HABITATION AND INTERACTION IN THE LOWER ILLINOIS RIVER VALLEY: A CASE STUDY ON HOUSEHOLD STRUCTURE AND CERAMICS AT THE GERMAN SITE (11C377)

By

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B.A., Centre College, 2018

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A Thesis Approved on

April 12, 2021

by the following Thesis Committee

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Thesis Director Dr. Jonathan Haws

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Dr. Anna Browne Ribeiro

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Dr. Jason King

DEDICATION

This Thesis is dedicated to my parents, who never once told me not to dig in the backyard.

Dr. Robyn Cutright, who gave me my first taste of what archaeology is.

Dr. Jason King, there are no words that truly express how much he has shaped my work and my research.

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ABSTRACT

HABITATION AND INTERACTION IN THE LOWER ILLINOIS RIVER VALLEY: A CASE STUDY ON HOUSEHOLD STRUCTURE AND CERAMICS A THE GERMAN SITE (11C377)

Catherine Zoe Doubles

May 9, 2021

The purpose of this project is to investigate the less understood narrative of the Late Woodland peoples at the German site within the Lower Illinois River Valley. In order to determine the extent of Mississippian cultural interaction with the Jersey Bluff Phase, Late Woodland, peoples, I will examine the houses and artifacts found during the 2019 field season by the Centre for American Archeology. Data from the geophysical surveys, notes from the site excavations, and ceramic analysis will be used to place the German site within the theoretical framework and archaeological context of the region. In the end, the objective of this thesis project is to determine the scope of cultural interaction by analyzing the house structure and ceramics uncovered by the Summer 2019 CAA field programs. The proposed research will add to developing narratives of cultural interaction and the resistance and/or maintenance of cultural practices at the household level.

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INTRODUCTION

The Lower Illinois River Valley has been the subject of many archaeological projects and inquiries over the decades. Mounds and habitation sites pepper the landscape and produce a rich timeline for human occupation in the region dating back thousands of years. The Late Woodland period (AD 400-1300) is a small portion of this rich history and it is one of the least understood and studied. Once thought to be a period of social decline, archaeologists now understand it to be a period of complex social and cultural connections marked by (1) major population resettlement, (2) the widespread adoption of the bow and arrow, and (3) the increased reliance upon maize agriculture (Yerkes 1988; McElrath et al. 2000). There is also a lack of expressed hierarchy, especially when compared to the Mississippian culture at Cahokia beginning in AD 1050. Many archaeologists have proposed interpretations of how Late Woodland peoples interacted with and assimilated to Mississippian culture as it was brought into the region. While these projects shed light on this once ignored period, they all tend to highlight the Mississippian perspective, placing the Late Woodland peoples in a position where they are being acted upon, not actively engaging in processes of cultural change.

The archaeological focus in the Lower Illinois River Valley has centered around large earthen mound cemeteries and large habitation sites to answer questions about the adoption of Mississippian lifeways (Delaney-Rivera 2000, 2004; Farnsworth et al. 1991; Goldstien 1980; Perino 1971). These projects use ceramics and the concept of the hybridization of material culture to talk about interpretations on the intensity of Late

Woodland and Mississippian interaction within the region. Colony and colony-acculturation are two of the predominant narratives discussed by archaeologists when investigating these interactions (Delaney-Rivera 2004; Goldstein 1980; Farnsworth et al. 1991). Mississippian movement into the Lower Illinois River Valley, or LIRV, caused a shift in subsistence strategies, ceramic technology, and site layout that can be seen in the archaeological record. Ceramics at the Schild cemetery and the Audrey site are often cited as having numerous examples of hybrid ceramics, with sherds and vessels exhibiting characteristics assigned to both Late Woodland and Mississippian ceramic traditions. Settlements such as the Audrey site also have hybrid characteristics and include multiple features and structures corresponding with each culture. Another explanation for interactions taking place during this period has been attributed to trade, as the Mississippian center of Cahokia grew and expanded those trade networks (Farnsworth et al. 1991). A key point in this argument is that many cemeteries associated with Mississippian artifacts and burial practices have had isotopic studies conducted showing that the populations buried within them are local, not from the American Bottom (Goldstein 1980). However, it is becoming increasingly clear that the nature of interactions between the Late Woodland and Mississippian peoples are more nuanced and need more careful examination to understand what was taking place during this period.

The German site (11C377) is a single component site located along a small tributary of the Illinois River just south of the Center for American Archeology in Kampsville, Illinois. The site has been relatively dated to the Jersey Bluff phase (AD 800-1350) using ceramics and has one radiocarbon date that was tested in 2019, a sample of maize dating to 900±20BP, with a calibrated date of AD 1046-1218 (UGa-43426). The

Center for American Archeology, or CAA, has had a longstanding interest in all time periods (Studenmund 2000) and German is the most recent Late Woodland site to be excavated during the CAA's field programs. The incorporation of the field where the German site is located by the McCully Heritage Project in the 1970s saved the site from further agricultural destruction as it was previously used to grow corn. Geophysical surveying determined the location of magnetic anomalies and ground-truthing units were placed to cross-cut the larger anomalies. The results of those units uncovered six features and a house basin (Feature 1).

The goal of this project is to understand the nature of Jersey Bluff and Mississippian cultural interaction as it plays out within the household. Within this research, I incorporate the household perspective into the archaeological narrative of the Lower Illinois River Valley through the case study of the German site. I use the ceramic assemblage and construction techniques to address questions of hybridity to piece together the nature of cultural interaction. I then compare German to other sites in the Lower Illinois River Valley, the Central Illinois River Valley, and the American Bottom to show how Late Woodland peoples were engaging and creating new practices towards the end of this temporal period.

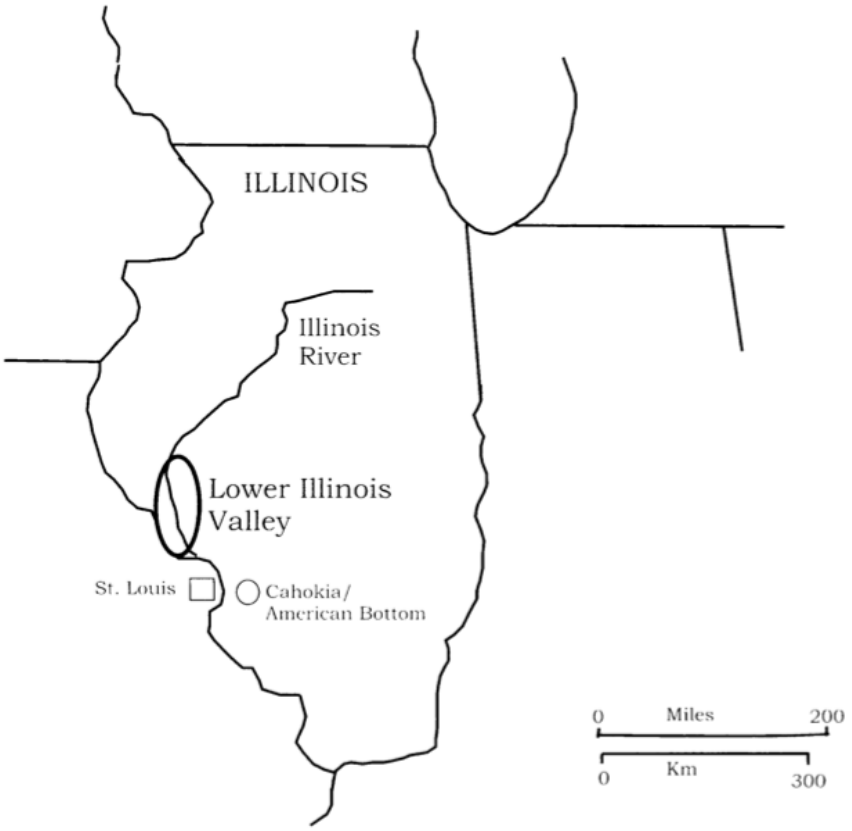

Figure 1: Location of the Lower Illinois River Valley in relation to the American Bottom (Delaney-Rivera 2004).

BACKGROUND AND THEORY

The Lower Illinois River Valley: The Late Woodland Perspective

The Late Woodland period (AD 400-1350) has not been the center of archaeological focus in the Lower Illinois River Valley for several decades as more captivating records, the Hopewell and the Mississippian, have diverted the attention of archaeologists. While the Late Woodland record has been discussed within the context of larger projects, the majority of scholar's focus has been on the Mississippian perspective. The Late Woodland period continued the trend established in the Archaic period of a more sedentary lifestyle with an increase in population size (Braun and Plog 1982). Maize was introduced to the Lower Illinois River Valley around AD 900 and that encouraged changes in the subsistence strategies that once centered around hunting and gathering and the growing of native cultigens (Delaney-Rivera 2000; Vanderwarker et al. 2013; Vanderwarker et al. 2017). Settlements are thought to have been made up of close kin groups or nuclear families (Yerkes 1988, 329; Delaney-Rivera 2000, 21). The Late Woodland period is also understood to have been egalitarian due to the grave goods and differentiation in mortuary practices not reflecting larger socio-political hierarchies (Droessler 1981; Conner 1984; Delaney-Rivera 2000). It is also argued that during this time there is a coalescence of groups as stylistic variations within ceramics and other artifacts decreases (Yerkes 1988, 328-9). Some of the most notable Late Woodland sites in the LIRV include Audrey (11GE20), Koster, and Starr Village (Titterington 1935; Farnsworth et al. 1991; Delaney-Rivera 2000, 2004).

The Late Woodland period within the Lower Illinois River Valley is separated into multiple phases, each defined based on ceramic typologies (Titterington 1935;

Farnsworth et al. 1991; Studenmund et al. 1995; Delaney-Rivera 2000; Studenmund 2000). The temporal phase names also refer to these ceramic typologies that are associated with sites from those phases. The first phase, known as White Hall, begins around AD 400 and continues until AD 600. Subsistence strategies differed from the Middle Woodland period and changed in response to different stimuli: climate change and population growth (Styles 1981; Braun and Plog 1982). Climatic responses are varied across studies. Some archaeologists argue that there was a cooling of the climate and that made Middle Woodland people transition from relying more on agriculture to hunter-gatherer strategies (Styles 1981, 3-4). Others contend that there was a period of warming, not cooling, and the exploitation of resources centered along the bottomland, not upland (Styles 1981, 4). As for population growth, the increased dependence on agriculture that was taking place during this period contributed to and supported the growing population leading to practices that would increase the productivity of the land (Styles 1981, 4-5). The ceramics from this phase are identified by the presence of cordmarking across the whole of vessels and the use of sand tempering (Styles 1981, 1; Delaney-Rivera 2000; Studenmund 2000). Decorations were limited to repeated design elements at the rim including punctates, nodes, and cord-wrapped stick impressions (Styles 1981). Settlement types reflect the changing subsistence strategies including long-term base camps or villages along the edges of the valley to use highland and lowland resources or short-term camps used to temporarily exploit seasonal, lowland resources. (Styles 1981, 261). The previous socio-cultural climate of the Middle Woodland shifted as the region grew to be more stable. There is evidence of population movement as people dispersed into previously unused territories and long-distance trade

networks, common in the Middle Woodland, stopped being used (Braun and Plog 1982; Charles 1992; McElrath et al. 2000). The placement of exotic goods in burials stopped and elaborate decoration of pottery did not continue in the mortuary practices of the Late Woodland peoples (Styles 1981, 3).

The next phase is known as Early Bluff, and it encompasses the first half of the late Late Woodland period (AD 600-800) (Delaney Rivera 2000). Subsistence strategies continued similarly to the White Hall phase. People continued to practice pre-maize agriculture by exploiting the local plants including chenopodium, *Iva annua*, erect knotweed, squash, and gourds (Braun and Plog 1982; Mueller 2019). Vessels during the Early Bluff phase were predominantly jars with cordmarking covering the whole of the vessel, and rapid changes in ceramic technology reflected the changing subsistence strategies and methods of cooking continuing from the White Hall phase on (Braun and Plog 1982). However, grit, or crushed chert and stone, began to dominate temper type (Farnsworth et al. 1991; Delaney-Rivera 2000). Decoration increased in homogeneity as related ethnic groups moved into the region rather than the "increasing supralocal cooperation and regional social integration" once proposed by Braun and Plog (Braun and Plog 1982; McElrath 2000, 7). The location of settlements expanded to include more areas further away from streams and other sources of water (Braun and Plog 1982). Burials indicate that populations were increasing and moving around less frequently than they were in previous periods. There is also some evidence supporting an increase in localized warfare that would continue through the next phase in some areas within the LIRV (Braun and Plog 1982).

The Jersey Bluff phase is the final phase of the Late Woodland period in the Lower Illinois River Valley, defined temporally from AD 800 to AD 1200 or 1300 depending on the location within the valley (Farnsworth et al. 1991; Delaney-Rivera 2000). This is the phase during which maize was introduced, and there was an increasing reliance on this crop throughout this phase (Hedman and Emerson 2008; Hart and Lovis 2013*)*. In addition to this new crop, more agricultural practices developed to exploit the native cultigens to help support the growing population (Mueller 2019). The surface treatments for ceramics changed so that cordmarking no longer covered the entire jar; it extended from the shoulder of the vessel to the base while the neck was smoothed (Farnsworth et al. 1991; Delaney-Rivera 2000). While decorations during this period were not common, some types helped identify this phase at sites across the region due to their dominance in stratum associated with Jersey Bluff. Lip notching is the most distinctive decoration type for this period, as lip notching fell out of practice during the Mississippian period (Delaney-Rivera 2004; Boszhardt 2008). Settlement patterns varied and ranged in size from small, one- to two-structure homesteads, to larger, multi-house sites (Delaney-Rivera 2000, 2004). However, most notable about Jersey Bluff settlement patterns is the lack of hierarchical structures such as platform mounds and plazas common during the Mississippian period. The settlement patterns reflect the more egalitarian lifestyle that is indicative of the Jersey Bluff, and overall Late Woodland, period (Peregrine 1992).

The American Bottom: The Mississippian Perspective

More is understood about the Mississippian (AD 1050-1350) culture from the American Bottom thanks to the prominence of their material culture and the work done at and around Cahokia. The Mississippians developed from the Late Woodland cultures (AD 400-900) that were present in the American Bottom region. There is a significant period of transition within the archaeological record that was known as the Emergent Mississippian and now is referred to as the Terminal Late Woodland (AD 900-1050) (Pauketat 2004). During this time, hierarchies were developing and population centers were forming throughout the region, the largest becoming Cahokia (Goldstein 1980). Maize agriculture intensified which helped spur on the rapid population growth within these centers (VanDerwarker et al. 2017). Settlements are marked by numerous houses that were constructed linearly to one another, the introduction of large plazas, and the construction of platform mounds (Goldstein 1980; Kelly et al. 1990). Ceramics are most readily identified by their shell temper and increased variation in vessel form and decoration (Goldstein 1980; Farnsworth et al. 1991; Delaney-Rivera 2000, 2004; Boszhardt 2008). Mortuary practices include differentiated grave goods as well as different positioning of bodies that mark changes in social relationships taking place during the Mississippian period. (Goldstein 1980). The American Bottom Late Woodland period has three phases: Rosewood (AD 300-450), Mund (AD 450-600), and Patrick (AD 600-800) (Kelly et al. 1990). During the Patrick phase, many of the Late Woodland cultural and material advancements created the foundations for what would become the Mississippian culture. The bow and arrow technology was introduced during the seventh century in this region and maize was introduced during the ninth and quickly became a

main agricultural product (Fortier and McElrath 2002, 174). The population in the American Bottom also steadily increased during the Patrick phase. This increase in population as well as changing subsistence strategies allowed for "that so-called American Bottom cultural heartland" to develop as people started forming large population centers (Kelly 1992, 190; Fortier and McElrath 2002, 174).

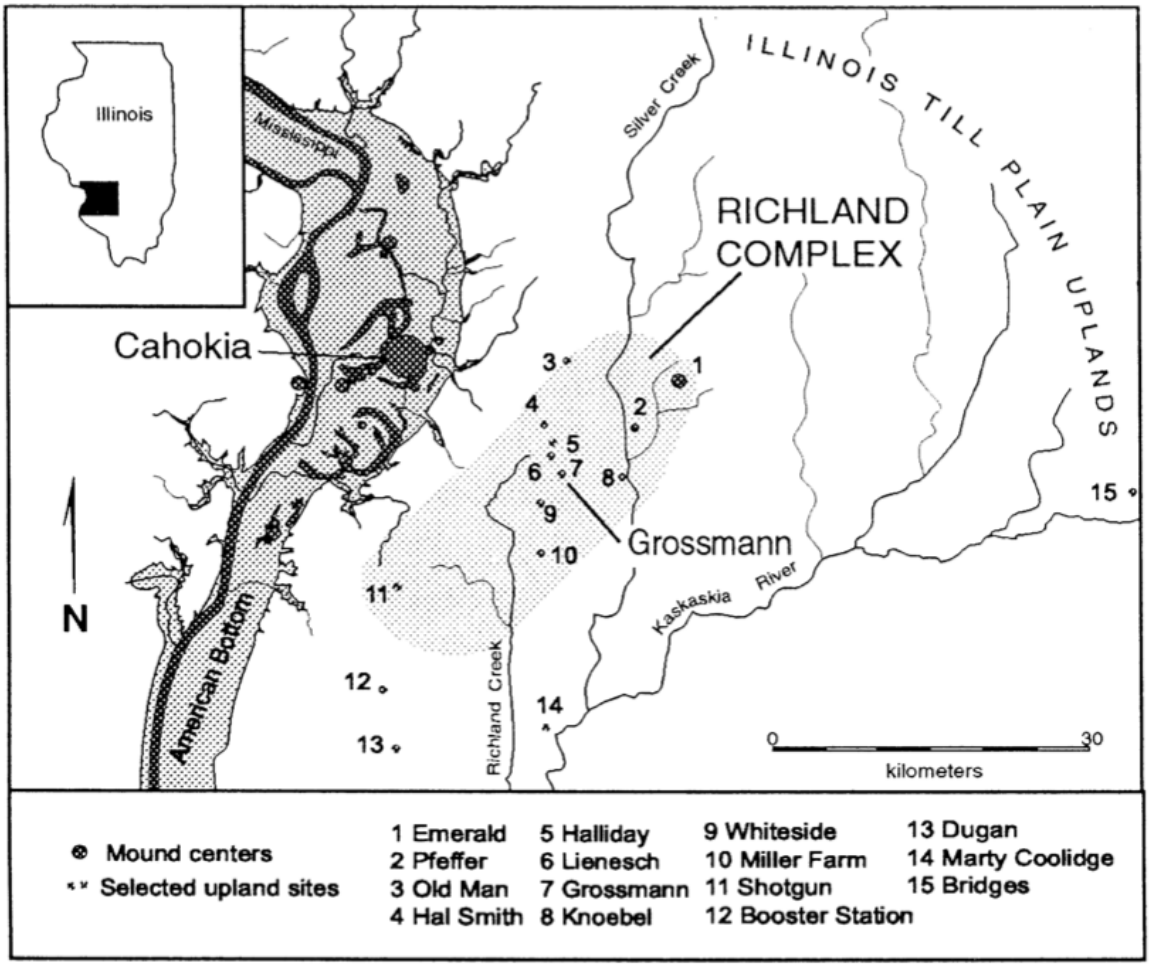

Figure 2: The American Bottom with Richland Complex and sites (Alt 2002).

Links between the Patrick and "Emergent Mississippian" phases have been the source for many debates and articles (Kelly et al. 1990; Fortier and McElrath 2002). Many models proposed in these works take an evolutionary and adaptationist approach

stating that the movement from the Patrick phase, to the “Emergent Mississippian,” then onto Mississippian culture all follow an evolutionary path (Fortier and McElrath 2002). Many articles (Kelly et al. 1990) question the interpretation of artifact attributes and the use of the term “Emergent Mississippian.” The Sponemann phase (AD 800-900) is defined by Fortier (1991) as taxonomically “Emergent Mississippian,” just as the Patrick phase refers to the Late Woodland cultural attributes in the American Bottom from AD 600-800 (Fortier and McElrath 2002, 176). However, Fortier and McElrath argue that “Emergent Mississippian" imposes a “gradualist, evolutionary framework on what is better viewed as a unique regional history of social interaction and a succession of events whose outcome was unforeseeable by participants" (Fortier and McElrath 2002, 177). They in turn decided to call the overall time period Terminal Late Woodland and it begins with the Sponemann phase (AD 800-900) followed by numerous phases broken down into further increments based on the site and assemblage location within the American Bottom. Within the Northern half of the American Bottom, the phases are broken down to Collinsville, Loyd, Merrell, and Edelhart (AD 900-1050). In the South, the phases are Dohack, Range, George Reeves, and Lindeman, also dated AD 900-1050.

For the sake of this paper, I will refer to this period as the Terminal Late Woodland. In general, the ceramics differed from the previous Patrick phase thanks to a higher percentage of limestone temper being used during the Terminal Late Woodland period and the absence of cord-wrapped stick impressions (Kelly et al. 1990). Vessels were often cordmarked and a range of tempering was used. During the Dohack phase, many pots were tempered with limestone and the vessel shapes included jars, bowls, and pinch pots and all but the pinch pots were typically cord-marked (Kelly et al. 1990).

During the subsequent Range phase, cord marking on jars begins to stop at the shoulder and there is a higher percentage of smooth neck vessels (Kelly et al. 1990). The settlements during this period were organized with houses surrounding central community squares and the frequency of pit features associated with structures decreased (Kelly 1990, 21-23; Peregrin 1992). House structures were changing from more circular structures to keyhole to more rectangular structures by the end of this period (Kelly et al. 1990; Peregrine 1992).

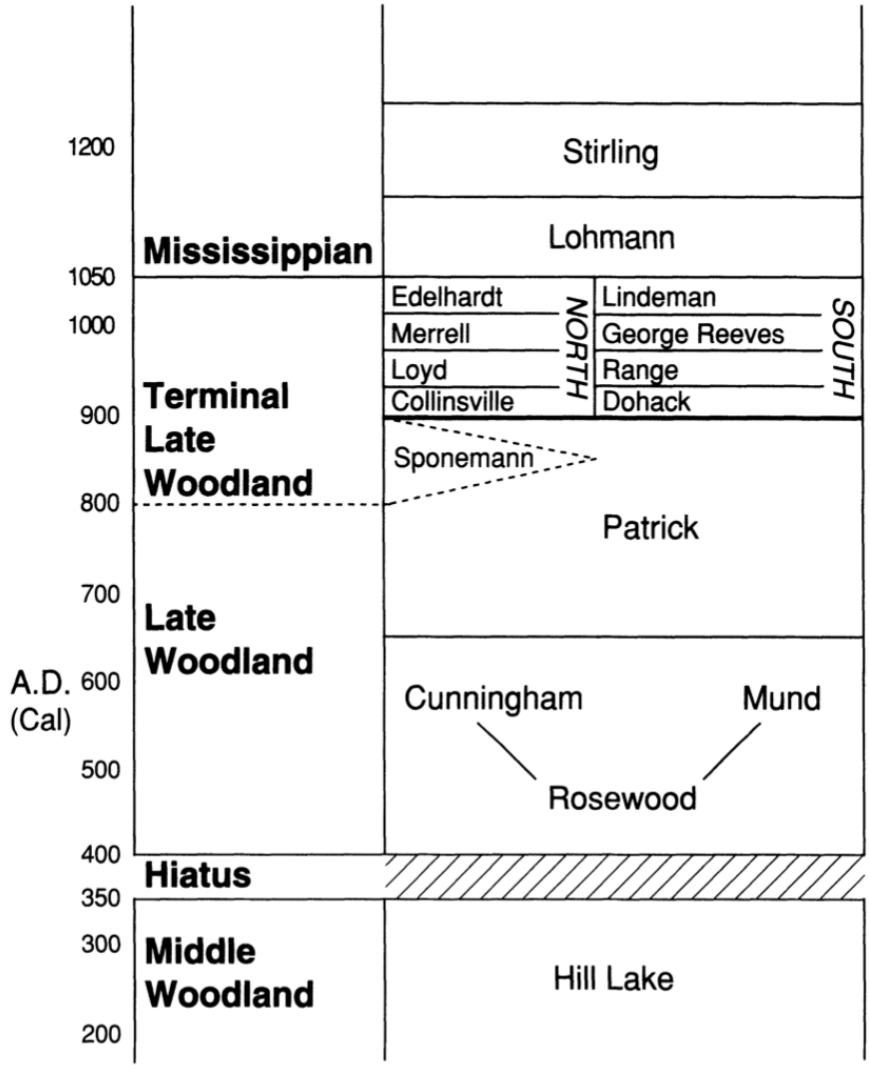

Figure 3: American Bottom Prehistoric Phases Calibrated (Fortier and McElrath 2002).

The Mississippian period begins in AD 1050 with the Lohmann phase (AD 1050-1100). During this phase, ceramicists are creating and using new vessel shapes such as beakers, water bottles, and funnels, in addition to jars and bowls (Delaney-Rivera 2000; Sullivan and Pauketat 2007). The predominant tempering agent is shell, however, limestone and grog, or crushed sherds, can still be seen (Delaney-Rivera 2000; Boszhardt 2008). Vessels are no longer cordmarked and there are no examples of lip impressions after the Mississippian period begins; however, other lip modifications are seen, such as jars with thickened lip margins (Delaney-Rivera 2000; Mehta and Connaway 2020, 41). Surfaces are plain, often smoothed with polish or slipping (Delaney-Rivera 2000). Powell Plain and Cahokia red-filmed jars are the most associated typology with the Lohmann phase (Mehta and Connaway 2020). Larger settlements started to form across the region, with the largest and most well-known being Cahokia, which was established around AD 1050 (Pauketat 2004, 11; Bardolph 2014). Political consolidation began with the Lohmann phase and some of the first Mississippian outposts were being built within the surrounding region (Pauketat 2004). Platform mounds dominated the landscape and large plazas were central in Mississippian settlements (Pauketat 2004). Rectangular houses were now commonplace and the construction techniques also changed, shifting from set posts to wall trenches (Peregrine 1992; Pauketat and Alt 2005). These structures had no internal hearths or storage features, and large storage pits were located between structures (Mehta and Connaway 2020, 37).

The following Stirling phase (AD 1100-1200) saw the height of Mississippian power and influences as well as the beginning of Cahokia's decreasing power towards the end of the phase (Pauketat 2004). The trends in ceramic traditions, such as temper, vessel

shape, and decoration, continued from the Lohmann phase. Shell was the most prevalent temper type used during this phase. Many diagnostics for the Stirling phase include rolled rims and Ramey Incised jars (Delaney-Rivera 2004). Settlements continued to grow, house size increased, and the once external storage pits became internal as site layouts shifted to accommodate more people (Peregrine 1992; Delany-Rivera 2004; Mehta and Connaway 2020). Cahokia's fall has often been attributed to climate change (Comstock and Cook 2018) and the migration of peoples from the American Bottom to other regions, including the Ohio River Valley and Lower Mississippi (Mehta and Connaway 2020; Cook and Price 2015).

The Jersey Bluff phase within the Lower Illinois River Valley overlaps with the Mississippian period from the American Bottom creating the possibility for a rich record of interaction that can be traced through artifacts and features at sites. The proximity between communities in these two regions and their access to the Illinois River would have allowed for people to move back and forth as trade routes were being reestablished during the early period of Cahokia's rise. It is possible that kin networks were also established during this time, or earlier, between the two regions making the exchange of technological and social ideas easier during this period through marriage and other means of kin interaction. However, there is another region where the interaction between the Late Woodland and Mississippian peoples is being studied by archaeologists and could benefit in the discussion and interpretation of the German site: the Central Illinois River Valley.

The Central Illinois River Valley: A Late Woodland to Mississippian Narrative

The Central Illinois River Valley is also important to understand when looking at the interactions taking place between the peoples of Lower Illinois River Valley and the American Bottom. The Late Woodland peoples in the Central Illinois River Valley, CIRV, had interactions with the Mississippians from the American Bottom and those interactions can be seen clearly within the archaeological record. However, there are some interesting differences that impact how people within the CIRV were interacting with and adapting to the incoming Mississippian cultures. In this section, I will provide some detail on the Late Woodland and Mississippian phases and how the people changed and adopted different ceramic traditions, subsistence strategies, and settlement patterns within the CIRV.

Figure 4: Central Illinois River Valley with Mossville sites (Esarey 2000, 397).

The Late Woodland period in the CIRV is understood to begin around cal AD 250 with the Weaver phase (cal AD 250-600). Weaver is an initial complex of Late Woodland culture within the CIRV, similar to the White Hall phase in the Lower Illinois River Valley. The basic characteristics of this early Late Woodland phase are thinner and plainer pottery and settlements that are located in small tributaries and the larger valley (Green and Nolan 2000, 351). Settlements included large, bluff base communities that were made up of multiple households and could reflect longer-term occupation. There have also been several smaller settlements identified that were located at bluff bases, stream-edges, as well as upland from rivers and streams. Some of these smaller sites have been interpreted as short-term, hunting and resource procurement sites based on the frequent finds of Steuben points that are associated with this phase in time (Green and Nolan 2000, 353). Subsistence strategies remained broad and included the use of terrestrial and aquatic animals, cultivation of starchy (erect knotweed, goosefoot, little barley) and oily (sumpweed, sunflower) seeds, and a reliance on hickory and other nuts (Green and Nolan 2000, 354). Weaver ceramic characteristics are similar to those in the LIRV at this time. The ceramics have thinner walls and limited decoration. Such decoration includes some exterior lip and rim notching and rim noding. Cordmarking and smoothing on vessels below the rim can also be seen during this phase.

The following phase is the Myer-Dickson (AD 500-600) which differs from Weaver through ceramic characteristics. There is some temporal overlap between the two phases and the Myer-Dickson phase could be seen as “Terminal Weaver” (Green and Nolan 2000, 355). The two sites that helped define this phase are the Deer Track and the Myer-Dickson. Ceramics found there included “cordmarked, subconoidal, circular-orifice

pottery vessels with no decoration other than lip or interior rim notching" (Green and Nolan 2000, 355). Little else is known about the Myer-Dickson that separates it from the Weaver and following phases.

The next phase in the timeline is the Later Late Woodland Bauer Branch phase (cal AD 600-950). Sites that have been clearly defined as Bauer Branch are located within the Sugar Creek drainage in the Schuyler and Brown counties of Illinois. Settlement patterns are small and dispersed over the landscape. Most of these sites are located on bluff tops, on upland ridges, or near ravine heads, but they are also found in the valleys of major and minor rivers (Green and Nolan 2000, 362). These sites also represent year-round occupations for small residential groups, most likely households. Single-post construction houses are found at these sites, as well as deep-basin, keyhole-type structures, similar to those found in the American Bottom (Green and Nolan 2000, 362-3). Ceramics during this phase were very distinctive with punctuated-shoulders, high-rim, notched-lip jars. These vessels were often cordmarked and grit-tempered (Green and Nolan 2000, 364). Subsistence strategies exploited a wide variety of wild and cultivated resources including goosefoot, knotweed, sunflower, and tobacco (Green and Nolan 2000, 367). There is some evidence for the cultivation and use of squash and corn, but it is comparatively less frequent than in the major river valleys.

The Bauer Branch phase does not relate to the following two phases within the Central Illinois River Valley. The Maples Mills phase (AD 700-900/1000) has no known origin within the CIRV and is thought by archaeologists studying this region to be intrusive (Esarey 2000, 389). The majority of our knowledge on the Maples Mills phase relies on small data sets from poorly controlled contexts within mortuary settings as well

as other sites throughout the region (Esarey 2000, 389-391). The majority of ceramics during this phase can be assigned to one diagnostic type, Maples Mills Cord Impressed. These ceramics often have design elements on the vessel like quadrupeds, birds, and geometric designs created with single cord-impressions (Esarey 2000, 394). "Essentially absent in the Maples Mills phase are the plain or cordmarked companion types without cord-impressed designs so often present in assemblages of single cord-impressed wares to the north and west" (Esarey 2000, 391). Settlement patterns are still largely unknown during this period as many of the larger Maples Mills sites are located on natural levees and floodplain ridges which shaped how communities were laid out (Esarey 2000, 392). Subsistence strategies reflect some seasonal uses of different seeds and nuts depending on the location. Maize was now abundant during this phase in the region and was capable of being stored long-term. Freshwater mussels were being harvested for food and to use as raw materials for shell artifacts (Esarey 2000, 393).

The Mossville phase (AD 1050-1100) follows the Maples Mills phase and was identified through the ceramic assemblage at the Rench and Mossville sites (McConaughy et al. 1985; Esarey 2000; Bardolph 2014; Figure 4). The Rench site clearly shows the transition between the Mossville phase ceramic style and the Mississippian ceramic style. There is a large frequency of cord-impressed interior lips in both the Mossville Plain and Mossville Cordmarked vessels. Many of the cord-impressed sherds have crosshatch patterns (Esarey 2000, 403). Mossville Plain vessels also exhibit signs of becoming more like the early Powell jar from the American Bottom with "its classic extruded lip and angled shoulder" (Esarey 2000, 396). Shell-tempered Mississippian ceramics, as well as St. Clair Red Filmed and St. Clair Plain types, are all found

alongside Mossville ceramics at the Rench Site. There were two burnt domestic structures at the Rench site. One was a rectangular, wall-trench building while the second was a rectangular single-post construction. These two buildings could have been occupied at the same time and represent a winter and summer dwelling (Esarey 2000, 397). Subsistence strategies are also difficult to determine due to the context of the Rench site being compromised. It is thought that the site was occupied during the earlier portion of the Late Woodland period and there was some mixing of contexts. Mammals, like white-tailed deer, and fish (catfish, buffalo, redhorse) appear to be the most important food source based on biomass (Esarey 2000, 398). Maize and starchy seeds were also found in high frequency at the Rench site, while nutshells were less common.

From what is understood in the archaeological narrative, the Bauer Branch phase does not transition into or share many characteristics with the Maples Mills phase. However, both of these Late Woodland lineages impact the Late Woodland characteristics that are found within the Eveland phase (AD 1100-1200) (Esarey 2000, 400; Bardolph 2014). This phase is identified in the ceramic record as having characteristics from the Mossville, Maples Mills, and Bauer Branch phases as well as more Mississippian characteristics. Ceramics during this phase no longer have cord impressions, though there are occasionally some along the interior lip (Esarey 2000, 399). In addition, Mississippian ceramics during the Eveland phase were likely the result of local production, not trade, based on thin-section analysis revealing that these ceramics were made from local clays (Bardolph 2014, 76). Dana Bardolph (2014) investigated Mississippian influence within the CIRV by observing the types of ceramics being used and cooking features present at the Lamb site. Her results showed that while there was an

adoption of Mississippian wares within the Lamb site, these vessels were being used in the Late Woodland cooking tradition. This fits neatly in with the narrative of the Eveland phase as there was an increase of Mississippian culture in the region. However, the settlement layout (location of cooking features) and lack of serving wares suggested that while the Late Woodland peoples at the Lamb site were engaging in the Mississippian ceramic tradition, they maintained their Late Woodland cooking practices (Bardolph 2014).

In both the Lower and Central Illinois River Valley, there is still a lot that is not understood about the Late Woodland cultures that were interacting with the Mississippians. More is understood about these interactions from the Mississippian perspective (Delaney-Rivera 2000, 2004, 2007; Goldstein 1980). However, in both regions, archaeologists are attempting to piece together the nature of these interactions and how the Late Woodland peoples were reacting to the incoming culture (Bardolph 2014). By approaching questions of interaction using the household perspective, more information can be gathered on how the Jersey Bluff peoples were responding to and interacting with the Mississippians in the latter half of the phase. Throughout the rest of this thesis, I will address topics of hybridity, ceramics, and house construction techniques to investigate a case study, the German site, and to provide more information on Jersey Bluff settlements that have been missing from archaeological research for many years. For this project, I begin by discussing the concept of hybridity and how it has been understood in several different contexts. Next, I explore how the ceramic theory has fed into this project, followed by the household theory that can be applied to create the archaeological narrative.

An Application of Hybrids

Hybridity is not a new concept to archaeological investigations around the world and within the Lower Illinois River Valley and the American Bottom. Many of the articles and book chapters I cite in the following pages observe hybrid practices in the Belize River Valley (Jordan 2020), Europe (Silliman 2013), Mesopotamia (Baltali Tirpan 2013), and North America (Sassaman and Rudolphi 2001; Ehrhardt 2013) while answering questions surrounding identity, material culture, and problems that arise when using the concept of hybridization in the archaeological record (Deagan 2013; Harrison-Buck 2013). Within the Lower Illinois River Valley, Gregory Perino (1971) began thinking and discussing hybrid vessels in his excavations and analysis of the ceramics found at the Schild Cemetery. Colleen Delaney-Rivera (2000, 2004, 2007) continued to evaluate hybridity in ceramics at both the Audrey site and the Schild Cemetery. Pauketat and Alt (2005) both comment on the hybrid nature of houses and house construction during the transition between the Late Woodland and Mississippian periods in the American Bottom. I will use their examples to explore the nature of hybrid ceramics at the German site. I will begin this examination by defining the concept and its use in archaeology.

So what is hybridity? Several authors engage the concept of hybridity in a recent volume titled *The Archaeology of Hybrid Material Culture* edited by Jeb. J. Card. The volume explores a wide range of conceptual applications including identity (Deagan 2013), biology (Klaus 2013), architecture (Baltali Tirpan 2013), and material remains (Ehrhardt 2013), just to name a few.

Silliman (2013) generally defines hybridization as when "a group (1) encounters or has sustained interaction with another group or its material culture, whether by force or by choice, and (2) adjusts to or incorporates new material, practical, genetic, and symbolic elements associated with the encountered group in *experimental*, *creative*, or seemingly imitative ways, again whether in coercive or equitable relations" (Silliman 2013, 488). When examining hybridity within an archaeological record, it is important to think about what is defined as "non-hybrid" material (Silliman 2013, 489). Silliman also notes that when addressing hybridity that agency needs to be a part of the conversation as well, otherwise there is a risk of "seeing cultural stasis as the default condition, the one not to bother explaining" (Silliman 2013, 489). Keeping these concepts in mind, hybridization should be viewed as a social practice that involves people's differences, agency, and resistance (Silliman 2013). There are some issues to think about when using hybridity to interpret the archaeological record. Oftentimes it focuses attention on the short-term interactions between cultures, during a particular period of interaction (Silliman 2013, 493). Hybridity has been used in many different areas of archaeology and archaeological theory including linguistics, Actor-Network Theory, and post-colonial theory. Silliman makes some recommendations about the application of hybridity: "keep hybridity anchored firmly to the postcolonial studies that have produced its current form" and "apply hybridity as a term and a conceptual realm to practices (not to people, places, or things) and agency of past social actors with strategies, histories, and resources" (Silliman 2013, 497). This does not mean that hybridity should only be applied to colonial cases, numerous other studies use it to interpret pre-colonial narratives, but it is crucial to remember that hybridity should be applied not to people, but to the practices

that they continue. However, many of the sources I will discuss throughout this paper focus on the hybrid nature of the material culture, not the processes that create these materials. Throughout this project, I will navigate these narratives by studying the material culture and talking in terms of the material culture, but I will continue to emphasize the human aspect that is an active participant and creator in what we, as archaeologists, interpret as "hybrid."

One drawback of the use of hybridity is that a majority of these material typologies most likely do not reflect, or should not be considered as, the way people in the past understood these changes (Baltali Tirpan 2013, 471). Oftentimes, the changes that come about with the interaction of different cultural groups can be absorbed into, and perceived as, being culturally "authentic" and not mixed (Baltali Tirpan 2013, 471). As I work with and engage the concept of hybridity within the context of the Lower Illinois River Valley and the German site, I want to state clearly that the typologies and cultural divisions established by previous archaeologists that I use can only take our understanding of interaction during this period so far. The differences that we have perceived as important and distinct may not have been so during the production and use of these ceramics. The construction techniques may not reflect a unique social or cultural affiliation. Of course, it would be difficult to obtain the emic perspectives and what people were thinking as they were producing and using pottery or constructing their homes and settlements. Despite some pitfalls, hybridity can be used to create a better understanding of the Jersey Bluff/Late Woodland perspective to aid in the comparison between it and the Mississippian culture.

Ceramics, which I will discuss more theoretically in the next subsection, are a very common way to identify hybrid practices through established typologies in a non-colonial setting. Hybridity can manifest in the amalgamation of production techniques, materials used to create the vessel and paste, as well as what surface treatments or decorations are applied to the vessel. Eleanor Harrison-Buck and her colleagues (2013) looked into the matter of hybrid ceramics in the non-colonial setting of the Sibun Valley of Belize. In the valley, inhabitants incorporated non-local ceramics and this could represent the local elites emulating a new style or people with distinct ceramic traditions coexisting together (Deagan 2013). Harrison-Buck and her team approached these questions through the stylistic, chemical, and compositional analysis of ceramics found at nonlocal architecture at sites that "were assumed to have been associated with elite resident compounds" (Deagan 2013, 263). From their findings, Harrison-Buck and her colleagues suggest that small groups of nonlocal elites moved into the valley and coexisted among the local elites, without dominating them (Deagan 2013, 264). Ann S. Cordell studied Apalachee "colonoware" ceramics and addressed the topic of Apalachee and Spanish interaction within certain households (Deagan 2013). The Apalachee continued to make and use traditional ceramic vessels, while also adopting some forms of colonoware, creating new hybrids with traits from the Spanish as well as French. It is important to define what hybrid material culture means in the context of multicultural engagement (Deagan 2013, 272). It is also important to note that hybrid material culture does not have to be associated with identity transformation or construction. It can easily reflect creativity, innovation, emulation, and commercial production (Deagan 2013, 274). "We must be attentive to hybrid incorporation and identity shift in all the groups involved

in pluralistic cultural engagement, regardless of their assumed positions of power" (Deagan 2013, 274). And we must be conscious of the fact that hybridity can become "normal" (Deagan 2013, 274).

Sevil Baltali Tirpan (2013, 466-485) addressed hybrid practices within the architectural record in Ancient Mesopotamia. Baltali Tirpan observed hybridity within a non-colonial context since there is no evidence for southern domination over the northern Mesopotamian peoples (Baltali Tirpan 2013, 469). The results of his study show that proportions of southern and hybrid materials and architecture vary by site, indicating that northern and southern Mesopotamians were commingling within structures to different degrees at different sites. At certain sites, distinct lines were found where the southern materials and architecture are located in one part of the site and northern materials and architecture in the other. This provides a different example of cultural interaction, one where the northern and southern Mesopotamians were living within the same community but were practicing their own cultural traditions apart from one another. Baltali Tirpan (2013, 470) focused his analysis on the fusion of different cultural elements with an emphasis on the human aspect of the creation and production of what is defined as hybridity. Baltali Tirpan emphasizes the need to study the context in which cultures are being replicated and mixed. It is also important to say through this process of hybridization, cultural differences are not canceled out but instead can be "perceived as authentic and uniquely different by people as part of their symbolic construction of difference" (Baltali Tirpan 2013, 470). It is the emic perspective of the hybridization process that is crucial to Baltali Tirpan's argument and is something that archaeologists need to consider when studying hybridity within their own research. When investigating

architectural hybridity, Baltali Tirpan focuses on the role of social actors when addressing historical production and sociocultural meaning. There is a large portion of this work that understands the notion of built space is reflective of sociocultural orders and continues to replicate a culture through how one moves, views, and interacts within a space (Bourdieu 1977, 89; Baltali Tirpan 2013). Baltali Tirpan (2013:480) notes temple and household structure and organization including wall paintings to represent the southern and northern Mesopotamian groups and to help narrate the symbolic divisions between the two cultures. Furthermore, Baltali Tirpan (2013, 480) argues that there is a need to understand the how, the why, the cultural meanings, and the extent to which these hybrid materials come about. "The concept of hybridity can also enable us to disentangle the material-cultural elements wherein 'own' and 'foreign/other' are symbolically constructed" (Baltali Tirpan 2013, 480).

This literature and others (Sassaman and Rudolphi 2001; Jordan 2020) have informed my understanding of hybridity and how I am using this concept in my research. I agree with Silliman (2013) that it is the practices that are hybrids, not the artifacts. The piece is just a piece and we, the archaeologists, are interpreting the practices that made the surviving materials. However, included with this focus on underlying practices, I am drawn to reflect on the communities of practice in which people were active members and how those communities shaped and changed people's socio-cultural expressions throughout their lives (Sassaman and Rudolphi 2001; Jordan 2020). I will discuss communities of practice in the next section and how they inform ceramic traditions. Different kin groups and the movement of people through these communities can, and often do, lead to changes in how practices are performed. These changes could be

observed as “hybrid material cultures” without any clear understanding of the kin networks and organization of communities that are creating them. With this brief introduction of communities of practice, I will now discuss the ceramic theory that has impacted my research and will elaborate more on how communities of practice influence and shape our interpretations of the archaeological record.

Ceramic Theory

Ceramic theory has a long history of development in archaeology. The typological phase, defined by Orton and Hughes (2013) as beginning in the late 1800s continuing until around 1960, focuses on the individual sherd, shifted from the whole vessels that were being studied as works of art (Orton and Hughes 2013, 5). The typologies and the views that originated during this time period still play a crucial role in several archaeological records and how they are interpreted. The use of ceramics to produce chronologies and act as “type-fossils” began during this phase and can still be seen today (Orton and Hughes 2013, 8). Many temporal periods are identified by the ceramic record found at sites (Titteringtons 1935; Farnsworth et al. 1991; Studenmund et al. 1995; Delaney-Rivera 2000, 2004). This allows for sites to be relatively dated which can then be tested and corrected by radiocarbon dating.

In addition to temporal periods being defined by ceramics, cultural groups are also heavily linked to ceramic assemblages. Within the Lower Illinois River Valley, many of the ceramic traditions are referred to by their associated archaeologically defined culture-name: Late Woodland, Jersey Bluff, Mississippian to name a few. V Gordon Childe discussed this theory in 1929, stating that regularly associated traits could be

termed as “cultural groups" or just as a “culture” (Childe 1929, vi; Pikirayi 2007; Orton and Hughes 2013, 8). These cultural definitions for groups based on ceramics, as well as other artifacts, are still prevalent in modern archaeological records and interpretations of sites (Pikirayi 2007). These ceramic traditions have been the focus of more research in the last few decades as the theory has shifted from typologies and traits to focus more on the individual and agents who made and used the ceramics (Hegmon 2003). Ceramic vessels often reflect cultural symbols and meanings that are both passively and actively expressed through their construction and use (Hegmon 2003; Delaney-Rivera 2007; Pikirayi 2007). An example of active stylistic expression would be decoration, the creators’ purposeful placement of design elements on an object. An example of passive style is the technological style that “reflects behaviors and techniques that are frequently internalized (Stark 1998; Delaney-Rivera 2007, 301). Pikirayi (2007) addresses the use of style and the close correlation of ceramics to cultural groups in southern Africa’s Iron Age. The ceramics expressed and communicated different social and cultural meanings through ornamentation. Pikirayi (2007) argues that ceramic assemblages during southern Africa’s Iron Age need to undergo more discussion bringing in arguments of power, gender, age, and status (Pikirayi 2007). The ceramics are a reflection of the culture and society that they were created by and used in, and thus they need to be set in those contexts, not just studied objectively.

Such typologies form the foundation of many archaeological projects today. It is difficult to study an assemblage or try to interpret and date a site without relying on the ceramics and other material remains found during excavations. Typologies are not dangerous until they begin equating “pots to people" (Conkey 1990; Delaney-Rivera

2007; Orton and Hughes 2013). As mentioned above, these interpretations in the past ignored the human element from the ceramic analysis. Devore (1968) once commented on Binford's *New Perspectives in Archaeology* saying "sherds do not actually breed, evolve, and so on, nor do they invade" (Orton and Hughes 2013; 13). It is crucial to keep this fact in mind when analyzing ceramic assemblages to help answer questions on cultural interaction. Some issues brought to light by Delaney-Rivera (2007) include (1) that the archaeological "cultures" created by these typologies and archaeologists did not exist in the past and (2) using trait lists and artifact typologies can create too much or false variability (Delaney-Rivea 2007, 296). In short, archaeologists are in danger of creating groups and cultural differences that could hide possible cultural affiliation or magnify differences that do not have any weight solely based on ceramic traits. Delaney-Rivera (2007) addresses these concerns in her analysis of "hybrid vessels" found at the Schild Cemetery in Illinois. Previous work with the Schild ceramic assemblage conducted by Gregory Perino (1971), who excavated a portion of the cemetery, proposed that the "hybrid vessels", or vessels with characteristics from both Late Woodland and Mississippian ceramic traditions, should be given a new ceramic type (Delaney-Rivera 2007, 311). Delaney-Rivera argues that creating a new ceramic type would hide the variability within the Schild, and other, ceramic assemblages that had similar characteristics (Delaney-Rivera 2007). This new ceramic type would mask a whole section of time and interaction that combines Late Woodland and Mississippian influence.

In the post-processual world of archaeological theory, particularly in North America, these challenges with typologies are driving the changes in focus taking place.

Evolutionary perspectives, though still used, are being set aside to provide a greater focus on individuals and agency (Hegmon 2003, 217). What follows is a revision of typologies, not a rejection of them (Earle and Johnson 1987; Hegmon 2003). These revisions in typologies are aided by an increase in radiocarbon technology that allows for more accurate dates to be achieved (Birch 2020) as well as closer looks into ceramic assemblages and the notion of "hybrid vessels" (Delaney-Rivera 2004). Typologies established in the past act as a starting point to relatively date sites and to place assemblages within a broader context. From these typologies, the next step would be to get actual dates that can help refine timelines and open windows into interactions taking place. Typologies can then be adjusted and fit a more precise representation of the archaeological assemblage and get us one step closer to better understanding assemblages and how they were used in the past.

In addition to extensive radiocarbon dating and refinement of existing typologies, the study of communities of practice can and should play a large role in how ceramic analysis and study are done in the LIRV. The creation of pottery is a learned practice in communities around the world and those communities leave their own special mark on the vessels they produce. Kenneth Sassaman and Wictoria Rudolphi (2001) observed slight differences within pottery decorations in the American Southeast that could have reflected the handedness of the potter and how communities were organized whether they were matrilocal or patrilocal. Through their analysis, Sassaman and Rudolphi showed communities were most likely matrilocal due to the percentage of left-handed markers within ceramic assemblages (Sassaman and Rudolphi 2001, 420). The continued persistence of left-handedness would increase if the community of women teaching the

techniques were predominantly left-handed and lived within the same community they grew up in. While the argument of handedness is beyond the scope of this project, it is the analysis of gestures and the learned behavior that creates the material record that can benefit the analysis of ceramics in the LIRV.

Jillian Jordan, Julie Hoggarth, and Jamie Awe investigated communities of practice in Late to Terminal Classic ceramic assemblages in the Belize River Valley. Their study included thin-section petrography and macroscopic observations to "identify communities of practice by evaluating low and high visibility attributes" (Jordan et al. 2020, 1-2). Low visibility attributes were defined as characteristics that could not be readily seen by the naked eye, including the acquisition and processing of the raw materials used for ceramic production. High visibility attributes included decoration and vessel form, elements that can be visually observed on the vessel (Jordan et al. 2020). What is so crucial about these distinctions is that while high visibility attributes could be imitated upon looking at a vessel from trade, low visibility attributes were most likely the result of face-to-face interactions between potters. Spheres of influences could then be determined based upon how different ceramic assemblages were produced. Jordan and her colleagues also introduce the concept of "constellation of practice," in which a group of people form too broad, diverse, or diffuse a population to be considered one community. Instead, they are connected by "shared historical roots, related enterprise, or geographic relations" (Wenger 1998, 126-133; Jordan et al. 2020). The potters within their study region all produced similar pottery types in which most variability came from the sources gathered to create the vessels, indicative of the increasing population size and prevalence of pottery production throughout the polities. Jordan and her colleagues

discovered some correlation between location and black versus red slip use, but the differences in slip color did not correspond to paste recipes. With this result, they suggest that “information about the location of raw materials and how to process them was shared much more broadly in the region” (Jordan et al. 2020, 5). The concept of constellations of practice allows the nature of social and cultural interactions in both the Lower Illinois River Valley and the American Bottom to be better understood, especially prior to the Mississippian period, because of similarities in ceramics. Technology in the form of temper and the location of resources could have been transmitted between the two regions creating similarities in ceramic construction as well as providing the pathways for change when new ceramic traditions were being used. More ceramic analysis would need to be conducted to elaborate upon this idea. However, based on the similarities of ceramic vessels within the LIRV region and the genetic continuity of populations within Middle Woodland and Late Woodland cemeteries, Late Woodland people's ceramic production practices fit Jordan and her colleagues constellation of practice concept. Similar materials and techniques are used within the LIRV indicating some shared ceramic practices that develop similarly across the region. Eventually, the Late Woodland communities are introduced, through trade or kin networks and marriage, to the Mississippian practices that are adopted and whose influence we can see in the archaeological record.

The vast majority of my ceramic analyses will be rooted in the typologies established by Titterington (1935) and elaborated on by Delaney-Rivera (2000, 2004, 2007) and Studenmund (2000) for the LIRV and American Bottom (Pauketat 2004). I will also discuss “hybrid vessels" and the information that archaeologists can obtain by observing these materials produced by members of intermingling cultures. Now, I will

explore the theory and previous work conducted on hybridity in both ceramics and households following my introduction to Household Theory.

Household Archaeology and Theory

The household perspective is a crucial part of the narrative that I will be exploring throughout this paper. The house is part of the foundation of a culture and society, and thus it has become the focus of many archaeological studies in recent years (Peregrine 1992, 132; Douglas and Gonlin 2012, 1). This perspective allows for archaeologists to gain keen insights into not only the mundane day-to-day lives of individuals in the past but also provides important clues into how society and culture are replicated from one generation to the next (Steadman 1996, 54; Douglas and Gonlin 2012, 2). I first address household archaeology theory more broadly and then focus on the Lower Illinois River Valley. Case studies of household work with the American Bottom and the Lower Illinois River Valley follow, providing examples of how current archaeological work is being conducted. Finally, I examine the German (11C377) site and how the site's assemblages fit into the current narrative surrounding household and cultural interaction within the Lower Illinois River Valley.

My approach and research fall into the work of household archaeology which has its roots in settlement archaeology and the archaeology of architecture (Steadman 1996; Leslie 2019). This field incorporates many different approaches to address issues relating to social, economic, and political structure and spatial patterning (Steadman 1996, 52). Settlement archaeology focuses on the large-scale study of settlement patterns across a region or the activities and spatial organization within one room (Steadman 1996, 54).

Studying the household and its structures is the first step in understanding society and culture (Leslie 2019, 4-5). Household archaeology is defined as studying the most basic element within a socioeconomic structure "where the 'most primary functions of society' take place" (Sharer and Ashmore 1987, 439; Steadman 1996, 54). In addition to the physical remains, household archaeology can include work from cultural anthropologists, incorporating symbolic meanings of the built environment (Steadman 1996, 52). Katie Leslie, in her 2019 thesis statement, defined 'structure' and 'building' based on Mehrer and Collins' (1995) work and I will be adopting those definitions for this paper.

> A "structure" is defined as the physical representation of walls, floor, basin, and roof; a "building" is a structure in combination with its internal furnishing such as interior pits, benches, or dividing walls; while a "household" is defined as a set of buildings that all date to the same time and were used by a family group (Leslie 2019, 5).

While I agree with Leslie's definition of "household," I feel that it cannot be applied to the German site without additional anomalies being excavated because only one structure has been uncovered. The use of this definition would be speculative and while I believe German fits into this definition, it is beyond the scope of this thesis based on the data collected so far. Instead, I use a closer definition of "household" to Wilk and Netting's ideas involving spheres of activities that can represent what was taking place within the one structure uncovered during the 2019 excavations.

Following Wilk and Netting (1984), many researchers have begun to look at the household as a sphere of activity, where individuals are living, performing actions, and creating the household (Wilk and Netting 1984; Ashmore and Wilk 1988; Douglas and

Gonlin 2012, 3). The household serves five major functions: production, distribution, transmission, reproduction, and coresidence (Wilk and Netting 1984; Steadman 1996, 55-56; Douglas and Gonlin 2019, 3). These functions see the household as the basic unit of the economy. Production centers around the households' ability to gather and increase the value of resources and distribution involves the movement of these resources. Transmission, also called inheritance, is the generational movement of objects or nonmaterial objects, like titles. Reproduction begins with the birth of new members to the household and can impact the wealth of the household by increasing the labor that can be used. This category can also refer to socialization, which requires more time spent within the household and a passing down of traditions. Coresidence is often assumed within households but is not a requirement because a lot of economic activities do not take place within the walls of the home (Douglas and Gonlin 2012, 3-5).

In addition to Wilk and Netting's (1984) studies, Richard Blanton (1994) has investigated the economic aspects of households in cultures without monetary-based incomes (Blanton 1994; Steadman 1996, 57). His methods focus on the material displays of wealth that reflect the social and economic differences between households (Blanton 1994, 117-119; Steadman 1996, 57-8). Blanton uses multiple lines of evidence from complex agrarian and industrial communities to see how households expressed not only their material wealth and statues but also more cosmological and spiritual views as well as gendered and age differences (Steadman 1996, 57). Blanton's approach is more holistic and fits the context of the German site. Another key aspect of interaction at the time between the Late Woodland and Mississippian peoples, and with that comes the

economic function of the home, however, the breadth of this thesis will be establishing the literature and research for the German site.

Going beyond the economic function of a household, the construction of a home can be seen as teaching and reproducing societal and cultural expectations. Pauketat and Alt (2005) argue that post molds represent a fundamental layer of cultural construction because of their nature and how people were harvesting and creating, placing, moving, and destroying posts. The use of posts is an active way of establishing gender and corporate identities involving both adults and children (Pauketat and Alt 2005, 220). They argue the structure and how it was constructed can communicate symbols and signs indicating how one should act within the community and what types of activities are conducted within the walls of the building (Steadman 1996, 66-7). How buildings are constructed is another way these social and cultural cues are expressed within the community.

While post molds can be difficult to define in the archaeological record, studying post molds allows for questions about cultural change and continuity to be addressed based on the built landscape and varying construction techniques within the Illinois River Valley (Pauketat and Alt 2005, 215). There are a few different house construction techniques that Pauketat and Alt discuss in a number of their works (Alt 2002; Pauketat and Alt 2005; Alt and Pauketat 2011). Post-construction techniques require either a hole to be dug in which a post will sit or a post is jammed into soft ground. The post, once its purpose has been served, can either be left to rot or removed and the hole filled in (Pauketat and Alt 2005). Wall trenches were adopted within the American Bottom beginning in AD 1050 and reflect the Mississippian construction style. These trenches

were excavated and then walls were lifted into place within the trench foundation (Peregrin 1992, 137; Pauketat and Alt 2005, 224-5). The shift from posts to wall trenches was dramatic and covered the majority of the Mississippian world. There were, however, some hybrid construction techniques that indicated some communities were holding onto their traditions (Alt 2002; Pauketat and Alt 2005). These hybrid houses could have some walls that were trenched and others made from posts. One interesting combination Pauketat and Alt (2005) refer to as "faux" wall trenches had a trench that was a few centimeters deep with posts beneath, indicating that someone had created a trench and then dug and placed individual posts as well (Figure 5). This indicates that the builders of this home were holding on to traditional construction techniques while appearing to follow the Mississippian pattern. This could reflect a hesitancy to a new construction method and would have provided additional support to the structure until the community was more comfortable with building wall trench structures. Or it could reflect the hidden rituals and actions that go into building a home. Through Pauketat and Alt's (2005) work, houses are not only a place where activities and culture take place, the house itself can demonstrate social and cultural positions, exhibiting the builders' beliefs and reproducing them in the next generation. This notion is not a new one. Pierre Bourdieu's (1977) work in North Africa laid the foundation for understanding that "houses" have specific meanings and can express those views of society through their construction and shape (Steadman 1996, 65). Through architectural characteristics, placement of material goods, and the ethnographic record, a space can have many different levels of interpretation. While Bourdieu's work can add some insights, it cannot be directly applied to the archaeological record without modification due to its use of the ethnographic record

(Steadman 1996, 65-6). It could be possible to use the communities of practice model, determined through the material record, to replace the ethnographic record when interpreting an archaeological site.

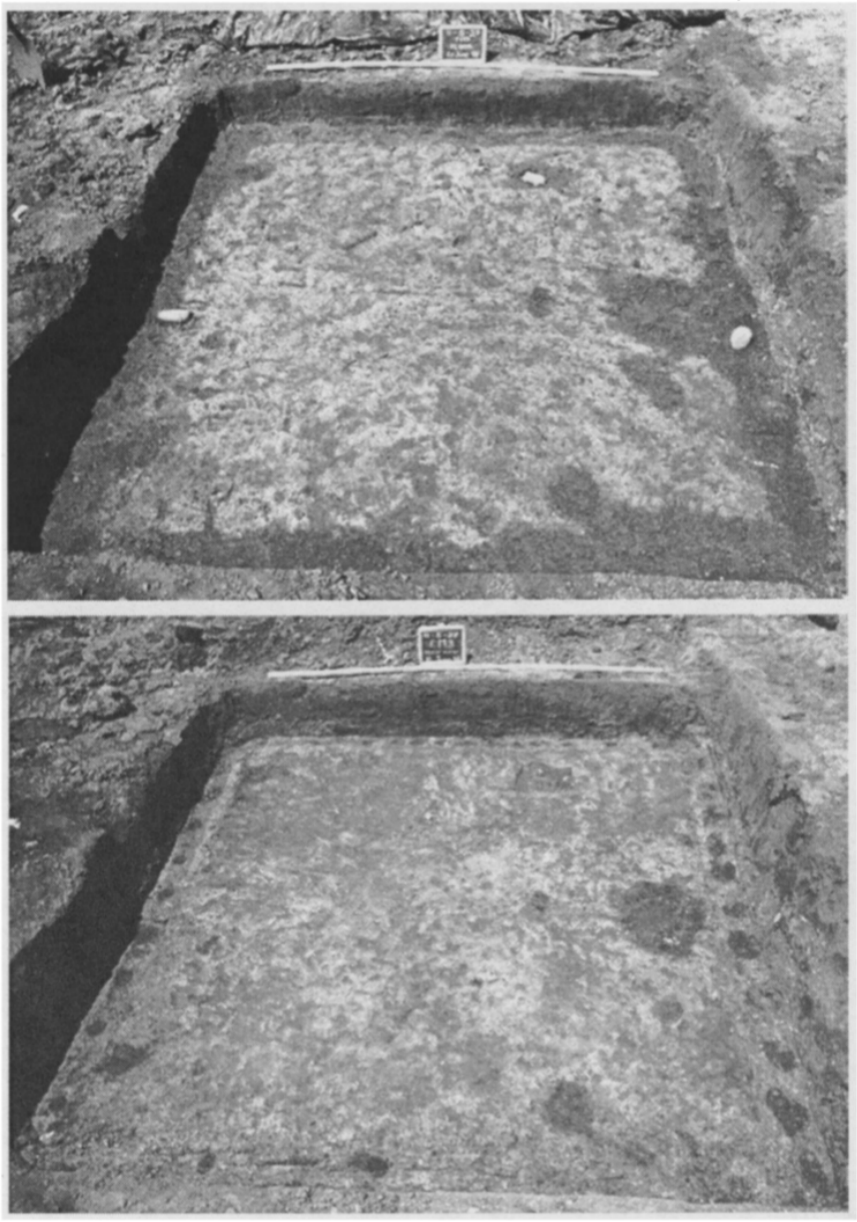

Figure 5: Faux wall-trench building at the Halliday Site, Illinois. Post molds are visible after the faux wall-trench was removed (Pauketat and Alt 2005).

Peregrine (1992) used the household to track changes in the sociopolitical organization between the Late Woodland and Mississippian periods in the American Bottom. Peregrine (1992), Robbins (1966), and Whiting and Ayres (1968) all focus on house form and how it reflects the socio-political organization of a group. They argue that rounder houses within these regions represent smaller, impermanent societies with no or less reliance upon agriculture while rectangular houses are associated with larger, more permanent societies that have more intensive agriculture (Peregrine 1992, 132; Robbins 1966, 21). Rectangular houses have also been attributed to status distinctions and housing extended, larger families (Whiting and Ayres 1968). Peregrine discusses the different types of houses structures and community layouts for the Middle (150 BC-AD 300) and Late Woodland (AD 300-800) phases as well as Emergent Mississippian (AD 800-1000) and Mississippian (AD 1000-1400) phases to show how houses changed with the different economic and sociopolitical organization (Peregrine 1992, 143-9). In the context of Late Woodland and Mississippian houses, only square or rectangular structures are present. What is most crucial from Peregrine's analysis is the layout of sites as they change and reflect the new social-political systems from the Late Woodland to the Mississippian period. Late Woodland houses and features formed a circle surrounding a central plaza (Peregrine 1992, 136). Emergent Mississippian phase houses reflected the Late Woodland style early on with community layout still following the circular Late Woodland pattern of structures around a central plaza. During later phases, site layouts were more linear with houses in rows, not circles (Peregrine 1992, 136-7). During the Mississippian phase, new construction techniques, such as wall trenching, allowed for larger settlements to be built quicker and reflected a more stable political system

(Peregrine 1992, 138). House size increased with population size during the Mississippian period, however, there was still some variability during this time and site layout ranged from being organized in rows to having a circular layout or no pattern at all (Peregrine 1992, 139). While the house remained the basic unit of economy and farming, the status of those households is reflected through the linear organization of sites and the larger buildings made possible by new construction techniques (Peregrine 1992, 141). Peregrine's analysis is very insightful and shows how house site layout can be used when observing changes in social dynamics.

From this background, I want to emphasize two key points that will inform this and future research at the German site. Number one is site layout. Site layout has been used by archaeologists to reflect socio-political organization (Peregrine 1992) and how people were interacting with not only others in their community but further abroad by taking into account the different activities being conducted at a site. Site layout can also be used to help relatively date sites within certain cultural contexts as there are shifts in how people organized their homes and communities in the past (Peregrin 1992). The second important point is how houses were constructed. There has been limited work done with houses in the LIRV (Wetterson 1983; Studenmund 2000), so this project seeks to add to the existing literature on Late Woodland house construction techniques in the LIRV. I also want to show how people were interacting with their environment through the construction of their buildings and the site around them. For the German Site, my analysis will focus more on the house construction techniques simply because not enough of the site has been excavated at this time to reach any definitive conclusions about the site layout and how people were moving and using the site and surrounding areas. The

further excavation of the site will then confirm or change our understanding of the site and its layout and use in the past.

THE GERMAN SITE (11C377)

The German site is located on a colluvial slope along the Crawford Creek tributary of the Illinois River (Figure 6). The site sits on a slope that was cultivated before being incorporated in the McCully Heritage Project. Since then, no extensive plowing has occurred, preserving what remains of the site beneath ~20cm of plow zone. Natural drainage ditches have developed along the slope and erosion can account for the potential mixing of artifacts on the surface.

The site was mapped in 1968 and again in 1975 (Figure 7). Surveys conducted in 1993 and 1994 found Jersey Bluff and Mississippian ceramics along the surface of the field and relatively dated to the Jersey Bluff phase. No further investigation occurred at the site until the summer of 2019. In 2019, Center for American Archeology field schools conducted fieldwork at the German site, including geomagnetic survey and excavation of 1x2m units to test magnetic anomalies suggestive of pit features and house basins. Based upon the geomagnetic survey and excavations, the site is larger than previously expected. These units uncovered a house structure complete with post molds (Squares 1, 2, 5, and 6), several external features (Feature 2, Feature 3), as well as an internal hearth (Feature 6). Ceramics recovered in these units were mostly Jersey Bluff in nature with grit-temper, cord-marked bodies, lip impressions on the rims, and ranged in color from tan/salmon pink to grey, black and brown. Sherds with Mississippian characteristics were also found at the site within the house units. A maize (*Z. mays*) kernel found within the house basin (Sq 1-04a) was submitted for AMS radiocarbon dating to the Center for Applied Isotope Studies, University of Georgia (UGa-43426). The kernel was dated to 900±20 BP, and calibrated in OxCal 4.4.2 (IntCal20) as cal AD 1046-1218 (95.4%), suggesting

occupation of the site during part of the Jersey Bluff phase and during the time of Jersey Bluff and Mississippian interactions (Bronk Ramsey 2020; Reimer et al. 2020).

As currently understood, the German site is a Jersey Bluff phase habitation site with at least one house, though the magnetic data shows several large features that are likely additional house basins at the site. The people at German were interacting with the Mississippian culture that was moving into the region from the American Bottom due to the presence of Mississippian ceramics. In addition to ceramics that are associated with the American Bottom, a sherd was found within Sq1-02A, which exhibits characteristics of the Maples Mills tradition found within the Central Illinois River Valley. The nature of these interactions are more likely trade or ties to kin groups between the three regions because of the small proportion of Mississippian-like and CIRV ceramics uncovered at the site so far.

In the following sections, I will briefly describe some sites within the Lower Illinois River Valley, American Bottom, and Central Illinois River Valley that are often cited when answering questions about the Late Woodland and Mississippian interactions. These sites range from large population centers to small, two-house homesteads. The nature of interactions at these sites can, in my opinion, be compared to the German site and should be kept in mind when pursuing further research and interpretations.

Figure 6: Google Earth image of the German Site and surrounding land.

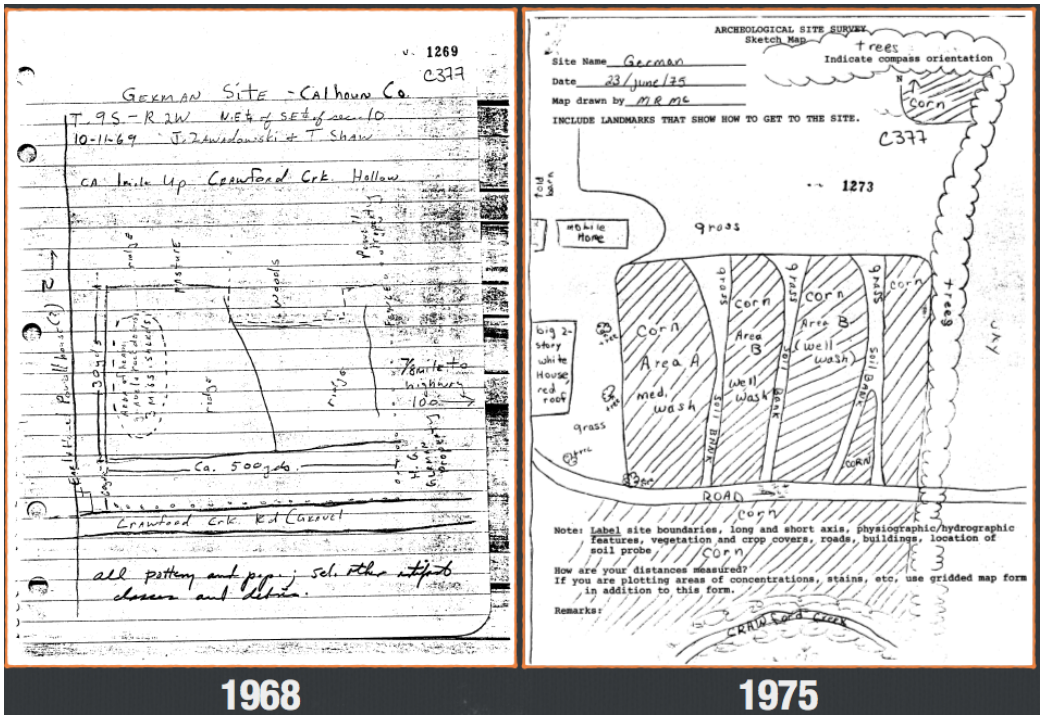

Figure 7: Field sketches of the German site from 1968 and 1975.

COMPARISON SITES

Within this section, I will discuss in more detail some of the sites within the Lower Illinois River Valley and the American Bottom that are key in the current understanding of Late Woodland and Mississippian interaction as well as others I feel inform the interpretation of the German Site.

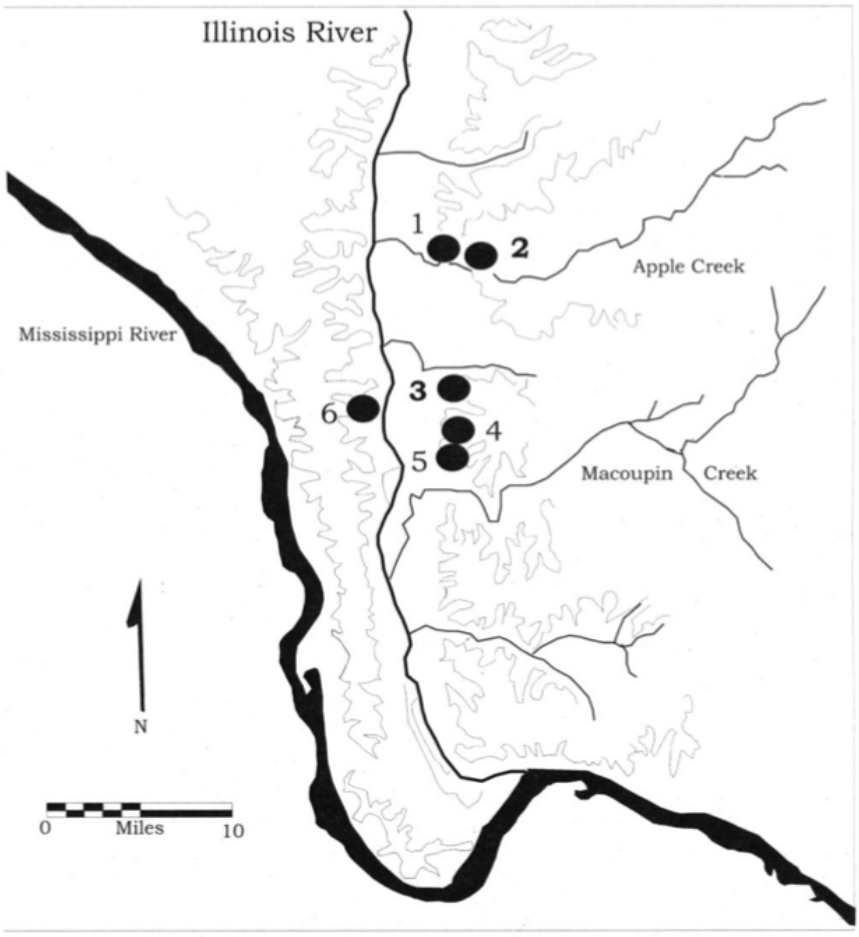

Figure 8: Map of Lower Illinois River Sites mentioned in text: (1) Moss Cemetery, (2) Audrey, (3) Bushnell Hollow- not mentioned, (4) Schild Cemetery/Whiteside site, (5) Kosrt North/South, and (6) Evie. (Delaney-Rivera 2004).

The Audrey Site

The Audrey site is located on a sand-dune formation, approximately 8km east of the Illinois River on the northside of Apple Creek (Figure 8). This site has multiple components including Middle Woodland, Early Late Woodland, and Mississippian, and has been the center of many archaeological discussions of how Mississippian culture was adopted in the Lower Illinois River Valley. While a final site report for Audrey has yet to be completed, the site has been interpreted as an example of Mississippian and Late Woodland cultural interaction (Perino 1971; Farnsworth et al. 1991; Delaney-Rivera 2000, 2004). I discuss the colony and colony-acculturation models and how they impact the interpretation of the German site later in this thesis.

Among the first archaeological investigations at the site included surface collections that were conducted in the late 1960s and early 1970s. Ceramics found at this time ranged from Archaic to Mississippian, however, no efforts were made to look into the timeline of the site based upon temper types (Delaney-Rivera 2004). Excavations at Audrey began in 1973 and would continue until 1985. The scale of excavation was very large and revealed that Audrey is the "largest early Mississippian period habitation site" that has been excavated to date in the LIRV. Excavations revealed post mold and wall trench structures as well as numerous features with artifacts corresponding to late Late Woodland and Mississippian cultures (Delaney-Rivera 2000).

Previous interpretations of the site suggested that Audrey was first occupied during the Late Woodland and Mississippian transition by locals in the valley (Delaney-Rivera 2000). These Late Woodland individuals acculturated to the Mississippian way of life and moved back to Audrey after a brief hiatus in the site's

occupation. Delaney-Rivera (2000, 2004) argues that this interpretation is too simple of an explanation. There is clear evidence of interaction, ceramics with both grit and shell temper, the presence of non-local materials, and shell tempered ceramics found in structures classified as Late Woodland (Delaney-Rivera 2000). Thomas Cook summarized the fieldwork taking place at Audrey in 1981 and 1982 and provides his interpretations. He mentions numerous house structures (some with wall trenches and others that are burnt) trash dumps, as well as a potential plaza that may have existed at the site (Delaney-Rivera 2000). Cook suggests that Audrey was occupied by Late Woodland peoples from AD 600-1000 (uncalibrated) and then a brief break in habitation occurred followed in AD 1050-1150 (uncalibrated) by the Mississippian occupation of the site (Delaney-Rivera 2000). Farnsworth et al. (1991) postulate that Audrey was a larger Jersey Bluff town with Mississippian components that could represent the best candidate for a Mississippian colony in the Lower Illinois River Valley (Farnsworth et al. 1991; Delaney-Rivera 2000).

Delaney-Rivera (2000, 2004) has been working with the Audrey site assemblage for many years and has suggested a different interpretation that expresses a more complicated narrative than one of pure colonization. In her dissertation and subsequent articles, she proposed an acculturation model, where Jersey Bluff individuals were living alongside their family members that had adopted the Mississippian way of life (Delaney-Rivera 2004, 47). This claim is based on the distribution of "hybrid vessels", or ceramics containing characteristics of both Later Woodland and Mississippian ceramic traditions. These vessels (n=16) were all clustered within one structure, 10 features, and two test units (Delaney-Rivera 2004). The Audrey site is not, in Delaney-Rivera's

opinion, a colony, but the interactions are more nuanced and are more representative of the local acculturation of Mississippian culture. In her 2004 article, she tentatively introduces a new phase, the Audrey Phase, that captures the interactions taking place around AD 1050-1150 between the Jersey Bluff peoples and the Mississippians (Delaney-Rivera 2004, 50). "This phase is characterized by Mississippian wall-trench buildings placed close to floodplain locations, the presence of early Mississippian ceramic vessels constructed of local and nonlocal clay, and the presence of exotic materials and hybrid vessels. Furthermore, this is a period when local Late Woodland groups and nonlocal Mississippian populations are interacting and creating a local manifestation of a Mississippian society" (Delaney-Rivera 2004, 50).

The ceramic analysis conducted by Delaney-Rivera for her 2000 doctoral dissertation included the surface collections and ceramics found through excavations. "The two primary considerations of this research were (1) to determine whether or not a Late Woodland Jersey Bluff phase component existed at the site, and if so, what was the relationship, if any to the Mississippian component, and (2) to understand the inhabitants of the Mississippian component (e.g. to determine the presence of non-local individuals)" (Delaney-Rivera 2000). Within her analysis, the predominant sherd temper was sand and shell at 43%, while grit temper represented only 13% of the surface collected ceramics. This reflects a break in habitation between the early Late Woodland and the Mississippian periods and the limited Jersey Bluff presence at the site (Delaney-Rivera 2000). Within the excavated contexts, the frequency of grit-tempered vessels is only 11% (n=1490 of the total 13,771 sherds analyzed). Sand tempered sherds represent 49% (n=6771) of the assemblage and shell tempering was found in 32% (n=4473) of the assemblage

(Delaney-Rivera 2000, 182 Table 6.3). There was a small number of vessels that could be designated as Jersey Bluff. Only 18 percent (nine vessels) were determined to be from the Jersey Bluff phase and were recovered from a feature context (Delaney-Rivera 2004, 46). "Hybrid ceramics," determined by Delaney-Rivera, were also found and were compared to "hybrid vessels" found at the Schild Cemetery. These ceramics had attributes of Late Woodland and Mississippian ceramics and reflect the two ceramic practices that create the "hybrid materials." Delaney-Rivera avoids creating new typologies for early Mississippian ceramics at the Audrey site because a larger sampling would be necessary to create more accurate typologies (Delaney-Rivera 2000, 187). Some "hybrid ceramics" found at Audrey had shell temper (Mississippian characteristic) and cordmarked surfaces (Late Woodland trait), while others had shell temper and Late Woodland vessel forms (Delaney-Rivera 2000, 205). Conclusions based on the ceramic analysis suggest that the Audrey site was occupied during the Late Woodland White Hall phase, experiences a break in occupation, then was reoccupied by early Mississippian (Lohmann/Stirling phases) people (Delaney-Rivera 2000).

Settlement layout suggests that Audrey's Mississippian occupation was short-lived, lasting from about 5 to 20 years. Analysis of the spatial distribution of the ceramic assemblages does not "suggest that different portions of the sites were occupied at different times" (Delaney-Rivera 2000, 225). Ceramics from different phases as well as "hybrid sherds" were found within features across the site. The organization of the site also suggests that a portion of the population living at Audrey were engaged completely in the Mississippian way of life. The layout and orientation of structures followed a Mississippian format: they were arranged in rows and were similar sizes to those typical

of a Stirling phase Mississippian site in the American Bottom (Delaney-Rivera 2000, 227). Wall trench structures were present, a trait of Mississippian construction techniques. There was a circular post structure that has been identified as a sweatlodge, similar to those found within the American Bottom. There is also some evidence suggesting there was a palisade at the site, a Mississippian feature generally believed to be constructed during the later portion of the Stirling phase (Delaney-Rivera 2000, 228). No earthen mound structure is present at the site. It is hypothesized that if the occupation of the Audrey site had lasted longer, that one would have been constructed (Delaney-Rivera 2000). While these lines of evidence may suggest a shorter period of Mississippian occupation at the Audrey site, there are eight radiocarbon dates, used by Delaney-Rivera (2004) to establish the time periods the site was occupied. Three of those samples date to the White Hall phase while one date, a structure beam (sample no. ISGS-1881) dates to the Late Woodland period. The other four samples date four features within the timeframe of Mississippian influence within the LIRV (Delaney-Rivera 2004, 46). Delaney-Rivera proposes a new phase, the Audrey Phase, that reflects the "hybrid" nature of the materials from the Audrey site which dates roughly from AD 1050-1150, corresponding to the Lohmann/Stirling phases from the American Bottom (2004, 51). The Audrey site was occupied during this whole phase, based upon the radiocarbon dates, showing that occupation at the site may have lasted longer than originally proposed.

In summary, the Audrey site has the best evidence thus far of a strong Mississippian presence within the Lower Illinois River Valley. The site exhibits White Hall (AD 400-600) artifacts and Mississippian artifacts and structures (AD 1050-1200). While there is some debate about the nature of interactions taking place at Audrey, it is

clear that there is a strong emphasis on the Mississippian nature of the site. The Audrey site looks to be at a stage further along in time and the integration of Mississippian ideas and culture than the German site. Of course, more in-depth ceramic comparisons and further excavation need to take place in German before more concrete comparisons can be made.

The Hill Creek Site

The Hill Creek site is located within the Hill Creek Valley approximately 3 km west of the Illinois River (Figure 9). The site was identified in 1977 by the Illinois Archaeological Survey, walkover surveys were begun during 1979 by the Center for American Archeology. Testing and further excavations began again in 1983 and uncovered two burned structures and nine associated pit features, five that were external and four internal to the burned structures (Conner 1985a, 1985b). Based on ceramics and radiocarbon dates, Hill Creek is a single-component Mississippian site. It is also referred to as the Hill Creek homestead in the literature due to the size of the site being smaller than a village and the fact that only two structures were uncovered. At the time of the Hill Creek report, the understanding of Mississippian sites within the Lower Illinois River Valley was limited and only a few large publications had been made, Perino's (1971) and Goldstein's (1980) analysis of the Schild and Moss cemetery.

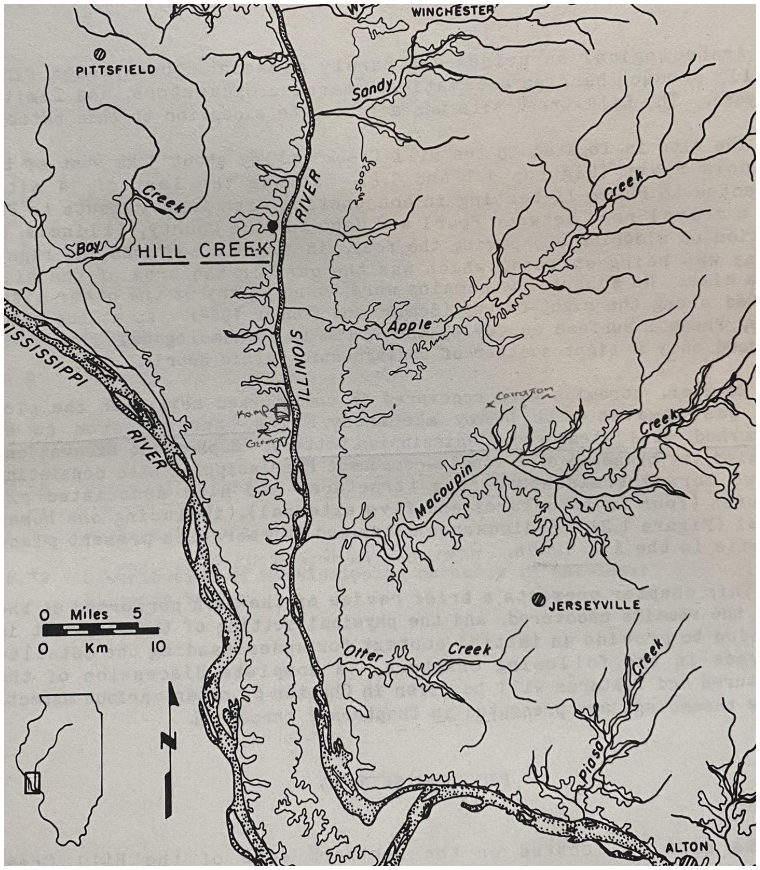

Figure 9: Hill Creek Homestead Location (Conner 1985a)

Many of the research questions asked during the report on the Hill Creek homestead involve how the site compares to similar sites in the American Bottom, Lower Illinois River Valley, and in the Central Illinois River Valley. The questions help position the Hill Creek site within the context of previous work, as well as leaving room for future comparisons as new sites are excavated. Determining the chronology and culture of the site relied most heavily on the ceramic analysis, but also included a look into lithics, determining what activities were taking place and the location of raw materials, and faunal and floral remains and how it compared to data from other small Mississippian sites.

The ceramic assemblage is predominantly Mississippian in characteristics. Shell, or the plate-like cavities indicative of leached shell (Stoltman et al. 2008, 323), was the most common temper used in the sherds found at the site. Some sand and sand-grit temper was found in a handful of sherds, but they were limited to body fragments as no lip-rims had these temper types (Morgan 1985). Interestingly, the majority of sherds had cordmarked exteriors on at least some portion of the sherd (68.5%; Morgan 1985). Plain surface sherds made up 31.5% of the studied assemblage. Vessel shape was also studied. The predominant vessel form was jars and they mostly exhibited smooth rims and cordmarked bodies. The ceramics at the site were compared to the terminology applied to assemblages in the American Bottom with cordmarked vessels being classified as Cahokia Cordmarked and the plain vessels called St. Clair Plain (Morgan 1985). Plates made up the second-highest vessel form found at the site at 16.4% of the assemblage (n=9). Only two of the plates were completely plain, while the others had some incising along the rim. Shell and chert (or grit) were both used as tempering agents within this category of vessel (Morgan 1985, 23). Bowls, pans, water bottles, and bean pots were also found at the Hill Creek site. The diverse range of vessel forms is similar to the ceramic assemblages associated with other Mississippian sites.

The two burnt structures at the site show different construction techniques that I believe show some similarity to the work done with Richland Complex American Bottom structures (Conner 1985b; Alt and Pauketat 2011). Structure 1 is a 30 cm deep basin with wall trenches along all four sides. Post molds are present inside the walls and below the wall trenching. There is an internal hearth (*Feature 2*) which was crosscut by a historical post, and a potential storage pit (*Feature 9*) that was partially filled in when the structure

was burned (Conner 1985b). The second structure was constructed in a 60cm basin, and its walls were constructed using posts with no evidence of wall trenching. It included an internal hearth (Feature 12), a small pit (Feature 11), and nine interior post molds. Interpretations proposed about these two structures include that they were occupied at different times of the year, one being a warm-weather home while the other was used during the colder seasons. The ceramics found within both structures support the idea that both houses were occupied during the same period of time and there are three examples of sherd matches from three different vessels between the two structures (Conner 1985b, 206).

The Hill Creek Homestead is a Mississippian site that is estimated to have been occupied around AD 1200, based on ceramic typologies and radiocarbon dating. While this estimate places the Hill Creek site being slightly younger than the German, I believe that they can be studied together in interesting ways. First, the construction techniques used to build Structure 1 and 2 at the Hill Creek site are similar to how buildings were being constructed in the American Bottom during the Richland complex. The use of post molds are characteristics of Late Woodland construction techniques while wall trenches are introduced to the region during the Mississippian period. However, at sites that make up the Richland complex east of Cahokia in the American Bottom reveal that there are hybrid construction techniques with posts being established under wall trenches (Alt and Pauketat 2011, 109). This hybridity is observed at the Hill Creek site, though the thickness of the wall trench is not noted and these connections are not mentioned. The ceramic assemblage of the Hill Creek site is much more Mississippian in nature, with a great presence of shell-tempered ceramics. However, the continuation of cordmarking

and mixing of shell- and grit- in the paste lends to the possibility that this homestead was participating in more than just Mississippian ceramic tradition.

The Halliday Site and General Richland Complex Sites

The Halliday Site (11S27) is located 16km from Cahokia southwest of O'Fallon Illinois (Figure 2). The site has had a lot of damage done to it because of construction and city expansion (Emerson et al 2000). It is considered to be a part of the Richland Complex, or a "series of rural settlements in the uplands to the east of Cahokia" (Pauketat 2003). Occupation of the site is within the early Middle Mississippian period, ranging from Lohmann (AD 1050-1100) to Stirling (AD 1100-1200). The site was discovered in the 1930s and approximately 50% of the whole site has been excavated and it is one of the largest early Middle Mississippian period sites in the region. Excavations took place from 1994 to 1996 and resumed from 1998 to 2000.

Archaeologists have used the Halliday site when studying the migration of people to and from the Cahokia region. The Richland Complex exposes a brief period of village farmers that moved to the uplands, most likely due to increased population density and the strain on the local resources (Pauketat 2003). Some sites that were positioned closer to Cahokia practiced a way of lifepost-wall closer to those living within Cahokia proper. The further away villages and homesteads were, the slower they seemed to adopt Mississippian practices (Pauketat 2003; Pauketat and Alt 2005).

The movement of people into the greater Cahokia and Richland Complex accounted for the increased diversity of ceramic types in the region. At the Halliday site, pottery types include those dating the site to the Lohmann and Early Stirling phase as

well as nonlocal ceramic types called Varney Red filmed (Alt 2002; Pauketat 2003). The Varney Red Filmed tradition comes from southeast Missouri and northeast Arkansas. A number of ceramics at the Halliday site appear to be Varney-like however they used local clays to produce this style. It is possible that a significant quantity of people from Missouri and Arkansas moved into the American Bottom and settled in the Richland Complex and the Halliday site accommodating the large proportion of Varney and Varney-like ceramics within the assemblages throughout Cahokia and the Halliday site (Pauketat 2003).

The site layout of Halliday was rather large and consisted of clusters of houses surrounding cleared spaces, or courtyards, with large, central posts. Structures at the site were a mix of post wall and wall trench construction, with the post wall structures dating earlier and were often rebuilt with all trenches later (Emerson et al. 2000; Pauketat 2003; Pauketat and Alt 2005). Pauketat and Alt (2005) used the Halliday site as a test case when observing the transition from post wall to wall trench construction techniques in the American Bottom region. Wall trench construction was rapidly adopted in Cahokia around AD 1050 and spread throughout the region as more people began adopting more Mississippian practices. Pauketat and Alt (2005) use post molds as a foil for human agency and the passing down of traditions from generation to generation. Adults and children would labor together to dig post holes as indicated by the different depths of the holes (Pauketat and Alt 2005, 220). There was evidence of rebuilding at the site as post wall construction shifted to wall trench construction. The Halliday site would be one of the slowest in the Richland Complex to shift to wall trench construction. Clusters of houses would move or be rebuilt and the central courtyard post would also be shifted

roughly correlating to the number of times the homes were rebuilt (Pauketat and Alt 2005, 221). Also at the Halliday site were several hybrid houses and "faux" wall-trenches all dating to the Lohmann phase (Figure 5). The hybrid structures would have some walls be constructed using post walls while others used wall trenches. Faux wall trenches are defined by Pauketat and Alt (2005, 226) as structures with wall trenches only a few centimeters deep with posts beneath the trench. These two construction techniques could reflect the people's adoption of new techniques as they balanced expressing a more Mississippian style merged with their own "traditional" construction techniques.

It is important to ask the question: why would people shift to wall trench construction? Pauketat and Alt (2005) suggest that it would be easier and more efficient for one or a small group of people to dig and construct structures (Figure 10). Instead of house construction being a community-wide endeavor, small, specialized groups could build structures with little input from the community. Walls would be prefabricated and set into excavated trenches (Figure 11). It would allow for more homes to be constructed quickly to keep up with the expanding population as well as to fit the urban planning taking place at Cahokia (Pauketat 2003; Pauketat and Alt 2005).

When thinking about the Halliday and the German site together, it will be interesting to see the site layout of German after further excavation. Since the Halliday site shows some hesitation when it comes to adopting Mississippian construction techniques, it could present a good comparison to how people, of approximately the same time, were fairing in two different regions. The Halliday site and the entire Richland Complex is an interesting area to observe the movement of people around the same time that German would have been inhabited. If there was a Mississippian movement into the

Lower Illinois River Valley, these two regions would be parallel to one another and provide crucial comparisons as to how different groups of Late Woodland and pre-Mississippian people were interacting with the growing presence of Mississippian peoples.

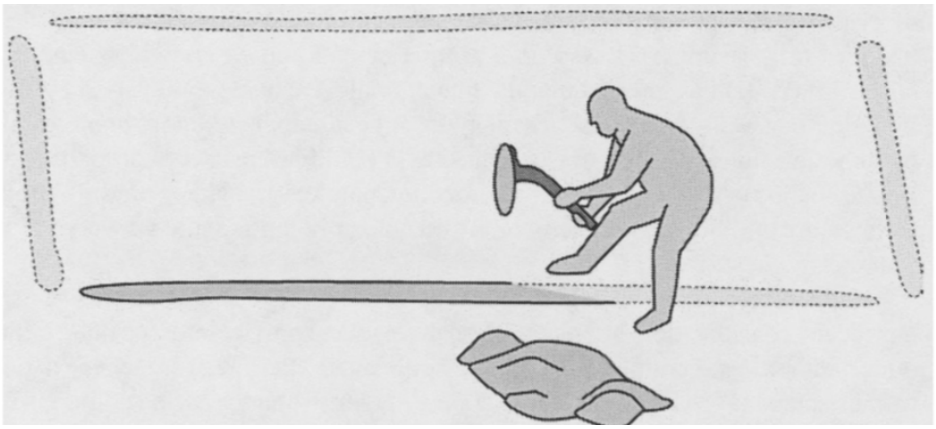

Figure 10: Wall-trench excavation technique (Pauketat and Alt 2005, 225)

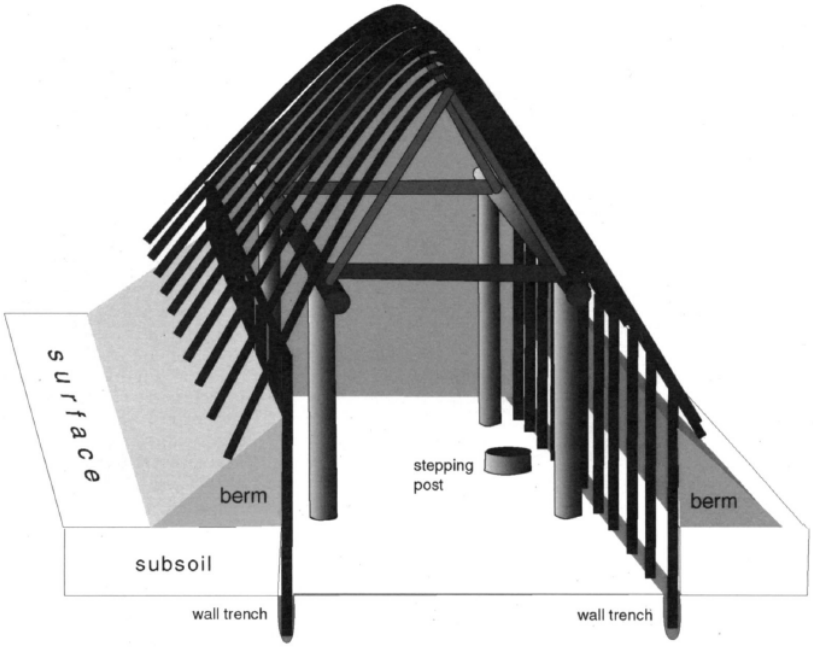

Figure 11: Cutaway view of a projected wall trench early Mississippian house (Pauketat and Alt 2011, 119)

The Lamb and Rench Sites within the Central Illinois River Valley

The Lamb Site is a small rural settlement located in Schuyler County in west-central Illinois. It was excavated in 1990 as a part of salvage excavations taking place by avocational archaeologist Glenn Hanning (Brapholph 2014, 75). No structures were found during excavations, however, 33 pit features were uncovered and all but two of them contained Late Woodland and Mississippian ceramics. The Lamb site is considered an early Eveland phase habitation site with cultural ties to the local Bauer Branch phase (Bardolph 2014, 73). Inhabitants at this site participated in a wide variety of domestic activities, indicated by the ceramics, chipped stone, and groundstone tools. Both terrestrial and aquatic animals were processed and consumed at the site and maize as well as other cultigens were found (VanDerwarker et al. 2013; Bardolph 2014).

In her 2014 study, Dana Bardolph observed the trends in the ceramic assemblage at the Lamb site to investigate questions regarding the manner of change and continuity of Late Woodland foodways into the Eveland phase (AD 1100-1200). Bardolph used rim curvature (RC) and rim protrusion rations (RPR) to compare the ceramics at the Lamb site with those from the American Bottom. The majority of sherds (n=553) found at the site could be classified as Mississippian, including those that fall under the category of Powell Plain and Ramey Incised jars (Bardolph 2014). The Late Woodland sherds (n=313) reflected the Bauer Branch ceramic typology. Only eight sherds were classified as "hybrid," having attributes from both Late Woodland and Mississippian ceramic traditions. The presence of Ramey Incised jars at the Lamb site, with their rich cosmological symbolism, shows that the people at the Lamb site were actively engaging with the Mississippian mythos and worldview, not just adopting the temper and slip

techniques (Bardolph 2014, 78). However, Bardolph argues that while the people at the Lamb site were engaging with the Mississippian worldview through their ceramics, they were still using the vessels in a Late Woodland manner. The assemblage consists mainly of jars, similar to that of a Bauer Branch assemblage and these jars were functionally similar. The Lamb assemblage also lacked the serving wares that are associated with Mississippian ceramic assemblages especially during the Stirling phase, which the Lamb site is hypothesized to coeval with (Bardolph 2014, 76). The lack of serving ware indicates that the people at the Lamb site were not engaging in serving practices common in the American Bottom. Their ceramics, though outwardly present a Mississippian worldview, the function of these vessels continued to be more Late Woodland in nature, especially in the way food was stored, prepared, and served (Bardolph 2014, 80).

These ceramics and Bardolph's interpretations of what was taking place at the Lamb site exhibit the importance of understanding practice and the context in which people are living, especially during this period. While she does not mention this concept explicitly, my understanding of Bardolph's work indicates that there is some form of hybrid practices taking place. It is not through the production of material cultures, the ceramics trend towards more Mississippian in nature. However, how they are used is hybrid because these Mississippian-type vessels are being used within the Late Woodland context. It poses the question of how were Mississippian vessels used at the German and other Jersey Bluff sites in the LIRV. Bardolph's work can also play a key role when explaining the idea of hybrid practices that extends beyond the creation of material goods such as ceramics.

The Rench Site (11P4) is located approximately 20 km north of Peoria in central Illinois. Excavations took place between 1980 and 1983 to limit the destruction that would take place during the proposed construction of the interstate highway (I-474) interchange near Mossville, Illinois (McConaughy et al. 1985). While the Rench site was initially determined to be a Weaver, or early Late Woodland site, based upon surface collections, a small late Late Woodland section was uncovered during these excavations. Two burnt structures, dating to the Late Woodland and Mississippian phases, were uncovered and are among some of the best-preserved structures from this period in the CIRV (McConaughy et al. 1985). These two structures within the northern part of the Rench site represent significant interaction taking place between the Late Woodland and Mississippian peoples around AD 1000 in the CIRV.

House One, as McConaughy and his colleagues call it, is the poorest preserved of the two structures. The base of the structure was closer to the modern ground level and there was significant damage done by plowing (McConaughy et al. 1985, 172). The house is rectangular and was constructed using the wall trench technique, however, the wall trench was shallow and there were 45 post molds found beneath the wall trench (McConaughy et al. 1985, 172). Four central posts that were larger than those beneath the wall trench indicate a supported roof, though no roof fragments were preserved. No hearth or house floor was uncovered likely because those upper layers of the site were destroyed through plowing. The house had some charred hickory logs that were radiocarbon tested, placing the site around AD 950 (McConaughy et al. 1985). This date supports the ceramic evidence which was becoming similar to the Mississippian ceramic assemblages from the American Bottom (McConaughy et al. 1985; Esarey 2000).

The second structure, or House Two, was a post-mold construction and was better preserved below the plow zone. There was an extensive amount of burnt subsoil from where the structure had been set ablaze and then covered by dirt to extinguish (McConaughy et al. 1985, 173). In addition to the burning of the structure, there was a lack of a domestic assemblage within the structure, indicating that the floor and home had been cleared before it was intentionally burnt. The house was built in a prepared basin and lacked wall trenching suggesting it was built in the Late Woodland tradition (Esarey 2000, 397). Two pit features were present, one basin-shaped hearth and a small basin-shaped pit that could have been a pot stand (McConaughy et al. 1985). Radiocarbon samples taken from this structure date the house to around AD 1020 and AD 1010 (McConaughy et al. 1985, 176). It has been proposed by McConaughy (1993) that the two structures are contemporaneous and represent a summer and winter dwelling used by one household (Esarey 2000, 397).

Ceramics found throughout the site include Mississippian and Mossville wares. The Rench site provides a clear look into how the late Late Woodland ceramic traditions, Mossville, were transitioning to a more Mississippian tradition. The Mossville Plain vessels were beginning to include attributes similar to early Powell jars including more extruded lips and angled shoulders (Esarey 2000, 396). Shell tempering was also present and other Mississippian ceramic types can be identified within this assemblage: St. Clair Red Filmed and St. Clair Plain.

The Rench site structures are interesting because they remind me of settlements within the American Bottom's Richland Complex, discussed above. At this site, two structures were built with different construction techniques. One, house two, used a more

Late Woodland construction technique evidenced by the post holes. The other structure, house one, used what Pauketat and Alt (2005) would call "faux" wall trenching, where post holes were found beneath a shallow wall trench. The fact that there appears to be this "faux" wall trench could indicate that inhabitants of the Rench site were experimenting with wall trench construction while still maintaining the Late Woodland practice of digging individual post holes. Ceramics at the site, though not expressly marked as "hybrid," do show the adoption of Mississippian design elements. The relation of these two structures along with the in-between nature of the ceramics shows that the people living at the Rench site were actively involved with Mississippian ideas and material culture and were integrating the Mississippian ideas and ways of life in their own way. It will be interesting to see how German compares to the Rench site in the CIRV and the Halliday site in the American Bottom once more of the site has been excavated. The nature of the construction techniques used will be something to focus on with future research.

The Evie Site

The Evie site is along the same tributary creek as the German site (Figure 12). From 1993 to 1995, it was excavated by the Center for American Archeology and National Science Foundation scholars who wrote several reports on the preliminary findings. Some features were found, including one post hole, however, no structures were uncovered. Ceramics relatively date the site within the Early Bluff and Jersey Bluff phases, though some Adena points were found during excavations (Corral 1994; Hildebrand 1995). The questions asked in the student reports on the Evie site focus on

dating the site based on ceramics, understanding the ceramic assemblages and how they compare to other sites in the LIRV (Hildebrand 1995), feature shapes and contents (Corral 1994), as well as lithic and faunal analysis.

Ceramics at Evie contained characteristics from the Early Bluff and Jersey Bluff traditions. Jars were the most common vessel form found, however, only 7 sherds were large enough to assign form to (Hildebrand 1995). Decoration was not very common, with some types including punctuates and dowel impressions. Surface treatments at Evie included cordmarking that extended from the shoulder down the body, with a smooth neck. The tempers used in the Evie assemblage were mostly a sand and grit combination. Out of all the rims found at Evie, 12 were classified as Early Bluff, 9 Jersey Bluff, and 8 rims could not be determined (Hildebrand 1995).

Another student report used the features found at Evie to investigate questions of cultural dynamics during the Late Woodland period. Corral (1994) compared the 12 features from Evie to other contemporary, non-Jersey Bluff sites. A few potential fire pits were uncovered- Feature 3, 5, and 7. These features had lots of limestone and charcoal in them and very few artifacts. Feature 1 and 4 were identified as refuse pits and both were the only features to contain macrofaunal and micro botanical remains. Feature 1 had clear evidence of individual dumping episodes with different artifacts that were spatially segregated. Feature 8 is thought to be a storage pit due to its similarity to storage pits at other sites and its lack of cultural materials. Feature 13 was also tentatively identified as a storage pit as it lacked all cultural materials. Feature 10 was a pit with some Early Woodland artifacts that could represent an early component of the site. Feature 11 was

the only post mold found at Evie and included a high density of charcoal with no cultural materials present.

When comparing Evie to German, the proximity of the sites will play a crucial role. Since they are very close to one another, interpretations could be that Evie was occupied more heavily within the Early Bluff period, and German was established a little later in the Jersey Bluff, but there was some period of overlap. The Evie and German sites could be two kin groups living near one another. It would be interesting to look at the Evie field notes and ceramics to see if there is any evidence of Mississippian ceramics or if the site was abandoned before that period. Also, the finding of refuse pits could explain why we haven't uncovered any at the German site. Perhaps the Evie site was abandoned as people moved across the creek to German and used the site to dispose of their trash.

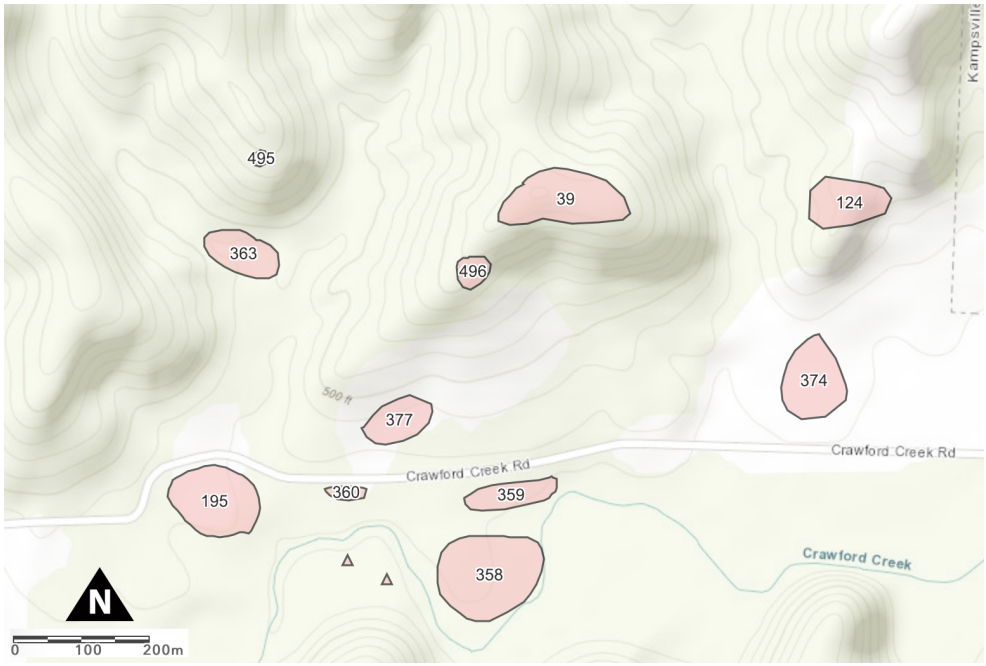

Figure 12: Location of Sites along Crawford Creek; the German Site (377) and the Evie Site (195).

METHODS

The methods utilized here focus on the ceramic assemblages and the house structure recovered from the German Site. My analysis only includes the ceramics and profiles from the house units, Squares 1, 2, 5, and 6. Several faunal remains were found, including deer bones and mandibles, fish vertebrae, and a turtle carapace, however, for the scope of the project I have excluded them, deciding to focus on ceramics and structural analysis when answering questions about Jersey Bluff and Mississippian cultural interaction. There was also limited floral material found at the site. While there were some deposits of charcoal in Feature 2 and the hearth within Sq1. The only radiocarbon sample tested was a maize copule (900±20 BP uncalibrated; AD cal AD 1046-1218). As more of the house deposits and floor is uncovered, additional floral and faunal analysis will be beneficial to help follow cultural shifts through subsistence patterns during this period.

All of German's materials were processed in the CAA's lab by the high school and adult field schools, the REU program, and the ASU field school in 2019 as well as other adult field programs in the Fall of 2019 and 2020. The methods for washing, sorting, and classifying artifacts follow the Center for American Archeology's lab protocols. Artifacts were washed, dried, and bagged maintaining their original provenience information. The artifacts were then sorted based on material classes (ceramic, lithic, faunal, floral, and historic) with their counts and weights and diagnostic artifacts, called Type Collection following CAA protocols. These Type Collections refer to any ceramic rim sherds; sherds with decoration; fragments of figurines, pipes, or earspools; and undecorated sherds with

residue; lithic points; lithics that were retouched; lithic hoes flakes from non-local materials; lithic cores; or groundstones. Students used the Arizona State University Field School Field Archeology Manual that was provided to them in Kampsville to identify Type Collections and the different material classes. All information, count, weight, material, and whether or not an artifact could be considered a Type Collection were recorded on forms with provenience information as well as information on the students and staff recording the data. No additional analysis has been conducted on the artifacts from the German site.

Ceramics

The ceramic analysis took place in two parts, first an analysis of the Ceramic Type Collections, or CTCs, followed by a sampling of the Non-Type Collection, or Non-TC, sherds from the house units. For both analyses, surface color, surface treatment, decoration, weight, and temper were all recorded. The sherds were then categorized into the understood typologies of ceramics for the Early Bluff, Jersey Bluff, Mississippian, and Maples Mills traditions. Early Bluff Ceramics were identified less frequently and have similar traits to the Jersey Bluff ceramics, however, the cordmarking is found across the entire vessel. Jersey Bluff Ceramics are classified as being grit-tempered, with cordmarking on the body and smoothing from the shoulder to lip (if applicable). Jersey Bluff rims were identified by the lip notching decoration and presence of lugs as well as the other Jersey Bluff traits. Mississippian Ceramics were identified by the smooth surface treatment as well as the use of red slip and shell tempering. There is one sherd

that has been identified as being from the Maples Mills tradition from the Central Illinois River Valley based on its lug and single cord designs.

Weight was recorded to the nearest tenth of a gram for this analysis. Temper was identified visually with the naked eye. The temper types present at the German site include grit, grog, limestone, and shell, sometimes in combination. If the temper was unclear in my observations, I left the category blank for analysis, erring on the more cautious side of estimates. The main sorting of the Non-TC and CTC sherds pulled out approximately 34 rims from the sample and one body sherd with bone and residue on the interior surface. An additional 14 rim sherds were found in my second round of subsampling conducted on the Non-TC sherds. Rim diameter and Estimated Vessel Equivalence (EVE) were recorded for the 17 rims that were 2cm and 2%EVE or greater. In addition to more rims, a potential base to a vessel was also found during subsampling. A number of the sherds within the assemblage were very fragmented and small, so a sizing chart was put in place to help subsample and any sherd less than a 2x2cm box was not included in this analysis (Figure 18). In total 509 sherds were analyzed from the house units.

House Profile Analysis

Once the house units, Sq 1, 2, 5, and 6 were excavated to sterile, field students and staff drew wall profiles of the cultural and natural levels. These profiles described the soil (Munsell color, texture, etc.) and gave coordinating numbers across all the walls drawn within the individual units. Within this analysis, I digitized the profile drawings to obtain a clearer image of the changes in soil color and texture across the individual units.

Any connections between the different units that had matching soil descriptions were then associated and noted as a part of the same cultural or natural level. In addition to spatial association and distribution of ceramics artifacts, different areas of activity were distinguished within the house structure. Piece plots or artifacts that were large enough and whose coordinates were noted within the unit, as well as the level depths themselves, were all linked using the geospatial coordinates given to each unit with the total station. This spatial analysis is limited since only 4 units, spaced 1 meter apart, were excavated at the time of writing this thesis. In the future, a complete excavation of the house is expected and will provide a greater understanding of the spatial organization of the house floor and activities taking place within.

Statistical Analysis

SPSS version 27 was used to conduct all statistical analyses for this project. These tests helped establish general density by count and weight within the four units by level. Chi-square analysis was conducted to determine differences between the squares and levels when comparing densities, ceramic tradition, decoration, and surface treatments. Additional Chi-square testing was done to look at the changing trends between ceramics, observing temper and inclusions, decoration, and exterior color. T-Tests and ANOVA were conducted for the Rim Diameters of the 17 CTCs. Non-parametric tests were conducted for the weights of sherds by square as well as weight by temper and weight by surface treatment.

DATA AND RESULTS

I analyzed ceramic densities and typological trends based on surface treatment, decoration, and temper/inclusions as well as the profile drawings of Squares 1, 2, 5, and 6. All of the sherds analyzed were collected using a one-quarter inch mesh screen and sherds that were larger than a quarter (an arbitrary measurement used in the field to identify piece plots) and found in context had their coordinates measured. Only sherds, with at least one identifiable surface, were included in this research though there were other ceramic materials uncovered such as tempered ceramics with no recognizable surface and non-tempered ceramics. The total number of sherds looked at in this statistical analysis is 509, with a total weight of 4,256.98g. The majority of the sherds were excavated from Square 1 (n= 232; 45.6%) (Table 1).

General frequencies and percentages for temper and inclusion, decoration, surface treatment, and ceramic tradition were looked at among the 509 Non-TC and TC ceramics. For temper and inclusions (Table 2), the majority of the sherds consisted of grit temper/inclusions (n=432 sherds, 84.9% of the sample). I use "temper/inclusions" with grit because determining if the grit was added intentionally, making it temper, or were natural inclusions in the paste is beyond the scope of this thesis. Shell temper made up 4.3% of the sample and was often defined by the absence of temper and plate-like cavities, though there were a handful of sherds where the shell temper was still visible. Limestone made up the smallest percent, 0.2%, and was also identified by its absence and pit cavities. The unidentified category combines unclear temper/inclusions as well as a combination of temper types.

Percent and Frequency of Sherds by Square

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Sq 1	232	45.6	45.6	45.6
	Sq 2	110	21.6	21.6	67.2
	Sq 5	77	15.1	15.1	82.3
	Sq6	90	17.7	17.7	100.0
	Total	509	100.0	100.0	

Table 1: Percent and Frequency of Sherds by Square

Temper and Inclusions Total

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Unidentified	54	10.6	10.6	10.6
	grit	432	84.9	84.9	95.5
	limestone	1	.2	.2	95.7
	shell	22	4.3	4.3	100.0
	Total	509	100.0	100.0	

Table 2: Percent and Frequency of Temper and Inclusions from Total sample.

Surface Treatment

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Undetermined	43	8.4	8.4	8.4
	cordmarking	314	61.7	61.7	70.1
	smooth	136	26.7	26.7	96.9
	smooth/cordmarking	16	3.1	3.1	100.0
	Total	509	100.0	100.0	

Table 3: Percent and Frequency of Surface Treatments of Total Sample.

Surface Treatment (Table 3) among the total sherd count reveals cordmarking to have the greatest frequency within the sample (n=314; 61.7%). Smooth sherds made up 26.7%, totaling at n=136. Sixteen sherds had evidence for both smoothing and cord marking as part of their formation process (n=16; 3.1%). Forty-three sherds were marked as undetermined due to weathering destroying the original surface making the surface treatment unclear.

Decorations (Table 4) held the most disparity, with the majority of the sherds having no evidence for any decoration types (n=497; 97.6%). Lip Notching was the most prevalent form of decoration with 7 sherds exhibiting some lip notching. Lip lugs were seen on two sherds, and one of the lugs was in the shape of an animal figurine. Polish and slipping were only determined for one sherd each and there was only one sherd that had two or more forms of decoration present.

Based on these characteristics, the sherds were placed into Ceramic Traditions (Table 5), Early Bluff (EB), Jersey Bluff (JB), Mississippian (Miss), Maples Mills (MM), and Undetermined. Jersey Bluff ceramics make up the majority of the assemblage, n=428, 84.1%. Mississippian sherds consist of 1.8% of the total and Early Bluff makes up 0.8%. Maples Mills is only 0.2% of the assemblage with one sherd being associated with this ceramic tradition. Undetermined sherds are categorized as such because they could not be definitively put into one of the other 3 categories. Also, it is important to note that the Early Bluff and Jersey Bluff traditions have similar surface treatments across the body of their vessels.

Decoration

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No Decoration	497	97.6	97.6	97.6
	combo	1	.2	.2	97.8
	lip lug	2	.4	.4	98.2
	lip notching	7	1.4	1.4	99.6
	polish	1	.2	.2	99.8
	slip	1	.2	.2	100.0
	Total	509	100.0	100.0	

Table 4: Percent and Frequency of Decoration of Total Sample

Ceramic Tradition Total

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Undetermined	69	13.4	13.4	13.4
	Early Bluff	4	.8	.8	14.2
	Jersey Bluff	428	83.3	83.3	97.5
	Mississippian	12	2.3	2.3	99.8
	Maples Mills	1	.2	.2	100.0
	Total	514	100.0	100.0	

Table 5: Percent and Frequency of Ceramic Tradition of Total Sample

Chi-Square Analysis of Squares and Levels

This analysis involved testing all four units and all levels (making no distinctions between units). The null hypothesis of these tests is that there will be no difference in the weights of the different variables between the squares and all levels. The different variables tested include decoration, surface treatment, and ceramic tradition. For these tests, significance occurs when *p* is at or less than 0.05. Adjusted Residuals are given for any comparison that may sway the significance and are significant when the AdjR is greater than 2 or less than -2.

The decoration between the four squares did not significantly differ (Pearson X2= 20.820; *p*= 0.143) (Table 8). However, significantly more polished sherds (AdjR= 2.4) and slipped sherds (AdjR=2.4) were found within Square 5. Significantly more sherds with multiple decoration techniques were found in Sq 6 (AdjR=2.2).

The decoration for all the levels also does not significantly differ (Pearson X2= 44.384; *p*=0.846; Table 9). Significantly fewer undecorated sherds were found within level 01 than expected (AdjR= -3.1). Significantly more lip notched sherds were found in level 01 than expected (AdjR=4.6). Significantly more slipping was found within level 02 than expected (AdjR= 2.0). Significantly more polished sherds were found within level 05 than expected (AdjR=2.9).

Surface Treatment between the four squares does significantly differ (Pearson X2= 17.093; *p*=0.047) (Table 10). Significantly fewer smooth sherds than expected were found in Sq 5 (AdjR=-2.4). Significantly more undetermined sherds were found in Sq 5 than expected (AdjR=2.9).

The Surface Treatment between all levels also significantly differ (Pearson X2=69.951; *p*= <0.001) (Table 11). Rejecting the Null Hypothesis. Significantly more sherds that had both smoothing and cordmarking were found within the walls than expected (AdjR=2.7). Significantly more sherds whose surface treatment could not be determined were found in level 00 than expected (AdjR=2.5). These results signify the erosion and artifact destruction that takes place in the plow zone. Significantly more sherds with undetermined surface treatment were found within level 01 (AdjR=4.1). Also within level 01, fewer cordmarked sherds were identified (AdjR=-2.0). Significantly more sherds had undetermined surface treatment within level 02 than expected (AdjR=2.8) while significantly more sherds were smooth within level 03 (AdjR=2.4). Significantly fewer sherds were undetermined within level 04 than expected (AdjR=-2.5). Significantly more sherds were cordmarked in level 09 than expected (AdjR=2.3). Significantly fewer sherds found in level 09 were smooth (AdjR=-2.2). These two things also make sense because they are deeper and older in time, so more cord marking would be expected because the Early/Jersey Bluff used cordmarking than the smoother Mississippian vessels.

The Ceramic Traditions labeled unidentified, Early Bluff, Jersey Bluff, Mississippian, and Maples Mills, within the different squares do not significantly differ (Pearson X2=11.795; *p*= 0.462) (Table 12). Significantly more unidentifiable sherds were found in Sq 6 than expected (AdjR=2.0).

The Ceramic Traditions within all levels across all units also do not significantly differ (Pearson X2=34.085; *p*=0.733) (Table 13). Significantly more Mississippian typed sherds were found within all level 04 than expected (AdjR=3.9).

T-Test, ANOVA, and Non-Parametric Testing Results

Rim Diameter and Weights were tested for normality and equal variance to determine the type of testing required for the specific data. Rim Diameter was normal (Skewness= 0.528; Kurtosis=0.327) while Weight was not normal (Skewness=3.755; Kurtosis=17.350) (Table 14). The equal variance was also tested with Rim Diameter having equal variance (p=0.205) and Weight having non-equal variance (p=0.025) (Table 15).

ANOVA with Post Hoc Bonferroni was conducted with Rim Diameter since it met the conditions of the test and I wanted to compare the sherds within the squares as well as ceramic traditions represented in the sample. When ANOVA was run for the squares, no significant results were reported (p=0.709; Table 16). None of the Post Hoc tests were run because two of the groups, Squares 2 and 5, had fewer than 2 cases reported. When conducting ANOVA for the Ceramic Tradition comparison, no significant results were found (p=0.443) (Table 17). No Post Hoc test was run comparing Rim Diameter and Ceramic tradition because Maples Mills has less than 2 cases. These results show that there are no differences between the Rim Diameter mean counts between the four squares and Ceramic Traditions.

Nonparametric testing was conducted for Weight since they failed to meet the parameters for ANOVA testing. I used the Kruskal-Wallis nonparametric test to compare more than two variables. The comparisons I made included the distribution of weight by square, weight by ceramic tradition, weight by level, weight by temper, and Weight by surface treatment.

When comparing weight by square, there are no significant results produced (p=0.309), retaining the null hypothesis that there are no differences in ceramic weight distribution by squares (Table 18).

The distribution of weight by ceramic tradition did produce significant results (p=0.007) with the Early Bluff sherds (3) averaging heavier than the Jersey Bluff, Mississippian, or Maples Mills sherds (Table 19).

When looking at the density of weight by level, levels 02, 03, and 04 have the greatest density by weight (p= <0.001) (Table 19). In the pairwise comparison, differences between levels 01 and 04 (p= 0.008) and levels 01 and 06 (p=0.008) were driving the significance (Table 20).

When looking at the weight distribution across temper and inclusions, no significant differences emerged (p=0.576) (Table 21). The distribution of weight is the same across all categories of temper/inclusions.

However, significant results were revealed when looking at the distribution of weight by surface treatment (p= <0.001). The combination of smooth and cordmarked sherds was heavier than the other categories (Table 22). The majority of these sherds are fragments of the shoulder of vessels and appear to be thicker than the body and rim sherds upon general observations.

General Ceramic Trends

Cross-tabulations were conducted to look at how different variables related to one another and can form the basis of identifying hybrid typologies for further analysis. Decoration, Surface Treatment, and Exterior Color (Table 23) were all compared to Temper and Inclusions. Of the 509 sherds, 432 had grit tempering. The majority of the sherds in this sample had no form of decoration present. The most common form of decoration was lip notching and all of those seven sherds had grit temper (Table 6).

When looking at surface treatment compared with temper and inclusions (Table 7), some interesting combinations emerge. Cordmarked sherds make up the majority of the sample (n=314) and 297 of those sherds are identified as having grit temper. What is interesting is that 2 of the cordmarked sherds also have shell tempering, a combination that could reflect some hybridity within the sample, to be touched on in the Discussion section below.

The Estimated Vessel Equivalence, or EVE, was determined for 17 of the 29 rim sherds that were separated for this analysis. These sherds were chosen based upon the size, being greater than 3% of the rim upon measuring its diameter. These EVEs represent a fraction of a vessel and can stand in as a representative of the whole pot (Orton and Hughes 2013, 210). The EVE across the four squares do not significantly differ (Pearson X2= 46.278, p= 0.062; Table 24). Similarly, the EVE for levels 02 through 07 are not significant either (Pearson X2=58.125, p= 0.361; Table 25). Finally, the crosstabulation comparing EVE and Ceramic Tradition does not significantly differ (Pearson X2= 46.042, p= 0.388; Table 26).

Decoration * Temper/Inclusions Crosstabulation

Count

		Temper/Inclusions				
		undetermined	grit	limestone	shell	Total
Decoration	no decoration	53	422	1	21	497
	combo	1	0	0	0	1
	lip lug	0	2	0	0	2
	lip notching	0	7	0	0	7
	polish	0	1	0	0	1
	slip	0	0	0	1	1
Total		54	432	1	22	509

Table 6: Decoration versus Temper and Inclusions Crosstabulation

Surface Treatment * Temper/Inclusions Crosstabulation

Count

		Temper/Inclusions				
		Undetermined	grit	limestone	shell	Total
Surface Treatment	Undetermined	15	25	0	3	43
	cordmarking	14	297	1	2	314
	smooth	24	95	0	17	136
	smooth/cordmarking	1	15	0	0	16
Total		54	432	1	22	509

Table 7: Surface Treatment versus Temper and Inclusions Crosstabulation

Establishing the "Living Floor"

This section of analysis seeks to determine the "living floor" and define fill episodes following the abandonment of the structure. Statistical analysis was conducted to determine the densities of sherds by weight within the four units and levels. Within all of the four units, the first two levels, approximately the first 20cm, 00 and 01, are plow zone and mixed contexts. Beginning with level 02, we see minimally disturbed contexts of the fill episodes (I say minimally because there is some evidence of bioturbation) and an increase in sherd concentrations. Levels 02, 03, and 04 have the greatest density of sherds by weight (Table 20). The percentage and frequencies of sherds within the four units were conducted to see which levels had the greatest number of sherds (Tables 27, 28, 29, 30). In Squares 2, 5, and 6, there also appears to be a slight increase in sherd frequency within the deeper levels (Level 07 for Sq 2; Level 05 for Sq 5; Level 09 and 10 for Sq 6). At the lowest level for all four squares, post molds were uncovered and represent the foundation for the house.

The structure is determined to be a house basin that was dug into the B horizon with a potential entrance ramp along the eastern edge. In Square 2, both the North and South wall profile have an extension that protrudes out from the main rectangle of the basin that is filled with brown, midden-like fill. In the south wall profile of Sq 2, there also appears to have a dip with feature fill, laminated midden/B horizon (Figure 23). Square 6's south wall appears to catch the edge of the slope with a similar brown, midden-like filling (Figure 31). The east and west walls of Squares 1 and 5 show the basin edge clearly against the B-horizon (Figure 22, 28).

I attempted to align Squares 1 and 5's North wall to show if fill episodes between the two units are similar or different. Within Figures 20 and 27, descriptions 12 in Sq5 and 18 in Sq1 have similar characteristics: Munsell 10yr 4/2, dark grayish brown, "soft grey fill". Both of these layers sit directly above the B-Horizon ('2' in images). Above this layer is one of mottled yellow-grey fill; 17 in Sq1 and 10 in Sq5. The mottled yellow-grey layer in Sq 5 is thicker than it is in Sq1. Several thin fill layers appear in Sq1 between the mottled yellow-grey layer and the next larger fill episode(15 and 16 in the Sq1 North Wall figure 19). A grey layer sits atop the yellow-grey mottled one, 13 in Sq1 and 9 in Sq5. The next similar layer is that of 5 in Sq1 and 6 in Sq5. It is a slightly different shade of dark grey-brown and in both units has some charcoal mottling. Within Sq1 there are two more layers that I believe either disappear between the two units (combine into one within the space between Sq 1 and 5) or 4 in Sq 1 is a layer of mottling between the grayer soils below and the more yellow soils above in 3. Layer 3 in Sq1 matches most closely to layer 4 in Sq5, even with 4 being browner (10yr4/3) and 3 being a mixture of brown and yellow-brown (10yr5/4 and 10yr4/3).

DISCUSSION

The German site represents a unique setting to study Late Woodland archaeology in the LIRV due to the lack of continued farming of the site and minimal post-depositional disturbances. After the land was included with the McCully Heritage Project, damage to the house structure and other features stopped, allowing for the preservation of the underlying context. While the plowing done in the past and the slope on which the site sits disturbed the uppermost 20cm of the site, interpretations can still be drawn from the contexts below. These preliminary conclusions drawn in this paper will change with the continued excavation of the German site and similar ones within the LIRV. There is a great wealth of information to uncover about the Late Woodland period and it begins within the home.

Square 1

Square 1 crosscuts the southern wall of the house structure and contains Feature 6, a hearth, within its bottom-most level associated with post molds 22 through 25 (Figure 13). A turtle carapace uncovered in level *7*, which may reflect some form of ritual being conducted within the structure at the time of abandonment. However, due to the lack of studies, this pattern has not been established within the Late Woodland record in the Lower Illinois River Valley. Additional comparisons will need to be conducted focusing on Jersey Bluff abandonment practices. The layers of deposition between levels 07 and 08, have fewer sherds by weight than the others, possibly indicating a cleaning of the main living surface before the house basin was filled in. The nature of Late Woodland

abandonment practices within the LIRV is still unclear and more structures will need to be studied to determine if this is a societal trend.

The quantity of sherds found within this unit indicates that the post-depositional fill in this section of the house basin contained the majority of the broken ceramics, discarded shells, and faunal remains. Across all house units, there is at least one layer of fill due to the finding of three rim sherds that refit together within Sq 1 level 04 (501.245m) and 06 (500.865m) and Sq 6 level 05 (501.005m). While these are the most conclusive sherd links, several other sherds across all the house units have similar wear patterns and appearances, even though none of them refit. In addition to these refits, a Maples Mills sherd was uncovered in level 02. This ceramic tradition is from the Central Illinois River Valley, dating around cal AD 750-1000, indicating that there was some exchange going on between the LIRV and the CIRV.

Square 5

Square 5 also crosscuts the southern wall and is a meter to the east of Square 1. Square 5 produced the least amount of sherds (n=77) and appears to catch the south-eastern corner of the structure, indicated by the right angle created with Post Mold 8-11 (Figure 14).

Figure 13: SQ1 Post Molds 22-25

Figure 14: SQ 5 Post Molds 8-11

Square 2

Square 2 and Square 6 are located along the western wall of the house basin and both appear to form a ramp structure of soil layers which is considered to be a possible entrance into the structure (Figure 24; Figure 31). However, the complete excavation of the house basin will be necessary to discern possible entrance locations. Square 2 has the second-highest frequency of analyzed collected ceramics (n= 110).

Square 6

Square 6 as mentioned above also appears to catch part of the entrance. It also reveals the North-Western corner of the structure. Only 90 sherds were analyzed from this unit.

One interesting sherd of note from this Sq 6 is piece plot (PP) 14 with a recorded depth of 501.37m (Figure 15). It has a red slip which is characteristic of the Mississippian period ceramics. It also has lip impressions, which are a decoration style attributed to the Late Woodland, Jersey Bluff phase. Lip impressions shifted out of use after the Jersey Bluff phase ended in the Lower Illinois River Valley. The presence of this sherd, with characteristics of both Jersey Bluff and Mississippian ceramic traditions, indicates some overlap in techniques in use during the time at the German site. This sherd is the most obvious example of "hybrid" ceramic culture at the German site. On this sherd, in particular, there are decoration techniques that are associated with both the Late Woodland and Mississippian ceramic traditions. In terms of high visibility (Jordan et al. 2020), PP 14 would show that the practices for adding both lip impressions and red slip to vessels were being done at the site. In future research, it will be crucial to determine

the locality of the paste used for this sherd to see if there is a movement of vessels or if it's the practices that are moving with people. Regardless of the regional location of the paste, the decorations still show some hybrid practices being used within the ceramic tradition at the German site.

Figure 15: Red Slipped sherd with Lip Impressions

Ceramics

While the sample from these four units studied was limited, the ceramics express the changes that took place at the site. German is, as of this study, a Late Woodland site with one known house basin. There are a handful of sherds that have Early Bluff characteristics (cord marking to the rim) and Mississippian characteristics (shell temper and red slipping). The most common ceramic tradition is that of Jersey Bluff with cordmarking along the body of the vessel that stops at the shoulder and grit temper. Based on the ceramic finds, the site appears to have been occupied from the Early Bluff phase (AD 600-800) into the Jersey Bluff when there were interactions and exchanges with the Mississippian peoples (AD 800-1300). It is possible that Early Bluff ceramics and production techniques continued to be used at the site into the Jersey Bluff phase due to the presence of the 3 refit rims that have cordmarking attributed to Early Bluff ceramics found in contexts with Jersey Bluff and Mississippian sherds (Figure 16 and 17). These 3 sherds being found at the site shows the longevity of occupation, as well as the longevity of ceramic practices as this community, may have continued to cordmark some of their vessels to the lip or kept using those older vessels. More radiocarbon dating, as well as thin-section petrography, will need to be conducted as more of the site is excavated to provide absolute dates for its occupation and the location of clay sources.

Figure 16: Three refit sherds from Sq 1-04E, Sq 1-06A, and Sq 6-05A; front

Figure 17: Three refits from Sq 1-04E, Sq 1-06A, and Sq 6-05A; back

Household Archaeology

So far, the house basin at the German site shows evidence for continued occupation through the Early Bluff and Jersey Bluff phases. The house itself was dug into the B-horizon, with a possible ramp entrance on the Western edge of the structure. The house fits into the Late Woodland standards having posts used to construct the walls of the structure. Timothy Pauketat and Susan Alt have questioned the different construction techniques within the American Bottom and Richland complex as Cahokia and Mississippian culture began to dominate the region (Alt 2002; Pauketat 2003; Pauketat and Alt 2005; Alt and Pauketat 2011). They argue for the agency of peoples that is expressed through their built environment and preserved in the archaeological record as post molds. Though one of their case sites, the Halliday site (11S27), is to the south of Cahokia, it could serve as an interesting parallel to the German site as they both contain post-mold structures and the German site has the potential for more than one house basin.

There were a handful of other features excavated at the German site in 2019 that lend a hand in the site layout. Feature 2, a bell-shaped pit, is an earth oven (Figure 18). Very few lithic, ceramics, faunal or floral remains were found, but there was a lot of ash and charcoal uncovered. There was a thin layer of the pit that held the most charcoal and some evidence of burnt clay. Additional features, though smaller, also contained thin layers of charcoal and ash deposits (Feature 4 and 5).

Feature 3 (Figure 19) is a rectangular pit that contains a larger quantity of ceramics and lithics, including burnt and unburnt limestone compared to Feature 2. No post molds were uncovered beneath this feature. Also, the lack of concentrated artifacts,

faunal remains, ceramic sherds, and lithic debris, leads me to think that this isn't a midden deposit.

While only a small portion of the German site has been excavated and I only focused on the house basin for this thesis, there are a few conclusions that can be drawn about the site. First, no midden deposits have been conclusively uncovered. There is evidence of filling in the house basin post abandonment, however, it was filled mostly by dirt with artifacts and faunal remains mixed in. I would expect a midden deposit to have a greater ratio of artifacts to dirt. Second, there is a hearth within the house basin as well as an earthen oven located outside the walls of the structure indicating the use of both internal and external spaces for cooking activities. Third, no storage pits have been uncovered, whether internal or external. As the excavations at the site continue, it will be important to find these pits, if there are any, because it has been an important way of marking cultural shifts in the American Bottom (Pauketat 2004; Pauketat and Alt 2005). Finally, the house basin uncovered in 2019 is probably not the only structure at the site. Magnetometry data shows that there are a few other rectangular anomalies to the north of the excavated house basin that could be other house basins. Also, a few, round anomalies are clustered in a central location to the rectangular anomalies that could be indicative of central posts, similar to the Halliday site layout from the American Bottom (Pauketat and Alt 2005). More ground-truthing and excavations will be required before a further comparison of German's site layout can be made to other examples in the LIRV and American Bottom.

Figure 18: Feature 2, Bell-shaped Earth Oven, Bisect Profile.

Figure 19: Rectangular Feature 3 level 04.

Networks and Interactions

Interactions within the Lower Illinois River Valley have often been attributed to trade or colonization, but the time has come to look into the nuances of the interactions as people actively created their identities and adopted and adapted as new technologies and strategies were introduced and knowledge was passed down within communities. When maize was introduced into the LIRV around AD 900, new ceramic technology to best exploit this new resource would soon follow. The use of shell tempering is not only associated with the Mississippian culture but has benefits that make it an ideal temper when cooking and preparing maize dishes (Boszhardt 2008; Bardolph 2014). The strength shell-tempering allowed vessels to achieve fit the changing subsistence strategies and new ways of cooking and preparing food that came along with maize agriculture.

The LIRV and the American Bottom are two regions that are very close and connected by the Illinois River as an excellent mode of transportation. It is very possible that kin networks tie the two regions together and could have led to the adoption of Mississippian ceramics and other material cultures in the LIRV. These communities of practice could also have been linked by marriage resulting in the influx of Mississippian ceramic wares as people moved from the American Bottom brought with them their knowledge and tools. The exchange of goods could have led to the adoption of ideas that the Jersey Bluff people incorporated into their own culture, as seen in previous discussions of hybridization (Baltali Tirpan 2013).

There is also the exchange and interaction taking place between the Central and the Lower Illinois River Valley to consider when looking at the German site. A Maples Mills sherd was found within the house feature indicating some form of exchange taking

place between the two groups of Late Woodland peoples. The focus for both of these regions is often on how the American Bottom was impacting life and Late Woodland traditions. Little is understood about how people within the Lower and Central Illinois River Valleys were interacting with one another during this time. People could have been moving between these regions for decades before and during the Mississippian movement into the LIRV and CIRV, thus complicating the narrative of cultural interaction we see at sites such as German.

Future research that I would like to do would include testing the ceramics found at the German site to determine the locality of the clay used for the paste. The sherds that have Mississippian characteristics would be important to determine if they were brought to the site from the American Bottom or other location, or were made on site. More flotation and floral and faunal analysis would also be important to conduct so that subsistence strategies could be included in the discussion on cultural interaction. Using multiple lines of evidence would bolster our understanding of Jersey Bluff culture as well as help answer more questions as to the nature of interaction, adoption, and change between the Jersey Bluff and Mississippian peoples.

As mentioned above, there is some preliminary evidence suggesting hybrid ceramic practices were taking place at the German site. Piece plot 14 exhibits decoration techniques from both the Late Woodland and Mississippian traditions. Several other sherds have shell tempering and cordmarking on their external surface. This combination of Mississippian temper techniques and Late Woodland surface treatment can begin to show us how people were exchanging within different communities of practice that followed and were impacted by changing subsistence strategies and cultural expression.

The presence of the Early Bluff sherd links (Figures 16 and 17) show that the inhabitants of the German Site had some ceramic connections to the Early Bluff tradition and continued to practice or hold on to those techniques into the Jersey Bluff phase.

Unfortunately, it is too soon to see if the hybrid practices continue with house construction techniques. Not enough of the house or the site has been excavated to show that the Jersey Bluff peoples were interacting and integrating with a more Mississippian lifestyle. I postulate that since houses weren't rebuilt often, maybe every 10-15 years, that the expression of hybrid practices would first begin with ceramics and easily transportable materials then construction techniques would follow, later as it was needed. As the Mississippians were moving into the LIRV, through trade or kin networks and marriage, they brought their ceramic traditions with them and that knowledge could be easily transmitted between the two groups. This could reflect the social organization, whether the Jersey Bluff and Mississippians were matrilocal or patrilocal, but more research would need to be done to gather evidence in support of that idea. The social organization of these regions could also be included within the communities of practice phenomenon as the transmission of knowledge would fall on different people within a community. Site layouts and construction techniques would not reflect these initial interactions through timing or social organization. However, sites that were built by Mississippian people as they were moving into the LIRV, like Audrey, would mirror the American Bottom settlements as they would be relatively new construction and needed to support growing populations living within them. German may not have been occupied long enough for this type of rebuilding (like at the Halliday site) to have taken place. Again, further excavation would need to be conducted as well as determining if different

kin groups can be identified based upon their ceramic production methods. This would allow for communities of practices to be identified and then mapped as people migrated between the Lower and Central Illinois River Valleys and the American Bottom.

Future Directions

Current work with Bayesian statistics and the reevaluation of ceramic typologies could benefit our understanding of what was taking place within the Lower Illinois River Valley during the Late Woodland period. Dr. Jennifer Birch from the University of Georgia has been challenging chronologies established in Southern Ontario by establishing an "independent, absolute chronology for Northern Iroquoian archaeology" known as the Dating Iroquoia Project (Birch 2020, 48). This project challenges the stepwise progression and dating of different cultural groups and opens up the field of archaeology to focus more on the lived experience of peoples and their unique expressions of culture. I think it is well past time to start establishing this way of thinking in the Illinois archaeological record. The variety of ceramics and the new excavation of the German site could act as the starting block to propel this way of interpreting assemblages from the LIRV into the narrative.

In addition to a reevaluation of ceramic typologies, it would be interesting to determine how the Mississippian ceramics were being used at the German site. Similar to Dana Bardolph's work within the Central Illinois River Valley, I would like to investigate how people were using the ceramics at the German site and more broadly within the LIRV. This would provide contextual insight into how the Late Woodland people were using/modifying/incorporating Mississippian wares into their daily routines. The

understanding of the context in which the people were using the materials we uncover allows archaeologists to provide more accurate interpretations of what was taking place in the past. As technologies advance and new methods are used, we get one step closer to rewriting that narrative.

CONCLUSION

The house basin at the German site is fairly well preserved and has maintained good context beneath the 20 centimeters of plow zone. The majority of ceramics were found *in situ* beneath this zone and show at least one episode of post-abandonment fill covering the floor surface. The site is a later Jersey Bluff settlement based on the ceramics found at the site and the continued use of post wall construction techniques employed for the house basin.

The ceramics found within the house basin units, Squares 1, 2, 5, and 6, are predominantly Jersey Bluff in characteristics. However, several shell-tempered sherds show some Mississippian ceramics were being used at the site. Multiple sherds of note had both Mississippian and Late Woodland characteristics, indicating some degree of hybridization as the newer ceramic tradition was introduced to the region. Further testing of these hybrid sherds would include testing the locality of the paste used in their construction to determine if it was local or not. This hybridity shows to me that Late Woodland potters were incorporating the new technological advancements, like shell for tempering, and other decoration styles, like red slip, while maintaining some continuity of their own, in continuing to cordmark vessels and adding lip impressions to rims.

The way the house basin was constructed shows that the German site was occupied during the Jersey Bluff phase but then abandoned before the population fully adopted a Mississippian lifestyle, or at least before they could rebuild the house in a more Mississippian way. At sites in the American Bottom that were occupied during the Late Woodland and Mississippian periods, structures were first built using post walls in the

Late Woodland style and were eventually rebuilt using wall trenches, the new Mississippian technique. For this first house basin at German, we did not uncover any wall trenching along the two sides that were excavated. As more of the site is uncovered and more structures are excavated, it would be interesting to see if other structures were built using post holes, or if there appears to be any wall trenching being done.

This research does not seek to limit the interpretation of the site as the majority of it remains beneath the ground. As previously mentioned, the site exhibits strong Jersey Bluff characteristics both from the artifacts uncovered to the construction of the house basin itself. Geophysical surveying has found some anomalies similar to the house basin that was excavated in the Summer of 2019 and further ground truthing is required to determine the size and layout of the site. The Center for American Archeology has plans to continue excavations at the site in the following field seasons and will explore the nature of Late Woodland and Mississippian interactions as they played out at the site.

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APPENDIX

Appendix 1

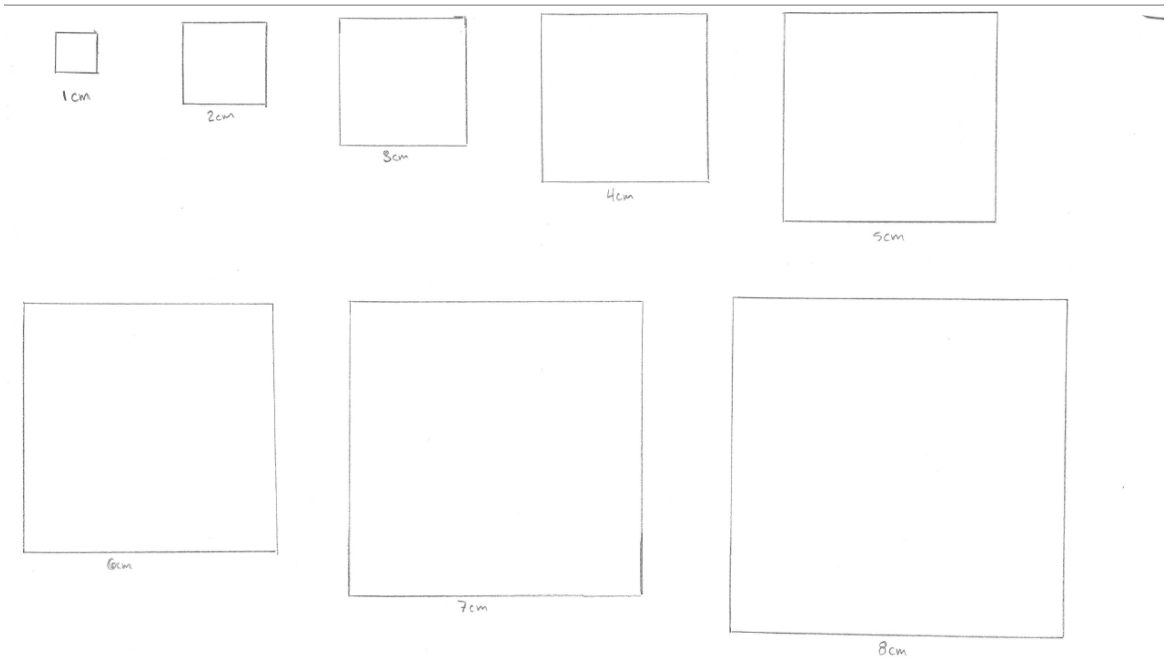


Figure 17: Ceramic size boxes

Appendix 1: Chi-Square Test Results

Table 8: Comparing Decoration across Square

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	20.820[a]	15	.143
Likelihood Ratio	17.790	15	.274
N of Valid Cases	509		

a. 20 cells (83.3%) have expected count less than 5. The minimum expected count is .15.

Square Number * Decoration Crosstabulation

			Decoration						
			Undecorated	combo	lip lug	lip notching	polish	slip	Total
SqNum	Sq 1	Count	226	0	2	4	0	0	232
		Expected Count	226.5	.5	.9	3.2	.5	.5	232.0
		% within SqNum	97.4%	0.0%	0.9%	1.7%	0.0%	0.0%	100.0%
		% within Decoration	45.5%	0.0%	100.0%	57.1%	0.0%	0.0%	45.6%
		Adjusted Residual	-.3	-.9	1.5	.6	-.9	-.9	
	Sq 2	Count	109	0	0	1	0	0	110
		Expected Count	107.4	.2	.4	1.5	.2	.2	110.0
		% within SqNum	99.1%	0.0%	0.0%	0.9%	0.0%	0.0%	100.0%
		% within Decoration	21.9%	0.0%	0.0%	14.3%	0.0%	0.0%	21.6%
		Adjusted Residual	1.1	-.5	-.7	-.5	-.5	-.5	
	Sq 5	Count	73	0	0	2	1	1	77
		Expected Count	75.2	.2	.3	1.1	.2	.2	77.0
		% within SqNum	94.8%	0.0%	0.0%	2.6%	1.3%	1.3%	100.0%
		% within Decoration	14.7%	0.0%	0.0%	28.6%	100.0%	100.0%	15.1%
		Adjusted Residual	-1.8	-.4	-.6	1.0	2.4	2.4	
	Sq6	Count	89	1	0	0	0	0	90
		Expected Count	87.9	.2	.4	1.2	.2	.2	90.0
		% within SqNum	98.9%	1.1%	0.0%	0.0%	0.0%	0.0%	100.0%
		% within Decoration	17.9%	100.0%	0.0%	0.0%	0.0%	0.0%	17.7%
		Adjusted Residual	.9	2.2	-.7	-1.2	-.5	-.5	
Total		Count	497	1	2	7	1	1	509
		Expected Count	497.0	1.0	2.0	7.0	1.0	1.0	509.0
		% within SqNum	97.6%	0.2%	0.4%	1.4%	0.2%	0.2%	100.0%
		% within Decoration	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 9: Comparing Decoration among all Levels, regardless of the square.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	44.384[a]	55	.846
Likelihood Ratio	31.535	55	.995
N of Valid Cases	509		

a. 62 cells (86.1%) have expected count less than 5. The minimum expected count is .01.

Level * Decoration Crosstabulation

			Decoration						
			Undecorated	combo	lip lug	lip notching	polish	slip	Total
Level	Walls	Count	24	0	0	0	0	0	24
		Expected Count	23.4	.0	.1	.3	.0	.0	24.0
		% within Level	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
		% within Decoration	4.8%	0.0%	0.0%	0.0%	0.0%	0.0%	4.7%
		Adjusted Residual	.8	-.2	-.3	-.6	-.2	-.2	
	0	Count	5	0	0	0	0	0	5
		Expected Count	4.9	.0	.0	.1	.0	.0	5.0
		% within Level	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
		% within Decoration	1.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.0%
		Adjusted Residual	.3	-.1	-.1	-.3	-.1	-.1	
	1	Count	40	0	0	4	0	0	44
		Expected Count	43.0	.1	.2	.6	.1	.1	44.0
		% within Level	90.9%	0.0%	0.0%	9.1%	0.0%	0.0%	100.0%
		% within Decoration	8.0%	0.0%	0.0%	57.1%	0.0%	0.0%	8.6%
		Adjusted Residual	-3.1	-.3	-.4	4.6	-.3	-.3	
	2	Count	103	0	1	1	0	1	106
		Expected Count	103.5	.2	.4	1.5	.2	.2	106.0
		% within Level	97.2%	0.0%	0.9%	0.9%	0.0%	0.9%	100.0%
		% within Decoration	20.7%	0.0%	50.0%	14.3%	0.0%	100.0%	20.8%
		Adjusted Residual	-.4	-.5	1.0	-.4	-.5	2.0	
	3	Count	79	0	0	1	0	0	80
		Expected Count	78.1	.2	.3	1.1	.2	.2	80.0
		% within Level	98.8%	0.0%	0.0%	1.3%	0.0%	0.0%	100.0%
		% within Decoration	15.9%	0.0%	0.0%	14.3%	0.0%	0.0%	15.7%
		Adjusted Residual	.7	-.4	-.6	-.1	-.4	-.4	
	4	Count	112	1	0	0	0	0	113
		Expected Count	110.3	.2	.4	1.6	.2	.2	113.0
		% within Level	99.1%	0.9%	0.0%	0.0%	0.0%	0.0%	100.0%
		% within Decoration	22.5%	100.0%	0.0%	0.0%	0.0%	0.0%	22.2%
		Adjusted Residual	1.2	1.9	-.8	-1.4	-.5	-.5	
	5	Count	52	0	1	0	1	0	54
		Expected Count	52.7	.1	.2	.7	.1	.1	54.0
		% within Level	96.3%	0.0%	1.9%	0.0%	1.9%	0.0%	100.0%
		% within Decoration	10.5%	0.0%	50.0%	0.0%	100.0%	0.0%	10.6%
		Adjusted Residual	-.7	-.3	1.8	-.9	2.9	-.3	
	6	Count	32	0	0	1	0	0	33
		Expected Count	32.2	.1	.1	.5	.1	.1	33.0
		% within Level	97.0%	0.0%	0.0%	3.0%	0.0%	0.0%	100.0%
		% within Decoration	6.4%	0.0%	0.0%	14.3%	0.0%	0.0%	6.5%
		Adjusted Residual	-.3	-.3	-.4	.8	-.3	-.3	
	7	Count	22	0	0	0	0	0	22
		Expected Count	21.5	.0	.1	.3	.0	.0	22.0
		% within Level	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
		% within Decoration	4.4%	0.0%	0.0%	0.0%	0.0%	0.0%	4.3%
		Adjusted Residual	.7	-.2	-.3	-.6	-.2	-.2	
	8	Count	4	0	0	0	0	0	4
		Expected Count	3.9	.0	.0	.1	.0	.0	4.0
		% within Level	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
		% within Decoration	0.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.8%
		Adjusted Residual	.3	-.1	-.1	-.2	-.1	-.1	

	9	Count	13	0	0	0	0	0	13
		Expected Count	12.7	.0	.1	.2	.0	.0	13.0
		% within Level	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
		% within Decoration	2.6%	0.0%	0.0%	0.0%	0.0%	0.0%	2.6%
		Adjusted Residual	.6	-.2	-.2	-.4	-.2	-.2	
	10	Count	11	0	0	0	0	0	11
		Expected Count	10.7	.0	.0	.2	.0	.0	11.0
		% within Level	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
		% within Decoration	2.2%	0.0%	0.0%	0.0%	0.0%	0.0%	2.2%
		Adjusted Residual	.5	-.1	-.2	-.4	-.1	-.1	
Total		Count	497	1	2	7	1	1	509
		Expected Count	497.0	1.0	2.0	7.0	1.0	1.0	509.0
		% within Level	97.6%	0.2%	0.4%	1.4%	0.2%	0.2%	100.0%
		% within Decoration	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 10: Comparing Surface Treatment between the Squares

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	17.093[a]	9	.047
Likelihood Ratio	16.496	9	.057
N of Valid Cases	509		

a. 3 cells (18.8%) have expected count less than 5. The minimum expected count is 2.42.

Square Number * Surface Treatment Crosstabulation

			Surface Treatment				
			Undetermined	cordmarking	smooth	smooth/cord marking	Total
SqNum	Sq 1	Count	18	138	69	7	232
		Expected Count	19.6	143.1	62.0	7.3	232.0
		% within SqNum	7.8%	59.5%	29.7%	3.0%	100.0%
		% within SurfTreat	41.9%	43.9%	50.7%	43.8%	45.6%
		Adjusted Residual	-.5	-.9	1.4	-.1	
	Sq 2	Count	8	72	27	3	110
		Expected Count	9.3	67.9	29.4	3.5	110.0
		% within SqNum	7.3%	65.5%	24.5%	2.7%	100.0%
		% within SurfTreat	18.6%	22.9%	19.9%	18.8%	21.6%
		Adjusted Residual	-.5	.9	-.6	-.3	
	Sq 5	Count	13	51	12	1	77
		Expected Count	6.5	47.5	20.6	2.4	77.0
		% within SqNum	16.9%	66.2%	15.6%	1.3%	100.0%
		% within SurfTreat	30.2%	16.2%	8.8%	6.3%	15.1%
		Adjusted Residual	2.9	.9	-2.4	-1.0	
	Sq6	Count	4	53	28	5	90
		Expected Count	7.6	55.5	24.0	2.8	90.0
		% within SqNum	4.4%	58.9%	31.1%	5.6%	100.0%
		% within SurfTreat	9.3%	16.9%	20.6%	31.3%	17.7%
		Adjusted Residual	-1.5	-.6	1.0	1.4	
Total		Count	43	314	136	16	509
		Expected Count	43.0	314.0	136.0	16.0	509.0
		% within SqNum	8.4%	61.7%	26.7%	3.1%	100.0%
		% within SurfTreat	100.0%	100.0%	100.0%	100.0%	100.0%

Table 11: Comparing Surface Treatment and Levels regardless of square

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	69.951[a]	33	<.001
Likelihood Ratio	70.052	33	<.001
N of Valid Cases	509		

a. 27 cells (56.3%) have expected count less than 5. The minimum expected count is .13.

Level * Surface Treatment Crosstabulation

			Surface Treatment				
			Undetermined	cordmarking	smooth	smooth/cord marking	Total
Level	Walls	Count	0	16	5	3	24
		Expected Count	2.0	14.8	6.4	.8	24.0
		% within Level	0.0%	66.7%	20.8%	12.5%	100.0%
		% within SurfTreat	0.0%	5.1%	3.7%	18.8%	4.7%
		Adjusted Residual	-1.5	.5	-.7	2.7	
	0	Count	2	2	1	0	5
		Expected Count	.4	3.1	1.3	.2	5.0
		% within Level	40.0%	40.0%	20.0%	0.0%	100.0%
		% within SurfTreat	4.7%	0.6%	0.7%	0.0%	1.0%
		Adjusted Residual	2.5	-1.0	-.3	-.4	
	1	Count	11	21	12	0	44
		Expected Count	3.7	27.1	11.8	1.4	44.0
		% within Level	25.0%	47.7%	27.3%	0.0%	100.0%
		% within SurfTreat	25.6%	6.7%	8.8%	0.0%	8.6%
		Adjusted Residual	4.1	-2.0	.1	-1.3	
	2	Count	16	63	25	2	106
		Expected Count	9.0	65.4	28.3	3.3	106.0
		% within Level	15.1%	59.4%	23.6%	1.9%	100.0%
		% within SurfTreat	37.2%	20.1%	18.4%	12.5%	20.8%
		Adjusted Residual	2.8	-.5	-.8	-.8	
	3	Count	6	42	30	2	80
		Expected Count	6.8	49.4	21.4	2.5	80.0
		% within Level	7.5%	52.5%	37.5%	2.5%	100.0%
		% within SurfTreat	14.0%	13.4%	22.1%	12.5%	15.7%
		Adjusted Residual	-.3	-1.8	2.4	-.4	
	4	Count	3	73	32	5	113
		Expected Count	9.5	69.7	30.2	3.6	113.0
		% within Level	2.7%	64.6%	28.3%	4.4%	100.0%
		% within SurfTreat	7.0%	23.2%	23.5%	31.3%	22.2%
		Adjusted Residual	-2.5	.7	.4	.9	
	5	Count	2	36	15	1	54
		Expected Count	4.6	33.3	14.4	1.7	54.0
		% within Level	3.7%	66.7%	27.8%	1.9%	100.0%
		% within SurfTreat	4.7%	11.5%	11.0%	6.3%	10.6%
		Adjusted Residual	-1.3	.8	.2	-.6	
	6	Count	1	23	8	1	33
		Expected Count	2.8	20.4	8.8	1.0	33.0
		% within Level	3.0%	69.7%	24.2%	3.0%	100.0%
		% within SurfTreat	2.3%	7.3%	5.9%	6.3%	6.5%
		Adjusted Residual	-1.2	1.0	-.3	.0	
	7	Count	0	17	3	2	22
		Expected Count	1.9	13.6	5.9	.7	22.0
		% within Level	0.0%	77.3%	13.6%	9.1%	100.0%
		% within SurfTreat	0.0%	5.4%	2.2%	12.5%	4.3%
		Adjusted Residual	-1.5	1.5	-1.4	1.6	
	8	Count	1	1	2	0	4
		Expected Count	.3	2.5	1.1	.1	4.0
		% within Level	25.0%	25.0%	50.0%	0.0%	100.0%
		% within SurfTreat	2.3%	0.3%	1.5%	0.0%	0.8%
		Adjusted Residual	1.2	-1.5	1.1	-.4	

	9	Count	1	12	0	0	13
		Expected Count	1.1	8.0	3.5	.4	13.0
		% within Level	7.7%	92.3%	0.0%	0.0%	100.0%
		% within SurfTreat	2.3%	3.8%	0.0%	0.0%	2.6%
		Adjusted Residual	-.1	2.3	-2.2	-.7	
	10	Count	0	8	3	0	11
		Expected Count	.9	6.8	2.9	.3	11.0
		% within Level	0.0%	72.7%	27.3%	0.0%	100.0%
		% within SurfTreat	0.0%	2.5%	2.2%	0.0%	2.2%
		Adjusted Residual	-1.0	.8	.0	-.6	
Total		Count	43	314	136	16	509
		Expected Count	43.0	314.0	136.0	16.0	509.0
		% within Level	8.4%	61.7%	26.7%	3.1%	100.0%
		% within SurfTreat	100.0%	100.0%	100.0%	100.0%	100.0%

Table 12: Comparison of Ceramic Traditions across the Squares

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	11.795[a]	12	.462
Likelihood Ratio	13.255	12	.351
N of Valid Cases	509		

a. 11 cells (55.0%) have expected count less than 5. The minimum expected count is .15.

Square Number * Ceramic Tradition Crosstabulation

			Ceramic Tradition					
			Undetermined	Early Bluff	Jersey Bluff	Mississippian	Maples Mills	Total
Square Number	1	Count	27	3	195	6	1	232
		Expected Count	29.2	1.8	195.1	5.5	.5	232.0
		% within SqNumNom	11.6%	1.3%	84.1%	2.6%	0.4%	100.0%
		% within CerTrad	42.2%	75.0%	45.6%	50.0%	100.0%	45.6%
		Standardized Residual	-.4	.9	.0	.2	.8	
	2	Count	9	0	97	4	0	110
		Expected Count	13.8	.9	92.5	2.6	.2	110.0
		% within SqNumNom	8.2%	0.0%	88.2%	3.6%	0.0%	100.0%
		% within CerTrad	14.1%	0.0%	22.7%	33.3%	0.0%	21.6%
		Standardized Residual	-1.3	-.9	.5	.9	-.5	
	5	Count	10	0	66	1	0	77
		Expected Count	9.7	.6	64.7	1.8	.2	77.0
		% within SqNumNom	13.0%	0.0%	85.7%	1.3%	0.0%	100.0%
		% within CerTrad	15.6%	0.0%	15.4%	8.3%	0.0%	15.1%
		Standardized Residual	.1	-.8	.2	-.6	-.4	
	6	Count	18	1	70	1	0	90
		Expected Count	11.3	.7	75.7	2.1	.2	90.0
		% within SqNumNom	20.0%	1.1%	77.8%	1.1%	0.0%	100.0%
		% within CerTrad	28.1%	25.0%	16.4%	8.3%	0.0%	17.7%
		Standardized Residual	2.0	.3	-.7	-.8	-.4	
Total		Count	64	4	428	12	1	509
		Expected Count	64.0	4.0	428.0	12.0	1.0	509.0
		% within SqNumNom	12.6%	0.8%	84.1%	2.4%	0.2%	100.0%
		% within CerTrad	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 13: Comparison of Ceramic Traditions between all Levels, regardless of Square

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	34.085[a]	40	.733
Likelihood Ratio	34.466	40	.717
N of Valid Cases	485		

a. 41 cells (74.5%) have expected count less than 5. The minimum expected count is .01.

Level * Ceramic Tradition Crosstabulation

			Ceramic Tradition				
			Early Bluff	Jersey Bluff	Mississippian	Maples Mills	Total
Level	0	Count	0	0	5	0	0	5
		Expected Count	.7	.0	4.2	.1	.0	5.0
		% within Level	0.0%	0.0%	100.0%	0.0%	0.0%	100.0%
		% within CerTrad	0.0%	0.0%	1.2%	0.0%	0.0%	1.0%
		Adjusted Residual	-.9	-.2	1.0	-.3	-.1	
	1	Count	4	0	40	0	0	44
		Expected Count	5.8	.3	36.8	1.0	.1	44.0
		% within Level	9.1%	0.0%	90.9%	0.0%	0.0%	100.0%
		% within CerTrad	6.3%	0.0%	9.9%	0.0%	0.0%	9.1%
		Adjusted Residual	-.8	-.5	1.4	-1.1	-.3	
	2	Count	15	0	89	1	1	106
		Expected Count	14.0	.7	88.7	2.4	.2	106.0
		% within Level	14.2%	0.0%	84.0%	0.9%	0.9%	100.0%
		% within CerTrad	23.4%	0.0%	21.9%	9.1%	100.0%	21.9%
		Adjusted Residual	.3	-.9	.1	-1.0	1.9	
	3	Count	13	0	66	1	0	80
		Expected Count	10.6	.5	67.0	1.8	.2	80.0
		% within Level	16.3%	0.0%	82.5%	1.3%	0.0%	100.0%
		% within CerTrad	20.3%	0.0%	16.3%	9.1%	0.0%	16.5%
		Adjusted Residual	.9	-.8	-.3	-.7	-.4	
	4	Count	13	1	91	8	0	113
		Expected Count	14.9	.7	94.6	2.6	.2	113.0
		% within Level	11.5%	0.9%	80.5%	7.1%	0.0%	100.0%
		% within CerTrad	20.3%	33.3%	22.4%	72.7%	0.0%	23.3%
		Adjusted Residual	-.6	.4	-1.0	3.9	-.6	
	5	Count	11	1	41	1	0	54
		Expected Count	7.1	.3	45.2	1.2	.1	54.0
		% within Level	20.4%	1.9%	75.9%	1.9%	0.0%	100.0%
		% within CerTrad	17.2%	33.3%	10.1%	9.1%	0.0%	11.1%
		Adjusted Residual	1.7	1.2	-1.6	-.2	-.4	
	6	Count	4	1	28	0	0	33
		Expected Count	4.4	.2	27.6	.7	.1	33.0
		% within Level	12.1%	3.0%	84.8%	0.0%	0.0%	100.0%
		% within CerTrad	6.3%	33.3%	6.9%	0.0%	0.0%	6.8%
		Adjusted Residual	-.2	1.8	.2	-.9	-.3	
	7	Count	2	0	20	0	0	22
		Expected Count	2.9	.1	18.4	.5	.0	22.0
		% within Level	9.1%	0.0%	90.9%	0.0%	0.0%	100.0%
		% within CerTrad	3.1%	0.0%	4.9%	0.0%	0.0%	4.5%
		Adjusted Residual	-.6	-.4	.9	-.7	-.2	
	8	Count	1	0	3	0	0	4
		Expected Count	.5	.0	3.3	.1	.0	4.0
		% within Level	25.0%	0.0%	75.0%	0.0%	0.0%	100.0%
		% within CerTrad	1.6%	0.0%	0.7%	0.0%	0.0%	0.8%
		Adjusted Residual	.7	-.2	-.5	-.3	-.1	
	9	Count	0	0	13	0	0	13
		Expected Count	1.7	.1	10.9	.3	.0	13.0
		% within Level	0.0%	0.0%	100.0%	0.0%	0.0%	100.0%
		% within CerTrad	0.0%	0.0%	3.2%	0.0%	0.0%	2.7%
		Adjusted Residual	-1.4	-.3	1.6	-.6	-.2	
	10	Count	1	0	10	0	0	11
		Expected Count	1.5	.1	9.2	.2	.0	11.0
		% within Level	9.1%	0.0%	90.9%	0.0%	0.0%	100.0%
		% within CerTrad	1.6%	0.0%	2.5%	0.0%	0.0%	2.3%
		Adjusted Residual	-.4	-.3	.7	-.5	-.2	

Total	Count	64	3	406	11	1	485
	Expected Count	64.0	3.0	406.0	11.0	1.0	485.0
	% within Level	13.2%	0.6%	83.7%	2.3%	0.2%	100.0%
	% within CerTrad	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Appendix 2: T-Test, ANOVA, NonParametric Test Results

Table 14: Test of Normality- Skewness and Kurtosis- for Rim Diameter and Weight

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Weight	508	.95	90.78	8.3799	11.37544	3.755	.108	17.350	.216
RimDiam	17	9	36	21.41	7.151	.528	.550	.327	1.063
Valid N (listwise)	17								

Table 15: Test of Homogeneity of Variance for Rim Diameter and Weight

Tests of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
Weight	Based on Mean	3.146	3	504	.025
	Based on Median	1.175	3	504	.319
	Based on Median and with adjusted df	1.175	3	415.279	.319
	Based on trimmed mean	1.572	3	504	.195
RimDiam	Based on Mean	1.777	1	13	.205
	Based on Median	1.303	1	13	.274
	Based on Median and with adjusted df	1.303	1	11.543	.277
	Based on trimmed mean	1.755	1	13	.208

Table 16: ANOVA conducted with Rim Diameter and Squares

Descriptives

RimDiam

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1	12	21.83	8.133	2.348	16.67	27.00	9	36
2	1	18.00	.	.	.	.	18	18
5	1	28.00	.	.	.	.	28	28
6	3	18.67	2.309	1.333	12.93	24.40	16	20
Total	17	21.41	7.151	1.734	17.74	25.09	9	36

ANOVA

RimDiam

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	79.784	3	26.595	.468	.709
Within Groups	738.333	13	56.795		
Total	818.118	16			

Table 17: ANOVA Conducted with Ceramic Traditions (1=Jersey Bluff, 2=Mississippian, 3=Early Bluff, 4=Maples Mills)

Descriptives

RimDiam

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1	8	23.50	9.103	3.218	15.89	31.11	9	36
2	3	21.33	6.110	3.528	6.16	36.51	16	28
3	4	19.50	1.000	.500	17.91	21.09	18	20
4	1	11.00	.	.	.	.	11	11
Total	16	21.31	7.373	1.843	17.38	25.24	9	36

ANOVA

RimDiam

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	157.771	3	52.590	.960	.443
Within Groups	657.667	12	54.806		
Total	815.438	15			

Table 18: Kruskal-Wallis Weight by Square Test Summary and Histogram

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.[a,b]	Decision
1	The distribution of Weight is the same across categories of SqNumNom.	Independent-Samples Kruskal-Wallis Test	.309	Retain the null hypothesis.

a. The significance level is .050.

b. Asymptotic significance is displayed.

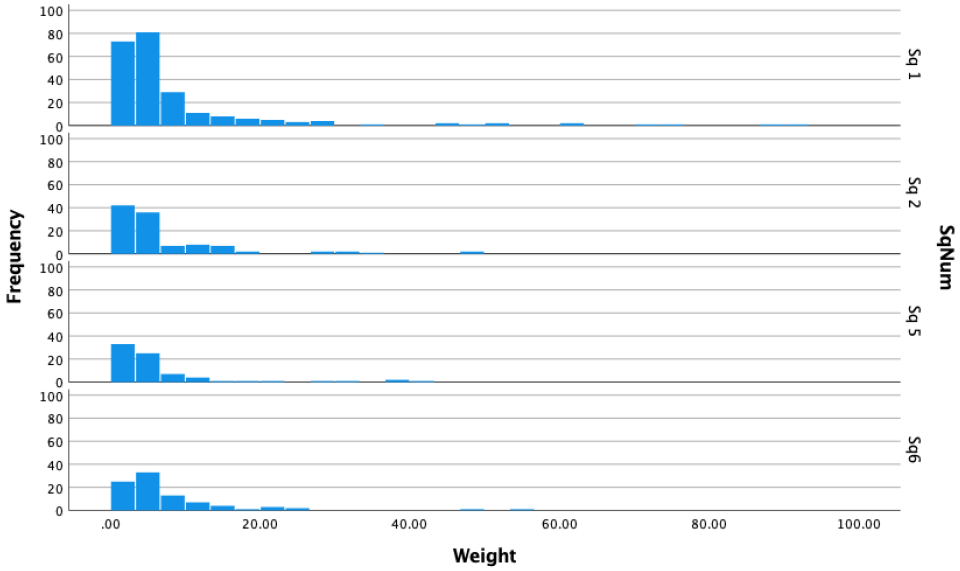


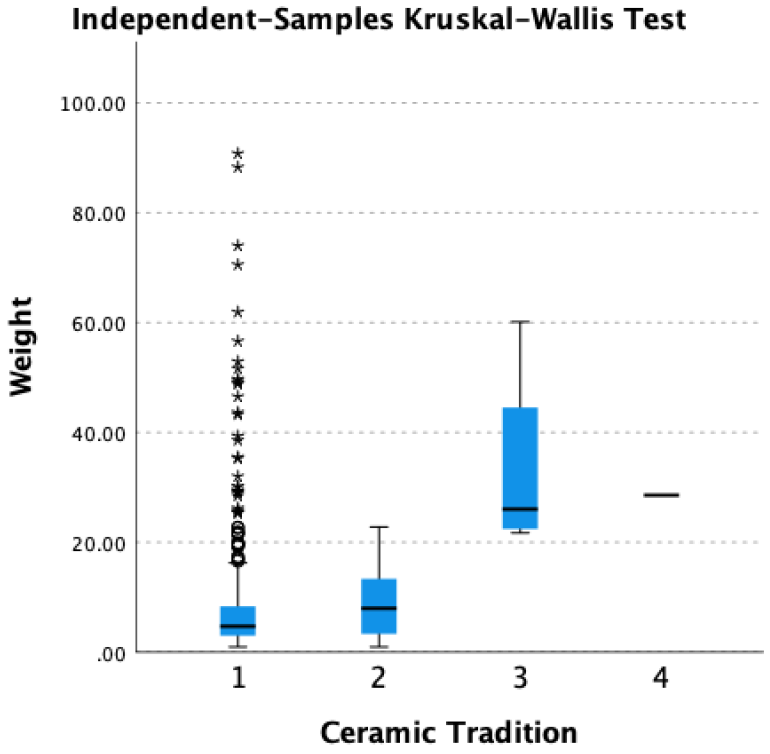
Table 19: Kruskal-Wallis Comparison of Weight by Ceramic Tradition with Test Summary, Box plot, and Pairwise Comparison

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.[a,b]	Decision
1	The distribution of Weight is the same across categories of CerTradNom.	Independent-Samples Kruskal-Wallis Test	.007	Reject the null hypothesis.

a. The significance level is .050.

b. Asymptotic significance is displayed.



Pairwise Comparisons of Ceramic Tradition

Sample 1-Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig.[a]
1-2	-29.733	37.558	-.792	.429	1.000
1-4	-196.525	128.466	-1.530	.126	.756
1-3	-197.400	64.458	-3.062	.002	.013
2-4	-166.792	133.555	-1.249	.212	1.000
2-3	-167.667	74.083	-2.263	.024	.142
4-3	.875	143.461	.006	.995	1.000

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.

Asymptotic significances (2-sided tests) are displayed. The significance level is .050.

a. Significance values have been adjusted by the Bonferroni correction for multiple tests.

Table 20: Kruskal-Wallis Comparison of Weight by Level

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.[a,b]	Decision
1	The distribution of Weight is the same across categories of Level.	Independent-Samples Kruskal-Wallis Test	<.001	Reject the null hypothesis.

a. The significance level is .050.

b. Asymptotic significance is displayed.

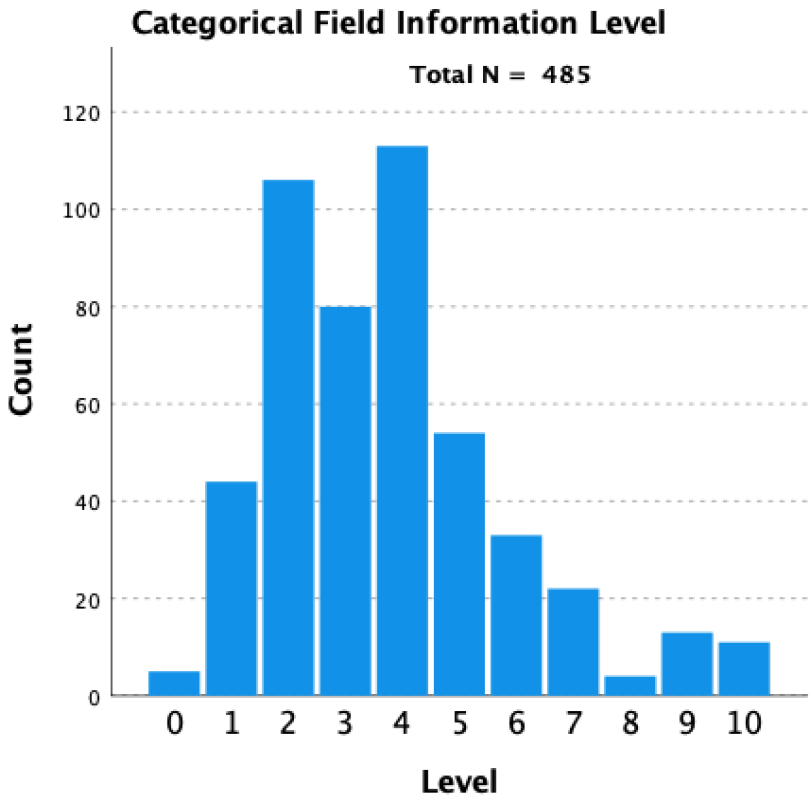


Table 21: Kruskal-Wallis Comparison of Weight by Temper and Inclusions

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.[a,b]	Decision
1	The distribution of Weight is the same across categories of TempInclusNom.	Independent-Samples Kruskal-Wallis Test	.576	Retain the null hypothesis.

a. The significance level is .050.

b. Asymptotic significance is displayed.

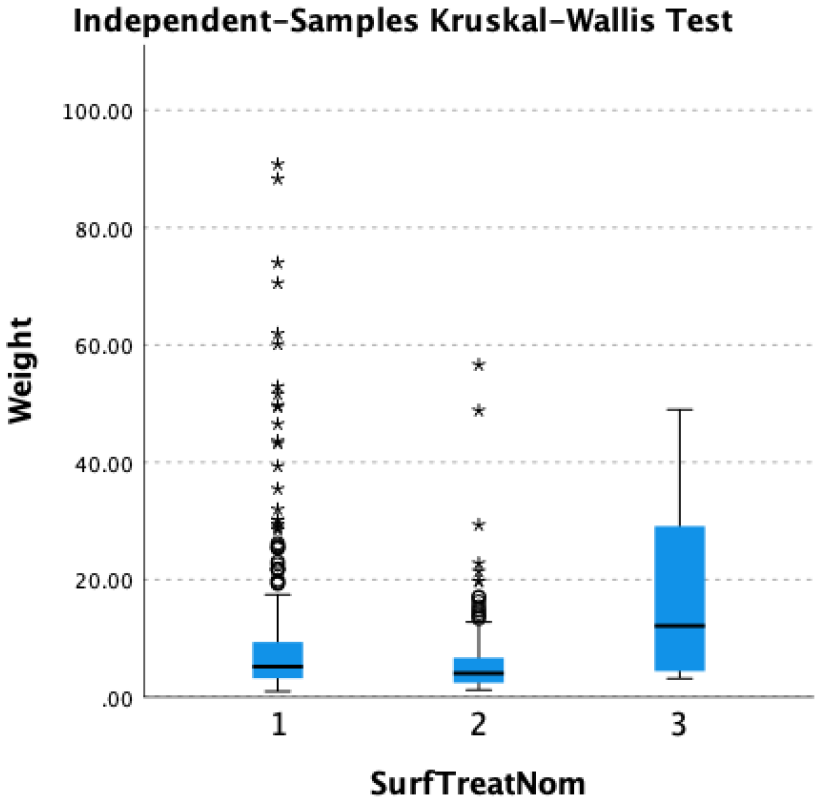
Table 22: Kruskal-Wallis Comparison of Weight by Surface Treatment including Pairwise Comparison

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.[a,b]	Decision
1	The distribution of Weight is the same across categories of SurfTreatNom.	Independent-Samples Kruskal-Wallis Test	<.001	Reject the null hypothesis.

a. The significance level is .050.

b. Asymptotic significance is displayed.



Pairwise Comparisons of SurfTreatNom

Sample 1-Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig.[a]
2-1	49.363	13.801	3.577	<.001	.001
2-3	-141.599	35.516	-3.987	<.001	.000
1-3	-92.236	34.442	-2.678	.007	.022

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.

Asymptotic significances (2-sided tests) are displayed. The significance level is .050.

a. Significance values have been adjusted by the Bonferroni correction for multiple tests.

Appendix 3: Ceramic Trends Test Results

Table 23: Exterior Color Comparison with Temper and Inclusions

Exterior Color * Temper/Inclusion Crosstabulation

Count

		Temper/Inclusion				
		undetermined	grit	limestone	shell	Total
ExtColor	undetermined	4	4	0	1	9
	black	4	62	0	0	66
	brown	13	146	0	6	165
	brown and black	0	2	0	0	2
	grey	2	39	0	0	41
	orange	11	84	1	9	105
	red	3	3	0	1	7
	tan	15	86	0	5	106
	yellow	2	5	0	0	7
	yellow-brown	0	1	0	0	1
Total		54	432	1	22	509

Table 24: Crosstabulation of EVE and Squares

EVE Percentage * Square Number Crosstabulation

Count

		SqNumNom				
		1	2	5	6	Total
EVEPerc	3	1	0	0	0	1
	4	2	0	0	0	2
	5	2	0	0	1	3
	6	0	0	0	1	1
	7	0	0	1	0	1
	7	1	0	0	0	1
	8	2	0	0	0	2
	11	1	0	0	0	1
	12	1	0	0	0	1
	14	0	0	0	1	1
	18	2	0	0	0	2
	20	0	1	0	0	1
Total		12	1	1	3	17

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	46.278[a]	33	.062
Likelihood Ratio	26.281	33	.790
Linear-by-Linear Association	.057	1	.812
N of Valid Cases	17		

a. 48 cells (100.0%) have expected count less than 5. The minimum expected count is .06.

Table 25: Crosstabulation of EVE and Levels

EVEPerc * Level Crosstabulation

Count

		Level						
		2	3	4	5	6	7	Total
EVEPerc	3	0	0	1	0	0	0	1
	4	0	1	1	0	0	0	2
	5	0	1	0	1	0	0	2
	6	0	0	1	0	0	0	1
	7	1	0	0	0	0	0	1
	7	0	0	0	1	0	0	1
	8	0	1	0	0	0	0	1
	11	0	0	0	0	1	0	1
	12	0	0	0	1	0	0	1
	14	0	0	1	0	0	0	1
	18	1	0	0	0	1	0	2
	20	0	0	0	0	0	1	1
Total		2	3	4	3	2	1	15

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	58.125[a]	55	.361
Likelihood Ratio	43.105	55	.878
Linear-by-Linear Association	2.296	1	.130
N of Valid Cases	15		

a. 72 cells (100.0%) have expected count less than 5. The minimum expected count is .07.

Table 26: Crosstabulation of EVE and Ceramic Traditions

EVE Percentage * Ceramic Tradition Crosstabulation

Count

		Ceramic Tradition					
		Undetermined	Early Bluff	Jersey Bluff	Mississippian	Maples Mills	Total
EVEPerc	3	0	0	1	0	0	1
	4	0	1	1	0	0	2
	5	0	1	2	0	0	3
	6	0	0	0	1	0	1
	7	0	0	0	1	0	1
	7	1	0	0	0	0	1
	8	0	1	0	1	0	2
	11	0	1	0	0	0	1
	12	0	0	1	0	0	1
	14	0	0	1	0	0	1
	18	0	0	1	0	1	2
	20	0	0	1	0	0	1
Total		1	4	8	3	1	17

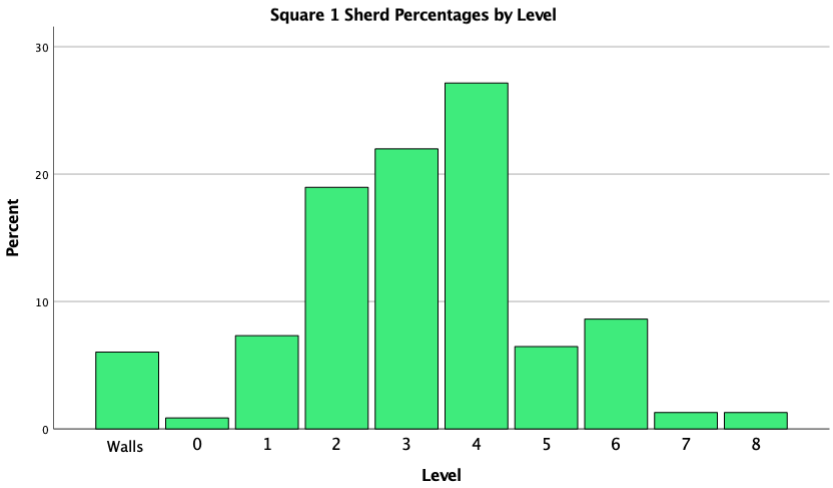
Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	46.042[a]	44	.388
Likelihood Ratio	33.239	44	.882
N of Valid Cases	17		

a. 60 cells (100.0%) have expected count less than 5. The minimum expected count is .06.

Appendix 4: Establishing the "Living Floor"

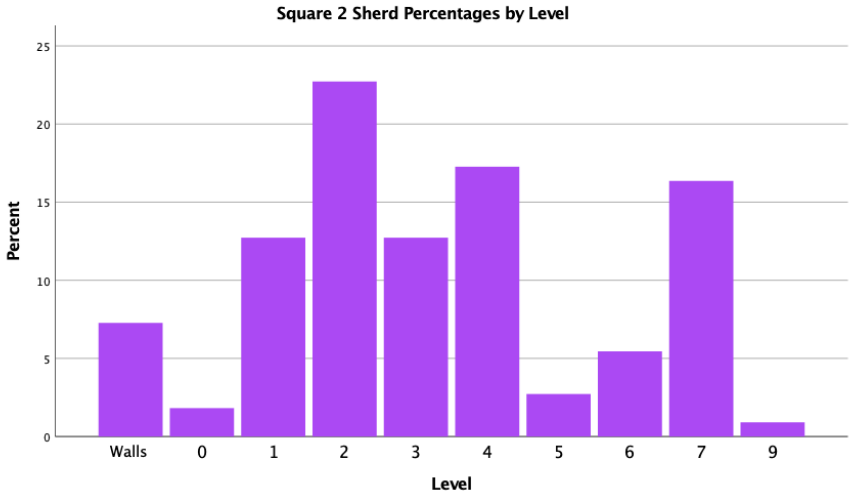
Table 27: Square 1 Sherd Percentages and Frequencies by Level with Box Graph



Square 1 Sherd Percentagesand Frequency by Level

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Walls	14	6.0	6.0	6.0
	0	2	.9	.9	6.9
	1	17	7.3	7.3	14.2
	2	44	19.0	19.0	33.2
	3	51	22.0	22.0	55.2
	4	63	27.2	27.2	82.3
	5	15	6.5	6.5	88.8
	6	20	8.6	8.6	97.4
	7	3	1.3	1.3	98.7
	8	3	1.3	1.3	100.0
	Total	232	100.0	100.0	

Table 28: Square 2 Sherd Percentages and Frequencies by Level with Box Graph



Square 2 Sherd Percentages and Frequencies by Level

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Walls	8	7.3	7.3	7.3
	0	2	1.8	1.8	9.1
	1	14	12.7	12.7	21.8
	2	25	22.7	22.7	44.5
	3	14	12.7	12.7	57.3
	4	19	17.3	17.3	74.5
	5	3	2.7	2.7	77.3
	6	6	5.5	5.5	82.7
	7	18	16.4	16.4	99.1
	9	1	.9	.9	100.0
	Total	110	100.0	100.0	

Table 29: Square 5 Sherd Percentages and Frequencies by Level with Box Graph

Square 5 Sherd Percentages and Frequencies by Level

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	11	14.3	14.3	14.3
	2	33	42.9	42.9	57.1
	3	7	9.1	9.1	66.2
	4	5	6.5	6.5	72.7
	5	21	27.3	27.3	100.0
	Total	77	100.0	100.0	

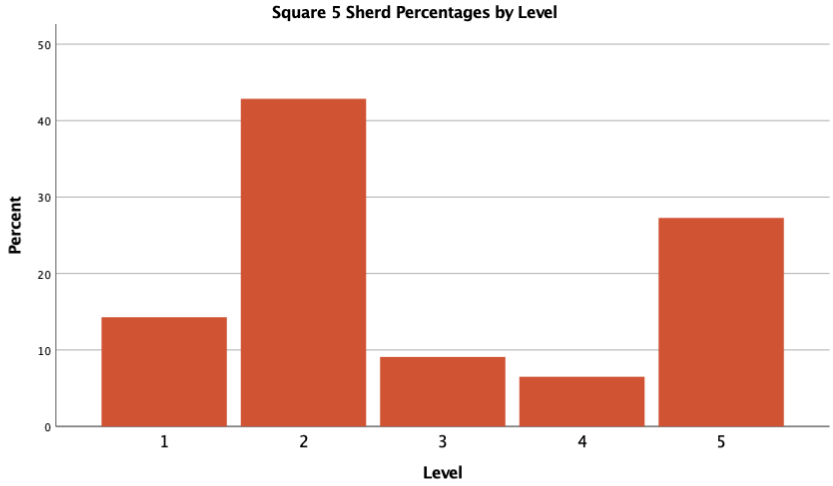
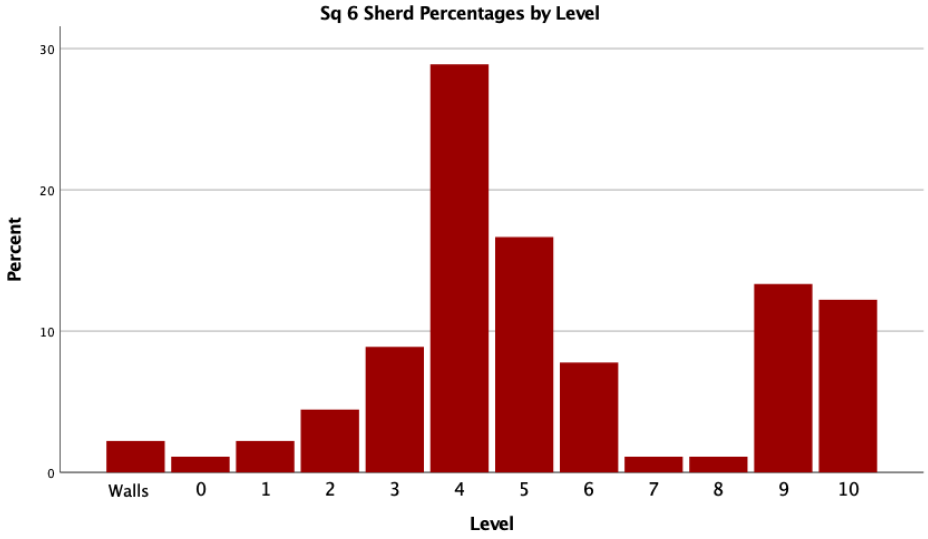


Table 30: Square 6 Sherd Percentages and Frequencies by Level with Box Graph

Square 6 Percentages and Frequencies by Level

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Walls	2	2.2	2.2	2.2
	0	1	1.1	1.1	3.3
	1	2	2.2	2.2	5.6
	2	4	4.4	4.4	10.0
	3	8	8.9	8.9	18.9
	4	26	28.9	28.9	47.8
	5	15	16.7	16.7	64.4
	6	7	7.8	7.8	72.2
	7	1	1.1	1.1	73.3
	8	1	1.1	1.1	74.4
	9	12	13.3	13.3	87.8
	10	11	12.2	12.2	100.0
	Total	90	100.0	100.0	

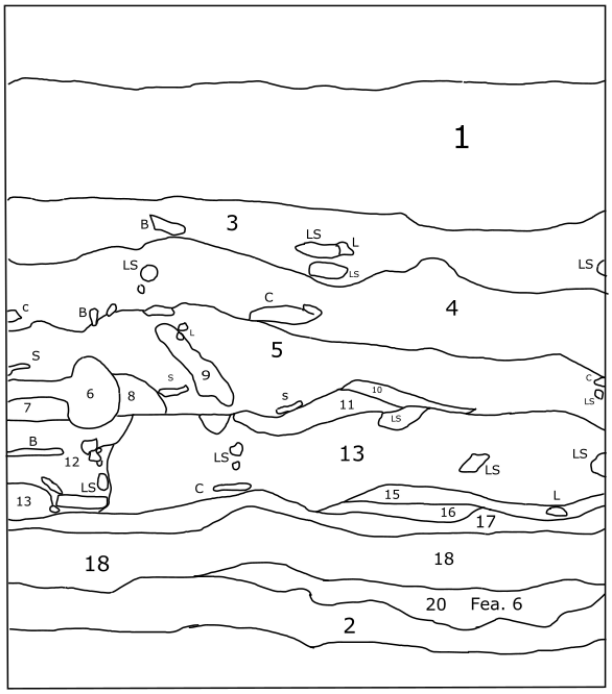


Appendix 6: Square Profiles and Zone Notes

Figure 20: Square 1 North Wall Profile - 1m

Upper Depth: 16 cm

Upper Depth: 17.5 cm



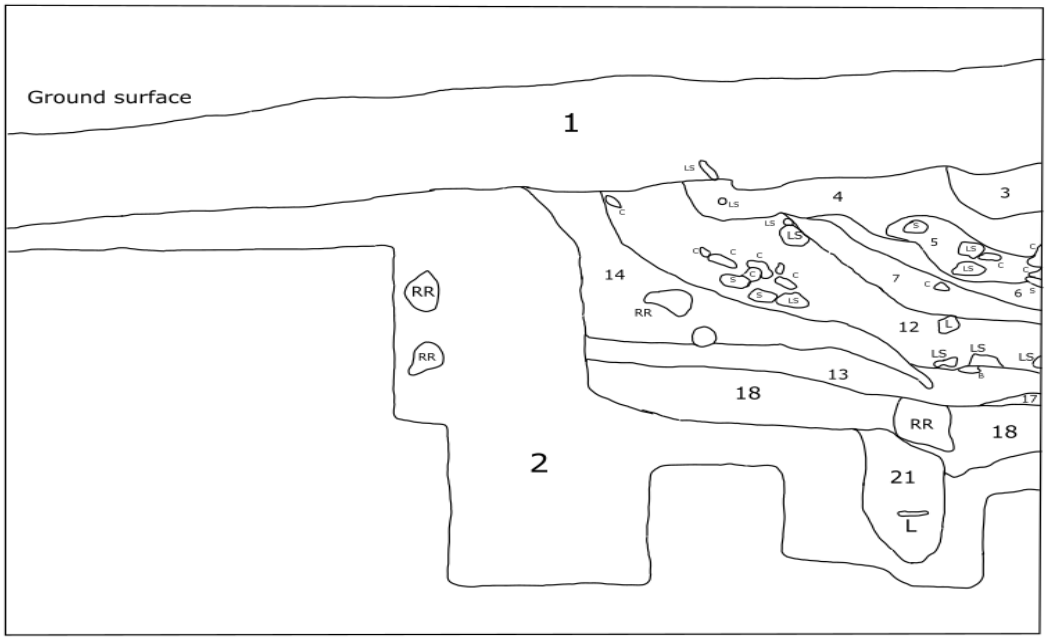
Lower Depth: 111.5 cm

Lower Depth: 112 cm

Figure 21: Square 1 West Wall Profile - 2m

Upper Depth: 31 cm

Upper Depth: 15 cm



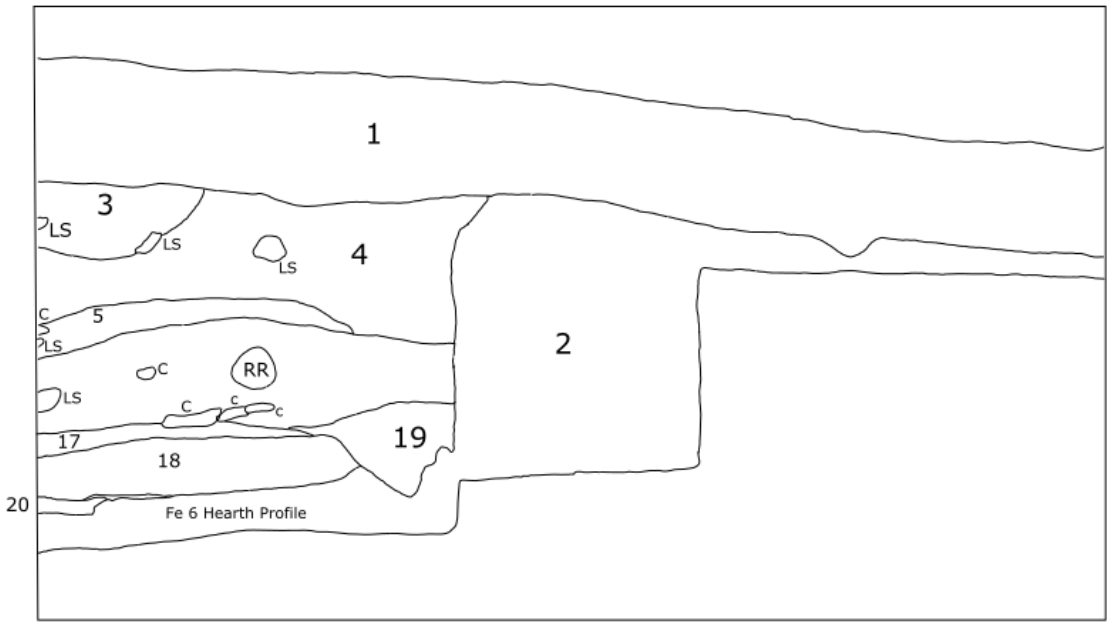
Lower Depth: 58 cm

Lower Depth: 111 cm

Figure 22: Square 1 East Wall Profile - 2m

Upper Depth: 20 cm

Upper Depth: 35 cm



Lower Depth: 113 cm

Lower Depth: 60 cm

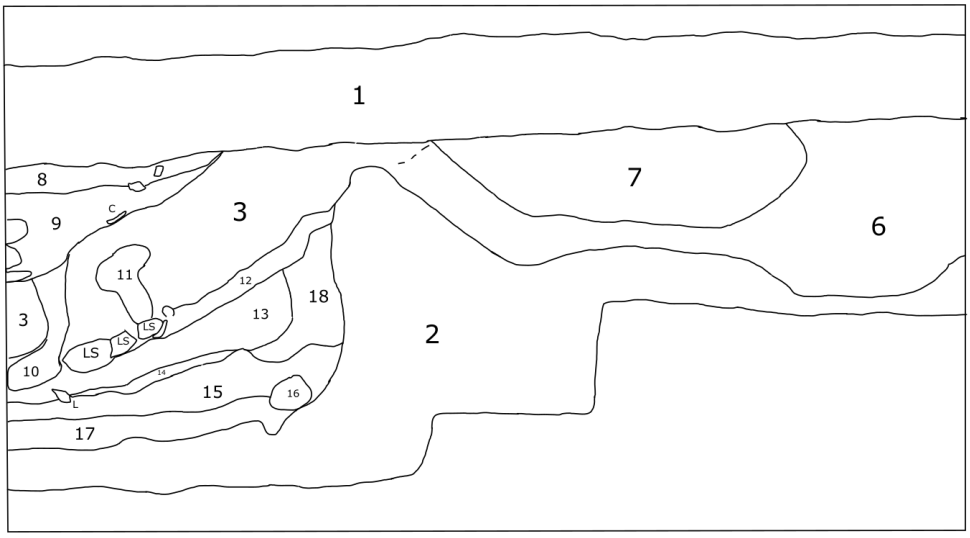
Square 1 Profile Zone Notes

Zone	Description
1	Plow Zone
2	B Horizon
3	Mottled (North wall→ E and W wall)- Feature fill- not mottled from Plow zone; dark, bone, chert, charcoal, burnt limestone, pottery
4	Browner than B- feature fill- ___ mottling, charcoal, and burnt earth (possible blobs); burnt limestone, pottery, all 3 walls
5	Feature fill- a lot of burnt earth, some ash, charcoal, reddish color, shell, limestone, chert, pottery; increase of burnt deposit than previous layers; in all wall
6	North and West wall; more yellow, but more burning evidence = Feature Fill; mixed with B horizon and burnt soil = highly mottled
7	Yellow gray, mottled; decrease of burnt stuff than zone 5 and 6, has some charcoal and pottery = Feature fill
8	Gray pocket, some burnt earth = Feature fill
9	Gray load/gray fill -looks a lot like zone 4
10	Lens of fill- looks like a mix of zone 4, and 2 ___ S; decrease mottled than those two
11	Lens of brown/gray, charcoal, burnt earth
12	More gray fill- a little brown to it; lots of limestone (burnt and unburnt); charcoal, mussel shells, pottery, bone etc.
13	Grayer than stuff above, _____ mottled clay; limestone/shell?, some chert, some burnt limestone, some charcoal; bone in wall/shell
14	(2 Rodent runs) Mixed B horizon, gray feature fill
15	Fill lens, but with charcoal in it; chert present
16	Yellow lens of fill
17	Mixed B and gray stuff; potentially distrubed?
18	Soft gray stuff, mottled, gray silty clay
19	More mottled with B- disturbed
20	Hearth, burnt earth, ash, charcoal, goes into two walls
21	Post Molds with chert in it

Figure 23: Square 2 South Wall Profile- 2m

Upper Depth: 38cm

Upper Depth: 33.5cm



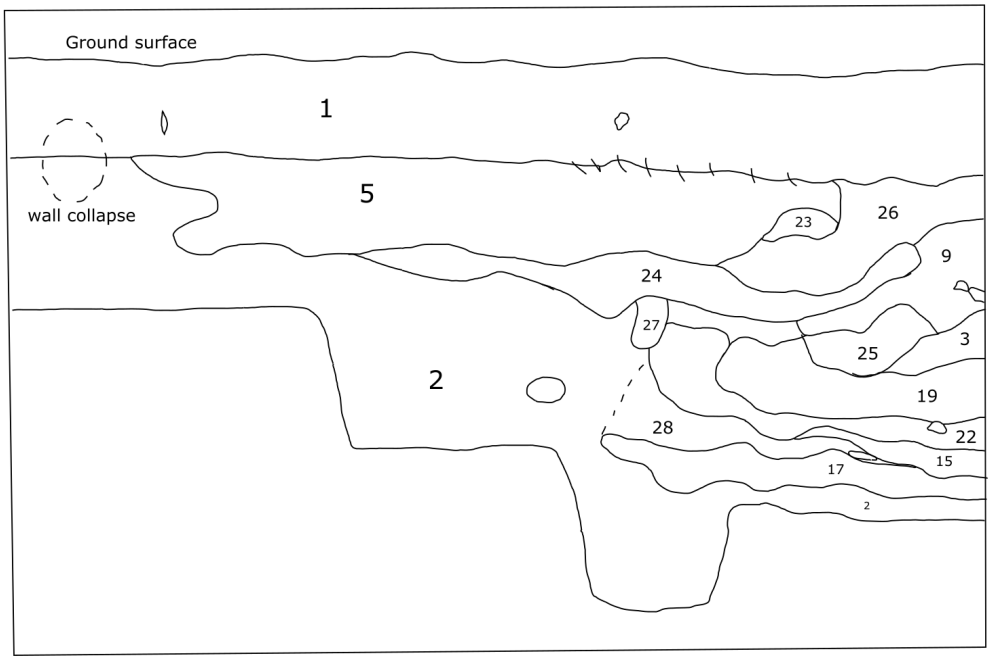
Lower Depth: 128cm

Lower Depth: 91cm

Figure 24: Square 2 North Wall Profile -2m

Upper Depth: 24 cm

Upper Depth: 30cm

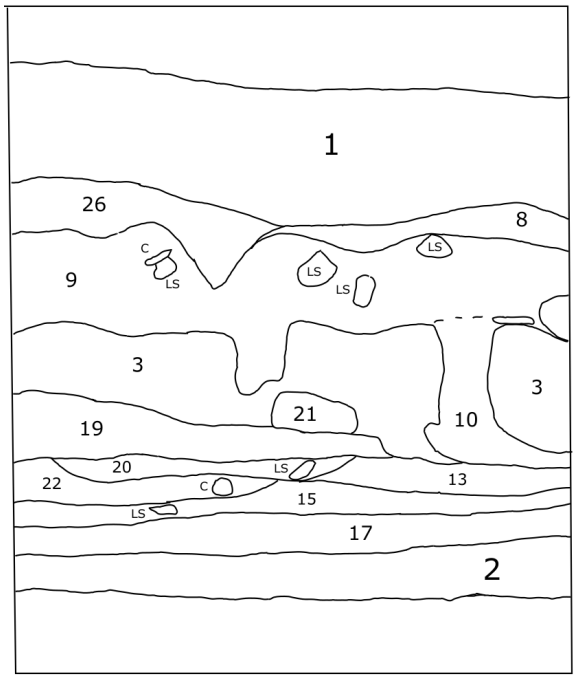


Lower Depth: 78cm

Lower Depth: 123cm

Figure 25: Square 2 East Wall Profile - 1m

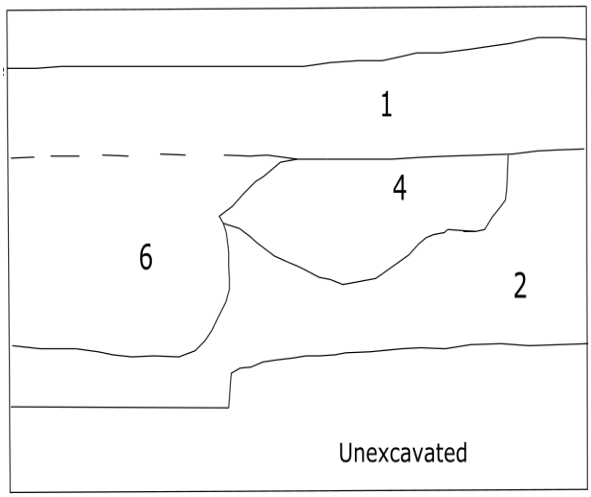
Upper Depth: 30 cm Upper Depth: 37 cm



Lower Depth: 123 cm Lower Depth: 127.5cm

Figure 26: Square 2 West Wall Profile - 1m

Upper Depth: 32.5 cm Upper Depth: 23.5cm



Lower Depth: 90cm Lower Depth: 79.5cm

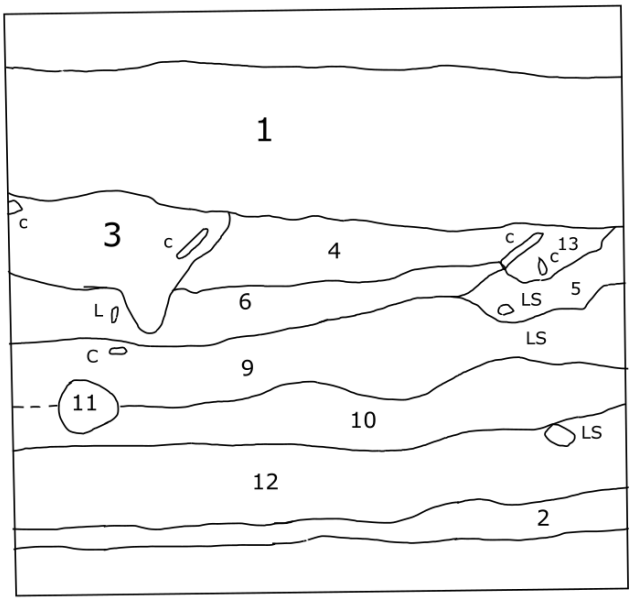
Square 2 Profile Zone Notes

Zone	Description	Wall
1	Plow Zone	All
2	B Horizon in situ	All
3	Redeposited B Horizon	N, S, E
4	Feature, not house basin	W
5	Brownish, middeny fill	N
6	Feature, Laminated Midden/B Horizon	N, W
7	Feature, Redeposited B horizon	S
8	Basin Fill, midden	S, E
9	Basin Fill, midden	N, S, E
10	Rodent Run	S, E
11	Rodent Run	S
12	Basin fill, mottled, charcoal, burnt earth, ls	S
13	Basin fill, mottled/laminated: midden/B horizon	S, E
14	Basin fill, dark with thin possible organic lens	S
15	Basin fill, mottled, midden/B horizon, ‘midden is grayer than above	S, E
16	Disturbance	S
17	Soft gray fill at Basin Base	N, S, E
18	Basin fill, mixed midden/B horizon	S
19	Fill, redeposited B horizon, similar to zone 3, a little more mixed	N, E
20	Fill lens of mixed G/B, darker than surrounding- then dark lens at top, organic?	E
21	Disturbance; Rep. B	E
22	Redeposited B? More like redeop. B above it than gray below it	E, S
23	Disturbance	N
24	Fill, middeny brown; more like zone 5 than darker midden to the SE	N
25	Redeposited B horizon, some midden	N
26	Fill midden	N, E
27	Possible Post Mold, DR, Rodent Run	N
28	Like zone 15, yellower with gray mottling	N

Figure 27: Square 5 North Wall Profile - 1m

Upper Depth: 17 cm

Upper Depth: 22 cm



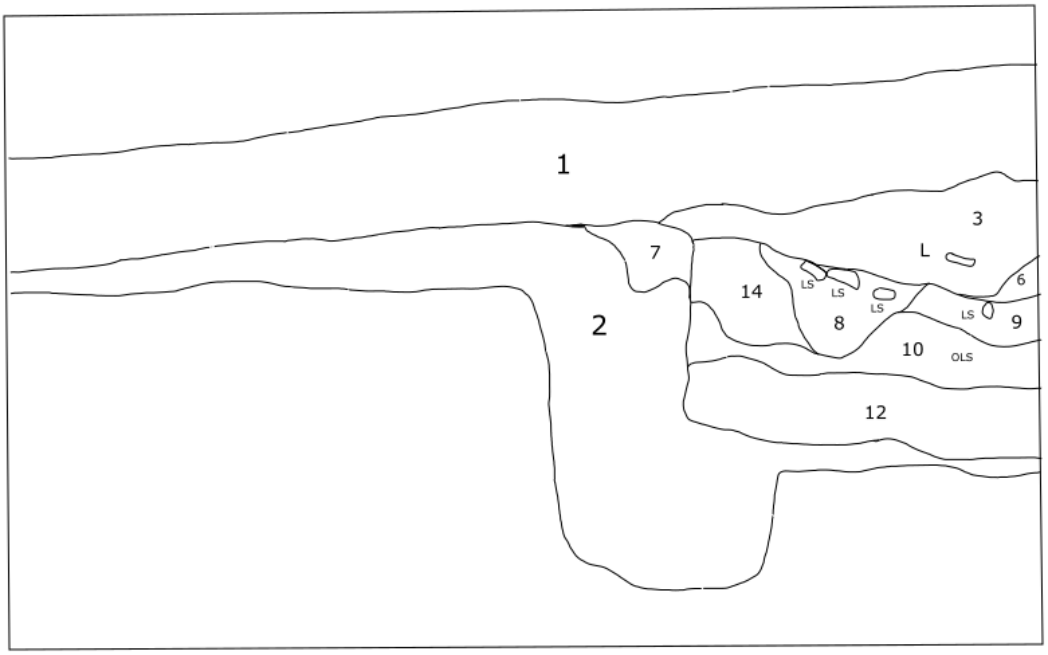
Lower Depth: 100 cm

Lower Depth: 97.5cm

Figure 28: Square 5 West Wall Profile - 2m

Upper Depth: 34 cm

Upper Depth: 19 cm



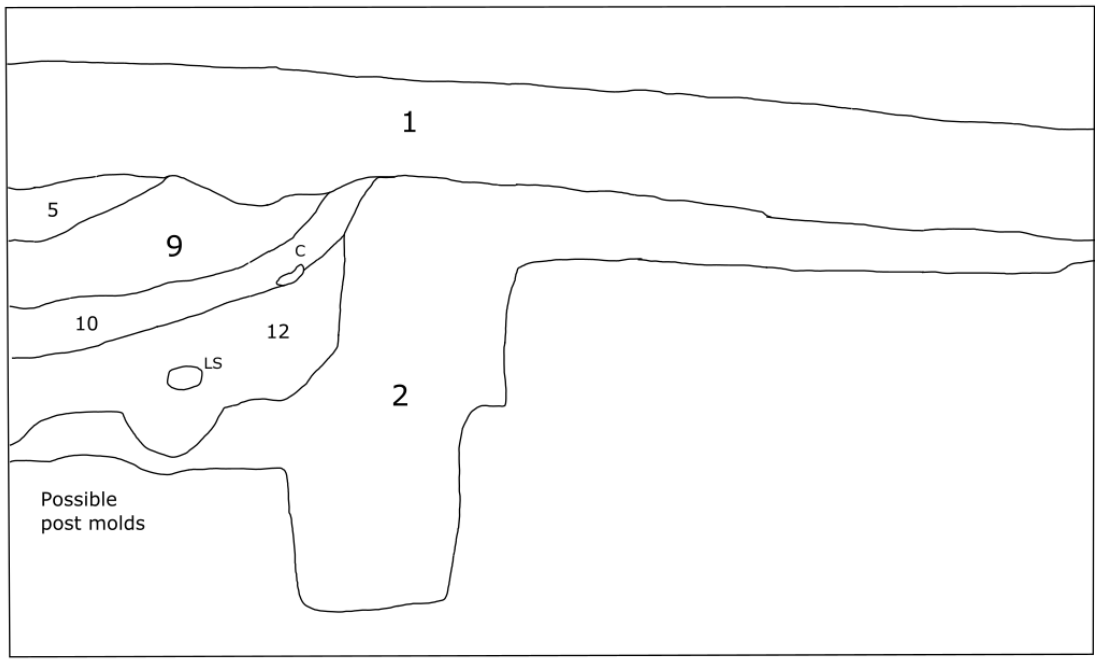
Lower Depth: 62 cm

Lower Depth: 99.5 cm

Figure 29: Square 5 East Wall Profile - 2m

Upper Depth: 22.5 cm

Upper Depth: 39 cm



Lower Depth: 97 cm

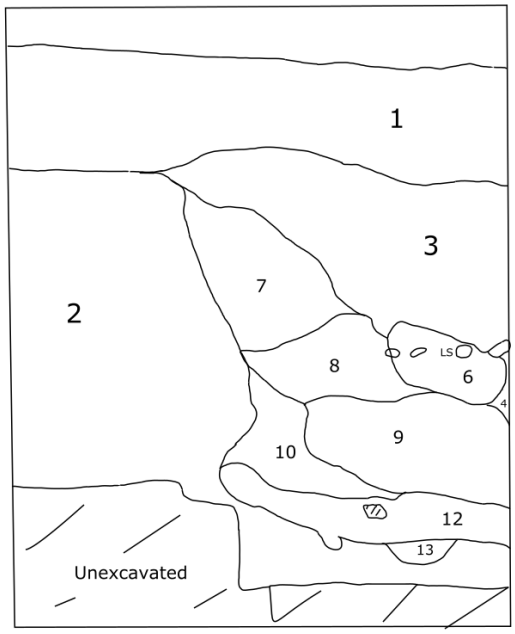
Lower Depth: 65 cm

Square 5 Profile Zone Notes

Zone	Description
1	Plow Zone
2	B horizon
3	Feature Fill
4	Feature Fill, brown
5	Feature Fill with yellow mottling
6	Feature Fill
7	Feature Fill
8	Possible small feature
9	Feature Fill, dark grayish brown
10	Yellow mottled fill
11	Disturbance, root
12	Soft gray fill
13	Feature Fill, dark grayish brown
14	Feature Fill, dark grayish brown

Figure 30: Square 6 East Wall Profile - 1m

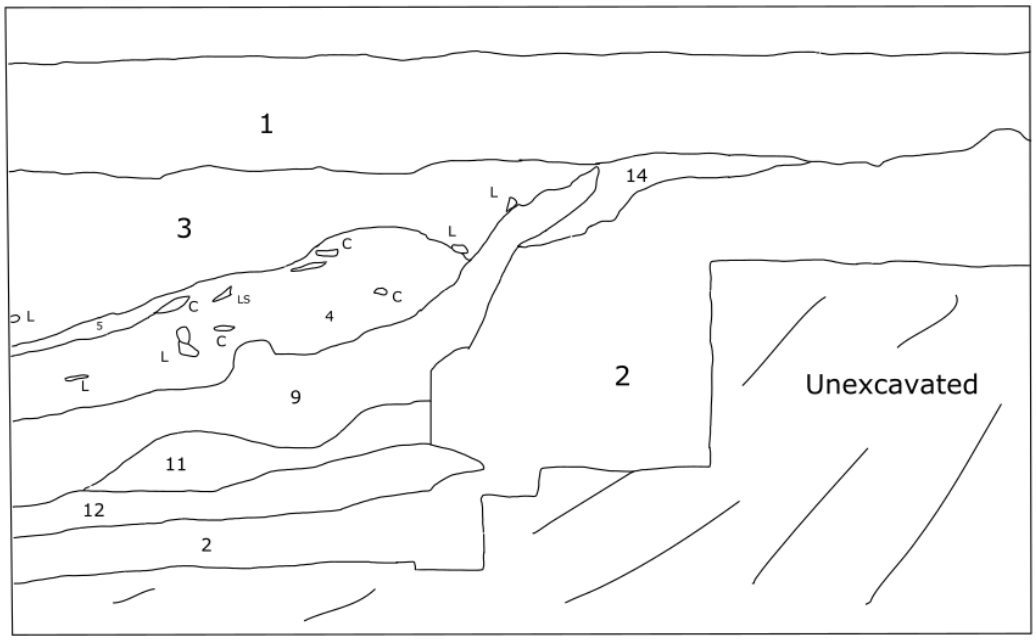
Upper Depth: 38.5 cm Upper Depth: 44.5 cm



Lower Depth: 127 cm Lower Depth: 146 cm

Figure 31: Square 6 South Wall Profile - 2m

Upper Depth: 42 cm Upper Depth: 44.5 cm



Lower Depth: 85.5 cm Lower Depth: 146 cm

Square 6 Profile Zone Notes

Zone	Description
1	Plow Zone
2	B Horizon
3	Basin Fill, Middeny, charcoal
4	Basin Fill, middeny, charcoal, more artifacts than zone 3; lots of pottery; darker (slightly) than zone 3
5	Basin fill; Basin fill (1)
6	Basin fill; basin fill; a little redder, burnt earth
7	Basin, less yellow than zone 2, ____ than other fill, less middeny; matrix= gray/midden/mottled= yellow
8	Fill, gray/middeny with yellow mottles, more like dark fill than zone 7
9	Mixed/mottled B horizon and midden- possible redeposited B horizon, but more mixed than in Sq 2, but similar to redeposited B/mixed in Sq 5
10	Similar to zone 9, less laminated
11	Mixed B/gray; more gray than B: matrix G, ____ Y/B
12	Soft gray silty clay; base deposit of basin
13	Small lens of B/soft gray; possible Post Mold
14	Possible basin fill, slightly browner than B (zone 2) but more mottled than Ap.

CURRICULUM VITAE

Catherine Zoe Doubles

Current Address:
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Phone: 540-525-6826
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EDUCATION

University of Illinois at Urbana-Champaign — Start Date: August 2021
Anthropology Ph.D. Program — Urbana-Champaign, IL
Fully Funded Graduate Assistantship

University of Louisville — August 2019 – May 8, 2021
Masters Anthropology — Louisville, KY
Anthropology Graduate Student Association: Secretary 2019-2020; Vice President 2020-2021 — Overall GPA: 4.0

Thesis: "Habitation and Interaction in the Lower Illinois River Valley: A Case Study on Household Structure and Ceramics at the German Site (11C377)."

Centre College — 2014 – 2018
B.A. Anthropology/Sociology and Classics — Danville, KY
Dean's List 2018 — Overall GPA: 3.436
Varsity Volleyball 2014-2018
Founding Member Iota Chapter of Kappa Delta Sorority 2016-2018

Senior Seminar: "Changing Homes, Changing Culture: An Analysis of Late and Roman Iron Age house structures."

FIELDWORK AND FIELD SCHOOLS

Center for American Archeology — September 2020
Site Supervisor and Instructor — Kampsville, IL

Center for American Archeology — June -August 2019
Women in Archaeology Intern — Kampsville, IL

Center for American Archeology — June- August 2018
Women in Archaeology Intern — Kampsville, IL

Azoria Archaeological Project - IFR 2017 — June - August 2017
Field school partnered with the University of North Carolina, Chapel Hill — Azoria, Crete

Ventanillas Archaeological Project — June - July 2016

Student Research Assistant (to Dr. Robyn Cutright) Ventanillas, Peru

RESEARCH EXPERIENCE

University of Louisville Master Thesis June 2019 – Present
Master Student Research Kampsville, IL

Curating and data entry. Investigating questions regarding cultural continuity and change during the Late Woodland and Mississippian transition through household perspective and ceramic analysis.

Centre College Senior Seminar September 2017 – May 2018
Undergraduate Researcher Danville, KY

Senior Seminar: "Changing Homes, Changing Culture: An Analysis of Late and Roman Iron Age house structures."

Ventanillas Archaeological Project June 2015 - July 2015
Student Research Assistant Danville, KY

Assisted with analysis of archaeological data collected from Ventanillas, a site in Northern Peru, from the 2013 field season. Participated in-lab data entry, analysis, and artifact drawing in Adobe Illustrator.

TEACHING EXPERIENCE

Center for American Archeology September 2020
Site Supervisor and Instructor Kampsville, IL

Responsible for the intensive immersive education in archaeological excavation techniques within the context of Illinois archaeology during the Adult Fall Field Program. Taught context-keeping methods and paperwork within the field. Lab work and methods, including washing, tabbing artifacts, and curation.

Center for American Archeology June - August 2018, 2019
Women in Archaeology Intern Kampsville, IL

Responsible for instruction in archaeological excavation techniques within the context of Illinois archaeology to high school-aged students and adults. Taught context-keeping methods and paperwork within the field. Lab work and methods, including washing, tabbing artifacts, and curation.

Glass Studio Technician: August 2018 - May 2019
Danville, KY

Working in Centre College's hot shop under the resident professor Stephen Powell and interim professor Che Rhodes, head of the University of Louisville's glass department. Responsible for the hot shop, cold shop, and equipment maintenance; instruction of students in basic glass blowing skills; curating displays and collections; organizing class schedules, and managing student workers. Assistant in making components for larger glass pieces.

HONORS AND AWARDS

Graduate Dean's Citation – University of Louisville, 2021
Recognition of superior accomplishments in graduate studies beyond a high GPA.
Dean's Scholar – Centre College, 2017-2018
Recognition of scholarly excellence in each academic calendar year.
SAA Honor Roll – Southern Athletic Association, 2014-2015, 2015-2016.
Recognition of scholarly excellence while participating in Varsity athletics.

SCHOLARSHIP

Conference Posters

Z. Doubles, E. Jones, E. Ferrales, K. May, J. King, J. Buikstra. "An Analysis of Embankment at Golden Eagle." 2018. Midwest Archaeological Conference, Notre Dame, IN.

R. Cutright, Z. Doubles, J. Paz. "Household Wealth and Ethnic Identity in the Middle Jequetepeque Valley Peru." 2017. Society for Amazonian and Andean Studies, Millsaps College, Jackson, MS.

R. Cutright, Z. Doubles, J. Hale. "Households at the Edge of Coastal Control: Recent Research at Ventanillas, Peru." 2016. Presented at the Southern Andean and Amazonian Studies meeting, Baton Rouge, LA.

Conference Papers

Z. Doubles, A. Surowiec, T. Milosavljevic, A. Lockhart, J. King, J. Lulewicz, J. Buikstra. "Habitation and Interaction the German Site (11C377)." 2020. Society for American Archaeology, Austin, TX. Canceled due to COVID-19.

Z. Doubles, A. Surowiec, T. Milosavljevic, A. Lockhart, J. King, J. Lulewicz, J. Buikstra. "Habitation and Interaction the German Site (11C377)." 2019. Midwest Archaeological Conference, Makato, MN.

E. Jones, Z. Doubles, E. Ferrales, K. May, J. King, J. Buikstra. "Monumentality and Time at the Golden Eagle Site." 2019 84th Annual Meeting of the Society for American Archaeology, Albuquerque, NM.

PROFESSIONAL MEMBERSHIPS

Phi Kappa Phi- Member, March 2021- Present
Society of American Archeologists – Member, 2018 – Present
Midwest Archaeological Conference – Member, 2018 – Present
Center for American Archeology – Member, 2018 – Present

SKILLS

Technical
Creative Software: Adobe Illustrator, Adobe Photoshop
Geophysical Program: ArcGIS, Erdas Imagine
Microsoft Word and Excel
Field Equipment: Total Station

Language
Intermediate proficiency in Ancient Greek
Beginner proficiency in French