

**PALIMPSESTS, ACTIVITIES, AND ARCHAEOLOGICAL TAXONOMY:  
IMPLICATIONS FROM LATE PLAINS WOODLAND COMPONENTS (AD 500-1000)  
OF THE HAMON SITE IN NORTHEASTERN KANSAS**

By

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Submitted to the graduate degree program in the Department of Anthropology and the Graduate Faculty of the University of Kansas in partial fulfillment of the requirements for the degree of Master of Arts.

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Date approved: April 10, 2015

## ABSTRACT

This thesis describes the results and interpretations of a multi-faceted analysis of Late Plains Woodland components (AD 500-1000) of the Hamon site (14JF350) in Jefferson County, northeastern Kansas. Methods included artifact analysis, newly obtained radiocarbon dates, a reconstructed spatial analysis of the original excavations, and a field survey to locate and define the site boundaries. The results reveal that the site was a palimpsest of occupations further disturbed by agricultural plowing. This is in contrast to the original interpretations, which were affected by the excavated materials having never been analyzed and low-resolution obstacles due to a multitude of excavation factors including weather, excavation boundaries, and not having reached culturally sterile subsoil. Activities represented by the material remains of the site occupants include lithic and ceramic production, with evidence for a possible open fire kiln, and inhumation of the deceased.

The analysis also reveals that a revision of archaeological taxonomy is needed for several designation units in the Late Plains Woodland Period (AD 500-1000). The formal traits of artifacts from the Hamon site, and other sites used to define the Grasshopper Falls phase, are indiscernible from other defined Middle (AD 1-500) and Late Plains Woodland units and pottery wares/types in the region, including Valley, Loseke Creek, Held Creek, Sterns Creek, and Minotts. The ceramic assemblage from the Hamon site contains vessel forms, production techniques, and design motifs that are reflective of some of the above-mentioned wares/types, but might also be representative of Steed-Kisker ware.

This study is an important addition to the knowledge of activities and adaptations of Late Woodland people in the central plains. I argue that a ceramic production event occurred at the Hamon site and that the inhabitants were in contact with other Late Plains Woodland groups in the

region of the lower Missouri Valley. The latter is evident through similarities in material culture that are otherwise clouded by existing archaeological taxonomy. Future research can transcend the taxonomic obstacles to further reveal that more interaction and less isolation existed among Late Plains Woodland people occupying the greater region of the lower Missouri Valley in Kansas, Missouri, Nebraska, and Iowa by looking to curated collections for comparative analysis.

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## CHAPTER 1: INTRODUCTION

Excavated in 1971-1972, the Hamon site (14JF350) was initially identified as a manifestation of the Grasshopper Falls phase of the Plains Woodland period (BC 500-AD 1000) and played a critical role in the formal definition of this phase (Reynolds 1979). However, in reference to the site as a single component of the Grasshopper Falls phase, Reynolds (1987) acknowledged that the data recovered from the excavations was never analyzed. Given the importance of analyzing the data recovered from the excavations in adding to knowledge about Central Plains Woodland archaeology, I chose to analyze the excavation records and material assemblage. Upon this analysis, variability among both the material and excavation records became apparent. This led to additional analysis that culminated into a multi-faceted research design involving artifact analysis, obtaining accelerator mass spectrometry (AMS) radiocarbon dates, a spatial analysis, and limited field testing. The results reveal that the inhabitants engaged in lithic and ceramic production as well as inhumation of the dead. The analysis also reveals that more than one group of people over time were responsible for the material left behind.

Four AMS dates were obtained from residue on pottery from the site to be added to one conventional charcoal date obtained by the Kansas State Historical Society (KSHS). Combined, all five dates span a 2-sigma calibrated date range of AD 648-1224. The artifacts, especially the ceramics, also reveal a mix of traits other than those described for Grasshopper Falls ware that share affinities with Valley Cord-Roughened, Loseke Creek ware, Held Ware, Minotts Ware, Sterns Creek ware, and possibly Steed-Kisker ware. I will present the artifact analyses in the context of newly obtained radiocarbon dates, spatial analysis, and survey of the site. The results reveal that the Hamon site contains a palimpsest of at least two Late Plains Woodland (AD 500-

1000) occupations, by either a familial descent group, or a non-local group, in contrast to interpretation of the site as a single component house feature.

My spatial analysis reveals that subsurface artifact deposition and features extended beyond the boundaries of the original excavation. It also suggests that the inhabitants operated an open fire kiln for pottery production with a possible wind-break or associated structure constructed with wattle-and-daub. While grass-impressed daub is present in the assemblage, an equal amount of non-impressed fired clay of the same material as some of the pottery is also present. This may represent activities associated with ceramic manufacture rather than house construction. Igneous, metamorphic, and sedimentary rocks used for temper in the site's pottery are also present, along with clay-covered and heated limestone rocks. Intentionally crushed hematite, a component of ochre, is present in modified fragments. It is also present in the paste of some pottery vessels as well as in a paint, wash, or slip applied to some vessel surfaces. The extension of subsurface features, presence of burned clay, intentionally transported and prepared tempering materials, and intentional use of crushed hematite indicate pottery production activities at the Hamon site.

Features were also revealed from field records and artifact labels that have never been referenced. This raised questions about the interpretation of the site containing only a single component composed of three features, of which one was a house. Reference to field records indicates that rainy weather caused many problems with the excavation, and some units were closed before features could be identified. The delineation of post molds for the house was also ambiguous. Two attempts were made by the excavators. Both attempts followed the same methods. However, numerous post molds were cancelled from the first set of interpretations in favor of reinterpretations. The post mold interpretations will be discussed further in Chapter 5.

I met with Mr. Charles Hamon, the owner of the site, who thought excavations took place in a different location than what is recorded in the KSHS site files. The spatial analysis implications and possible incorrect record of the site location led to a 2014 pedestrian survey that relocated the excavation location and numerous artifacts. The survey results support the spatial analysis results in revealing that the original excavations missed material data and portions of the site are still intact. Ultimately, the results argued for in this thesis imply that the original interpretations of the Hamon site as containing a single-component occupation represented by a single house feature, are not accurate, although a structure may have been present at one time.

This analysis also raises concerns about the definition of a Grasshopper Falls phase component. KSHS archaeologist John Reynolds' initial definition of the Grasshopper Falls phase was based on three sites that had been plowed, for which there was no vertical provenience for the artifacts (Reynolds 1979:1-2), and for which the descriptions of the lithics and ceramics were very general and occasionally confusing. For example, the last page of the publication illustrates a mixture of Late Archaic through Plains Woodland period points (several of them being Dickson and Snyder points, commonly associated with Middle Woodland components) (Reynolds 1979:134). The pottery description appears to combine traits of Middle and Late Plains Woodland vessels into one group. The one consistent trait described for the pottery is the temper, which was identified as grit composed of quartz, feldspar, and pink or red orthoclase. Additionally, a small proportion of pottery was described as non-tempered or tempered with indurated clay (Reynolds 1979:70). Cord-roughened, smooth, or "characteristically vertical" brushing of the rim, neck, and shoulder are the recognized surface treatments (Reynolds 1979:70).

Reynolds compared Grasshopper Falls ware with Valley Cord-Roughened and Harlan Cord-Roughened pottery wares more than any other defined Plains Woodland period pottery wares or

types. He concluded that Grasshopper Falls ware “shares more traits with Valley Cord-Roughened than any other defined Plains Woodland pottery type” (Reynolds 1979:93). He briefly discussed the defined Sterns Creek and Loseke Creek phases, noting that Sterns Creek ware consists of pottery vessel shapes, rims, surface finish, and other traits markedly different than Grasshopper Falls ware (Reynolds 1979:96). He did not elaborate as to what those differences are, but found “straw-roughened” or fiber brushing on Sterns Creek pottery interesting, because the only documented instances of this surface treatment on Plains Woodland pottery in the Central Plains, comes from Grasshopper Falls and Sterns Creek wares (Reynolds 1979:96). He provided one sentence to the Loseke Creek phase, locating it in Nebraska, Iowa, and South Dakota, and commented that one site of this phase is interesting because charred corn was recovered there (Reynolds 1979:96). He does not mention the pottery ware associated with Loseke Creek components.

It is clear that Reynolds (1979:97) acknowledged shared characteristics between the Grasshopper Falls phase and other Plains Woodland complexes, but in his own words “will make no attempt at presenting a thorough analysis of these similarities” (Reynolds 1979:97). Instead, Reynolds transitioned into a focus on house forms from Grasshopper Falls phase components. While they are stated (Reynolds 1979:98-99) to be rare features for any Woodland site, house features are abundant at Grasshopper Falls phase components and an important trait for the definition of the cultural designation unit.

My own analysis suggests that what Reynolds describes as Grasshopper Falls ware, defined on the basis of assemblages with no vertical provenience, is actually a mixture of several different pottery wares from the same geographical region. My comparisons of the Hamon site pottery, the pottery from the three sites Reynolds used to identify the Grasshopper Falls phase, and Valley

Cord-Roughened pottery from the type site (25VY1), reveals a strong similarity in traits defined for Valley Cord-Roughened ware (Hill and Kivett 1940). However, this does not apply to all the pottery from the Hamon site. A considerable amount of variation is present and not documented for Valley Cord-Roughened, or Grasshopper Falls phase ware. After consulting publications describing Late Plains Woodland Loseke Creek, Sterns Creek, Held Creek, and Minotts wares (Benn and Green 2000; Johnson 2001; Ludwickson and Bozell 1994; Tiffany 1971, 1977), I found the differences among these, pottery used by Reynolds to define the Grasshopper Falls' phase, and pottery from the Hamon site to be indistinguishable. This calls into question the utility of the Grasshopper Falls phase designation for all of the ceramic assemblage at the Hamon site.

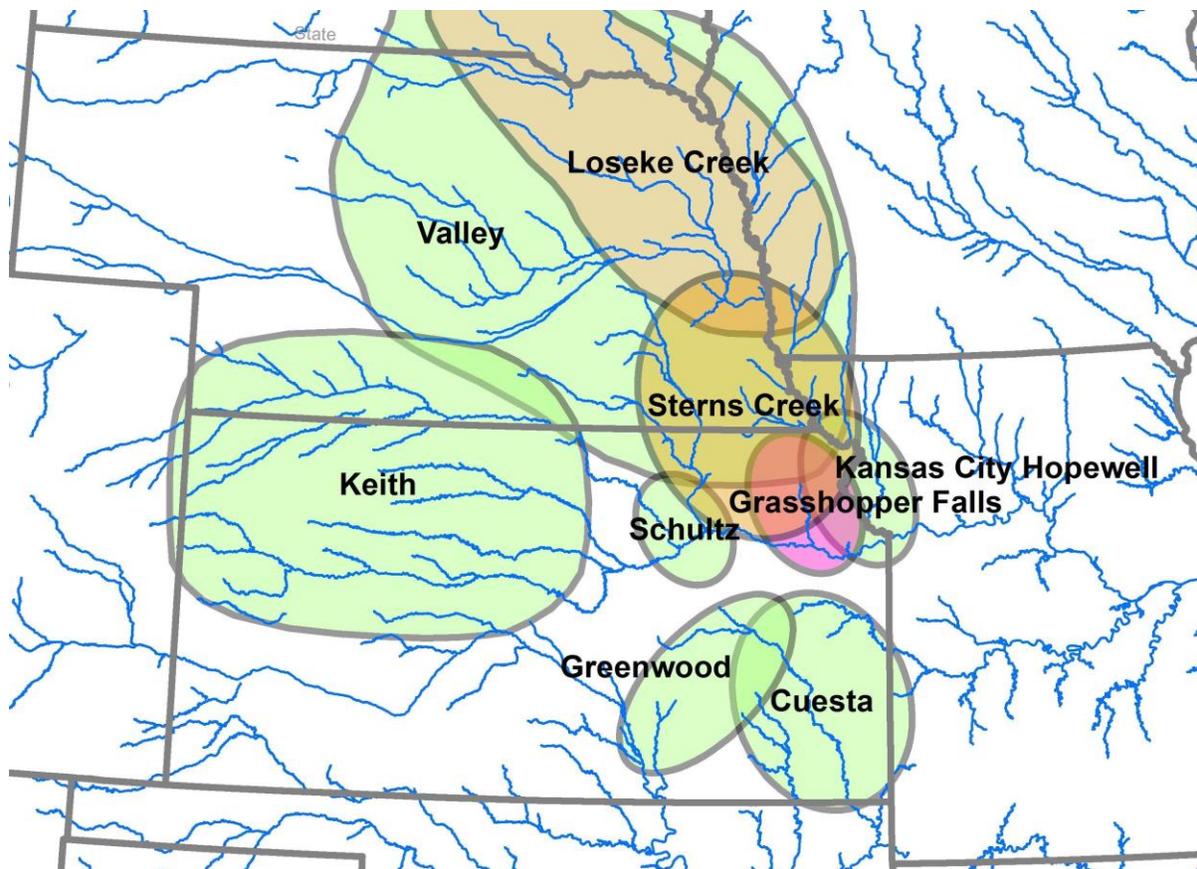
Valley, Kansas City Hopewell, Loseke Creek, Sterns Creek, and many other archaeological units have been identified in Nebraska, Iowa, South Dakota, and Missouri (Alex 2000; Benn and Green 2000; Ludwickson and Bozell 1994; Zimmerman 1981). However, the utility of any of these phases (other than Kansas City Hopewell) in Kansas has yet to be acknowledged, despite the fact that some researchers have stated that Valley and Sterns Creek components may be present in northeastern Kansas (Hill and Kivett 1940; Ludwickson and Bozell 1994; Tiffany 1977, Wedel 1974). While an attempt to reconcile problems between the Grasshopper Falls designation and the above-mentioned pottery units is necessary and vital to Plains Woodland archaeology, it is outside the scope of this thesis. However, I want to draw special attention to this dilemma. In the future, archaeologists working with these Late Plains Woodland components should find a solution to what appears to be an issue of typological splitting. Addressing this may involve subsuming some pottery wares and even archaeological units into others whose definitions have priority. Until this is accomplished, I will attempt to address the Grasshopper Falls phase on the basis of its current usage.

## **The Plains Woodland Period and the Grasshopper Falls Phase**

The Plains Woodland period (BC 500-AD 1000) is identified as corresponding to a Formative period (Willey and Phillips 1958) in North American archaeology. This was a time when ceramic technology began to appear in the context of agricultural sedentism, as evidenced by its widespread representation in archaeological assemblages that also include dwellings, mortuary features, and artifacts representative of early horticulture. In Kansas the cultural traits of the Plains Woodland period have been evaluated in comparison to similar phenomena during the Woodland Period (divided into Early, Middle, and Late) in the eastern United States. Researchers hypothesize that the Woodland presence in the Plains is a result of diffusion from the east (Johnson 2001, Wedel 1972, Willey 1966). The preceding Archaic period, which in the Plains includes some examples of early pottery production (Reid 1984), is similar to the Woodland Period in the sense that both cultural periods involved mobile hunter-gatherer lifestyles with the presence of trends that gradually contributed to more sedentary lifestyles. The succeeding Plains Village period is characterized by widespread farming and growth in the size of sedentary populations and settlements. Thus, the Plains Woodland period represents an important time of cultural transition between primarily aceramic, non-sedentary hunter-gatherer cultures of the Archaic period and the more sedentary farmers of the Plains Village period. Researchers have defined multiple cultural phases within the Plains Woodland period in various and sometimes overlapping formally defined regions of Kansas (Figure 1).

The Plains Woodland period has been scientifically researched since the early to mid-twentieth century, when archaeologists such as William Duncan Strong (1933, 1935), Waldo Wedel (1938, 1947, 1959), A. T. Hill (Hill and Kivett 1940), and Marvin Kivett (1953) began publishing their research on prehistoric cultures of the Central Plains. Archaeological research in the Central Plains

evolved with changing concepts and terminologies. Early research, especially during the 1940s and 1950s, favored concepts such as “aspect” and “focus.” Beginning in the late 1950s, and especially in the 1970s and 1980s, the concept of cultural “phase” was recognized as being especially useful. Archaeologists began defining new Woodland cultural phases based on the newly defined taxonomic method known as the Cultural-Historical Integration method (Willey and Phillips 1958), which described a cultural phase as being a distinct archaeological unit with boundaries in space, time, and form (Willey and Phillips 1958:22).

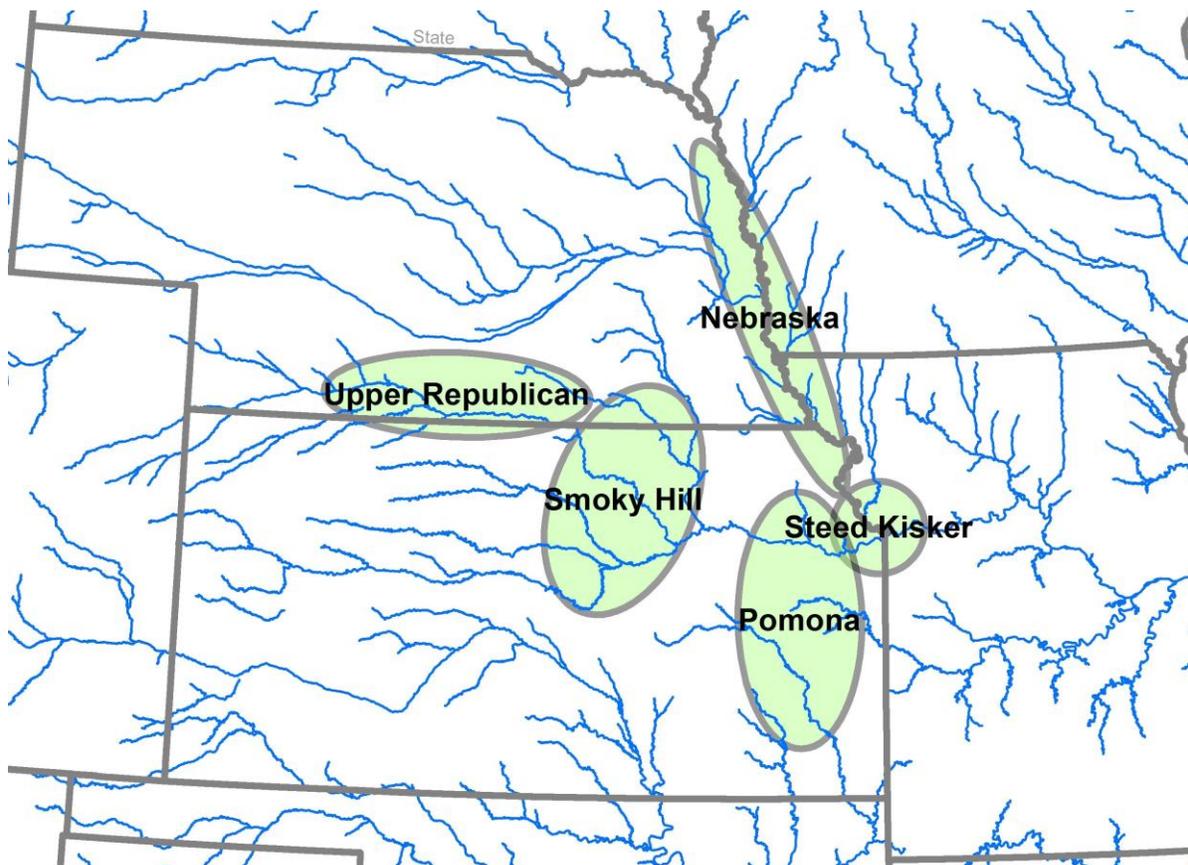


*Figure 1. Geographical expanses of Middle Plains Woodland (green area plots, AD 0-500) and Late Plains Woodland (pink-buff area plots, AD 500-1000) archaeological designation units discussed in the text.*

The Grasshopper Falls unit has been referred to as both a focus and a phase, but the latter definition has been more complete and is more widely accepted. In a memoir of excavations at the Hamon site, Jim Feagins (personal communication, January 8, 2014) recalls that in the late 1960s and early 1970s archaeologists were informally labeling some sites in northeast Kansas as pertaining to a “Grasshopper Falls Focus,” according to the McKern Taxonomic Method. However, Reynolds (1979) published a formal definition of a Grasshopper Falls phase based on artifact traits and the spatial and temporal characteristics of components from the Malm site (14JF307), the Anderson site (14JF331), and the Teaford site (14JF333) near the Lake Perry Reservoir in northeast Kansas. Although an earlier manuscript (Reynolds 1978) had already provided a tentative definition, Reynolds’ 1979 publication became the principal reference for identifying the Grasshopper Falls phase. The defining traits of the Grasshopper Falls phase include: 1) lithic technology in the form of medium to small corner notched or un-notched dart points and arrow points, 2) stone celts and other bifacial technologies, 3) ceramic technology dominated by cord-roughened or smoothed over cord-roughened, medium-size, conical base vessels, made from grit-tempered pastes, and 4) oval, single- to double wattle-and-daub habitation structures that had no internal hearths (Reynolds 1979).

The spatial limits of the Grasshopper Falls phase were defined as being along the Delaware River and its tributary systems. Reynolds (1979:65) noted that components at 124 prehistoric sites in the region could be attributed to the phase based upon these characteristics, but these had not been (and still remain to be) analyzed. The temporal framework from AD 500-1000 of the Grasshopper Falls phase within the Late Plains Woodland period is based upon estimates using one radiocarbon date of AD 760 ± 90 from the Anderson site (14JF331), which was available when Reynolds (1979:75) defined the phase. In the 35 years since the Grasshopper Falls phase was

defined, associated single and multicomponent sites have been identified, many of which have multiple components attributable to other Archaic, Plains Woodland, and Plains Village taxonomic units. Most identification of the Grasshopper Falls phase to date has been made on the basis of geography, the presence of what is considered “diagnostic” grit-tempered pottery, and associated radiocarbon dates within the range of AD 500-1000 (Baugh 1991; Benison 1996; Fosha and Logan 1991; Fosha and Williams 1990; Jones 1976; Williams 1986; Witty 1983).



*Figure 2. Geographical expanses of some Plains Village (AD 900-1400) archaeological designation units discussed in the text.*

Other cultural units identified for the Plains Woodland period in Kansas (only some of which have been labeled as phases) include Valley, Keith, Greenwood, Cuesta, Schultz, Kansas City Hopewell, Butler, Bemis Creek, Wakarusa, and Deer Creek. Plains Village period units that date after AD 900 include Smoky Hill, Upper Republican, Nebraska, Steed-Kisker, and Pomona (Roper

2006:105). Geographically, the Grasshopper Falls phase overlaps with the earlier Valley and the later Pomona and Nebraska (phases) of the Central Plains tradition, and borders the geographical extents of the earlier Middle Plains Woodland Kansas City Hopewell phase and the later Steed-Kisker phase of the Central Plains tradition. Temporally, Valley, Kansas City Hopewell, and Schultz are considered to be Middle Plains Woodland components that precede the Grasshopper Falls phase, while Pomona, Nebraska, and Steed-Kisker are considered to be Plains Village period components that succeed the Grasshopper Falls phase (Figures 1 and 2).

Although the extent range of Valley phase is often depicted on maps as extending into Kansas, no sites in the state other than 14DP3 (Taylor Mound) have been identified as a Valley component (O'Brien 1971). The Greenwood and Cuesta phases have been defined as bordering the Grasshopper Falls phase to the southwest and southeast geographically. The Schultz focus, limited to the geographical region of the north-central Flint Hills, has been defined as pertaining to a region west of that in which the Grasshopper Falls phase occurs (Adair 2013; Eymann 1966). The Keith phase is a Plains Woodland period manifestation that is geographically located in western Kansas and southwestern and central Nebraska. The Butler, Bemis Creek, Wakarusa, and Deer Creek phases were identified based on one site each in different geographic regions (Logan 2006). Researchers rarely mention these phases, and some have even expressed opinions that they may belong to other defined cultural units. For example, the Wakarusa and Deer Creek phases may be subsumed within the Grasshopper Falls phase on the basis of artifacts assemblages and geographic location (Logan 2006:86). Notable Plains Woodland cultural units defined in neighboring Nebraska, Missouri, Iowa, and South Dakota include Valley, Loseke Creek, and Sterns Creek (Figure 1).

Plains Woodland phases share more in common than they differ with respect to formal characteristics of artifacts and spatial organization. General characteristics include: 1) lithic technologies in the form of medium to small size projectile points, 2) cord-roughened, smoothed-over, plain, and elaborately decorated ceramics (Kansas City Hopewell), 3) site locations along major waterways and their tributaries, 4) the presence of post molds and daub for habitation and different functioning structures, and to a lesser extent, 5) evidence for agricultural practice. Many of the defined phases, or other taxonomic units, differ from one another only in certain artifact characteristics, such as ceramic temper, or feature differences such as the presence/absence of hearths within a habitation structure, and radiocarbon dates (which are limited). Some researchers (Logan 2006:85) have criticized the fact that many of the Plains phases in Kansas were defined without critical peer review, resulting in confusing terminology as well as issues of splitting and lumping unit designations. Some of these have been defined on the basis of extremely limited and perhaps insufficient evidence. For example, the Grasshopper Falls phase was originally defined on the basis of evidence from only three sites, none of which contained vertical provenience for the artifacts analyzed (Reynolds 1979), and only one radiocarbon date.

### **The Hamon Site (14JF350) Environment**

The Hamon site is located 0.5 miles south of the Jefferson/Atchison County line, north of Valley Falls, Kansas. It is situated on a terrace adjacent to wide shallow slough area on the north, and to the east of Coal Creek West, a tributary of the Delaware River. The major physiographic division of this portion of northeastern Kansas is the Central Lowlands section of the Interior Plains subdivision known as the Dissected Till Plains. The Dissected Till Plains are comprised of two areas, the Kansas Drift Plain and the Attenuated Drift Border (Shoewe 1949:289). The central and northern portions of Jefferson County are located in the Kansas Drift Plain. This is characterized

by glacial drift deposits that mantle the underlying bedrock as a result of at least two past glaciations. The topography is gently undulating with an erosional drift-controlled surface (Shoewe 1949:289). Near larger stream courses, the topography is dissected into gentle rolling slopes and wide open valleys are common. The land areas adjacent to the larger streams are highly dissected into large hilly regions (Shoewe 1949:289). Glacial tills of quartzite, granite, and other glacial erratics are common. Deposits of Quaternary loess sediments are abundant in the Kansas Drift Plain and certain areas of the Dissected Till Plains.

The Hamon site is located on a terrace composed of Wabash series soil. The Wabash silty clay loam is a deep soil formed in clayey alluvium (Dickey, Zimmerman, and Rowland 1974:20). A representative profile from a cultivated field in Jefferson County is described as a dark silty clay loam from the A-C horizons and depths are provided in non-metric units. The Ap horizon is 0-6 inches deep, followed by a A12 horizon 6-19 inches deep. Both are black in color. The B2g horizon, from 19-38 inches, is very dark gray and followed by a B3g horizon that is grayish brown. The C horizon from 43-80 inches, is dark gray and dark grayish brown (Dickey, Zimmerman, and Rowland 1974:20). The A12 horizon contains some fine, dark gray mottles. The B horizons contain fine distinct yellowish-brown mottles, and strong brown mottles. The C Horizon contains fine, faint, but distinct yellowish-brown mottles. Immediately surrounding the terrace, silty clay loam, and clay loam soils of Kennebec, Reading, Martin, and Pawnee clay series occur (Dickey, Zimmerman, and Rowland 1974:11-16).

The vegetation today includes a mixture of deciduous floodplain forests and savannahs that are occasionally interrupted by freshwater marshes in and around rivers and their tributaries (Kuchler 1974:600). Bluestem prairies dominate upland areas adjacent to the floodplains. The major species along the floodplain forests and savannahs include hackberry (*Celtis* spp.), cottonwood (*Populus*

spp.), peach-leaved willow (*Salix amygdaloides*), and black willow (*Salix nigra*) (Kuchler 1974:600-601). The freshwater marshes contain species of tall gramineae, most notable being prairie cordgrass (*Spartina pectinata*). The bluestem prairies contain a mixture of tall and medium size gramineae and numerous forbs. The most common species include big bluestem (*Andropogon gerardii*), little bluestem (*Schizachyrium scoparium*), switchgrass (*Panicum virgatum*), and Indian grass (*Sorghastrum nutans*) (Kuchler 1974:595-597). The Mosaic ecotone was appealing to prehistoric groups for sustenance, shelter, and raw material locations of chert, glacial till, and alluvium clays for production of cultural materials.

### **The Hamon Site (14JF350) Discovery and Excavation**

The site was brought to the attention of Tom Witty in 1971 by Milton Reichart, a local collector and amateur archaeologist, affiliated with the Kansas Anthropological Association (KAA). The site had been known to collectors, and Reichart thought it was important that KSHS archaeologists consider excavating it. After showing and donating a collection of ceramic sherds, lithics, a pipe, and possible figurines fragments to the KSHS, Witty and Reichart visited the site for a survey, coring and collecting more surface finds. On the basis of this visit, Witty recommended further subsurface exploration of the site through excavation. In the fall of 1971, KSHS archaeologist Tom Barr led an excavation with Reichart, John Reynolds, and other KAA members. The crew excavated for three days over two weekends instead of one weekend, as initially planned, due to heavy rain that started late on the first day of the excavation. The results of the dig were summarized in a few paragraphs, published in the KAA fall newsletter (Barr 1971). In April and May of 1972, over the period of three weekends, a crew consisting of Witty, Reynolds, members of the KAA, and Witty's Washburn University students went back to the site and expanded the excavation grid (KSHS 1972: 14JF350 record number 58).

Excavated artifacts and interpreted features included lithic tools and debitage, daub, ceramic sherds, post-molds, storage pits, a presumed house feature associated with an infant burial, rock, burned earth, and additional human remains consisting of a mandible and occipital fragments. Hearth features are described in the records, but are not referred to by Barr (1971) or Reynolds (1987). One radiocarbon date was obtained on a sample of charcoal recovered from the upper fill of the pit containing an infant burial in the center of the interpreted house floor. The uncorrected date of  $1000 \pm 95$  BP was initially calibrated in 1998 by the University of Washington Quaternary Isotope Laboratory. Using Radiocarbon Calibration Program 4.3 (Calib Rev 4.3), the lab determined a 2-sigma range of AD 862-1251 with 0.987 relative area under the probability distribution and a median probability of AD 1041. This central date fell close to AD 1000, the traditional boundary between the Plains Woodland and Plains Village periods. The site has an Unmarked Burial Site number (UBS 1991-51) due to the presence of an infant burial in compliance with the Kansas Unmarked Burial Site Law (KSA 75-2741 through 75-2754).

### **Summary**

The conclusion of my thesis is that the Hamon site contains a palimpsest of multiple components where activities of ceramic and lithic production, and burial of the dead took place. This interpretation results from a combination of critical analyses of artifacts according to typological traits and interpreted use, a spatial reconstruction of artifact provenience, newly obtained radiocarbon dates, and a survey I performed to locate the Hamon site and the original excavations. In addition, I utilize theoretical perspectives on archaeological palimpsests, analysis of Woodland sites located in plowed fields, and material evidence for ceramic production to support my arguments (Bailey 2007; Binford 1972; Stark and Garraty 2004). Additional arguments and conclusions of my thesis involve the problems of archaeological taxonomy. Specifically, some

defined archaeological units are based on ceramic traits more than features and assemblages of components as a whole. The ceramic analysis of the Hamon site material reveals that variable traits are present that are identical to pottery wares designated under different archaeological units, and more research is needed to explore the similarities and possible augmentations for defining Grasshopper Falls and other Late Plains Woodland designation units.

Various approaches to the analysis of the Hamon site's excavation records, artifacts, and spatial distribution are presented in this thesis, following the evolution of my analysis. As my analysis of the lithics and ceramics began to show variability, and then the excavation records began to reveal artifact provenience and features suggestive of multiple components, it became apparent that radiocarbon dates needed to be obtained and a thorough spatial analysis needed to be reconstructed for the original excavations. I obtained residue from the charred interiors of ceramic sherds associated with different provenience and features. These samples were submitted to Direct AMS in Washington for dating, and the results of four assays span nearly the entire Late Plains Woodland period (AD 500-1000). The spatial analysis of artifact provenience from the original excavations also reveals patterns suggestive of the site extending outside the excavation limits. Finally, I performed a pedestrian field survey of the Hamon site in October, 2014. I located a polyethylene sheet laid down after the original excavations and recovered numerous artifacts in the process.

The following Chapters of my thesis are presented in the same order of my analysis described above. A detailed description of my methods follows next in Chapter 2. Chapters 3 and 4 present the lithic and ceramic artifact analysis, and Chapter 5 presents the spatial analysis of the original excavations (based on excavation records and an artifact catalog), old and newly obtained radiocarbon dates, and the October 2014 survey results. Brief references to the radiocarbon dates

and spatial analysis occur in the artifact analysis chapters to provide support in discussions and interpretations. Incorporation of the different analyses are presented in the conclusion of my thesis that the Hamon site is 1) a multicomponent site with 2) activities of lithic and ceramic production, and burial of the dead by different groups of people in time, 3) pottery is present and reflective of interaction with other Plains Woodland groups over a larger geographical area, and 4) archaeological designation units with identical pottery descriptions need further research to refine the taxonomy and pursue further studies of interaction between Late Plains Woodland groups over a larger regional area in the Plains.

## CHAPTER 2: METHODS AND TECHNIQUES

The methods and techniques utilized in this research include artifact analyses, AMS radiocarbon dates from pottery residue, a spatial analysis of artifacts from the original excavations, and a modern-day pedestrian survey with limited testing to locate the original excavation and determine the site boundaries. The excavators of the Hamon site interpreted it as a single component habitation house structure with an infant burial in the house floor. While the presence of daub may indicate a house structure, my analysis provides another interpretation that involves the use of an open fire kiln for pottery production. The combined techniques of analysis also reveal that the Hamon site does not contain a single component, but was occupied on multiple occasions, resulting in the formation of an archaeological palimpsest. Archaeological palimpsests are the results of consecutive occupations that either erase the previous traces of activity, or mix with them so well that they cannot be differentiated. In theory, the former is known as a “true” palimpsest and the latter a “cumulative” palimpsest (Bailey 2007:203-04). Consecutive occupations and modern plowing have given the Hamon site mixed characteristics of both palimpsest types.

### **Lithic Artifact Analysis**

The lithic artifact assemblage from the Hamon site was analyzed in terms of tool type and reduction sequence. The methods utilized combined techniques and terminology to identify tools and debitage, based on Andrefsky’s and Odell’s terminologies and methods (Andrefsky 2005, Odell 2004). The categories include tools and debitage. The debitage is categorized based on attributes of cortex, bulbs of percussion, terminations, errailure scars, and angular or blocky debris. The debitage categories are categorized as follows; primary flakes, secondary flakes, tertiary flakes, debris (angular or blocky), and shatter. Cores, bifaces, scrapers, points, abraders, and other discernible tools (hammer stones, manos, and metates) are categorized accordingly. Other lithic

materials not considered to be tools or reduction debris (limestone, quartzite, sandstone, and other glacial erratics) are categorized as rock, with heating traits being noted for delineation of use (for example, rocks for hearths or other activities). Rocks associated with ceramic production activities are addressed separately in the ceramic analysis.

Identifying projectile points is an arduous undertaking. Projectile points discovered in Kansas are no exception to this statement. To date, there are no publications that define the morphological aspects of projectile points found explicitly in Kansas. Researchers have to utilize publications of typologies defined for points in the southern (some southern plains typologies do consider Kansas as part of the study area; Duncan et al 2007), eastern, and Midwestern United States. The latter is usually restricted to Illinois, and immediate surrounding states (Justice 1995), and rarely notes that the points are found in Kansas, even though morphological correlates may be common in this area. These publications are still useful in the context that one can relate morphological correlations of points found in Kansas to those that have been put into a typology in the outlying Midwest and east. However, it is my opinion that labeling points found in Kansas that share morphological traits with named points in other areas of the United States, can be problematic. For the method employed here, I did not assign type names to projectile points from the Hamon site. Instead, the points were identified based upon the morphological correlates to named points. The results conclude that some points share morphological correlations with several named types. This technique is important for identifying points without putting them into controversial typologies.

### **Lithic Raw Material Analysis**

Raw material sources of the lithic tools and debitage is also part of the analysis. The methods involve analysis of the geological systems and outcroppings of Kansas, with special focus given to the geological nature of Jefferson County, literature of previously identified lithic materials

found in Kansas and their regional locations, and direct comparison of the lithic materials from the Hamon site with the University of Kansas' lithic comparative collection (KUMA-LCC). The macroscopic and microscopic elements of the lithic materials from the Hamon site were cross referenced with the KUMA-LCC materials for identification. As noted in other lithic material sourcing studies (McLean 1998; Stein 2006), the time and expense of performing advanced analysis by means of petrographic thin-sections, trace-element sourcing, x-ray diffraction and other methods were not feasible for this study. Ultra-violet light fluorescence was attempted, but the results were ineffective in producing a response with the Hamon site materials.

McLean's lithic material sourcing analysis of material from the DB site (14LV1071) was innovative for visual comparative methods (McLean 1998). Since researchers utilizing the visual comparative method alone cannot be 100% confident that their interpretation is correct, McLean developed a confidence ratio method. My study utilized the same technique to rank the material into four categories of identification confidence; positive, probable, indeterminate, and unidentified. Positive specimens fell into an 80-100% confidence scale of identification. Probable fell into a 60-80% scale. Indeterminate was used for material that closely fit one material type, but showed traits with at least one other material type in addition. This was for specimens falling into a 50-60% confidence scale. All other specimens that could not be placed into the previous three ratings were categorized as unidentified. The confidence scale method is elaborated further in Chapter 3.

### **Ceramic Artifact Analysis**

The abundant ceramic sherds from the Hamon site were analyzed in terms of temper material, vessel form, size and decoration. As with the lithic material, advanced techniques of micro-chemical analysis, among others, were not feasible for the time and budget of this analysis.

Following techniques for macroscopic and microscopic identification of temper, reconstruction of vessel form from sherds, and decoration (Rice 1987; Shepard 1956), the analysis compared the ceramics with definitions for Grasshopper Falls' ware and other Plains Woodland wares respectively.

Of particular interest is the relationship of Grasshopper Falls ware with Valley Cord-Roughened and Sterns Creek ware. Sites with components attributed to these cultural designation units of the same name, occupy overlapping geographical areas in the glaciated region (Ludwickson and Bozell 1994:115; Reynolds 1979:67). Valley Cord-Roughened ware is described as elongated vessels with conoidal bases. The cord-roughening pattern is typically vertical, diagonal, and sometimes crisscrossed. The rims vary from strait to slightly flaring and contain minor decorations below the rim of bosses or oblique tool impressions. The predominant temper materials are sand and grit (Hill and Kivett 1940). The Sterns Creek ware (Tiffany 1971, 1977) is described as being cord-roughened, straw-impressed (brushed), and lacking decoration except for the lip of rims that can be tool impressed forming a "scalloped" design. The Grasshopper Falls ware is remarkably similar in description to both Valley Cord-Roughened and Sterns Creek ware. The ware is typically cord-roughened or smoothed over cord-roughened. The pattern is vertical or diagonal. The necks are slightly constricted with strait to slightly flaring rims. Occasional decorations on rims include bosses or oblique tool impressions. Some of the rims and shoulders are also "brushed" and contain tool impressions on the lips. The predominant temper material is grit and occasionally sand (Reynolds 1979).

The ceramic analysis investigates the relationship between the above and other defined cultural designation unit pottery wares (Loseke Creek ware, Held ware, Minotts ware and Steed-Kisker ware) to explore the hypothesis that Valley, Sterns Creek, Grasshopper Falls, and other Plains

Woodland (and possibly early Plains Village) units may be related in cultural development during the Plains Woodland Period. The brief description of Valley Cord-Roughened ware, Sterns Creek ware and Grasshopper Falls ware is given above to introduce the similarities between their described traits and form. Ceramics from the Hamon site and all of the above mentioned wares are further described in Chapter 4.

### **Spatial Analysis**

In order to pursue the research goals of delineating the number of component(s) or occupations at the Hamon site, the provenience data of all artifacts were entered into an Excel database. The vertical and horizontal provenience for each artifact was collected during the 1971-72 excavations. The resolution is not very high. The vertical provenience is limited to 0.5 foot levels for each artifact (during the time of the original excavations the KSHS did not use the metric system). The excavation reached approximately 1.7 feet below the surface. Therefore, all artifacts collected can be put into one of four arbitrary 0.5 foot levels. The horizontal provenience for each artifact is limited to the excavation grid unit from which it was recovered, unless it was associated with a feature, in which case exact horizontal location was recorded. Following spatial analysis methods conducted at Hatchery West (Binford 1972), but with no surface and no vertical balk wall provenience data to analyze, numerical distributions and total weight of artifacts from different levels, and units of the excavation grid were reconstructed. They support the Hatchery West conclusions about Woodland sites in plow zones: surface concentrations do not always reflect the subsurface nature of the site and number of occupations present.

The reconstruction of this data was conducted by entering the Excel data into a vector-based software that projects the data in visual imagery, based on counts of artifacts and replicated measurements within the excavation grid. The count frequencies projected into the grid are cross

referenced with total artifact weights to enhance interpretations of distributions and concentrations. Features from excavation records and interpreted post molds are also superimposed over the count and weight data projections, with symbols and legends that are described in associated tables. Post molds are shown in larger scale than their actual interpreted dimensions for ease of appearance. The counts are empirical to each unit and level to project a total of all artifacts and weight.

Reconstruction of the vertical and horizontal locations of the artifacts reveals the site features as they were interpreted by the excavators, and many other features indicative of different activity zones and possible occupations that are acknowledged on record forms. This reconstruction reveals that the original interpretations are too simple for a complex site such as Hamon, and a new model for interpretation is presented. The modern plowing of the field in which the Hamon site is located, palimpsest development from multiple occupations and lack of provenience for 1,615 artifacts complicate an optimal spatial analysis. However, the documented provenience of 3,937 artifacts, and the plow zone extending through one and a half or possibly two of the four 0.5ft levels that were analyzed, reveals that general concentrations and vertical zones of occurrence are still open to interpretation.

### **AMS Radiocarbon Dating**

Four AMS dates were obtained on residue from pottery to add to the one conventional charcoal date obtained by the KSHS in the early 1990s. Eight different sherds from the assemblage contained a significant amount of charred residue on their interiors. The four best samples, representing the surface, a hearth feature in Level 3, the daub concentration from Level 2 referred to by Reynolds (1987:162-165), and a Level 2 sample with different horizontal provenience than the daub feature, were submitted to Direct AMS in Washington for dating. The results reveal older dates from the hearth feature in Level 3, and the sample from the collected surface material. The

younger dates come from the both of the Level 2 samples. All four dates in combination with the one conventional date obtained by the KSHS, support the interpretations that the site had multiple components.

All five dates were calibrated in Calib Rev 7.0.2 and OxCal 4.2.4 (Bronk Ramsey 2009; Reimer et al. 2013). A combination of all dates was performed to analyze the possibility of different dates being reported for one chronological event (*r-combine* tool in OxCal 4.2.4). The test of significance for the dates resulted in a failed chi square test, concluding that they are indeed significantly different and not reporting different dates for the same occupation. I also ran a model in OxCal 4.2.4 that tells the program there is one group of five dates that are sequential in order with a start and end boundary (a one sequential group model with boundaries created by the model). I also randomly entered the dates in the one sequential group model to cross check the agreement values and confidence intervals from each model with the failed chi square test from the combined dates. The one sequential group model with the ordered dates had higher agreement values and confidence intervals than the random model and further supports the significantly different dates from multiple occupations of the Hamon site. AMS calibration and OxCal models are described further in Chapter 5.

#### **2014 Pedestrian Survey to Locate the Hamon Site and Original Excavations**

Charles Hamon informed me that when the excavation was completed in 1972, the archaeologists laid down polyethylene sheets over the grid prior to back filling. With permission from Charles Hamon and the aid of two fellow students, in October 2014 I performed a survey with limited shovel testing to locate the site and original excavations. The survey was successful in locating a portion of the polyethylene from the excavations, and numerous artifacts in the process including points, ceramics, burned earth, quartzite, and hematite/limonite-rich

sedimentary rocks. The survey results are important because they support 1) the ceramic variability, 2) the spatial and excavation records analyses that differ from referenced interpretations, and 3) the observation that the excavation grid was not expanded far enough to interpret features and concentrations that appear to expand into unexcavated units.

The survey was successful due to LIDAR analysis in ArcGIS and targeting the location where Mr. Hamon remembered the excavations occurring, in contrast to the recorded location on file at the KSHS. All coordinates from the survey shovel tests were recorded with GPS and plotted in ArcGIS to show the location of polyethylene and artifacts in reference to an approximate location of the original excavation grid.

### CHAPTER 3: LITHIC ARTIFACTS

The Hamon site lithic assemblage is analyzed by type in forms of tools and debitage. In addition, the raw material types are identified as confidently as one can when methods are limited to comparative collections. Both aspects of the lithic analysis are important for understanding activities at the Hamon site. Variety among raw material types is significant for understanding resource procurement via local or long distance activities and possibilities of trade with other groups of people. Reduction sequences across material types can also reveal different patterns of activity at the site. Coupled with a chronological framework of a site, the variety in these patterns can indicate the diversity of activities among one group of people or can suggest that multiple groups occupied the site and engaged in different activities. Thus, to interpret the above possibilities, data from the lithics is an important addition to the analyses of the Hamon site.

The lithic assemblage consists of 2,277 artifacts, of which 1,082 are categorized as tools and debitage (Table 1). The remaining 1,195 show no signs of human modification and have been categorized as “rock” (Table 2). However, this categorization does not imply that they are not the result of human activity. They may have entered the site in the context of 1) hearths and cooking activities, 2) raw material for ceramic production, and 3) raw material for lithic production. The discussion of the use of rocks for ceramic production will be addressed in Chapter 4.

The 110 stone tools are classified by a type-variety method based on the criteria of 1) shape, 2) technology, 3) type and location of intentional modification, and 4) use-wear (cf. Odell 2003:106-107). The 972 pieces of debitage from the reduction of stone tool production/maintenance activities are categorized based on a hybrid model of the Sullivan Rosen Technique (SRT) (Sullivan and Rozen 1985) and the triple-cortex approach (Andrefsky 2005:115-118). The SRT method classifies debitage into 1) complete flake, 2) broken flake, 3) flake

fragment, and 4) debris. In this system, a *complete flake* is one that is completely intact, a *broken flake* shares the same attributes but has fractured margins, a *flake fragment* is missing platforms (bulbs of percussion are not present as well), and *debris* has an indiscernible ventral surface. The triple-cortex approach classifies flakes into *primary*, *secondary*, and *tertiary* reduction sequences based on the amount of cortex present on dorsal surfaces. Primary flakes are categorized by the presence of 50% or more cortex, secondary with less than 50%, and tertiary with no cortex present. Andrefsky (2005:115) notes that this method is the most popular, even though some researchers use these categories with alternative percentages of cortex, a practice that has been criticized by Sullivan and Rozen (1985:757).

*Table 1. Total Counts of Lithic Tools and Debitage by Category and Material. \*Denotes Unidentified Material and Categories with Counts Represented by Whole Specimens and Fragments.*

Lithic Reduction/ Tool Type	Westerville/ Toronto	Plattsmouth	Winterset	Permian	Secondary	Glacial Till/ Sedimentary/ Metamorphic	*Unid.	Total
<b>Debitage:</b>								
Primary Flakes	3	3	2	2	53	1	3	<b>67</b>
Secondary Flakes	10	11	2	4	95	0	13	<b>135</b>
Tertiary Flakes	19	14	13	2	11	0	4	<b>63</b>
Utilized Flakes*	5	3	3	1	4	0	0	<b>16</b>
Debris	51	34	33	14	403	7	149	<b>691</b>
<b>Total Debitage</b>	<b>88</b>	<b>65</b>	<b>53</b>	<b>23</b>	<b>566</b>	<b>8</b>	<b>169</b>	<b>972</b>
<b>Tools:</b>								
Points	5	2	2	0	4	0	1	<b>14</b>
Bifaces	5	2	2	2	5	0	0	<b>16</b>
Scrapers/Drills	0	0	2	0	2	0	0	<b>4</b>
Cores	5	6	1	0	26	0	1	<b>39</b>
Groundstone/ Hammerstone*	0	0	0	0	0	25	0	<b>25</b>
Celts	0	0	0	0	0	3	0	<b>3</b>
Abraders/ Sandstone Pipe/ Polished Hematite	0	0	0	0	0	9	0	<b>9</b>
<b>Total Tools</b>	<b>15</b>	<b>10</b>	<b>7</b>	<b>2</b>	<b>37</b>	<b>37</b>	<b>2</b>	<b>110</b>
<b>Overall</b>	<b>103</b>	<b>75</b>	<b>60</b>	<b>25</b>	<b>603</b>	<b>45</b>	<b>171</b>	<b>1082</b>

The flake and debitage classification strategy used in this study is based on attributes from both SRT and triple-cortex methods in order to simplify categorization, employing what Odell (2003:101) calls “the technique used to produce [flakes] or the stage in which they occurred in the lithic reduction process.” Artifacts are divided into the categories of flakes and debitage, defining the latter as blocky/angular debris and shatter. My definition of a complete flake is slightly modified from that used in a typical SRT method as described above. SRT differentiates a complete flake from a broken flake on the basis of non-intact lateral margins, but I included as complete flakes those broken flakes that had platforms and clear bulbs of percussion on the ventral surfaces with fragmented margins. I did this only when more than 75% of the flake from the proximal end to the distal end was present, and only if a complete margin fracture was present in the 25% portion of the distal end. A complete flake could also have minute fractures or small areas of lateral margins missing, but was not fractured from one margin to another, severing the flake into two or more fragments. Following Andrefsky (2005), I categorized a flake as *primary* when cortex was > 50% from proximal to distal end, as *secondary* with cortex < 50%, and as *tertiary* when no cortex was present.

Table 2. Lithic Material Classified as "Rock."

Lithic Material (Rocks)	Total
Basalt	11
Gabbro	8
Granite	58
Unidentified Glacial Till	8
Hematite	19
Limestone	398
Limonite	16
Quartz/Quartzite	176
Sandstone	456
Schist	6
Secondary	19
Unidentified	20
<b>Total</b>	<b>1195</b>

Midsections and distal portions of broken flakes were categorized as *debitage* along with blocky debris and flake shatter. I did this because fragmented flakes are hard to recognize and are, therefore, conservatively included in undetermined categories (Odell 2003:121). Flakes that showed retouch on one or both lateral margins were categorized as *utilized flakes*. It is difficult to differentiate between an actual utilized flake and a thin margin that has suffered silica dissolution from weathering, trampling, or other post depositional processes, so utilized flakes were categorized conservatively. My analysis provides an interpretive model for reduction activities represented in the lithic assemblage. I make references to chert types in this analysis, but lithic raw material identification is discussed in the section that follows analysis of form.

### **Tools and Debitage**

Excavators recovered 14 projectile points (Table 3, Figure 3), representing a mixture of types ranging from medium-to-large corner-notched darts to small triangular arrow points. Projectile point classification can be a difficult task, as many types defined for specific subregions have no morphological difference with defined types from another. The types Steuben, Lowe Flared, Bakers Creek, and Chesser Notched are good examples of this and are relevant for this analysis. These four point types are morphologically similar, if not identical, as many scholars have acknowledged (Bell 1958, 1960; Justice 1995; Perino 1968, 1971). The issue has been best handled by Justice (1995), who grouped all the different correlates into clusters. I will describe points using Justice's method.

Morphological similarities across different chronological units can make point identification problematic. Many Archaic points are morphologically similar to Woodland points. For instance, the Late Archaic Table Rock cluster and the Middle-to-Late Woodland Lowe Cluster, as well as the Late Archaic Merom cluster and the Late Woodland Scallorn Cluster, are excellent examples

of this issue. Problems of chronological relationships can be aided by absolute dates from contexts in which points are recovered. However, this is not always possible. Two points from the Hamon site assemblage are morphological correlates that resemble two technological styles from different chronological periods, the Late Archaic Table Rock cluster, and the Middle-to-Late Woodland Lowe Cluster.

*Table 3. Projectile Points from the Hamon Site Classified as Morphological Correlates and by Material Type. \*Denotes Unidentified.*

Projectile Point Correlates	Westerville/ Toronto	Plattsmouth	Winterset	Secondary	*Unid.	Total
Motley	0	0	0	1	0	1
Lowe Cluster/ Possibly Late Archaic	0	0	0	2	0	2
Lowe Cluster/ Reworked Snyders	0	1	0	0	0	1
Lowe Cluster	1	1	0	0	0	2
Scallom Cluster	4	0	2	1	1	8
<b>Total</b>	<b>5</b>	<b>2</b>	<b>2</b>	<b>4</b>	<b>1</b>	<b>14</b>



*Figure 3. Points from the Hamon site. Top row, left to right, (a) c.3385, (b) c.356, (c) c.72.62.773, (d) c.2999, (e) c.2369, (f) c.4086, (g) c.338, (h) c.72.62.772. Bottom row, left to right, (i) c.1500, (j) c.72.62.771, (k) c.1499, (l) c.3274, (m) c.72.62.752, (n) c.2343.*

Six points (Figures 3 and 4, bottom row) have expanding stems that vary from straight to convex with either deep, round corner notches or upward curving corner notches. They are most similar to Late Archaic and Woodland Snyders, Motley, Table Rock Stemmed, and Lowe Cluster points. The blades are subtriangular and either straight to excurvate. One (Figure 3l) resembles a Snyders point in notching and pronounced shoulder barbs (Bell 1958:88; Justice 1995:201-204). However, the neck is extremely thin in comparison to an Early-to-Middle Woodland Snyders point, and the blade is more triangular than ovate. It is a better match with the Late Archaic Motley cluster in morphology (Bell 1958:62; Justice 1995:198-200). I compared its measurements with data available from 224 Motley points from Poverty Point, Louisiana (Justice 1995:254) and found that it fell not only within this range, but fit almost exactly with the mean (Table 4). However, neck and base width data were not available for the stems of the Poverty Point specimens, so those traits might reveal further similarity or discrepancy. Two points (Figure 3m-n), both biconvex in cross section, resemble the Lowe Cluster points in upward-curving notches, excurvate blade edges, expanding stems, and straight to convex bases (Justice 1995:208-14; Perino 1968:94, 1971:6, 60). However, they also resemble Late Archaic points, such as the Table Rock Stemmed, in basal-grinding and pressure-flaking techniques. One specimen (Figure 3m) appears to have impurities in the chert that affected the manufacturing process. The distal tip is also missing. Both points' measurements fit into the average measurements for other Lowe Cluster points (Justice 1987:254-255; Table 4). One specimen (Figure 3j) resembles a Steuben point of the Lowe Cluster or may be a reworked Snyders point. Its stem and base width, along with the convex base, fit well with data for other Snyders points (Justice 1995:254; Table 4). Two specimens (Figure 3i and k) fit extremely well with the morphology and measurements of Lowe Cluster points. They exhibit upward curving corner notches, expanding stems, rounded shoulders, and slightly excurvate

subtriangular blades. I measured the five Lowe Cluster correlates collectively and compared them with other Lowe Cluster point data. They match favorably in every category (Justice 1995:254-255; Table 4).

*Table 4. Measurements of Points from the Hamon Site Compared with Available Morphological Correlate Measurements Compiled by Justice (1995). \*One Point, Resembling a Possible Retouched Snyders or Steuben, was Averaged in both Categories.*

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

I compared the six points that correlate with Motley, Snyders, and Lowe Cluster points with points from Quarry Creek (14LV401), a Kansas City Hopewell site in Leavenworth County, Kansas (Logan, et al. 1993), for three reasons: 1) it is located less than 30 miles to the east of the Hamon site in the same geological region, 2) the collection is curated at the University of Kansas and 3) some points from the Hamon site resemble Middle Woodland Hopewell correlates. Several of the specimens are almost identical to some Quarry Creek specimens (Figure 4). Not only is

there strong morphological similarity, but the chert from which they were made was identical in nearly all of the specimens (exceptions being points that appear to be made from secondary source material). This includes a gray chert with abundant fossils that is described as Plattsmouth or Spring Hill (Logan, et al. 1993:134), and light-gray cherts that resemble Westerville chert. The points from Quarry Creek also correlate morphologically with the Snyders and Steuben types (Logan, et al. 1993:135-136). This reinforces the morphological and measurement data of the points from the Hamon site and suggests a relationship with terminal Middle and Early Late Woodland Kansas City Hopewell points.



*Figure 4. Points from the Quarry Creek site (14LV401). Top row, left to right, (a) c.A2728-91, (b) c.A2334-91, (c) c.A4182-91, (d) c.A1989-91, (e) c.A4002-91, (f) c.A4135-91. Points from the Hamon site (14JF350). Bottom row, left to right, (g) c.1500, (h) c.72.62.771, (i) c.1499, (j) c.3274, (k) c.72.62.752, (l) c.2343.*

The other eight points (Figure 3, top row) are morphological matches for the Scallorn Cluster (Bell 1960:80; Justice 1995:220-222) and five are morphologically identical to its Sequoyah variety (Justice 1995:223-224; Perino 1968:88). These five points are thinner than the regular Scallorn type and have pronounced serrations on the blade edges. Two specimens (Figure 3c and

g) are missing stems, but the shoulders and extreme distal portions of the necks are present. Two specimens are complete (Figure 3e-f) and one (Figure 3d) is nearly complete with the extreme distal tip of the point missing. The other three specimens are typical Scallorn types, of which one (Figure 3h) is complete, one (Figure 3a) is missing the stem, and one (Figure 3b) is missing a portion of a lateral stem edge with a notch remaining on the complete side. The complete point (Figure 3h) has deep corner notches, giving it very pronounced shoulders, slightly excurvate blade edges, and a slightly convex base. It has remarkable morphological similarity to point types of the Snyders Cluster but in miniature form. Averaged measurements from the Scallorn Cluster points were consistent with other Scallorn Cluster points (Justice 1995:255), especially for the Sequoyah variety (Table 4).

Sixteen bifacial knives and preforms (Figures 5 and 6) were collected (Table 1). The knives are thick and biconvex in morphology (Figure 5a-c). Four (c.1285, c.0-3, c.72.62.753, c.72.62.760) not pictured here, are broken fragments. Two may have been scrapers, but the morphology and use is ambiguous. One preform (Figure 6e) is made from Westerville or Toronto chert and has measurements that fit the dimensions of some of the larger points recovered from the site. Another one of the preforms (Figure 6a) is small and ovate/triangular in morphology. This is morphologically similar to the un-notched Scallorn type known as a Crisp Ovate, which some consider to be a preform for the Scallorn type or its Sequoyah variety (Justice 1995:223). One of the bifacial fragments may be the lateral half of a base from a corner notched projectile point.

Excavators recovered four drills and/or scrapers (Figure 5, bottom row). Two (Figure 5f-g) may have functioned as both. One (Figure 5f) may have been a medium-to-large size point that was retouched until it no longer functioned as a point. Two specimens (Figure 5d-e) are unifacially worked end scrapers.



*Figure 5. Bifaces, scrapers, and drills from the Hamon site: Top row, left to right, (a) c.72.62.757, (b) c.0-2, (c) c.72.62.756. Bottom row, left to right, (d) c.72.62.751, (e) c.72.62.754, (f) c.72.62.755, (g) c.0-4, (h) c.390.*



*Figure 6. Bifacial preforms from the Hamon site. Left to right, (a) c.1862, (b) c.751, (c) c.2246, (d) c.72.62.758, (e) c.2963.*



*Figure 7. Secondary source cores from the Hamon site. Top row, left to right, (a) c.3710, (b) c.1750, (c) c.3011. Bottom row, left to right, (d) c.72.62.761, (e) c.2053, (f) c.1830, (g) c.1513.*



*Figure 8. Primary source material cores from the Hamon site. Top row, left to right, (a) c.846, (b) c.4171, (c) c.3793, (d) c.4250. Bottom row, left to right, (e) c.2706, (f) c.0-1, (g) c.4263, (h) c.4217.*

Thirty-nine cores were recovered from the site (Figures 7 and 8). Of these, 23 represent testing cores of secondary source material. These are water-worn, chert-bearing cobbles in which flakes were removed only a few times to examine their potential quality for tool production (Figure 7). The remaining 16, all blocky, bilaterally reduced cores, do not show uniformity in reduction. They show reduction on multiple faces, and some were reduced on every face in various overlapping

directions until the point of expenditure. Twenty-six made from secondary source material dominates the core assemblage. The remaining cores have been identified as Plattsmouth, Westerville/Toronto, Winterset, and unidentified (Table 1, Figure 8).

Debitage in the form of flakes, utilized flakes, and debris (blocky/angular debris and shatter) is represented by 972 artifacts. These were categorized as 67 primary flakes (cortex > 50%), 135 secondary flakes (cortex < 50%), and 63 tertiary flakes (0% cortex), comprising 27% of the debitage assemblage (primary 7%, secondary 14%, and tertiary 6%). Sixteen utilized flakes comprise another 2%. Debitage in the form of blocky debris and shatter comprises the remaining 71% (Tables 1 and 5).

*Table 5. Debitage Categories with Percentages across Material Types. \* Denotes abbr. "Unidentified."*

Debitage Type	Westerville/ Toronto	Plattsmouth	Winterset	Permian	Secondary	Glacial Till/ Sedimentary/ Metamorphic	*Unid	Total
Primary Flakes	3.4%	4.6%	3.8%	8.7%	9.4%	12.5%	1.8%	<b>6.9%</b>
Secondary Flakes	11.4%	16.9%	3.8%	17.4%	16.8%	0.0%	7.7%	<b>13.9%</b>
Tertiary Flakes	21.6%	21.5%	24.5%	8.7%	1.9%	0.0%	2.4%	<b>6.5%</b>
Utilized Flakes	5.7%	4.6%	5.7%	4.3%	0.7%	0.0%	0.0%	<b>1.6%</b>
Debitage	58.0%	52.3%	62.3%	60.9%	71.2%	87.5%	88.2%	<b>71.1%</b>
<b>Total</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

Two variables conceal the resolution of interpreting the lithic reduction: 1) the secondary source, Permian and unidentified cherts, and 2) the Pennsylvanian cherts. The low percentage of tertiary flakes compared to other categories suggests primary lithic reduction activity. However, when percentages for debitage categories are examined separately for secondary source, Permian, and unidentified cherts in one group and Pennsylvanian cherts in another, two different patterns are apparent. The first one arises with the secondary source, Permian, and unidentified cherts, which account for 766 artifacts (including one primary flake and seven pieces of quartzite debris).

Primary flakes, secondary flakes, and debitage categories compose 97.4% of the total for the secondary cherts, 87% for the Permian, and nearly 97.7% for the unidentified chert materials (Table 5). With a low percentage of tertiary and utilized flakes for this material, the above-mentioned pattern of a primary lithic reduction sequence is apparent. In combination with the “testing” aspect of the secondary source cores and the poor nature of a majority of the chert-bearing cobbles, the activity of primary decortication with large amounts of blocky debris and shatter would be expected. The total numbers for identified Permian chert is low, but a large amount of the unidentified material, and even the secondary source material may be Permian due to the same reduction pattern. It is arguable that the secondary source, Permian, and unidentified material show nearly identical reduction sequences because they were utilized by the same person, or group of people at the Hamon site. However, difficulty in identifying the secondary, Permian, and unidentified chert is a factor here. This topic will be discussed further in the sourcing section of this chapter.

In contrast to the secondary source and Permian chert data, the Pennsylvanian cherts average nearly identical percentages in primary, secondary, and tertiary flake reduction. The pattern shows a steady increase from primary to tertiary flakes, which are more abundant than primary and secondary flakes combined (Table 5). Utilized flakes are more abundant among the Pennsylvanian cherts, and debitage in the form of debris and shatter varies from 51% to 62%. This data reveals a pattern of secondary reduction sequences on lithic material that had already undergone primary decortication at another locale. This suggests that Pennsylvanian chert bifaces, preforms, and finished tools were being retouched more frequently. This pattern is skewed in the total percentages of all the material because the secondary source cherts make up 58% of the debitage assemblage.



*Figure 9. Pecked and smoothed celts from the Hamon site. Left to right, (a) c.1577, (b) c.577, (c) c.72.62.765.*



*Figure 10. Groundstone, handstone, abrader, polished hematite and sandstone pipe from the Hamon site. Top row, Left to right, (a) c.2342/c.3834/c.1712 Refit, (b) c.72.62.769, (c) c.540. Bottom row, left to right, (d) c.72.62.774, (e) c.72.62.767, (f) c.212.*

Groundstone artifacts, in the form of handstones (commonly referred to as manos), hammerstones, celts, abraders, a piece of polished hematite, and one pipe (Figures 9 and 10) are represented by 37 of the remaining lithic tools. Seventeen groundstone artifacts are broken handstones or mullers (Table 1). However, no whole grinding slabs (commonly referred to as

metates) or fragments were recovered. Three diorite celts, one complete (Figure 9a) and two fragmentary (Figure 9b-c), were made from a diorite that could be sourced locally. One incomplete sandstone pipe (Figure 10e) shows evidence of difficulties in the production process that may have contributed to breaks on one side of the artifact. It resembles platform pipes made of polished hematite or stone by Hopewell groups in the Middle Woodland period (Figure 10e). One object is a piece of polished hematite (Figure 10d) in triangular form that has broken from a larger section. Since this was the only piece recovered, it is difficult to determine what kind of object it belonged to, therefore, it was categorized as an “unknown tool.”

### ***Conclusions of the Typological Analysis***

The typological analysis reveals that the Hamon site yielded a diversity of tools and debitage in form, function, and material. The tools represent a mixture of dart points, arrow points, scrapers, drills, and the core/handstone materials from which these tools were made. Groundstone items for processing materials, celts for axes or ceremonial use (burials) are also represented. The presence of the scrapers and drills would suggest that processing of animals took place. However, faunal remains were not recovered from the site indicating that these activities took place and the scrapers and drills were not necessarily produced for processing animals. It is more likely that the Hamon site included a workshop for making these tools or another functional aspect. The presence of groundstones, abraders, handstones, and an unfinished sandstone pipe also reflect the workshop nature of activity at the Hamon site. Ultimately, this indicates that the site occupants needed tools for activities of hunting animals, processing animals, and resources such as seeds/nuts, reflecting the hunter gatherer lifestyle of the peoples of the Woodland Period.

The reduction sequence among the chert material shows two patterns: primary reduction, and secondary reduction. This may be reflective of two different lithic reduction activities by different

groups of people in time at the Hamon site. This interpretation is supported by the AMS and conventional radiocarbon dates from the site (which are discussed in detail in chapter 5). The use of the celts at the Hamon site is confused by the event of burials that took place at the site. Celts are common grave goods in the Plains Woodland period and early Plains Village period (Wedel 1938:104; 1943:92-93) making distinctions between functional and ceremonial unobtainable in the mixed context of the Hamon site's components.

### **Lithic Raw Material Identification and Sourcing Analysis**

Lithic sourcing studies can reveal important details about the ecological relationships of prehistoric people, their mobility patterns, and the socio-political context of contact with other groups via trade. The raw material analysis of lithics from the Hamon site reveals that there is a diversity of material with local and non-local types represented. In combination with the different reduction patterns among the materials, the analysis reveals that the occupants of the Hamon site did trade with other Late Plains Woodland groups, or multiple groups occupied the site bringing different materials in with them.

Some ambiguity exists in the identification of certain materials, especially when two or more types from different geographic expanses mimic one another. This similarity not only makes the designation of a specific material type doubtful, but can obscure the distance that the material traveled to end up in the context of the Hamon site. Ultimately, it obscures whether the people were highly mobile or involved in a trade network to obtain the material. As will be seen, this situation of ambiguous material types arises in categories of Smoky Hill jasper and Permian cherts versus secondary source jaspers and cherts, and Westerville versus Toronto and Burlington cherts. Pennsylvanian cherts of Plattsmouth and Winterset varieties are distinguishable by visual traits more confidently than the others. The presence of these materials and ambiguous presence of the

other above-mentioned types, reveals that local and non-local materials were utilized by occupants of the Hamon site, which is indicative of long distance mobility or medium distance mobility and trading with other Late Woodland groups along fringe areas of mobility extents. It is also reiterated that the diversity in material may reflect different groups that occupied the site through time.

Macroscopic and microscopic elements were cross referenced with KUMA-LCC materials for identification. Ultraviolet fluorescence was attempted. However, the response was weak, with only a few specimens reacting in specific areas that might represent residue from either prehistoric or recent activities (e.g., lab cleaning procedures). The microscopic analysis was performed with a 10x ocular wide lens, magnified with a 43x .55 objective lens in the University of Kansas' Archaeological Research Center (ARC).

Macroscopic and simple microscope magnification of specimens with cross referenced material is not the optimal way to perform lithic identification, as many specimens from different geological contexts resemble one another in both categories. Comparative collections are inherently biased in chert quality and locations from which they were collected. Under these circumstances, comparative samples do not represent the full range of varieties for any given lithic source. Therefore, the methods for this analysis include the adopted "confidence levels" introduced in a similar study from the DB site in Leavenworth County (McLean 1998).

### ***Kansas Geological Systems***

The state of Kansas is comprised of the following geological systems from oldest to youngest. The Archean-Proterozoic system (Precambrian) is composed of igneous, metamorphic, and metasedimentary rocks that underlie the entire state. The most common igneous rock is granite, while quartzite and schist are the most common metamorphic rocks (Goebel 1968). Around 542 million years ago (mya), the Cambrian-Ordovician system was deposited over the Archean-

Proterozoic system. This system is composed of a marine sedimentary sequence of arkose sandstone beds, overlain by dolomite beds (Goebel 1968). The Silurian-Devonian system (444 mya) is composed of beds of dolomite and limestone that overlie the Cambrian system. It has been noted that outcrops of a “coarsely crystalline dolomite” attributed to this system occur northwest of Jefferson County (Lee 1943). The system is restricted to northeastern and north-central Kansas (Goebel 1968).

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

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

in different regions of the physiographic region known as the Flint Hills (Blasing 1984; Haury 1984).

The Jurassic system (199 mya) is located in the subsurface of northwestern Kansas and only outcrops in a small portion of Morton County in the extreme southwest (O'Connor 1968). The deposits are composed of various shales and red sandstone. The Cretaceous system (145 mya) overlies the Jurassic and Permian systems and outcrops in central, north-central, and western portions of the state (KGS State Wide Map). Sandstone, shale, limestone, and chalk make up the deposits of the Cretaceous system (Holen 1989:4; Stein 2006:275). Within the Smoky Hill chalk member of the Niobrara formation, outcroppings of silicified chalk known as Smoky Hill jasper can be found (Holen 1989:3). Prehistoric groups used the Smoky Hill jasper in the same manner as the Pennsylvanian and Permian cherts. Hematite and limonite occur in Dakota sandstone outcroppings. Hematite could be ground into pigment, and denser forms were commonly used for the production of pipes by prehistoric groups (Stein 2006:276-277).

The Neogene system (Tertiary) (23 mya) consists of the Ogallala formation in the northwestern portion of the state (KGS State Wide Map). It is composed of outcroppings of silt, caliche, clay, sand, and quartzite (Stein 2006:278). The Quaternary system (2.6 mya) is composed of loess and river valley deposits, sand dunes, and glacial drift deposits (KGS State Wide Map). Sioux quartzite, granite, basalt, ferric oxides (hematite, limonite, etc.), and diorite are common among the glacial till deposits located in the northeastern portion of the state (McLean 1998:176; Stein 2006:278). The glacial drift deposits are remnants from the last glacial maximum that extended into northeastern Kansas. Clay, silt, sand, and gravel were deposited in and along stream channels as recently as the early Holocene (Stein 2006:278). Loess deposits occur in the south-central and western portions of the state. They also occur in the extreme northeastern portion. Sand dunes are

confined primarily to the south-central and southwestern portions of the state (KGS State Wide Map).

Within the geologic outcroppings of the Pennsylvanian, Permian, Cretaceous, and glacial tills of the Quaternary system chert, silicified chalk, quartzite, granite, sandstone, limestone, metamorphic rocks, and hematite outcrop or were deposited as till. All were used by prehistoric cultural groups in Kansas. Mississippian system outcrops contain certain cherts, such as Burlington and Keokuk. However, this system outcrops only in extreme southeastern Kansas. Therefore, cherts from the Mississippian system in Kansas archaeology assemblages originated there, or more likely originated from sources farther east in Missouri or Iowa.

### ***Jefferson County Geology***

The location of the Hamon site is within the outcroppings of the Pennsylvanian system and glacial drift deposits of the Quaternary system. Therefore, it is important to analyze the geological systems at the county level to understand what sources of chert are locally available. The northeastern and east-central portions of Jefferson County are composed of glacial drift from the Neocene system. There are also sporadic glacial drift sediments in the western portion. A large part of southeastern Jefferson County contains sediments of the Pennsylvanian system. Outcroppings of the Shawnee group and Wabaunsee group limestones, shales, and sandstones are located throughout the county. Quaternary deposits of alluvium, loess, and lacustrine clay from the late Pleistocene and early Holocene are present around the Delaware River and its tributaries (KGS County Maps).

County-level geology reveals that there is a high probability that Plattsmouth and Toronto chert varieties could be sourced locally in Shawnee group outcroppings in the northeastern and southeastern portions of the county. Plattsmouth and Toronto outcrops are noted in the Stranger

Creek drainages of western Leavenworth County, in both primary and secondary contexts (Logan 1988:326, 2008:30; Logan, Skov and Frye 2007:49). Sioux quartzite, granite, basalt and greenstone (diorite) could also be sourced locally in glacial till deposits. Kansas City and Lansing group cherts (Winterset, Westerville, Argentine, and Spring Hill) would not be found at the county level. However, outcroppings of the Lansing and Kansas City groups are found as close as Leavenworth County, which borders Jefferson on the east. Permian system outcroppings are not present at the county level. However, Jackson and Shawnee Counties, which border Jefferson County on the west, do contain sediments of Permian age that possibly contain Foraker and other Permian chert sources, or they may be intermingled among secondary sources within drainages (KGS County Maps). Other varieties of Florence and Wreford chert are found farther to the west.

#### ***Description of Chert Varieties Present in the Hamon site Assemblage***

Identifying Pennsylvanian, Permian, and other geological chert types based on macroscopic and microscopic traits includes fossil inclusions and mottling patterns (considered diagnostic), color, grain texture, luster, and translucency (Morrow 1994:110). Cherts, silicified sediments, and quartzite from bedrock outcrops and their immediate vicinities are considered primary sources. Secondary sources are considered to be river gravels such as pebbles, cobbles, boulders, and till that are chert bearing, but are not locally found in the geographic regions in which they are deposited (Morrow 1994:109; Reid 1980:121). Secondary sources are located most commonly along banks of rivers, tributary systems, and in till layers. Identifying secondary sources of chert is challenging, and in most cases not much can be said about them except for the fact that they are secondary gravel sources. Secondary source materials can be identified by traits including a rounded and polished cortex that is tan-to-dark brown; general round-to-ovoid pebble and cobble size fragments; an internal slick sheen obtained from water erosion. The following descriptions

are not a comprehensive list of all the chert varieties in Kansas. They are descriptions of the types identified as being present in the Hamon site assemblage. A total of 1,081 stone tools and debitage from the typological analysis were included in this analysis. The piece of polished hematite categorized in the glacial till, metamorphic, and sedimentary materials category (Table 1) could not be confidently placed into one of them alone and was left out of this portion of the analysis.

### ***Pennsylvanian Shawnee Group Cherts***

Plattsmouth chert is described as having a matrix that is very light-gray to medium dark-gray or brownish in color (McLean 1998:173; Morrow 1994:127). Broad and faint mottling is noted, and medium-sized fusulinids are the predominant fossil inclusions in the chert. They are described as being distinct spirals or coiled fossil inclusions, common in Pennsylvanian and Permian chert varieties (Morrow 1994:127). The fusulinids are typically off-white to light gray and brown. They are noticeable due to their lighter color in contrast to the surrounding chert matrix. The texture is described as medium-fine and luster is dull to satiny (McLean 1998:173; Morrow 1994:127).

The lithic assemblage contains 75 chert artifacts that match the KUMA-LCC's specimens 725 and #747 in matrix color, mottling, and fusilinid presence. Of the 75 artifacts, two are projectile points. Bifaces, cores, and reduction debris make up the rest of the specimens. All of the artifacts are gray to brownish in color and match the KUMA-LCC's specimens macroscopically and microscopically.

### ***Kansas City Group Cherts***

Winterset chert has eight varieties. However, only two varieties were found for comparison in the KUMA-LCC. The descriptions of types one and two have been described extensively (Logan 1988; McLean 1998; Morrow 1994). Type one is described as light gray, dark gray, tan, or pale brown in color and has veins of calcite. Thin bands can give it a striped appearance, and color can

range from gray to brown throughout the layers of bands (Logan 1988:324; McLean 1998:179; Morrow 1994:126; Reid 1980:123; Stein 2006:269). Type two has tan to light gray color, can be mottled, or have faint banding (McLean 1998:179). Winterset contains small fossil fragments and occasionally fusulinids and branching bryozoans (Morrow 1994:126). I found that Type two can show similar characteristics to Toronto chert, especially when the banding is very faint.

The lithic assemblage contains 60 chert artifacts that match the KUMA-LCC's Winterset specimens 732 and #761 in matrix color and banding. Nineteen of the artifacts match KUMA-LCC specimen #732 and four of the artifacts match specimen #761. Specimen #761 compares well with the descriptions for type one, while #732 compares well with type two. Some of the artifacts resemble Toronto chert macroscopically in color and when banding is too faint to observe, but they match better with the Winterset specimens microscopically.

#### ***Toronto and Westerville Cherts: The Pennsylvanian Dilemma***

Toronto chert of the Oread limestone formation and Westerville chert of the Cherryvale shale formation (Kansas City Group) are noted as being nearly impossible to distinguish from one another (Logan 1988:324). This problem was encountered with the lithic material in the Hamon site assemblage. Mclean (1998:175-176) notes that she was able to distinguish Toronto from Westerville "A" collected by Reid at the Westerville chert type locality, even though they still had close resemblances microscopically. The Westerville specimens were finer grained and had calcite inclusions, while the Toronto specimens were coarser grained, and lacked inclusions. However, the Toronto chert was of poor quality and McLean (1998:176) recommends that this should be checked again with better quality specimens.

I found that both the Toronto and Westerville specimens in the KUMA-LCC are representative of a minority of the variations that these cherts can have. There are no Toronto specimens that fit

the descriptions of a white to yellowish brown matrix (see below for Toronto descriptions). A majority of the specimens are of poor quality, containing much more cortex than chert. If possible, the task of collecting better specimens for the comparative collections should be undertaken. The KUMA collections also contain artifacts from the Nebo Hill site (23CL11). A majority of the chert material, in the form of cores, debitage, and points, is made of Westerville chert. These specimens were utilized for comparison with the Hamon site artifacts to a higher degree of satisfaction than the KUMA-LCC specimens.

Toronto chert is described as having a matrix that is buff-tan, white to yellowish-brown, or pale brown. The texture is fine-medium grained, homogenous, and fossil free (Logan 1988:324, McLean 1998:175). Toronto and Westerville "A" cherts are difficult to distinguish from one another due to the similarities of color and the lack of fossil inclusions (Logan 1988:324; McLean 1998:175). The KUMA-LCC specimens only represent examples of the buff tan variety.

Westerville chert is described as pale brown, yellowish-brown, or light gray, is either homogenous or may have faint banded layers, and lacks fusulinids (Logan 1988:324; McLean 1998:178; Stein 2006:269). McLean notes that two types of Westerville are distinct. Type A is tan-buff colored, lacks fusulinids, and is homogenous (McLean 1998:178-179). Type B is grayer in color, has mottling, and has more fossil inclusions. As previously mentioned, Type A can be hard to differentiate from Toronto chert. At this time I am of the opinion that both types of Westerville may be indistinguishable from Toronto macroscopically and microscopically. The fact that Westerville Type A is buff colored and nearly impossible to distinguish from Toronto chert raises the concern that white-gray Toronto varieties may be indistinguishable from the similar colored Westerville B variety. The specimens from the Hamon site assemblage closely resemble both Westerville types and descriptions for Toronto.

The lithic assemblage contains 103 lithic artifacts that match descriptions of both Toronto and Westerville chert varieties. There is a nearly equal distribution of this material in the form of points, bifaces, and cores, with the remainder being debitage. The possibility of some of these artifacts being Burlington chert was explored. However, the microscopic traits did not match. The weathered surfaces of the artifacts could be disguising the true matrix of the chert. Without destroying the artifacts to get through the weathered surface, it is not possible at this time to rule out the possibility of Burlington chert being the source of some of this material.

### *Permian*

Florence chert is identified as having four varieties. Florence A is described as buff, yellow-gray, tan or brown (Blasing 1984:11; Haury 1984:93). It often contains fusilinids and banding patterns described as “fingerprint” and “wood-grain” in appearance (Haury 1984:93; Stein 2006:271). Florence B has dark gray, blue (steel) gray color with mottling and fossil fragments, such as crinoids, fusilinids, and echinoids (Blasing 1984:11; Haury 1984:93; Stein 2006:271). Florence C is light gray, homogenous, and contains small fossil fragments, giving it a speckled appearance (Blasing 1984:11; Haury 1984:94; Stein 2006:271). Florence D is described as gray to buff with darker bands of slightly more translucent material (Blasing 1984:11; Stein 2006:272).

Eighteen artifacts match the KUMA-LCC’s Florence B specimens 795 and #796 in blue steel-gray coloring of the matrix and mottling patterns. Five match the KUMA-LCC’s Florence D specimen #630 in gray to buff coloring of the matrix and dark bands of slightly more translucent material. Two bifaces match the KUMA-LCC’s unidentified Permian specimen #829 in matrix coloring, slight bands, and mottling. Specific variety for the chert cannot be identified at this time, as the KUMA-LCC specimen is unidentified. All Permian artifacts match the KUMA-LCC specimens macroscopically and microscopically.

### *Mississippian*

McLean (1998:186) describes two varieties of Burlington chert. The first type is a mottled white or light gray-colored matrix that may or may not have mottling (McLean 1998:186). The texture is medium to medium-fine with a dull luster. Crinoid columns and fenestrate bryozoans are commonly found in Burlington chert (McLean 1998:186; Morrow 1994:123). The second type contains a higher density of fossils than type one. It has a light gray to cream or tan matrix. It has a medium-coarse to medium texture and has a dull luster (McLean 1998:186).

No positive Burlington chert identifications were made in the Hamon site assemblage. However, due to the afore-mentioned concern that weathered and non-weathered surfaces of the Westerville and Toronto specimens have Burlington chert characteristics, such as color and mottling, it is possible that there is Burlington chert present in the Hamon site assemblage.

### *Cretaceous*

Smoky Hill jasper is described as having various colors, including tan, yellow, brown (which are common), white, purple, and green (which are rare) (Holen 1989:6). Black streaks, patches, or specks may be present (Stein 2006:275). Concentric banding of colors is occasionally present. Smoky Hill jasper is commonly opaque but may be translucent (Stein 2006:275). One isolated scraper resembles the KUMA-LCC's Smoky Hill jasper specimen #802 in matrix color (yellow), black specks, and grain texture. Several other specimens from the Hamon site assemblage also resemble Smoky Hill jasper. However, they are not exactly like the specimen microscopically, and the KUMA-LCC's Smoky Hill jasper material is not diverse enough for adequate analysis. The resemblance to other secondary source materials (which includes jasper) also confounds the problem of identifying the material as Smoky Hill jasper.

### *Quaternary*

Three greenstone (diorite) celts, all of the hammerstones and groundstones made from quartzite, and glacial till (basalt and granite) materials can be attributed to Quaternary till deposits. All specimens can be sourced locally in any part of the Delaware and its drainages. The KUMA-LCC does not contain glacial till for comparison. However, this type of material is easily identifiable in contrast to cherts.

### ***Secondary and Unknown Source Material***

A total of 603 chert or jasper specimens in the Hamon site assemblage have secondary source traits. Most are from chert-bearing stream, river, and gravel tills, based on characteristics of rounded, water-worn cortex, and polishing. The chert-bearing interiors of these artifacts contain slick sheens from accumulation of silica that takes place in water-worn environments. The colors vary from light brown to olive and light to dark gray. A total of 141 show characteristics of extreme heat treatment. This includes debitage from lithic reduction sequences and larger cobbles that may have been heated in hearth settings.

Several points and bifaces were crafted from chert-bearing river tills and gravels. However, an abundant amount of the secondary material is in the form of primary and secondary flakes and blocky debris/shatter, suggesting a testing sequence of this material for its potential to produce tools. The blocky debris, core specimens, and flakes have traits that reveal the difficulty in trying to reduce the material. This includes signs of poor fracturing potential, including the presence of numerous abrupt hinge and step terminations and flake scar surfaces that are blocky and undulating due to impurities of the matrix. However, there are plenty of specimens that do contain a smooth, high quality matrix from which tools could be made, justifying the testing of such material. Attempts to find a match with the KUMA-LCC specimens turned up negative. Without the water-

worn cortex (smooth and cobble-like) this material resembles an assortment of identified cherts and jaspers from many different geological systems.

In reference to the issue of some of the secondary source and unidentified materials being Permian cherts due to similar reduction patterns, the color and matrix of many specimens resemble Permian varieties, but some also resemble Smoky Hill jasper, and others have veins of calcite characteristic of Pennsylvanian cherts. Only the presence of the rounded and tan water-worn cortex makes the identification assignable to any of those materials difficult. At this time and with basic visual comparison methods, the cherts from these secondary sources cannot be confidently assigned to any other category.

### ***Sourcing Analysis Discussion and Conclusions***

The lithic tool and debitage assemblage reveals a high level of local sourcing strategies in two different variables. The first is the abundance of secondary raw material in the form of river and gravel bar cobbles, highlighting the utilization of local materials that could be found in the banks of the Delaware River and its tributaries. Nearly 56% of the assemblage is made up of unidentified river gravel cherts and jasper. The remaining 44% of the assemblage is made up of Pennsylvanian, Permian, glacial till, metamorphic, sedimentary, and unidentified raw material (Chart 1). An additional 19 specimens, which can only be categorized as “rock,” are also secondary source material. Whether the use was for lithic reduction in testing and tool production activities or for other site use activities (e.g., hearth lining or cooking activities), locally retrievable secondary sources were in abundance at the Hamon site.

The second variable is apparent when the secondary source and unidentified materials are set aside. The remaining lithic from primary source materials continue to support a high level of local resourcing strategies. The identified chert varieties by geologic systems break down as follows:

Pennsylvanian 78%, Permian 8%, glacial till 6%, metamorphic 5%, and sedimentary 3% (Chart 2). The ambiguous Westerville and Toronto cherts make up 34% of the Pennsylvanian material, while the rest has been identified as Plattsmouth (24%) and Winterset (20%) (Chart 3). However, the Westerville-Toronto problem must be considered in the interpretation of this data. It is possible that Westerville chert, compounded with the Winterset material, shows evidence of more non-local chert utilization by the Hamon site's occupants. The remaining materials are composed of glacial till granites/basalts, quartzite (both glacial till and secondary sourced), and sandstone. This data, combined with the geologic setting of Jefferson County and the adjacent glaciated region, reveals that the local resources of Shawnee group cherts and glacial till were being utilized at a high frequency by the Hamon site's occupants. The smaller quantity of Permian raw materials from the site further supports the focus on local resources. However, the possibility that Burlington chert is present in the assemblage would take away from the overall total of Pennsylvanian chert, but the percentage would remain the highest among this group of cherts.

This analysis was conducted using the adopted confidence scale introduced by McLean (1998). This method has strengths in revealing the complicated nature of identifying chert resources, based solely on macroscopic and microscopic attributes. It would be nearly impossible to conduct more intense scientific analysis on large collections of chert material without incredible amounts of time and monetary expenses. The confidence scale follows Mclean's methods, modified with three categories of identification confidence: positive, probable, and indeterminate. Positive confidence characterizes specimens that show a strong affiliation with one chert type. Probable confidence characterizes specimens containing affinities with two chert types, but leaning more toward one of the two. Indeterminate affinities characterize specimens showing affinities with two or more chert types with no positive leans towards one over others.

Chart 1. Identified Primary Sources with Secondary Sources and Unidentified Material.

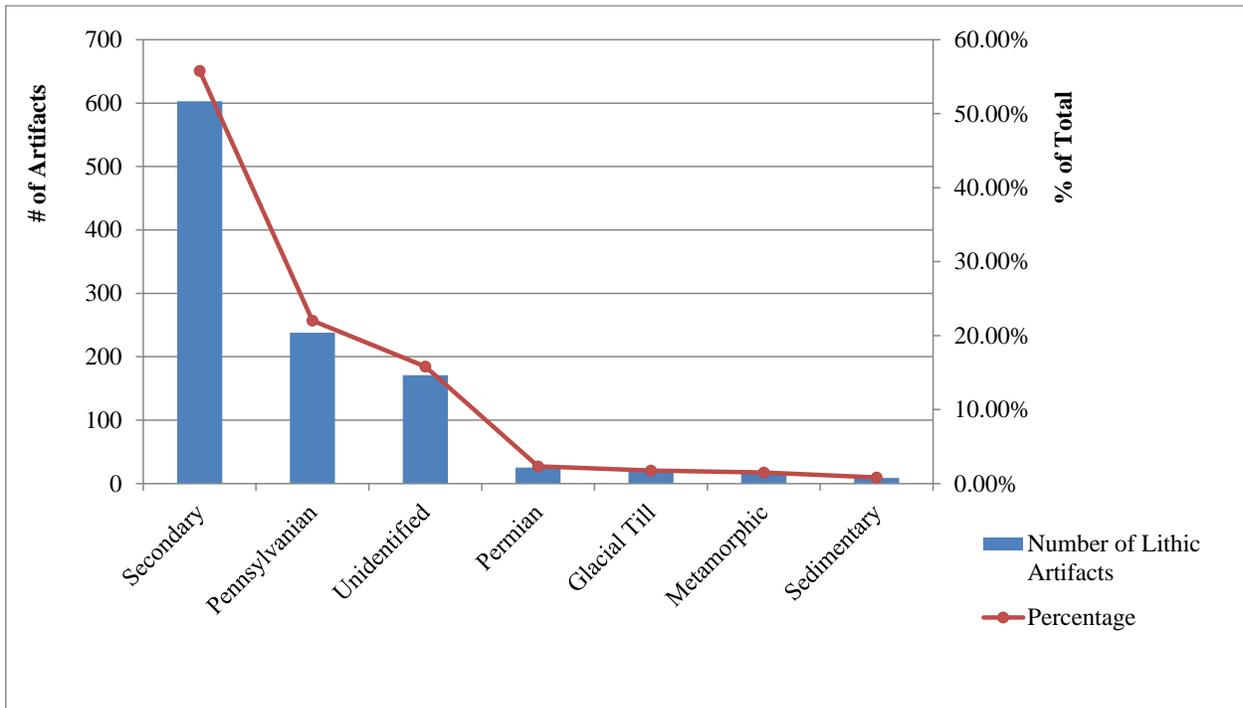


Chart 2. Identified Primary Sources without the Secondary Sources and Unidentified Material.

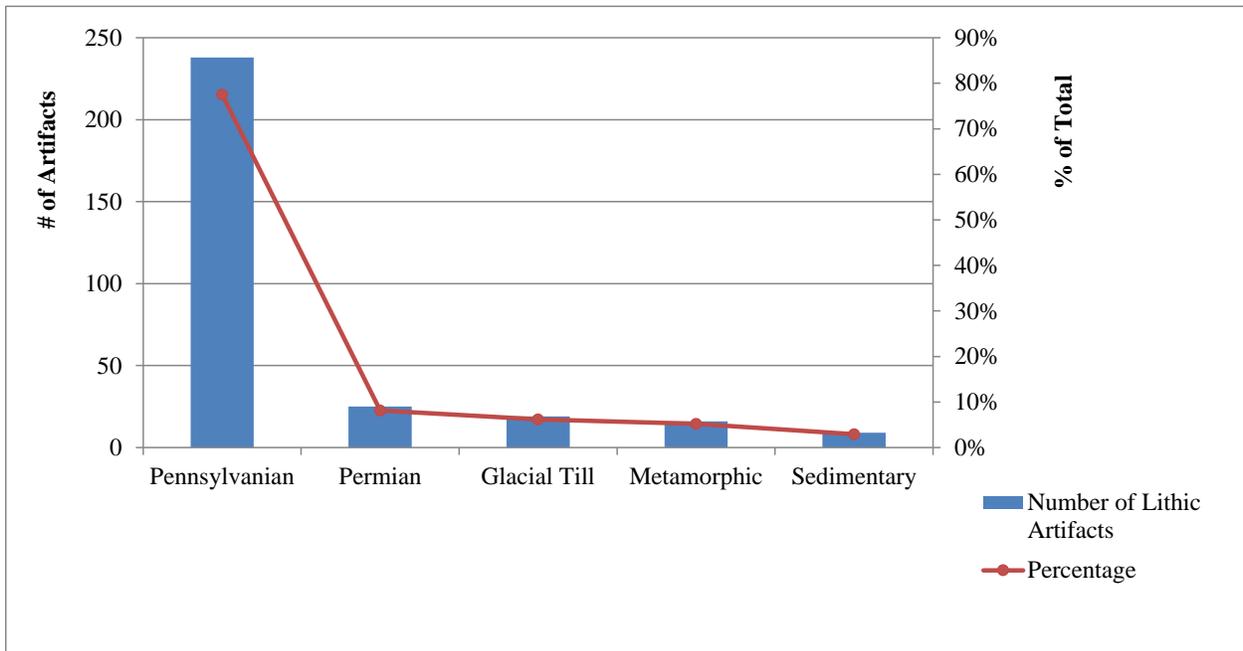


Chart 3. Identified Primary Source Material by Specific Variety.

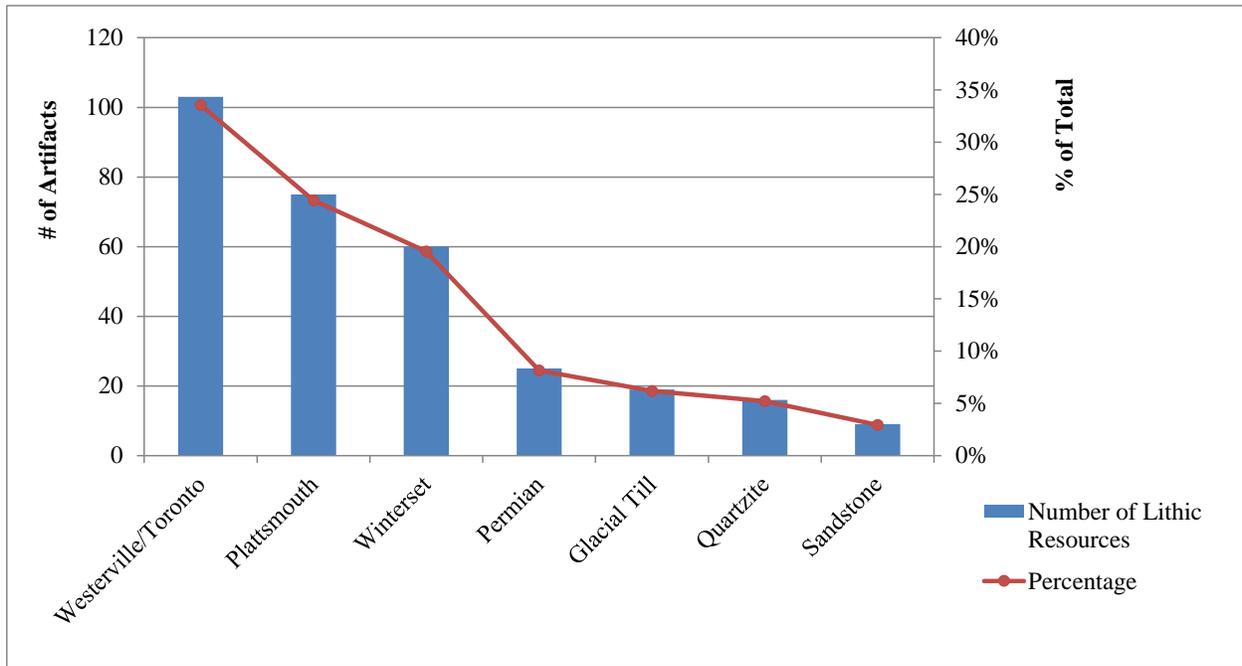


Table 6. Total Counts of Identified Lithic Source Material with Associated Confidence Levels and Percentages (adapted from McLean 1998).

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

Westerville/Toronto cherts and Permian cherts contained the lowest percentages of positive confidence levels, while Plattsmouth and secondary sources contained the highest percentages of positive confidence levels (Table 6). This reflects the general ease with which macroscopic attributes of Plattsmouth and rounded, water-worn cortex of secondary sources can be identified in contrast to the difficulties with other varieties of Pennsylvanian and Permian cherts. The tools and debitage of glacial till, metamorphic, and sedimentary specimens all had 100% positive

confidence levels as these are not chert-bearing rocks and are easily identifiable. Therefore, those artifacts have been left out of the overall counts and percentages for the confidence levels (Table 6).

In conclusion, raw material analysis shows that most primary and secondary source materials are local and non-local (some of the Pennsylvanian and Permian chert), but not from exotic (long-distance) locations. The Hamon site occupants exploited local Pennsylvanian, possibly Permian chert, and river gravel bar cobbles at a higher rate than non-local Pennsylvanian, Permian, Cretaceous, and Mississippian sources. This suggests that inhabitants had an intimate knowledge of the local environment of the previously glaciated region of present-day northeast Kansas, Nebraska, Iowa, and Missouri. However, the presence of Permian, Westerville and Winterset Pennsylvanian cherts, reveals that non-local materials were also utilized by the Hamon site's occupants. The ambiguous presence of Burlington cherts and Smoky Hill jasper adds to the non-local and possibly exotic material presence, and may be indicative of trade or different occupants of the site through time. The people that occupied the Hamon site had an intimate knowledge of the local resources as seen in the abundance of secondary source material, Plattsmouth and Toronto cherts, and glacial till materials. In mobility of the local area, other groups of Plains Woodland people to the west/northwest, and east/northeast may have been encountered by the Hamon site occupants. Trade between them may have taken place, accounting for the presence of Winterset, Westerville, Permian, and possibly Smoky Hill jasper and Burlington cherts in the assemblage. However, distinctly different radiocarbon dates obtained from the Hamon site provides a basis for the consideration that groups located in geographical areas where Permian, Winterset, Westerville, Smoky Hill jasper, and Burlington cherts are naturally abundant, may have migrated and occupied the Hamon site in different episodes of time during the Late Woodland Period.

## **Lithic Analysis Conclusions**

The typological and raw material analyses of the Hamon site lithic assemblage reveals that diversity exists in both aspects, with the occupation of more than one group through time being responsible for this diversity. The points vary from medium-to-large to small, indicative of dart or knife use and arrow point use. Some of the points resemble Late Archaic forms, others are similar to styles seen in Middle Woodland contexts, and the smaller points are considered to be a later technological form, reflecting the introduction of the bow and arrow. However, the point typologies are not clear indicators of time or cultural groups. This is reflected in the fact that throughout the Woodland Period or any chronological designation unit for prehistoric archaeological components, points share similar morphological traits over vast regions of the continent. The smaller points, considered to be used with the bow and arrow, do not make a definitive chronological appearance, and when they do appear, they are usually in contexts with the medium-to-large style dart or knife points that are considered to be an older technology. However, the Scallorn and Sequoyah varieties are more commonly found at sites dating later in the Woodland period. They are abundant at major sites that rose at the end of the first millennium AD and flourished over the next several centuries of the second millennium AD, including Spiro in Oklahoma and Cahokia in Illinois. The Late Archaic and Early-to-Middle Woodland points of the Motley, Table Rock, Snyders, and Lowe Cluster types are abundant at earlier sites, including Poverty Point in Louisiana, multiple Hopewell sites in Ohio, Illinois and Kansas City. Since the Hamon site contains a mixture of these types with varying material used, and radiocarbon dates span roughly three-to-four centuries or more at the site, they may be reflective of lithic tools of different Plains Woodland groups over time.

The fact that a variety of stone tools were designed to cut, grind, and create tools like points, reveals that a lithic production workshop took place at the Hamon site. This is reinforced by the lack of evidence that these tools were utilized in animal processing. No faunal remains were recovered from the site. While bone preservation may be a factor, bone, both human and animal was recovered (very small amounts of animal, none from mammals of medium to large size), supporting the interpretation of activities associated with a production workshop.

The two different reduction sequences among varying chert materials also supports the interpretation of at least two different production activities at different times. One group of occupants may have been more reliant on local sources of secondary, Plattsmouth and Toronto cherts, and engaged in primary reduction of the secondary source materials. Another group may have traded with people or migrated from regions where Westerville, Winterset, Permian, Burlington and Smoky Hill jasper materials were more abundant or preferred. These materials may have received primary reduction at a different location, with finishing of tools occurring at the Hamon site. Overall, the tools and debitage from production imply that different activities with different material occurred as the result of different groups occupying the site through time. This may have been a local group of kinship descendants whose material use, technology, and contact with other groups evolved over time or the occupation of a migrant group sequential to a local one.

The lithic artifacts reveal that the people engaged in a lifestyle of semi-sedentary hunter gatherers. Their tools are those associated with hunting and processing of animals for subsistence. The groundstones and celts indicate a need to process material other than animal, including grains, seeds, and nuts for subsistence and wood for construction of structures. The celts may have functioned as axes used in processing wood materials, but they may have also been ceremonial grave goods. The pipe is indicative of social activities other than subsistence need. This could

represent activities of social bonding, relaxing, or other ritual-ceremonial purposes. With the indication of the tools not being used for their technological purpose at the site, economic activities of production for use elsewhere, or trade with other groups is likely.

## CHAPTER 4: CERAMIC ARTIFACTS

As with most Eastern and Plains Woodland period ceramic assemblages, ceramics from the Hamon Site exhibit a number of variations in form, temper, and surface treatment. I analyzed the ceramic assemblage on the basis of qualitative and quantitative modes, consisting of sherd type, sherd thickness, surface treatment, weight, temper material, rim form, vessel form, and vessel diameter. The last was calculated only on rims or vessel portions significantly large enough to enable reconstruction. Temper material varied from no temper to sand and crushed rock (grit),<sup>1</sup> but temper was found to be a less significant variable than either surface treatment or form. Grasshopper Falls phase pottery is described as smooth, cord marked, or brushed, all of which are surface treatments present in the Hamon site assemblage. However, sherds with curvilinear, parallel, and v-shaped trailed lines, trailed-over cord-marking, and orange-red to brown paint-wash-slip treatments are also present. With reference to the last, I observed the addition of colored pigment that appears to be a general wash and sometimes a paint applied in zones. However, deterioration of this treatment complicates designation as a paint, wash or slip.

In conjunction with variations of vessel thickness and form in the rim and shoulder regions, the above-noted differences support the prospect of ceramic change over time or multiple, but contemporaneous wares. Regardless of whether the same population produced the material over time or if different groups migrated into the area, the variations among the ceramics imply multiple occupations at the Hamon site, resulting in the need for comparison with pottery types for other

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<sup>1</sup> The term “grit” is ambiguous as some sands can be arkose, containing a large amount of poorly sorted grains that may be labeled as grit but are more correctly identified as sand. Limestone, dolomite, and various other sedimentary, igneous, and metamorphic rocks could be crushed and utilized for pottery temper. Therefore, “crushed rock” as used by Rice and Shepard (1987:406-407; 1956:26-27), is used here for the identification of materials added to the pottery that are poorly sorted in nature including arkose sand, other sedimentary, igneous, and metamorphic rocks.

known Plains Woodland components that have been designated under other cultural taxonomic units.

### **Middle and Late Woodland Pottery Descriptions in the Central Plains Region**

Descriptions of Plains Woodland period pottery in the early-to mid-twentieth century resulted in ceramic types, distinguished by surface treatment and form. Some of the earliest pottery types described were generally referred to under names upon which the cultural designation unit component was named, including Valley, Kansas City Hopewell, Loseke Creek, and Sterns Creek (Hill and Kivett 1940; Sterns 1915; Strong 1935; Wedel 1938). As time passed by, more researchers (and original researchers) analyzed materials and named the pottery wares and types associated with these archaeological designation units. Middle Plains Woodland (AD 0-500) Valley Cord-Roughened vessels are described as thick with straight to slightly flaring rims, weakly curved shoulders, and conoidal to subconoidal bases, with a general “bag” shape. Surfaces are cord-marked with vertical to oblique impressions that may also have simple trailed lines and geometric trailed, incised, or cord-marked designs. Rims are described as mostly plain, but also may have bosses, punctates, or tool impressions on flat or rounded lips. Surface colors range from tan to black. Sand and crushed rock (grit) are the most common tempering materials (Benn and Green 2000:433-434; Hill and Kivett 1940:173-181; Kivett and Metcalf 1997:151; Ludwickson and Bozell 1994:111).

Middle Plains Woodland Kansas City Hopewell pottery, named for its resemblance in decoration to Havana Hopewell pottery from Illinois, was first described by Wedel (1938). Decorations are the most diagnostic trait for Hopewell pottery wares and types. They commonly include cross-hatched rims and bodies with dentate, punctate, and dentate rocker-stamped zones. Temper added to vessels includes grit and sand. Vessel colors range from tan, buff, orange, and

gray to black. Wedel notes that another pottery type, said to be identical to Valley Cord-Roughened from Nebraska, was also present at the Renner site (23PL1) (Wedel 1938:101-102; 1959:554; 1974:90). Over time, more researchers have accompanied descriptions of elaborately designed Kansas City Hopewell pottery with descriptions of a less elaborate type composed of smooth surfaces and crenulated rims (Johnson 2001:161; Logan 2006:80; Wedel 1974:89).

Around AD 600-800, and perhaps earlier, ceramic production shifted from thick vessels to thinner vessels with more pronounced shoulders. The bodies became subglobular, as compared with Middle Plains Woodland Valley Cord-Roughened vessels. Bases tend to remain subconoidal. Two of the earliest defined wares for the Central Plains includes Loseke Creek and Sterns Creek. Sterns Creek ware was described early by Sterns and Strong (1915, 1935). Since then, other researchers have elaborated on a description of thin, subglobular vessels with constricted necks and straight to slightly out-curved or flaring rims. The surfaces of vessel bodies are most typically cord-marked, paddle-stamped, or smoothed over. A straw-roughened or brushed treatment has been noted as well, with plain rims or tool-impressed lips that gives a scalloped effect. Sterns Creek Ware is predominantly grit tempered (Strong 1935; Tiffany 1971, 1977:41-50; Wedel 1959:549). Geographically, Sterns Creek components have a core area in southeastern Nebraska, with components identified in Iowa and Missouri. On topics of remains assignable to the Plains Woodland Period, Wedel (1959:549) notes "...one of which some traces might be expected in Northeastern Kansas, is the Sterns Creek Culture."

Loseke Creek Ware is considered to be a thinner Late Plains Woodland survival of Valley ware (Kivett and Metcalf 1997:151-152; Ludwickson and Bozell 1994:119). The Valley pottery traits seen in Loseke Creek Ware include cord-marking with occasional flat lips and sub-lip bosses or punctation. At least five types for Loseke Creek Ware are described: Feye Cord-Imprinted and

Feye Cord-Roughened, Scalp and Ellis Cord-Imprinted, and Missouri Bluffs Cord-Imprinted (Benn 1982; Benn and Green 2000; Hurt 1952; Keyes 1949; Kivett 1952). All of the cord-imprinted varieties contain similar rim and neck decorations of tripartite zones with single, cord-imprinted horizontal and vertical lines, and a variety of either triangular, zig-zag, or chevron motifs. The Feye Cord-Roughened variety lacks this decoration but contains vertical cord marking on the body, shoulder, neck, and rim. Sometimes it is partially smoothed over (Benn 1982; Benn and Green 2000; Kivett 1952). Loseke Creek Ware often contains a variation of grit and sand temper (Wedel 1959:550).

It is important to note here that Willey and Phillips (1958) devised a new classification scheme for archaeological taxonomy that resulted in the addition of a plethora of new archaeological phases for the Plains Woodland period. Their new definition of “phase” differed from the previously used “focus” in the Midwestern Taxonomic Method in emphasizing time and space as strongly as form. The term “component” is also important here because both focus and phase are defined from the component or components at an archaeological site. The component itself is a theoretical construct, based upon assemblages of archaeological material at a site. One component may be distinguished from other components at a site based on interpretations of assemblages from other sites that result in a definable phase. Willey and Phillips (1958) noted that a single component could provide the basis for defining a phase, but would be expected to manifest itself in other components at other sites in order to affirm and support the original definition. Willey and Phillips’ statement that a phase could manifest itself in a single component and in a limited geographical area was especially important. This resulted in newly defined phases for the Plains Woodland period, based on minute differences in pottery. Sometimes these new phases were limited to a single site or tributary of a major drainage. One example is the Grasshopper Falls phase.

Pottery from Grasshopper Falls phase components are described as “a uniform type which has been classified as Grasshopper Falls Ware” (Reynolds 1979:104). This classification was made on characteristics of 457 pottery sherds from three sites in the Delaware River region of northeastern Kansas. Forms are described as medium to large jars with thickened, conical bases, straight to slightly bulging sides, slightly constricted necks, straight to slightly inverted lips, and globular jars with inverted lips (Reynolds 1979:71). Exterior surface treatments are reported as 39% cord-roughened, 25% smoothed-over cord-roughened, 16% smoothed, 7% brushed, and 1% polished. Cord roughening is vertical to oblique and brushing is characteristically vertical (Reynolds 1979:70). Thickness ranges from 4-17 mm, with the majority reported as 6-11 mm. Simple, non-thickened rims with round to flat lips, thickened rims with flat lips, straight, slightly and markedly out-curved rims, and inverted rims are present in 68 rims from three sites. Decoration is only present on rims and includes oblique tool impressions on the outside of the lip, oblique cord impressions on the top of the lip, and occasional bosses, punctates, or perforations on the exterior below the lip (Reynolds 1979:71).

It is important to note that, when discussing the three sites separately, Reynolds (1979:21, 41, 55-56) describes a single line-incised sherd in the Malm site assemblage, cord-impressed surfaces distinct from cord-roughened surfaces at the Anderson and Teaford sites, and a sherd that had both vertical and horizontal brushing marks on the exterior surface at the Teaford site. However, the above variety of being incised and cord-impressed distinct from cord-roughened, is not found in the discussion of exterior surface treatment that defines Grasshopper Falls Ware. Reynolds (1979:41) also notes that smoothing on interiors of vessels was done using two methods: 1) “finger impressions or finger trailing impressions,” (it is not specified as to whether this means the finger or nails were used to make impressions) and 2) wiping with a handful of grass. Reynolds defines

the Grasshopper Falls phase as being in the Late Plains Woodland period with an estimated span of AD 500-1000.

Some other notable Middle and Late Plains Woodland phases in the region include Keith, Greenwood, and Cuesta. Middle-Late Plains Woodland Keith phase ceramics are considered to be a pottery ware with one type, Harlan Cord-Roughened. It is described as being similar to Valley Cord-Roughened ware except it lacks the rim decorations and is predominantly tempered with crushed calcite, occasionally containing hematite and fine sand (Kivett 1953:131). Greenwood phase pottery was described by Calabrese (1967) before the Greenwood phase had been defined and was further elaborated upon by Reynolds (1982, 1984) and Witty (1982). Calabrese defined two types of pottery without stating that they were of the same “ware” and that the classification followed the guidelines presented by Albert C. Spaulding at the fifth Plains Anthropological Conference in 1948 (Calabrese 1967:57-62): these are the Verdigris and Greenwood “types.” The Verdigris type is further defined by Reynolds as having two vessel forms: 1) wide-orifice, straight-walled jars with conical bases, vertically cord-roughened exteriors, and horizontally scraped marks on interiors, and 2) constricted-orifice jars with pronounced shoulders and smooth exteriors. Both forms are tempered with limestone and occasionally small amounts of bone. The Greenwood type is globular with constricted necks, straight or “s” curved rims, and shale or “clay” tempering material (Reynolds 1982:111-113; Witty 1982:208).

Witty decided to designate components from the sites that he, Calabrese, and Reynolds had excavated, using the cultural-historical integration method, and the Greenwood and Verdigris pottery “types” became diagnostic material of the Greenwood phase (Witty 1982:207-208). However, in doing so, he combined Calabrese’s and Reynolds’ descriptions of Verdigris and Greenwood pottery “types” as Greenwood phase pottery without classifying the pottery any

differently. The classification should have a Greenwood “Ware” with two “types” (Verdigris and Greenwood) and two “subtypes” within the Verdigris “type.” The names of the types and subtypes of the Greenwood ware should be modified to reflect how the Verdigris and Greenwood “types” and “subtypes” differ. This could be accomplished by classifying them according to the above form differences as two types 1) Verdigris Conoidal and 2) Greenwood Globular. The two subtypes for Verdigris Conoidal are based on the slight form difference of the shoulders and rims and the distinct surface treatment between the two as 1) Verdigris Unrestricted Cord-Roughened and 2) Verdigris Restricted Smooth. Another option would be to categorize them as two wares with two types in the Verdigris ware.

Cuesta Phase pottery is described as manifesting Plains Woodland and Hopewell traits (Marshall 1972), which has been considered distinct from the Cuesta pottery and labeled “Cooper Hopewell.” Although it has been noted that Cuesta and Cooper may belong to a single designation unit that should not be split (Logan 2006:82). Combined, they have at least nine pottery types (Marshall 1972:47-55), with decorations ranging from plain and cord-roughened, to elaborately decorated, with designations related to Illinois Hopewell types, such as Naples Stamped, Netler Stamped, Dentate Stamped, and an “unnamed punctate type,” among others. Vessel forms include ones with straight to out-curved rims and conical bottoms. Grit and grog (in forms of different colored “clay” inclusions or broken sherds from other vessels) tempers have been identified.

Two other wares described for the Plains Woodland period, Held Creek and Minotts, are also important to consider. Held Creek ware is described from Boyer Variant middens at the M.A.D. (13CF101) and Rainbow (13PM91) sites (Benn and Green 2000). It is described as having developed out of Valley Cord-Roughened ware as early as 200 AD and as having tool impressions on lips and shoulders, zones of stamping with less-frequent punctuation or no decoration. Small

bowls are also present in Held Creek ware. Vessel forms are elongated with conoidal bases and have straight to slightly out-curved rims (Benn and Green 2000:446). Benn and Green note that “Held Creek ware and Grasshopper Falls Phase ware are so technically and decoratively similar that there may not be a clear distinction between the two.” Minotts Cord-Imprinted, Minotts Tool-Imprinted, Minotts Plain, and Minotts Decorated-Lip are also reviewed by Benn and Green (2000:472-477). Minotts vessels vary from thick to thin, with low and high rims, some decorated similar to Great Oasis pottery, and some that are tool-impressed (fingernail impression is always possible) on the lip with plain surfaces remarkably similar to Held Creek, Grasshopper Falls, and Sterns Creek ware decoration. It is noted that oxidized pastes are common for the decorated-lip variety (Benn and Green 2000:473).

### Pottery from the Hamon Site

Approximately 46% of the artifacts recovered from the Hamon site are ceramics. 74% are tempered with crushed rock, 23% are tempered with a mixture of sand and crushed rock, and the remaining 3% are not tempered (Table 7). As mentioned earlier in the chapter, crushed rock is commonly referred to as grit. This term for temper is interesting because grit is quite variable and can derive from numerous types of rock, including limestone, granite, and other igneous, sedimentary, and metamorphic rocks.

*Table 7. Total Amount of Ceramics and Temper Frequencies from the Hamon Site.*

Temper	Ceramic Sherds	Small Vessels & Possible Pipe Frags.	Ceramic Waste Material	Possible Appendages	Total	%
Crushed Rock	1797	0	13	0	1810	73.76%
Sand & Crushed Rock	569	3	0	2	574	23.39%
Clay (No Temper)	37	7	25	1	70	2.85%
Total	2403	10	38	3	2454	100%
%	0.9792	0.0041	0.0155	0.0012	100%	100%

Table 8. Surface Treatment Present on Vessel Section Sherds from the Hamon Site.

Surface Treatment	Base	Base/Low Body	Base or Shoulder	Body	Shoulder	Shoulder/ Neck	Neck	Rim	Total	%
Smooth	12	3	0	117	10	8	2	30	182	7.6%
CM	1	2	1	533	12	10	3	6	568	23.6%
Smoothed Over CM	2	2	2	395	4	5	2	6	418	17.4%
Brushed	0	0	0	33	9	18	17	9	86	3.6%
Brushed Over CM	1	0	0	58	1	2	1	0	63	2.6%
Trailed Lines	0	0	0	9	9	10	1	6	35	1.5%
Trailed Over CM	0	1	0	19	6	5	1	8	40	1.7%
Punctate/ Dentate	0	0	0	7	2	7	1	12	29	1.2%
Malleated	0	0	1	1	2	0	0	0	4	0.2%
P/W/S	0	1	0	11	1	0	0	3	16	0.7%
Deteriorated	1	4	0	844	45	18	8	42	962	40.0%
<b>Total</b>	<b>17</b>	<b>13</b>	<b>4</b>	<b>2027</b>	<b>101</b>	<b>83</b>	<b>36</b>	<b>122</b>	<b>2403</b>	<b>100%</b>

Table 9. Discernible Surface Treatment (D “trait”) Present on Deteriorated Vessel Section Sherds from the Hamon Site and Deteriorated Sherds with no Discernible Surface.

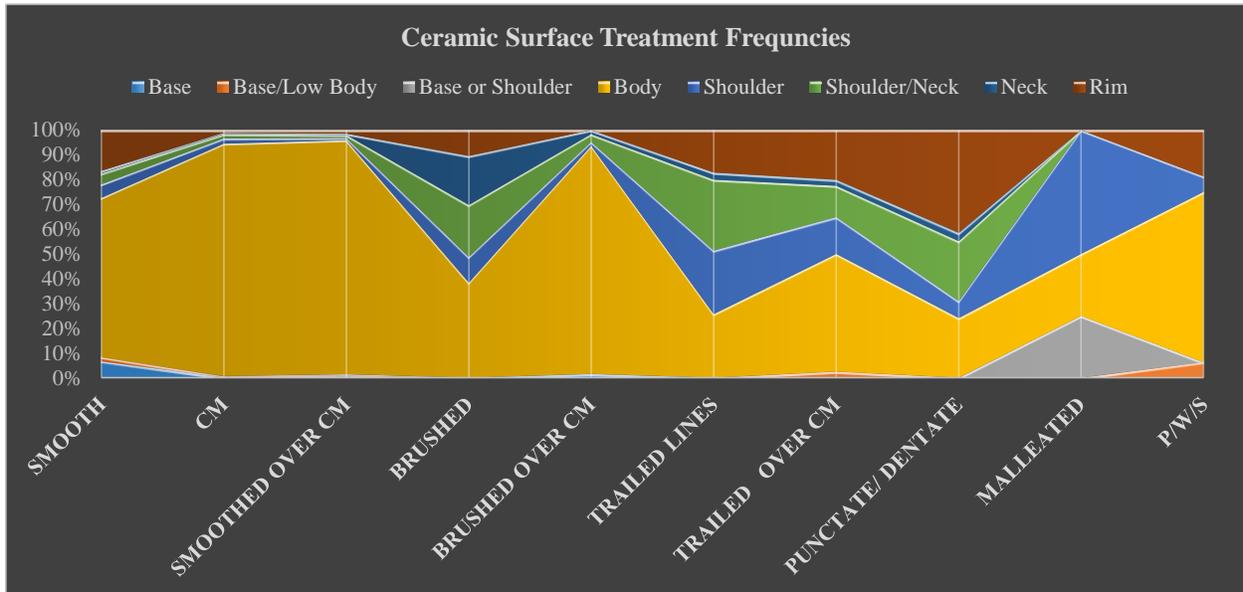
Surface Treatment	Base	Base/Low Body	Base or Shoulder	Body	Shoulder	Shoulder/ Neck	Neck	Rim	Total	%
D Smooth	0	0	0	0	1	0	0	1	2	0.2%
D CM	0	0	0	322	8	2	2	4	338	35.1%
D Smoothed Over CM	0	1	0	23	1	2	0	1	28	2.9%
D Brushed	0	0	0	3	0	0	1	1	5	0.5%
D Brushed Over CM	0	0	0	2	0	1	0	0	3	0.3%
D Trailed Lines	0	0	0	0	2	2	0	1	5	0.5%
D Trailed Over CM	0	0	0	0	11	3	2	2	18	1.9%
D Punctate/ Dentate	0	0	0	0	0	0	0	1	1	0.1%
D Malleated	0	0	0	0	0	0	0	0	0	0.0%
D P/W/S	0	2	0	41	6	0	0	14	63	6.5%
Deteriorated	1	1	0	453	16	8	3	17	499	51.9%
<b>Total</b>	<b>1</b>	<b>4</b>	<b>0</b>	<b>844</b>	<b>45</b>	<b>18</b>	<b>8</b>	<b>42</b>	<b>962</b>	<b>100%</b>

### Surface Treatment

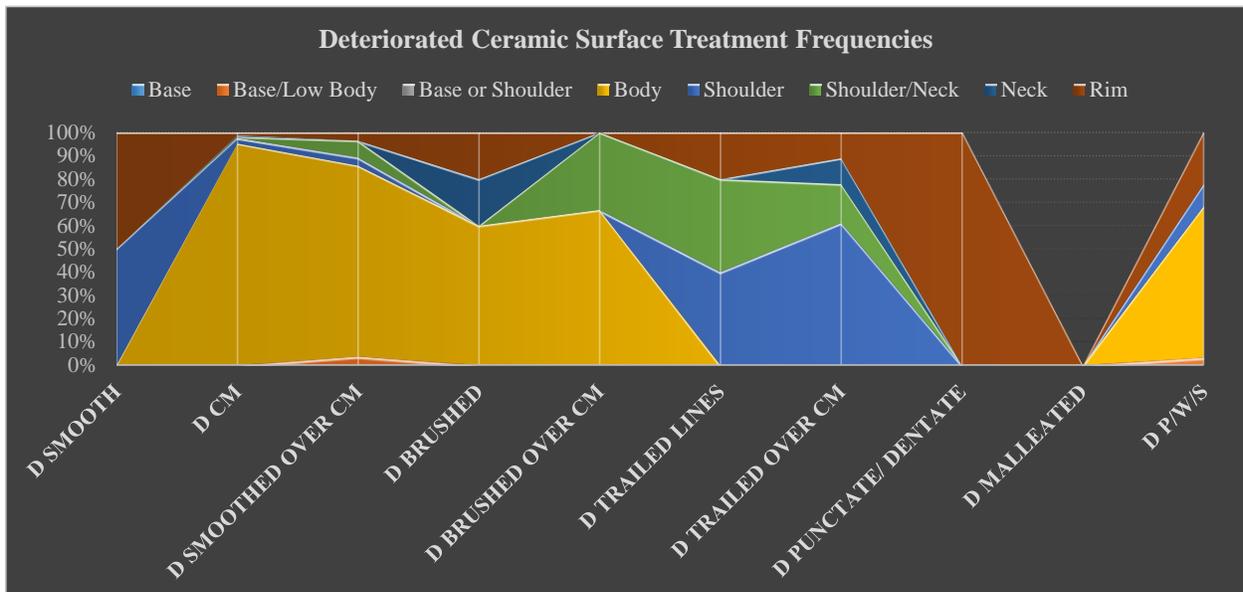
The pottery from the Hamon site is characterized by a variety of surface treatments. Cord marking or roughening is the most common, followed by smoothed-over cord marking and smoothed surfaces (Table 8). Brushing, trailed lines (alone or in combination over cord marking), punctuation, dentation, and a deteriorated paint-wash-slip are also present in lower frequencies. Generally, the deteriorated sherds that still have discernible surface treatments follow the same

relative frequencies as the non-deteriorated sherds (Table 9). Rims that have tool impressed lips are included in the punctate/dentate category of the overall surface treatment for all sherds, and specifically categorized in the descriptions of rim sherds (Table 11).

*Chart 4. Frequencies of Surface Treatment Present on Vessel Sherds from the Hamon Site.*



*Chart 5. Frequencies of Surface Treatment Present on Partially Deteriorated (Denoted by “D” in Front of Treatment Type) Sherds from the Hamon Site.*



Cord-marked, smoothed-over cord-marked, smooth, and brushed-over cord-marked treatments are present in highest frequencies on body sherds of vessels (Charts 4 and 5). When present, brushing, which is identified by parallel or overlapping striations, occurs on bodies as frequently as shoulders, necks, and rims of vessels combined. Trailed lines, a variant form of incising, are distinguished from brushing by the occurrence in isolation, geometric patterns, and zones containing parallel, curvilinear, and angled motifs. Trailed lines have the additional characteristic of being pulled with a pointed, blunt, or rounded tool that leaves behind trails with “heels” at the end of strokes<sup>2</sup> (Shepard 1956:195-203). Trailing and trailed-over cord-marking occurs on body sherds in low frequencies, with higher frequencies occurring on shoulders, necks, and rims. Punctuation, indentations, and tool impressions occur most frequently on the necks and low rims of vessels. A malleated treatment (a dented pattern suggestive of being “slapped” with a paddle) is present on a limited number of sherds with a frequency roughly distributed between ambiguous bases, shoulders, and body-and-shoulder sherds. An apparent paint, wash, or slip is present in the form of an orange, buff, or brown pigment on numerous bodies, shoulders, and rims, with a higher occurrence discernible on bodies (Charts 4 and 5).

### ***Thickness***

The percentage of sherds that fall within certain thickness ranges are useful for showing the uniformity or diversity in aspects of ceramic form. The thickness of sherds from the Hamon site was measured and rounded to whole millimeters and is reported with averages for specific portions of vessels (Table 10). Digital Calipers were used and measurements were taken around the circumference of sherds and towards the center as close as possible. In instances of single sherds

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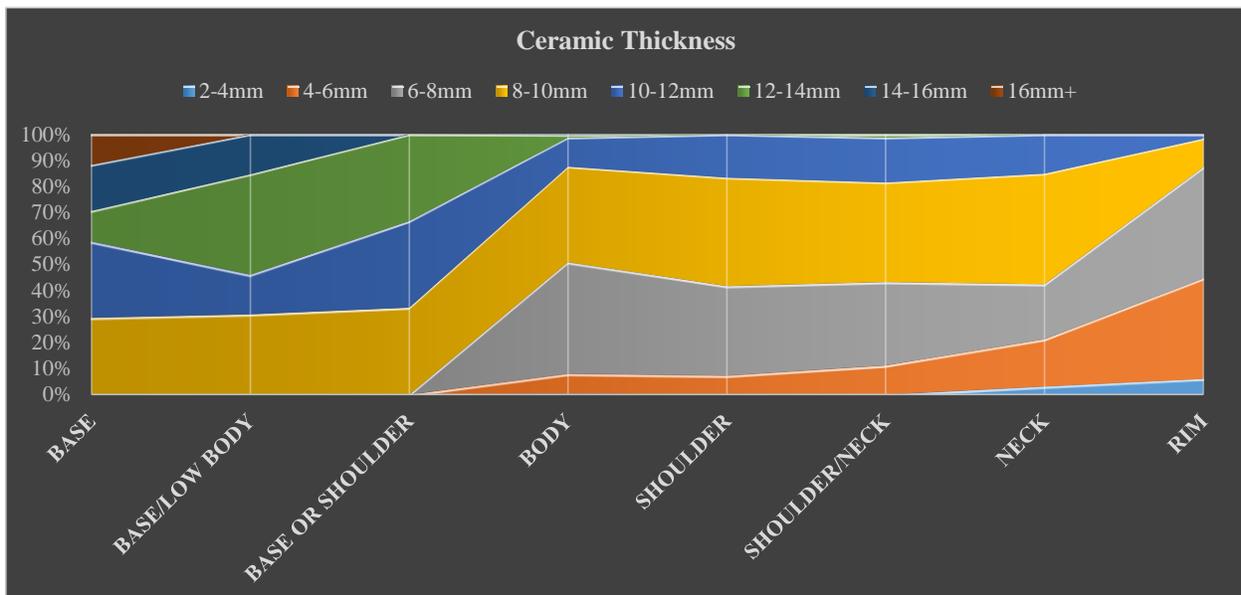
<sup>2</sup> A “Heel” as described by Shepard, is the point on the vessel where the tool being used to make a trailed line decoration stops and leaves a slight bump formed by the clay accumulation being dragged by the tool. It can also just be where the tool stopped and the displacement of clay returns to its natural elevation of the vessel surface.

having a range of thickness spanning one mm or more, the minimum and maximum ranges were averaged. Rim sherds were aligned vertically and measured 5-10mm below the lips (depending on the form and size of the lip) at a perpendicular angle. A range of 2mm was chosen to show the different frequencies in which the various sherds from Hamon are distributed (Table 10, Chart. 6).

*Table 10. Thickness Variation of Ceramic Sherds from the Hamon Site.*

Ceramic Thickness	Base	Base/Low Body	Base or Shoulder	Body	Shoulder	Shoulder/ Neck	Neck	Rim	Total	%
2-4mm	0	0	0	5	0	0	1	7	13	0.5%
4-6mm	0	0	0	143	7	9	6	46	211	8.8%
6-8mm	0	0	0	794	33	26	7	51	911	37.9%
8-10mm	5	4	1	680	40	31	14	13	788	32.8%
10-12mm	5	2	1	208	16	14	5	2	253	10.5%
12-14mm	2	5	1	18	0	1	0	0	27	1.1%
14-16mm	3	2	0	5	0	0	0	0	10	0.4%
16mm+	2	0	0	0	0	0	0	0	2	0.1%
NA	0	0	1	174	5	2	3	3	188	7.8%
<b>Total</b>	<b>17</b>	<b>13</b>	<b>4</b>	<b>2027</b>	<b>101</b>	<b>83</b>	<b>36</b>	<b>122</b>	<b>2403</b>	<b>100.0%</b>
Average	12.78	12.36	10.93	8.59	8.7	8.82	8.43	6.78	NA	NA

*Chart 6. Distribution Frequencies of Ceramic Sherd Thickness from the Hamon Site.*



Thickness of base sherds range from 8 to 16 mm. with nearly 60% ranging from 8 to 12 mm. The remaining sherds are nearly evenly distributed from 12 to 16 mm, with a couple that are

slightly thicker than 16 mm (Table 10, Chart. 6). Bases and body sherds have the same general distribution from 8 to 12 mm, with a slightly higher distribution from 12 to 14 mm. Curvature and thickness of certain sherds make it apparent that they are either bases or shoulders. However, a clear distinction could not be made. Those sherds have a similar distribution of thickness from 8 to 12 mm as the base sherds, but none are thicker than 14 mm.

Body sherds range from 2 to 16 mm in thickness. The largest range of distribution is from 6 to 8 mm followed by 8 to 10 mm, 10 to 12 mm, and 4 to 6 mm. Only 28 have a thickness from 2 to 4 mm, 12 to 14 mm, or 14 to 16 mm. Shoulder and neck sherds have a similar distribution of thickness as the body sherds except that there is an incline in the percentage from 2 to 4 mm and 4 to 6 mm. Rims have the largest percentage of thickness from 2 to 4 mm and 4 to 6 mm than any other vessel section. A nearly equal amount range from 6 to 8 mm and there is a noticeable decrease at the 8 to 10 mm range, with only a couple ranging from 10 to 12 mm (Table 10, Chart 6).

### ***Rim Forms, Vessel Diameter and Interpreted Vessel Forms/Function***

A total of 127 rim sherds, refits of rim sherds, and portions of vessels containing rims (large sherds comprising a significant portion of the original vessel) were analyzed in traits of rim form, lip form, and vessel diameter at the rim (where applicable). A majority of rims (77) are straight with a slight outcurve, 29 are straight, 16 are noticeably out-curving, one rim is inverted, and four are too fragmentary to interpret (Table 11). The majority of lips (61) are round, followed by flattened (29). Sub-flattened lips are present in eight rims, tool impressions are present in 14 rims, and the exterior portion is thickened (sometimes with a noticeable wedge shape) in 10 rims. Five rims are deteriorated in the lip region making a distinct classification unavailable (Table 11).

Table 11. Rim Forms, Lip Forms, and Reconstructed Vessel Diameters of Ceramics from the Hamon Site.

Rim Form	Sherds	Refits	Vessel Portions (Large Sections)	Total
Strait	26	0	3	29
Strait/Slight Out Curve	66	10	1	77
Outcurving	14	1	1	16
Inverted	1	0	0	1
NA	4	0	0	4
<b>Total</b>				<b>127</b>
<b>Lip Form</b>				
Round Lip	56	3	2	61
Flat Lip	25	4	0	29
Subflattened Lip	6	2	0	8
Tool Impressed	14	0	0	14
Exterior Thickened/Wedge	7	2	1	10
NA	3	0	2	5
<b>Total</b>				<b>127</b>
<b>Vessel Opening</b>				
Diameter 0-12cm	2	0	5	7
Diameter 13-25cm	8	8	0	16
Diameter 26-31cm	2	2	0	4
<b>Total</b>				<b>27</b>

Reconstruction of vessel diameters was conducted by creating a diagram of circles ranging from 2 to 30cm on one large piece of stock paper. Rim sherds, refits, and vessel portions that were large enough to contain a necessary proportion of the orifice's curvature were aligned horizontally over the diagram of circles. The rims were aligned to the circles on the diagram until the curvature of the rim matched the circles on the diagram without curving outside the boundaries or within the boundaries. The results achieved a 2 cm range accuracy or more in some cases. Based on general orifice diameter ranges of small, medium, and large vessels (Trabert 2011:335, after Braun 1980:182), the vessel orifice diameter ranges are categorized as small 0-12 cm, medium 13-25 cm, and large 26-31 cm. A total of 27 sherds, refits, and vessel portions were of sufficient size to

calculate orifice diameters. Seven have small diameters, 16 medium, and four large (Table 11). Eight of the medium-size diameters are calculated from refits, of which four refitted to one group, and the other four refitted into two groups. Two of the large-size diameters were calculated from one group of refits. Due to refits and possibility of some sherds being from different quadrants of the same vessel, a reasonable estimate of the minimum number of vessels represented is not possible.

Based on the orifice diameters, variations of shoulder emphasis (constriction and lack of constriction at rim-shoulder junctions), thickness, and conoidal to sub-globular bases in the assemblage, vessels appear to range from thick to thin, straight to ovoid, and subglobular-globular in form (comparisons of rim, neck, shoulder, and body quadrants). Small personal bowls and medium to large vessels reflective of storage and cooking for several individuals, are reflected in the size of orifice diameters and large sherds containing portions of the shoulders and rims of the vessel. A cooking function for some of the vessels is apparent from the charred residues on some sherds. In some samples the residue is quite abundant and was utilized to obtain AMS dates. In others residue and/or thermal alterations are not present. The functions of these vessels could have been numerous, including water and resource storage, and ceremonial (e.g., grave goods). Although it can be, the difference of form between a larger elongated vessel and a smaller subglobular vessel is not a clear indication of different wares or types through time, but may reflect different functional purposes.

### ***Vessel Portions, Possible Ceramic Pipe Fragments, Possible Appendages***

Ten large sherds are representative of vessel sections, including nine small vessels and one medium-sized vessel (when compared to smaller vessel sections). Four of the smaller vessel sections may be fragmentary pipes, although it is unclear whether they are pipe fragments or rims

of miniature vessels (Figure 11c-d). One of the smaller vessel portions contains trailed, or possibly incised lines on the body. It is broken at the neck and appears to have been globular in form (Figure 11e). One has a cord-marked shoulder and smooth rim, one is cord-marked and possibly malleated, and the other two are smooth. The portion from a larger vessel contains a cord-marked body with trailing or brushing and a punctate pattern on the neck. All four of the ambiguous small vessel or pipe fragments are smooth.



*Figure 11. Left picture, top row, left to right: (a) small vessel c. 1505 & c.3357 refit, (b) shoulder/neck c.3136, (c) miniature vessel/possible pipe fragment c.1273, (d) miniature vessel/pipe fragment c.4253. Bottom row, (e) small globular vessel portion with trailed or incised lines c.72.62.725, (f) body portion c.72.62.722, (g) globular Base portion c.1349 & 1490 refit. Right picture, (h) possible appendage/bead/figure fragment c. 3677, (i) small vessel/pipe/waster/appendage fragment? c.286, (j) possible appendage c.2210, (k) possible appendage c.2538.*

Three artifacts may be appendage remnants. Two are small, curved, and deteriorated (Figure 11j-k). One artifact is cylindrical and contains multiple holes that intersect a long, perpendicular hole (Figure 11h). One end is smooth and the other has been broken, which is indicative of being larger or attached to another ceramic artifact, possibly a vessel. This same piece may also be a clay bead fragment, pipe fragment, or perhaps a portion of a clay figurine. Several rims also have deteriorated zones below the lip areas and may indicate that appendages once were attached in that spot. One waster may be an appendage remnant. However, it is categorized as ceramic waste due

to overall similarities with that material. The cylindrical artifact with holes is made of non-tempered clay, and the other two have temper of sand and crushed rock (Figure 11h).

### **Ceramic Production Material**

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

Thirty-eight ceramic artifacts from the Hamon site are waste materials, represented by a mixture of wasters (truly deformed), spherical clay balls, and cylindrical fragments that most likely represent fragments of coils from unfinished vessels. One artifact has a thumb or finger impression in the clay (Figure 12g), a literal “fingerprint” of one of the prehistoric people at the Hamon site. The appearance of broken coils and finger impressions suggests that coiling was used to form vessels. As stated earlier, nearly 40% of the sherds from the Hamon site are deteriorated, roughly half of those to the point that it is not possible to interpret surface treatment. Any number of those sherds could be de facto wasters. However, the difficult discernment of de facto wasters from naturally deteriorated sherds makes such an interpretation subjective and has been avoided.

Crushed rock temper is present in 13 of the ceramic waste materials. The remainder contain no temper (Table 7).



*Figure 12. Ceramic production material. Left picture, clay, top row, (a) spherical ball c.339, (b) cylindrical coil fragment c.72.62.728, (c) cylindrical coil fragment/possible figurine? c.72.62.727, (d) spherical ball c.72.62.732. Middle row, (e) elliptical lump c.3249, (f) spherical lump c.2579, (g) finger imprinted clay c.1429, (h) clay waste c.2409. Bottom row, (i) clay waste c.1262, (j) clay waste c.53, (k) clay waste c.103, (l) finger imprinted clay c.72.62.729. Right picture, limestone with clay and hematite, top row, (m) c.1256, (n) c.3816. Middle row, (o) c.1808, (p) c.4439, (q) c.2856, (r) c.382. Bottom row, (s) c.4443, (t) c.4435.*

The ceramic waste material includes numerous limestone artifacts covered in clay. Some have remnants of arching smears of clay, suggesting that they were used as a platform upon which ceramic production was conducted (Figure 12, right picture). Numerous hematite and limonite (iron oxides) objects show signs of having been worked with a tool (Figure 13, left picture). One of the hematite objects has a deep, circular depression from such alteration (Figure 13b). Hematite is an abundant inclusion in pottery from the Hamon site. Addressing whether hematite was intentionally added to the clay is made difficult by the fact that clay from alluvial sources may naturally contain a large amount of hematite (Beck 2001). However, the paint, wash, or slip that was applied to some of the pottery was apparently derived from hematite and limonite fragments in the assemblage. This provides evidence for production activities at the site.



Figure 13. Left picture, worked hematite, top row, (a) c.180, (b) worked Bowl depression c.2123, (c) c.2875, (d) c.2609. Middle row, (e) c.2223, (f) c.1327, (g) c.3953, (h) c.1660. Bottom row, (i) c.3416, (j) c.1659, (k) c.2635, (l) c.2633. Right picture, worked igneous and metamorphic rock, top row, (m) c.4017, (n) c.4244, (o) c.1141, (p) c.177. Second row, (q) c.2682, (r) c.2876, (s) c.3552, (t) c.2558. Third row, (u) c.4186, (v) c.1782, (w) c.183, (x) c.2390. Bottom row, (y) c.2803, (z) c.1949, (aa) c.417, (bb) c.1921.

Numerous igneous, metamorphic, and sedimentary rocks in the assemblage match the grit temper in the ceramic sherds. These materials are granite, basalt, schist, gneiss, hornfels, quartzite, arkose, and finely sorted sandstone. Several of the specimens have characteristics of being crushed (Figure 13, right picture). In combination with the other material evidence, it is clear that ceramic production took place at the Hamon site.

### **Ceramic Relations with other Plains Woodland and Plains Village Pottery Wares**

Cord-marked, smoothed-over cord-marked, and smooth surfaces, described by Reynolds (1979) for Grasshopper Falls phase pottery, are abundant in the Hamon site assemblage. Reynolds (1979:71) interpreted brushing, occasional punctation, and bosses as insignificant and asserted that Grasshopper Falls phase pottery was a utilitarian ware. He notes that the most similar Plains Woodland pottery type to that of Grasshopper Falls ware is Valley Cord-Roughened. However, the brushing, and tool-impressed lips of pottery from Grasshopper Falls phase components

provided differences (coupled with interpretations of house forms) that justified the naming of a new phase and pottery ware. Upon direct comparison, some pottery from the Hamon site resembles Valley Cord-Roughened pottery from the type site 25VY1, and some pottery is quite different (Figures 14 and 15).



*Figure 14. Valley Cord-Roughened from the Valley type site 25VY1 in Nebraska. Top left picture, top row, (a) VY1-745, (b) VY1-1848, (c) VY1-1740/2, (d) VY1-2334/1. Middle row, (e) VY1-799, (f) VY1-531, (g) VY1-1155, (h) VY1-145/1. Bottom row, (i) VY1-130B? (j) VY1-356/2, (k) VY1-2129/10, (l) VY1-363, (m) VY1-154/2. Top right picture, top row, (n) VY1-1867/3, (o) VY1-1877/2, VY1-1822? Bottom row, (p) VY1-1241/1, (q) VY1-1989, (r) VY1-304, (s) VY1-2136/VY1-2290/5 refit? Bottom left picture, top row, (t) VY1-1559/4&5 Refit. Bottom row, (u) VY1-2166/13, (v) VY1-2049/5. Bottom right picture, all five clockwise from the largest specimen on the left, (w) VY1-450, (x) VY1-998, (y) VY1-639, VY-1 2779/3 & VY1-607/1 Refit, (z) VY1-48/50/1&2 Refit (the “?” denotes catalog numbers that are too difficult to interpret correctly due to faded labels).*



*Figure 15. Rim sherds and body sherds from the Hamon site. Top left picture, thick and relatively straight rims, top row, (a) c.4370, (b) c.3329, (c) c.1726, (d) c.283. Bottom row, (e) c.77, (f) c.1008, (g) c.72.62.415, (h) c.868. Top right picture, thin rims, some relatively straight, others with slight outcurves and distinctly bulging shoulders, top row, (i) c.1697, (j) c.4054, (k) c.72.62.434, (l) c.496 & c.497 refit. Bottom row, (m) c.81, (n) c.1011, (o) c.2128, (p) c.966. Bottom left picture, bodies, top row, (q) c.72.62.447, (r) c.525, (s) c.1584. Bottom row, (t) c.2609, (u) c.1770, (v) c.3390. Bottom right picture, bodies, top row, (w) c.1544, (x) c.843. Bottom row, (y) c.3535, (z) c.1767.*

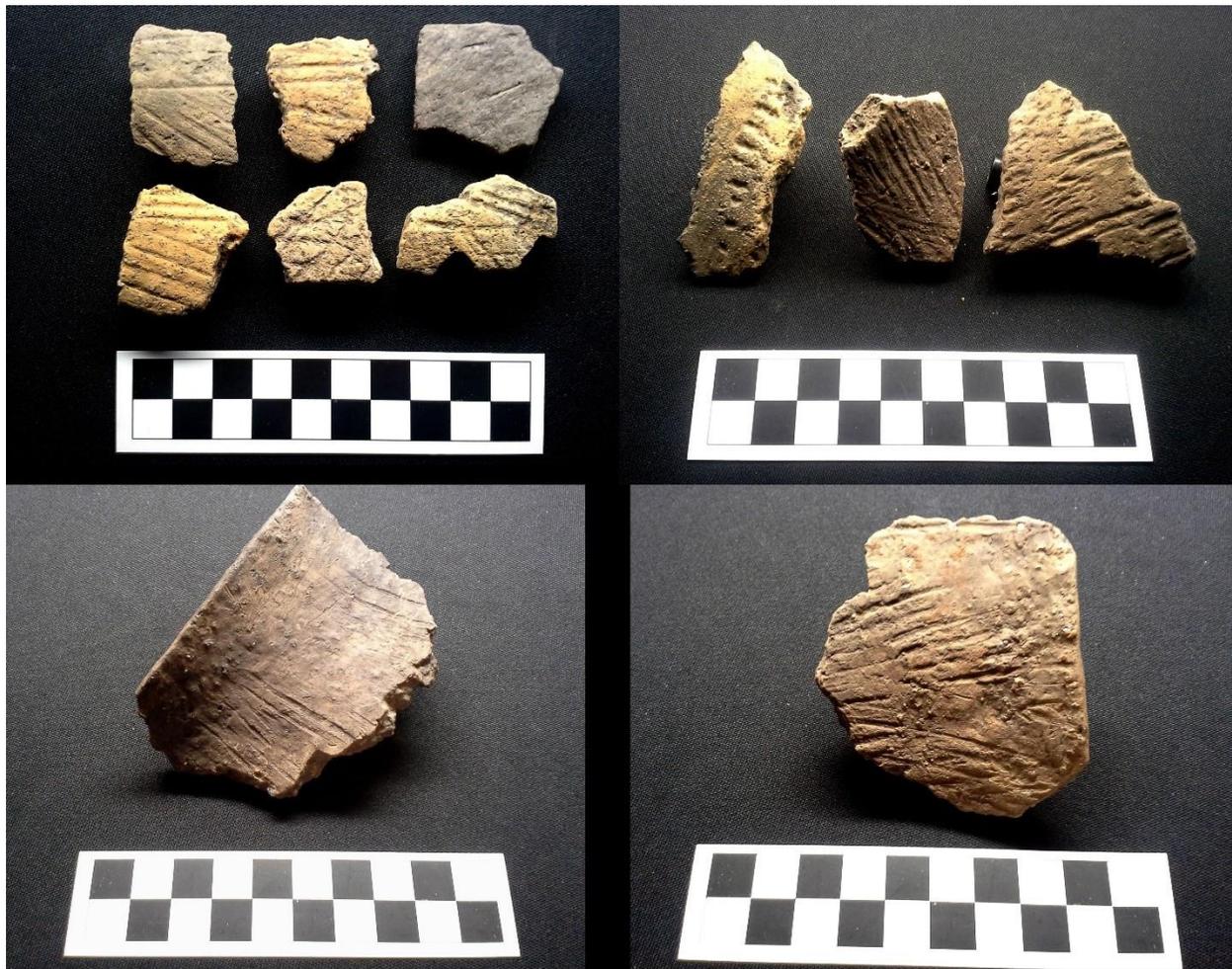
It is important to note that, given the close location of the Hamon site to the Quarry Creek Hopewell site, comparisons were made with lithic points from both sites with a high degree of morphological and material similarities among them (Chapter 3). However, there are no diagnostic Hopewell pottery traits (Cross-Hatched rims, Rocker-Zoned Stamping) present in the Hamon site assemblage. Lineal dentate designs are present, but this decoration alone is not enough to establish an argument for a Hopewell connection or manifestation at the Hamon site. Interestingly, the plain

vessels from Trowbridge do resemble numerous sherds from the Hamon site in paste, temper, and form.

The hemispherical bodies, and the crenulated lip forms of vessels recovered from Kansas City Hopewell sites raises the question: Do these vessels represent a Hopewell manifestation or any of the Late Plains Woodland units with similar pottery forms (Grasshopper Falls/Sterns Creek, etc.) inhabiting the same areas as the Kansas City Hopewell? In addition, miniature vessels were recovered from both Kansas City Hopewell components and the Hamon site. Even in light of these similarities, there is not enough material evidence to argue for a relationship because plain vessels and miniature vessels are found among other Plains Woodland and Plains Village components. Beneficial knowledge to understanding these Plains Woodland groups could be waiting in the cross referencing analysis of curated materials.

Some ceramics from the Hamon site have trailed lines on smooth surfaces or applied over cord-marking. These form abstract geometrical patterns, curved lines next to straight lines, and appear in zones (Figure 16). Brushing does not occur in zones, but in parallel, usually overlapping strokes, and as a lighter impression or striations on the surface. Vessels containing trailed-line decorations are sometimes coupled with punctate or dentate patterns. This occurs on the lower portions of rims, necks, and shoulders. These vessels are thinner and have more distinct shoulders that are characteristic of Loseke Creek ware vessel forms as opposed to the straight or relatively weakly defined shoulders of Valley Cord-Roughened vessels. However, other than the tripartite motifs, of which one specimen from the Hamon site exhibits a similar decoration (Figure 16h), trailed-line designs have not been adequately described for Loseke Creek ware. Future research endeavors could prove promising in comparing these pottery wares to one another. Cord-impressed and cord-marked surfaces are thoroughly described for Loseke Creek ware. These types are also present in

the Hamon site assemblage, although the tripartite designs, considered ancestral to Great Oasis pottery decoration, are lacking or deteriorated. Numerous specimens fit the vessel form and the cord-marked and cord-impressed surface treatments, associated with the Feye Cord-Roughened and Feye-Cord-Impressed types.



*Figure 16. Trailed line motifs with cord marking and punctates/dentates occasionally. Top left picture, body sherds, top row, (a) c.72.62.605, (b) c.3685, (c) c.54. Bottom row, (d) c.1589, (e) c.521, (f) c.72.62.523. Top right picture, neck/shoulder sherds, (g) c.3749, (h) c.3472, (i) c.2823. Bottom left picture, (j) rim/shoulder c.3307. Bottom right picture, (k) rim/shoulder c.3406. \*The Neck/Shoulder sherds in the top right picture and the rim/shoulders in the bottom left and right pictures are tilted to enhance the visual photo quality of the surface treatments.*

Trailed-line decorations, occurring in parallel, curvilinear, and zoned forms, occurs with Steed-Kisker phase pottery that temporally ranges from the terminal Late Plains Woodland period into

the Plains Village period, dated ca. AD 950-1400. However, some place tighter chronological restrictions in the tenth through twelfth centuries AD (Logan 2010:229; Roper and Adair 2011:20; Trabert 2009:291). Steed-Kisker ware is described as large and small hemispherical vessels that contain direct straight or flared rims. It is predominantly shell-tempered, but grit and sand occur at the Cloverdale and Friend and Foe sites, and these are the dominant temper materials at the former (Trabert 2009:296). Sherds with trailed or incised-line motifs on the shoulders have been reported from three sites in northeastern Kansas: 14LV1082, 14LV1071 and 14LV380 (Logan 2001; Trabert 2009). Logan and Ritterbush (1994) note that the development of Steed-Kisker from Plains Woodland predecessors, or as a Mississippian group that migrated into the Kansas City area, is poorly understood. Although they (among other researchers) also note Steed-Kisker interactions with other defined units of the Central Plains tradition (Logan and Ritterbush 1994:4-5; Trabert 2009:296-297; Wedel 1943:94-97).

Given associated AMS radiocarbon dates (discussed in the next section), the trailed-line designs from some of the vessels may represent either a Steed-Kisker component or contact with people at the Hamon site. However, no intact portions of rims, necks, and shoulders of vessels contain appendages or shell tempering in the Hamon site assemblage, but body, shoulder, and low rim sections clearly similar to Steed-Kisker forms and decorative design, are present in the smaller trailed line vessels (Figure 11). Alternatively, the designs may represent a decoration unique to present day northeastern Kansas in the Late Plains Woodland period, or decoration noted for Valley Cord-Roughened and Loseke Creek ware that is manifesting in northeastern Kansas. This hypothesis is supported by the facts that trailed line designs are noted for these pottery wares and types in the Plains Woodland period, but the trailed line designs for these wares and types needs to be researched further because descriptions are lacking in the literature.

Lip crenation is present and, as described earlier in this section, has been noted for Grasshopper Falls ware, Held Creek ware, and Sterns Creek ware. It is worth mentioning here that this decoration is also a trait of Pomona ware. Pomona is defined as a focus by Witty (1967), according to the Midwestern Taxonomic Method. The defining traits of the pottery ware are described as globular vessels with vertical to flared rims (occasional collared rims are noted) made from “un-tempered” clay. Witty describes the surface treatment as cord-roughened or smooth, with finger-pinched or thickened lips and occasional sub-lip “knobs” (bosses/protuberances). Bowls lacking necks are also described for Pomona ware but not defined as a separate type (Witty 1967).

Brown (1984:442-447) further defines Pomona as a Variant (distinct from a focus) with four different named phases including 1) Clinton 2) Wolf Creek 3) May Brook and 4) Apple Valley. In his description, scalloping and lip crenation are added to decoration styles. Brown also adds temper to the definition, noting a variety of materials. However, these are geographically distributed, with granite present only in the northern Delaware and Wakarusa drainages, and the presence of granite temper in these drainages is not emphasized, but the use of shell temper is (Brown 1984:427). Brown (1984:444-448) asserts that shell tempering always occurs in the Delaware River drainage and places the core geographical location of the Apple Valley phase (the latest chronologically, AD 1300-1350) there (Brown 1984:444-448).

The definitions of Pomona are confusing. Furthermore, sites with two or more radiocarbon dates at different points of the Late Plains Woodland chronological designation (early AD 600 and late AD 1000) have been described as containing a Plains Woodland component (i.e. Grasshopper Falls phase) and a Pomona component, with the latter being considered a Plains Woodland survival in the Plains Village period because the pottery sherds are almost indistinguishable from earlier Plains Woodland pottery types (Brown 1984:429; Williams 1986:44). Confounding the issue of

what Pomona ware is, are descriptions by Brown (1984:454) of Pomona ware being related to Keith and Greenwood phase wares and images of Pomona ware from 14AT2 (cf. Williams 1986: Figure 8, A) that depict a vessel portion identical to the Minotts Tool-Impressed and Minotts Decorated-Lip images provided by Benn and Green (cf. 2000: Figures 18.35 and 18.36).

One site in Johnson County (Shadow Glen, 14JO21), described as having a Pomona component, has materials that may be compared to the pottery from the Hamon site (Logan and Heddon 1993). The pottery is described as Pomona ware with straight rims, flaring shoulders, and cord-marked or smooth surfaces (Logan and Heddon 1993:22). The images of sherds, which are especially valuable (this does not always occur in published descriptions of pottery), reveal that they are remarkably similar to some of the rims from the Hamon site. However, the radiocarbon dates from Shadow Glen are much later than any obtained from the Hamon site. The pottery is described as predominantly grog-tempered with smaller amounts of shell (Logan and Heddon 1993:26). This led the authors to identify problems in associating the site with any of Brown's phases for the Pomona variant. The descriptions for Feye Cord-Roughened and the similar cord-roughened variety from sites at Saylorville Lake (Benn and Green 2000:459-463) are almost identical to pottery from Shadow Glen in form and decoration. Considering the temporal differences between Shadow Glen and the Hamon site, the pottery of this style present at the Hamon site may be more closely related to Loseke Creek ware than Pomona ware.

This brings us back to the scalloped or crenulated-lip rims from the Hamon site, which seem identical to ceramics described for Held Creek and Sterns Creek wares (Figure 17). As noted earlier, Benn and Green (2000:446, Figure 18.14) commented that Held Creek Ware and Grasshopper Falls ware are so similar in technology and decoration that there may not be a distinction between them. I agree with this acknowledgment. Photo images of Sterns Creek vessels

also suggest that the scalloped or crenulated rim, as well as the smooth rim and neck, are extremely similar to examples from the Hamon site (cf. Alex 2000:21 Figure 6.26; Benn and Green 2000:448 Figure 18.14). The geographical extent of sites with a Sterns Creek phase component neighbors and overlaps those with a Grasshopper Falls phase component. Photo images of Minotts Plain and Minotts Decorated-Lip recovered near Saylorville Lake are provided by Benn and Green (2000:476 Figure 18.36) and also show a remarkable similarity to rims from the Hamon site (Figure 17b-f).



*Figure 17. Crenulated, tool impressed (some "scalloping" effect) rims. Left picture, (a) Grasshopper Falls/Held Creek/Sterns creek rim c.2926 & c.2124 refit. Right picture, Sterns Creek/Minotts Decorated-Lip? Similar attributes as Pomona? Top row, (b) c.72.62.436, (c) c.581, (d) c.2344. Bottom row, (e) c.455 & c.2721 refit, (f) c.582.*

The taxonomic designations for these different Late Plains Woodland units are confusing. As Adair (2012:210-211) has pointed out, numerous methods including the Direct Historical Approach, McKern's Midwestern Taxonomic Method, Willey and Phillips Cultural-Historical Integration Method, Lehmer's "Variant," and Champe's classification schemes have been employed by archaeologists in the plains. Today, veteran researchers and new students alike find that the classification system in use contains a mixture of these methods even though they were

never meant to be interchangeable. These cultural designation units need to be refined, with some absorbed into others if there is not enough justification to keep them separate.

The patterns in shared decoration and pottery production techniques also reveal that Late Plains Woodland communities were distributed over a broad region along the Missouri River Valley and peripheries. Some of these connections could have involved trade, the movement of spouses between groups bringing unique pottery styles with them, or local replication via contact with neighbors. This also calls for a reanalysis of defined designation units not only to use one methodology, but to eliminate splitting that may have taken place in isolated research.



*Figure 18. Left picture, paint/slipped/washed rims with deterioration, (a) c.583, (b) c.4160, (c) c.4354 & c.578 refit. Right picture, paint/washed body sherds with deterioration. Top row, (d) c.545, (e) c.1869. Middle row, (f) c.2719, (g) c.1970, (h) c.1756, (i) c.1520. Bottom row, (j) c.3358, (k) c.4072, (l) c.3860.*

The painted, washed, or slipped pottery from the Hamon site (Figure 18) is difficult to associate with other components in the region. Slipped sherds are present in the Shadow Glen Pomona assemblage (Logan and Heddon 1993). They are also present in Late Plains Woodland assemblages in Missouri, Nebraska Phase assemblages (Billeck 1993, Hoard et al. 2003; Ives 1955; Trabert 2011), and Wedel (1943:78, 95-96) notes deteriorating wash or slips on Steed-Kisker vessels. Common to all descriptions of red-slipped or washed sherds is the fact that they are rare,

as is the case for the sherds from the Hamon site. However, the fact that deterioration of the paint or wash is clearly evident on the Hamon site material makes it impossible to determine the percentage of sherds that may have had this trait.

If the general Middle to Late Plains Woodland descriptions that identify a shift in ceramic forms from vessels with thick, poorly defined shoulders to thin, clearly pronounced shoulders is assumed for the ceramic material from the Hamon site, then it appears that pottery resembling that of Valley Cord-Roughened, Grasshopper Falls ware, Held Creek ware, Sterns Creek ware, Loseke Creek ware, Minotts Decorated-Lip, and possibly Steed-Kisker ware may reflect that shift. However, the evidence for Steed-Kisker ware, other than trailed lines, one or two smaller, more globular vessels and Hamon chronology (Chapter 5), remains the weakest.

Temper (with the exception of shell for Steed-Kisker ware and Pomona ware) is far less important than either form or decoration for defining any of the above mentioned pottery complexes. Based on my own analysis of these definitions, sand, grit, and other “crushed rock” tempers are not a useful indicator of different groups of people in the archaeological record of the Central Plains during the Woodland period. I make this statement because in this region cultural preferences, among them shell-tempering, do not appear to have been more significant than resource availability, and all of the above-named pottery wares or types share the common ground of being sand and grit tempered. Natural resources, including tempering materials, are utilized in adaptations to specific environments. That is, people of the Middle to Late Woodland period in the Central Plains (in contrast to Plains Village people) do not appear to have been making a special effort to obtain shell, or other exotic material for temper when it was not locally available. All of the above-mentioned ceramics come from components at sites within the same broad geographical region. It is not surprising that sand and grit, which are ubiquitous, is the dominant temper in all

of them. The occupants of the Hamon site may have produced ceramics multiple times during different occupations and exploited sediments of the once-glaciated region that provided derivatives from granitic and metamorphic rocks for temper.

Although advanced petrographic analysis was not undertaken for this study, it is evident that clays used for these ceramics contain iron oxide inclusions. Their appearance in ceramic temper suggests an alluvial source. Ceramic characteristics other than temper reveal that the people at the Hamon site had contact with other neighboring groups to the north and east during the Late Plains Woodland period (AD 500-1000). Pottery with trailed line motifs may have been a locally independent invention, the result of replication following contacts with neighbors, or the result of trade. Determining if some of the items entered the site via trade is impossible without advanced chemical sourcing analysis.

### **Ceramic Analysis Conclusions**

Analysis of pottery from the Hamon site highlights the necessity for careful study of the relationships among ceramic assemblages of all the taxonomic units described. This must be undertaken not only to understand variability and similarities among and within them, but to help refine archaeological units used to describe archaeological phenomena as they are employed to interpret broader, more coherent, regional adaptations of prehistoric people who inhabited the Missouri River valley and its peripheries. Information into the social practices, adaptations, economics, and lives of individuals living in the Late Plains Woodland period along and near the Missouri River Valley of Kansas, Missouri, Nebraska, Iowa, and possibly South Dakota may be hidden in research conducted during the first three quarters of the twentieth century. This research was conducted by scholars who did not have the technological advantage of sharing the information with other researchers like we do today.

Furthermore, this analysis reveals the kinds of artifacts present in Plains Woodland sites where ceramic production activities appear to have taken place and suggests an alternative hypothesis for interpreting the presence of daub, a topic that is lacking in North American ceramic studies. Houses are the most common features interpreted from Plains Woodland period archaeological sites containing daub. However, it is important to reiterate that daub can be left behind from numerous activities, one of them being ceramic production events.

In two hypothetical scenarios, let's consider how this could happen. In the simplest open fire event, fuel is gathered and placed in a location for burning. Nothing other than a gathered pile of material will be burnt with ceramic vessels piled on top. This could leave traces in the archaeological record similar to house daub. The ground surface upon which the material burns, in this case wood material burning on grass-covered earth and weighed down by the ceramic vessels on top of it, becomes burned earth. In combination with the vegetation growing in the A horizon of the soil and penetrating the surface, the wood and grass would leave the same impressions on the burned earth as those left on daub from a burnt house.

Another form of open fire kilns can be more complex to allow for more control of the event. Similar to an earth oven for other purposes, a small basin area can be dugout, and the fuel material placed within. A wind break or overhang structure might be constructed over a portion of the basin for additional control and manipulation of the firing event, or for protection of the production material from the elements to ensure a successful event. In this scenario the odds increase for the traces left behind in the archaeological record to resemble house daub. The multitude of ways daub could be left behind in this scenario include wood pressing against the earth oven walls as it becomes burned earth, the structure associated with the kiln being of the same type of materials as a daub-covered house, clay waste baking on wood, and the upper A horizon becoming burned

earth in the same manner as the first scenario. At sites where there are large amounts of ceramic material in association with burned earth, daub, and burned stone, ceramic production should be explored as an option of the activity that has left these traces. In addition, the presence of other artifacts used in ceramic production might be present to support a ceramic production event.

In this chapter I describe a number of stone and clay objects that reflect ceramic production (Figures 12 and 13). Numerous igneous and metamorphic rocks were recovered from the Hamon site that show clear evidence of being worked by grinding and other forms of reduction. These rocks are composed of feldspar, quartz, and other associated minerals including mica, biotite, hornfels, beryl, chrysoberyl, topaz, garnet, tourmaline, peridot, spinel, and even zircon. The identifiable minerals composing the grit temper in the ceramics is variable and matches those in the modified rocks. It is conclusive that these rocks were beaten, ground, and broken down to be added to the clay paste as temper in ceramics at the Hamon site. Numerous pieces of raw hematite in the earthy ochre form, in contrast to compact crystalline specular iron varieties (Busbey et al. 1997:167), are also present with clear signs of human modification from processing and use. The pigment and mineral material of the paint or wash present on some of the Hamon site pottery is also ochre and appears to have derived from the processed ochre at the site. The abundant and large limestone rocks recovered from the Hamon site are uniformly covered in clay, and many specimens are smeared with red-brown hematite pigments. Numerous pieces of clay with very minute amounts of temper, or no temper, are spherical, cylindrical, and oblong in shape. These artifacts reflect clay processing associated with ceramic production. In combination, the clay-covered limestone, hematite smeared limestone, igneous and metamorphic rocks, raw clay, abundant ceramics, burned stone, and burned earth-daub materials at the Hamon site reflect the activity of ceramic production.

The ceramic analysis with accompanying stone material reveals that a ceramic production event took place, but the ceramics themselves also reveal variability associated with numerous defined pottery wares and types in the Late Plains Woodland period. The vessels are variable in form and surface treatments. Some vessels have straight rims with very little emphasis on shoulders, while others have a very distinct curve from the rim area to the shoulder, suggesting a more globular or subglobular body form. Surface treatments vary from smooth, cord-marked, and brushed, to intricate designs, composed of linear/curvilinear and basic geometric patterns. In identifying this variability as one pottery ware, or types within a pottery ware, a dilemma arises. The pottery could be identified and argued as belonging to Valley, Grasshopper Falls, Sterns Creek, Held Creek, Loseke Creek, Minotts, and even Steed-Kisker wares and types. This calls attention to problems of cultural designation units for Plains Woodland components and the value of conducting comparative research on collections and excavations records from components and sites attributed to them. More research could result in promising steps towards understanding the adaptive, economic, and social aspects of Late Woodland people in the Plains.

The question of whether more than one component in time is present at the Hamon site rises from the material analysis of the ceramics and lithics from Chapter 2. In addition, the excavation records from the Hamon site also encourages this question. The next, and final analysis chapter of this research, was conducted in part to pursue an answer. It reviews original interpretations the Hamon site, a reconstruction of the original excavations, a spatial analysis of recovered artifacts and interpreted features, results of newly obtained AMS dates from ceramic residue associated with important features, and the results of a field survey I conducted to locate the original excavation area and define the site boundaries at a higher resolution.

## **CHAPTER 5: SPATIAL ANALYSIS, AMS DATES, AND 2014 SURVEY OF THE HAMON SITE**

The variability of traits among the artifact assemblage and evidence for production activities (discussed in Chapters 3 and 4) led to additional analyses in attempts to answer the question about possible multiple components at the Hamon site. Since the data was available and important for interpretations, I initially planned to analyze the excavation records and reconstruct a spatial distribution of recovered artifacts. Reflecting the variability among the artifact assemblage, the records contain data of features that do not appear in the discussion of the Hamon site by Reynolds' (1987). The KSHS had curated the material from the excavations for 42 years when I began my analyses. An ideal circumstance arose from the ceramic analysis when abundant charred residues were discovered to be present on numerous sherds associated with different provenience. Four specimens were prepared and submitted for AMS radiocarbon dating. Once review of the excavation records and the spatial analysis data had been completed, and two of the four AMS results had come back with different dates, it became important to perform a pedestrian survey to locate the excavation area and site boundaries. The results of the above analyses and survey is presented here, and reveal that the Hamon site is a palimpsest of multiple components during the Late Plains Woodland Period.

The cultural material from the original 1971-1972 excavations was recorded in three, half foot (6 inch), or roughly 15 cm levels and a partial fourth (depending on the unit). I created a database of artifact provenience from these excavations and then analyzed the data using Microsoft Excel spreadsheets. I used a vector-based software to project the data onto a map of the excavation grid. This analysis shows that artifact densities were high in units on edges of the excavation grid, suggesting that they extend into unexcavated areas. However, the excavation was never expanded

with the exception of a limited effort in an attempt to locate post mold patterns on the last few days.

The AMS dating samples come from several different spatial locations within the excavations. One (D-AMS 007435) was recovered from a deeper provenience than all others, while another (D-AMS 007434) came from surface-collected material. Two others (D-AMS 007947 and 007948) were recovered from a similar depth, roughly halfway through the excavation depth limits but from different horizontal proveniences. All four samples were submitted for analysis to Direct AMS in Seattle, Washington. The results are significantly different from each other. When combined with the one conventional date (I-11371), obtained from a piece of charcoal by the original excavators, they span a 2-sigma calibrated median probability date range of AD 675-1040 (Bronk Ramsey 2009; OxCal 4.2.4; Reimer et al 2013). The latest median probability date of AD 1040 comes from sample I-11371 (associated with a pit containing an infant burial), which was from a deeper level than the sample with the earliest median probability date of AD 675, thus, suggesting that the later date is associated with an intrusive feature.

The data cited above prompted me to undertake a survey with limited testing in October 2014 in order to locate the original excavations and to determine whether other portions of the site were still intact. During this survey I located a polyethylene sheet from the original excavations, which had been left to indicate the location of backfill, as well as artifacts ranging from projectile points, lithic debitage, ceramic sherds, burned earth, hematite- and limonite-rich rocks, quartzite, and sandstone. My findings support interpretations, based on the reconstructed excavations spatial analysis, and conclusively demonstrate that portions of the site are still intact and/or material was missed during the original excavations. I was also able to demonstrate that some of the original interpretations made by the excavators are inaccurate, especially with respect to their interpretation

of the Hamon site as a single-component site whose features were confined within the limits of their excavation. Further details of the survey with limited testing are discussed later in this chapter.

The Hamon site is described by the excavators as “mix.” They regularly report in field records that they are in the “mix,” referring to the cultural mix of charcoal, burned earth, and perhaps any other indicator of human activity in the soil. This descriptive term is applied not only to plow zones, but to any level in the excavation. This term is confusing because it leads one to interpret that the cultural material being recovered is in a mixed state, and occasionally the term is used for that purpose. The excavators also interpreted the site as representing a single occupation that consisted of a house feature because daub was present.

Daub is burned clay with impressions on it that can indicate its use as a crude mud plaster applied to perishable material. As mentioned, when daub is present at prehistoric sites of the Plains Woodland period, interpretations consistently suggest houses are the explanation for its presence. However, the only difference between a mass of daub and material designated as burned earth is the presence of impressions on the material, and grass or pole impressions may not always indicate a house. If house construction involved plastering the wood poles and grass matting with clay, then other structures, such as wind-breaks, walls (fortification, etc.), drying racks, and structures associated with production areas, such as those for ceramics, would have been constructed from the same materials and likely daubed as well. As mentioned in Chapter 4, protection from the elements may have been needed for ceramic production and the remains of either partly roofed or wind-break structures would have fulfilled this function more optimally if daub was applied as a sealant. As discussed in Chapter 4, daub may also result from accident. Especially given the rich alluvial clay soils of Jefferson County. Therefore, interpretation of daub as evidence for houses is

too restrictive. The daub at the Hamon site might represent the remains of a house, but the situation is more complicated.

### **Reconstructing the Original Excavations**

The site was first excavated as part of a KAA Fall Fling in September 1971. These events, in which the KAA partners with KSHS archaeologists to conduct archaeological field or laboratory work over the course of a weekend, are held in the fall every year. The excavations were supervised by Tom Barr of the KSHS (Barr 1971; Jim D. Feagins Personal Communication, January 8, 2014). Toward the end of the first day (September 24, 1971), rain started to fall, and the dig was postponed until the following weekend (October 2 and 3, 1971). Barr (1971:1-2) notes that 11 people were on hand for excavations the first day, 16 on the second, and 13 on the third.

The excavation began with a 10-x-40 foot (3.048-x-12.192 m) trench, located 140 feet east of the edge of the field and tree line. The trench was oriented north-to-south on the long axis over the terrace edge tested by Tom Witty in September 1971 (KSHS 1971: 14JF350 record number 19, 26, and 30; Figures 19 and 20). It was subdivided into 10-x-10 foot (2.048-x-3.048 m) squares. By the end of the weekend, the north end of the trench had been extended an additional two squares, and two more had been opened to the west and adjacent to the northern portion of the trench, resulting in a total of eight, 10-x-10 foot (3.048-x-3.048 m) units (Barr 1971; KSHS 1971: 14JF350 record number 26). At this time KSHS archaeologists did not employ the metric system in excavations. Therefore, all provenience data was recorded in feet and inches. Soil was removed in arbitrary 6-inch levels (15.24 cm; Barr 1971). The units were designated by numbers north of the datum (N) starting with the second unit to the north and included units 0-0, N1, N2, N3, N4 and N5 in the main trench. Units west of this center row were labeled with a north and additional "L"

designation: N3-L1 and N4-L1 which were adjacent to N3 and N4 on the west (KSHS 1971: 14JF350 record number 19 and 26; Figure 19).

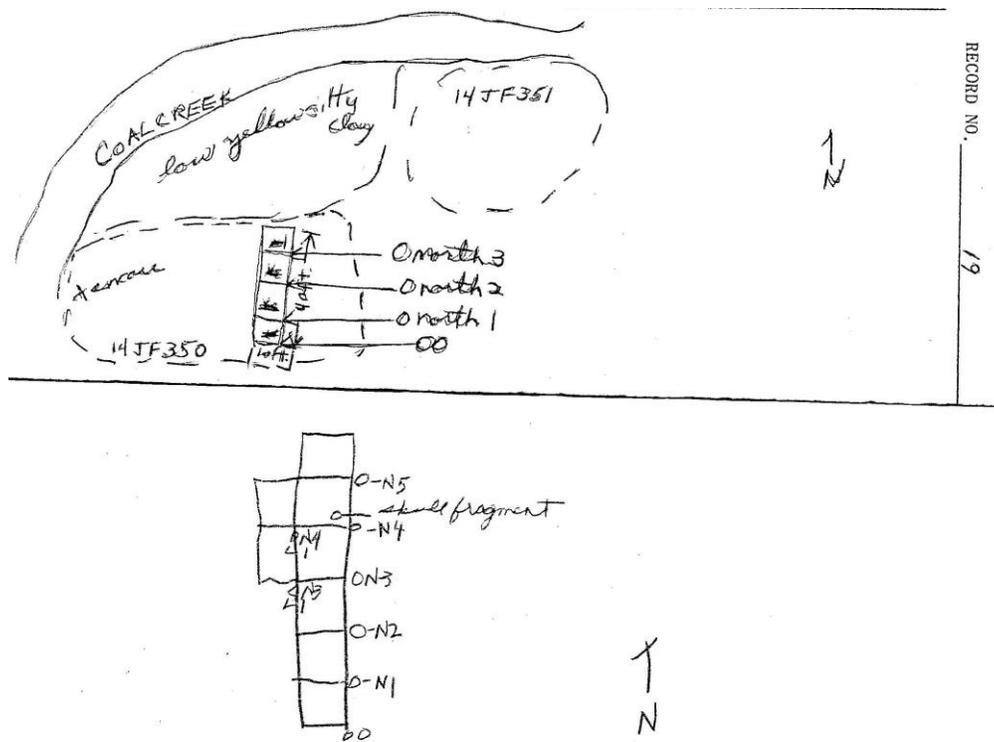


Figure 19. 1971 progress report files showing the location and excavation grid at the Hamon site (KSHS 1971: 14JF350 record number 19 and 26).

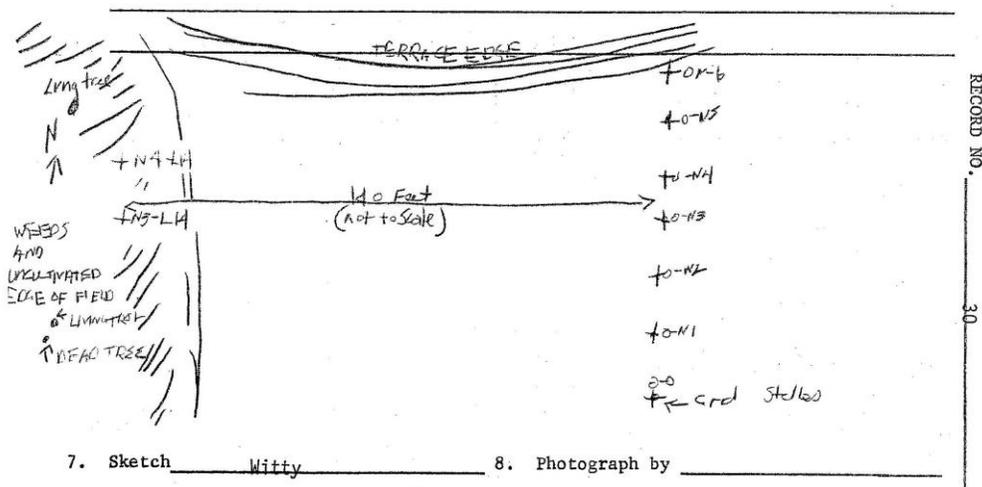


Figure 20. 1971 progress report describing the distance of 140 feet between the edge of the field and the main excavation trench (KSHS 1971: 14JF350 record number 30).

Barr summarized surface finds as corner-notched dart and arrow points, daub, and grit-tempered cord-roughened pottery sherds. He interpreted this as suggestive of a Middle Plains Woodland occupation. The excavation uncovered more cord-roughened pottery, a large but restricted concentration of daub, several corner-notched arrow points, one corner-notched dart point, and a portion of a single burial (Barr 1971:1-2). No post mold stains were present in the lower levels of the excavation, which at 1.5 feet (45.72 cm) did not reach sterile soil (Barr 1971:2). At the conclusion of the excavation, polyethylene sheeting was laid over the units, and they were backfilled.

I contacted archaeologist Jim D. Feagins, who participated in the 1971 excavation. He informed me that this had been his first time excavating, and he kindly offered to write a memoir of his experience for me. The following excerpt reveals what the digging was like, according to Feagins, for the first portion of excavations at the Hamon site:

The site was in a field on the east side of Coal Creek, some miles north of Valley Falls, Ks. I helped open up the site by working with two or three others in one square—we shovel skimmed; although since we were in a plowzone the skimming was done rather thickly and we did not screen the soil (at least not at that level). I am not sure if anything was screened even at lower depths. Below that level the thinner-shovel skimming applied. We found a few flakes and cord-marked pottery and perhaps daub. We were told the site was a Grasshopper Falls focus (the term phase was not used by the society at that date) but at this stage in my learning I would not have known one taxonomy from another anyway.

Just below the plowzone, a child's cranium was discovered after someone's sharp skim shovel had bisected it—probably several times. It was in very poor condition and I don't think the excavator, whose name I do not recall, knew what was being uncovered--until Tom Barr stopped him. I don't recall seeing a mandible or other bones although there might have been some—as I said preservation was very poor. Perhaps the uppermost part also had been damaged by farming activities, as it must have been just below or perhaps protruded slightly into the plowzone—perhaps not—we will never know for sure. The cranium was worked around with trowels to pedestal and then photographed. The light colored bone was not much more than a powder so I have no idea if it actually made it back to the lab intact or not within that pedestal. I don't recall if the child had been buried inside of a house or adjacent to one (Feagins, personal communication, January 8, 2014).

This one account suggests that excavation occurred quickly with shovels, and none of the dirt was screened. A considerable amount of data was lost, as evident from the discussion of the shoveling of a child's cranium that was divided into numerous pieces by an excavator who did not realize what he was doing until he was stopped by Barr.

For three days in April 1972, KSHS archaeologists returned to the site with 30 students from a sociology course that Witty was teaching at Washburn University in Topeka, Kansas. Witty assigned a new number system for the grid, using the designation "X" instead of maintaining the original "N" (KSHS 1972: 14JF350 record number 56). The squares 0-0, N1, N2, N3, N4, and N5 were renamed as X4, X13, X20, X29, X37, and X46 (Figure 21). On April 8, 1972, the first day of the 1972 excavation, all of the original squares were reopened except for X4 (0-0) and X46 (N5). In addition, new squares including X14, X19, X31, X35, and X48 were opened. By the end of day one, units X36 and X31 were noted as being near completion, while all other squares were "in some kind of mix" (KSHS 1972: 14JF350 record number 58).

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

April 29, 1972, the third and final day of excavations with the Washburn students, included excavation of X12, X13, X18, X19, X20, X28, X29, X30, X31, X35, and X38. Squares that were

completed, although not excavated to sterile soil, were X18, X20, and X28. Several balk walls were removed between units X36-X30, X48-X35, X31-X30, X31-X18, and partially between X36-X35. Significant progress report notes included the coring of mixed soil in X18 that contained burned earth, which was interpreted as a post mold, and a similar feature in X30 that lacked “mix” was dug noting differences in compaction and texture. Two additional features in X31 and X20 lacked “mix” or compaction and were rejected as post molds (KSHS 1972: 14JF350 record number 117).

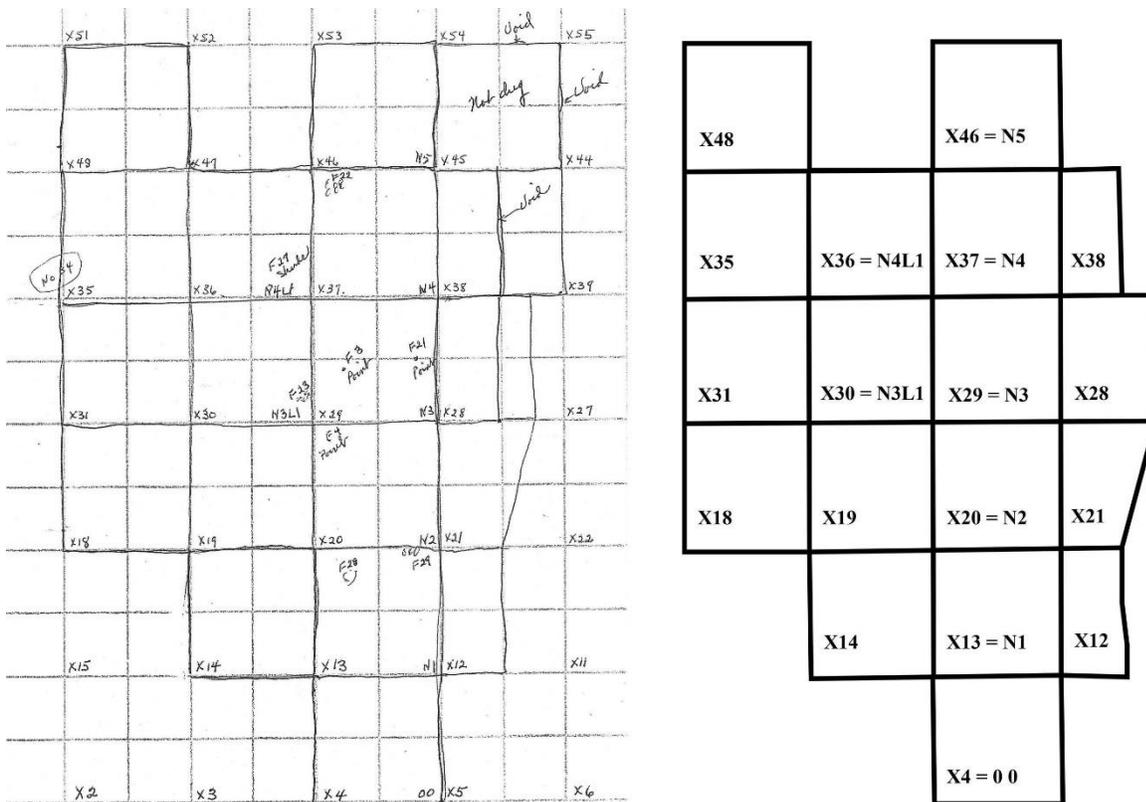


Figure 21. Revised grid number system and excavation limits for 1972. Original document on the left (KSHS 1972: 14JF350 record number 41), reproduction on the right.

Between April 29 and May 17, 1972, no work was done at the site. From May 17 to 19, Tom Witty, John Reynolds, and Milton Reichart returned to the site to remove remaining balk wall portions and attempt to locate post mold patterns for the assumed dwelling that once stood at the site (KSHS 1972: 14JF350 record number 136). The difficulty in locating post mold patterns over

these three days is expressed by Witty (KSHS 1972: 14JF350 record number 136) in the following excerpt from the second to last progress report:

The entire problem of post hole locating at the site is as yet satisfactory [sic] resolved. The features that have been dug into and cored and assumed to be post holes are found by the exposing in HX of small areas which have flecks of burned earth and usually flecks of charcoal. The overall soil coloration at a depth of about 1.7 ft beneath the surface is that of dark brown. Little or no discoloration shows to mark post holes or even rodent burrows. It is just the presence of mixed materials that reveal their location. If the mixed material is in a limited area coring is attempted with the mix normally extending only to a depth of about 1 or 2 inches below our excavation floor. From there on down coring is done by texture and moisture content of the soil. In the features which we cored and assumed to be post holes the compaction of the soil was noticeably softer and moister [sic] going straight [sic] down.

These features are being found chiefly around the perimeter of the main artifact and detritus concentration.

In two cases the assumed post hole features were vertically cross sectioned. Again, no coloration difference was noted however one could detect compaction differences in the area assumed to be the post hole fill.

Other significant finds for these three days included the discovery of an infant burial in between X30 and X29. Milton Reichart noticed a concentration of burned earth and charcoal in the balk between these two units as he was removing it. Coring of this resulted in the discovery of the burial. Interestingly, the mix was noticed in the balk and recorded that way by Witty in the May 24, 1972, progress report (KSHS: 14JF350 record number 136), but the recording on the feature form describes the depth as starting at 1.7 feet. It is worth noting that Barr and Feagins described the occipital bones from the 1971 excavation as located slightly in the plow zone and under it in level 2 (0.5-1.0 feet), while a feature form filled out by Reynolds (KSHS 1972: 14JF350 record number 22) identifies the depth as 1.75-1.85 feet below the surface. The differences in vertical provenience measurements for these burials, recorded upon initial discovery and on later record forms, are problematic.

The final progress report, dated May 31, 1972, is the second reference to three days in May (i.e. May 24, 25, and 26, 1972), although it is not clear if they were at the site on these days in addition to May 17, 18, and 19, or if there are typos in the documents. It is clear that they worked for at least three days in May, and possibly six. In either case, the last progress report reiterates that Witty, Reynolds, and Reichart were at the site “still attempting to locate post holes and gain some information about the assumed dwelling which once stood at the site” (KSHS 1972: 14JF350 record number 139). They were seeking to do this by following a pattern of apparent post holes within the excavation limits and around the main artifact concentration. Witty’s (KSHS 1972: 14JF350 record number 139) discussion in the progress report reveals that this was not easy and that a whole new interpretation of the pattern took place:

We were still attempting to locate post hole patterns and gain some information about the assumed dwelling which once stood at this site. On the first day we continued to skimming the floor to try and detect evidence of post holes. We worked across the northeast and northwest areas of the floor and located a few more spots marked by burned earth and occasional flecks of charcoal which when cored were found to be soft, cylindrical and had a depth of about 1.1 to 1.2 ft. During this time we also cancelled a larger number of spots which failed to have any mix extending below the surface of the excavation floor and/or were firm in texture. It became evident that the arch of features which we interpreted as post holes swung to the east that it crossed into X38, X28 and through the undug portion of X21. The balk walls between these excavations and the principal excavation were removed. Also, X21 was excavated in what would amount to slightly more than its west half. The house did appear to be roughly circular with the burial, F134, being in the approximate center. On Friday we mapped the site, cleaned the floor and photographed it. However the black and white camera broke and it is doubtful if we have any black and white photos of the finished excavation. We filled in the pit, F133, containing the burial and removed all of the grid stakes as well as the balk remnants at the grid corners. When we left the site it was completely clean of any of our material.

It is clear that features that may have represented post molds were being interpreted as such even though sterile sub-soil had not been reached. Under these circumstances, it can be difficult to differentiate post holes from rodent burrows. To complicate matters even more, weather caused

problems during the April excavations. In the progress report from April 29, Witty (KSHS 1972: 14JF350 record number 117) stated “Today work began at the site with the Washburn University class. Rains earlier in the week and during the morning had left the site again wet. However we were able to work and were not slowed up too much.” The site was wet on April 29 and had been previously as well, even though this was not noted in any of Witty’s other progress reports. However, progress reports that workers filled out daily for individual units do provide information about the wet excavation conditions. “Finding our square quite saturated with water, we proceeded to further excavate our second level (8” deep).” Ann Hawks, April 22, 1972 (KSHS: 14JF350 record number 76). “In grid #X31 we continued our excavation of level 0.8’-1.25’. A great deal of water had filled our grid and left a great deal of silt on the floor.” Harry W. Lunley, April 22, 1972 (KSHS: 14JF350 record number 131). “The second level under the plow zone that had progressed about two feet from the east wall on the 22<sup>nd</sup> was started again, in the mud (Mother Nature simply isn’t cooperating).” Ann Hawks, April 29, 1972 (KSHS: 14JF350 blank record number). “The reason for leaving X20 square was a lack or near lack of mix and because of the muddy earth it was not possible to make out post holes if any.” Don L. Sieve, April 29, 1972 (KSHS: 14JF350 record number 150). The excavation units were saturated with water for at least two of the three days in April. In addition, as was evident with the 1971 portion of the excavations, the work was extremely fast. Pictures from the first day (April 8, 1972) and feature records reveal that excavations had reached Level 3 (1.0-1.5 feet or 30.48-45.72 cm) by the end of the day (Figure 22, Table 16).

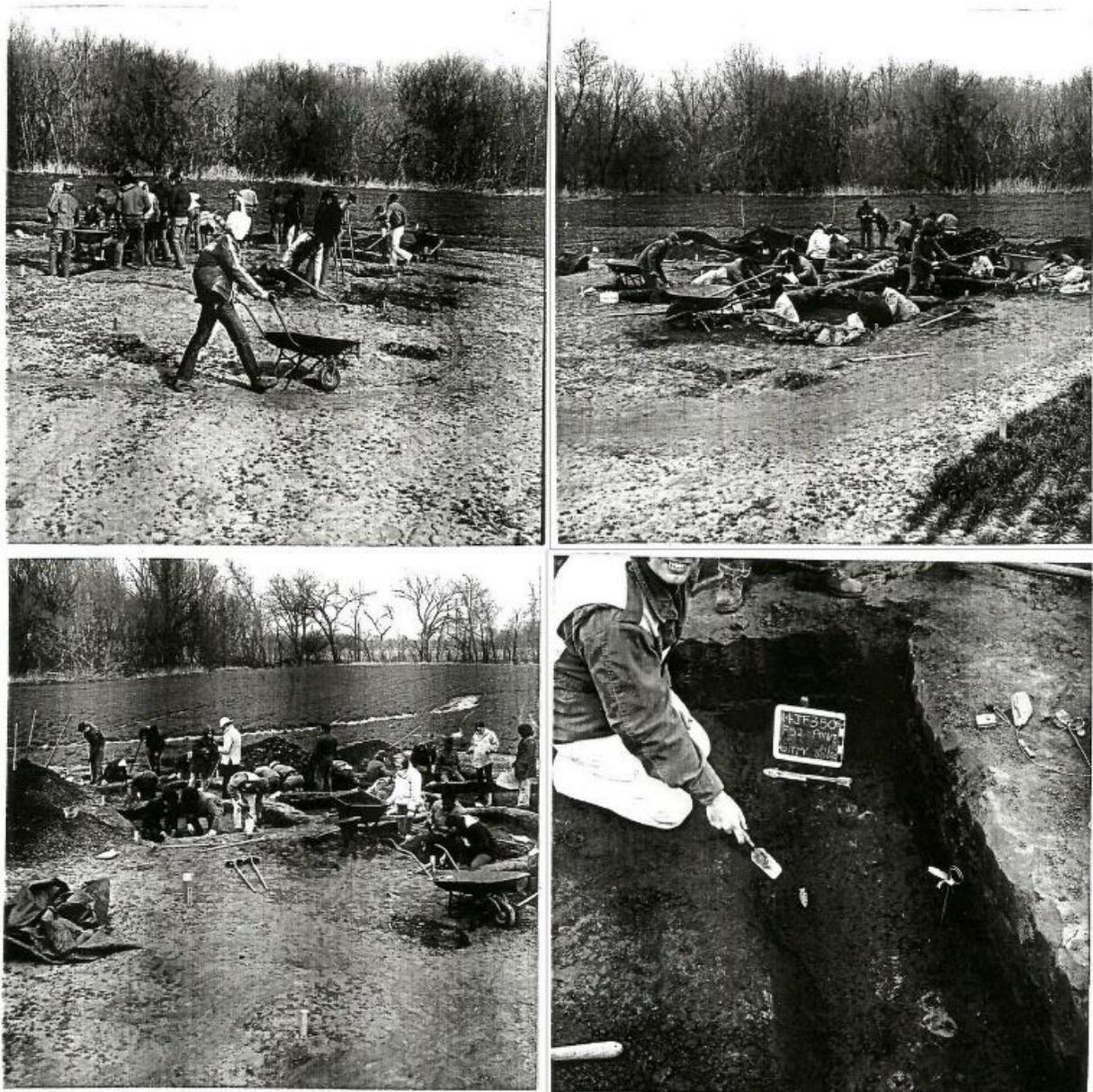
The 1971 excavation had reached a depth up to 1.0-1.5 feet (30.48-45.72 cm) in three days, and the 1972 excavation had (on average) reached a depth up to 1.7 feet (51.82 cm) in three days. A span of three days in May 1972 was spent by Witty, Reynolds, and Reichart removing any

remaining balk walls, and expanding excavations slightly on the eastern edge of the excavation limits in pursuit of post molds. The project spent a total of 9 days (possibly 12 if Witty, Reynolds, and Reichart were there for six days in May) excavating the Hamon site, of which only six had more than three individuals working. The site was wet from rain on at least three of those six days, but work continued in the mud. Excavation took place with a week of exposure of the site in between day one (September 24) and day two (October 2) in 1971, two weeks of exposure between day one (April 8) and day two (April 22) in 1972, one week of exposure between day two (April 22) and day three (April 29), and two and a half weeks of exposure between day three (April 29) and the first (May 17) of the few days in May 1972 when Reichart, Reynolds and Witty worked alone. If X20 needed to be closed down because muddy soil prevented the interpretation of features, then many other units may have been excavated where features could not be distinguished either. In regards to both the 1971 and 1972 excavations of the Hamon site, it appears that fast digging with shovels, some inexperienced crew, rainy weather, and not having reached a light colored (Wabash soils are dark), sterile sub-soil, may have obscured and lost data, leading to an unintentionally biased interpretation of the site.

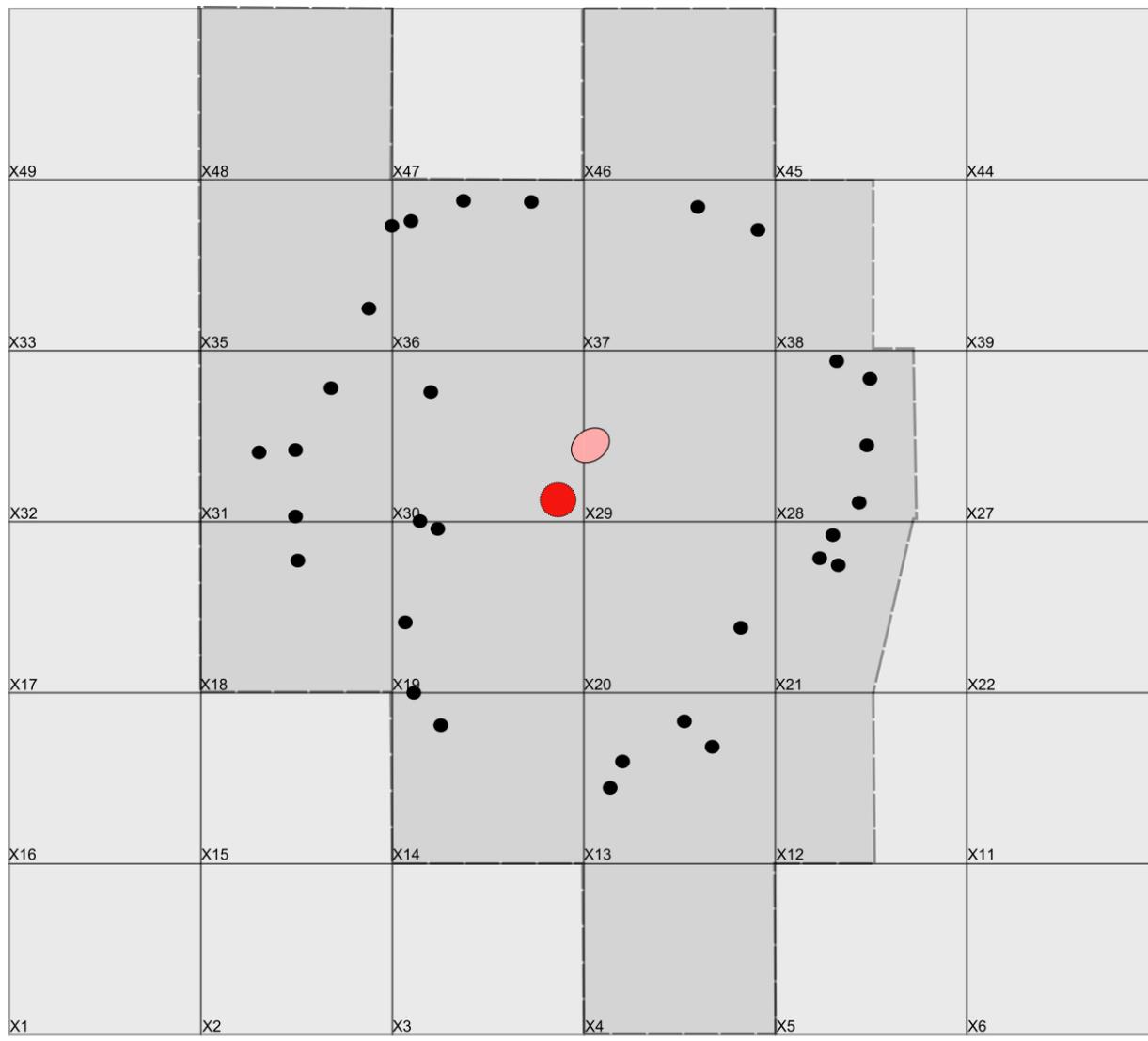
### **Original Interpretations**

A complete analysis of the excavations and material recovered from the Hamon site was never performed and published, but Barr did write a brief summary of the 1971 KAA Fall Fling excavation. Fifteen years later, data about the house in the form of a map of the inferred post molds, the basin containing the infant burial, and a mass of daub just southeast of that basin was published in a report about archaeology of the Grove Reservoir by Reynolds (1987:162). This image has been replicated here with the vector-based software that shows the house and feature map along with the excavation grid and its limits (Figure 23). The house plan is identical to Reynolds' map

with the exception of the skew to show true north. The grid was not set to true north during the excavation; it was skewed to the northwest, which was revealed from site records and is apparent in the black and white photographs from Day One in 1972 (Figure 22).



*Figure 22. April 8, 1972 excavations begin with progress in order from top left to right and bottom left to right. Top left, view to slight northwest. Top right, slightly further to the west than the view in top left. Bottom left, view to the north. Bottom right, point feature, north arrow shows that the excavation is aligned to the northwest.*



1972 Hamon Excavation Grid with assumed house postmolds and associated features:

Adapted from maps on file at the Kansas Historical Society and Reynolds 1987.

● Postmold (1.7 Feet approximately)

○ Basin 1

● Burned Daub Concentration

Excavation Limits

Figure 23. Reynolds' house plan at the Hamon site aligned to the northwest configuration evident from the field records and photographs. Reynolds' had it aligned to true north (1987: 162).

In this report Reynolds (1987:161-179) provides a discussion about Grasshopper Falls phase houses. With reference to the Hamon site, several discrepancies from the actual field records and Witty's progress reports become apparent with what is shown and said about the house and associated features. Specifically, Reynolds' acknowledges only two features: the pit that contained the infant burial and the daub concentration in the southeast corner of X30, just slightly south of the infant burial. As we shall see, numerous features from Levels 2-4 were omitted by Reynolds. The next inconsistency between the excavation records and Witty's progress reports is with regard to details about the post molds. As noted earlier, Witty said that no discoloration was evident to mark posts; the general color of the soil was a dark brown and posts and rodent burrows could not be detected by discoloration. This correlates with the dark colored Wabash soil of the terrace that the Hamon site is located in. In the 1987 publication, Reynolds (1987:166) states that "At site 14JF350 the excavated stains which marked the post molds were actually the postholes into which posts had been set."

Reynolds continues to mention that the Hamon site contained better preserved post molds than other Grasshopper Falls phase houses excavated by Marshall (1987:166), and that trash-filled basins were found from numerous Grasshopper Falls phase house sites, with those from the Hamon site being exceptional because of the infant burial. Reynolds (1987:167) does not specify which sites, but mentions that numerous posts from several sites were not part of house structures but rather auxiliary structural remains from perhaps drying racks, windcreens, etc. The provided table of Grasshopper Falls phase houses reveals a glaring difference in the interpreted house size at the Hamon site, compared to the five houses from other sites. The length and widths of the other five houses are 12-x-10 feet (3.6576-x-3.048 m), 13-x-11 feet (3.9624-x-3.3528 m), 15-x-11 feet (4.572-x-3.3528 m), 20-x-18 feet (6.096-x-5.4864 m) and 24-x-21 feet (7.3152-x-6.4008 m). The

house from the Hamon site is described as having a length and width of 32-x-29 feet (9.7536-x-8.8392 m) (Reynolds 1987:164). In addition, an interpreted Grasshopper Falls phase house from the Avoca site (14JN332) with dimensions of 15.75-x-10.75 m (Baugh 1991:41), is even larger than the interpreted size of the one from the Hamon site. Both interpreted houses from the Avoca site and the Hamon site are incredibly large compared to those interpreted from other sites. Reynolds notes that the Hamon site contained a single occupation Grasshopper Falls phase house with two features and no internal hearth, similar to other Grasshopper Falls phase houses.

### **Spatial Analysis and New Interpretations**

I reconstructed the original excavations of the Hamon site by summing the total counts of artifacts and weights from each excavated unit and used this data for visual projections. The categories of material recovered from the Hamon site included chert, rock, ceramic, daub, and burned earth. Only 27 artifacts were not one of those. These include small amounts of metal, burned wood, bark, bone, and one snail shell. I then separated the artifacts counts/weights by unit and the arbitrary level provenience used in the excavations for a total count per each 0.5 foot (15.24 cm) level. Of 5,354 artifacts, 1,615 could not be utilized in the spatial analysis because they have poor provenience data, coming from balks of the grid, the surface, back dirt, deviated provenience recording methods<sup>3</sup>, or are missing any specific provenience (Table 12). The majority of the deviated provenience artifacts come from units X21, X28, and X31.

After being entered and analyzed in Excel, I entered data pertaining to the remaining 3,739 artifacts (Table 13) into a vector-based software (Inkscape) and created a surface area of quantities

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<sup>3</sup> The phrase “deviated provenience recording methods” refers to artifacts that were mainly recorded during the last few days in May 1972, when the eastern edge of the excavation was slightly expanded to search for post molds. However, there were some instances where this occurred in units during the excavations with the Washburn students as well. These methods were not in 6-inch increments as the rest of the material from the excavation were and therefore had to be left out of the spatial analysis.

of artifacts by unit for each of the four levels of excavation. This data was then cross referenced with weight totals. Level four was the only level that was not a 0.5 foot (15.24 cm) level. As seen earlier in Witty’s progress reports, the excavation reached an average of 1.7 feet (51.82 cm) below the surface. I combined this data with the interpreted post mold pattern and recorded features, and projected these together in the vector-based software. The result is a two-dimensional representation of a three-dimensional relief of artifact frequencies in each unit, with the interpreted features and post mold locations superimposed on top. The total artifact counts are represented by pyramid models and total weights are represented by shade scales of the unit. Larger pyramids and darker shades represent higher total counts and weights, respectively. This representation gives a unique look into the distribution of the artifacts in association with the recorded features.

*Table 12. Artifacts Containing no Provenience, or Provenience Non-Conforming to the Rest of the Excavation.*

<b>X unit</b>	<b>Level 1</b>	<b>Level 2</b>	<b>Level 3</b>	<b>Level 4</b>	<b>Total</b>
Balk Walls	NA	NA	NA	NA	<b>654</b>
Surface No unit Provenience	NA	NA	NA	NA	<b>640</b>
X31: Level 1-2					
Non-Standard Recording Methods	?	?	NA	NA	<b>83</b>
X12, X29, X31, X36, X48: Level 2-3					
Non-Standard Recording Methods	NA	?	?	NA	<b>178</b>
X21, X28: Level 3-4					
Non-Standard Recording Methods	NA	NA	?	?	<b>39</b>
Back Dirt	NA	NA	NA	NA	<b>17</b>
NA	NA	NA	NA	NA	<b>4</b>
<b>Total</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>1615</b>

The surface of the Hamon site yielded 640 artifacts (Table 12). Level 1 contained 752 artifacts but was considered plow zone and excavated very fast without interpretations of features (Table 13). The distribution of artifacts by unit reveals that a significant amount of material was being recovered from the central and north/northeast portions of the excavation limits. The amount coming from the southeast and western edges of the excavation were relatively minor in

comparison. X20, X48, X35, X14, and X13 have low total weight in comparison to artifact counts. X19, X30, X29, X28, X38, X37, X36, and X46 have the highest proportion of total weights along with high artifact counts (Tables 13 and 14, Figure 24). The overall trend of the artifact distributions suggest that the unopened units, X45, X47, X39 and X27, along with the second half of X38, would have had a high probability of material extending into them.

*Table 13. Artifact Counts and Total Weight with Uniform Provenience Data used in the Reconstruction and Spatial Analysis of this Chapter.*

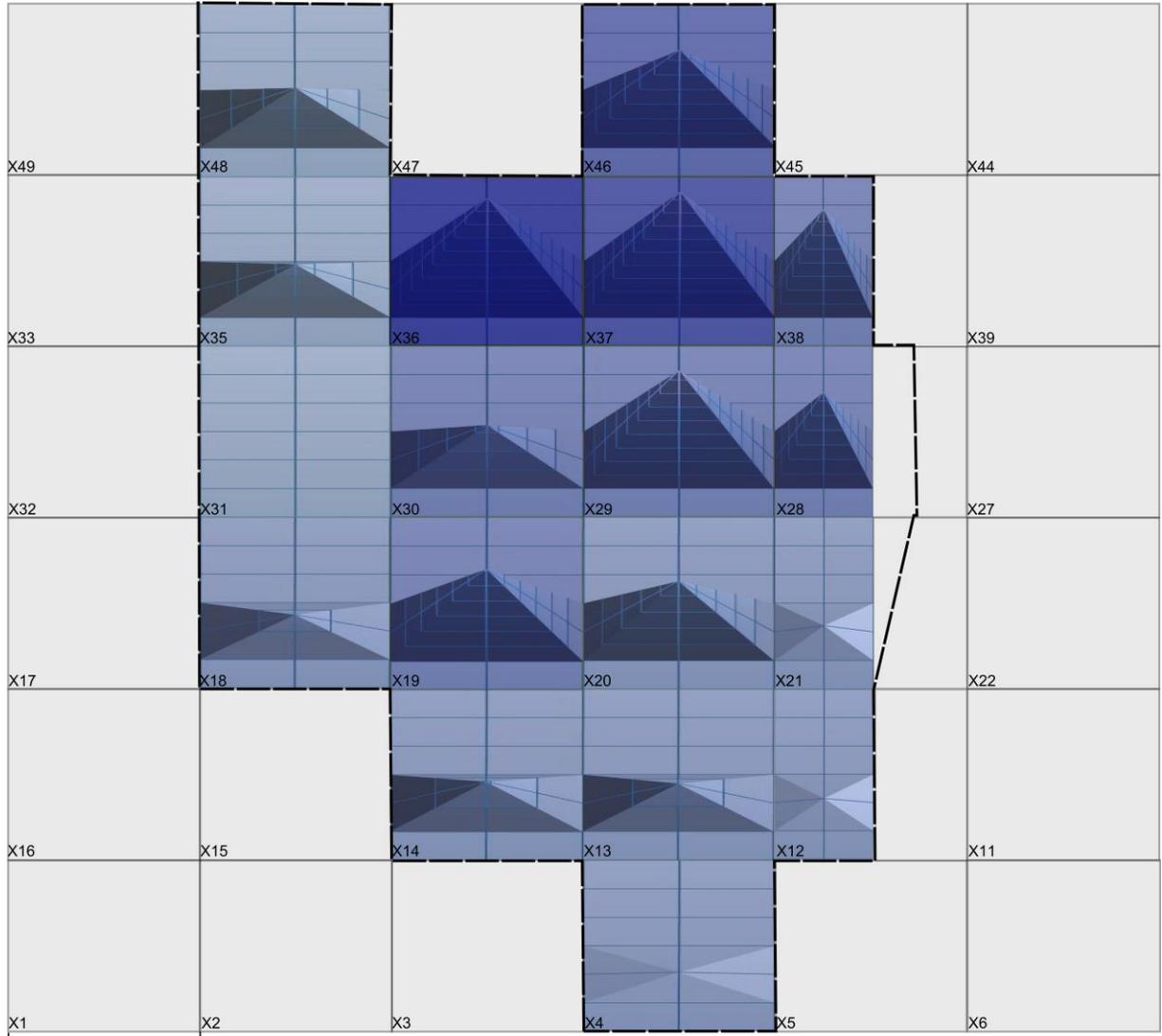
X unit	Level 1 N	Weight (g)	Level 2 N	Weight (g)	Level 3 N	Weight (g)	Level 4 N	Weight (g)	Total Count	Total (g)
X4	2	6.1	65	206.7	0	0	0	0	67	212.8
X12	4	45.9	1	0.8	8	147.8	7	21.9	20	216.4
X13	19	224.6	164	2005.1	91	2069.8	20	426.8	294	4726.3
X14	21	164.8	68	520	62	609.8	7	200.9	158	1495.5
X18	16	210	75	1137.4	17	147.2	3	108.4	111	1603
X19	61	1027.6	384	5981.69	9	281.9	6	178.3	460	7469.49
X20	49	338.2	345	5440.87	244	5543.79	40	751.57	678	12074.43
X21	6	29.3	26	241.8	38	477.4	22	467.9	92	1216.4
X28	66	582.6	77	977.5	96	2027.8	4	105.6	243	3693.5
X29	87	1106.4	180	4238.45	86	811.6	14	137.1	367	6293.55
X30	34	859.51	156	3003.22	83	1490.1	0	0	273	5352.83
X31	0	0	45	1057.3	52	1262.1	4	38.7	101	2358.1
X35	25	100	36	323.4	18	228.4	0	0	79	651.8
X36	90	3027.8	119	2831.1	0	0	0	0	209	5858.9
X37	96	1821.89	63	1791.68	73	997.67	1	13.9	233	4625.14
X38	79	1088.6	54	467.5	87	953	0	0	220	2509.1
X46	67	1366.8	37	211.5	0	0	0	0	104	1578.3
X48	30	105.1	0	0	0	0	0	0	30	105.1
<b>Total</b>	<b>752</b>	<b>12105.2</b>	<b>1895</b>	<b>30436</b>	<b>964</b>	<b>17048.4</b>	<b>128</b>	<b>2451.07</b>	<b>3739</b>	<b>62040.64</b>

The second level was still partially in the plow zone. This level had the most recorded artifacts, with a total of 1,895 and the first features starting to be recorded (Tables 13 and 15). The feature recording included single artifacts (points, ceramic rim sherds) and actual configurations of stone/ceramics/chert/daub/burned earth/charcoal as they were encountered. Unfortunately, the majority of the 17 recorded features from this level were single artifacts and not actual archaeological features (Table 15).

Table 14. Percent of Total Artifact Weight per Unit by Level.

X Unit	Level 1 % (g)	Level 2 % (g)	Level 3 % (g)	Level 4 % (g)	Total % (g)
X4	0.1%	0.7%	0.0%	0.0%	0.3%
X12	0.4%	0.0%	0.9%	0.9%	0.3%
X13	1.9%	6.6%	12.1%	17.4%	7.6%
X14	1.4%	1.7%	3.6%	8.2%	2.4%
X18	1.7%	3.7%	0.9%	4.4%	2.6%
X19	8.5%	19.7%	1.7%	7.3%	12.0%
X20	2.8%	17.9%	32.5%	30.7%	19.5%
X21	0.2%	0.8%	2.8%	19.1%	2.0%
X28	4.8%	3.2%	11.9%	4.3%	6.0%
X29	9.1%	13.9%	4.8%	5.6%	10.1%
X30	7.1%	9.9%	8.7%	0.0%	8.6%
X31	0.0%	3.5%	7.4%	1.6%	3.8%
X35	0.8%	1.1%	1.3%	0.0%	1.1%
X36	25.0%	9.3%	0.0%	0.0%	9.4%
X37	15.1%	5.9%	5.9%	0.6%	7.5%
X38	9.0%	1.5%	5.6%	0.0%	4.0%
X46	11.3%	0.7%	0.0%	0.0%	2.5%
X48	0.9%	0.0%	0.0%	0.0%	0.2%
<b>Total</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

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



**Level 1 Artifact Distributions by Unit**  
 Taller Pyramids = Higher artifact counts  
 Darker shaded units = Higher total artifact weight

Excavation Limits

N ↑

*Figure 24. Artifact count and weight distributions by unit for level 1, 0.0-0.5 foot/0-15.24 cm.*

In X19 the excavators recovered 384 artifacts. Two features, one composed of a configuration of rock, pottery, and daub, and the other composed of a configuration of rock, pottery, and burned

earth, were recorded. The progress reports of the unit excavators reveal that some controversy took place over some of the material in X19 at this level:

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

One of the other excavators in the unit mentioned this situation, as well as commenting on Feature 63 located in the southwest corner:

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

In addition to the large amount of material and possible features being encountered in X19, the unit directly to the east, X20 contained nearly the same amount of artifacts (345), the second largest quantity for the level, yet no features were recorded in this unit. The spatial distribution shows that the total weight was nearly identical to X19 as well (Tables 13 and 14, Figure 25).

In the north east corner of X31, feature 110 was recorded as a complex of burned and unburned limestone/chert and small pottery sherds (KSHS 1972: 14JF350 record number 110). Like feature 23, it was described as having a circular arch radiating southwest from the northeast corner of the unit and probably extending into adjacent units (Table 15, Figure 25). It was recorded as continuing into the balk wall between X31 and X35 (KSHS 1972: 14JF350 record number 116). All three features with arching complexes of stone that may have been hearths and activity areas (feature 23, 63 and 110) were not mentioned in the progress reports of adjacent units, and feature 63 appears

to have an arch that would suggest a spread into X15, but that unit was never opened (KSHS 1972: 14JF350 record number 63).

*Table 15. Features Recorded in Order by Date of Excavation from Level 2, 0.5-1.0 foot/15.24-30.48 cm.*

Feature #	Date	X Unit	Type/Description	Depth	Dimensions/Location
21	10/2/1971	29	Small corner notched serrated point	0.7ft/21.3cm	5.4ft N of SE Stake/0.5ft W of E wall.
22	10/2/1971	37	Human Occipital bone fragments/small bone fragments	0.75-0.85ft/ 22.9-25.9cm	2.75ft W of E wall/1.0ft N of S wall
23	10/2/1971	30	Circular arching concentration of daub mix of charcaol/burned earth/pottery/stone	0.8ft/24.4cm	4.4ft radius extending from SE corner to the NW
24	10/2/1971	30	Rim Sherd	0.9ft/27.4cm	1ft S of N wall/5.2ft W of E wall
25	10/2/1971	30	Two Rim Sherds 2ft apart	0.9ft/27.4cm	3ft S of N wall/3.5ft E of W wall & 5ft S of N wall/4.5ft E of W wall
27	10/2/1971	36	Pottery Concentration: Sherds removed prior to record	0.75ft/22.9cm	2.5ft W of the SE stake/0.9ft N of S wall
29	10/3/1971	13	Historic fence post remains	0.9ft/27.4cm	1.75-2.7ft S of N wall/0.9ft E of W wall
43	4/8/1972	37	Rim Sherd	0.7ft/21.3cm	1.9ft E of W wall/0.3ft S of N wall
62	4/8/1972	19	Cluster of Stone/Ceramic/Daub	0.6ft/18.3cm	2.5ft E of W wall/5.0ft S of N wall
63	4/8/1972	19	Cluster of Stone/Ceramic/Burned Earth	0.7ft/21.3cm	3.4ft N by S & 1.8ft E by W in SW corner
64	4/8/1972	19	Rim Sherd	0.7ft/21.3cm	7.3ft E of W line/2.2ft N of S wall
78	4/8/1972	14	Rim Sherd with some stone not in situ	1.0ft/30.5cm	3.7ft W of E wall/4.5ft S of N wall
59	4/22/1972	19	Stone celt in the general mix zone	1.0ft/30.5cm	4ft N of S wall/3ft W of E wall
61	4/22/1972	19	A large cord roughened body sherd in main mix zone	1.0ft/30.5cm	0.7ft W of E wall/3.9ft N of S wall to center
94	4/22/1972	28	Three Clusters of Ceramics: Mixed soil containing Chert/Burned Earth/Daub/Charcoal	0.7ft/21.3cm	Complex A: 3ft N of S/2.5 E of W to center. B: 5.3ft N of S/2ft E of W to center. C: 1.8ft N of S/2.2ft E of W to center.
101	4/22/1972	38	Muller Section	0.8ft/24.4cm	2.3ft E of W wall/4.5ft N of S wall
110	4/29/1972	31	A scattered complex of burned and unburned stone/chert/small sherds in the general mix level	0.85-1.0ft/ 25.9-30.5cm	5ft E to W/3.5 N to S in a circular arch from the NE corner

The spatial distribution for level 2 shows an increase in both artifact counts and weight from level 1 to level 2 in X4, X13, X14, and X18, which indicates that adjacent units, X15 and X3, had and have, a high probability of containing additional portions of the site (Tables 13 and 14, Figure 25). X13, X19, X20, X29, X30, X36, and X37 contained the highest total weights and artifacts for

level 2, with a shift in frequency to the south, in contrast to the north in level 1 (Tables 13 and 14, Figure 25).

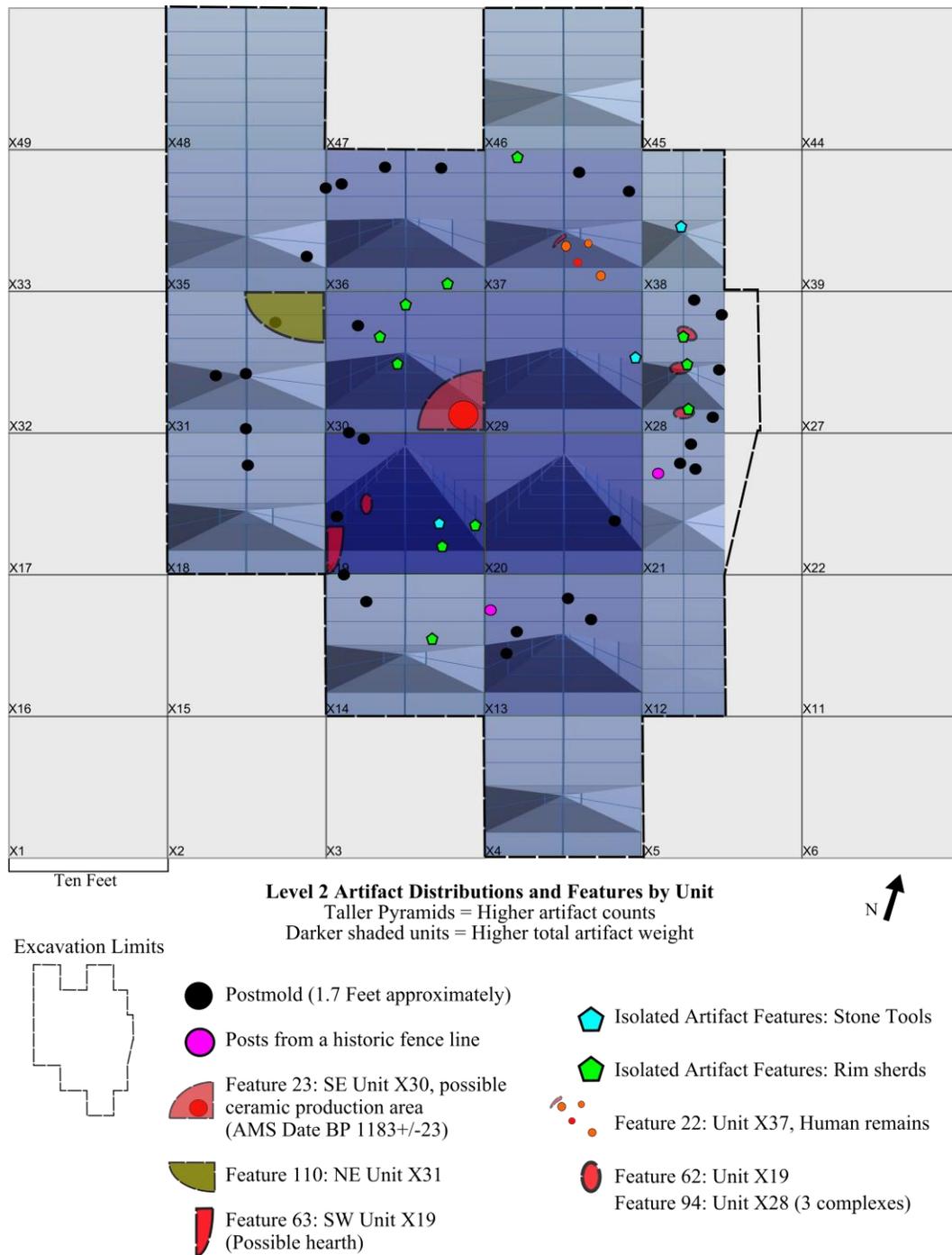


Figure 25. Artifact count and weight distributions by unit for level 2, 0.5-1.0 foot/15.24-30.48 cm, with recorded features (post molds are for reference and associated with level 4).

*Table 16. Features Recorded in Order by Date of Excavation from Level 3, 1.0-1.5 foot/30.48-45.72 cm.*

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

The quantity of artifacts recovered from level 3 (1.0-1.5 feet/30.48-45.72 cm) decreased from level 2 to a total count of 964, making it the second densest level from the excavations (Table 13). Although X4 had increased in artifact density from level 1 to level 2, it was not opened during the 1972 excavations as the rest of the units from the 1971 excavation trench were. This is important because, as we will see, the adjacent unit to the north, X13, continued to progress in material and total level distributions. X46 was not opened in 1972 either. Both X4 and X46 were at the extreme ends of the north/northwest aligned grid. Interestingly, X19, the most abundant in material for level 2, only had nine artifacts with provenience from level 3. Meanwhile, X20 remained extremely

productive, with more material recovered than any other unit in level 3, but only one feature, an isolated projectile point, came from this unit (Table 16). The overall artifact totals dropped in most of the denser units (X29, X30 and X36) from level 2, but a few of them did see increases. Both X12 and X48, which had one artifact and no artifacts, respectively, in level 2, increased in level 3. However, X48 and some of the X12 material had provenience recorded in non-standard methods, could not be confidently placed in level 2 or 3, and was left out of the analysis.

Recorded features from level 3 continued to be dominated by isolated stone tools and pottery rim sherds or clusters of three to five pottery sherds. A human tooth that had a deteriorated root was recovered from the extreme northern portion of X30 and was recorded as a feature (KSHS 1972: 14JF350 record number 60). Upon inspection of the morphology, I have determined that the tooth is a P3 or P4 premolar, of which mandibular or maxillary placement cannot be adequately assessed. Given the development of the root and wear on the crown, the specimen most likely represents an individual in the mid to late teenage years at minimum.

X13 and X28 both contained features recorded as concentrations or complexes of material. In X13 two features were recorded, one in 1971 and the other in 1972. The one recorded in 1971, feature 28, was described as a concentration of stone, pottery sherds, and burned daub at 1.1 feet/33.528 cm (KSHS 1971: 14JF350 record number 28, Table 16, Figure 26). The 1972 feature (148) was recorded to the south of feature 28 and aligned more to the center of the square. It was described as a complex consisting of burned limestone, “featured rock” and pot sherds at 1.45 feet/44.196 cm (KSHS 1972: 14JF350 record number 148, Table 16, Figure 26). Feature 149 in X28 was described as a complex of cord-roughened rim (two) and body sherds, flint debris, burned limestone, and burned sandstone (KSHS 1972: 14JF350 record number 149, Table 16, Figure 26). The sketch of feature 149 depicts it as a long complex with a circle opening in the center. The

sketch of feature 28 in X13 is also somewhat circular but more scattered than feature 149. It is hard to discern a general shape for Feature 148, other than a scatter of material in a relatively confined, somewhat oval area (Figure 26).

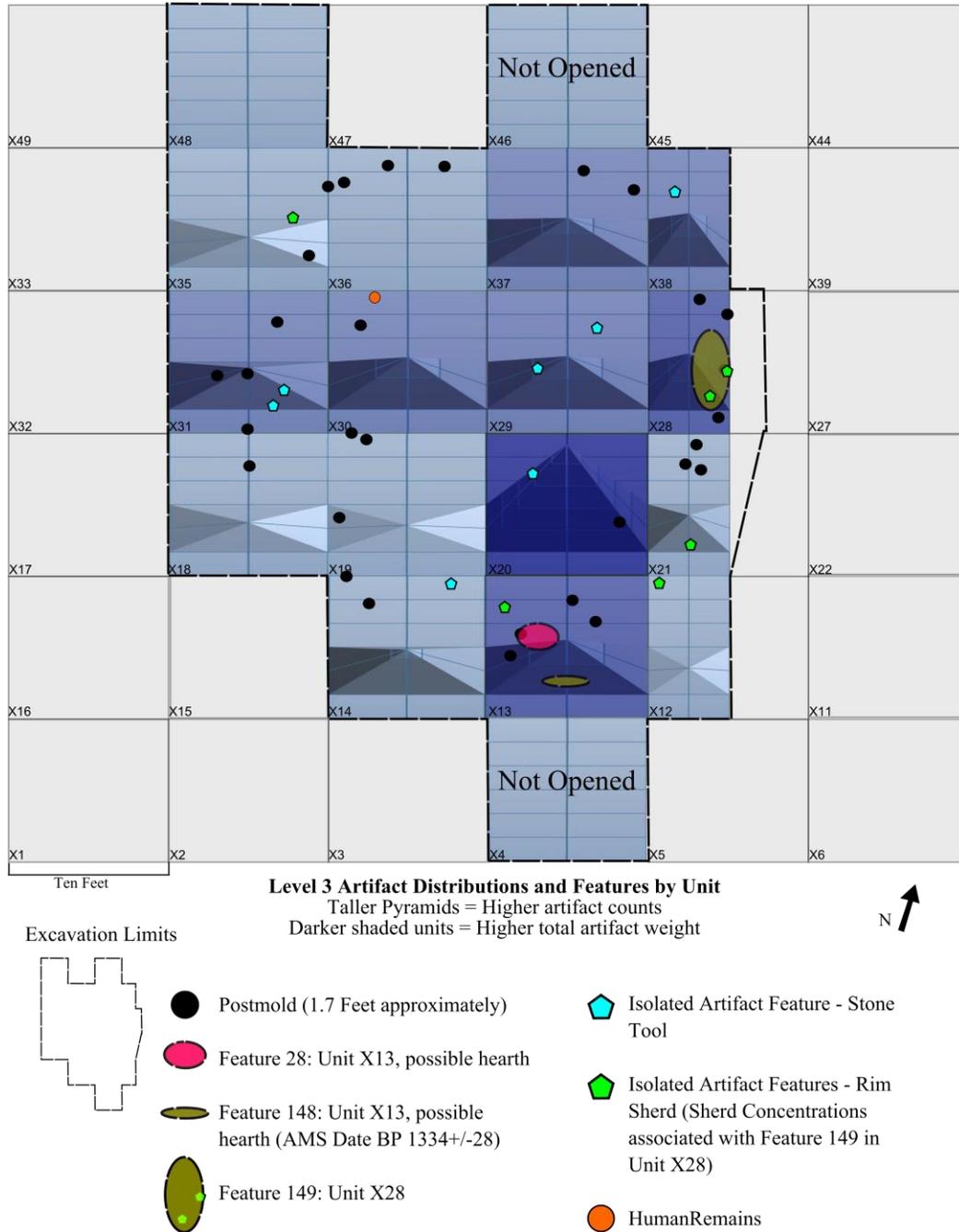


Figure 26. Artifact count and weight distributions by unit for level 3, 1.0-1.5 foot/30.48-45.72 cm, with recorded features (post molds are for reference and associated with level 4).

The highest total artifact counts and weights in level 3 come from X13, X20 and X28. There was a significant drop from level 2 to 3 in X19, X29 and X36, but some material from X29 and X36 could not be confidently associated with level 2 or 3, based on non-standard provenience recording (Tables 12 and 13). In addition, an increasing trend of weight distribution in this level occurred in X14, X31, and X21 (Table 14, Figure 26). The southern and eastern edges of the excavation grid increased in the abundance and overall distribution of artifacts in level 3 (Figure 26). This suggests that the adjacent units X27, X39, X15, and X4 would have a high probability of containing additional portions of the site if they were opened. The increasing trend of counts and weights through X28, X20 and X13 suggests an arching pattern in the southeast portion of the grid that may be distinct from other patterns in the grid. Even though the material could not be plotted in this recreation and analysis, the return of material at this level in X48 at the extreme northwest corner of the grid implies that more portions of the site, and possibly a distinct episode of occupation, may be present in this area.

*Table 17. Features Recorded in Order by Date of Excavation from Level 4, 1.5-2.0 foot/45.72-60.96 cm.*

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

The final level of the excavation was not the same depth as the previous three levels. Occasionally the unit progress reports state that excavation stopped at the 1.5-2.0 foot/45.72-60.96

cm level. However, Witty's progress reports stated that the site on average was about 1.7 feet/51.82 cm at the floor upon which post mold interpretations were made. The artifacts recovered from this level were described as being located on the floor of units. While the total number significantly decreased from the prior levels to only 128, some very important features came from level 4 (Tables 13 and 17).

At this level on April 29, 1972, X20 was closed due to the muddy soil in the unit and inability to interpret post molds. However, on April 22, 1971, an important feature was recorded in the northeast corner of the unit. Feature 46 was described as a complex of rocks and pottery sherds on the floor of the unit at 1.6 feet/48.77 cm below the surface (Table 17). The rock was noted as being sandstone, and charcoal was found in fairly heavy amounts within the configuration with almost none on the outside (KSHS 1972: 14JF350 record number 46). According to a progress report (KSHS 1972: 14JF350 record number 96) by the excavator working in the unit, this feature was likely a hearth and some items in this location were recovered the week before but not recorded:

Dug 80% of .4ft of dirt. Uncovered rock configuration (reported) in north corner with three pieces of pottery, and many pieces of charcoal with configuration. Note that this is the exact same place where three sherds were found last week. One was about 2"x3" but none were separately recorded, i.e., they were not recorded as to location within our area. Finding these three items together (configuration of rocks, charcoal, broken pottery) would seem to indicate an area where food was cooked.

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

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

Feature 118 consists of a pottery sherd found in situ in the floor of this square. The specimen is of an un-tempered and orange clay. It might be a portion of a clay pipe or portion of a small pottery vessel. Chunks (small) of daub and stone fragments and a small

grit tempered pottery sherd were found at the same depth in a 1.0 ft. radius around the sherd. Also, charcoal flecks and burned earth noted in this same area. Another rim sherd from a larger vessel was found 0.1 ft. below this first sherd and is included in the feature (as well as a dark circular stain of approximately 1.0 ft. in diameter). John Reynolds, May 18, 1972 (KSHS: 14JF350 record number 118).

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

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

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

The overall distribution of artifacts from the thin level 4 excavation continues to suggest that more portions of the site exist outside the excavation limits. The southern and eastern units along the edges of the excavation continued to produce material in comparison to the north and northwest units, which nearly stopped (Tables 13 and 14, Figure 27). X13, X20, and 21 contained the highest counts and weights in this level. X14 and X18 also increased in overall level distribution, compared with level 3, and several other units still produced material (Tables 12 and 13, Figure 27). Witty's

remarks about the soil still being a dark brown, in which no stains showed post molds or rodent burrows, and features located on the same floor as interpreted post molds, leads to the conclusion that the excavation had not reached culturally sterile sub soil.

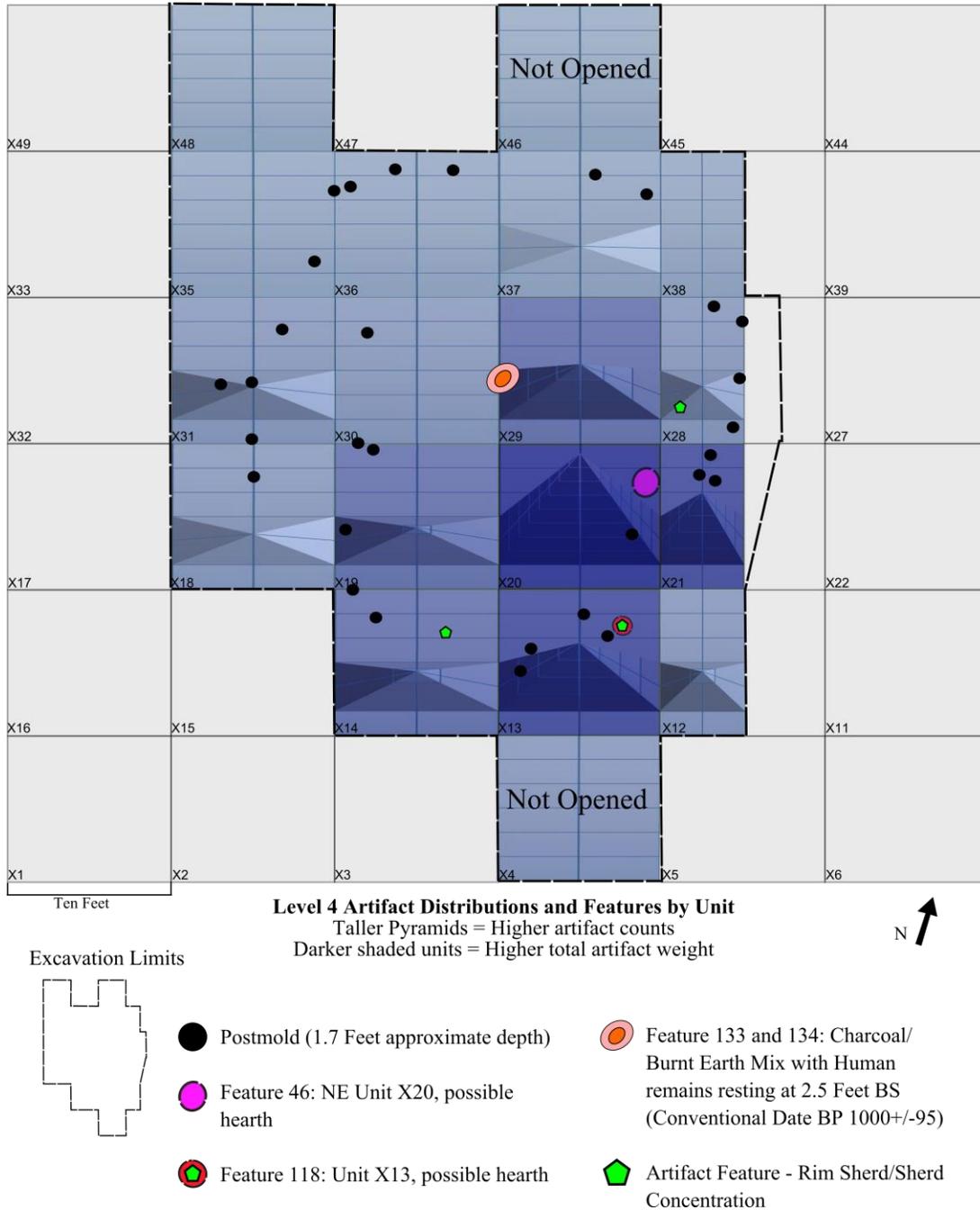


Figure 27. Artifact count and weight distributions by unit for level 4, approximately 1.5-1.7 foot/45.72-51.82 cm, and associated features including interpreted post molds.

Considering the above reconstruction and spatial analysis of the artifact and feature distributions, I offer a new interpretation for the Hamon site, differing from what is found in Reynolds' (1987) publication. When all four excavation levels are collapsed to produce an overall plan view of the features from the Hamon site (Figure 28), a very different, and more complicated picture arises in comparison to Reynolds' site plan (Figure 23). Additionally, the presence of daub does not necessarily mean that a house stood on the site. Although, I am not ruling out the possibility. The location of post molds confined within the excavation limits, except for one slightly expanded area, are too ambiguous in their locations and should not be interpreted without solid material evidence in the matrix. In addition, complications increase if artifacts and features are coming from the same provenience as post mold interpretations. I personally have worked at an archaeological site where rodent burrows and post holes were almost impossible to distinguish from one another, even in bisection, and there were stained areas in opposition to the lighter colored surrounding soil. As discussed earlier, hearths, open fire kilns for pottery production, or similarly constructed structures for drying racks or windbreaks would leave the same material trace in the archaeological record as a house. Only in circumstances with the best preserved materials and features would archaeologists be able to delineate one from the other.

The Hamon site was plowed over into the second level of excavations, leaving only one and three-quarters, possibly two whole levels undisturbed. The features reviewed in level 2 of X19, X30, and X31 were circular arching complexes that should have continued into their adjacent units, but they did not. However, some linear features, composed of similar material complexes, may represent the effect that plowing had in disturbing and spreading out these complexes. In addition, the north/northwest portion of the excavation was on the downward slope of the terrace edge toward the shallow slough that cuts through the field. Slope wash was most likely a factor in artifact

distribution in the first two levels. The clay rich soils of northeastern Kansas are also susceptible to argilliturbation and freeze-thaw processes. In combination with plowing, slope wash, bioturbation and argilliturbation may have played a significant role in site formation processes.

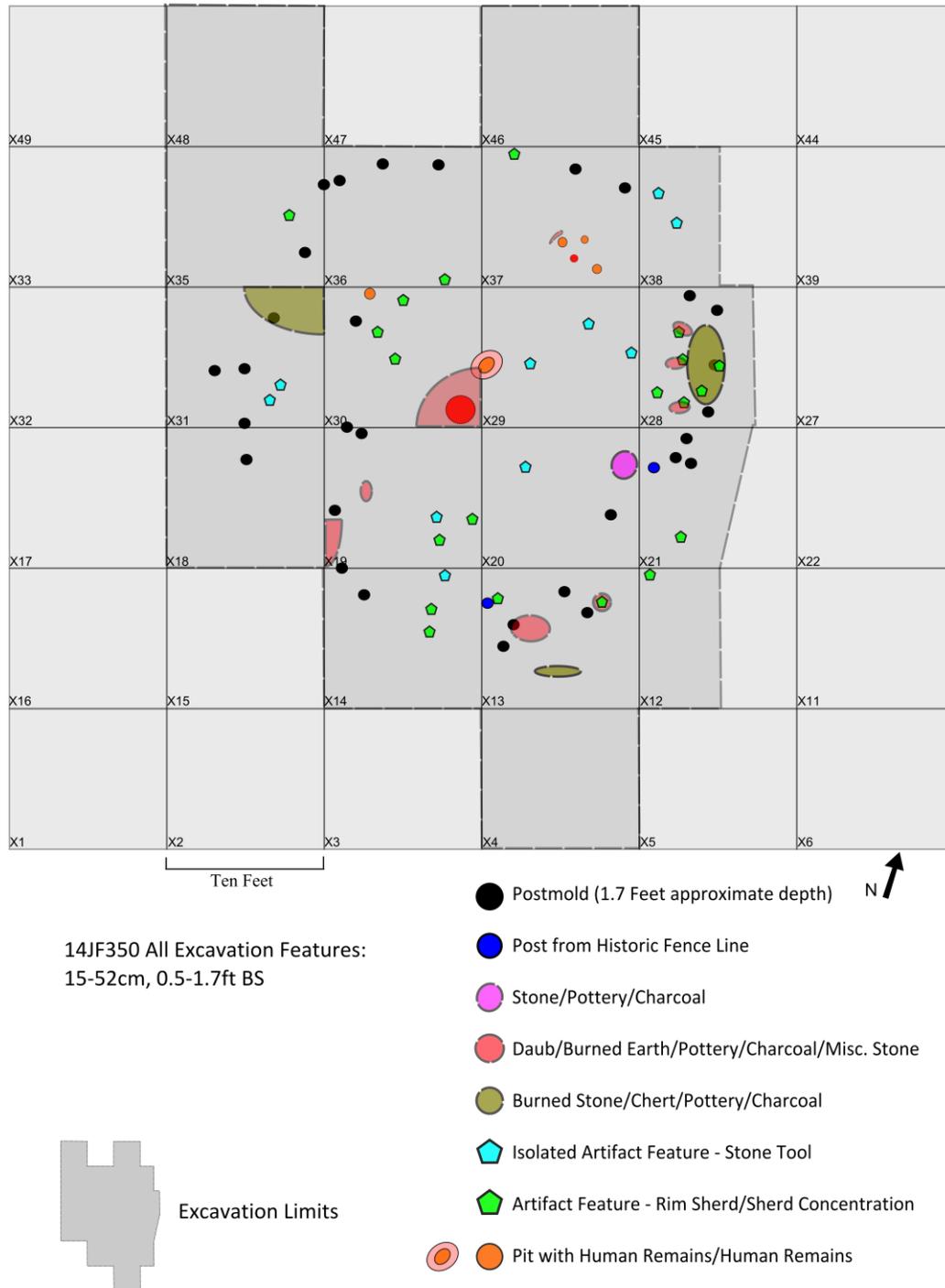


Figure 28. All features from the Hamon site excavation records, levels 2-4).

Hatchery West, a Woodland site located in Illinois and on a similar terrace location as the Hamon site, was excavated in the 1960s. Conclusions from the analysis emphasized that a surface scatter can reveal details about an archaeology site, but it does not always reflect the quantities and locations of the site's subsurface features (Binford 1972:178-180). In that study surface finds were recorded in a grid system before excavations took place. The surface of the Hamon site was not treated this way. Hatchery West also contained complexes of rock, charcoal, pottery, and burned earth, which were interpreted as hearths and deep earth ovens (Binford 1972:177). Sometimes these features overlapped, were in different locations, and did not reflect the nature of the site's surface artifact density. The study resulted in the identification of at least four distinct occupations in time from the Archaic-Mississippian periods (Binford 1972:179). It appears that what took place at the Hamon site was exactly what Binford was arguing against: the assumption that surface material at a site reflects the nature of sub surface features at the site, and that the limits/features can be defined by that surface scatter.

The spatial distribution of artifacts from the Hamon site shows a trend which suggests that more of the site was outside the excavation boundaries. The largest expanse of excavations covered a 60-x-37 foot area, but the majority of the excavations took place within a 40-x-37 foot area (north to south and east to west). Without expanding an equal amount of excavation area in all portions of the grid, data may have been missed. This is apparent in the amount of material that was recorded from the eastern edge units that were expanded in non-methodological ways in the search for post holes (Table 12).

Combined with all the other discussed factors of the excavation, I argue that the Hamon site contains a cumulative palimpsest of material from multiple occupations. Ceramic variability was discussed in Chapter 4, and two different modes of lithic reduction, along with a diverse amount

of chert in combination with local river gravels or water worn chert cobbles were discussed in Chapter 2. That data provides further evidence for multiple occupations. As I shall discuss next, four AMS radiocarbon dates from ceramic residue and a survey that relocated the sites original excavations, further reinforce the interpretation of multiple occupations and portions of the site still being present.

### **AMS Radiocarbon Dates**

Numerous ceramic sherds from the Hamon site assemblage contain charred interiors. After reviewing the provenience data for these sherds, I found that several were associated with features. Samples were taken from the charred interiors of sherds associated with the general surface collection, level 2 of X29, feature 23 in level 2, and feature 148 near the bottom of level 3. The samples were submitted to Direct AMS in Washington for dating. The results conclusively reveal that the Hamon site was occupied on at least two occasions. The radiocarbon determinations were calibrated in OxCal v4.2.4 using the IntCal13 atmospheric curve (Bronk Ramsey 2009; Reimer et al 2013).

The AMS dates, in combination with the conventional charcoal date from feature 133 in level 4, have a calibrated chronological (2 sigma 95.4%) range of AD 648-1224 at (Table 18). None of the uncorrected AMS radiocarbon determinations BP contained values that implied overlaps one another. Therefore, to test the probability of this being true, a Bayesian statistical model was applied to the dates with addition of the conventional charcoal date (Table 18).

A Bayesian model takes the observations ( $y$ ) or measurements made from a set of parameters ( $t$ ). The prior, or information about the parameters apart from the measurements is expressed as  $p(t)$ . The likelihood for the measurements given a set of parameters is  $p(y/t)$ . The posterior probability becomes  $p(t/y)$  or the probability of a particular parameter set given the measurements

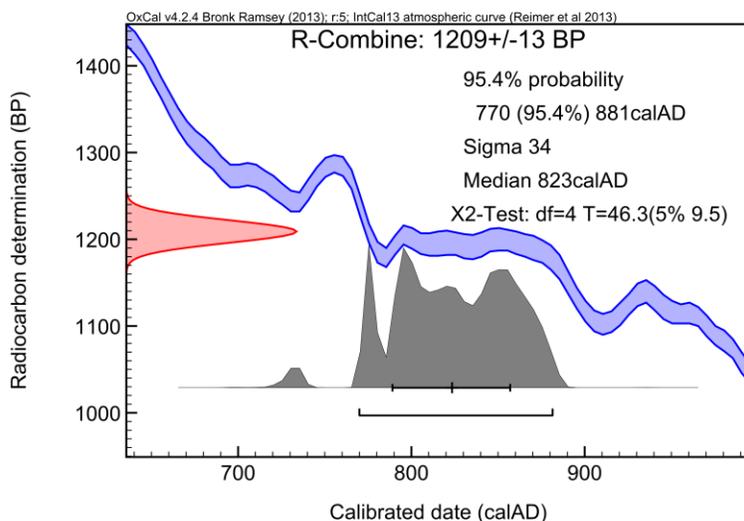
(Bronk Ramsey 2009:338). Thus, the formula of Bayes' Theorem tell us that  $p(t/y) = p(y/t)p(t)$ . The Bayesian model gives the  $p(t/y)$ , or posterior probability given all the observations from the likelihoods and prior of the model. The results model the probability distributions for each of the parameters, in this case, radiocarbon determinations, giving 68.2%, 95.4% and 99.7% total area of distributions with the highest probability density, which differs from the 1, 2, and 3 sigma ranges in normal calibration results. Since these probabilities are multidimensional, an algorithm, Markov chain Monte-Carlo (MCMC) is run to build up a representative sample of possible solutions for (t) (Bronk Ramsey 2009:3534-354). The results of the Bayes' Theorem model refines the radiocarbon dates, providing less "noise" in the overall ranges or parameters for the dates.

*Table 18. Calibrated AMS and Conventional Dates from the Hamon Site (Calibrated Columns) with a Bayesian Model of the Dates as Sequential within the Group (Modelled Columns). 95.4% (2 Sigma) and 68.2% (1 Sigma) Ranges are Reported for the Dates along with the Median Probability (Bronk Ramsey 2009; OxCal 4.2.4; Reimer et al. 2013).*

Lab No./ Radiocarbon Determination (BP)	Structure/ Sample Type/ Level	Cal BC/AD			Modelled BC/AD			Amodel 105.4 Aoverall 104.2		C Integral	
		From	To	Range	M	From	To	Range	M		A(i) Level
	<i>End Sequence 1</i>					896	1438	95.4	1065		97.8
<b>I-11,371</b> Conventional <b>1000 ± 95 BP</b>	<b>Charcoal: F133</b> <b>Level 4?</b>	904 777	1160 1224	68.2 95.4	1040	906 894	1041 1148	68.2 95.4	996	107.8	99.6
<b>D-AMS 007948</b> AMS <b>1116 ± 23 BP</b>	<b>Residue: X29</b> <b>Level 2</b>	895 887	970 986	68.2 95.4	935	891 885	964 981	68.2 95.4	923	99.9	99.8
<b>D-AMS 007947</b> AMS <b>1183 ± 23 BP</b>	<b>Residue: F23</b> <b>Level 2</b>	778 771	885 939	68.2 95.4	834	779 773	885 891	68.2 95.4	835	102.5	99.9
<b>D-AMS 007434</b> AMS <b>1258 ± 25 BP</b>	<b>Residue:</b> <b>Surface</b>	691 671	771 862	68.2 95.4	731	707 675	773 821	68.2 95.4	738	101.5	99.8
<b>D-AMS 007435</b> AMS <b>1334 ± 28 BP</b>	<b>Residue: F148</b> <b>Level 3</b>	653 648	689 765	68.2 95.4	675	654 648	690 764	68.2 95.4	676	97.8	99.7
	<i>Start Sequence 1</i>					311	763	95.4	626		98.7

To determine if the results of the model are acceptable or not, two measurement factors are incorporated in the model: agreement indices and a convergence integral. The agreement indices determine how well the prior model agrees with the observations. Individual agreement indices

identify what samples do not agree with the model and should be above 60% if they do agree. An overall individual agreement index is reported from the product of the individual indices and should also be above 60%. The model agreement tells us if the model as a whole is likely or not given the data and should be above 60%. Convergence integrals measure the effectiveness of the MCMC analysis by seeing how similar different attempts to perform the analysis are. This calculation is measured with the overlap integral “C.” This is reported for each parameter and should be above 95% (Bronk Ramsey 2009:353-354).



*Figure 29. R combine run in OxCal for the AMS and conventional dates from the Hamon site. The combined determination of 1209 +/- 13 BP fails a Chi Square test at 5% level.*

The model I used for the dates includes a constraint of a one group sequence (ordered dates in separation from one another) with a grouping model that contains start and end boundaries. Since determinations of whether any of the five dates are part of distinct phases (these groupings differ from “phase” in archaeological taxonomy) is not evident, this single group model was the most appropriate to apply. To further justify this model selection, a combine sequence was attempted on all five dates to see if they overlap enough to be considered part of the same event. The

combination of the grouping failed a Chi square test and supports the modeling of the dates in a sequential order (Figure 29).

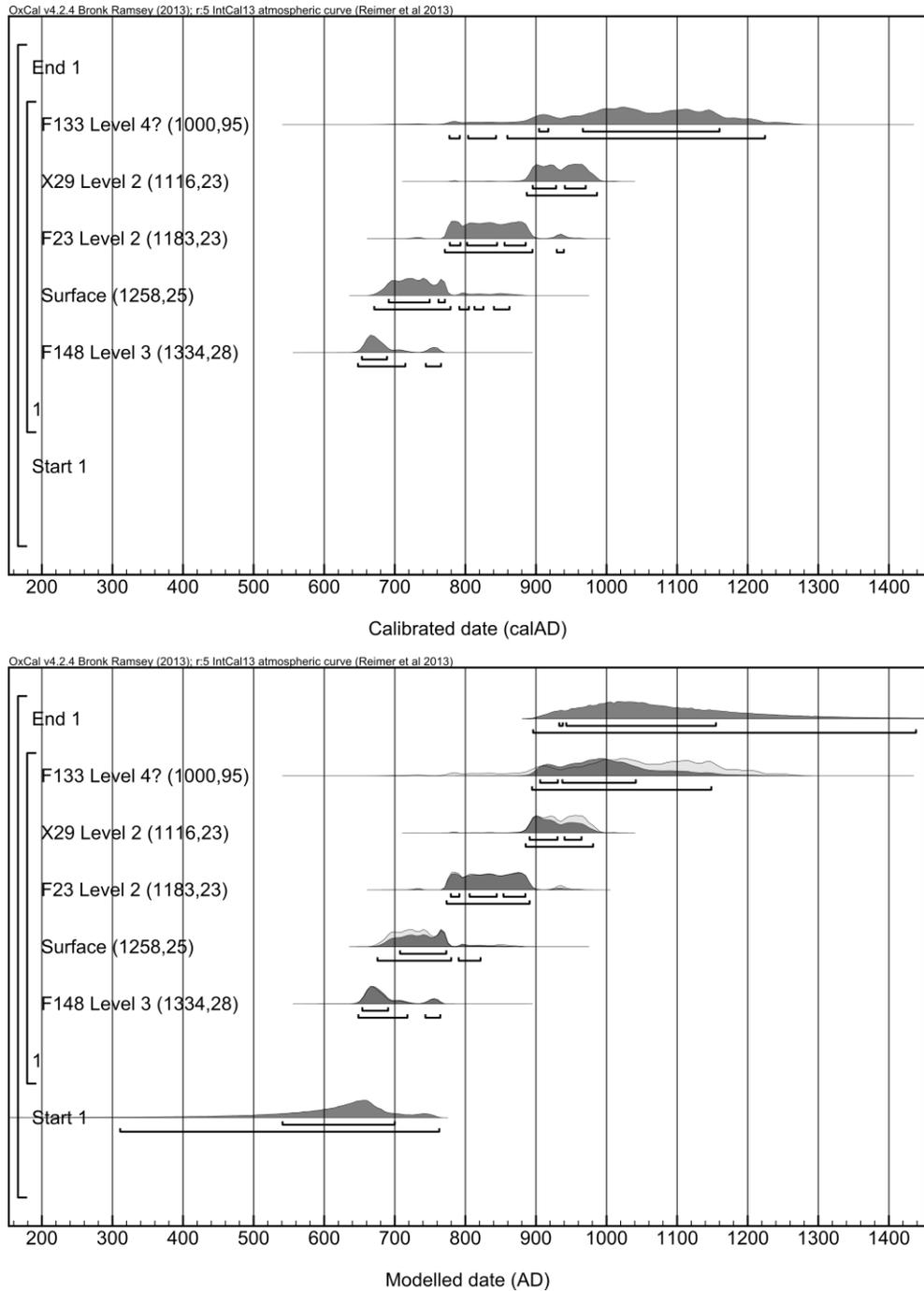


Figure 30. Calibrated BC/AD multi plots of the dates from the Hamon site (top), 1 sequence group model multi plots (bottom). Brackets represent 1 and 2 sigma ranges (Bronk Ramsey 2009; OxCal 4.2.4; Reimer et al 2013).

The modeled results agree well with the original calibrated data. The agreement model is 105.4 and the overall agreement is 104.2 (Table 18). Any value close to 100 in agreement indices provides a positive result, whether slightly below, or above that number. When a model has placed the highest probability into more area of a radiocarbon date's original plot, the indices can exceed a value of 100. Although it has never been specifically stated in a publication as to what the highest maximum agreement values are, it has been stated by Bronk Ramsey in the OxCal group question board that 60-140 is the best range. The closer to 100 the agreement values are, the less altering of the original data has taken place in the model. The following multi-plot curves for the original calibrated dates and agreement model for sequential dates reveal a general similarity, which the model refines to enhance the resolution of the different dates at the Hamon site through time (Figure 30).

The provenience data for the dated materials are important for understanding the multiple events through time at the Hamon site and how later occupations intruded upon older deposits. The earliest date in the sequence is associated with feature 148 at 1.45 feet/44.2 cm below the surface, followed by a date associated with the residue from a sherd collected on the surface of the site. This reveals that plowing or other human activity disturbed the site enough to bring older deposits to the surface. The dates from feature 23 and X29 are younger and from a provenience above the older date from feature 148 (0.8 feet/24.4 cm and 0.6-1.0 feet/18.3-30.5 cm), as would be expected in a stratified context. The conventional date from charcoal associated with feature 133 is from the deepest provenience at the site of 1.7 feet/51.2 cm. This is the latest date and at a deeper provenience than the older dates, suggesting that this feature, associated with the infant burial, was intrusive upon older deposits. It must be acknowledged that this is the only conventional date out of the five dates from the site and that it has the largest 2 sigma span (Table

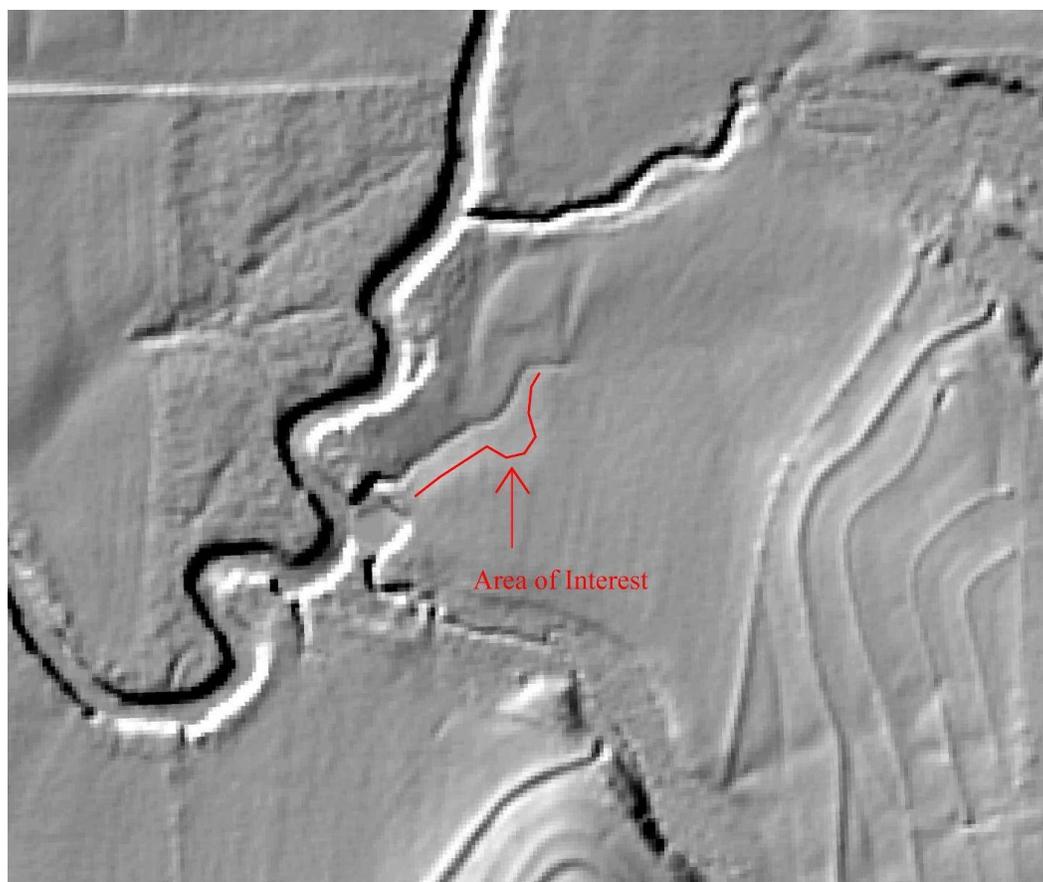
18). It may be associated with the younger dates from feature 23 and X29 in level 2. As mentioned earlier, the feature was first recognized in the balk wall, but provenience was recorded at the excavation unit floor. An acceptable combine was performed on this date with the dates from feature 23 and X29, but it only barely passed the Chi square test and still did not pass with the combination of the older dates. The data from the radiocarbon dates reveal that at least two or more distinct events took place at the Hamon site, and those consecutive events, coupled with modern plowing, have mixed and obscured the resolution of this sequence.

### **Pedestrian Survey to Relocate the Hamon site and Original Excavations**

The grid location, as described in the excavation records (Figures 19 and 20), was utilized to locate the Hamon site and the original excavations. LIDAR imagery was obtained from the online DASC database, maintained by the Kansas Geological Survey, for use in ArcGIS to evaluate whether surface anomalies are present in the area of the recorded location of the site. Inspection of the LIDAR imagery revealed an area that seemed probable for the location of the original excavations. The area is nearly 140 feet east/northeast of the tree line in the field as plotted in the site records. The anomaly present is a disturbance on the edge of the terrace (Figure 31). The terrace edge can be seen along the east/west axis of the northern edge of the field next to a shallow slough just to the north. Before reaching the slough, the terrace ends, dipping in elevation before slightly rising again at the slough edge. Along the terrace edge a noticeable depression can be seen in the LIDAR imagery (Figure 31).

Utilizing the LIDAR imagery in combination with the excavation records, the site was visited on two afternoons in October 2014. With permission of the landowner, Charles Hamon, a pedestrian survey of the area was performed with no artifacts noticeable on the ground surface. Mr. Hamon, who was present during the excavations, told me that the archaeologists had placed a

thick polyethylene plastic over the site when they finished excavating. He granted me permission to try to locate the polyethylene by placing a series of small shovel tests over the area. I informed Mr. Hamon that the site was recorded as being mainly at the top of the terrace to the southeast, but he responded that he did not recall it being located there and that he remembered it being closer to the location of the depression visible in the LIDAR imagery.



*Figure 31. Lidar imagery revealing a cutout of the terrace edge where the 1971-1972 excavations of the Hamon site might have been located.*

Starting from the southeast and moving to the northeast from the center of the terrace toward the location of the depression in the LIDAR imagery, the first three tests were negative for polyethylene or cultural material. The fourth and fifth tests encountered the polyethylene laid down following excavation (Figure 32). Fifteen more tests were placed around the perimeters of the polyethylene to define the excavation limits. No more polyethylene was encountered, but five tests

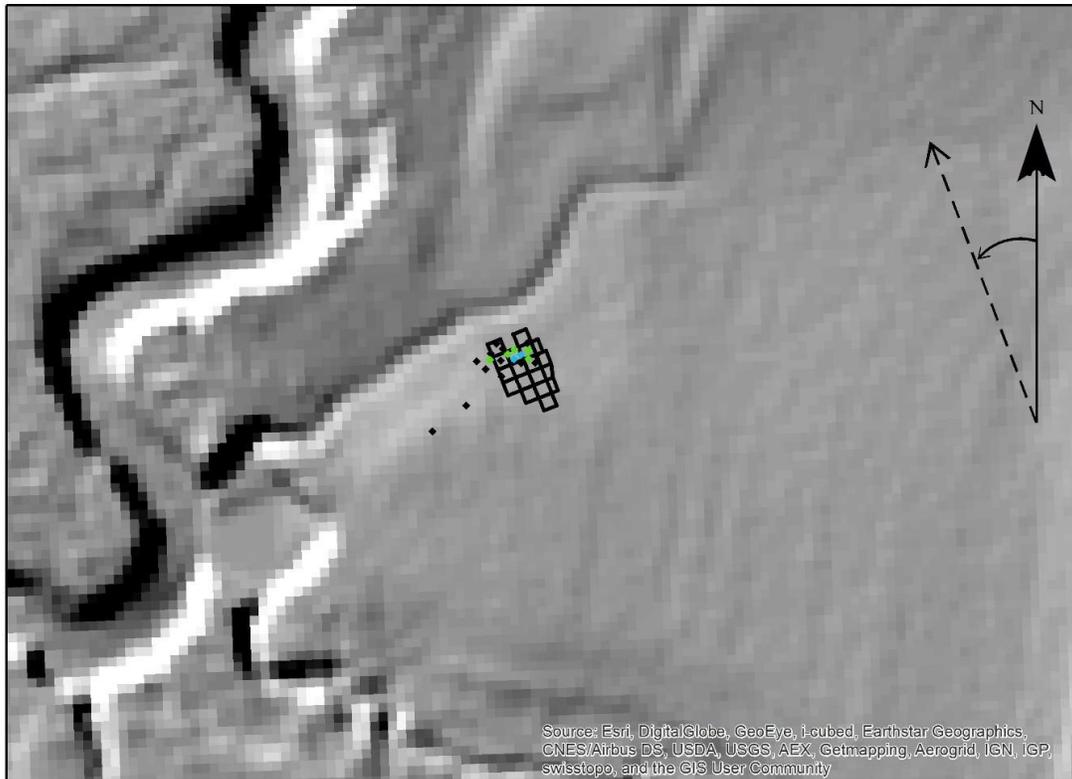
were positive for cultural material and the remaining 10 tests were negative. Great care was taken in the testing to stay cognizant of the fact that burials were found at this site and that the infant burial was not removed. No human remains were encountered in the testing, and it is possible that the polyethylene covered the filled-in pit where the infant burial was located. All tests were immediately filled upon completion.



*Figure 32. Shovel tests four (left) and five (right) with flagging pins marking the located polyethylene from the original excavations.*

The coordinates from the location of each test were recorded with a GPS device and entered into ArcGIS. The excavation limits were also incorporated into ArcGIS, based on the measurement location from the excavation records. The resulting location of the test points and the placement of the grid reveal that the excavation was relocated and in the area of the depression visible in the LIDAR imagery (Figure 33). Additionally, an aerial view for a higher resolution view of the grid location and tests has been provided (Figure 34). The grid was recreated in the exact dimensions of 60 feet north-to-south by 40 feet east-to-west. The actual location may vary slightly in any direction, but the polyethylene may mark the northern portion of the excavation or near the middle area where feature 133, containing the burial (feature 134) at the bottom, had been located. The encountered artifacts in the positive tests included a small corner-notched point, ceramic sherds,

quartzite, sandstone, and hematite-limonite-rich stone, burned earth, and lithic debitage (Figure 35).



**14JF350 Estimated 1971-72 Excavation Grid Location**

- ◆ 14JF350 Plastic From Original Excavations
- ◆ 14JF350 Positive Shovel Tests (Artifacts, No Plastic)
- ◆ 14JF350 Negative Shovel Tests
- 14JF350 Excavation Limits (1971-72)

**Jefferson Co Lidar**



*Figure 33. LIDAR image location of the placed excavation grid and test points from the October 2014 survey.*

The relocation of the original excavations and the recovery of cultural material reveal that portions of the Hamon site are still present, or an abundant amount of material was overlooked during the original excavations. It is not certain that the location of the excavation grid as I have plotted it here is correct. I would place a buffer of 15 feet in any direction, which would place the

polyethylene encountered at either directional edge of the excavation grid or nearly in the center. The artifacts recovered were from tests where no polyethylene was encountered, and below the location of the polyethylene which was at 10 cm in test 4, and at 20-25 cm in test 5. Neither of these vertical locations are 1.7 feet/51.2 cm deep. Suggesting that the excavation in this area did not reach 1.7 feet/51.2 cm deep or that a considerable amount of erosion has taken place in the soil above the polyethylene's location. Corn is regularly grown in the field, which slopes toward the slough to the north, and erosion almost certainly has taken place in the last 43 years.



**14JF350 Estimated 1971-72 Excavation Grid Location & 2014 Testing**

- ◆ 14JF350 Plastic From Original Excavations
- ◆ 14JF350 Positive Shovel Tests (Artifacts, No Plastic)
- ◆ 14JF350 Negative Shovel Tests
- 14JF350 Excavation Limits (1971-72)

*Figure 34. Aerial satellite view of the location of 2014 test points and the placement of the excavation grid from 1971-1972.*



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

In this chapter I have argued that the reconstructed excavation data along with the spatial distribution of artifacts in each unit suggests that parts of the Hamon site may be present outside of the excavation limits. Recorded features, including feature 148, 118, and 46, in the lower levels of the excavation also suggested possibilities for hearths that might belong to different occupations than materials and features located above those levels. AMS dates from the different levels clearly indicate a chronological difference in support of my argument. The survey and shovel testing of the location and recovery of cultural material bolsters the argument made by these data factors. The variability in the ceramic artifact assemblage discussed in Chapter 4 also adds yet another factor. The Hamon site was, and is more complicated than a single component house feature of the defined Grasshopper Falls phase. However, a house may have stood at the site during one of the occupations, but it either was intrusive, or intruded upon by other occupations.

## CHAPTER 6: CONCLUSIONS

The Hamon site represents a palimpsest of occupations, a place that was occupied on numerous occasions during most or all of the Late Plains Woodland period (AD 500-1000). The palimpsest is reflected by mixed provenience of artifacts, radiocarbon dates, and numerous features resulting from multiple occasions of occupation by either a kinship related group, or multiple groups with no kinship connections. This study, which incorporated artifact analysis, a spatial analysis, new AMS radiocarbon dates, and a thorough review of field records from the original excavations, reveals that palimpsests can be recognized, even when dealing with a curated collection from excavations that took place 44 years ago. Methods of analysis have evolved and will continue to evolve for archaeologists interpreting archaeological sites. New computer programs and theoretical approaches (such as acknowledging the potential for palimpsest development) allow for the extraction of minute details that archaeologists did not have a half century ago. Due to poor working conditions and the material remaining unanalyzed until now, much of the data that I have presented here was overlooked by the archaeologists who conducted the original excavations.

The ceramic analysis demonstrates that several previously defined Late Plains Woodland wares or types, identified from sites located within the same geological region, are actually very similar, and might reflect the same pottery ware or type. This is important because it reveals 1) that pottery may not be as important of a cultural designation unit identifier as has been previously emphasized in taxonomy, and 2) that if some of the wares or types represent the same phenomena, then significant interaction among smaller groups of people over a larger geographic region is implied. The pottery associated with Valley, Grasshopper Falls, Sterns Creek, and Loseke Creek components, along with Minotts and Held Creek wares/types, should be further analyzed to explore the above mentioned interaction among the Plains Woodland groups who produced them

one-to two millennia ago. A further analysis may reveal specific traits that can differentiate the pottery of one designation unit from another, which at this time I could not find in any literature of Grasshopper Falls, Sterns Creek, Held Creek wares, and some Loseke Creek and Minotts types.

Interpretation of the archaeological record of activities of the people and their way of life is the most important aspect of this and any archaeological study. The material evidence from the Hamon site points to the presence of both artifact production and mortuary activities. The possibility that a Late Plains Woodland house once stood at the site has not been rejected by this analysis. However, as discussed in earlier chapters, alternative activities may have been responsible for the material remains that were previously interpreted as a house. Furthermore, a house may have stood at the site for only one of its various occupations, with different function and use occurring in previous or subsequent occupations.

The archaeological record at the Hamon site provides evidence of many different activities. The pottery and ceramic production material evident in lithic artifacts, and raw finger-impressed or rolled clay, indicates that ceramic production activities took place at the Hamon site during at least one of the occupations. The abundant lithic debitage and stone tools also point to production activities. The local and non-local raw material from which stone tools and pottery temper was produced reveals that the occupants successfully exploited local resources but that some material may have entered the site via trade or migration. Several hearth features, containing pottery sherds with residue, also indicate that cooking took place at the site. The last activity represented is burial of the deceased. At least one of the burials is likely intrusive upon earlier occupation layers. The late date derived from charcoal associated with the pit containing a burial, despite its deep provenience in comparison with that of a date three centuries older, but given its similarity to one of the AMS dates from a higher level, confirms the intrusive nature of the mortuary activity. The

Hamon site may have been a locale where descent groups related through kinship constructed houses, produced material important for their way of life, and eventually buried the dead through ancestral remembrance and connection to the land.

The Woodland lifestyle is reflected in the stone tools used for multiple purposes, including hunting, and the ceramics used for storage and cooking. Agriculture is not directly evident, but may have taken place on a small scale. The charred residue on ceramics reveals that cooking activity took place. In addition, the abundance of pottery with clean interiors may reflect water containers or an abundance of material to be traded for economical purposes. Alternatively, this may reflect a lack of preservation of non-burned organic material.

The occupants of the Hamon site may have been interacting with other Late Plains Woodland people and trading pottery with them. Given the indistinguishable pottery from Late Plains Woodland components over the entire region in between, such social connections may have extended as far north as present day South Dakota, and Iowa, but the most promising material evidence may come from components located in the four corner region of Kansas, Missouri, Iowa, and Nebraska. Excavated Middle Plains Woodland period Kansas City Hopewell, and later Plains Village period Steed-Kisker components, contained burials with associated grave goods of celts, pipes, projectile points, and pottery (Wedel 1938:104; 1943:92-93). The Hamon site occupants may have interred similar items with the deceased, but given the palimpsest nature of the site, it has not been possible to determine whether any of the pottery or stone tools were grave goods.

Important implications for understanding Late Plains Woodland people, their adaptations, activities, and interactions with other people, and overall way of life have come from the analysis of the excavations and artifacts from the Hamon site. The ceramic similarities among the various wares implies that greater interaction was taking place among Late Plains Woodland people

beyond the context of the site. It is relevant that researchers working with Late Plains Woodland ceramic wares further address this topic and the broader interaction it implies. My interpretation for a pottery production event at the Hamon site could be applied to similar material assemblages and features from other Late Plains Woodland components. The pursuit and interpretations of pottery production locations would add to our knowledge of the activities, economics, and interaction of Late Plains Woodland groups.

Among the most important of these implications is the significance and validation of the value of long-term curation of archaeological collections from controlled excavations. The records kept from the excavations of the Hamon site were important for identifying features and their locations, excavation methods, and my overall analysis interpretations. My analysis of those records highlights the important of consistency in excavation methods and record keeping, so that all of the data from an excavation can be properly analyzed. It also revealed that features evident of the palimpsest at the Hamon site were overlooked due to the existing paradigm that daub implies a house feature. Assuming that daub represents a house feature and emphasizing that with isolated artifacts, led to interpretations about the Hamon site before excavations were completed. The records reveal that it is important to caution against interpreting components at a site before excavations have taken place or been completed. The material and records from the Hamon site had been curated for more than four prior to this analysis. Many curated collections have never been analyzed. It is important that researchers consider the potential of adding to our knowledge of prehistoric people by utilizing these sources. Answers to questions about prehistoric people's activities, social interactions, and ultimately their ways of life and change through time are still waiting in other unanalyzed collections.

## BIBLIOGRAPHY

- Adair, Mary J.  
2012 Refining Plains Woodland Chronology. *Plains Anthropologist* 57(223): 183-228.  
2013 The Temporal Range of Mound Burials in the Lower Republican River Valley: The Schultz Phase. Paper Presented at the 35<sup>th</sup> Annual Flint Hills Conference, Manhattan, Kansas.
- Alex, Lynn M.  
2000 *Iowa's Archaeological Past*. University of Iowa Press, Iowa City.
- Andrefsky, William  
2005 *Lithics: Macroscopic Approaches to Analysis*. 2<sup>nd</sup> ed. Cambridge University Press, Cambridge, United Kingdom.
- Bailey, Geoff  
2007 Time Perspectives, Palimpsests, and the Archaeology of Time. *Journal of Anthropological Archaeology* 26, 198-223.
- Baugh, Timothy G.  
1991 *The Avoca Site (14JN332): Excavation of a Grasshopper Falls Phase Structure, Jackson County, Kansas*. Contract Archeology Publication No. 8. Archeology Office, Kansas State Historical Society, Topeka.
- Barr, Tom  
1971 K.A.A. Fall Dig, 1971. *Kansas Anthropological Association Newsletter* 17(3): 1-5.
- Beck, Margaret  
2001 Pottery Production at the Mugler Site (14CY1-A), A Central Plains Tradition House in North-Central Kansas. *Plains Anthropologist* 46(175): 5-20.
- Bell, Robert E.  
1958 *Guide to the Identification of Certain American Indian Projectile Points*. Special Bulletin No. 1. Oklahoma Anthropological Society, Norman.  
1960 *Guide to the Identification of Certain American Indian Projectile Points*. Special Bulletin No. 2. Oklahoma Anthropological Society, Norman.
- Benison, Christopher J.  
1996 *Phase III Archeological Investigations at 14DO81: Testing and Excavation of a Prehistoric Campsite in Northern Douglas County, Kansas*. Contract Archeology Publication No. 16. Archeology Office, Kansas State Historical Society, Topeka.
- Benn, David W.  
1982 The Ceramic Assemblage and Arthur Site Ceramics in Regional Perspective. In *A Preliminary Report on the Arthur Site, East Okoboji Lake, Iowa*, edited by Joseph A. Tiffany, pp. 38-82, 161-181. Research Papers No. 7(1). Office of the State Archaeologist, University of Iowa, Iowa City.
- Benn, David W., and William Green  
2000 Late Woodland Cultures in Iowa. In *Late Woodland Societies: Tradition and Transformation across the Midcontinent*, edited by Thomas E. Emerson, Dale L. McElrath, and Andrew C. Fortier, pp. 429-496. University of Nebraska Press, Lincoln.
- Billeck, William T.

- 1993 *Time and Space in the Glenwood Locality: The Nebraska Phase in Western Iowa*. Unpublished PhD dissertation, Department of Anthropology, University of Missouri, Columbia.
- Binford, Lewis  
1972 *An Archaeological Perspective*. Seminar Press Inc., New York.
- Blasing, Bob.  
1984 *Prehistoric Sources of Chert in the Flint Hills*. Manuscript on file, City Archaeologist's Office, Wichita State University, Wichita, Kansas.
- Braun, David P.  
1980 Experimental Interpretation of Ceramic Vessel Use on the Basis of Rim and Neck Formal Attributes. In *Archaeological Investigations Paje to Phoenix 500 KV Southern Transmission Line*, by Donald C. Fiero, Robert W. Munson, Martha T. McClain, Suzanne M, Wilson, Anne H. Zier, pp. 171-231. MNA Research Paper No. 11. Museum of Northern Arizona, Flagstaff.
- Bronk Ramsey, C.  
2009 Bayesian Analysis of Radiocarbon Dates. *Radiocarbon* 51(1): 337-360.
- Brown, Kenneth L.  
1984 *Pomona: A Plains Village Variant in Eastern Kansas and Western Missouri*. Unpublished PhD dissertation, Department of Anthropology, University of Kansas, Lawrence.
- Brown, Kenneth L., and Alan H. Simmons  
1987 *Kansas Prehistoric Preservation Plan*. Office of Archaeological Research, Museum of Anthropology, University of Kansas, Lawrence. Submitted to the Kansas State Historic Preservation Office, Kansas State Historical Society, Topeka.
- Busbey, Arthur B. III, Robert R. Coenraads, Paul Willis, and David Roots  
1997 *The Nature Company Guides: Rocks and Fossils*. Time-Life Books, New York, New York.
- Calabrese, F. A.  
1967 *The Archeology of the Upper Verdigris Watershed*. Anthropological Series No. 3. Archeology Office, Kansas State Historical Society, Topeka.
- Dickey, Harold P., Jerome L. Zimmerman, and Harold, T. Rowland  
1974 *Soil Survey of Jefferson County, Kansas*. United States Department of Agriculture Soil Conservation Service in Cooperation with the Kansas Agricultural Experiment Station.
- Duncan, Marjorie A., Larry Neal, and Don Shockley  
2007 *Southern Plains Lithics: The Small Points*. Special Bulletin No. 26. Oklahoma Anthropological Society, Norman.
- Eyman, Charles A.  
1966 *The Schultz Focus: A Plains Middle Woodland Burial Complex in Eastern Kansas*. Unpublished MA Thesis, Department of Archaeology, University of Alberta at Calgary.
- Fosha, Michael R., and Brad Logan  
1991 Quixote and Reichart: Archeological Investigation of Grasshopper Falls Phase Habitation Sites in the Perry Lake Project Area, Northeastern Kansas. *The Kansas Anthropologist* 12(2): 11-31.
- Fosha, Michael R., and Barry G. Williams

- 1990 *Dates, Pots and Pits: A Grasshopper Falls Phase Site in Northeastern Kansas*. Paper presented at the 12<sup>th</sup> Annual Flint Hills Conference, Kansas City, Missouri.
- Goebel, Edwin D.
- 1968a Precambrian Rocks. In *The Stratigraphic Succession in Kansas*, edited by D.E. Zeller. Bulletin No. 189. Kansas Geological Survey, Lawrence. Web version August 2005.
- 1968b Cambrian System. In *The Stratigraphic Succession in Kansas*, edited by D.E. Zeller. Bulletin No. 189. Kansas Geological Survey, Lawrence. Web version August 2005.
- 1968c Ordovician System. In *The Stratigraphic Succession in Kansas*, edited by D.E. Zeller. Bulletin No. 189. Kansas Geological Survey, Lawrence. Web version August 2005.
- 1968d Undifferentiated Silurian and Devonian. In *The Stratigraphic Succession in Kansas*, edited by D.E. Zeller. Bulletin No. 189. Kansas Geological Survey, Lawrence. Web version 2005.
- Haury, Cherie E.
- 1984 Prehistoric Utilization of Chert Resources in the Southern Flint Hills of Kansas. In *Prehistoric Chert Exploitation: Studies from the Midcontinent*, edited by B. M. Butler and E. E. May, pp. 87-99. Occasional Paper No. 2. Center for Archaeological Investigations, Southern Illinois University, Carbondale.
- Hill, A. T., and Marvin Kivett
- 1940 Woodland-like Manifestations in Nebraska. *Nebraska History* 21(3): 141-243. Nebraska State Historical Society, Lincoln.
- Hoard, Robert J., Aaron A. Anglen, John R. Bozell, Danielle Montague-Judd, Elizabeth J. Miksa, Terrell L. Martin, and Patti J. Wright
- 2003 Ceramic Analysis. In *The Late Woodland Component of the Stauffer Site, 23CO499*. Memoir No. 35. *Plains Anthropologist* 48(188): 16-35.
- Holen, Steven R.
- 1989 The Smoky Hill Chalk Member of the Niobrara Formation in Kansas: Implications for the Distribution of Smoky Hill Jasper. Plains Historical Resources, Lawrence, Kansas. Submitted to Kansas Historic Preservation Office, Kansas State Historical Society, Topeka.
- Hurt, Wesley R., Jr.
- 1952 *Report of Investigation of the Scalp Creek Site 39GR1 and the Ellis Creek Site 39GR2, Gregory County, South Dakota*. Circular No. 4. South Dakota Archaeological Commission, Pierre.
- Ives, John C.
- 1955 Glenwood Ceramics. *Journal of the Iowa Archeological Society* 4(3-4): 2-32. Johnson, Alfred E.
- 2001 Plains Woodland Tradition. In *Handbook of North American Indians, Plains*, edited by Raymond J. DeMaillie, pp. 159-172. Smithsonian Institution, Washington.
- Jones, Bruce A.
- 1976 *The Palmer Site: A Grasshopper Falls Phase Occupation in the Upper Wakarusa Watershed, Osage County, Kansas*. Archeology Office, Kansas State Historical Society, Topeka. Submitted to the USDA Soil Conservation Service, Salina, Kansas.
- Justice, Noel D.
- 1995 *Stone Age Spear and Arrow Points of the Midcontinental and Eastern United States: A Modern Survey and Reference (Reprint Edition)*. Indiana University Press, Bloomington.

Kansas Geological Survey.

- 2014 Geology: County Maps, State Wide. University of Kansas, Lawrence. Online access <http://www.kgs.ku.edu/General/Geology/index.html>

Kansas State Historical Society

- 1971 Field Records and Progress Reports from Excavations at the Hamon Site, 14JF350, dated September 24, October 2 and 3, 1971. Records on file, Kansas State Historical Society, Topeka.
- 1972 Field Records and Progress Reports from Excavations at the Hamon Site, 14JF350, dated April 8, 22, and 29, May 18, 24 and 31, 1972. Records on file, Kansas State Historical State, Topeka.

Keyes, Charles R.

- 1949 Four Iowa Archaeologies with Plains Affiliations. In *Proceedings of the 5<sup>th</sup> Plains Conference for Archaeology*, assembled by John L. Champe, pp. 96-97. Notebook No. 1. Laboratory of Anthropology, University of Nebraska, Lincoln.

Kivett, Marvin F.

- 1952 *Woodland Sites in Nebraska*. Publications in Anthropology No. 1. Nebraska State Historical Society, Lincoln.
- 1953 *The Woodruff Ossuary: A Prehistoric Burial Site in Phillips County, Kansas*. River Basin Survey Papers No. 3. Bureau of American Ethnology Bulletin No. 154. Smithsonian Institution, Washington, D.C.

Kivett, Marvin F., and George S. Metcalf

- 1997 The Prehistoric People of the Medicine Creek Reservoir, Frontier County, Nebraska: An Experiment in Mechanized Archaeology (1946-1948). Memoir No. 30. *Plains Anthropologist* 42(162): 151-179.

Kuchler, A. W.

- 1974 A New Vegetation Map of Kansas. *Ecology* 55(3): 586-604.

Lee, Wallace

- 1943 *The Stratigraphy and Structural Development of the Forest City Basin in Kansas*. Bulletin No. 51. Kansas Geological Survey, Lawrence.

Logan, Brad

- 1988 Lithic Resources, Terrain Variation and Prehistoric Site Distribution in the Kansas City Locality. *Plains Anthropologist* 33(121): 321-336.
- 2001 Excavation of the Scott Site (14LV1082), A Steed Kisker Phase House in Stranger Creek Valley. *Current Archaeology of Kansas* 2: 14-19.
- 2006 Woodland Adaptations in Eastern Kansas. In *Kansas Archeology* edited by Robert J. Hoard and William E. Banks, pp. 76-92. University Press of Kansas, Lawrence.
- 2008 *Archaeological Survey in Stranger Creek Basin, Northeastern Kansas 2007-2008*. Department of Sociology, Anthropology and Social Work, Kansas State University, Manhattan. Submitted to Historic Preservation Office, Kansas State Historical Society, Topeka.
- 2010 Frontier Life: Late Prehistoric Adaptations of the Kansas City Locality. *Midcontinental Journal of Archaeology* 35(2): 229-269.

Logan, Brad, (editor)

- 1993 *Quarry Creek: Excavation, Analysis, and Prospect of a Kansas City Hopewell Site, Fort Leavenworth, Kansas*. Museum of Anthropology Project Report Series No. 80. University of Kansas, Lawrence.

- Logan, Brad, and John G. Heddon  
 1993 Shadow Glen: A Late Pomona Variant Occupation in the Lower Kansas River Basin. *The Kansas Anthropologist* 14(2): 10-30.
- Logan, Brad, and Lauren W. Ritterbush  
 1994 Late Prehistoric Cultural Dynamics in the Lower Kansas River Basin. *Central Plains Archaeology* 4(1): 1-25.
- Logan, Brad, Eric Skov and Mitchell Frye.  
 2007 *National Register of Historic Places Evaluation of the New-McGraw Site, Stranger Creek Valley, Northeastern Kansas*. Submitted to the Historic Preservation Office, Kansas State Historical Society, Topeka.
- Ludwickson, John, and John R. Bozell  
 1994 The Early Potters. *Nebraska History* 75: 108-119. Nebraska State Historical Society, Lincoln.
- Marshall, James O.  
 1972 *The Archeology of the Elk City Reservoir: A Local Archeology Sequence in Southeast Kansas*. Anthropological Series No. 6. Archeology Office, Kansas State Historical Society, Topeka.
- McLean, Janice A.  
 1998 Lithic Raw Material Use at the DB Site. In *Prehistoric Settlement of the Lower Missouri Uplands*, edited by Brad Logan, pp. 167-197. Museum of Anthropology Project Report Series No. 98. University of Kansas, Lawrence.
- Morrow, Toby  
 1994 A Key to Identification of Chipped-Stone Raw Materials Found on Archaeological Sites in Iowa. *Journal of the Iowa Archaeological Society* 41: 108-129.
- O'Brien, Patricia J.  
 1971 Valley Focus Mortuary Practices. *Plains Anthropologist* 16(53): 165-182.
- O'Connor, Howard G.  
 1968 Jurassic System. In *The Stratigraphic Succession in Kansas*, edited by D.E. Zeller. Bulletin No. 189. Kansas Geological Survey, Lawrence. Web version August 2005.
- Odell, George H.  
 2004 *Lithic Analysis*. Kluwer Academic/Plenum, New York.
- Perino, Gregory  
 1968 *Guide to the Identification of Certain American Indian Projectile Points*. Special Bulletin No. 3. Oklahoma Anthropological Society, Norman.  
 1971 *Guide to the Identification of Certain American Indian Projectile Points*. Special Bulletin No. 4. Oklahoma Anthropological Society, Norman.
- Reid, Kenneth C.  
 1980 Upper Pennsylvanian Cherts of the Forest City Basin: Missourian Stage. *Plains Anthropologist* 25(88): 121-134.  
 1984 Fire and Ice: New Evidence for the Production and Preservation of Late Archaic Fiber-Tempered Pottery in the Middle-Latitude Lowlands. *American Antiquity* 49(1): 55-76.
- Reimer, Paula J., Edouard Bard, Alex Bayliss, J. Warren Beck, Paul G. Blackwell, Christopher Bronk Ramsey, Caitlin E. Buck, Hai Cheng, R. Lawrence Edwards, Michael Friedrich, Pieter M Grootes, Thomas P. Guilderson, Hafliði Hafliðason, Irka Hajdas, Christine Hatte, Timothy J.

- Heaton, Dirk L. Hoffmann, Alan G. Hogg, Konrad A. Hughen, K. Felix Kaiser, Bernd Kromer, Sturt W. Manning, Mu Niu, Ron W. Reimer, David A. Richards, E. Marian Scott, John R. Southon, Richard A. Staff, Christian S. M. Turney, Johannes van der Plicht  
 2013 Intcal13 and Marine13 Radiocarbon Age Calibration Curves 0-50,000 Years Cal BP. *Radiocarbon* 55(4): 1869-1887.
- Reynolds, John D.  
 1978 *Archeological Investigations at the Malm, Anderson, and Teaford Sites in Perry Reservoir, Jefferson County, Kansas*. Archeology Office, Kansas State Historical Society, Topeka.  
 1979 *The Grasshopper Falls Phase of the Plains Woodland*. Anthropological Series No. 7. Archeology Office, Kansas State Historical Society, Topeka.  
 1982 *Archeological Investigations at the Cow Killer Site, 14OS347*. Archeology Office, Kansas State Historical Society, Topeka. Submitted to U.S. Army Corps of Engineers, Kansas City District.  
 1984 *The Cow-Killer Site Melvern Lake, Kansas*. Anthropological Series No. 12. Archeology Office, Kansas State Historical Society, Topeka.  
 1987 *The Archeology of the Grove Reservoir Kansas, 1969*. Anthropological Series No. 14. Archeology Office, Kansas State Historical Society, Topeka.
- Rice, Prudence M.  
 1987 *Pottery Analysis: A Sourcebook*. University of Chicago Press, Chicago.  
 1996 Recent Ceramic Analysis: 2. Composition, Production, and Theory. *Journal of Archaeological Research* 4(3): 165-202.
- Roper, Donna C.  
 2006 The Central Plains Tradition. In *Kansas Archeology* edited by Robert J. Hoard and William E. Banks, pp. 105-132. University Press of Kansas, Lawrence.
- Roper, Donna C., and Mary J. Adair  
 2011 Interpreting AMS Radiocarbon Age Determinations from Selected Central Plains Tradition Sites. *Plains Anthropologist* 56(217): 3-22.
- Schoewe, Walter H.  
 1949 The Geography of Kansas: Part II Physical Geography. *Transactions of the Kansas Academy of Science* 52(3): 261-333.
- Shepard, Anna O.  
 1956 *Ceramics for the Archaeologist*. Carnegie Institution of Washington, D.C. 1985 reprinting. Braun-Brumfield, Inc., Ann Arbor, Michigan.
- Stark, Barbara L., and Christopher P. Garraty  
 2004 Evaluation of Systematic Surface Evidence for Pottery Production in Veracruz, Mexico. *Latin American Antiquity* 15(2): 123-143.
- Sterns, Frederick H.  
 1915 A Stratification of Cultures in Eastern Nebraska. *American Anthropologist* 17(1): 121-127.
- Stein, Martin C.  
 2006 Kansas Lithic Resources. In *Kansas Archaeology*. Edited by Robert J. Hoard and William E. Banks, pp. 264-292. University Press of Kansas, Lawrence.
- Sullivan, Alan P., and Kenneth C. Rozen.  
 1985 Debitage Analysis and Archaeological Interpretation. *American Antiquity* 50(4): 755-779.

- Strong, William Duncan  
 1933 The Plains Culture Area in the Light of Archeology. *American Anthropologist*, 35(2): 271-287.  
 1935 *An Introduction to Nebraska Archaeology*. Smithsonian Institution, Washington D.C.
- Tiffany, Joseph A.  
 1971 *The Sterns Creek Phase In Iowa*. Unpublished honors thesis, University of Iowa, Iowa City.  
 1977 Artifacts from the Sharp's Site: A Sterns Creek Component in Southwestern Iowa. *Journal of the Iowa Archaeological Society* 24: 84-124. University of Iowa, Iowa City.
- Trabert, Sarah  
 2009 Steed-Kisker Ceramics: Analysis of the Scott Site (14LV1082) Assemblage. *Plains Anthropologist* 54(212): 289-299.  
 2011 A Reexamination of Glenwood Locality Ceramic Variation and Vessel Form. *Plains Anthropologist* 56(220): 331-345.
- Wedel, Waldo R.  
 1938 *Hopewellian Remains near Kansas City, Missouri*. Proceedings of the United States National Museum 86(3045). Smithsonian Institution, Washington, D.C.  
 1943 *Archeological Investigations in Platte and Clay Counties, Missouri*. U.S. Government Printing Office, Washington, D.C.  
 1947 Prehistory and Environment in the Central Great Plains. *Transactions of the Kansas Academy of Science* 50(1): 1-18.  
 1959 *An Introduction to Kansas Archeology*. Bureau of American Ethnology Bulletin No. 174. Smithsonian Institution, Washington, D.C.  
 1972 Culture Sequence in the Central Great Plains. *Plains Anthropologist* 17(57): 291-352.  
 1974 *Prehistoric Man on the Great Plains*. University of Oklahoma Press, Norman.
- Willey, Gordon R.  
 1966 *An Introduction to American Archaeology Volume One: North and Middle America*. Prentice-Hall, Inc., Englewood Cliffs, New Jersey.
- Willey, Gordon R., and Philip Phillips  
 1958 *Method and Theory in American Archaeology*. 2001 edition with new forward by Gordon R. Willey and edited with an introduction by R. Lee Lyman and Michael J. O'Brien. University of Alabama Press, Tuscaloosa.
- Williams, Barry G.  
 1986 *Early and Middle Ceramic Remains at 14AT2: a Grasshopper Falls Phase House and Pomona Focus Storage Pits in Northeastern Kansas*. Contract Archeology Publication No. 4. Archeology Office, Kansas State Historical Society, Topeka.
- Witty, Thomas A.  
 1967 The Pomona Focus. *Kansas Anthropological Association Newsletter* 12(5):1-5.  
 1982 *The Slough Creek, Two Dog and William Young Sites, Council Grove Lake, Kansas*. Anthropological Series No. 10. Archeology Office, Kansas State Historical Society, Topeka.  
 1983 *Four Archeological Sites of the Perry Lake, Kansas*. Anthropological Series No. 11. Archeology Office, Kansas State Historical Society, Topeka.
- Zimmerman, Larry J.

1981 *Woodland Villagers*. South Dakota Educational Series No. 4. Archaeology Laboratory, University of South Dakota, Vermillion. Accessed online <http://history.sd.gov/archaeology/edseries.html>