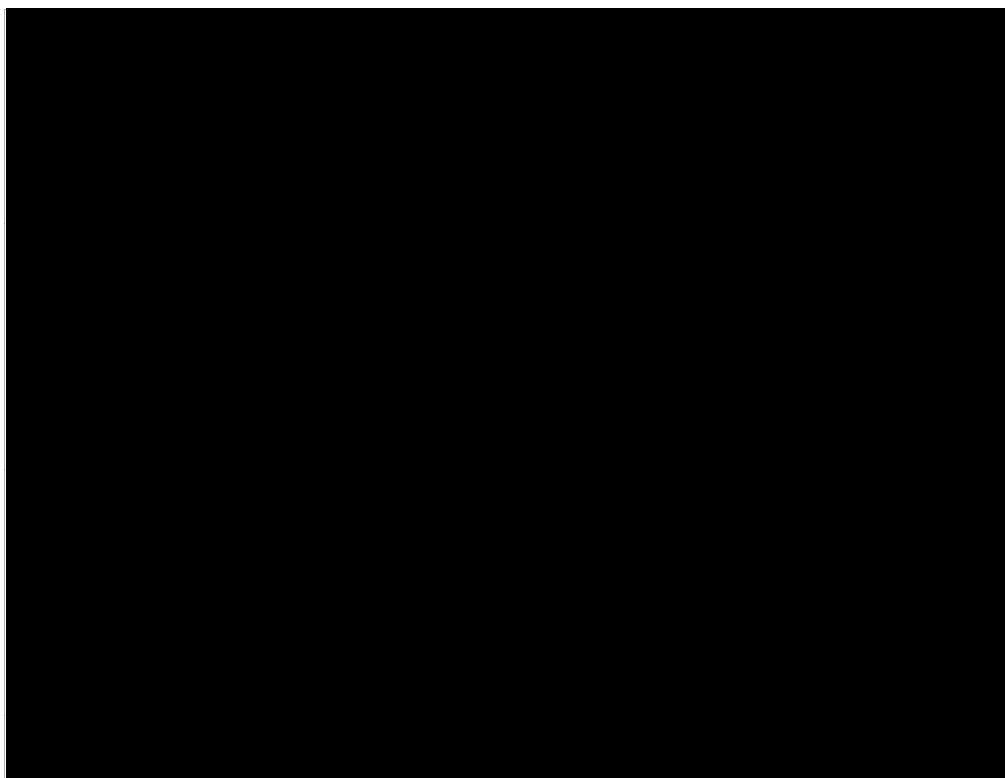


Figure 1. Location of the Bevel site (140S64) on the Marais des Cygnes River in eastern Kansas and other sites with triangular unnotched arrow points of Burlington-Crescent chert.

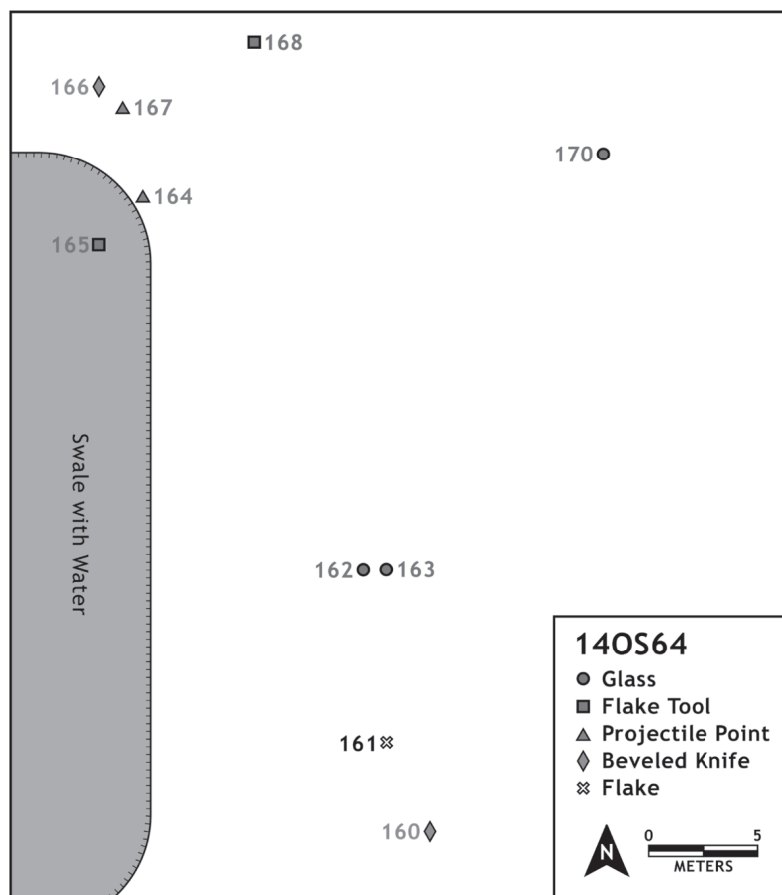


Figure 2. Distribution of artifacts at the Bevel site.

along the Marais des Cygnes in this area between 1845 and 1886 (Carswell 1982; Green 1913, 1914; Hagan 1958). The Sac and Fox lived primarily in bark-covered lodges, even though some government-built stone and frame homes were constructed on the reserve (Hagan 1958; Green 1914). Archeological signatures of bark lodges are ephemeral, especially so for those in fields that have been under cultivation for more than 100 years.

Porcelain and opaque milk glass four-hole buttons were being produced and widely used beginning in the 1840s (Marcel 1995). Neither the button nor whiteware is particularly diagnostic, but they are typical of what might be expected in a Sac and Fox household in the mid-nineteenth century. No historic European-American farmsteads or houses have been documented nearby. While the majority of the Sac and Fox people were removed to their Oklahoma reservation in 1869, members of Mokohoko's band remained in this section of the

Kansas reserve until they were forcibly removed in 1886 (Green 1914; Hagan 1958; Herring 1990). Within a few hundred meters of 14OS64, other sites have yielded more abundant and diverse materials attributable to the Sac and Fox.

CHIPPED-STONE ARTIFACTS

Four categories of chipped-stone artifacts were found at the Bevel site: flakes, flake tools, projectile points, and beveled knives (Figures 3 and 4). No features or fire-cracked rocks were observed, but one small piece of reddened limestone was evidence of a fire, which could post date the activity involving stone implements. With only one exception the chipped-stone artifacts were manufactured from Burlington-Crescent chert or "undifferentiated Osagean" chert (Ray 2007:200, Fig. 8.23). This distinctive light-colored Mississippian-age chert occurs in the Ozark uplift region of south-



Figure 3. Bevel site artifacts: A, beveled knife #160; B, beveled knife #166; C-D, arrow points #167 and #164.

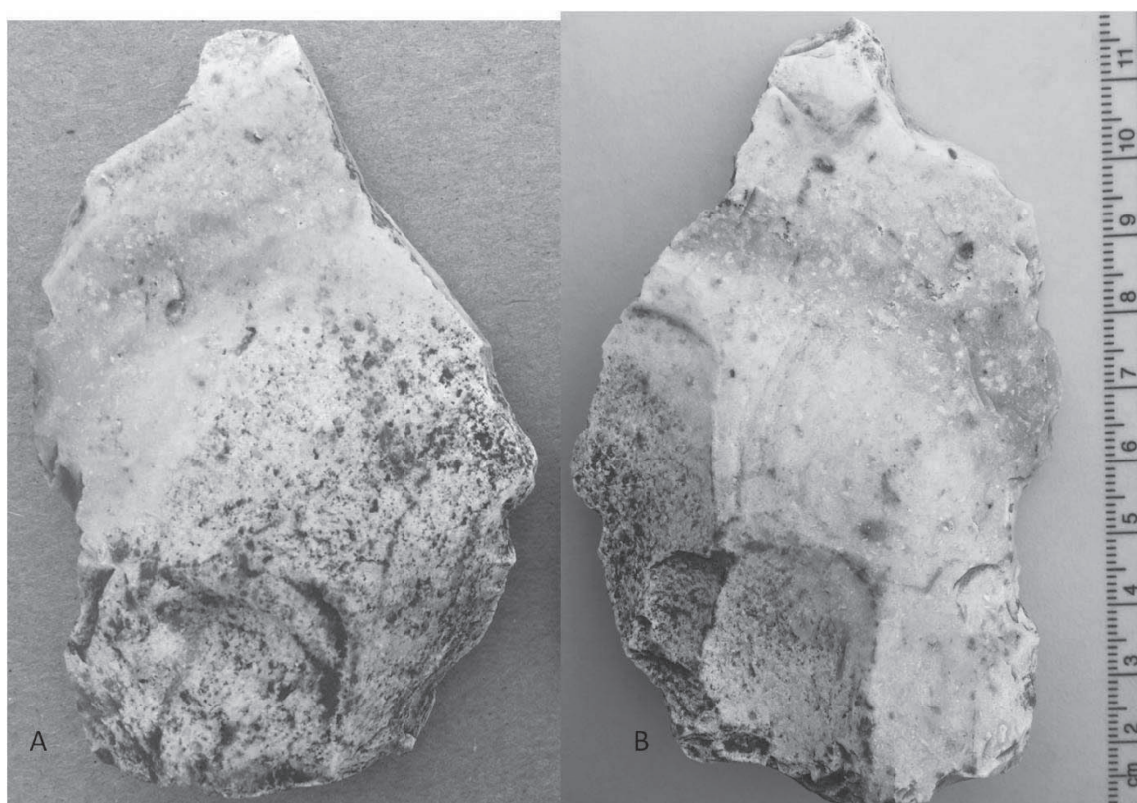


Figure 4. Bevel site large flake tool #165: A, ventral face; B, dorsal face.

western Missouri and northeastern Oklahoma with the closest sources from 200 to 250 km east and southeast of 14OS64. The other lithic material, represented by a broken beveled knife, is Permian chert, specifically gray Florence B, with the nearest sources to the west 75 km or more distant (Stein 2006).

The chipped-stone artifacts were encountered in two clusters (Figure 2). The northern concentration, discovered at the northern end of a swale that commonly holds water, consisted of two

flake tools (specimens 165 and 168), two projectile points (specimens 164 and 167), and a beveled knife (specimen 166). The southern concentration, located about 35 m southeast of the northern concentration on the eastern side of the swale, comprised only a beveled knife (specimen 160) and a broken flake (specimen 161). The historic objects were recognized to the east and north between the two concentrations. Table 1 provides a summary of the dimensions and characteristics of each chipped-stone artifact.

Table 1. Chipped-Stone Artifacts from 14OS64.

Specimen	Type	Length	Width	Thickness	Easting	Northing	Notes
160	Beveled knife	34.34+	31.14	8.83	171	543	Florence B
161	Flake	12.23	9.00+	4.00+	172	547	
164	Projectile point	23.79	16.21	3.42	161	572	Impact break
165	Tool	96.27	65.19	17.43	158	572	Large flake tool
166	Beveled knife	61.88+	37.60	9.42	160	576	
167	Projectile point	27.29	12.19	4.21	159	577	Impact break
168	Flake tool	29.86	21.21	4.14	166	579	

+ Indicates incomplete measurement on broken specimen.

Flake

Specimen 161. This small flake of Burlington-Crescent chert has no platform and no cortex on the dorsal surface. It is probably the product of resharpening or maintenance of a larger tool, such as specimen 165. No other unmodified flakes or retouch flakes were noted. Surface conditions at the time of the field visits were excellent, and all except very tiny flakes should have been visible. Apparently little or no stone tool production or significant maintenance occurred at this location.

Flake Tools

Specimen 168. This flake of Burlington-Crescent chert lacks a platform, is approximately 3 cm long, and has minimal retouch along one lateral edge. The retouch is believed to have been prehistoric modification and not incidental breakage from cultivation. The flake apparently was a handheld implement for cutting or scraping, associated with carcass butchering or tool maintenance.

Specimen 165. This large flake has irregular, retouched, and broken or battered edges and might have been employed for heavy dismemberment and cutting tasks. The flake is big enough that it could have been fashioned into a knife or scraper or functioned as a core to produce flakes for smaller artifacts, such as projectile points. The large flake likely was transported with the tool kit to serve as a handheld unhafted implement and as a blank for replacing broken or lost items. Presumably it was misplaced, as it was still functional as a tool and of use as a blank. Loss of such an object, as well as sizable segments of beveled knives, might signal that surface conditions during carcass butchering or other activities were conducive to loss. Heavy vegetation, thick leaf litter, snow, or poor light could have contributed to loss of tools from the initial butchering process.

Beveled Knives

Two broken beveled knives were found, and both had been reworked multiple times (e.g., Sollberger 1971). They have bend or snap breaks across the blades and probably were broken during use. This tool form commonly is supposed to have served butchering, cutting, and meat-filleting functions

related to carcass processing (e.g., Ray and Lopinot 2008:73). The presence of broken knives suggests that processing activities occurred at 14OS64 and that the projectile points were not simply lost in hunting. Although the knife breakage could have resulted from agricultural activity, these artifacts do not exhibit the type of edge-crushing damage commonly associated with the impact of agricultural implements on stone. The impact-damaged points and broken knives indicate that one or more carcasses possibly were processed at this location. The lack of bones or fire-cracked rock argue that initial animal processing occurred here but not camping or cooking. Perhaps the carcasses were moved to a campsite after initial processing. The beveled knives were about 40 m apart and potentially were components of two different tool kits or activity sets.

Specimen 160. This beveled knife fragment is the only piece in the assemblage that was not manufactured from Burlington-Crescent or undifferentiated Osagean chert (Ray 2007) from source areas well to the east. Instead it was made of a gray banded fossiliferous chert from the Permian Formation, Florence B, from the Flint Hills to the west. It was found at the southern end of the site about 5 m from the small flake tool (specimen 161). These two artifacts were located more than 30 m southeast of the other tool concentration. This knife has been heavily reworked with bend breaks on both the proximal and distal ends. The edges are slightly concave in outline and steeply beveled on the left side of each face, when the narrow or tip end is oriented up. This knife had been repeatedly resharpened (compare Sollberger 1971) prior to breakage and loss or discard.

Specimen 166. This beveled knife is made from a high quality Burlington-Crescent chert that is slightly pink from thermal alteration (Klippel 1970; Ray 2007). Almost half is present, with the bend break occurring near what probably was the mid-section and widest portion of the knife. The beveled edges are on the left margins of each face.

Projectile Points

The two projectile points are unnotched triangular arrow points very similar in form and flaking. They were discovered 4 m apart in the space defined by

a beveled knife (specimen 166), a large flake tool (specimen 165), and a broken flake (specimen 168). All of these pieces are believed to be related to the same activity set. Both points have oblique flake scars from upper left to lower right on the left side of each face and roughly parallel-horizontal flake scars on the right side of each face. This suggests a very similar final flaking pattern and perhaps the work of the same stone worker. Both points are completely bifacially flaked with no remnants of the original flake blanks. Marginally retouched triangular points with remnants of flake blank scars are most common in the latest prehistoric and early historic period, and these points are not of that variety. Both points have impact-damaged tips that were not reworked. Both points are large enough to have been reworked and still be functional, so undoubtedly they were simply lost. The points might have become detached in the animal carcass, even if the arrow shafts were retrieved.

Specimen 164. This is the shorter and wider of the two arrow points. It has an impact-damaged tip and has not been reworked, indicating a high velocity impact with solid material, such as bone. It very likely was lost in the animal carcass during the butchering process. The arrow shaft might have been recovered, even though the point was not.

Specimen 167. This is the longer and narrower of the two arrow points. Both points share very similar retouch flaking patterns and possibly were made by the same knapper. Both have impact breaks on their distal ends and probably were lost in a carcass. Given the presence of the beveled knives and flake tools, the game likely was butchered here.

ARTIFACT SUMMARY

This small assemblage is interpreted as a group of associated artifacts, including pieces mislaid or discarded during the processing of animal carcasses. The site location, adjacent to a river, presumably was heavily vegetated or the surface covered with vegetal debris and litter. With no evidence of season or time of day, circumstances that could influence the loss of tools, such as light conditions, rain, snow cover, etc., are unknown.

Likely the large flake tool was lost rather than discarded because it was still highly functional and could have served as a core or blank for making

other implements. It might have been obscured by ground cover or smeared with blood and residue from carcass dismemberment and misplaced during or after butchering. The projectile points, both with impact damage on their tips, probably were separated from their shafts and remained in the animal carcass while the shafts were removed. The combined loss of projectile points, beveled knives, and flake tools, some of which were still functional or could have been repaired, suggests that conditions were poor for recovery and that the period of time at the site was relatively brief. Factors such as dense vegetation, low light, and partial or selective butchery or hide removal may have contributed to the loss of still-functional items.

CHRONOLOGY, SITE ACTIVITIES, AND CULTURAL IDENTITY

The age of the Bevel site is not precisely known, but it is interpreted to be very late prehistoric or early historic age. By A.D. 1800 stone projectile points rapidly were being replaced by metal points, and guns were a well-established trade item in the region. In what is now central and eastern Kansas, unnotched triangular arrow points were the latest style prior to the introduction of metal points. After A.D. 1500 most arrow point assemblages were dominated by unnotched triangular forms (Blakeslee and Hawley 2006; McMillan and Schubert 2008:43; Ray and Lopinot 2008; Sudbury 1976; Wedel 1959). Chapman (1959:11–15, 48, Figures 7, 35) reported triangular unnotched arrow points and common French trade goods from the Little Osage (Plattner site [23SA3]) and Missouri village (Gumbo Point site [23SA4]), which were occupied between 1727 and 1777 (Chapman 1959:2; also see Chapman 1946:Figures 3, 8). Triangular unnotched arrow points were the most common form at the Utz site (23SA2), where beveled knives were also common (Bray 1991:103, 109–111, Figures 21, 24). Minimal European trade material was present at Utz, which was abandoned by 1712 (Bray 1991:135; see also Henning 1970).

The limited number of artifacts, predominance of one non-local lithic material type, almost total lack of debitage, and absence of fire-cracked rocks or hearth stones indicate an ephemeral occupation. Depending on the time of year and time of day of

site activity, fires might have been needed or used, but if these were surface fires without hearth stones, very little evidence would remain after 150 years of field cultivation. The range of activities seems limited; artifact types and their presumed functions can be accounted for with the killing, skinning, initial butchering, and processing of one or a few animals, likely deer, elk, or bison. No bones were observed or recovered, but bone preservation on the surface at this location is highly implausible due to cultivation, soil conditions, and weathering.

The direction of movement for this human group might be expected to be from the east, as most of the lithic pieces are made from chert that occurs 200 km or more east of 14OS64. Burlington-Crescent chert typically occurs in relatively small percentages in Great Bend aspect (Wichita) assemblages to the west and southwest in the Arkansas River basin. Those assemblages tend to be dominated by varieties of Florence chert (Blakeslee and Hawley 2006; Hofman and Crable 2019; Sudbury 1976; Vehik 2007). Throughout the historic period and presumably during pre-contact late prehistoric times, the Osage as well as the Kansa were actively involved in hunting in the Missouri/Kansas border region and areas extending well to the west (Chapman 1959, 1982; McMillan 2012:92-94,2014; Mead 2008; Parks 2014; Wedel 1973). However, their homelands probably were not as far west as the Arkansas River valley but farther east on the western flanks of the Ozarks (McMillan 2014; Vehik 1993). Competition for European trade by the early 1700s encouraged more aggressive hunting efforts by the Osage and increased friction with their Caddoan neighbors to the west.

Bison hunting was a key reason for Osage activity in Kansas, although exploitation of other resources and game, including deer, elk, turkey and small fur bearers, undoubtedly was common on these western trips. Bison were present in Missouri and perhaps relatively common in many areas during some periods (McMillan 2012; McMillan and Schubert 2008). Bison remains are plentiful in Oneota and Osage sites in Missouri (McMillan 2012:92-93). Thus, 14OS64 is interpreted as an example of what must be a fairly common site type, representing Osage hunting of bison and other resources in the eastern Kansas prairies that drain into the Osage River basin of western Missouri. Three other

known sites in the Marais des Cygnes River valley have projectile points made from Burlington-Crescent chert that are very similar to the 14OS64 points, indicating that this is probably a common pattern. Two of these sites, 14OS378 (Stein 1985a) and 14OS379 (Stein 1985b), are located across the Marais des Cygnes from 14OS64 and are only 400 and 500 meters away. The third site, 14DO1059, is located on West Eight Mile Creek, a small Marais des Cygnes tributary, 30 km to the northeast (Hofman et al. 2009). Undoubtedly numerous other sites in the area are of this age and have evidence of Burlington-Crescent chert use.

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ONE PERSON'S TRASH IS ANOTHER'S TREASURE: A FLAKE CACHE FROM 14BT436

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Kansas Historical Society

A small segment of a large donation from Barton County was found to be 110 flakes of Flint Hills region chert, cached in the distant past. This brief report describes the cache and how it made its way from western Kansas to the Kansas Historical Society.

A DONATION IS GIVEN

In 2021 the Kansas Historical Society (KSHS) received a communication from Richard Lartz II, the executive director of the Barton County Historical Society (BCHS). Lartz informed the KSHS that the Robert Button estate had bequeathed a large archeological collection to the BCHS with the caveat that anything unwanted by the BCHS was to be offered to the KSHS. The BCHS staff had chosen what they wanted to keep and were prepared to pass along the remainder to the KSHS.

Lartz, stating upfront he did not have an archeological background, thought it only fair to warn that the remaining artifacts had been described to him as “trash” and that the KSHS might not want them. He took his charge seriously and, despite any misgivings, offered the remnants of the collection to the KSHS. Society archeologists readily recognized Robert Button’s name, as it appears more than 25 times as a recorder of sites in Barton County in the Kansas Historical Society Archeological Inventory; they requested some pictures of the collection. These images not only revealed a daunting pile of bags and boxes, but also individual containers labeled with several different site numbers.

A DONATION IS RECEIVED

After several weeks the Button collection from the BCHS in the west arrived at the KSHS in the east. Robert “Bob” Button (1926–2020) from Great Bend had been a member of the Kansas Anthropological Association (KAA), the Santa Fe Trail Association,

and the BCHS, where he served as president. According to his obituary (<https://www.bryantfh.net/obituary/robert-button>), he loved history and artifact collecting. He did not simply collect artifacts but also recorded 26 archeological sites in Barton County.

Artifacts from more than 40 sites have been identified in the Button/BCHS collection, mostly from Barton County. To date over 5,000 artifacts have been cataloged, representing more than half of the BCHS collection. Cataloging of the collection continues in the KSHS archeology lab.

A CACHE IS FOUND . . . AGAIN

Button and fellow KAA member Orrie Graves recorded 14BT436 as a Late Ceramic period (1500–1800 C.E.) campsite along Walnut Creek. Artifacts recovered from the site included sand-tempered pottery, some with cord marking; ground stone manos; chipped stone triangular and side-notched arrow points, drills, scrapers, and numerous flakes made from a variety of lithic materials, such as Flint Hills cherts, Alibates agatized dolomite, Smoky Hill silicified chalk, and quartzite; historic artifacts, namely lead bullets, bullet casings, and a partial cannonball; and a deer tooth. Altogether the donated collection comprises 352 objects.

When the 14BT436 collection was unpacked in preparation for cleaning, the plastic bread wrapper that housed the cache also held an explanatory note, presumable written by Button. The small scrap of paper included a drawing with “X” marking the spot of a “flint casch.” A cache is a discrete group of artifacts, deposited in the past, and stored or hidden

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Figure 1. Some of the debitage from 14BT436. Courtesy of kansasmemory.org, Kansas Historical Society.

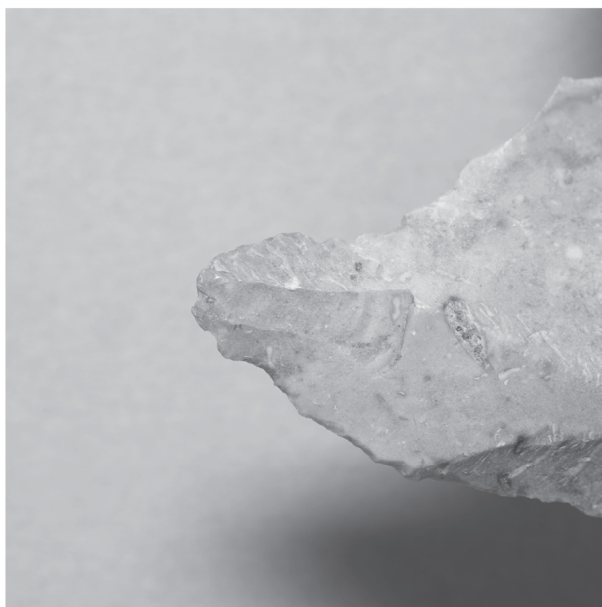


Figure 2. Minimal edge modification on a modified flake. Courtesy of kansasmemory.org, Kansas Historical Society.

for later use. In this case it consisted of 110 lithic flakes, exclusively of Flint Hills cherts. Within the cache was a single sand-tempered pottery body sherd without any explanation for its presence.

All the stone material originated in the Flint Hills region. Button had collected 59 pieces of debitage, including flakes, thinning flakes, shatter, and blades, in addition to the modified flakes discussed below (Figure 1). Only one fragment was thermally altered. Twenty-one of the pieces have cortex remaining on a small area (secondary flakes), and the remainder have no cortex present (tertiary flakes). The cortex was chalky on 18 pieces and had a rind-like quality on three.

Fifty-one flakes exhibit minimal edge modification (Figure 2). Of these, 25 were secondary flakes, one of which was thermally altered. Three of the 26 tertiary flakes were thermally altered. The cache would benefit from additional analysis of these edge-modified flakes.

A CACHE BY ANY OTHER NAME

Often a collection is donated with the hope that it will be used in a display. Donations have helped to fill the display cases of museums across the nation. For researchers the value of a collection, donation,

or cache lies in its research value. It is a gift that keeps on giving because researchers can return to a collection time and again with new questions and fresh perspectives. Bob Button's "casch" is just such a gift and one that merits being revisited.

TWO EPISODES IN THE HISTORY OF ARCHEOLOGY AT MARION, KANSAS

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Wisconsin Historical Society

The Marion, Kansas, area is one of several communities in Kansas situated upon the ubiquitous remains of earlier cultures, particularly those assigned to the Great Bend aspect, the archeological manifestation of Wichita-speaking peoples (Kitikiti'sh). This archeological legacy resulted in discovery and discussion of the remains, including speculation on their age, peaking in the years 1879-1882. At the time archeological materials were returned to one of the great museums of the United States, the Peabody Museum of Archaeology and Ethnology at Harvard University. Interest waned over the years, but in the early twentieth century the community's archeological heritage inspired the formation of an archeological society or boys' club. The goals of this paper are a) to offer a glimpse of archeological activity (by local and non-local persons) at Marion in the late nineteenth and early twentieth centuries and b) to provide information that adds to the stock of knowledge regarding the Great Bend aspect settlement at Marion. Source materials include newspapers, correspondence, field notes, museum catalog records and annual reports, magazines, and scientific journals.

Euro-American settlement of what would become Marion County, Kansas, commenced in 1860. In 1865 the county was organized, and by 1870 it had four post offices, including one in the eponymously named Marion Centre (Figure 1). Melvin Ozias Billings, the son of one of its early residents and a principal character in Part I of this paper, succinctly described the community's physical setting in 1882:

Marion, Kansas, is situated on the northwest quarter of Section five, Township twenty, Range four, east of the sixth principal meridian, near the confluence of the Cottonwood River and Muddy Creek, a portion being in the valley between the streams and a portion on the hill east of the Muddy (Billings 1882:211).

Marion Centre (as the name was spelled; it was shortened to Marion in 1881) was destined to become the county seat, with the surrounding countryside given over to cattle and sheep ranching and agriculture, especially the production of corn and, to a lesser extent, wheat (Socolofsky 1973).

As it happened, the Euro-Americans who settled Marion Centre soon found that they were not the first inhabitants of the valley. Billings observed,

... this [locality] was at some time a far more densely populated city, is evidenced by the fact that in excavating almost every well, cellar or cistern, relics of ancient inhabitancy are found ... (Billings 1882:211).

Billings was correct in his assessment, a fact attested to not only by his and other contemporary writings (Billings 1880, 1882; *Marion Headlight* [MH] 1888; Mason 1881; Putnam 1880; Thomas 1891; West 1879a, 1880a, 1880b, 1880c), but also avocational and professional archeological investigation in the vicinity many decades later (Craine 1955, 1956; Emerson 1977; Keller 1961; Lees 1988; Lees et al. 1989; Reed et al. 2005; Rohn and Emerson 1984; Roper 2002; Wedel 1959).

To the first generation of settlers in the Marion area, the relics included those recognized as related to "modern" Native Americans, based on their association with European-made trade items, and those left by one or more older unknown "others." These latter discoveries were sometimes cast within an explanatory framework of an extinct race (or races), frequently known as the Mound Builders, who allegedly inhabited the continent prior to the Native Americans. Part of the issue was that observers of

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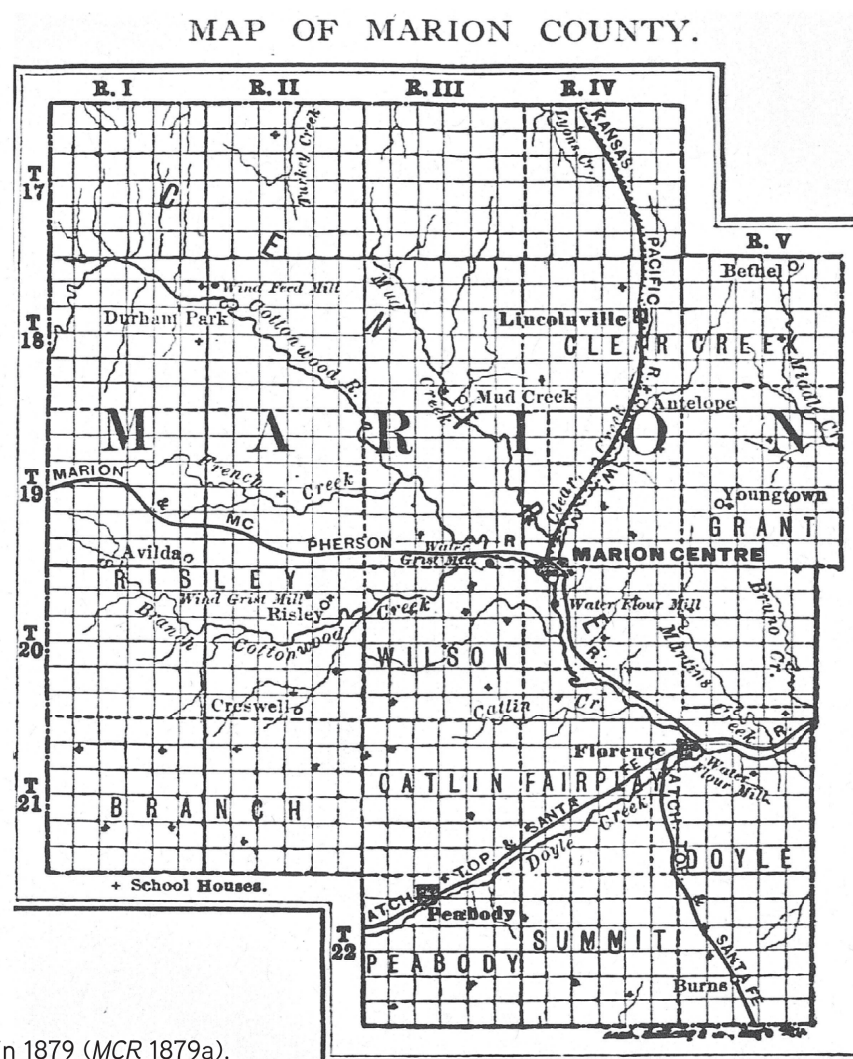


Figure 1. Marion County, Kansas, in 1879 (MCR 1879a).

contemporary Native Americans could not credit them as the architects of mounds and earthworks, as these seemed to be the product of more numerous peoples with a higher degree of cultural advancement. Although racism was certainly a factor, there were extenuating circumstances unrealized until much later: contact with Europeans had drastically impacted Native American societies, resulting in catastrophic population losses (estimates range to 50 million deaths), warfare, and dislocation (Koch et al. 2019). The Mound Builder myth ultimately had an adverse impact, effectively severing Native Americans from *their* pasts and the landscapes that *they* had transformed over the course of many millennia (see Barnhardt 2015; Calavito 2020; Dunnell 1991; Miller 2015; Silverberg 1968; Timmerman 2020).

As archeology developed and matured in the United States and in the Great Plains region, the Mound Builder myth gradually fell by the wayside, and the remains of earlier cultures were ascribed to the ancestors of contemporary Native Americans. In the mid-twentieth century archeologists employed various means of categorizing archeological remains, including those in the Marion area, framing them within a culture-historical schema that included the Great Bend *aspect*, as well as two separate but related *foci*: the Lower Walnut focus, centered above the confluence of the Walnut and Arkansas rivers in Cowley County, and the Little River focus in the upper reaches of the Little Arkansas River in Rice and McPherson counties (Wedel 1959:210-211, 344-346, 377, 500-502; see also Blakeslee and Hawley 2006). Concentrations

of similar sites in terms of artifact content were present around Marion and Neodesha but were not designated as distinct cultural units due to limited study.

In the Marion area the most obvious discoveries and those that have received the most attention are attributable to the Great Bend aspect. This culture-historical unit denotes the archeological manifestation of Wichita-speaking peoples (Kitikiti'sh). Vehik (1992:327, 328) located one particular group, the Taovaya, in the area. Taovaya sites are found at the confluence of Mud and Clear Creek, north of Marion and on the Cottonwood River floodplain and adjacent bluffs both above and below the town. Radiocarbon ages and the few European-made objects recovered from excavation suggest an occupation between ca. A.D. 1630 into the first decade or two of the eighteenth century (Lees et al. 1989; Rohn and Emerson 1984; Roper 2002). It should be noted that older cultural remains are present within the Cottonwood River basin (i.e., Beeton and Mandel 2011; Craine 1955; Witty 1963).

This paper reviews two separate cases in which Marion's archeological heritage inspired its citizens and some non-locals at two different points in its history: 1879-1882 and 1903-1904. Of course, the archeological sites have been a draw for collectors and archeologists from federal, state, and academic institutions over the past 80 years or so. Ultimately, the goals of this paper are a) to offer a glimpse of archeological activity in the Marion area in the late nineteenth and early twentieth centuries and b) to provide information (particularly in Part I) that adds to the stock of knowledge about the Great Bend aspect sites at Marion. Information for the paper derives from historical newspapers, unpublished correspondence, field notes, museum catalog records and annual reports, and papers in defunct magazines and scientific journals.

PART I "A BURIED RACE IN KANSAS": ARCHEOLOGICAL DISCOVERY AT MARION CENTRE, KANSAS, 1879-1882

Part I of this paper focuses on the early explorations in and around Marion Centre in the period 1879-1882, conducted both by its residents (especially Melvin O. Billings) and outsiders, including

Edwin Curtiss, a Nashville, Tennessee-based field man for the Peabody Museum of Archaeology and Ethnology at Harvard University, and Elias Putnam (E. P.) West, a judge and self-taught geologist and archeologist from Kansas City, Missouri. Source materials include historical newspapers, unpublished Curtiss correspondence and field notes, as well as published reports.

Putnam's Proxy

Although archeological discovery around Marion Centre began almost immediately with Euro-American settlement, the necessity of construction of a railroad, important for the flow of goods and information and critical in the shipment of crops and livestock, was the catalyst for announcing these discoveries to the public and nascent professional archeological community. In the early-mid 1870s, the Atchison, Topeka & Santa Fe (AT&SF) Railroad began its push from Topeka westward across the state, linking towns and cities along the way. By the end of the decade, the AT&SF's main activity, especially in eastern and central Kansas, was the construction of spur lines tying disparate communities to the trunkline (Ducker 1983:2; Socolofsky 1973).

It was these latter projects that drew Edwin Curtiss to the area. A railroad man, Curtiss was also an occasional field collector for Frederic W. Putnam, curator of the Peabody Museum of Archaeology and Ethnology at Harvard University (Browman 2002; Dexter 1980; Freed 2011; Hinsley 1982, 1999; Morse 1915) (Figure 2). The museum

... played a crucial role in the evolution of U.S. anthropology ... and the individuals at the museum who were involved in the early development of this trajectory have had a major impact on [the] discipline A large part of this success ... was due to the leadership of Frederic Ward Putnam ... (Browman 2002:508).

Putnam was born in Salem, Massachusetts, in 1839. As a young man with an initial interest in fishes, he studied under a trio of great naturalists: Louis Agassiz, Jeffries Wyman, and Asa Gray. Over time his attention shifted to archeology (Hinsley 1982, 1999). As an archeologist, Putnam had an out-sized



Figure 2. Frederic Ward Putnam (1839–1915), “the father of American archaeology” (*FSDT* and *FSDM* 1887).

influence on the development of American archeology in the late nineteenth and early twentieth centuries. His contributions were varied and included some 400 publications, public education, improvements to field methods, institution building (not only the Peabody Museum, but also the anthropology programs at the American Museum of Natural History, Columbia University, the University of Californian at Berkeley, and the Field Museum), and shaping scientific and anthropological societies (e.g., American Academy for the Advancement of Science, American Anthropological Association, and American Institute of Archaeology) (Browman 2002; Dexter 1966a, 1966b, 1966c, 1976, 1980; Hinsley 1982, 1999). He was instrumental in the preservation of Serpent Mound in Ohio as well. One of Putnam’s contemporaries judged him to be “the father of American archaeology” (Morse 1915:6).

Putnam was named curator of the Peabody Museum in 1875, taking over from Gray, who briefly had succeeded Wyman, and immediately set about broadening its collections and its influence,

ultimately to further a “proper understanding of the condition of the early inhabitants of America, and their relation to those of other parts of the world” (Putnam, quoted in Watson 2001:5). To accomplish this goal, museum staff took full advantage of postbellum American expansion in its quest for collections, acquired through donation or purchase (Thwing 1881; Watson 2001). For his part, after being named curator, Putnam built up a network of correspondents and field collectors, which came to include Edwin Curtiss (Hinsley 1982, 1999).

Born in 1830 in North Lansing, New York, Curtiss earned a living as a tailor. With the onset of the Civil War, he enlisted in the 1st Regiment of the New York Light Artillery (Moore and Smith 2009:7). By 1863 he was billeted in Tennessee, attached to the Union Army’s Commissary Department. After the war Curtiss settled with his family in Nashville, where he worked as an independent contractor for improvements to the Tennessee and Cumberland rivers, the construction of levees along the Mississippi River, and railroad and bridge building (House 2009; Moore and Smith 2009; Putnam 1881b). Curtiss eventually crossed paths with Putnam, and from 1877 until Curtiss’ untimely death in December 1880, Putnam found sporadic employment for him as an archeological field collector, primarily in Tennessee and Arkansas (Putnam 1881b).

In the employ of the AT&SF, Curtiss alighted in Florence, Kansas, about 10 miles southeast of Marion Centre, on July 6, 1879 (Figure 3). Railroad work was grueling and sometimes dangerous with the added uncertainty of regular recompense, as Curtiss (1879d, 1879e) groused. The construction of the AT&SF’s spur line between Florence and McPherson (aka the Marion & McPherson RR), besides its critical socio-economic impact on local communities, also put Curtiss, an experienced archeological field man, in an area with a tangible record of past human habitation.

Shortly after his arrival in Florence, Curtiss wrote to Putnam, informing him of his whereabouts. More to the point, he began to angle for a return to collection work on Putnam’s behalf. (Note that transcription of Curtiss’ letters and notes reproduce his eccentric spelling and punctuation as closely as possible. The author has only Curtiss’ side of the correspondence.)

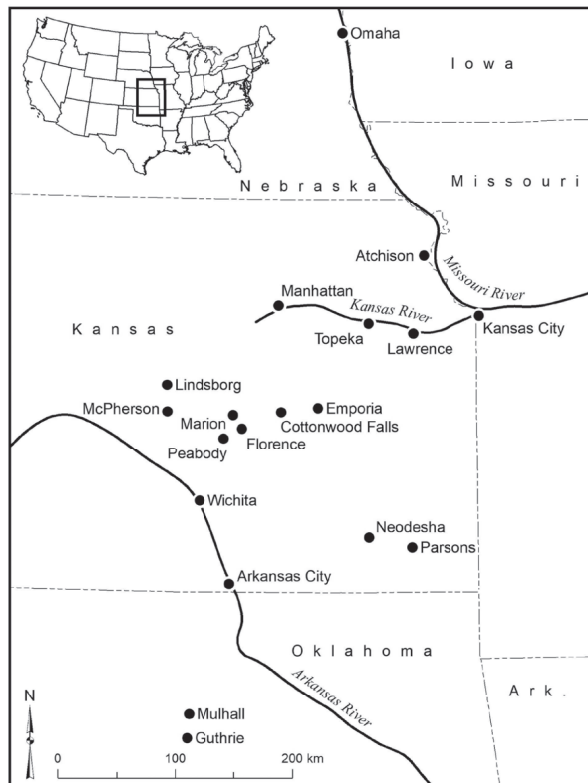


Figure 3. Map of regional cities and towns mentioned in the text.

I arrived here last week and am hard at work I don't think I shall like it out here . . . things look different here than they do in Tenn I have heard of some curious mounds about one hundred miles south east of Kansas City Mo I think I will take my old place in the harness this fall if agreeable to you I no I shant like it out here this winter it seems as though the wind never stops blowing here I have ben here ten or twelve days in the state and it is has blowed constantly evry day and it is hard work to keep the tents up and the thunder and lightning is terrific . . . the line of the road follows the cotton wood river to Mcpherson the terminus of the branch that I am on (Curtiss 1879a:1).

Although Curtiss' regular job placed considerable demands on his time, requiring long hours, seven days a week, in a second letter a few weeks later, he shared archeological information with Putnam. He wrote,

I have found some mounds that are on the banks of the cotton wood but what is in them I cant tell but

will give them a trial this week there has ben one dug in and some pipes flints and potery found in it but I could not find the parties who done the work or had the things there were lots of bones found I will ship you some crania and what other things I get if I am luckey enough to find anything these are regular mounds like those that are found in Iowa by the descriptions of them. I saw two yesterday and people who live here tell me that there are hundreds of them near here along the cotton wood river I hope I shall have good luck I will give it a trial at all events (Curtiss 1879b:1).

With yellow fever raging in Tennessee, Curtiss (1879b:1) reflected, "am glad that I am spending the summer in Kansas." He concluded nonetheless that "a little of Kansas will do me I will take old Tenn in mine preferences."

Curtiss acted on his own initiative but no doubt realized that, were he to make a worthwhile discovery, Putnam would reward him for it. Curtiss succeeded in piquing Putnam's interest, the latter afterward remarking, "Mr. Curtiss had the opportunity of making some very interesting and important explorations in Kansas and Missouri" (Putnam 1880:717).

In early August Curtiss (1879c) received word from Putnam, who had good reason to be tardy in responding, as his wife had died in March and he himself was ill that summer. In turn, Curtiss informed Putnam.

Your letter came to hand a few days since and I take the earliest opportunity to answer it I have not opened any of those mounds yet for I have ben so hard at work on the RR Sundays and early and late I have not lost an hour since I came here but I . . . will be pleased to go to work for you if you have any place to put me to work . . . when I get through with my RR work and have explored those mounds on the cotton wood I shall be through by the 15th of this month with the RR I will have to [be paid] higher wages here than I did down south twenty five cts per diem more I saw one crania that came out of these mounds . . . (Curtiss 1879c:1).

The Marion & McPherson line was officially completed August 12, 1879. The line's inaugural celebration was pronounced "as the Jolliest Jollification

ever Jollified in central Kansas” by the *Marion County Record* [MCR] (1879b). By the time of this jolly event, Curtiss had quit the railroad, though he spent considerable time afterward trying to get paid, and was busy planning exploration of the countryside around Marion Centre in search of relics for the Peabody Museum.

In the Field

August 13, 1879, found Curtiss in the field, though his trial dig was delayed by heavy rain (Curtiss 1879e). Despite this setback, he was able to obtain “some stone implements and curious flints.” He (Curtiss 1879e:2) reported, “I shall stay here til I explore some 6 or 7 mounds,” after which he planned to relocate to Cottonwood Falls in Chase County, where rumor had it that there were “a large number of mounds.” He later proposed going to Wichita (“a place on arkansas river . . . by the name of Whichitaw but spelled Wichita”) after hearing of mounds near it (Curtiss 1879g).

Curtiss’ (1879j) notes on his excavations are incomplete but for their many shortcomings nonetheless record the first quasi-professional, if rather crude, excavations in the area and offer details not found in other contemporary descriptions of the mounds around Marion. (By the latter 1880s Putnam was committed to improving his field methods and insisted that his collaborators follow suit [Hinsley 1999].) On August 16, 1879, he, possibly assisted by others, opened a mound on Mrs. Gibson’s farm, probably contiguous with 14MN306. In his words,

this mound is situated on a table land amongst several others nearly the same size this being 45 ft long by thirty wide and four ft high over looking the Bottom lands on the cotton wood river. contained charcoal ashes Bones of animals Birds turtles && I send Shells that are vary numerous in this mound and worked Bones fragments & . . . some of stone pieces of quartz and flints Sand Stones && all of which is foreign to this locality I also found one large hammer Stone of which I Send Several of various Shapes & Size picked up by people when ploughing or working there land diging sellars wells && come across them pitch them out and save them in many cases more are lost I explored this mound thoraly but could save only fragments I watched

carefully and saw evry shovel ful of earth thrown out Sunk down to the bed rock I saved some shells flints and bones Large teeth of the buffaloes . . . and ocasionaly found pieces of potery fragments only and that was made like our southern potery shells clay & sand (Curtiss 1879j:1-4).

As an aside, 14MN306 yielded a probable bone-tempered, possibly locally made potsherd from a vessel similar to forms produced by Caddo populations in eastern Texas (Reed et al. 2005). The sherd and the vessel of which it was a part signal interaction of some kind (e.g., enslavement; intermarriage; exchange) between the Marion settlement and Caddo populations to the southeast.

The mound ultimately confounded Curtiss (1879j:4-5). He complained, “I consumed three days in this mound and got poorly paid [i.e., rewarded with choice artifacts or human remains] for my work . . . I found more interesting things laying loose on the surface than in the mound.” Although disappointed, he turned his attention to one of the smaller mounds on the farm.

mound no. two near no. one 15 ft in circumference two ft high no human remains found but large bones of the buffalos teeth & charcoal ashes shells & chared bones && horns of the antelope & some worked flints with flint clippings and fragments of potery two feet below the surface I came to what I supposed to be a Stone grave flat stones laid like the top of the stone graves in Tenn . . . but uppon taking them up I found nothing but the horns of the antelope and they are vary frail and tender will send them and the flints are the same as those I found in the other mounds (Curtiss 1879j:8-9).

Another of the cluster of mounds “had been dug in to . . . & nothing found in that for the parties that had worked in this told me they had found nothing in it So I thought it foolish to explore any more of them” (Curtiss 1879j:9-10).

Curtiss’ notes make no mention of it, but Peabody Museum records indicate that he also dug a shell heap on the McBower’s farm, located 3 miles south of town (Wedel 1959:499; see Appendix 1). More likely, this was the Bowers farm, largely contiguous with 14MN7.

Downstream a couple of miles south from Marion

Centre, Curtiss (1879j:10) was directed to several “Indian graves,” meaning evidently several stone cairns, reported by Putnam (1880:718). Putnam’s comments in the *Tenth Annual Report of the Peabody Museum of Archaeology and Ethnology* and museum catalog records indicate that Curtiss explored six of these, all located 3 miles south of Marion Centre on the west (right descending) bank of the Cottonwood (see Appendix 1). While Curtiss’ notes and correspondence provide little information on them, Putnam wrote,

These piles of stone . . . were erected over bodies which had been placed on bare rock. The skeletons under all the cairns that Mr. Curtiss removed were so much decayed that not a single cranium could be obtained. A number of objects of various kinds were found, which had been placed with the bodies. Among the most interesting of these, perhaps, are the several minute pipes made of catlinite. Under one pile of stones an arrow-point of obsidian was found associated with a glass bead. This single glass bead was the only object of European make discovered, but it is conclusive evidence of the comparatively recent period when at least one of this group of cairns was erected (Putnam 1880:718).

It remains uncertain how these particular stone features relate to the midden mounds and other Great Bend aspect/Taovaya cultural remains found in the area, although the glass bead suggests temporal overlap with some of the deposits.

Curtiss stayed on in the area until late August. “I have ben hard at work here have got Marion Centre and the surrounding country prety well worked up” (Curtiss 1879f:1). Over the course of a couple of weeks, he had found a variety of artifacts, including “some of the finest wrought flints or aggate rock that I have ever seen” (Curtiss 1879f:1), but he was deeply frustrated by his inability to find any whole pottery vessels and, of course, much coveted human crania. “[G]ot poorly paid” for the effort to find the latter, Curtiss (1879j:4) complained in his notes.

It would be easy to fault Curtiss for his interest in human remains, but he was simply responding to the anthropological imperatives of the day. For instance, Putnam, speaking to the John Hopkins University Archaeological Society, a handful of

years later in July 1886, declared, “. . . all human remains, from fragments of bones to perfect skeletons [should be preserved]. Skulls are unquestionably the most important . . .” (*Boston Evening Transcript* [BET] 1886:2). Skeletal remains were used to document human variation, within however an overtly racist evolutionary hierarchy (Barnhardt 2015).

As for pottery vessels, Curtiss (1879f:2) griped, “I cant come up with any whole ones I think it is doubtful if I ever find any for I sink down on there old earth heaps of shells and rubish and find nothing and I am getting discouraged in digging in them . . .” After taking the crated materials to Kansas City for shipment east, he added in his note to Putnam, “I hope you will be pleased with what I have sent” (Curtiss 1879k:2).

Curtiss need not have worried. He had been exploring an area of the Great Plains that was as yet largely unknown to the emergent archeological profession in the East, and in any event the archeological record, to put it in simplest terms, is what it is. Putnam (1880:717) was sufficiently impressed that all of the material except for surface finds was placed on temporary exhibit in the museum soon after it was unpacked and cataloged.

A Name for Himself

Soon after he arrived in the Cottonwood River valley, in tried-and-true fashion Curtiss made inquiries regarding collectors or known sites in the area. This led him to Melvin O. Billings (Figure 4). In fact Curtiss (1879c) lodged at the Billings’ residence. As a courtesy, Curtiss (1879a:2) asked of Putnam, “Please send one of your annual reports to Mr. Billings.” He reported, “. . . he is vary fond of the work constantly picking up things and is not able to stand confinement and he is a cripple troubled with the spinal infection is 18 or 19 years of age and 4 ft two or three in. tall” (Curtiss 1879f:3).

The eldest son of Levi and Emily Billings, Melvin was born in La Grange, Indiana, in March 1861 (*MH* 1902; Methodist Episcopal Church 1903). William H. Billings, Melvin’s great uncle, was in 1860 among the first three Euro-American settlers in the county and was a principal in the founding of Marion Centre. His family in tow, Levi relocated to the community in 1864 and by the late



Figure 4. Melvin Ozias Billings (1861–1902) as a young man. Source: Laraine Clark.

1870s had become a prosperous Marion Centre merchant, proprietor of Centre House hotel, county treasurer, board member of the Cottonwood Valley Bank, and the local agent for the AT&SF railroad (Cutler 1883:1256, 1257). Emily Billings and two of her four children died from tuberculosis in 1875; Melvin and his sister, Mary Alice, survived. A year later Levi Billings married a local girl, Carrie B. Hoops, who was just a year older than Melvin (*Cottonwood Valley Leader* [CVL] 1875, 1876).

Melvin, or Mellie (also rendered as Melly) as he was nicknamed, completed his primary education in 1879, after which he sold insurance for a time (MCR 1881; *Peabody Weekly Republican* [PWR] 1883). In 1884 he enrolled in a Natural History course at the University of Kansas (KU) (*University Courier* [UC] 1884) but does not seem to have attended. Instead, he taught in county schools. In 1886 he enrolled at KU again, and this time was there for two semesters, though he did not take a degree (Kathleen Neeley, personal communication April 4, 2006; *Marion Tribune* [MT] 1886). At the conclusion of his year away, Billings returned home

and was a co-founder and business manager for the *Cottonwood Valley Times* newspaper (MH 1902). In September 1888 he wed Fannie West, who likewise was from Marion (MCR 1888). The couple's marriage was a tragically short one, however; Fannie died a little over a year later in December 1889 (MCR 1889).

Sometime after his wife's passing, Billings sold his interest in the *Cottonwood Valley Times*, and in 1892 he and his sister moved to Utah, where he secured a newspaper job in Ogden. Before long, he was an instructor and then principal of the Beaver, Utah schools (Methodist Episcopal Church 1903). He turned his attention to mission work and for a time was the pastor of the Beaver Methodist Church, while Mary Alice taught in the parochial school (*Church Review* [CR] 1895). In 1894 Billings' ministerial turn took him to the Garrett Biblical Institute in Evanston, Illinois, from which he graduated in 1897 (*Chicago Tribune* [CT] 1897). While attending Garrett, he preached to congregations at both Evanston and Bristol, Illinois, and afterward briefly in Missouri, before heading west once again (Methodist Episcopal Church 1903).

Billings' pilgrimage to the Garrett Institute was not solely devoted to the Lord's work. While in Evanston, he met and courted Elizabeth Jane Vogwill. The couple wed in 1898 in Chicago. By this time the church had transferred Billings from Colorado to Mulhall, Oklahoma, and it was there that the couple's two sons were born. He served not only as pastor, but also was employed as a cashier or "office deputy," as was his wife, for the U.S. Marshall's office in nearby Guthrie (MCR 1898; Methodist Episcopal Church 1903; PWR 1890). Billings died suddenly on October 29, 1902; he was 41 years old. His remains were returned to his hometown for burial (MH 1902; Methodist Episcopal Church 1903), while his widow removed with their children to the Chicago area, where her parents resided.

As Curtiss (1879f) noted, Billings roamed widely about the area and, in a pattern of acquisition typical for an era prior to scientific specialization, gradually amassed a collection of artifacts, including a few that the family had acquired in Arizona (Billings 1880; West 1879a, 1880a), and natural history specimens, i.e., insects, minerals, and rocks (Cassino 1882:11; MCR 1880; *Peabody*

Gazette-Herald [PGH] 1882). Only a few months before Curtiss' arrival, Billings and his pal Roger Hannaford had dug in

... an old Indian burial ground, about a mile from Marion Centre. After considerable prospecting and digging, they finally unearthed from one grave three skeletons—two adults and one papoose. In the same grave was found a large brass kettle, nearly rusted out, and the remnants of what appears to have been a tin bucket. The kettle contained the bones of some animal ... (MCR 1879c:3).

Curtiss did not say whether or not Billings assisted him in any way, but it seems likely that he acted as a guide. He was locally well known, and his presence certainly would have opened doors. Curtiss (1879f) planned on obtaining a skull from Billings, as he had had no luck finding any himself. In fact Peabody Museum records register the donation of two specimens by Billings: a nearly

complete cranium of an adult female, found on the Gibson farm, possibly one of those mentioned in the newspaper story quoted above, and a single ground stone tool (maul) (see Appendix 2). Billings also donated four cabinet card photographs of artifacts in his personal collection, including images of chipped stone artifacts, a carved zoomorphic pipe-stone pipe, and a rather puzzling engraved flat stone (Peabody Museum of American Archaeology and Ethnology 1882:82) (see Figures 5-8).

Billings' interaction with Curtiss and Curtiss' with Judge West in Kansas City set the stage for a second round of exploration that commenced a couple of months later and carried into succeeding years. The effort culminated with Billings' 1882

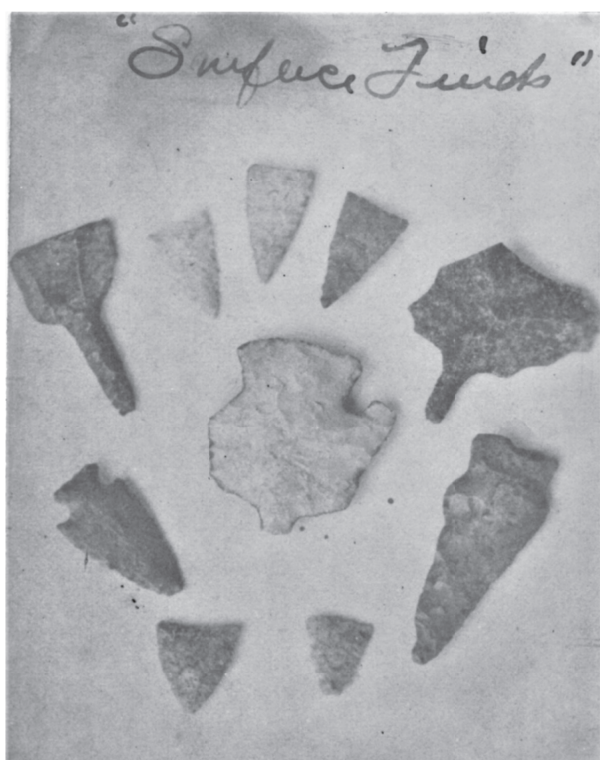


Figure 5. Chipped stone drills and projectile points. The point in the center and those flanking it predate the small triangular forms typical of the Great Bend aspect. Source: Peabody Museum of Archaeology and Ethnology, Harvard University, 2004.29.838.



Figure 6. Chipped stone knives (middle), end scraper (bottom), and awl (top). Source: Peabody Museum of Archaeology and Ethnology, Harvard University, 2004.29.839.

Figure 7. A zoomorphic carved, pipestone, pipe. Source: Peabody Museum of Archaeology and Ethnology, Harvard University, Cambridge, Massachusetts, 2004.29.840

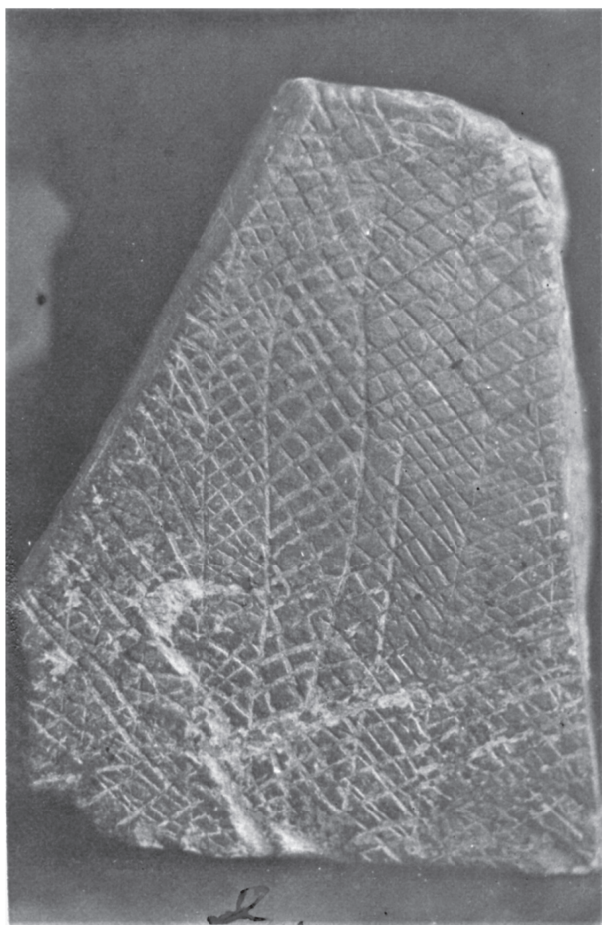


Figure 8. Incised stone slab. The two lighter streaks appear to be plow scars. Source: Peabody Museum of Archaeology and Ethnology, Harvard University, Cambridge, Massachusetts, 2004.29.837

paper presented in the pages of the *Kansas City Review of Science and Industry*.

Judge West Presides

With evident relief Curtiss departed Marion Centre in late August 1879, abandoning his plans to proceed to Cottonwood Falls. "I thought I would go to Wichita but gave that up [too] on account of hearing bad news from there by one of our civile engineers who . . . says there is nothing there [in terms of mounds]" (Curtiss 1879h:2). However, his informant added that a promising field of exploration was to be found "up the little Arkansas from [Wichita] one hundred miles or more . . . I had no way to go up and I gave it all up for this here . . . country dont amount to much." This may be among the earliest mentions of the Little River focus sites of Rice and McPherson counties.

In Kansas City, Missouri, Curtiss met Judge E. P. West (Figure 9). As Everhart (2015) documented, in his 72 years West led a life of remarkable industry. A native of Kentucky, where he was born in 1820, West was successively a lawyer, practicing in Bates and Cass counties, Missouri; attorney general (1848-1851) and U.S. attorney (1851-1853) for the Territory of New Mexico; postmaster (1871-1873) of Little Blue, Missouri; probate judge (1858-1868) for Cass County; and during the Civil War militia captain in Company K, 77th Missouri Enrolled Militia that served more or less as a home guard. To

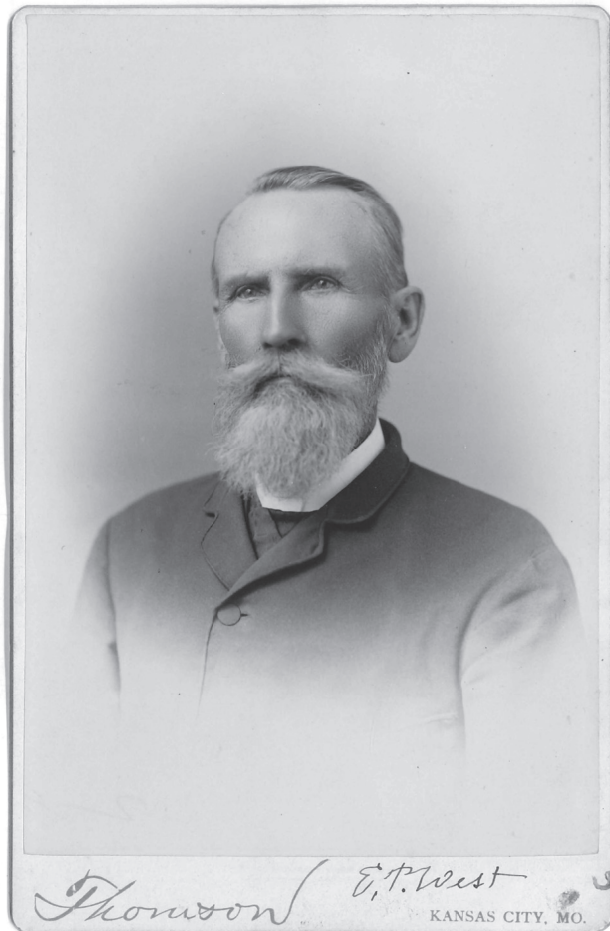


Figure 9. Elias Putnam West (1820–1892). Source: Archives, Kansas Historical Society, Topeka.

these could be added entrepreneur, as he operated a hotel in the early 1840s and published the Free Thought newspaper *Mirror of Progress* [MP], 1879–1881. West married Louisa M. Hocker in 1844, and the couple had seven children, three of whom died in infancy. The couple divorced sometime between 1870 and 1880 (Everhart 2015; Rafiner 2010:556; Stone 1928:267–268).

In the 1870s West turned his attention and considerable energy to scientific pursuits, particularly archeology and geology. He was among the cohort of autodidact (self-educated) natural scientists who founded the Kansas City Academy of Science, in which he played an active role for many years. The Academy published a journal, successively entitled *Western Review of Science and Industry* and *Kansas City Review of Science and Industry*, in which many of West's papers were published. He was appointed

to the Anthropology Committee of the Kansas Academy of Science, which included Franklin G. Adams, the secretary of the Kansas State Historical Society. He was also a member of the American Academy for the Advancement of Science, Section H (Anthropology) (*American Naturalist* 1883; *Transactions of the Kansas Academy of Science* 1880; *Western Review of Science and Industry* 1878). An ardent evolutionist, West was employed from 1884 until his death in 1892 by the University of Kansas as a paleontological collector, in which field he made a number of lasting contributions (Everhart 2015; Williston 1892, 1893).

West explored the bluff-top mounds along the Missouri River in proximity to Kansas City and as far north as Omaha and east to St. Louis (Broadhead 1880; Fowke 1910:65–66; West 1877; 1881a, 1881b, 1881c, 1881d, 1881e, 1881f, 1881g; 1882a, 1882b, 1882c, 1882d, 1883a, 1883b; Wedel 1943:12–13). His archeological pursuits took him westward into Kansas as well (*Junction City Tribune* [JCT] 1879; West 1879a, 1880a, 1880b, 1880c). The geological framework on which he relied to infer an age of as much as 10,000 years for the mounds is now severely dated (i.e., Dana 1880:527–539), not least because the geological record, as it was understood in the late nineteenth century, was foreshortened into hundreds of thousands or a few millions of years instead of hundreds of million or even a billion years. The rectilinear stone chambers found within many of the mounds, he argued, were primarily domiciles, and only secondarily used for burial (West 1877). Wedel (1943:153), following investigation of similar mounds in the Kansas City area some 70 years or so later, pronounced West's interpretations as "wholly untenable." Among other things, the mounds were much more recent than West thought, somewhere in the neighborhood of 2,000 years old. However, West's explorations and ideas gained him considerable notoriety, including widespread notice in the print media of the day, as well as in popular scientific journals, such as *Scientific American* (e.g., *Scientific American* 1880).

From his correspondence it is not clear how Curtiss came into contact with West, but probably casual inquiry was enough, as the Judge (like Billings) was relatively well known around his home ground. In any case at West's insistence, Curtiss spent a few

days digging three mounds on the Brenner Farm in Clay County, Missouri, from which he secured a small collection for the Peabody Museum (Curtiss 1879i; *MP* 1879:8; Putnam 1880:717-718, 1881a). Curtiss departed the Kansas City area in September and wintered in Arkansas, where he and several associates explored sites along the St. Francis River in Cross County, Arkansas, securing a major collection of Mississippian (A.D. 1200-1600) material culture (House 2003, 2009; Mainfort and Demb 2001; Morse and Morse 1983:19).

Of particular interest is that in the wake of Curtiss' visit, West included Marion Centre as a stop on an archeological trek around eastern Kansas. His goal, he said in a paper read before the Kansas City Academy of Science in late November 1879, was "to determine whether our Missouri Chambered Mound Builders extended their domain westward along the Kansas river valleys and valleys of other important streams in Kansas" (West 1879a:1). West (1879a) published his lecture in the *Mirror of Progress* a few days after he had presented it; it was subsequently reprinted in the *Kansas City Review of Science and Industry*, where it was misdated as read on Nov. 25, 1875 (West 1880a). Incidentally, West credited the AT&SF Railroad for making his trip possible, as it was over its rails that he was able to make the journey from Kansas City, Missouri, through Lawrence, Topeka, and Manhattan, as far west as Ellsworth and Lincoln counties. As for West's initial question, he felt that the evidence, as the paper's title suggested, pointed to the presence of "a buried race" in the state; he could not deduce, however, "when this mysterious race lived." He wondered, "Was it before or after the Glacial period?" (West 1880a:533).

In part West's journey involved inspecting archeological collections. He commented that among "the most [notable] collections" was that belonging to Melvin Billings (West 1879a:1; 1880a:531). Billings was away at the time of West's visit, though he soon dispatched a letter to him with details of his collection. He informed West, "Among the things which you did not see are the bone instruments from cellars in town" (quoted by West 1879a:2; 1880a:533).

As it happened, one of Billings' neighbors subscribed to the *Mirror of Progress* and loaned him her copy. "I was greatly interested in your paper on 'A

Buried Race in Kansas,'" Billings (1880:6) wrote in what was evidently his second letter to West. In his lecture West (1879a:2; 1880a:533) had commented that the bone implements Billings reported to him had been "covered by washings from the adjacent hills." To his credit, Billings would have none of it, and to his credit West published the following challenge.

... where[as] "the bone instruments which you did not see," spoken of in your article, were taken from a cellar, ... I do think were not covered by "washings from the adjacent hills" from the fact of the cellar being situated at least a mile from any higher ground The cellar bottom is of natural limestone strata and sides of red clay. If these remains were surrounded by wash where did this red clay wash from ... (Billings 1880:6).

Billings' letter challenged the hypothesis offered by West that artifacts and features in the Marion Centre were buried by colluvium. Using his knowledge of the area and the archeology, Billings found little support for the idea. He did not consider the Cottonwood River as a source of sediment; the river had not flooded to this point in his life, and thus he did not realize that the area's archeological deposits in fact had been buried in alluvium (Rohn and Emerson 1984; Roper 2002).

Some of the deposits that Billings identified as "graves" were instead subterranean storage or cache pits. Often "bell-shaped" in cross section, storage pits varied in depth from ca. 3 feet to as much as 6 or even 8 feet deep (in some Great Bend site clusters); such pits have been used globally for millennia to secret foodstuffs in a hermetic or partially hermetic state (see Al-Kirshi 2003; Dunham 2000; Reynolds 1974). Of course, there are many types and uses of subsurface features, running the gamut from post molds to roasting pits. From the descriptions, it is not apparent that Curtiss, Billings, or others encountered these types of features, although they almost certainly did (see Rohn and Emerson 1984). Commonly, once storage pits were no longer usable, wanted, or needed, they were filled with household refuse, as well as debris washed in or blown in by the wind (Figure 10). Human remains sometimes have been found in them on some Great Bend aspect sites, including perhaps at Marion,

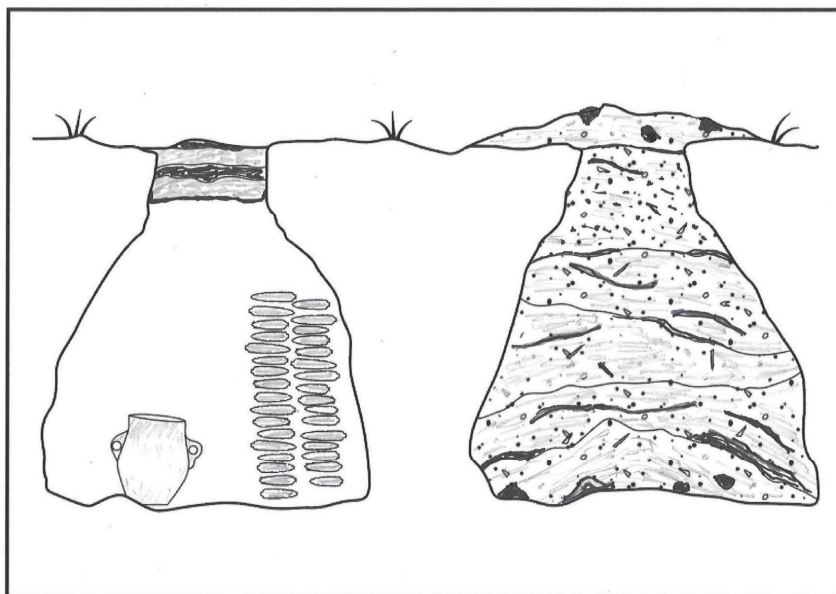


Figure 10. Cross-section view of a bell-shaped storage pit in use (left) and abandoned and filled with habitation debris and sediment (right). While in use, pits were sealed with some combination of hide, sediment, ash, and other materials. A small midden has formed over the filled abandoned pit. Source: Rob Fullmer and Marlin F. Hawley.

though this is unclear, but Billings appears simply to have called them “graves” for want of a better word (Billings 1882:6).

Billings provided additional observations about the local archeology.

At the brick yard two miles north of Marion Centre, in the valley of the Muddy near its confluence with Clear Creek, in digging clay for brick manufacture, six of these graves, or whatever they may have been, were found in a space not exceeding twenty five feet. One of these, which I personally examined, was cone shaped; fifty-four inches at the base, eighteen inches at the top, sides of brick clay resting upon white sands, and covered with two feet of black loam on the surface.

This grave contained black earth, fragments of bone, flint, pottery, shells, oxide of iron, limestone and quartz pebbles

Now do you think this was dug and filled or built and covered by wash? The gentleman owning this property says he took human as well as animal bones from one of the graves before mentioned, but for this I cannot vouch (Billings 1880:6).

The brickyard, operated by Corby & Sparrow, extracted clay from William Moulton’s property, possibly in the eastern portion of Section 30 or northwestern part of Section 29 a short distance north of town (Billings 1882; Davy Map and Atlas

Company 1885; *MCR* 1879d). Obviously, as the area was quarried, the deposits were destroyed. There is, however, a substantial cluster of Great Bend aspect sites at the nearby confluence of Mud and Clear Creek (Lees 1987; Lees et al. 1989; Roper 2002). Billings continued,

At the place where the M. & M. P. R. R. crosses Muddy Creek south of this city in grading the approach to the bridge, a large amount of prehistoric debris was discovered among which is broken bone instruments, arrow and spear points, tomahawks of flint, grooved mallets, rubstones, broken pottery in large quantities, shells, buffalo bones, fish and turtle bones, showing upon what these people subsisted (Billings 1880:6).

This locality lay on the south side of Marion Centre. Several sites have been reported in the area, and possibly one or all of 14MN501, 14MN503, and 14MN516 may codify these deposits or rather the remaining portions of them. Curtiss must have been working in another portion of the line and not been involved in construction of this bridge. His notes and correspondence make no mention of this discovery.

In digging a cistern at my home which you visited, one of these peculiar graves was struck from which charcoal—burnt bones—flint chips, a small red

stone pipe (now in possession of the Rev. Preston Wood, St. Joseph, Mo.) was taken. In excavating the basement part of our barn, thirty eight by forty feet, seven of these graves or spots were discovered. These two instances being upon the first raise of ground above the valley and on the verge almost of the hill could hardly have been covered by "washing" except at some very remote period (Billings 1880:6).

Levi Billings lived on the southeastern edge of Marion Centre. The closest reported site to his residence is 14MN503, which could conceivably represent a portion of the deposits that Melvin reported.

West, Billings, and Archeology at Marion

West (1880b, 1880c) returned to Marion Centre in the spring of 1880, where he visited a number of archeological and geological localities in the area, accompanied by Melvin Billings, whose father supplied a team and wagon. As he saw it,

. . . there is evidence of three distinct races, which preceded our present civilization. Evidence of the most recent is to be found in the burial places of our modern Indians; next a hundred or more of low mounds or borrows containing human remains, such as fragments of pottery, stone and bone implements, ashes, charcoal, burnt clay, stone pipes, and human bones, testify to greater antiquity; and evidence of the remaining, and most ancient race, is to be found in human remains without anything whatever upon the surface to indicate their presence (West 1880c:86).

In the latter instance West (1880c:86) pointed to those remains "encountered in excavations for cellars, in well-digging, and in cuts of M. & M.P. R.R." These he believed were entombed in "Lacustrine deposit[s]" by which he meant Champlain deposits that were thought by many geologists at the time to have been laid down in vast lakes of glacial meltwater (Dana 1880:543-549). These deposits overlay the older "Glacial drift." In modern terms West argued that glacial and post-glacial lacustrine sediments were in fact alluvial deposits unrelated to glaciation, which did not extend as far south as Marion County, or post-glacial lakes.

West's primary interest was ultimately in determining the age of archeological deposits, whether of the chambered mounds of the Missouri River valley or of the buried features at Marion Centre. Nonetheless, the so-called "graves," that is, refuse-filled storage pits, intrigued him; these were, he commented, ". . . very remarkable features independent of their evident great antiquity" (West 1880c:87).

From a careful measurement of some of these, by Mr. Billings and Mr. Moulton, they were found to be fifty-four inches in diameter at the base, eighteen inches at the top, and thirty-six inches high; i.e. there is found in the clay, of these dimensions, a black cone-shaped mass of mixed ashes, charcoal, fragments of shells, intermingled, perhaps, with clay and containing human remains (West 1880c:87).

West speculated that the features may have been "formed of some kind of cement upon the surface, before the Lacustrine time and covered by its deposits" (1880b:88). This would imply that the "graves" were many thousands of years old. He also argued for a correspondence in the shape of the cache pits with decoration on the pottery and that this suggested sun worship. It is safe to say that the resemblance was coincidental, if not, as he presented it, completely spurious. Of course, the cache pits had been dug into the substrate sometime in the seventeenth or early eighteenth century, and were not ancient (i.e., thousands or tens of thousands of years old) surface constructions by some mysterious long-vanished race.

The final statement from this early period of archeological activity at Marion was a short paper by Billings, published in 1882, in the *Kansas City Review of Science and Industry*. By this time echoing West, Billings argued for three pre-Euro-American occupations of the area; in his terms these were, from oldest to youngest, Mound Builders, Crematers, and modern Indians. He focused his remarks on the former, offering a detailed discussion of the character of the mounds.

The mounds from which we denominate this class "Mound-Builders" are situated on high ground around the junctions of streams adjacent, in irregular groups averaging eight mounds to the

group. Inside of three miles each from Marion there are five of these groups. These mounds measure from ten to sixty feet in diameter and from one to three and one-half feet in height. In none so far have been found human remains. The larger ones consist of earth, stones, pebbles, broken implements and utensils of all kinds, shells and scraps of bone, all of which seem to indicate that they are only heaps of kitchen scraps and camp debris. The smaller mounds seem to be the remains of adobe huts or wigwams, mostly of clay which bear the appearance of having been partly burned: in these are found ashes, charcoal, broken pottery and a few broken bones, but they do not contain the profusion of articles which the large ones do. Some of these small mounds, after being subject to the plow and weather, are covered with flint chippings and broken flint implements, showing that they were the workshops of arrow makers or the place where the refuse of this character alone was deposited.... The small mounds are circular while the large ones have on the southeast side a spur about one-fifth the size of the mound. This is not the exception but the rule. As to the use of these large mounds with their spurs we have no theory. We are simply stating the facts as they are (Billings 1882:211).

As Billings concluded, the mounds were middens formed of household and village trash (Blakeslee and Hawley 2006:167). He reasoned that some of the mounds marked the locations of dwellings, which Udden (1900) also surmised after contemporary work on a site near Lindsborg, Kansas. Analysis of soils in a putative house mound at Sharps Creek (14MP301) lends credence to the idea (Lees and Mandel 1993). In any event Udden (1900) argued that his site had been occupied by the Wichita, based on the fortuitous discovery of Spanish chain mail fragments and its connection to the Coronado entrada of 1540-1541. Historically, and even into the early twentieth century, Wichita houses were haystack-shaped grass structures, not adobe as Billings suggested; plausibly, the fired clay he mentioned derived from hearths or possibly from clay used as chinking or both (Figure 11). The inhabitants of the Marion Centre sites would have occupied similar dwellings.

Billings refused to speculate as to the origin of the larger mounds, but following his logic, it is

possible that these might be associated with larger structures, such as ramadas or arbors (Figure 11, left background). Both types of structure, used as covered activity areas, were typical of historic Wichita villages and by inference villages of earlier centuries as well. The purpose and nature of the “spur,” described by Billings, remains a puzzle. Unfortunately, most such mounds gradually were plowed away, making study and interpretation much more difficult. Free-standing middens likely existed, too.

The remainder of Billings’ remarks reiterated details of the “places,” which he no longer regarded as “graves,” described by West. In contrast to the Judge, Billings concluded that these “graves” or “places” were the product of the same people responsible for the midden mounds. He did not offer information on which deposits he associated with his “Crematers.”

Conclusions

The archeologist Nels Nelson (1919:115) once remarked, “We have entered the field not so much to recover specimens as to solve problems.” While this was not perhaps true of those exploring sites near Marion Centre (Nelson was, after all, speaking in a different era), it nonetheless raises an important question: Why did Curtiss, Billings, and West go into the field?

In the case of Billings the motivation is hard to discern, as he left few indications. Clearly, in his youth at least he had an interest in archeology, if not more generally in natural history. When this developed is impossible to know. That Marion Centre had been built amidst the vestiges of an older culture might have been inducement enough for him to take up the spade and pen. Family status and his infirmity may have allowed him greater license to pursue his interests. And, as indicated by his writings, Billings was an astute and capable observer. Curtiss immediately recognized his potential and to Putnam remarked, “I think he [would] make a very good man for you here” (Curtiss 1879f:3). Putnam did not take the hint. The *Marion Banner* [MB] (1880:3) also took notice and, following his mention in West’s publications, proclaimed, “Our young friend, Melvin Billings, is gaining some well-deserved notoriety as a naturalist.”



Figure 11. Wichita grass house, dating ca. 1880–1890. Source: Archives, Kansas Historical Society, Topeka.

Influenced in part by the interest shown by West (and Curtiss before him), Billings continued to collect from the area for the next several years at least (PGH 1882). In the early 1880s he was elected to the Kansas Academy of Science (*Topeka Daily Democrat* [TDD] 1881) and was listed as interested in archeology and geology in the pages of *The International Scientists' Directory* for 1882 (Cassino 1882:11). He donated some of his discoveries to the Peabody Museum and the Smithsonian Institution (Mason 1881; Putnam 1880:738) (see Appendices 2 and 3). At the University of Kansas he joined the Science Club and participated with faculty, club members, and onlookers in the excavation of mounds in Clay County, Missouri, in October 1886. The dig was directed in part by West (*Kansas City Journal* [KCJ] 1886). If all of this elides an understanding of Billings' motivations, what is clear is that, had he not turned to preaching, he easily could have pursued a scientific career.

Scientists of note, such as Samuel W. Williston, Charles N. Gould, and Barnum Brown, among others, emerged from the small towns and farms of frontier Kansas.

Edwin Curtiss was a paid field collector, going places and suffering privations for his sometime employer, F. W. Putnam. Curtiss' interest was in part pecuniary in nature. Put another way, it was a living, at least when Putnam had the financial wherewithal to pay him. That said, Curtiss understood the importance of what he did and was knowledgeable and possessed of the requisite skills necessary for the work, which was physically demanding, though perhaps not so much so as construction work. Probably archeological fieldwork had to be reckoned as safer than the former. Judging from his letters from Marion Centre, it paid more regularly. Curtiss could and did take pride in mention of his efforts in the reports of the Peabody Museum. In any final analysis and whatever his

motivations, Curtiss' work for Putnam, especially in Tennessee and Arkansas, left an irreplaceable record of notes, maps, and collections (House 2003; Jeter 2001; Mainfort and Demb 2001; Moore and Smith 2009; Morse and Morse 1983:19; Rolingson 1999). Wedel (1959:497-503) and later Rohn and Emerson (1984) incorporated Curtiss' Marion collections into their research on sites in the area. Wedel made a particular effort to try to tie the collections to specific localities, based on landowner names recorded by Curtiss. The collections are not without value, in other words.

The case of Judge West is no less difficult to ascertain than that of Melvin Billings. Although Williston (1892) mentioned that West's rooms in Lawrence were crammed with papers and other materials, apparently none have survived. West was a complicated individual, as his range of occupations and intellectual pursuits indicates. Williston, who was acquainted with him late in West's paleontological career, recorded these observations.

Personally Mr. West was, in many respects, a man of remarkable character, with a tireless energy and an indomitable will. At an age when most men are content to lean upon others, he still asserted, in an undiminished degree, the self-reliance and independence which had always characterized him. When past 70 years of age, he spent a season in the fossil fields of western Kansas, camping out alone, under the blazing sun and severe storms

As is always the case with men of such strong will as he possessed, he was not always understood, his marked peculiarities often concealing his real worth. Beneath his exterior, so often brusque, he had a kind heart. Especially was he averse to all ceremony and pretension . . . (Williston 1892:68-69).

His fellow freethinker Annie L. Diggs wrote in *The Kansas Liberal*, a freethought newspaper published in Lawrence, that West

. . . has sailed far out on the ocean of freethought, past the shoals and quicksands of contention and recrimination, and is off on a voyage of discovery of new facts and truths to the material for the study of the Science of Life (Diggs 1882:1).

Of course, while these remarks attest to West's dedication and his willingness to pursue ideas wherever they might lead him, his motivations remain murky. Too, it is unclear when his scientific interests were manifest, though he was an educated man, and doubtless had some interest for many years. One likely influence was his Cass County, Missouri, neighbor Garland C. Broadhead (1827-1912), who in 1863 had married West's niece. Broadhead was absorbed in the study of a wide range of natural history phenomena, particularly geology. He was employed at various times as a geologist in Illinois and Missouri. He might have inspired West's pursuits (Greger 1915; Stone 1928).

West spent at least a decade engrossed in geological and archeological exploration. His consideration of the region's mounds was refracted through his understanding of the era's geological thought and his acceptance of Darwinian evolution. In fact, he was less interested in material culture (i.e., pottery, stone tools, mounds) and human remains than he was in using these things to attempt to ascertain the age of deposits and by extension the age of past cultures or races. "Race" is a troublesome term that was employed in the era variously to mean tribe, nation, and race proper in a biological sense (Barnhardt 2015:3). West (1879b) argued for a continual evolution of humanity over a large swathe of geologic time; apparently he used the term "race" to denote a physically and culturally distinct people witnessed at a particular time along that continuum. Inclined to seek evidence of earlier races westward out onto the Great Plains, West's conversations with Curtiss led him to Billings and Marion Centre.

Billings did not seem to have been overly influenced by West, although he did add "Mound Builder" to his archeological vocabulary (i.e., Billings 1882) and "geology" to his list of interests in the 1882 edition of *The International Scientists' Directory*. It may well be that West was a factor in Billings' sojourn to the University of Kansas, where Billings concluded the arc of his archeological endeavors, digging in the chambered mounds near Kansas City. That West's conclusions were ultimately declared "wholly untenable" (Wedel 1943:153) is partly a function of the state of archeology during his lifetime and also the evolution of archeological thought as the profession developed and older notions were shed. Although West's

papers referencing archeology in the Marion area have not aged well, he inspired Billings to write, leaving posterity a noteworthy glimpse of archeology around Marion in those early decades after its founding.

PART II THE ARCHAEOLOGICAL SOCIETY OF MARION, KANSAS, 1903–1905

Representative of the first generation of settlement of the Marion area, Billings, Curtiss and West pioneered archeological (or, if one prefers, antiquarian) investigation of the cultural remains of its pre-Euro-American inhabitancy. However, after ca. 1882 this interest waned. As the years passed, archeological discoveries were noted, likely infrequently relative to the frequency of encounters, in the local newspapers (e.g., *MH* 1889; *MCR* 1893; *Marion Review* [*MR*] 1921). In 1893 the school in Marion issued a call for artifacts and natural curiosities (e.g., fossils, minerals, etc.) from the area for installation on its premises for the edification of its students (*MCR* 1893). Wedel (1959:500) also reported the 1892 donation to the Smithsonian Institution of a small collection of artifacts found in “Ash pits or fire-vaults in Marion County, Kansas” by J. W. Lambuth.

Archeological interest locally peaked again in the early twentieth century with the inception of an archeological society (aka Boys’ Archaeological Club) within the Marion community (*Free Press* [*FP*] 1904; *MCR* 1903a). Although short lived, the society nonetheless merits attention, not least given its inspiration in the Marion community’s archeological heritage. Part II of this paper explores this episode through the club’s constitution, as well as contemporary newspaper accounts of its activities.

Inception, Organization, and Activities

The organization of scientific and archeological societies is of considerable historical interest (i.e., Barnhardt 1998; Goldstein 2008, 2014; Hawley 2021; Hendrickson 1973), not least in that such entities have promoted and shaped all facets of research across the physical and social sciences. The post-Civil War era witnessed a significant growth in scientific organizations, although by the

early twentieth century the number had declined somewhat (Goldstein 2008:523). While archeological societies may not have been as ubiquitous, the gradual shift in the postbellum period toward disciplinary specialization resulted in the formation of national, regional, and even local archeological or sometimes anthropological societies in the United States (Lyon 1969:21). Of course, many scientific societies took an active interest in archeological matters before and after the Civil War. For instance, this included the Anthropology Committee of the Kansas Academy of Science and the Kansas City Academy of Science, which supported and published much archeological content in its journal. The Kansas State Historical Society also demonstrated concern for archeological matters.

As an early twentieth-century example of an archeological society, the one that formed in Marion was novel. Established in July 1903, it was announced in the September 17, 1903, edition of the *Marion County Record*.

Six Marion boys, the oldest probably not more than 15 years of age, have organized an “Archaeological Club” for the purpose of studying and collecting the relics of the prehistoric race of America, the American Indian, as they say in their constitution . . . (*MCR* 1903a:1).

The article further noted,

There are a great many Indian mounds and graves around Marion, and the boys make regular Club excursions to these places for excavation and exploration purposes. They are well up in the lore of relics, and have already found and mounted on cardboard over five hundred specimens of Indian warfare and utensils, including mauls, war points, bird points, game points, lame heads, scrapers, pieces of pipes, fragments of pottery, etc. (*MCR* 1903a:1).

The club’s founding cohort consisted of Leslie C. Bryan, Chester A. Evans, Wallis Hoch, Willard D. Keller and his younger brother Louis F. Keller, and Harry K. Rogers (*MCR* 1903a) (Figures 12–15). Evans was elected the club’s president, Louis Keller served as the treasurer, and Hoch was named secretary (Hoch 1904a).



Figure 12. Chester A. Evans (1887–1957), Archaeological Society president. Source: Marion County Historical Museum, Marion, Kansas.



Figure 13. Wallis Hoch (1889–1958), Archaeological Society secretary. Source: Marion County Historical Museum, Marion, Kansas.

News of the club's founding was reported in a number of newspapers around the state, mostly without comment. However, the *Topeka State Journal* [TSJ] (1903:12) dismissively suggested that "the mission of the boys is to explore Indian caves and procure scalp locks and other curios." This refrain was parroted by papers in Emporia, Parsons, and likely other communities (*Emporia Republican* [ER] 1903; *Evening Herald* [EH] 1903).

After reading of the organization sometime in early 1904, probably around the time of its first public exhibition, George J. Remsburg (1871-1954), an Atchison, Kansas, amateur archeologist, collector, writer, and editor (*Atchison Daily Globe* [ADG] 1954; *Western Life* 1901) wrote seeking additional information, which he intended to submit to the *Kansas City Journal* (Hoch 1904b). In response to the query, Secretary Hoch (1904a) forwarded to

Remsburg a handwritten copy of the organization's constitution. This document, preserved in a sheaf of Remsburg's papers at the Kansas Historical Society, briefly set out the club's rationale and its code of conduct. Referring to the club as the "Archaeological Society," the full document reads as follows.

Constitution of the Archaeological Society,
Marion, Kansas

We the members of this Society have joined together for the purpose of collecting and studying the relics of the prehistoric race of America (The American Indian).

Article I

Sec I. The Society shall consist of not less than ten members that have signified their wish to study about the life and ways of the Indians.



Figure 14. Louis F. Keller (1891–1983), Archaeological Society treasurer. Source: Marion County Historical Museum, Marion, Kansas.



Figure 15. Harry K. Rogers (1889–1956). Source: Marion County Historical Museum, Marion, Kansas.

Sec II. No member under the age of twelve years shall be admitted.

Sec III. Each new member shall pay an admission fee of 50¢ and 10¢ per month afterward.

Sec IV. No new member shall be admitted without the vote of all the members present.

Sec V. Each new member will be required to sign this Constitution and to promise to keep these laws to the best of his ability and to pay all dues and fines willingly.

Article II

Sec I. The officers shall consist of a President, Secretary and Treasurer. The officers shall be elected every six months.

Sec II. The duties of the President shall be to preside at all meetings and to see that order is preserved.

Sec III. The duties of the Secretary will be to keep record of each meeting and to read these records or minutes at the next meeting of the

Society and to answer all correspondence addressed to the Society.

Sec IV. The duties of the Treasurer will be to take charge of all the moneys of the Society and to see that all dues and fines are promptly paid.

Article III

Sec I. The behavior of each member of this society is at all times to be that of a gentleman. For a breach of conduct in the Society's meetings or in their club room the following provisions are made.

For profane language first offence a fine of 5¢, second offence double the first fine, and every additional offence shall be furnished with a fine in double the amount of the fine preceding it. If persisted in, the member shall be subject to suspension from the Society.

For the use of tobacco and intoxicating drinks in the club room a fine of \$1 will be

charged and a repetition of the offence will subject the member to expulsion.

For unnecessary noise made in the meeting, for failure to address the President before speaking, for interrupting a speaker who has the floor, for each of these offences a fine of \$1 will be imposed.

Sec II. For absence, unless sick or out of town, a fine of 5¢.

Sec III. Absence from three meetings in succession unless for good excuse satisfactory to the Society, will subject the member to suspension. The suspension or expulsion of a member must be by a four-fifth vote of the members of the Society. A member suspended or expelled can only be reinstated or restored by an unanimous vote of the members and the payment of a fee of 50¢.

Article IV

[Hoch omitted Article IV or mis-numbered it in the handwritten copy of the constitution that he sent to Remsburg.]

Article V

The meetings of this Society shall be held on Monday evening of each week at such a place as may be designated from time to time by the Society at its meetings.

Article VI

This Constitution may be altered or amended at any regular meeting of the Society, and such alterations or amendments must be carried by a four-fifths vote of all the members.

This constitution is revealing. Notably, as articulated in its mission statement, its members were interested in Native Americans, not Mound Builders or mysterious “buried races.” The boys were knowledgeable enough to have abandoned such notions, as had much of the archeological community of the era. That said, beyond Section I of Article I, the document makes no other mention of the subject, instead focusing almost entirely on the society’s code of behavior. For instance, there is nothing regarding standards of collection or recording of finds among other topics. In the absence of meeting minutes or other writings, understand-

ing how the group conceptualized its activities is severely hampered.

The constitution indicated that the membership “shall consist of not less than ten,” but the only additional member seems to have been LeRoy (Roy) Frazer (*Florence Bulletin [FB]* 1904) (Figure 16).

Members of the society dug into the midden mounds that dotted the banks of Mud Creek, Clear Creek, and the Cottonwood River in search of artifacts. In addition to these excursions, the society’s secretary appealed to area farmers for unwanted specimens (*MCR* 1903b).

Aside from the acquisition of artifacts, the principle activity of the society’s members was evidently educational, as they focused on public exhibition of their finds. The first of these was held on February 27, 1904, in a downtown Marion space that the boys rented for the occasion (*MH* 1904a).



Figure 16. LeRoy (Roy) Frazer (1889–1970). Source: Marion County Historical Museum, Marion, Kansas.

Hoch (1904a:2) had informed Remsburg that “we do not mount broken scrapers, war points, etc., so our collection looks very nice on the walls of our club room.” The *Marion County Record* (1904c:8) exclaimed,

The collection includes six or seven hundred specimens of Indian relics, chiefly found around Marion. It is certainly a fine collection and the boys deserve great credit for the industry with which they have made this collection, and the intelligence and taste they have displayed in arranging them for public exhibition.

Admission was 5 cents, with attendance for the first show tallied at nearly 200 visitors. Indeed, the event was so well received that a second showing was held the next weekend (*MCR* 1904a). Unfortunately, aside from their popularity, little else is known about the exhibits, such as how they were organized, their message, etc. The *Marion County Record*, incidentally, was edited by Hoch’s father, Edward W. Hoch, who served as governor of Kansas for two terms (1905-1909) (Capace 2000:104; Connelley 1928:2146).

At least two other exhibitions of the club’s collections were held, both in June 1904 (*MCR* 1904b, 1904c). By that summer the archeological display was not the only one in town. In August 1904 the *Marion Headlight* (1904b:3) noted that the local Agassiz Society had an exhibit in its club room, showcasing “minerals, fossils, Indian relics, ores, insects, reptiles and curiosities.” Like the Archaeological Society, admission was a nickel; unlike it, the Agassiz Society also had a “kissing-bug.” As the name suggests, the Agassiz Association, as it was officially known, derived its name from the late, great Swiss naturalist Louis Agassiz. Founded in 1875, chapters sprang up in considerable numbers across the United States, including many in Kansas, each with its own area of interest. One in Arkansas City, formed in the late 1890s, was dedicated expressly to “natural history and archaeology” (*Arkansas City Daily Traveler* [*ACDT*] 1897:8). The goal of the organization was to instill in adolescents an interest in the natural world, as well as a sense of the Divine to be found in it (Ballard 1919). In light of the age of the Archaeological Society’s members and the appar-

ent presence of an Agassiz Association chapter in town, it is possible, though far from certain, that the Archaeological Society was an offshoot.

Conclusions

Scientific organizations fail for all manner of reasons (Hanlon 1959; Hawkins 1939); the Marion Archaeological Society was no exception. When Remsburg checked in with Hoch in 1912, he was informed that the club had lasted but two years.

Am sorry to say that the members are now widely scattered over the country and consequently the club does not exist. I doubt if any of the other members are interested in this line anymore. I still have my collection almost entirely but being busy with college work for the past four years, I have not had time to take any active interest in collection (Hoch 1912).

The dissolution of the club is not surprising as it was too small. For it to have persisted, it needed at a minimum a regular infusion of new members as older members moved on and pursued college, careers, and families. For that matter, it needed those older members to remain members. Although short lived, historian of science Daniel Goldstein (2008:52) noted,

However long they lasted, however much or little they accomplished, [scientific] societies were all intended to serve as centers for scientific activity within a specific geographical area, an orientation that distinguished them . . . from national societies

Goldstein was, of course, speaking more generally of scientific societies, but the sentiment must surely hold for archeological societies as well. Realistically, the Archaeological Society in Marion was not organized with the lofty goal of being a center for archeological activity per se (as was the contemporaneously formed Wisconsin Archeological Society, for instance), but as a club whose members shared a common interest. However, it had the potential to be something greater than it proved to be.

Inspired by the community’s archeological heritage, the members of the Archaeological Society

took on serious tasks, such as regular meetings, during which they presumably discussed their readings about Native American life, etc., and field excursions, which involved hard work, ultimately without any expectations of recompense. These activities culminated in exhibitions for the lay public, in which they shared the fruits of their labors with their neighbors and peers. On the other hand, the organization's members gave short shrift to long-term considerations, such as the sustainability of the organization itself and the preservation of artifacts and other information collected.

Postscript to Part II

The members of the Archaeological Society dispersed after high school graduation, pursuing varied and sometimes surprising careers that in most instances took them far from Marion. The disposition of their collections is not known.

Leslie C. Bryan (1886–1949) was employed as a phone installer and handyman in Los Angeles.

Chester A. Evans (1887–1957) became a pharmacist in Marion before relocating his business to Wichita, Kansas.

LeRoy (Roy) Frazer (1889–1970) became a teacher and athletic instructor at Emporia State College; he subsequently was employed as a teacher in Long Beach, California, schools.

Wallis Hoch (1889–1958) was educated at Baldwin College and became a newspaperman, eventually serving as the editor of the *Marion County Record*.

Louis F. Keller (1891–1983) was a physical education instructor at Oberlin College in Ohio and later in St. Paul, Minnesota.

Willard D. Keller (1889–1968) moved to Vancouver, Washington, and made a living as a civil engineer.

Harry K. Rogers (1889–1956) took the most unusual career path, becoming a radio personality on “The Skokie Hour” in Skokie, Illinois. Prior to that, he traveled extensively about the country as Sparky, and later, Smoky the Fire Clown, educating children on the dangers of fire.

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Appendix 1. Artifacts Collected by Edwin Curtis near Marion Centre, Kansas, in August 1879.

Catalog Number	Object	Location	Provenience
79-4-10/19517	Clay slate, fragments	Near Marion Center	Shell heap
79-4-10/19518	Large grooved hammerstone	Marion Center	Leachman's Farm
79-4-10/19519	Grooved hammerstone	Marion Center	Leachman's Farm
79-4-10/19520	Sharpening stone	Marion Center	Leachman's Farm
79-4-10/19521	Sharpening stone	Marion Center	Leachman's Farm
79-4-10/19522	Stone knife	Marion Center	Leachman's Farm
79-4-10/19523	Spear point, broken	Marion Center	Leachman's Farm
79-4-10/19524	Spear point	Marion Center	Leachman's Farm
79-4-10/19525	Worked stones	Marion Center	Surface
79-4-10/19526	Grooved hammerstone	Marion Center	Surface
79-4-10/19527	Grooved hammerstone	Marion Center	Surface
79-4-10/19528	Grooved hammerstone	Marion Center	Surface
79-4-10/19529	Grooved hammerstone	Marion Center	Surface
79-4-10/19530	Grooved hammerstone	Marion Center	Surface
79-4-10/19531	Grooved hammerstone	Marion Center	Surface
79-4-10/19532	Grooved hammerstone	Marion Center	Surface
79-4-10/19533	Grinding stone	Marion Center	Surface
79-4-10/19534	Grinding stone	Marion Center	Surface
79-4-10/19535	Grinding stones	Marion Center	Surface
79-4-10/19536	Stone pipe (jasper?)	Marion Center	Surface
79-4-10/19537	Stone pipe, broken	Marion Center	Surface
79-4-10/19538	Worked stones	Marion Center	Surface
79-4-10/19539	Worked stone	Marion Center	Surface
79-4-10/19540	Stone scrapers	Marion Center	Surface
79-4-10/19541	Stone knives	Marion Center	Surface
79-4-10/19542	Stone knives	Marion Center	Surface
79-4-10/19543	Javelin points	Marion Center	Surface
79-4-10/19544	Triangular arrowheads	Marion Center	Surface
79-4-10/19545	Drills & borers, broken	Marion Center	Surface
79-4-10/19546	Scraper?	Marion Center	Surface
79-4-10/19547	Stone implements, broken	Marion Center	Surface
79-4-10/19548	Unio shell ornament, 4 holes	West side of Cottonwood River, 3 miles south of Marion Center	Cairn I, on bluff. Skeleton on solid rock, covered by pile of stones
79-4-10/19549	Cut bone, fragment	West side of Cottonwood River, 3 miles south of Marion Center	Cairn I, on bluff. Skeleton on solid rock, covered by pile of stones
79-4-10/19550	Borers or drills	West side of Cottonwood River, 3 miles south of Marion Center	Cairn I, on bluff. Skeleton on solid rock, covered by pile of stones
79-4-10/19551	Leaf-shaped flint knife	West side of Cottonwood River, 3 miles south of Marion Center	Cairn I, on bluff. Skeleton on solid rock, covered by pile of stones
79-4-10/19552	Flint knife flake, worked	West side of Cottonwood River, 3 miles south of Marion Center	Cairn I, on bluff. Skeleton on solid rock, covered by pile of stones
79-4-10/19553	Flint flakes	West side of Cottonwood River, 3 miles south of Marion Center	Cairn I, on bluff. Skeleton on solid rock, covered by pile of stones
79-4-10/19554	Sharpening stone, broken	West side of Cottonwood River, 3 miles south of Marion Center	Cairn I, on bluff. Skeleton on Cairn III, pile of rocks 6 ft long

continued

Catalog Number	Object	Location	Provenience
79-4-10/19555.1	Arrow straighteners	West side of Cottonwood River, 3 miles south of Marion Center	Cairn III, pile of rocks 6 ft long
79-4-10/19555.2	Arrow straighteners	West side of Cottonwood River, 3 miles south of Marion Center	Cairn III, pile of rocks 6 ft long
79-4-10/19556	Sharpening stone	West side of Cottonwood River, 3 miles south of Marion Center	Cairn III, pile of rocks 6 ft long
79-4-10/19557	Rubbing stone	West side of Cottonwood River, 3 miles south of Marion Center	Cairn III, pile of rocks 6 ft long
79-4-10/19558	Flint implements, 1 broken	West side of Cottonwood River, 3 miles south of Marion Center	Cairn III, pile of rocks 6 ft long
79-4-10/19559	Flake knives	West side of Cottonwood River, 3 miles south of Marion Center	Cairn III, pile of rocks 6 ft long
79-4-10/19560	Small stone implement	West side of Cottonwood River, 3 miles south of Marion Center	Cairn III, pile of rocks 6 ft long
79-4-10/19561	Burnt clay	West side of Cottonwood River, 3 miles south of Marion Center	Cairn III, pile of rocks 6 ft long
79-4-10/19562	Worked bone	West side of Cottonwood River, 3 miles south of Marion Center	Cairn III
79-4-10/19563	Worked bone	West side of Cottonwood River, 3 miles south of Marion Center	Cairn IV
79-4-10/19564	Burnt bones, fragments	West side of Cottonwood River, 3 miles south of Marion Center	Cairn IV
79-4-10/19565	Worked bone	West side of Cottonwood River, 3 miles south of Marion Center	Cairn IV
79-4-10/19566	Flint knife flake	West side of Cottonwood River, 3 miles south of Marion Center	Cairn IV
79-4-10/19567	Flint knife flake	West side of Cottonwood River, 3 miles south of Marion Center	Cairn IV
79-4-10/19568	Flint borer (drill)	West side of Cottonwood River, 3 miles south of Marion Center	Cairn IV
79-4-10/19569	Flint borer (drill)	West side of Cottonwood River, 3 miles south of Marion Center	Cairn IV
79-4-10/19570	Flint borer, broken	West side of Cottonwood River, 3 miles south of Marion Center	Cairn IV
79-4-10/19571	Flint spear point	West side of Cottonwood River, 3 miles south of Marion Center	In grave near Cairn IV
79-4-10/19572	Grooved hammerstone, ends inscribed	West side of Cottonwood River, 3 miles south of Marion Center	In grave near Cairn IV
79-4-10/19573	Small perforated disk	West side of Cottonwood River, 3 miles south of Marion Center	In grave near Cairn IV
79-4-10/19574	Pipe (Catlinite?)	West side of Cottonwood River, 3 miles south of Marion Center	In grave near Cairn IV
79-4-10/19575	Very small pipe (Catlinite?)	West side of Cottonwood River, 3 miles south of Marion Center	In grave near Cairn IV
79-4-10/19576	Perforated worked bone	West side of Cottonwood River, 3 miles south of Marion Center	In grave near Cairn IV
79-4-10/19577	Worked bone (whistle?)	Near Marion Center	In grave near Cairn IV

Appendix 1. continued

Catalog Number	Object	Location	Provenience
79-4-10/19578	Flint spearpoint	Near Marion Center	Grave, 5 ft deep
79-4-10/19579	Side-notched arrowpoint	Near Marion Center	Cairn V
79-4-10/19580.1	Glass beads (Venetian?)	Near Marion Center	South Cairns I & IV
79-4-10/19580.2	Glass beads (Venetian?)	Near Marion Center	South Cairns I & IV
79-4-10/19581	Flint flakes & knives	Near Marion Center	Cairn VI
79-4-10/19582	Flint hoe?, notched	Near Marion Center	Cairn VI
79-4-10/19583	Flint scrapers	Near Marion Center	Cairn VI
79-4-10/19584	Obsidian flake	Near Marion Center	Cairn VI
79-4-10/19585	Iron ore (red chalk)	Near Marion Center	Cairn VI
79-4-10/19586	Bone awl	Near Marion Center	Cairn VI
79-4-10/19587	Burnt worked bones	Near Marion Center	Cairn VI
79-4-10/19588	Unio shells	Near Marion Center	Cairn VI
79-4-10/19589	Pipe (Catlinite?)	West side of Cottonwood River, near Marion Center	Cairn VI
79-4-10/19590	Flint drill	3 miles south of Marion Center	Shell heap, McBower's Farm
79-4-10/19591	Flint drill	Cottonwood River, near Marion Center	Mrs. Gibson's Farm, Earth Mound I
79-4-10/19592	Flint scrapers	Cottonwood River, near Marion Center	Mrs. Gibson's Farm, Earth Mound I
79-4-10/19593	Arrowhead	Cottonwood River, near Marion Center	Mrs. Gibson's Farm, Earth Mound I
79-4-10/19594	Flint knife	Cottonwood River, near Marion Center	Mrs. Gibson's Farm, Earth Mound I
79-4-10/19595	Flint knife & flakes	Cottonwood River, near Marion Center	Mrs. Gibson's Farm, Earth Mound I
79-4-10/19596	Flakes & pebbles	Cottonwood River, near Marion Center	Mrs. Gibson's Farm, Earth Mound I
79-4-10/19597	Iron ore (red chalk)	Cottonwood River, near Marion Center	Mrs. Gibson's Farm, Earth Mound I
79-4-10/19598	Arrow straightener, broken	Cottonwood River, near Marion Center	Mrs. Gibson's Farm, Earth Mound I
79-4-10/19599	Arrow straightener, broken	Cottonwood River, near Marion Center	Mrs. Gibson's Farm, Earth Mound I
79-4-10/19600	Grooved hammerstone	Cottonwood River, near Marion Center	Mrs. Gibson's Farm, Earth Mound I
79-4-10/19601	Worked bone, fragments	Cottonwood River, near Marion Center	Mrs. Gibson's Farm, Earth Mound I
79-4-10/19602	Perforated worked bone	Cottonwood River, near Marion Center	Mrs. Gibson's Farm, Earth Mound I
79-4-10/19603	Bone awl	Cottonwood River, near Marion Center	Mrs. Gibson's Farm, Earth Mound I
79-4-10/19604	Bone tube (whistle?)	Cottonwood River, near Marion Center	Mrs. Gibson's Farm, Earth Mound I
79-4-10/19605	Bone celt	Cottonwood River, near Marion Center	Mrs. Gibson's Farm, Earth Mound I

continued

Catalog Number	Object	Location	Provenience
79-4-10/19606	Bones (elk)	Cottonwood River, near Marion Center	Mrs. Gibson's Farm, Earth Mound I
79-4-10/19607	Implements (deer horn)	Cottonwood River, near Marion Center	Mrs. Gibson's Farm, Earth Mound II
79-4-10/19608	Bones & teeth (elk)	Cottonwood River, near Marion Center	Mrs. Gibson's Farm, Earth Mound II
79-4-10/19609	Burnt bones, fragments	Cottonwood River, near Marion Center	Mrs. Gibson's Farm, Earth Mound II
79-4-10/19610	Bone whistle	Cottonwood River, near Marion Center	Mrs. Gibson's Farm, Earth Mound II
79-4-10/19611	Pottery, fragment	Cottonwood River, near Marion Center	Mrs. Gibson's Farm, Earth Mound II
79-4-10/19612	Flint implement	Cottonwood River, near Marion Center	Mrs. Gibson's Farm, Earth Mound II
79-4-10/19613	Flint implement, broken, & flakes	Cottonwood River, near Marion Center	Mrs. Gibson's Farm, Earth Mound II

Appendix 2. Artifacts Donated by Melvin O. Billings to the Peabody Museum in 1879.

Catalog Number	Object	Location	Provenience	Comment
79-46-10/19516	Ground stone clubhead	Marion Center	Mound, Gibson's Farm	Surface
79-46-10/19515.0	Nearly complete cranial remains of adult female	Near Marion Center	Gibson's Farm	Grave

Appendix 3. Artifacts Donated by Melvin O. Billings, Marion, Kansas, to the Smithsonian Institution in 1880 (Accession number 009243).

Number of parts	8 ca.	Number of parts	8 ca.
Index term	Point	Index term	Scraper
Object name	7 Arrow Heads (Triangular, Small & Thin)	Object name	Scrapers
Culture	Prehistoric	Culture	Prehistoric
Locality	United States, Kansas, Marion County, Marion Centre	Locality	United States, Kansas, Marion County, Marion Centre
Collector		Collector	
Date Collected		Date Collected	
Accession Number/ Date	009243 1880	Accession Number/ Date	009243 1880
Donor	Melvin Billings	Donor	Melvin Billings
Notes		Notes	
Catalog number	A43197-0	Catalog number	A43198-0

continued

Appendix 3. *continued*

Number of parts 1
Index term Knife
Object name Flint Knife (Flake)
Culture Prehistoric
Locality United States, Kansas, Marion County, Marion Centre
Collector
Date Collected
Accession Number/ Date 009243 1880
Donor Melvin Billings
Notes
Catalog number A43199-0

Number of parts 1
Index term Drill
Object name Stone Drill
Culture Prehistoric
Locality United States, Kansas, Marion County, Marion Centre
Collector
Date Collected
Accession Number/ Date 009243 1880
Donor Melvin Billings
Notes
Catalog number A43200-0

Number of parts 1
Index term Awl
Object name 2 Stone Awls or Perforators
Culture Prehistoric
Locality United States, Kansas, Marion County, Marion Centre
Collector
Date Collected
Accession Number/ Date 009243 1880
Donor Melvin Billings
Notes
Catalog number A43201-0

Number of parts 8 ca.
Index term Pottery
Object name 5 Fragments of Pottery
Culture Prehistoric
Locality United States, Kansas, Marion County, Marion Centre
Collector
Date Collected
Accession Number/ Date 009243 1880
Donor Melvin Billings
Notes
Catalog number A43202-0

Number of parts 2
Index term Sherd
Object name 2 Earthenware Pot Handles
Culture Prehistoric
Locality United States, Kansas, Marion County, Marion Centre
Collector
Date Collected
Accession Number/ Date 009243 1880
Donor Melvin Billings
Notes
Catalog number A43203-0

Number of parts 1
Index term Pipe
Object name Small Stone Pipe (Catlinite)
Culture Prehistoric
Locality United States, Kansas, Marion County, Marion Centre
Collector
Date Collected
Accession Number/ Date 009243 1880
Donor Melvin Billings
Notes

JACOB V. BROWER AND THE SEARCH FOR QUIVIRA: A CHAPTER IN THE EARLY HISTORY OF KANSAS ARCHEOLOGY

DONNA C. ROPER
Deceased

PREFACE

LAUREN W. RITTERBUSH
Kansas State University

Donna C. Roper, deceased in 2015, presented this paper in 1992 at the 50th Annual Plains Conference (Annual Meeting of the Plains Anthropological Society) in Lincoln, Nebraska. According to her notes, which are archived with her research papers at the Richard L. D. and Marjorie J. Morse Department of Special Collections at Kansas State University, she intended to prepare two papers about Jacob V. Brower's work in Kansas. The first, which she envisioned titling "Brower, Quivira, and Harahey: A Chapter in the Early History of Kansas Archaeology," was to be submitted for publication in *The Kansas Anthropologist*. The second planned manuscript was to be titled "Jacob V. Brower and the Search for Quivira" and meant to focus on "the whole matter of the search for Quivira" (Roper circa 1992). The text reproduced here appears to combine parts of both intended manuscripts.

In addition to Donna's 1992 Plains Conference contribution presented here, she delivered another about Brower at the 1993 Flint Hills Archaeological Conference at Wichita State University. She entitled that "An Early Flint Hills Archaeologist: Jacob V. Brower and His Manhattan Area Explorations in Search of Quivira." Unfortunately, no copy of this talk remains among her archived papers. In later years Donna also spoke about Brower's legacy in Kansas at several public venues, such as her presentation "What's That Obelisk in City Park? Jacob Brower's Archaeological Explorations in the Manhattan Area," sponsored by the Riley County Historical Society as part of Kansas Archaeology Month in April 2003.

The text published here is a useful supplement to Michael R. Penrod's contribution to *The Kansas Anthropologist* in 2022 regarding the Jacob V. Brower artifact collection. Lauren W. Ritterbush of Kansas State University made minor additions, based on additional research, and edited certain aspects of Donna's written presentation for clarity and a somewhat more formal presentation. Organization has been highlighted with subheadings, source citations and references have been identified and inserted, wording adjustments made to make clear certain points, and translations updated. Donna did not record which images she used to illustrate her presentation, but many can be surmised based on her text. These have been identified, researched, and inserted. With this publication, a small part of Donna's wide-ranging research is made available and her contribution to the archeology and history of Kansas continued.

The Donna C. Roper papers are archived with the Richard L. D. and Marjorie J. Morse Department of Special Collections, Hale Library, Kansas State University, Manhattan, Kansas; <https://findingaids.lib.k-state.edu/donna-c-roper-papers>.

As we celebrate the 50th Plains Conference (1992) and review the work of those who have studied Plains anthropology in the years since 1931, it is appropriate that we also acknowledge the work of those who made contributions in earlier decades. A research topic in anthropology and history in the late nineteenth and early twentieth centuries was determination of the route followed by Coronado and the location of Quivira. Much of the work was done from the armchair. Among the first to actually search for the archeological remains of Quivira was Jacob V. Brower, who worked in the greater Manhattan locality of Kansas in the 1890s. His identification of Quivira was erroneous and might be overlooked were it not for the extensive written documentation he produced and the stone monuments he erected. Although Brower's Quivira identification did not serve as a foundation for later investigations of the problem, his more enduring legacy is the record of a hundred or so prehistoric sites. The utility of this record for clues to locations of important sites has been acknowledged by later workers in the locality.

On October 20, 1541, Don Francisco Vasquez de Coronado wrote to his king of his journey across a portion of the Southern Plains, recounting that

It pleased Our Lord that at the end of having traveled seventy-seven days through those empty lands, I reached the *provincia* they call Quivira, to which the guides were leading me. (Flint and Flint 2012:38)

We all know, of course, that Coronado could have been the first European to proclaim the famous slogan of the overland migration, “In God we trusted, in Kansas we busted.” Failing to find gold or any of the other treasures promised by his duplicitous guide, “The Turk,” Coronado retreated to his southwestern headquarters at Tiguex and, following serious injury caused by a fall from a horse, abandoned his expedition and returned to Mexico City. His Franciscan priest, Father Juan de Padilla, undertook a literally short-lived mission to Quivira in 1542 (KSHS 2013). Otherwise, the Spanish paid little further attention to the province until the very end of the century.

Quivira was inscribed on European maps as early as 1556 (Gastaldi circa 1556), but given that the extent and shape of North America was so little known to Europeans then and in subsequent centuries, the location of Quivira was quite impossible to determine. The quest for Quivira may have inspired a couple of other Spanish expeditions to the Plains—Juan de Oñate's for certain in 1601 and maybe that of Antonio Gutiérrez de Humaña and Francisco Leyva de Bonilla in 1594 or 1595. Quivira was placed in a variety of locations in North

America on maps made as late as 1688. However, as the Spanish faded from the scene in the seventeenth century, so did Quivira. Long before the nineteenth century, therefore, the location of Quivira, always a nebulous matter, was quite lost.

Americans revived interest in locating Quivira in the mid-nineteenth century. Serious archeological investigations also began around this time, so it should not be surprising that the search for Quivira took an archeological turn in the 1890s. The first purposeful search for the archeological remains of Quivira was undertaken that decade by Jacob V. Brower and his allies. To anticipate a conclusion, Brower did not correctly identify the archeological remains of Coronado's Quivira. However, he did leave a multifaceted legacy, and, as a journalist might say, there is a story there. As we celebrate the 50th Plains Conference and the work of scholars in the years since the 1931 Vermillion, South Dakota, meeting of Plains archeologists that started this long-standing gathering, it is appropriate that we also reflect on the work of investigators in earlier decades. Thus, I tell Brower's story as a chapter in the early history of Kansas archeology.

EARLY IDENTIFICATIONS OF CORONADO'S QUIVIRA

To place Brower's investigations in context, we first need to appreciate the status of Quivira studies prior to the 1890s. The mid-nineteenth century acquisition of parts of the American Southwest by the United States was immediately followed by explorations in that region. The historical associations of places within it were not overlooked. Which pueblo was to

be identified with which place name, given by the chroniclers of the Coronado expedition, was a matter of some discussion, but the general region traversed by Coronado while he was among the pueblos was not contested. Not so with Quivira, his planned destination. Descriptions of his travels in the journals made it abundantly clear that the army entered the Plains. However, the earliest conclusions about the location of Quivira placed it at the Gran Quivira of New Mexico, about 90 miles due south of Santa Fe and Pecos Pueblo. Such a conclusion, of course, required some double-talk and explaining away of certain passages in the historical documents. Albert Gallatin exemplified the double-talk when, writing in 1848, he accepted the statement that Coronado went as far north as 40°N latitude (today's boundary between Kansas and Nebraska). Despite this, he suggested that Gran Quivira (latitude about 34°N) "was the true Quivira of the Indians" and through either treachery or misunderstanding "the Spaniards gave the name Quivira to an imaginary country, situated far north, and represented as abounding with gold" (Gallatin 1848:xcv). Cartographer Richard H. Kern also explained away or dismissed evidence in his 1853 map published in Henry Rowe Schoolcraft's (1857) history. Instead of showing the full route of Coronado's expedition, Kern (1857) depicted Coronado's army as simply turning back to Gran Quivira from a farthest point in Texas.

James H. Simpson's study of Coronado's route published in 1871 marked a breakthrough in placing Quivira at the end of Coronado's march to the north. Pointing out that there was "no such place" as Quivira on old maps where new maps show it—I presume by this he means the Gran Quivira—he suggested that particular Quivira did not exist at the time of Coronado. He further expressed his opinion that Coronado really did go north, just as chronicles said he did, and that they really did reach a province the Indians called Quivira. Accepting at face value the statement that they were at 40° N latitude, he placed Quivira in the Nebraska-Kansas border region "on toward the Missouri" (Simpson 1871).

This argument by Simpson was a breakthrough, not only because it divorced the province called Quivira from the Gran Quivira of New Mexico, but also because all subsequent scholars working on the problem accepted it. The Gran Quivira identi-

fication was further laid to rest after Adolph F. A. Bandelier's (1890) 1883 exploration of that New Mexico site. Modern research (e.g., Vivian 1964) has shown that Simpson was quite right: Gran Quivira did not exist at the time of Coronado.

If it were accepted that the Quivira, as conceived by the Native population and visited by Coronado, was on the Plains north of where Coronado divided the army during his travels, exactly where it was remained a matter of debate—as, for that matter, did the location of the place where Coronado divided the army. And this is part of the problem. Focusing on Quivira, we might sample a few of the conclusions about where it was.

In 1883 Cyrus Thomas believed that the Quivira as recounted by the Turk was in eastern Arkansas, while that place where Ysopete, a captive of the Pecos Indians reportedly from Quivira who also accompanied Coronado's expedition, was from differed from the Turks' Quivira. Thomas thought Ysopete took Coronado to his home, but the Turk disputed that this was Quivira. Therefore, Thomas (1883:492, 495) concluded that Coronado never reached the Quivira to which the Turk referred and instead traveled to the area of the Verdigris or Neosho River region with the actual place of Quivira in southwestern Missouri.

Around the same time, James W. Savage (1880/1885/1893) linked "the discovery of Nebraska" with Quivira. In presenting a historical overview of Nebraska, he placed Coronado's Quivira along the southern boundary of that state, somewhere between Gage and Furnas counties, and suggested that the Spanish expedition penetrated as far as the Republican or even the Platte River.

By 1889 Bandelier (1889) had come to yet a different conclusion, proposing that the place Coronado called Quivira was in northeastern Kansas about 200 miles northeast of Great Bend, although he made passing reference to the army making an entrance into Nebraska.

George P. Winship, the translator and editor of the 1896 edition of the Coronado narratives, believed that Simpson was essentially correct. He suggested, however, that Coronado did not go as far as Simpson suggested and doubted that "Coronado went much beyond the south branch of the Kansas river [the Smoky Hill River], if he even reached that stream" (Winship 1896:399).

There were other studies but all, like the ones I have cited, were armchair exercises. Perhaps some, as with Simpson, were grounded in some personal knowledge of the region and, as in the case of Winship, on an intimate familiarity with the documents. However, all based their conclusions on interpretations of documents. At this point Brower entered the scene.

JACOB BROWER'S INVESTIGATIONS OF QUIVIRA

Jacob Vradenberg Brower was 51 years old when he began his work on the Quivira problem (Figure 1). He was a Minnesotan and a member of the bar who had held a variety of positions, including state legislator and register of the U.S. Land Office at St. Cloud. His 1888-1889 explorations in the Lake Itasca area established the source of the Mississippi River, leading to the creation of Itasca State Park, of which Brower was the first commissioner. His interest in archeology dated to around 1860, and over the years he conducted personal research in an area extending from Wisconsin to the Rocky Mountains and south to Missouri (Chaney 1906). Very little

of this had been published when the antiquities of the Manhattan area of Kansas were brought to his attention in 1895. It was then that L. R. Elliott of Manhattan (Figure 2) sent Brower some locally collected artifacts for examination (Brower 1898:xii).

It is difficult to determine if Brower was aware of the Quivira problem before Elliott sent him the Kansas material or if he became interested in it because of Elliott's submittal. In saying this, I do not fully exclude the possibility that Brower solicited the material from Elliott. I am considerably more inclined to the latter interpretation, not in the least because it was in 1896, while Brower was studying Elliott's material, that Winship published his translation of the Coronado narratives. In any event, in a Prefatory Comment in the first of three volumes that he eventually published on his Kansas investigations (Brower 1898, 1899, 1903), Brower noted that the work of Simpson, Bandelier, and Winship was so valuable and complete that only identification of the Quivira village sites remained uncertain. Indeed, no one had yet even attempted to locate these sites. (Bandelier's inspection of the Gran Quivira of New Mexico was not intended to find the remains of Coronado's Quivira so much as

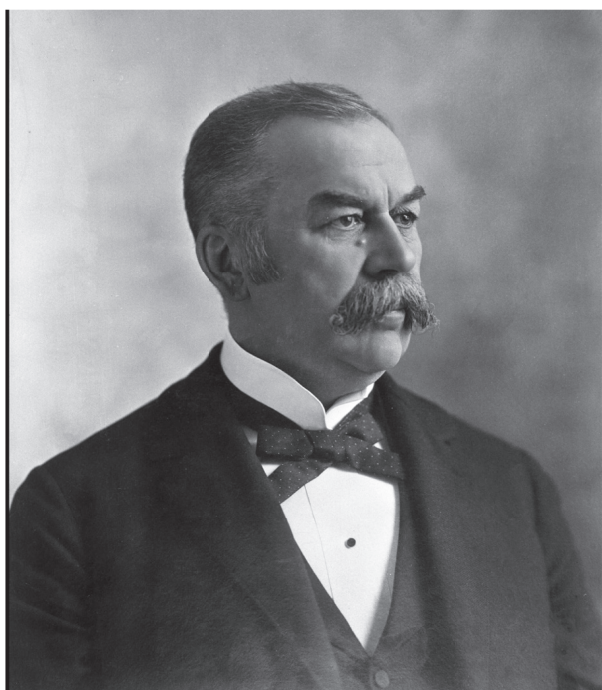


Figure 1. Jacob V. Brower, March 6, 1897. Courtesy of the Minnesota Historical Society.

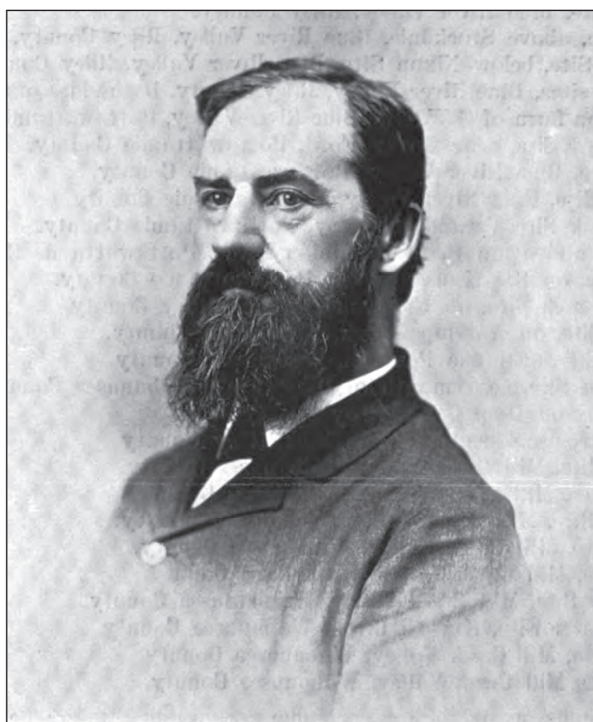


Figure 2. L. R. Elliott (Brower 1899:8 Plate II).

to determine that the Gran Quivira did not represent that.) We must, therefore, give Brower due credit for quickly recognizing this fact and acting on it.

Brower first visited the Manhattan area in late 1896. On November 20 of that year, Elliott showed him a site in the McDowell Creek valley, then designated and still known as the Elliott site (14GE303 and associated sites). As we shall see, Brower subsequently regarded that event as the moment of discovery of Coronado's Quivira. Elliott, William J. Griffing of Manhattan, John T. Keagy of Alma, and other amateur archeologists of the greater Manhattan area (roughly from Alma to Junction City) showed Brower many additional sites between November 1896 and November 1898. In the first months of the latter year, Brower brought out the first of three monographs on his Kansas work. These three monographs in turn comprise three of the eight volumes in his series, *Memoirs of Explorations in the Basin of the Mississippi* (Brower 1898, 1899, 1903).

His first volume, entitled *Quivira*, was a somewhat remarkable piece of work for its time in that it was a systematic presentation of his investigations of the archeology of the Kansas River drainage. Following his Prefatory Comments and a Historical Introduction sketching the Coronado expedition, in the first chapter Brower described the biophysical setting of the greater Manhattan area. He continued in most of the subsequent chapters to describe sites that he explored in 1896 and 1897. In some respects the most remarkable thing about the work, however, is the manner in which Brower at the end of the first chapter set the stage for the site descriptions. Following a "very careful study and consideration" of the data, he concluded that there were at least three and possibly four "quite distinct classes of village sites to be considered." I use his words below to present these classes and describe them in the same order in which he presented them.

The first site class is

Village sites of a more or less sedentary people who were quite permanently located on both sides of the Kansas River. They made and used earthen vessels (Figure 3) and the most exquisitely chipped specimens of flint implements, constructed mounds of stone and earth, and in some cases calcined remains of the dead (Brower 1898:11).

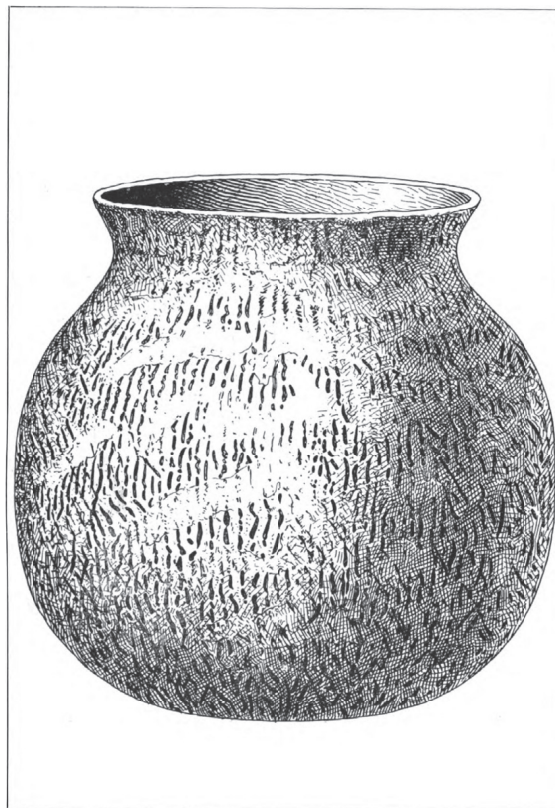


Figure 3. Brower's illustration of a ceramic vessel from the Griffing site, as envisioned from potsherds representing approximately one-third of the original vessel (Brower 1898:30 Plate VII).

Brower listed the Griffing site (now identified as 14RY21) as an example of this class. From what we know of this site today and from the other descriptions and illustrations in the *Quivira* volume, this first set of sites represents for the most part what we refer to today as Smoky Hill sites of the Central Plains tradition.

Brower's second site class is

Village sites of a wild and barbarous people who made very few, if any, earthen vessels, and whose chipped flint implements are rudely and roughly made, and who infested the plains as hunters and warriors (Brower 1898:11).

He chose the Elliott site to exemplify this class. Today this site is recognized as a series of components representing different periods of occupation (McDonald 1967; O'Brien et al. 1973; Roper 2000; Sorrell 1974), but Brower's illustrations of

specimens from sites assigned to this class clearly show that Brower essentially considered these to be sites we would now attribute to the Archaic period, particularly to the Munkers Creek phase (Figure 4) (Witty 1962).

The third site class was comprised of

Village sites which yield evidence that they were occupied alternately by people who widely differed in their customs and habits, the chipped implements of the first class and of the second class being promiscuously intermixed over an identical field of observation (Brower 1898:11).

The modern identification of this class is a little less clear than the others; Brower may have been referring to certain multicomponent sites. Examples and illustrations suggest that some Woodland (Early Ceramic) period materials were among the artifacts used to define this class.

Brower did not define in words what appears to be a possible fourth site class. However, his discussion of the Udden site (14MP1) on Paint Creek near Lindsborg, then being analyzed by J. A. Udden, suggests that he identified this with a different class (Brower 1898:55-56; Udden 1900; Wedel 1990). That site is now attributable to the Great Bend aspect.

We see, then, that by early 1898, Brower had recognized and correctly classified a large part of the cultural sequence of central Kansas. He did not interpret it as a sequence, however, and instead believed the remains to represent different but largely contemporaneous tribes. Brower believed the second class of sites, exemplified by Elliott and others, represented the villages of Coronado's Quivira.

Giant acts of faith are required to accept this identification. Very early on in Brower's description of the Elliott site, he noted that

After a careful study of the chipped implements which Mr. Elliott sent to St. Paul from this village site, I was firmly of the opinion that they were made by Indians at about the period of time when the Spanish discoveries in the western hemisphere were accomplished (Brower 1898:14).

This opinion is, of course, the crux of the whole story, and I am quite at a loss to know how he

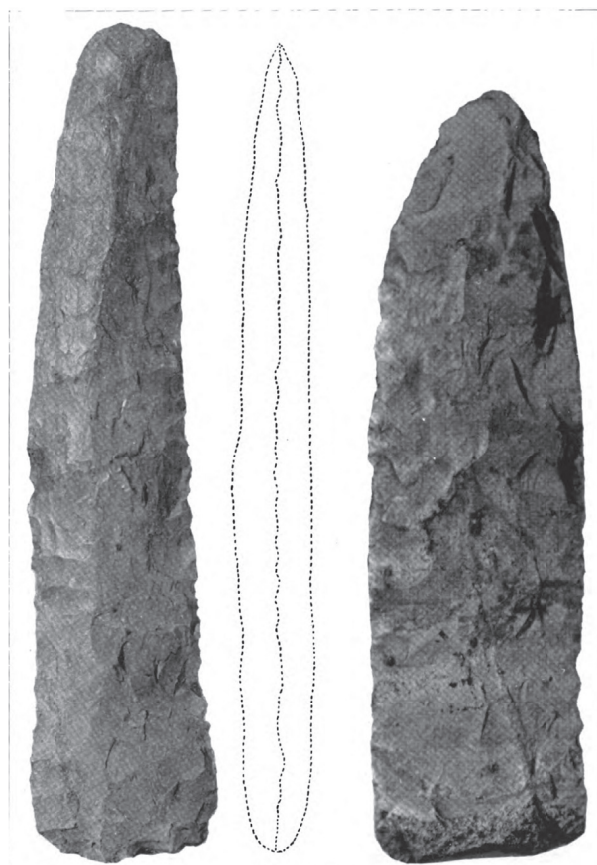


Figure 4. Chipped stone knives, called "Quivira knives" by Brower (1899:17 Plate V), identified by archeologists today as Munkers Creek knives.

formed it, which is also to say that Brower never really tells us what led him to this speculation. I am, however, going to construct a scenario that I suspect approximates his thinking.

The Elliott and other sites that Brower attributed to the Quivira occupation were largely those now attributed to the Munkers Creek phase of the Archaic period and known today to pre-date Quivira by about 5,000 years. What appears to have stood out to Brower as the diagnostic artifact of this site class was the ax form he called the Quivira tomahawk. This interpretation is based on the fact that this artifact was repeatedly illustrated in Brower's volumes on the Kansas investigations (Figures 5–7). This chipped stone artifact is large, thick, and coarsely flaked, commonly with broad, shallow notches on opposite lateral edges or a generally square stem. Overall, they are the most roughly shaped stone tool type that Brower recognized, and, you will recall, Brower used these words to describe the objects as

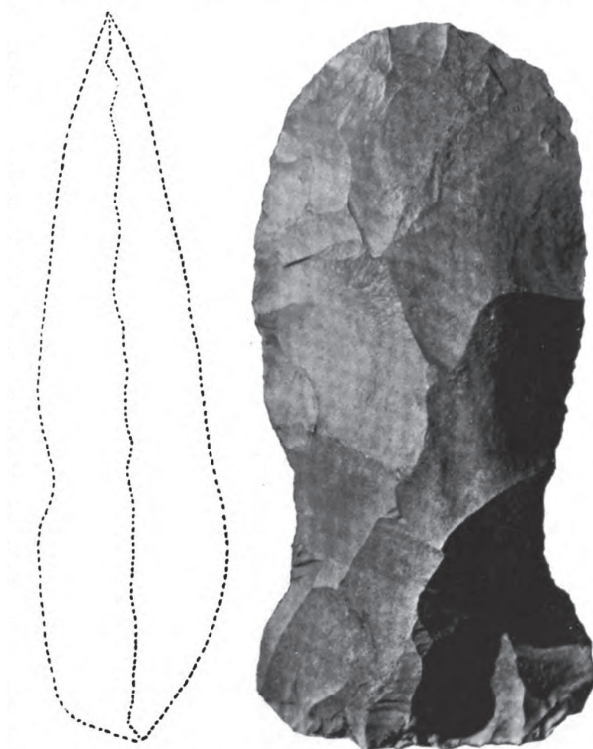


Figure 5. Chipped stone axe, called “Quivira tomahawk” by Brower, from the Elliott site (Brower 1899:79).



Figure 7. Chipped stone axe (“Quivira tomahawk”) from Mill Creek valley (Brower 1899:97). Comparable artifacts from Elliott and other sites can be viewed on Kansas Memory, <https://www.kansasmemory.org/>, search “Munkers Creek Axe.”



Figure 6. Chipped stone axes (“Quivira tomahawks”) from the Elliott site (Brower 1898:54 Plate XV).

being made by the “wild and barbarous people,” whom he imagined inhabited sites of his second type.

Now it also is the case that the Spanish accounts depicted the Indigenous peoples of Quivira in a manner that could be construed in the late nineteenth century as “wild and barbarous.” The expedition report, *Relación del suceso de la jornada que Francisco Vázquez hizo en el descubrimiento de Cibola*, for example, in Winship’s translation plainly said that

All that there is at Quivira is a very brutish people, without any decency whatever in their houses nor in anything (Winship 1896:577).

Alternatively, in the more recent translation of the “Report of the outcome of the expedition which Francisco Vázquez made in reconnaissance of Cibola” by Richard Flint and Shirley Cushing Flint (2012:122),

What there is in Quivira is a very brutish people without the least [indication of] civilization, in their houses or anything else.

To the Spanish, I suppose, if you have seen the Aztec capital of Tenochtitlan, from which the expedition proceeded less than two decades after its conquest, Quivira with its grass-covered houses probably did look a little—well—rural. The sort of words used by the Spanish in the sixteenth century reflect not only the biased perspective of the gold-seeking Spanish, but also the perspective of the late nineteenth century when Winship made his translation and Brower conducted his Kansas research. Popular and scholarly thinking at that time was heavily influenced by social evolutionary ideas that included classifying societies into “ethnical periods,” as defined by Lewis Henry Morgan and others. These ideas have since been found to be highly ethnocentric.

I suspect that Brower’s perception of the implications for the archeological record of such words as “a very brutish people” were matched by the Munkers Creek phase artifacts, which were among the most readily recognized central Kansas archeological materials despite their simple form. Brower may have “known” that he had found Quivira when he saw the Elliott site on November 20, 1896, or he may have in retrospect recognized this as the moment of discovery after becoming more firmly convinced of the correctness of his identification. In either event in his mind, his continued investigations “perfected” (to use his oft-repeated word) this identification.

As Brower pursued his identification of Coronado’s Quivira, controversy arose. Brower had become a corresponding member of the Kansas State Historical Society (KSHS), and his *Quivira* volume was addressed to that organization. He intended to present it at the society’s January 1898 meeting, but it was not quite finished by that time. There was some discussion of Brower continuing his work on the Quivira sites under society auspices, with the results of those investigations being published by the agency. He was already contemplating a second volume. As a result, the Board of Directors passed a resolution at its first annual meeting on January 18, 1898, appointing a committee to look into the matter (KSHS 1900a:16). Eugene Ware, the KSHS

Vice President chaired the committee. Brower was not at the January meeting but was in Topeka a couple of months later and met with the committee on March 1. Elliott was a member of the committee and, as its secretary, made a record of the meeting. I doubt that the record is very complete, but I quote much of it, as appended to Brower’s final publication (1903) regarding his investigations in Kansas.

Mr. Ware said he had made a study of the Coronado discoveries and had consulted with Mr. F. W. Hodge of the Bureau of Ethnology concerning the location of Quivira and as he understood the question, it was proper that the committee hear any statement which Mr. Brower had to make relating to the subject about which the committee had authority to act. Mr. Brower here made a full verbal statement of his explorations in Kansas which he had communicated to the Historical Society as a corresponding member, and explained in what particulars the work was unfinished and the necessity of completing the work which was the highest privilege of the Historical Society in preserving the history of Kansas.

Dr. Thompson moved that the thanks of the committee on behalf of the State Historical Society be tendered to Mr. Brower for the work already done and for his interest expressed in the results yet to be achieved by further investigations. Carried. Chairman Ware mentioned two large globes in the Grand Palace of the doges, very ancient and covered with parchment that was largely obliterated by age. On it he saw Kansas mentioned as Quivira.

The following questions were then asked and answered:

By Chairman Ware – Do you claim that Quivira was a local settlement in Kansas Valley?

By Mr. Brower – Yes, sir. Coronado’s Quivira was a local province discovered by the Spaniards in 1541, after a march of about eighty days across the Plains northeastwardly from the Rio Grande.

By Chairman Ware – The whole Plains were known as Quivira! How do you account for the black soil mentioned by the Spaniards when there is no such soil in Kansas?

By Mr. Brower – I found black soil in Kansas, just as the Spaniards described it, along the valleys of the creeks in Geary County, in [the] Kansas Valley and elsewhere, rich and productive.

By Chairman Ware – Well there are no such

fruits and nuts in Kansas as were found by Coronado! How do you account for that?

By Mr. Brower – I found wild grapes, plums, walnuts and acorns in abundance in [the] Kansas Valley, especially in Geary County.

By Chairman Ware – Where can you find in Kansas any such two large rivers as the St. Peter and the St. Paul?

By Mr. Brower – The River Saints Peter and Paul was a stream, discovered on the day of Saints Peter and Paul, in June, 1541, and named by Coronado in honor of the day upon which it was discovered. The Arkansas River in your state was the river so discovered and named.

The questions and answers created considerable feeling, and after some informal talk the committee took a recess until 4 o'clock p.m. When the committee retired Mr. Brower said to me that he did not come to Kansas expecting to encounter ignorance and prejudice (Brower 1903:78-79).

Later that day the committee decided that the society could not take up the work. The proceedings of the Board of Directors meeting the next year stated that the committee believed that Brower's investigations and publication would require an outlay that the society could not afford (KSHS 1900b:22). Brower (1903:75) referred to opposition to his work developing on March 1, 1898 (i.e., at the committee meeting in Topeka) and having been carried "to unnecessary extremes" over the next few years.

Despite the opposition of individuals with the KSHS, Brower continued his investigations at his own expense during 1898. By early 1899 he had his second volume ready. This publication, funded again by Brower (1899), was entitled *Harahey*. In my estimation it had two purposes. One was additional reporting of Brower's work in Kansas. He was already contemplating such a volume before he was turned down by the KSHS, and in any event his initial work continued beyond, shall I say, the cut-off date for inclusion in the first volume. A second purpose was to further drive home his identification of the location of Coronado's Quivira.

Brower did not organize the *Harahey* volume as systematically as he had *Quivira*, although it does contain some valuable work. He started with a discourse on Kansas chert, most specifically Flint Hills

chert, which Brower had become convinced was the attraction for settlement in the area.

I am fully convinced, after protracted deliberations and study, following a critical exploration of the region, that a fairly pure chert in great abundance, adjacent to rich and fruitful valleys fringed with timber in the immediate confines of a great buffalo plain, became, in prehistoric times, an alluring and superb natural prospect which attracted the early attention of uncivilized and barbarous man (Brower 1899:27).

One of the most extensively cited parts of Brower's entire published output on Quivira followed. This is a contributed paper entitled "Coronado's March to Quivira" by Frederick Webb Hodge, then with the Bureau of American Ethnology. He presented a careful consideration of the route of the expedition from its beginning in Mexico City to its farthest point in Quivira. He identified the pueblos visited along the way, presented patient and scholarly refutations of other suggested interpretations, including the highly inaccurate speculation of the route published by Dellenbaugh (1897) and compiled evidence for the interpretation of the Quivira people as the Wichita Indians. This is something we so take for granted today that it is only when we look at the work done up to that time that we realize that it was in this paper that this argument was published for the first time. As a footnote, however, Hodge, a Southwestern specialist, appears to have been in debt to James Mooney for assistance, and indeed Mooney presented a paper on "Quivira and the Wichitas" later the same year in *Harper's New Monthly Magazine*. In it Mooney took responsibility for equating Quivira with the Wichita (Mooney 1899).

The remainder of the *Harahey* publication described various other material that Brower believed relevant to his case for Quivira in the Kansas River drainage. He also addressed the location of Harahey, the province Coronado was told lay beyond Quivira. Brower identified the first class of his sites, those now identified as Central Plains tradition, as the remains of Harahey. His reasons for this are no clearer than his rationale for the Quivira interpretation. However, many of the Central Plains tradition sites that Brower inspected are north of the

Kansas River and thus “beyond” Brower’s Quivira to anyone coming from the south, and they do form the most coherent of the site classes in this region. Brower probably identified his first class of sites as representative of Harahey by default. Besides which, if the Spanish never visited Harahey, they could make it out to be whatever they wanted it to be, and Brower, perhaps too literally reading their translated words, could easily transform it into a less “brutish” people, who made what he likely perceived as more refined implements, including pottery (Figure 8). Whatever the rationale, Brower seems to have taken the identification of Harahey as an adjunct to the completion of the Quivira story.

Brower ended his fieldwork in Kansas in late 1898, a few months before the publication of *Harahey*. His interest in the region and the Quivira question did not end with publication of that work, however. Brower himself long since regarded his identification as accomplished, but controversy remained. Much of this controversy resulted from the study of Coronado’s route by another local Kansan, William E. Richey of Harveyville in Wabaunsee County. His publication of “The Real Quivira” in the *Collections of the Kansas State Historical Society* in 1900 certainly stirred the pot (Judge 1982). Brower seemingly referred to the work of Richey (1900) and those who supported

him as “studied and laborious attempts on the part of designing persons to detract from the [Brower’s] final conclusions” (Brower 1903:xiii). Richey was originally a supporter of Brower’s research but ultimately (at the urging of others) took issue with some of his conclusions and recognized that some of the archeological materials that Brower claimed to be diagnostic of Quivira sites were far too widespread throughout Kansas to be definitive (Brower 1903:80-82; Judge 1982; Porter 2016:12-13). This issue is reviewed in some detail in Sara Judge’s (1982) discussion of “Brower, Richey, and the Quivira Controversy” in the *Journal of the Kansas Anthropological Association*. Apparently Brower was unable to handle scholarly dialogue with work that overlapped his own.

BROWER’S MONUMENTAL LEGACY

What followed is the most amusing and certainly the most enduring part of the story. Feeling spurned by the Kansas State Historical Society, but retaining a small band of loyal followers from Kansas and Nebraska, Brower played a role in the founding of the Quivira Historical Society on October 29, 1901, in Alma, Kansas. Brower was its first president and wrote the society’s constitution. The ninth article of that document states, “The supreme object of this society shall be studies and discoveries in the field of geologic, ethnologic, historic and geographic researches, and the determination of correct nomenclature . . .” The next article provided for “The erection of monuments to commemorate discoveries and to perpetuate actual historic facts and dates,” noting that this task “shall be one of the highest privileges of the society” (Brower 1903:29). To put it mildly, members of the Quivira Historical Society liberally exercised that “highest privilege,” thereby creating the most visible and enduring part of the legacy of Brower’s Kansas investigations.

The first Quivira Historical Society monument was unveiled less than a year later with solemn ceremony on August 12, 1902 (Brower 1903; Martin 1910; Smith 1940:177; Wedel 1990:142). The society originally placed it in Logan Grove, a walnut grove south of present-day Junction City on the south side of the Smoky Hill River (Figure 9). Robert Henderson, a captain in the Kansas Volunteer Cavalry under General John A. Logan during the



Figure 8. Brower’s sketch of a ceramic vessel, based on sherds found at Logan Grove (“Henderson village site”) (Brower 1899:98 Plate XIX, 1903:54 Plate II).



Figure 9. Granite obelisk, erected in August 1902 in Logan Grove, Kansas, by the Quivira Historical Society in commemoration of Jacob V. Brower's claimed identification of archeological evidence of the location of Coronado's Quivira (Brower 1903:10 Plate I).

Civil War, owned this property and made it available to the public as a community park. He also found pre-contact artifacts here, which no doubt linked him to Brower and his studies of Quivira. This land was sold in the 1930s and passed to the American Legion, which moved the monument to Junction City and a city park named Coronado Park in 1974 (Figure 10) (Geary County Historical Society 2014, 2015, 2018; Waymarking 2017). The inscription on the granite obelisk states:

Quivira and Harahey
Discovered by Coronado 1541
Jaramillo, Padilla, Tatarrax
Rediscovered by J. V. Brower 1896
Erected for Quivira Historical Society
by Robert Henderson 1902
John T. Keagy, Chairman,
Edward Kilian, Secretary
Kansas, U. S. A.

Brower later said omission of the name of Ysopete, who also traveled with Coronado, was an oversight.



Figure 10. First monument erected by the Quivira Historical Society in Logan Grove and later moved to Coronado Park in Junction City, Geary County, Kansas. Photograph by Lauren W. Ritterbush, 2022.

The ceremony dedicating this monument was quite an event (Figure 11). Brower devoted almost entirely his third volume, entitled *Kansas* (1903), to reprinting the proceedings. The Congratulatory Address from the Quivira Historical Society to Captain Robert Henderson, who donated the monument in memory of his son, exemplifies its tenor.

The Quivira Historical Society hereby duly accepts the polished granite obelisk appropriately lettered and inscribed, this day offered by you and unveiled with ceremonious solemnity at Logan Grove, Kansas, commemorative of the discovery of Quivira and Harahey by Francisco Vazquez Coronado in 1541, and a rediscovery of the area of those provinces by J. V. Brower in 1896, for which the Society tenders its profound gratitude: adopts it as symbolical of the sacred purity of established history, and directs its preservation as a perpetual landmark that Quivira was discovered, lost in oblivion for 355 years, and duly rediscovered, thereby solving one of the greatest enigmas in



Figure 11. “Scene at unveiling ceremonies [at Logan Grove] (August 12, 1902.) From the left towards the right those shown in the engraving are John T. Keagy, Edward A. Kilian, J. V. Brower, Robert Henderson, Warren Upham, Helen Ritter [Robert Henderson’s granddaughter], John K. Wright, Rev. A. H. Harshaw, James Humphrey, N. H. Winchell, D. R. Anthony and E. E. Blackman” (Brower 1903:xvi Plate VI).

American history, now distinguished by formal commemoration (Brower 1903:38-39).

Somehow, I think Brower worded that (a single long sentence!). There followed a very long-winded and self-serving address by Brower concluding that after all his researches,

there is now no reason why I should not claim, and stand prepared to defend the honor of having accomplished for the benefit of mankind, an actual and subsisting rediscovery of the sites of ancient Quivira and Harahey. . . (Brower 1903:74).

The proceedings also included the reading of a poem called “Quivira, 1541–1902” by E. E. Blackman

of the Nebraska State Historical Society and an address by the geologist N. H. Winchell (Brower 1903:87-90). The latter was basically a detailed mineralogical description of the granite comprising the obelisk! What a day!

Not content with the monument at Logan Grove, the Quivira Historical Society erected three additional monuments on consecutive days in October 1904. One of these is in the Manhattan City Park at or at least near its original location (*MR* 1904a; Fischer 2015) (Figure 12). Manhattan is on the north side of the Kansas River within the area that Brower decided was Harahey, which explains why this monument was dedicated to “Harahey” and “Chief Tatarrax” (*MR* 1904b).



Figure 12. Quivira Historical Society monument to Harahey and Brower's research, erected in City Park of Manhattan, Riley County, Kansas. Photograph by Lauren W. Ritterbush, 2022.

Harahey
Governed by Chief Tatarax
Discovered by Coronado 1541
Rediscovered by J. V. Brower 1896
Erected by W. J. Griffing and F. B. Elliott
For Quivira Historical Society 1904
Kansas, U.S.A.

Local amateur archeologist William J. Griffing and Fred B. Elliott, eldest son of L. R. Elliott, appear to be the ones who organized the making and placing of this marker in the city in which they made their homes (Root 1900). Again, much fanfare accompanied the unveiling. As reported in the *Manhattan Republic* newspaper, "a good, big crowd of people from town and the surrounding country" attended, and "two battalions of the college cadets fired the salute as the flag fell from the granite shaft reveal-



Figure 13. Quivira Historical Society monument in Alma, Wabaunsee County, Kansas. Photograph by Lauren W. Ritterbush, 2022.

ing its inscription." Rev. Hannum gave an "appropriate prayer," Henderson presented the monument to representatives of the City of Manhattan on behalf of the Quivira Historical Society, and Dr. Charles F. Little (Connelley 1918:228) accepted the gift, "pledging the city authorities to the care and keeping of the monument." Little added a review of Euro-American pioneer settlers of Manhattan, after which Brower expounded on Indigenous history and Chief Tatarax (*MR* 1904b). Manhattan's City Park is not named for Coronado or anything reminiscent of the expedition; however, a 1980s subdivision on the north side of town has streets named Tatarax Drive, Coronado Heights, and Harahey Ridge.

The Quivira Historical Society erected yet another monument in Alma. It is now in front of the Wabaunsee County Courthouse (Figure 13), although that may not have been its original location (Fischer 2013). Chairman of the Quivira Historical

Society and Alma artifact collector John Keagy organized the erection of this obelisk. Its inscription is similar to that in Manhattan minus the reference to Chief Tatarrax. It is interesting that it highlights Harahey, as Alma is south of the Kansas River and basically within the territory Brower identified with Quivira.

The final monument is in Herington, Dickinson County, Kansas. Unlike the others, this is dedicated to Quivira and “Juan de Padilla, Martyr for the Faith,” who “Yielded His Life Here in 1542,” in addition to Coronado 1541 and J. V. Brower 1896 (Figure 14). Henderson, C. R. Schilling, and Rev. John F. Leary installed it on behalf of the Quivira Historical Society. It stands in Herington’s city park, called Father Padilla Memorial Park, alongside Lime Creek (Fischer 2011a; Waymarking

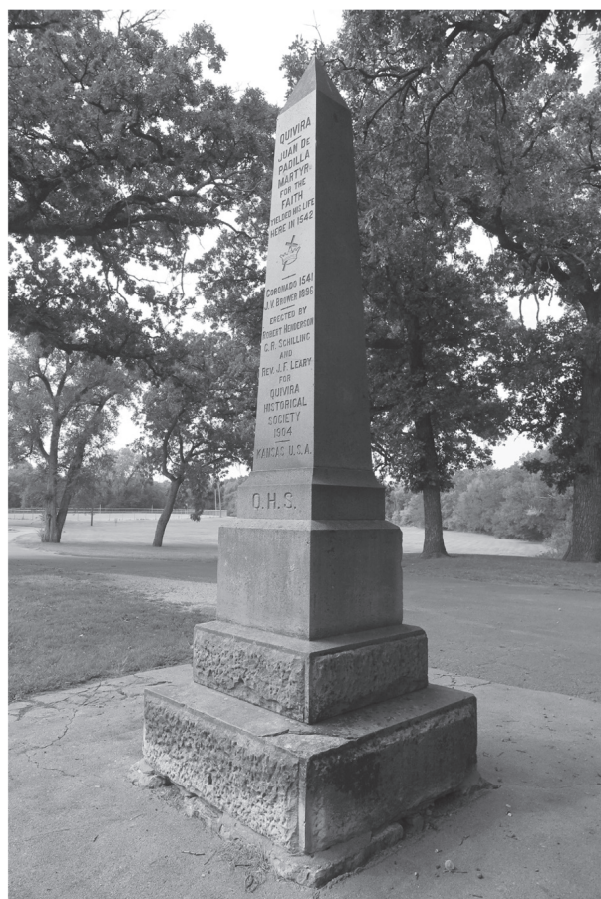


Figure 14. Quivira Historical Society monument in Father Padilla Memorial Park, Herington, Dickinson County, Kansas. Photograph by Lauren W. Ritterbush, 2022.

2019). Until recently, a KSHS historical marker near the south edge of town discussed Padilla’s association with the Coronado expedition and his return to the Plains the following year, where he was presumed to have been killed. This sign called attention to the monument in Herington (Fischer 2011b), but perhaps it was removed due to lack of detailed information about Father Padilla’s visit to Kansas. It has been replaced with a new State of Kansas Historical Marker unrelated to Coronado, Quivira, and Father Padilla and instead recognizes Dwight D. Eisenhower’s early years in Dickinson County.

Brower received yet one other informal recognition for his claimed discovery of Quivira. In 1897 in the midst of fieldwork, Elliott informed Brower that an eminence along McDowell Creek valley near the Elliott site had been designated Mount Brower. This was done “in recognition of the service rendered by yourself [Brower] in bringing to public notice the unique weapons and implements of the occupants of this ancient site, and for indefatigable efforts to discover something of the record of the people who lived here” (Brower 1898:8). The name Mount Brower, however, does not appear on the U.S.G.S. quadrangle map and has been lost with time.

BROWER’S ARCHEOLOGICAL LEGACY

As I indicated at the beginning of this paper, Brower left a multifaceted legacy, which has been noted in passing by various archeologists since his time. Smithsonian Institution archeologist Waldo R. Wedel in *An Introduction to Kansas Archeology* said

I believe that most of Brower’s conclusions are either wholly untenable or else are still subject to verification or correction. However, anyone undertaking archeology work in the area covered by him can ill afford to neglect altogether his published reports, for they contain many provocative and often profitable leads (Wedel 1959:88).

Patricia J. O’Brien who conducted research in that part of Kansas in which Brower worked likely would have seconded Wedel’s opinion. She used Brower’s reports for various site leads and con-

ducted excavations at part of the original Griffing and Elliott sites. Thus, the first part of his legacy is a still-useful record of many important sites in the Manhattan area. Accompanying this is an extensive collection, which Brower claimed included about 30,000 artifacts (see Penrod 2022). His ordering of the antiquities of central Kansas was remarkably accurate, even if that could not be tested at that time. No one uses his site classes, but I think it is hard not to admire his identification of these classes, given a total lack of precedent. Also, note that Brower's work contained none of the pessimism as to the potential of the archeological record of the Plains that so characterized the ethnology of his time (e.g., many believed no one could live successfully in the Plains without the horse) and, therefore, affected archeology in Kansas and beyond for some decades. But then there are the obelisks, material reminders of misidentification and of the ego that would not tolerate critique. Unfortunately, to all but a few archeologists, these monuments, with the place names they seem to have engendered, are the most enduring part of Brower's legacy.

Let me close by noting that Bandelier in 1889 opined that there were several Quiviras. One was the Quivira of Coronado, another was the Quivira of Oñate, another was the Gran Quivira that he showed was not to be confused with the others, and yet another was the indefinite or nondescript Quivira talked of and searched for over many years. Brower was the first archeologist to actually search for the first of these, the Quivira of Coronado. He sincerely believed that he had found it through the archeological record, and his memorial biography listed it, along with his determination of the source of the Mississippi River, as his major scholarly accomplishments (Chaney 1906:773). Few believed his Quivira identification, however, and the armchair studies of Coronado's route continued for some decades. Brower quite set aside Udden's (1900) tentative suggestion that the Paint Creek site might be one of the Quivira sites, and Udden was too self-effacing to press it. Thus, it was for the Jones brothers in the 1920s and Wedel in the early 1940s to finally correctly establish what Brower was seeking. What Brower found, then, was one of the Quiviras of imagination—but it makes a great story!

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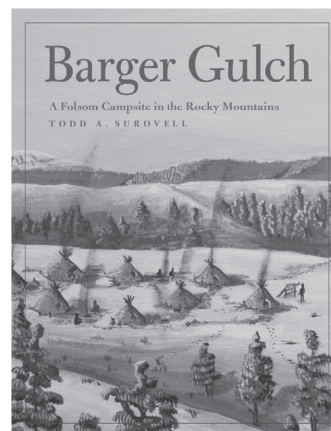
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BOOK REVIEWS

Barger Gulch: A Folsom Campsite in the Rocky Mountains. TODD A. SUROVELL. University of Arizona Press, Tucson, 2022. x + 229 pages, including 77 figures, 12 plates, 25 tables, 5 maps, 461 references, and index. \$65.00 (hardcover). ISBN-13-978-0-8165-4555-1. *Reviewed by Jim D. Feagins.*

When the term “Folsom” is expressed, the thoughts of professional archeologists, as well as of the knowledgeable general public, probably turn to the most skillfully made type of chipped stone projectile points created in the New World—or perhaps anywhere. In addition, imagination may conjure visions of roving bands of ancient hunters following great herds of large bison across the American Great Plains and beyond. However, after reading *Barger Gulch: A Folsom Campsite in the Rocky Mountains*, these Paleoindian or Paleoamerican hunters of 12,800 years ago might be viewed in a broader manner: a campsite of firmly identified multiple houses, an increased understanding of the use of space, and the exploitation of a variety of plants and animals. Still, they were hunter-gatherers, primarily depending on bison. As Surovell (p. 6) states, “Different archaeological sites lend themselves to [the study of] different problems.” This is especially true of Area B within the Barger Gulch (BGB) site, where careful excavation exposed a virtually undisturbed winter occupation with relatively high artifact densities, multiple features, internal and external hearth locations, and activity areas. With strict adherence to certain detailed techniques, archeologists identified 10 Folsom houses where Paleoamericans had overwintered at the Barger Gulch site.

In significant ways this monograph is not typical of many Folsom volumes. It is a study of (1) “Paleoindian technological variation...,” (2) “the spatial organization of a Folsom winter campsite and” (3) “the social organization of the people who lived there” (p. 3). For readers who simply want to read about Folsom stone work, a well-written summary chapter on the lithics is included. However, the book contains 10 chapters about different topics concerning the same people. As much as this reviewer enjoys certain aspects of lithic analysis,



he acknowledges that some of the other chapters do much more to expand horizons about Folsom lifeways. Speculating about the lives of people spending a winter at Barger Gulch is the most exciting part.

The BGB site is situated on a dry ridgetop at 2,300 m above sea level in Middle Park, an extensive intermontane basin within Colorado’s Rocky Mountains. This complex basin contains multiple streams that form the headwaters of the Colorado River. As a third-order tributary, directly joining the Colorado River, Barger Gulch occupies a relatively small area in the western part of the basin. Located in the upper portion of the gulch, the site’s present environment is dry, supporting scattered Rocky Mountain juniper (*Juniperus scopulorum*), Douglas fir (*Pseudotsuga menziesii*), and serviceberry (*Amelanchier alnifolia*) (pp. 15-16). Moisture zones are found at lower elevations. By today’s standards the gulch certainly would not be a comfortable place to spend the winter. However, in the past it apparently offered adequate materials for shelter and plentiful game nearby, as well as other useful tradeoffs, which might not show up in the archaeological record. What drew the Folsom inhabitants to overwinter at this location? Considering the site’s current environment, Surovell (p. 20) readily admits that

... the site itself holds nothing distinctive ... There is no water. It is very exposed. Yet the artifacts all around you demonstrate that at some time in the past this was apparently a good place to live.

The Kansas Anthropologist 44:108–114

The one season of habitation at Barger Gulch turned out to be a good thing for aiding better understanding of the archeological record there. Subsequent occupations over a longer period of time undoubtedly would have mixed and obscured the soil record, as relatively little soil accumulated at this location to separate cultural levels.

Until recent decades, when a few summer excavations began, the Paleoamerican archeology in Middle Park was essentially a surface record. In fact, in many ways it still is. The cultural record is mostly near the surface and is generally highly visible. Overall, the fairly limited professional archeological work at these higher altitudes has been advanced by collaboration with responsible and cooperative avocational archeologists/citizen scientists.

Intermittently throughout nine field seasons, starting in 1997, a total of 164 m² were excavated within Area B, recovering more than 75,000 pieces of chipped stone, over 2,500 bone fragments, a small amount of ground stone objects, and red ochre. Using a donated well-worn trailer, a portable lab often was set up near the site to wash, catalog, and roughly analyze artifacts at each summer's field project.

One chapter of the book discusses the region's geology, the site's geoarcheological context, and dating its Folsom component. The problems of dating the soil itself, while avoiding the ancient chemistry from thousands of years of root intrusions, and also dating cultural charcoal, while avoiding the affects of natural burning, such as forest fires, are addressed. In addition, bone dating from cultural features is examined extensively and proves to be quite reliable. The bone dating explanation is very insightful.

Combining the Main Block and East Block dates [in Area B] using the OxCal method provides an age estimate of 12,830 to 12,760 cal BP. Using the older date, the South Block hearth dates to 12,739 to 12,702 cal BP. If correct, the Main and East Blocks are separated in age from the South Block by about eighty years, but the three areas are still older than all other dated Folsom sites and likely are older than some Clovis sites (Waters and Stafford 2007) (p. 47).

Surovell devotes another chapter to Barger Gulch site formation processes in Area B, pointing out

that, despite many signs of disturbances, the locality retains clear signs of anthropogenic spatial patterning. Using selected 1-m squares, excavated in 5-cm vertical increments, the basic excavation data, including raw numbers of chipped stone, ground stone, bone, and ochre, are summarized by level in 10 pages of tables. Evidence of Folsom occupation occurred at depths between 0 and 63 cm, depending on horizontal locations, averaging 29 cm below the modern ground surface. While site disturbances (see Schiffer 1987; Wood and Johnson 1978) were present, the author and crew made a creditable effort to account for those disturbances during the 12,500+ years that the low-energy depositional environment existed (p. 52). This chapter helps lay the foundation for better understanding spatial patterns on this Folsom campsite, including the following information.

... (1) human decisions about where to do things (primary discard), (2) human decisions about where to throw things away (secondary discard), and (3) natural and cultural disturbance processes that modify the patterns produced by the first two things (Surovell and O'Brien 2016) (p. 51).

The BGB site is noteworthy for the presence of an unusually large number of artifacts, especially considering its age and the size of the excavations. It is "... among the densest of all known Folsom sites" (p.88). Only a relatively brief chapter is devoted to analysis of the stone artifacts/debitage, yet the lithics are summarized adequately. The volume's primary focus is the arrangement of groups of features (hearths, pits, houses, etc.) and artifact concentrations (activity areas, discard areas, etc.).

Selected diagnostic stone tools are pictured in Figures 5-1 and 5-2. As one might expect, the projectile point assemblage is dominated by proximal fragments. Four of those broken bases display evidence of burning. Surovell suggests that fire might have been used to easily remove broken points from their hafts. While interesting, this idea begs for clarification. If broken points were removed for the purpose of reclaiming the hafting elements, it seems that the amount of burning required to leave traces on the artifacts would damage or destroy the hafts in the process.

"Preforms show considerable variation in mor-

phology, which suggests multiple approaches to fluting, at least with respect to the configuration of the preform at the time of fluting” (p. 77). Apparently the flutes were not always made during the same precise step of point manufacture. Again, this reader would appreciate elaboration of this finding.

As might be expected, a few artifacts were relatively rare. For instance, only three “*ultrathins*” were recovered. One hundred-seventy-two channel flakes were collected from Folsom point fluting; however, only 12 of them were retouched. Also from the flake tool assemblage were 27 graters, 26 end scrapers, and 476 other flake tools.

The first five chapters of the book lay the groundwork for the central focus of the volume: spatial analysis. Chapters 6 through 10 describe the spatial patterns identified and how each is interpreted. For example, Chapter 6 is devoted solely to features interpreted as “hearths” and how they were identified. Some of these older hearths required close examination and did not stand out like hearths that archeologists are used to seeing in excavations of younger sites on the Plains and in the Ozarks. At BGB the hearths were distinguished by higher densities of artifacts and especially a higher density of burned artifacts. They did not exhibit a clear pit morphology, and the majority did not show signs of oxidation or ash; most, but not all, displayed charcoal staining. Clearly the hearths formed the heart of the living spaces for Barger Gulch inhabitants.

Chapters 7–9 discuss how households were identified at BGB and how interior spaces and exterior spaces were used. The walls of the various structures were identified with careful study of what were considered inside and outside drop zones. The walls formed a relatively narrow barren barrier between the two. As one would expect, there was a difference between the size and frequency of trash from inside and from outside the structures—a difference between primary discard and secondary discard. Surovell presents a well thought out and detailed discourse on the Folsom use of space at the site.

In Chapter 10, “People,” Surovell (p. 171) bravely undertakes to

... examine the site at larger scales to see what can be gleaned about the people who lived at BGB and their interactions. I begin by examining the

spatial layout of the camp writ large and then turn to estimating the size of the population who lived there. I then examine whether everyone traveled to the site together or whether mobility decisions were made at the house level. Related to that question, I attempt to determine relative durations of occupation for each house area. And I end with a brief discussion of markers of identity in the lithic assemblage and what they can tell us about the individuals who lived at BGB.

Surovell makes an admirable effort to meet this challenge and provides the means to answer questions posed by many paleoarcheologists. Readers can decide for themselves just how well he has achieved his aims. This reviewer feels quite comfortable in recommending *Barger Gulch: A Folsom Campsite in the Rocky Mountains*. The volume is generously illustrated, and the 8½-by-11-inch format renders the maps, tables, and graphs easy to view. Big color plates are used to full advantage. Written in an easy-to-read first-person style, the book will be of interest to professional archeologists, those working in related fields of study, avocational archeologists, and other citizen scientists among the general public. It may be obtained by telephone (800-621-2736) or online from the University of Arizona Press (<https://uapress.arizona.edu/>) or various book vendors.

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HyperCities: Thick Mapping in the Digital Humanities. TODD PRESNER, DAVID SHEPARD, YOH KAWANO. Harvard University Press, Cambridge, Massachusetts, 2014. 6-212 pp., preface, endnotes, acknowledgments, and credits. \$30.00 (paperback). ISBN 978-0-674-72534-8. *Reviewed by Denise Wallace.*

In the digital age not all artifacts are in the ground. Imagine having access to cell phone videos, tweets, and Facebook posts from King Tut's funeral procession, the volcanic eruption at Pompeii and Herculaneum, the Titanic voyage, the Trail of Tears, or the Kennedy assassination and then using software that can blend and parse all of that content with information from standard cartography, newspaper articles, Geographic Information System (GIS) data, and other resources. By overlaying the various information types, you can create next generation maps, charts, videos, and more over timelines that you select (hours, days, weeks, months, years), graph the tweets based on key words that you choose, blend the videos into a 360-degree panorama, as well as chart the level of activity before and after. Now imagine what already has been captured, digitally and otherwise, for 9/11, Hurricane Katrina, the Arab Spring, or the United States January 6th insurrection, and compile it all to generate the respective events in the moment, compared over time as historical events 50 years from occurrence. Welcome to HyperCities and thick mapping!

DIGITAL HUMANITIES, HYPERCITIES, AND THICK MAPPING

The Digital Humanities is an emerging field which goes beyond the algorithms and data. It is an attempt to preserve the digital, to rescue it from ephemerality.

The prefix "hyper" refers to multiplicity and abundance. As author Todd Presner (left inside book jacket) explains, "More than a physical space, a hypercity is a real city overlaid with information networks that document the past, catalyze the present, and project future possibilities." It goes beyond cartography of the physical to include that of the digital. The scope of data inclusion is far reaching.

Thick Mapping is layering the process of map-

ping with the study of humanities. This is more than a school teacher using multiple transparencies on an overhead projector. Thick maps, Presner (p. 17-18) points out, are also called "deep maps," because they are comprised of "temporal and historical dynamics through a multiplicity of layered narratives, sources, and even representational practices. . . . thickness connotes a kind of cultural analysis trained on the political, economic, linguistic, social and other stratifactory and contextual realities in which human beings act and create." Due to competing past in a single place, sedimented palimpsests are the result. (Traditionally, a palimpsest is a manuscript or piece of writing material on which the original writing has been effaced to make room for later writing but of which traces remain.)

HYPERCITIES AND GIS

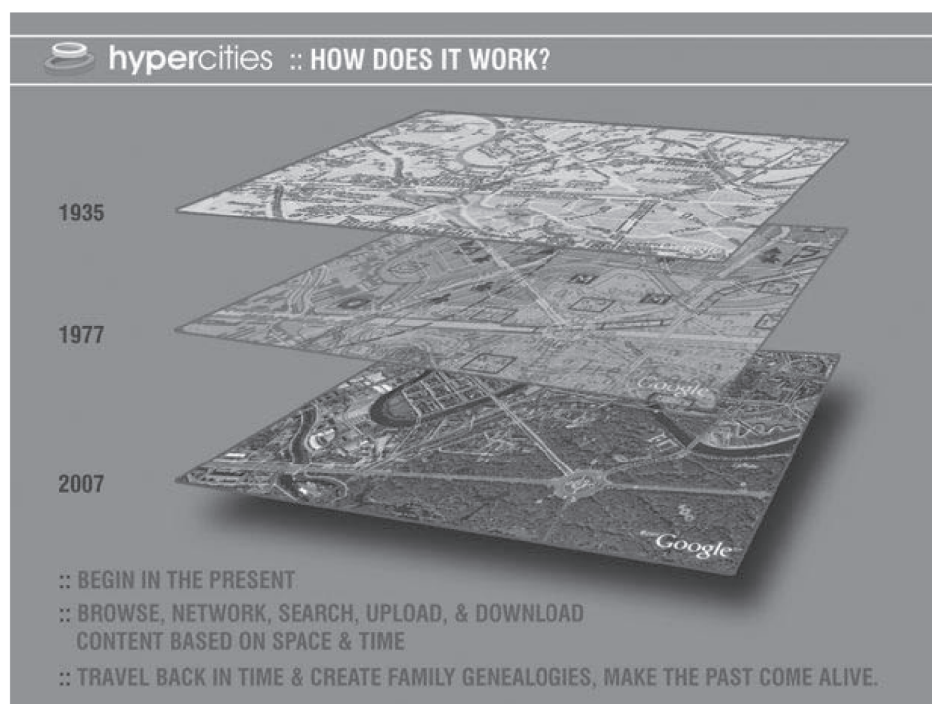
Much more than cartographic representations of the land and urban spaces, this process maps culture itself. "While the maps in HyperCities have been georeferenced and placed within a GIS-based system that displays objects in standard global projections, they are not static representations or accurate reflections of a past reality; instead the historical maps function as stacked representations in which one representation is keyed to another representation—not to reality," explains Presner (p. 109).

"To date, HyperCities features rich content on more than two dozen world cities, including more than 400 georeferenced historical maps, thousands of user-generated maps, and tens of thousands of curated collections, narratives, and media objects created by users in the academy and general public," notes Presner (p. 51).

GHOST MAPS

As part of the project, ghost maps are created. Presner (p. 69, 71, 73) points out that these are maps that

Preserve the visibility of older, prior shapes beneath those that have taken their place in later times [viewable as]. . . hand-crafted composites of archival analog cartography and vector-based, digital GIS layers. They are designed visually to reveal time, change, events, and motion through the



symbolic languages of color, shape, iconography, and textual annotation. They are dense, thick maps, not made to be read quickly, as would be mere illustrations or diagrams. As a rich and complex graphical composition drawn directly from the profound complexity of past social life itself, the content of a ghost map—like the metropolis itself—exceeds the capacity of any textual narrative to explain it.

HYPERCITIES NOW AND SENTIMENT ANALYSIS

Another component is HyperCities Now. With it, social media messages are visualized as events unfold and archived for later interrogation and analysis.

According to co-author Yoh Kawano (p. 177), “One aspect of social media is that its ephemeral nature can provide a snapshot of a moment’s mood, reflected—in aggregate—by the content of what people are tweeting about in real time.” For example, Kawano (p. 178) asks, “So what was the country ‘feeling’ after the earthquake? Was it engulfed in sorrow? Anger? Fear? What effect did the hundreds of aftershocks have on the populace? Creating a universe represented by two object types—days (in black) and words (colored by emotion cate-

ries)—one can see the gravitational pull for the more ‘central’ days and words.”

FUNCTIONALITY

What is the functionality level of HyperCities? It has a storage engine component for geotemporal narratives and a browser for viewing these narratives. Presner (p. 37) notes that it “behaves more like a desktop application because the front-end follows an event-driven programming model rather than a standard webpage submission model.”

Furthermore, says Presner (p. 51), “HyperCities essentially allows users to examine the historical layers of city spaces and tell stories in an interactive, hypermedia environment. The central theme is geotemporal argumentation, an endeavor that cuts across a multitude of disciplines and relies on new forms of visual, cartographic, and time/space-based narrative strategies.”

Storage and archival space would occupy significant space; however, HyperCities takes a different approach. Per Presner (p. 40),

While HyperCities hosts and stores some data locally, one of the central aims of the project is to host metadata connections to content stored and maintained in external repositories and on external

servers. These servers range from commercially available platforms (such as Google's 3D warehouse, YouTube, and Flickr) to library and archival platforms for maps, GIS data, oral histories, videos, photograph collections, and other media files. In this way, HyperCities provides connective tissue for the community of geospatial time travelers by leveraging the extensive development of data repositories and social networks.

SOFTWARE CODE

The HyperCities software is built on Google Earth/Maps. According to Presner (p. 48), the "source code to the storage engine and the browser [were released] as open source projects, available on GitHub." Presner (p. 50) claims, "Beyond Google, OpenLayers, an open source mapping platform with a global developer community, and Harvard's WorldMap, an ambitious, open source platform for exploring, visualizing, and publishing geographic information, are setting new standards for the preservation, dissemination, and analysis of networked geo-data."

EXAMPLES OF USE

Mapping Events as They Happen/Mapping Social Media

- 2009 Election Protests in Tehran
- Arab Spring events
- Fukushima nuclear power plant disaster
- Mubarak resignation speech on February 11, 2011
- Network graph of hashtags used during the Egyptian Revolution of 2011

Mapping Past Events

- a "ghost map" of downtown Los Angeles
- polyvocal memory maps of LA's historic Filipinotown
- avatar-based explorations of ancient Rome
- hour-by-hour mappings of the Tehran election protests of 2009
- a four-dimensional geotemporal argument and virtual worlds exploration of the Roman Forum in the ancient world
- the U.S. Holocaust Memorial Museum's Darfur genocide map

- George Mason's Archive of Hurricanes Katrina and Rita

PROJECT ISSUES AND CHALLENGES

This all sounds incredible. Can this be accessed right now? As of the 2014 book publication, not exactly. Presner (p. 13) says, "if you are looking for a finished software platform called HyperCities, let us be clear: it doesn't exist. There is no fully functional, released piece of software, only a series of prototypes, experiments, code modules, and projects that more or less work. This book is a synthesis of the HyperCities idea, composed in historical, conceptual, and speculative modes."

A significant challenge remains for how to incorporate the overwhelming volume of digital data into a useful, reliable outcome. Presner (p. 127) admits, "The challenge of inventing a 'global cognitive mapping' that does justice to the place of the individual subject within ever-thickening systems of surveillance, mediation, networking, control, and global flows is still before us."

PROBLEMS WITH THE BOOK

Even as exciting and perhaps revolutionary as the project goals are, overall this book reads like a philosophical debate, blended with computer coding and Dr. Who time travel.

Several times throughout the book, there are groups of pages where each page is divided into upper and lower (narratives and critical code studies) as two different sets of information and lines of thought. This makes for distracting and disjointed reading.

FUTURE

Future applications of HyperCities are intriguing. Digital data is now more than 30 years old. In terms of archeology, something historical is defined as at least 50 years old. Even though HyperCities is not turnkey right now, there is time to figure it out and perhaps expand it as the technology morphs. In the meantime, it certainly can be used to employ the current technology, blending the present resources to generate a more comprehensive map of sites and culture groups. Furthermore, this new resource can

be used to formulate additional questions for archeology projects or answer some existing ones, which then moves research forward or perhaps in a new direction. Finally, it could be a resource for archival historical research, writing, determining future excavation sites, etc. As Presner (p. 131) puts it, "Aiming to blur the distinction between map and experience, as we iterate forward we are combining gaming technology with the *HyperCities* blueprint to build an inhabitable world of maps and arguments."

HyperCities is an evolving digital humanities project, developed over a decade through which diachronically virtual travel, similar to archeological coring, is made possible through thick mapping. No longer are researchers limited to resources such as microfilm, microfiche, old photos, explorer jour-

nals, and traditional accounts by historians, nor to one TV film crew angle of the event. No longer is humanity's history buried in the ground. It is now in the ether, in the cloud, able to mix media to a blended and dynamic "flip book," interrogated and manipulated by the researcher and archeologist. As of the book publication in 2014, HyperCities is still merely a concept rather than a fully realized resource, but future applications are intriguing and potentially revolutionary.

OTHER RESOURCES

- <https://sciencenode.org/feature/exploring-history-hypercities.php>
- Toddpresner.com
- Hypercities.com

ABOUT THE AUTHORS

Barbara Crable



Barbara Crable received B.A. and M.A. degrees in anthropology from the University of Kansas. She is currently employed with the Kansas Historical Society as a contract archeologist. Her research interests include zooarchaeology, taphonomy, and Great Plains archeology. In the summer of 2014, she participated in the Kansas Archeology Training Program field school in Osawatomie and the KU field school at the Pawnee Indian Museum State Historic Site, where her passion for fieldwork began. Since then, she has been involved in archeological research from Louisiana to Wyoming.

Jim D. Feagins



Jim Feagins is a private archeological consultant who also serves as part of the adjunct archeological staff for the St. Joseph Museum. He received a B.S. degree from Pittsburg State University and a MNS 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.

Christine D. Garst



Christine Garst has a Master's degree in anthropology from the University of Kansas. She is an archeologist with the Kansas Historical Society where she supervises the Archeology Lab and its volunteers. Her interest in rural historical archeology stems from growing up on a farm in north-central Kansas, and other research pursuits include gunflints, petroglyphs, and the analysis and reporting of orphan artifact collections.

Marlin Hawley



A native of Washington, Kansas, Marlin Hawley received his Master's degree in anthropology from the University of Kansas. For the past 25 years, he has been employed by the Museum Archaeology Program at the Wisconsin Historical Society. He lives with his wife Amy and their two dogs in Sun Prairie, Wisconsin.

Matthew E. Hill, Jr.

Matthew Hill is an associate professor at the University of Iowa. He received a Master's degree from the University of Kansas and a Ph.D. from the University of Arizona. His recent research projects examine the timing of early settlement of ancestral Apache groups in the Great Plains, beginning in the A.D. 1400s, and understanding the changing land use and subsistence practices of bison hunters in the Great Plains and surrounding regions. Much of his research has been on archeological sites in Nebraska and Kansas, but he also worked on projects in Oklahoma, Texas, New Mexico, Arizona, the Philippines, and India.

Robert J. Hoard

Robert Hoard was the state archeologist of Kansas from 2000 to 2022. He is interested in the identification of traded items from archeological sites to determine exchange routes through time. He also studies the technical attributes of prehistoric pottery, especially the earliest pottery in the High Plains. Much of his fieldwork has been in the North American prairies and plains, including the Lamb Spring Paleoindian site in Colorado, but he also worked in Florida at the Little Salt Spring site, and in the state of Pohnpei of the Federated States of Micronesia at the World Heritage-listed site of Nan Madol. When not involved in archeological work, he builds dry-laid native limestone fences in the Flint Hills and identifies and preserves wild plants and their habitats.

Jack L. Hofman

Beginning in 1971, Jack Hofman has conducted archeological research throughout the Great Plains, Illinois, Tennessee, and in France. He attended the University of Oklahoma, University of Wyoming, and received his Ph.D. from the University of Tennessee. He taught at the University of Kansas from 1991 until 2019. Current research includes study of Pawnee and Sac and Fox post-contact cultures, technological and cultural changes in the Great Plains from early prehistoric through historic periods, investigation of prehistoric bison hunters, and documentation of archeological evidence for fire making.

Anthony Miles

Anthony Miles is an assistant cultural resources management specialist student at Burns and McDonnell. He graduated in December 2022 with a BGS in anthropology from Wichita State University. His interest in archeology began when he found his first artifact, a broken Dickson point, in October 1998. He has been studying and collecting with permission from the same site ever since. The site was officially documented in 2012, which furthered his interest in archeology. In February 2017 he took up flintknapping with the intent of being able to better understand the artifacts that he finds and the field in which he works. Anthony's primary interests in archeology are the Archaic period and lithic technology.

Lauren W. Ritterbush

Lauren W. Ritterbush is professor of anthropology at Kansas State University and life member of the Kansas Anthropological Association. Like her former colleague Donna C. Roper, Lauren is interested in the archeology, ethnohistory, and lifeways of the Indigenous peoples of the Great Plains and history of related investigations, including those around her present home in Manhattan, Kansas. While working with archivists in the Morse Department of Special Collections at Kansas State University to establish a permanent home for Donna's research papers after her untimely death in 2015, Lauren was reminded of many of Donna's contributions, including conference presentations that were never prepared for publication. The article in this volume is just one of the treasures among the Donna C. Roper Papers, curated in K-State's Morse Department of Special Collections (<https://findingaids.lib.k-state.edu/donna-c-roper-papers>).

Donna C. Roper

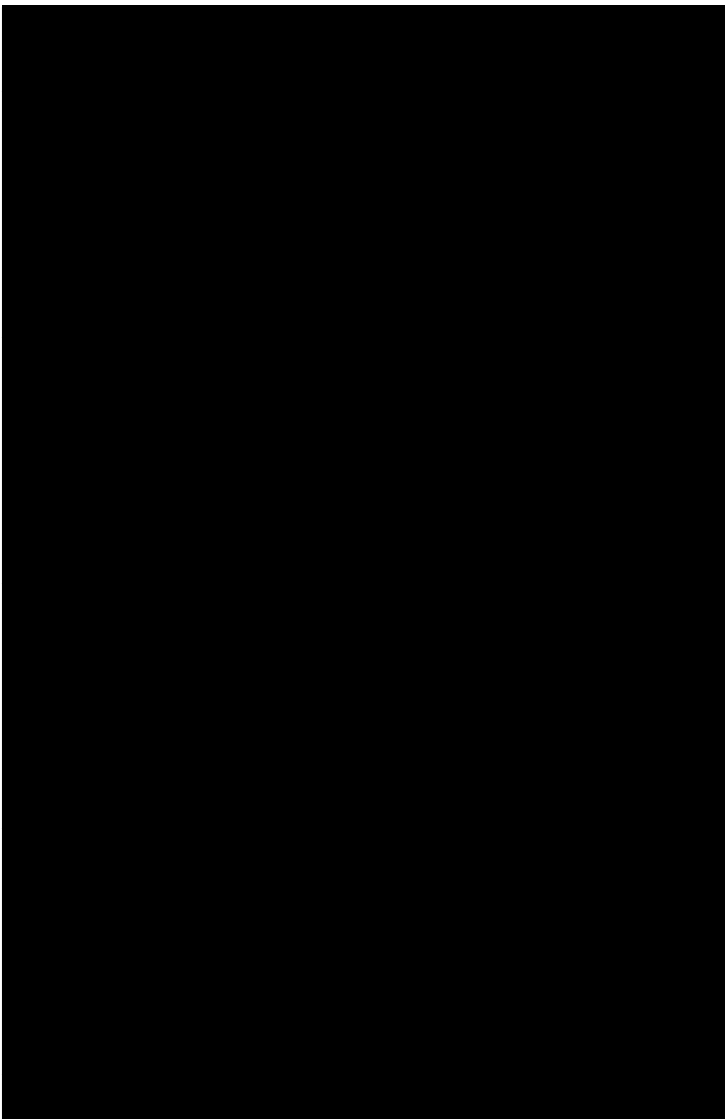
In 2015 the community of Great Plains archeologists and others who share interests in the Indigenous peoples of the Central Plains lost an ever-flowing fountain of knowledge and insight with the passing of Donna C. Roper. Donna developed her interest in archeology and history as a legacy student at Hartwick College in her hometown of Oneonta, New York. While furthering her studies at Indiana University and the University of Missouri at Columbia, she was introduced to the prairies and plains and the associated archeological record. After completing her Ph.D. at Mizzou in 1975, she continued to work in Missouri before joining Gilbert/Commonwealth, which later became Commonwealth Cultural Resources Group through a partnership co-led by Donna. Whenever possible, Donna pursued projects in the Great Plains, the region in which she felt most at home. In 1992 she followed her heart and moved to the Flint Hills of Manhattan, Kansas, to work as a private contractor and eventual research associate professor at Kansas State University. Donna truly dedicated her life to archeology and related interests for which her many contributions to research and service to her profession and the public were recognized during her last days through the Distinguished Service Award by the Plains Anthropological Society and the William Duncan Strong Award by the Nebraska Association of Professional Archaeologists. Many more contributions await rediscovery among her papers archived with K-State's Morse Department of Special Collections (<https://findingaids.lib.k-state.edu/donna-c-roper-papers>).

Denise Wallace

Denise has an extensive background in world cultures and foreign languages. Her Master's degree in anthropology with a combined emphasis in archeology and ethnobotany from Tulane University has afforded her the training and skills to work with both present and past cultural groups. She is a Certified Project Archaeology Instructor. Denise has worked in Panama and Peru, advocating cultural patrimony and on ethnobotanical uses with Indigenous tribes. She has conducted botanical surveys in Missouri, Kansas, Panama, and the Peruvian Amazon. Her archeological work ranges from Phase I-III work to artifact cataloging and curation in Arkansas, Kansas, Missouri, and Portugal.

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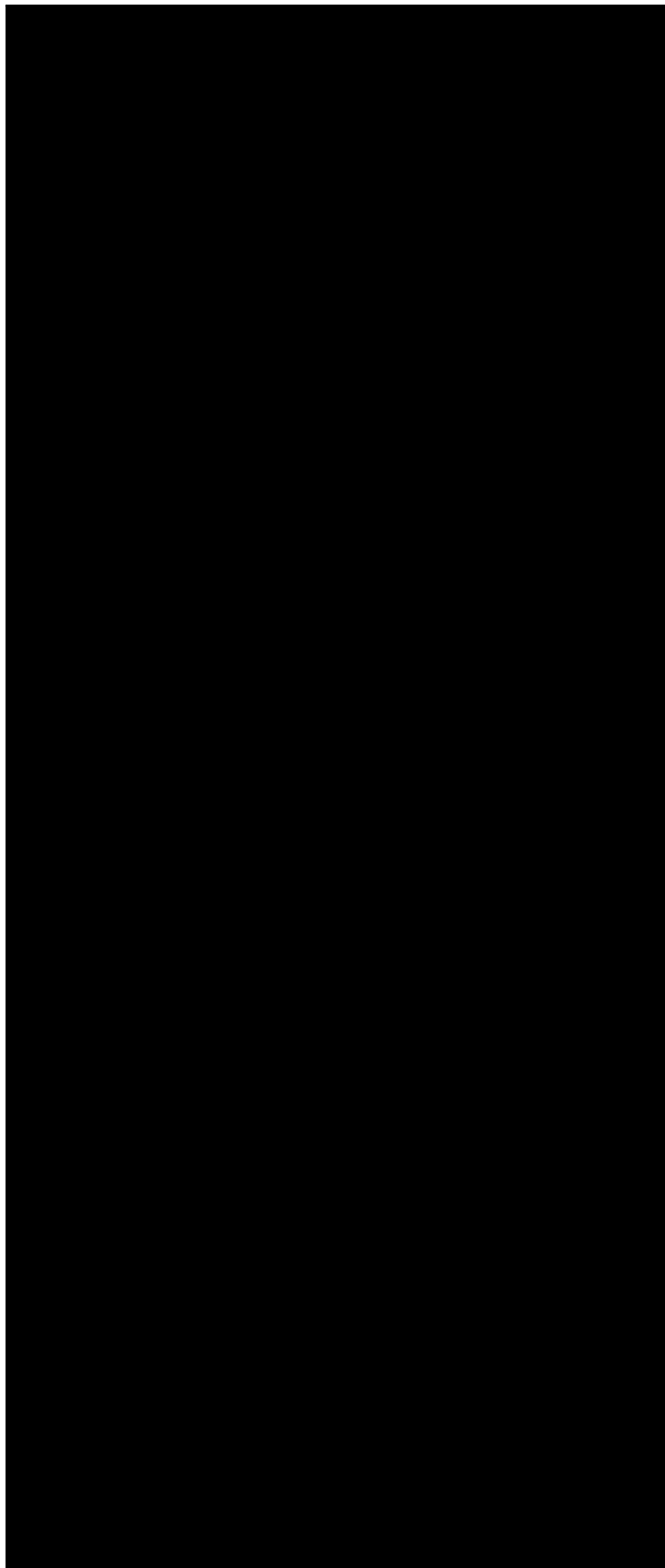
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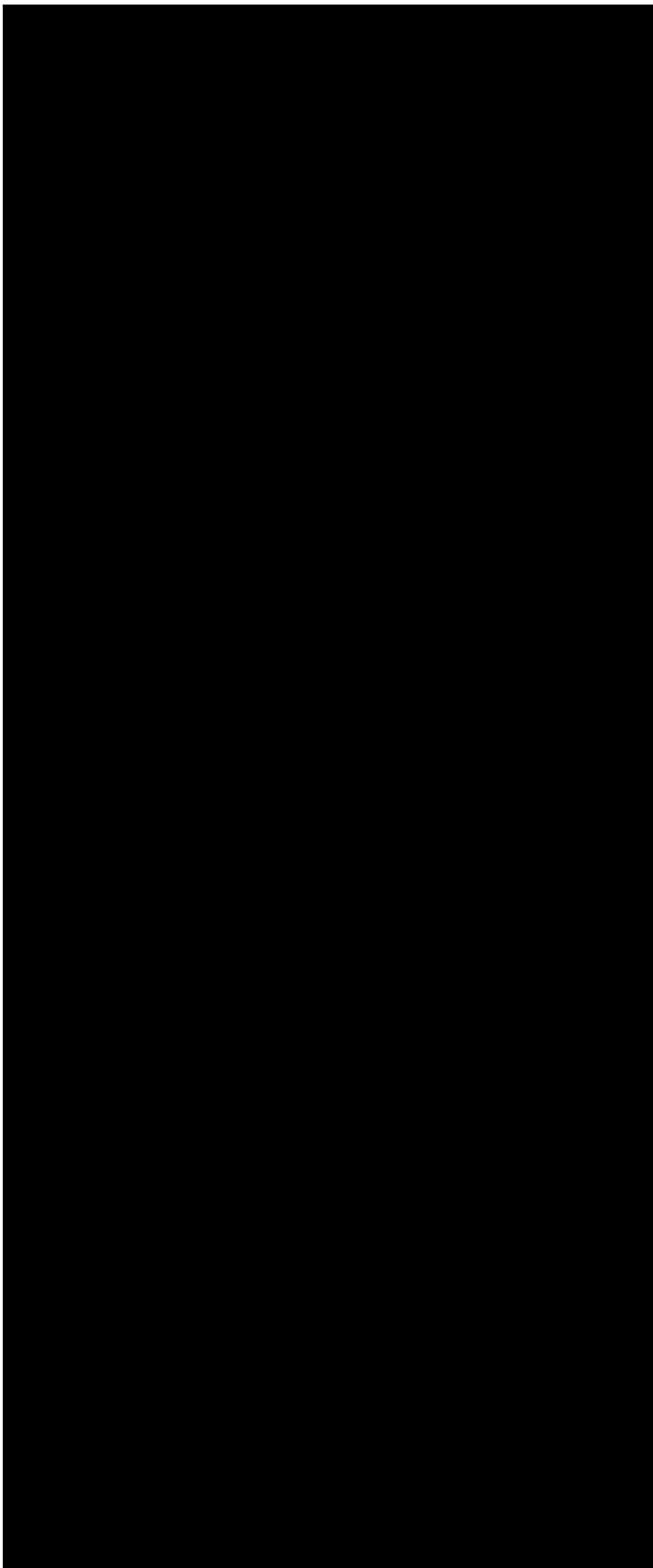


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