TRANSFORMING MATERIAL RELATIONSHIPS: 13TH CENTURY REVITALIZATION OF CAHOKIAN RELIGIOUS-POLITICS

BY

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DISSERTATION

Submitted in partial fulfillment of the requirements
for the degree of Doctor of Philosophy in Anthropology
in the Graduate College of the
University of Illinois at Urbana-Champaign, 2014

Urbana, Illinois

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Abstract

The rise and eventual decline of Cahokia, the largest pre-Columbian city north of Mexico, reverberated deeply within the historical trajectories of the North American mid-continent and southeast. The 11th century emergence of this multi-ethnic, multi-vocal metropolis appears to have been deeply entangled within a social-religious movement that spread rapidly throughout the region. By A.D. 1100, however, that initial movement seems to have become highly politicized. This increased politicization occurred shortly before an outbreak of violence throughout the mid-continent around A.D. 1150. The transition from the 12th to the 13th century is marked by rapid large scale changes to spaces and objects that were part of the 12th century Cahokian religious-politics.

Archaeological evidence from two thirteenth century villages in the uplands outside of Cahokia, the Olin and Copper sites, supports the supposition that these changes were intentional and targeted toward highly politicized Cahokian "elite" spaces and objects. At the same time, people maintained and/or re-integrated other practices, objects, and buildings reminiscent of the early Cahokian movement, with an increased emphasis on inclusivity. These changes suggest perhaps something akin to a revitalization movement – an intentional, material push for change – led to the return of certain religious practices, and production of their related objects, to the hands of local communities. Objects and spaces typically associated with warfare or violence, specifically fortifications, compounds, and imagery of warfare, appeared in conjunction with these changes. Given the timing and location of these materials of violence, they appear to be part of the 13th century revitalization movement in the American Bottom region.

These two upland sites, Olin and Copper, demonstrate clearly different practices and regional relationships, indicating that people living at these sites were maintaining a certain amount of autonomy while participating within this revitalized Cahokian religious sphere. This decentralization of certain practices and material objects may have occurred at the expense of disentangling the social-political-religious relationships and obligations that may have tied these local communities to each other and to Cahokia. Furthermore, the material aspects of violence that appear during the 12^{th} century to 13^{th} century transformation form key elements of the so-called Southeastern Ceremonial Complex (SECC) that spread throughout the greater southeast.

For Mom and Dad
and
For Tom

Acknowledgments

This dissertation initially began as a study of warfare, which over the years has transformed into its present form. This transformative process is the result of a great number of individuals who have had various influences on my intellectual and personal development. First and foremost, I would like to thank my committee members: Timothy Pauketat, Thomas Emerson, Lisa Lucero, and Christopher Fennell. To Lisa and Christopher I owe a deal of gratitude for pulling me out of my narrow perspective of the American Bottom and offering an outsiders' view. Furthermore, I would like to thank Lisa for giving me the opportunity to work with her in Belize; it was an amazing experience, providing a thought-provoking point of comparison on monumental architecture for this Midwestern Mississippianist.

I have benefited greatly from the wisdom and experience of Thomas Emerson, who has provided me with constructive criticism and even more constructive conversation over the years that has helped refine my understanding of Cahokia and the surrounding region. Additionally, as director of the Illinois State Archaeological Survey (ISAS), Tom has generously provided me with funding as a Charles J. Bareis Research Assistant as well as a full-time employee. And finally, what can one say about one's advisor? I count myself extremely fortunate that I can only say good things. Tim has been a friend, a mentor, and an inspiration for the past decade. He provided so many opportunities for me to expand my practical knowledge as a field school supervisor, research assistant, and instructor. In the field, Tim taught me how to see wall trenches and lined pits, and continues to challenge me to see the data in a different light.

I would also like to thank my formative mentors: Mike Michlovic, Rinita Dalan, and George Holley. As my undergraduate professors at Minnesota State University Moorehead, these three were instrumental in helping me develop as a young archaeologist. It is largely due to my experiences at MSUM that I was driven to pursue my Ph.D., with hopes to inspire future generations of archaeologists in the ways Mike, Rinita, and George did for me. Of course, a large part of that undergraduate experience was also due to my oldest archaeology friend, Theresa Barket. Theresa always inspired me to work harder and even though we have been separated by miles and dissertations, I count her as one of my best friends and look forward to every SAA meeting as a chance to see her.

In the more immediate task of completing this research, I am grateful to a number of people. I extend a great amount of appreciation to Dr. Sidney Denny for his years directing excavations at the Olin site. I am thankful to him for taking the time to talk with me about the site and am amazed at the amount of detail he remembers nearly four decades later. In this same vein, I would like to thank Dr. Neal Lopinot, Terry Norris, and Brad Koldehoff for their shared memories of the Olin site with additional thanks to Dr. Lopinot for sharing some of his field photos as well. I am indebted to Steve Kuehn (ISAS faunal analyst) for his hard work and dedication to the analysis of the Olin fauna; I am eternally in awe of Steve's efficiency and productivity. Thank you also to Stephanie Daniels (ISAS) for tabulating the diagnostic lithics in the Olin collection located in the ISAS Central Field Station, and to Katie Parker for analyzing a sample of the Olin botanical materials. Your time and talents are greatly appreciated. I also had the benefit of having an undergraduate volunteer willing to help sort thousands of tiny body sherds from Olin; thank you Liz Schlagel for your time, effort, and enthusiasm in the undertaking of an often tedious task.

I am grateful to both Robert Prine, who owns land on which the Copper site is located, as well as Fred Kunz, who farms the land, for their permission and patience while we dug up a swath of their corn. Additionally, thank you to Mr. Prine's daughter Beth and son-in-law Garth for their interest in our work and their offer to share a hose for cold water during a very hot June. Thank you to Jeffery Kruchten for helping with the high differential GPS and initial site mapping and thank you to Mike Hargrave (CERL) for doing the geophysical survey at Copper. Excavations at the Copper site would not have been possible without an awesome group of hardworking field school students. Thanks to the efforts of students Matt Ball, Jessie Beier, Kathleen Bindley, Colleen Lindsay, Montana Martin, Emily Marzolph, Kristy Mitchell, Kristen Paty, Jennifer Picard, Misty Rovinelli, and our volunteer, Georgia Wulff, we were able to accomplish so much in a very short four weeks.

For the past four years, I've been part of the ISAS team at the Northern Illinois Field Station. I owe so much to Paula Porubcan for her endless patience while I finished this dissertation and to Phil Millhouse for his advice and commiseration. I am so lucky to work with such a fun, hardworking, and intelligent group of archaeologists.

Over the last decade, I have come to know a brilliant, talented group of archaeologists: Ladies of CABB, I'm looking at you. I have learned so much from each of you. I am so proud of each of your accomplishments and look forward to many years of CABB collaboration. There are two people in particular that I want to recognize: Alleen and Sarah, the two people that I have spent the most time in the field with and who were particularly instrumental in my becoming who I am today. Alleen Betzenhauser was the first person to introduce me to the complicated stratigraphy (blobs!) of the American Bottom. Al has been my archaeological role model since I

began grad school and I hope to eventually have her abilities in the field (though I will never win a dance-off against her). Sarah Baires began as my co-TA, temple co-excavator, and mapping adversary at the Pfeffer field school in 2007. From our adventures in Belize to our adventures in Wisconsin, Sarah has become one of my closest friends. She is one of my favorite co-authors and challenges me to keep theoretically current and socially conscious. I am so lucky to have people like Sarah and Al, as well as Amanda, Meghan, Liz, Tamira and all the other CABB members in my archaeology family.

My non-archaeology family has been pretty fabulous as well. They have all been so supportive of me throughout this process. My in-laws, Antoinette and Zbigniew, Richard and Stephanie, and Christina and Pete, have been so patient and understanding when we had to miss out on holidays or family gatherings. The Gayes-Sigakis family has been a source of support and encouragement, with an insider's understanding of 'the long haul'. My sister, Michelle, has cheered me on every step of the way. In fact, I think a lot of this was her doing; years of her making me play school must have convinced me it was fun. To my parents, Bill and Darlene, thank you for your unfailing support and encouragement over all this time. You taught me the joy of learning and the importance of persistence. You may not have always understood exactly what it was that I was doing, but you have always made sure I knew you were proud of me. I can't express how much I appreciate everything you have done for me that has led to here. I love you all very much.

Finally, to my husband Tom, my best friend. You have kept me fed, caffeinated, and sane through this whole process. You have been so patient with me. You have endured early mornings, late nights, much frustration, and endless conversations about this one thing. I owe it all to you.

Table of Contents

List of Figures

List of Tables

CHAPTER 1. INTRODUCTION

Cahokia, the largest pre-Columbian city north of Mexico, was an epicenter of large-scale social, political, religious, and material transformations during the late pre-Contact period, inciting broad historical impacts across much of the Eastern Woodlands, Midwest, and greater Southeast. As the first, and the largest, Mississippian city, reverberations of Cahokia's impacts have even been felt across the Plains and perhaps into the Great Basin (suggested by similarities between Cahokia points and Desert Side-notched projectile points, Figure 1.1). Located in the wide floodplain of the Mississippi River just south of its convergence with the Illinois and Missouri Rivers (Figure 1.2), Cahokia quickly grew into an urban center around the middle of the 11th century A.D. The city flourished and expanded through the 12th century, and was depopulated shortly after the end of the 13th century. Researchers have postulated the reasons for this "collapse" of Cahokia, from environmental devastation (Benson et al. 2009; Fowler 1975; Lopinot and Woods 1993), to warfare, to factionalism (Emerson and Hedman 2013) and decreasingly effective community-integrating mechanisms (Milner 1990). Material changes occurred in the transition from the

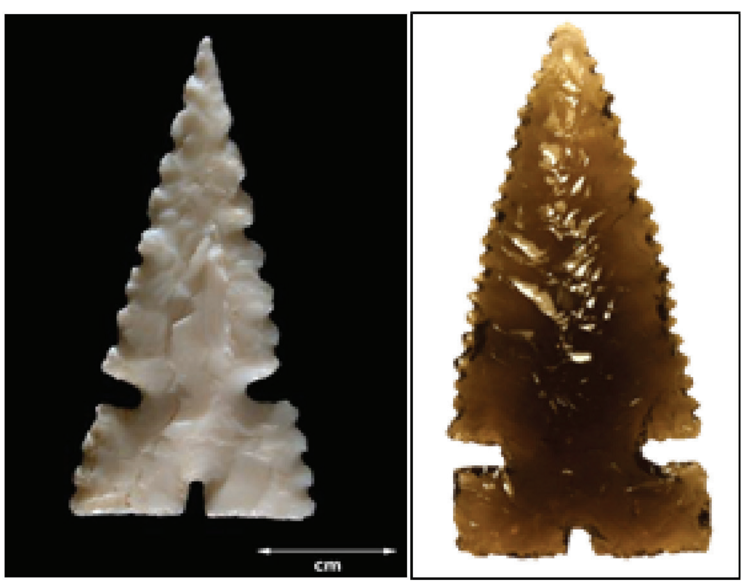

Figure 1.1. Left: Cahokia point (Illinois State Museum Collection); right: Desert Side-notched point (knapped by T. Barket, UC-Riverside, photo by M. Baltus).

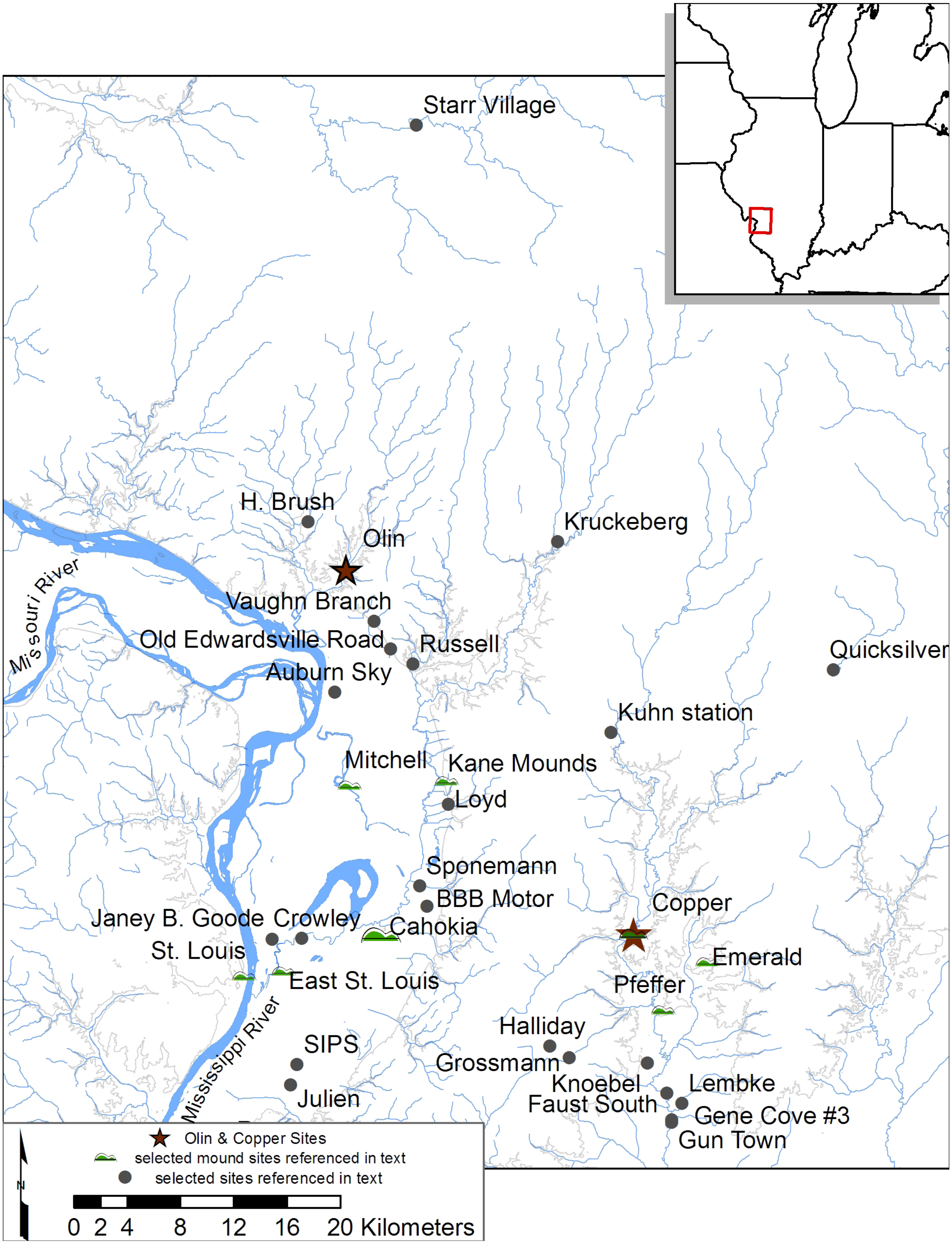

Figure 1.2. Map of the American Bottom region depicting Cahokia, Olin and Copper, and select sites discussed in text.

12th to 13th centuries at and around Cahokia. These appear to have been targeted at particular Cahokian political-religious objects and places as part of a religious movement or revitalization. Using new data from two 13th century sites in the uplands surrounding Cahokia, Olin and Copper, this dissertation explores the ways in which social and political violence, religious-politics, and material objects are variously entangled with these intentional changes at and around Cahokia during the decades leading up to Cahokia's eventual abandonment

The problem thus presented is three-fold: how sudden material changes are interdigitated with social, political, and religious change; how sudden material social, political, and religious changes may be related to violence; and how these qualitative changes can be understood as complementary to the ongoing processes of social change rather than contradicting the dynamic nature of 'the social.' I address these problems using two sites, the Olin and Copper sites, located in the uplands north and east, respectively, of the American Bottom floodplain location of Cahokia. Located outside of the city itself, these sites provide a comparative perspective as to the timing and intensity of these changes within the American Bottom region. Moreover, these sites provide a comparison with one another as to the local experience of political-religious transformation in the uplands and provide suggestions as to how the intentional material changes made at the beginning of the 13th century may have had unintentional consequences leading up to the abandonment of Cahokia.

Though it is romantic to consider dramatic "collapses" of great societies (see for example Diamond 2005), the decline of particular cities, states, nations, or polities is likely to be as complex as the factors and processes that led to their formations. In fact, such "collapses" are more accurately understood as social and political transformations that do not include the disappearance of a group of people but rather shifting material identities (see instead McAnany and Yoffee 2010 and Yoffee 2005). As is often the case, such “collapses” do not leave behind empty vacuums, but instead continue to impact history as people persist in their daily lives, move on, and reconstruct new identities and relationships. These processes are messy and complicated, occurring at different temporal and spatial scales, which necessarily complicates things for archaeologists dependent upon the control of space and time.

Additionally, given the unique nature of Cahokia as a city, as opposed to a ‘society,’ it is necessary to differentiate between abandonment and ‘collapse.’ In opposition to the seemingly “imaginary” organization of ‘society’ (Anderson 1991), the creation of a city is material and experiential, as well as spatial and relational (Pauketat 2010). A focus on Cahokia as a city re-centers ‘place’ as socially generative (Pauketat 2010) and raises the question of what drew people to and kept people attached to that particular place. Cahokia, in particular, appears to have resulted from convergence of people as part of a religious movement that cross-cut ethnic and linguistic differences (Beck and Brown 2012; Harkin 2004; Pauketat 2004, 2008, 2010). People create and sustain a city through reciprocal social relationships and material obligations in practices of daily life and special events. While elites and leaders may provide organization in the creation of place, it is these relationships and obligations that hold people together as a city. In the case of Cahokia, these relationships and obligations were equally social, political, and religious, and included humans and other-than-humans within a relational ontological perspective.

Though I feel that “collapse” is an overly-simplified characterization, I do not discount the real social changes taking place during the decline and eventual abandonment of political centers like Cahokia. Likewise, investigating these political transformations as more than “collapse” does not diminish the impact of social and political violence occurring in conjunction with these transformations – violence that may or may not be visible in the traditional sense (e.g., burned villages, murdered bodies, desecrated temples). I identify political violence here as any “use of violence as a political means” (della Porta 2008:223). In this case, certain acts of political violence may have been mobilized in the 13th century transformation of Cahokia. Acts of violence in the social and political sense include disruption of “traditional” ways of life, identities, material relationships, and social organization. As such, times of social or political transition may be considered to be simultaneously transformative and conservative, disruptive and productive, perhaps even dangerous, depending on context, scale, and perspective. Ultimately, these changes have impacts on identity, history, and social relationships that reverberate into the future.

Outlining the changes that have long been documented as separating the Stirling phase (A.D. 1100-1200) from the Moorehead phase (A.D. 1200-1300), in conjunction with recent evidence for regional interaction after the end of the Stirling phase, I interrogate the assumption that the Moorehead phase is the ‘beginning of the end’. Instead, using recent theories of materiality (e.g., Olsen 2010) and relational ontology (e.g., Alberti et al. 2011), together with discussions of historical revitalization movements, I demonstrate how Moorehead phase transformations were manifested through intentional material disengagement with the previous Cahokian Mississippian religious-politics and re-entanglements woven through new material practices and new social relationships. These transformations occurred during a period of regional warfare (Iseminger et al. 1990; Milner et al. 1991; Pauketat 2004; Wilson 2012). I suggest these social-political-religious changes may have been made as a means of negotiating political and social relationships within this context of warfare, while perhaps engaging with material elements of violence in the creation of the movement. Additionally, evidence presented here suggests that these transformations did not occur in lock-step throughout the American Bottom and into the uplands, highlighting community autonomy in the continuation of particular practices or objects that may have been present in various ways.

Among other things, I argue that the post-12th-century was not a stagnant 'devolution' of Cahokia, but a continuing productive space (sensu Alt 2006a; Soja 1996). I explore the transformation of material practices and the implications of the renewal or reconstruction of Cahokian relationships and identities during the 13th century Moorehead phase. These changes in material relationships were widespread, bearing long-term social and political implications as people continued to move into and out of the American Bottom. Evidence continues to support a de-population of the American Bottom from the Stirling phase through the Moorehead phase, therefore the ongoing creation of new Cahokian identities during this time period is important in understanding the spread of multiple and diverse ways of being Mississippian. This research will contribute to a wider anthropological understanding of everyday objects in the intentional material spread, and perhaps unintentional consequences, of political-religious movements. Likewise, this research suggests further avenues for inquiry into the entanglement of violence and religion in the spread of these movements.

Organization of the Dissertation

The theoretical perspectives through which these issues of social-political reorganization, material transformation, and violence will be explored are outlined in Chapter 2. Many of these perspectives, including materiality, object agency, identity and relationality, are intertwined and feed back into each other. Taken together these theories propose an animated, engaged, and entangled social world with numerous social relationships between human and other-than-human actor-participants. Additionally, these perspectives emphasize that material changes do not simply reflect social, political, and religious changes. Rather, they show that the social, political, and religious aspects of a lived world are enacted through, constructed with, and located in the material. Therefore material changes are changes to social, political, and religious relationships and organizations.

For this dissertation, I focus on the material aspects of political-religious change through the buildings and ceramics at Olin and Copper as produced and used along a continuum of domestic and extra-domestic contexts. Political-religious movements are acts of relating, between various social actors and agents, including other-than-human persons within an animate ontology. As expressed in Chapter 2, engaging with an animated world includes negotiating relationships with naturally empowered elements, animals, ancestors, spirits, or natural forces on a daily basis while simultaneously performing the usual, varied, and intertwined tasks of making, eating, building, cleaning, maintaining, warring, planting, hunting, and so on. Such relationships are brought to the forefront on particular occasions often marked by ceremonies of feasting, dancing, singing, praying, burning, and building. Often anthropologists make the distinction between "ritual" or "religious" and "daily" or "secular," but this strict division is untenable as life is experienced along a continuum of domestic and extra-domestic practices. Similarly, isolating practices of violence (e.g., warfare) from the experiences of daily life, including religion, is also flawed (Pauketat 2009); elements of violence will be explored as not simply a reaction to or cause of the political-religious transformations of the 13th century, but as part of the revitalization movement itself.

Chapter 3 presents a historical overview of Cahokia's urban beginnings, the regional spread of Cahokian Mississippian material practices, and the general material changes of the 11th to 12th centuries that have been recognized through previous research in the region. Again, while the writing of history tends to force a linear perspective, the changes occurring and relationships created during the rise of Cahokia and Mississippianization of the Midwest sent reverberating waves of social change and material entanglements throughout the region.

The specific case studies, the Olin site (11MS133) and the Copper site (11S3), are presented in Chapter 4. The Olin site was excavated as a series of field schools through Southern Illinois University Edwardsville between 1971 and 1975. No comprehensive analyses had been performed on the materials from Olin until I began analyzing the ceramic assemblage in 2007. The full Olin collection is curated at the Illinois State Archaeological Survey (ISAS) in Champaign, Illinois. The Copper site was known largely through the collections and excavations of local amateur enthusiasts, until the University of Illinois at Urbana-Champaign field school excavations in 2009 under my direction. All materials recovered from these investigations are also curated at ISAS

Chapters 5 and 6 present the results of the feature and ceramic analyses of Olin and Copper, contextualized within the sphere of Cahokia and the region at large. The broader discussion of the Stirling- to Moorehead phase transition and material dis-entanglements of the 13th century are presented in Chapter 7. Similarities with other sites in the Midwest, and specifically in the immediate range of Cahokia, suggest relationships created or maintained throughout this period of violence and transformation. Finally, Chapter 8 contains the larger implications regarding the ways material objects are complicit in social-religious movements and how violence and religious practices are united to promote or initiate political transformation.

My aim in this dissertation is to highlight the Moorehead phase as a period of active social transformation with broader regional importance. Rather than simply the denouement of Cahokia, the material transformations of this period, the newly constructed Mississippian identities, and the new relational entanglements created had lasting impacts within the Midcontinent. After all, it was during this period that Mississippian polities were appearing throughout the Southeast; perhaps influenced by, or entangled with, persons at or leaving Cahokia. Additionally, I show how changes at all levels of the continuum from domestic to supra-domestic were part of this creation of new ways of being Mississippian.

CHAPTER 2. ONTOLOGIES AND OBJECTS OF POLITICAL-RELIGIOUS MOVEMENTS

Many previous archaeological explanations for the rise of Cahokia and other mound centers in the Mississippian period assume a priori the existence and agency of elite social groups whose strategies and actions instigated the monumental construction of earthen mounds which initiated the socio-political coalescence at Cahokia (e.g., Anderson 1997; Emerson 1997a, 1997b; Fowler et al. 1999; Kelly 1997; King 2003; Pauketat 1994). Recent scholars have suggested a social-religious movement may been the catalyst for the rise of the late pre-Columbian North American city of Cahokia and the concomitant spread of Mississippian lifeways (Beck and Brown 2012; Harkin 2004; Pauketat 2004, 2008, 2010). Social or religious movements initiated by a charismatic individual or core group of people have implications for wide-reaching social changes. This possibility provides the tools to help elucidate and explicate the processes through which political power was constructed and accrued. Specifically, such movements could potentially be used to 'model' the creation and ascription of elite or powerful status to certain participants or patrons of social movements, as well as the concurrent empowerment of associated material objects, spaces, and places.

Understanding processes of social construction and changes requires consideration of the ontological principles governing the worlds in which these changes take place (Alberti et al. 2011). Accepting that "not all physical and conceptual worlds are alike," not only de-privileges a monolithic Western worldview, but allows for alterity in the past (Alberti et al. 2011:900). Recent theories of alternative and relational ontologies also de-center humans as the only (or main) social actors involved in these processes. Relational ontologies are those in which other-than-human persons, including animals, deities, ancestors, and what would be considered inanimate objects in Western perspectives (Hallowell 1960), are perceived as and related to as having personhood, agency, intentionality, and culture (Hill 2011; Ingold 2006; Morrison 2000). As social actors constantly in the state of becoming, other-than-human persons are equally created and re-created through their interactions with humans, and vice-versa (Ingold 2006).

The ever-entwined relationships of the social world lie at the core of archaeologies of relationality. This perspective engages the understanding that "humans and objects exist in a reciprocal world," (Zedeño 2009:407). Relational ontologies are based on "observation and experience of similarities and differences in the qualities of people, objects, places and entities" (Zedeño 2009:407). It is through these relational ontologies, explicated by theories such as Actor-Network Theory (ANT) (Latour 2005), enmeshments (Ingold 2006), or entanglements (Hodder 2012; Ingold 2008), that we come to understand how social relationships among people, places, and things constitute the social, or what anthropologists consider to be culture. These same theories apply to the constitution of a city, with the added implication of place. Ingold (2006:14) identifies the "texture of the world" as the continuously raveling and entangled relationships through which beings inhabit the world; organisms are likewise "constituted within [this] relational field," (Ingold 2006:14). These social ties and relationships are ever-shifting and changing, therefore it becomes difficult to pin down a particular 'group' for analysis (Latour 2005). Contrary to modern theories of community as 'imagined' (Anderson 1991), relational ontologies provide a material construction of the social; it is in and through the material that relationships – and thus all things social – are formed.

The participation of objects and other-than-humans interacting (willingly or not) in social relationships constructs them as social actors. Therefore, through the different ways in which people, things, space, and place are related and the various resulting relationships that are formed, “culture” is created. There is no distinction therefore between the Natural and the Cultural – all is cultural through their relational participation. Additionally, within this relational aspect “humans are but entities who occupy places equal to…any other objects or entities in the world” (Viveiros de Castro 2004:464). This engagement with a world populated by humans and other-than-humans is commonly referred to as animism. Though often over-simplified and touted as ‘primitive’ by Western judgment, animism is more than simply a religious belief system, but rather includes the entirety of the social, including linguistic structure, practice and learning, as well as experience (Harvey 2006; Zedeño 2009). An animist ontology acknowledges “a world that is full of persons, only some of whom are human” while “humans’ most intimate relationships are had with other humans” through varying degrees of relationality (Harvey 2006:xviii). Other-than-human actors must be considered as possible participants, or even co-instigators, of such movements. Similarly, accommodating alternate ontologies is important in understanding how ontologies themselves may be called into question, negotiated, or altered in the course of a social-religious movement.

Understanding sudden material transformations as intentional political-religious movements requires an engagement with alternate ontologies in addressing power (human and otherwise), factionalization, and violence, in the transformation of social relationships. Understanding drastic social, religious, and political changes also requires a historical perspective. That is, a perspective that emphasizes the processes by which material practices of social-religious movements spread and, in so doing, creates new social identities. These practices do not spread (and become adopted) uniformly (Harkin 2004; Smoak 2006; Spier 1935; Stewart 1987) but allow for negotiation and manipulation of the movement, resulting in differential constructions of social identities and localized social changes. Choices are made to transform certain practices, disengage with past social identities, and engage in new social relationships. Concepts of time, space, personhood and identity may be reconceptualized to accommodate new practices and material relationships. It is through such social negotiation and choice that certain practices, identities, and relationships persist in the midst of larger changes.

Appreciating sudden change as an effect of social movements does not negate the ongoing state-of-becoming of all things social; rather, they provide a means of understanding how or why that 'becoming' makes a sudden left turn, so to speak. Anthony Wallace (1956) defined such broad-scale movements involving religious or social agendas as 'revitalization movements'. Wallace (1956:265) initially defined such movements as "deliberate, organized, conscious" attempts to construct a "more satisfying culture."

Admittedly, the term "revitalization" is problematic as it implies an attempt to return to past ways of life (i.e., revivalism) in response to challenges to cultural stasis (Liebmann 2008). Connotations associated with the term "revitalization" suggests social change was reactive rather than proactive; instead 'culture' is necessarily dynamic and social stasis should be brought into question (Pauketat 2001a). Likewise, "revitalization movement" carries historical baggage as the term was defined based on cultic movements stemming from European or American colonial contact (though see Harkin 2004). Many studies of the historically documented revitalizations focus on the "deep feeling of spiritual, physical, and social deprivation, as well as social disintegration" that led up to these movements (Andersson 2008:24), though perhaps these identified motivations are due to the ability to study such movements only in post-colonial contexts.

Wallace (1956) argued that similar movements likely took place throughout history for a variety of reasons, with a range of success and myriad aftereffects. Modern research on social movements has shown that they "develop and succeed not because they emerge to address new grievances, but rather because something in the larger political context allows existing grievances to be heard" (della Porta 2008:223). These contextual changes include "regime shifts, periods of political instability, or changes in the composition of elites," (della Porta 2008:223) providing opportunities for larger changes to be instigated, initiated, or gain traction. Social-political-religious movements should thus be approached as divergences from ongoing processes of social change. This allows such processes as social-religious movements to be used for directed change by a particular group or groups of people, perhaps in challenge to, or conversely, in preservation of existing power structures. While movements may sometimes engage narratives of a shared past or material traditions to enforce coalescence and cohesion, this does not necessarily imply an attempt to revive the past en toto. In some instances, social movements have been conceptualized as a form of resistance or protest (della Porta 2008).

Pauketat (2013) has aptly deconstructed the concept of 'revitalization movements', noting that the social and the religious are located in material practices. Therefore social change is always enacted materially by social agents, which would suggest that "movements are the norm, so to speak, not the exception" (Pauketat 2013a:25). As a means of understanding the processes by which social, religious, and political agendas are integrated and materially mobilized for social change, 'revitalization movement' remains useful heuristically.

Among Native North American groups, and arguably all pre-industrial societies, religious, political, and social realms of daily life are so highly interdigitated as to be inseparable (Adair 2005[1775]; Bailey 1995; Fletcher and La Flesche 1992[1911]; Radin 1970[1923]; Swanton 2001[1931]; Warren 2009[1889]). In fact, for "most Native peoples their religions are inseparable from their cultural practices and vernacular modes of practicing history," (Parker and King 1998:328). In other words, religion is lived. Therefore, when speaking of religious movements, such movements are simultaneously social and political as well, and could therefore be considered 'vitalistic'.

These broad-scale processes of social-political-religious change have been historically documented among Native American groups, often with long-term reverberations, including the Pueblo Revolt of 1680 (Hackett and Shelby 1942; Liebmann 2008), the Prophet Dance of the Northwest (Spier 1935), the Ghost Dance of the Plains (Mooney 1991), and the spread of the Peyote religion (Stewart 1987). Documentation of these movements has demonstrated the ways in which social-religious movements are historically contingent and socially negotiated processes involving choices and changes (Smoak 2006; Stewart 1987). The practices and messages of these prophetic movements were systematically spread through intentional prophets and proselytizers, as well as inconsistently and unevenly spread through witnesses and participants (Smoak 2006).

Each of these past movements share similar traits, including a charismatic leader or leaders, reference to already-accepted religious tenets or past religious traditions, the ability to unify across ethnic and linguistic divides, and material or cult objects. For example, the seventeenth century Pueblo Revolt in the Southwest was initiated by a charismatic Pueblo holy man who "emerged from a kiva, proclaiming that he had received a revelation from three spirits with the power to emit fire from their fingertips" instructing him to preach a message rejecting Spanish influence and reviving native practices (Liebmann 2008:362). It is here necessary to highlight how an ontology that includes powerful supernatural spirits not only affects the reception and impact that such a message may have, but actively empowers the message. Widespread support was generated among "disparate linguistic and ethnic groups" who gathered together to execute or drive out Spanish priests and settlers from their lands (Liebmann 2008:362). Much of the violence enacted during the revolt was targeted at the mission churches and their material accompaniments (e.g., bells, crosses, and saints), those objects and places that the Pueblo people identified as the source of foreign domination (Hackett and Shelby 1942). From a relational ontology perspective, these objects (the bells especially, Mahar 2013) and spaces were potentially identified as the sources of power of the Spanish priests. In conjunction with the burning of the churches and missions, the call to return to pre-colonial ways of life was answered with the construction of "new forms of material culture…that resourced and referenced their perceptions of pre-Hispanic times but did not replicate them directly," (Liebmann 2008:364).

Leslie Spier (1935) argues that pre-existing cosmologies and ideologies based on motifs of world destruction and renewal provided reference for the mid-nineteenth century Prophet Dance in the far West. In different variations, the vision of a prophet or appearance of some other phenomena foretold the end of the world, after which the dance was initiated (Spier 1935). During performances of the Prophet Dance, participants would fall into trances and reawaken with new songs, paints, or affirmation of the doctrine. Neither the dance nor the ability to have visions or prophecies were restricted to a particular group of people; in fact "'[t]he dreams came as often…even more often, to men who had little [shamanistic] power than to men who had much, and brought no faculty for curing or other shamanistic acts'" (Spier 1935:7). Common elements of the Prophet Dance were found among a number of groups in the Northwest/Plateau area, including dance forms, songs, and body paints, as well as shared narratives of the living visiting with the dead (Spier 1935). Spier suggests the Ghost Dance of 1870, and the subsequent Ghost Dance of 1890, originated with the Prophet Dance.

The Ghost Dance movement of 1890, which spread throughout the Plains and western United States during the late 19th century, likewise began with the religious revelations of one man, a Paiute of Nevada named Wovoka (Andersson 2008; Hittman 1990). The doctrine espoused by Wovoka had its roots in previous religious movements, especially the earlier Prophet Dance and the Ghost Dance of 1870, and included a message of world transformation through natural events and supernatural powers (Andersson 2008). This message was predicated on widely held traditions of world renewal and enacted through practices of dancing and feasting. The initial material movement included sacred feathers and red paint (Andersson 2008). As the Ghost Dance spread to the Plains, the message and the materials changed, sometimes intentionally in accordance with the traditions of each group that adopted the movement, other times unintentionally due to language differences (Andersson 2008). Likewise, Gregory Smoak (2006) demonstrates how personal and group identities and histories, as well as individual perceptions of circumstances, had great bearing upon whether the degree to which people chose to participate in the late 19th century Ghost Dance. These choices and negotiations led to an uneven spread of varying permutations of the Ghost Dance. For example, among the Lakota, aspects of previous religious practices were incorporated into the Ghost Dance, including sweatlodges, the sacred tree, and the sacred pipe, while material innovations included supernaturally powerful shirts that made their wearers invulnerable (Andersson 2008; Mooney 1965; Spier 1935).

Likewise, Stewart (1987) describes the various material performances related to Peyotism. Often these include a ritually prescribed space and spatial organization as well as sets of objects, songs, and dances; these differ from group to group as "each ceremony is unique, but each has a common heritage" (Stewart 1987:30). Certain elements of the Peyote religion were carried from group to group by missionaries and practitioners, particularly the "persistent belief in the supernatural power of the peyote plant" (Stewart 1987:41). The spread of Peyotism provides a telling example of how religious movements transform more than material practices. In fact, Bailey (1995:5) documents how increasing adoption of the Peyote religion, or the Native American Church, "demanded total abandonment of traditional Osage religious beliefs and practices," including the destruction or sale of sacred bundles. This movement appears to entail, even require, a shift in how people related to their world in order to sever the cosmologically endowed relationships with those bundles.

The processes at work within social-religious movements are important in understanding the historical trajectory of Cahokia, especially how the initial social movement spread, and important to the argument here, the varying responses to this movement. Specifically, this requires a consideration of how this movement failed in certain places and why certain identities and practices appear to have become targets for intentional change. It seems that the spread of Cahokian practices, people, ideas, and objects was likewise a social negotiation, contingent upon existing relationships, practices, beliefs, and needs. Proselytizers, prophets, and missionaries – intentionally or not – spread the Mississippian message embedded within daily and religious practices and entangled material objects across the landscape. Social movements have a propensity for creating factions within social-political-religious movements (della Porta 2008), potentially as source of competition leading to various forms of social, political, or physical violence. Social movements were a potential means by which existing factions enacted political transformation through material changes.

Social-religious movements like revitalizations spread through social practices and interactions which are inherently material. Such movements were identified by Wallace (1956) as a rapid spread of multiple innovations, including narratives, rituals, and cult objects that were often constructed of everyday, utilitarian objects (e.g., Ghost Dance shirt). From a perspective of materiality, Liebmann (2008:369) argues for a reconceptualization of revitalization movements as a "rapid creation of a pattern of multiple innovations," in which material objects are not simply utilized in the interest of spreading a social movement, they are the movement (emphasis added). The medium is inseparable from the message (McLuhan, 1964; Taylor 2007:299). The material partners implicated in social movements should therefore be conceptualized as active social agents within the movement, recursively creating the movement as well as themselves as social entities. These social-political-religious movements are inherently material, spread through practices and experiences. Everyday objects, like pottery or domestic architecture, are "actively involved in creating and 'ontologizing' the new social schisms and thoughts" that are part of political-religious movements (Olsen 2010:146). In this manner, rhetoric, written propaganda, narrative, dance, prayer, 'sacred' spaces, and cult objects, are created as the material messages of these movements, simultaneously carrying and constituting the movement (Liebmann 2008; Wallace 1956).

Theories of materiality and object agency originate in attempts to break down the Cartesian duality between mind and body, object and subject, material and ideal (Appadurai 1986b; Meskell 2004; Meskell 2005; Pels 1998; Weiner 1985). Building off of theories of practice

(Bourdieu 1977) and agency (Dobres and Hoffman 1994; Dobres and Robb 2000), materiality highlights the interaction between thing and practice, object and process (Dietler and Herbich 1998). Every social interaction has a material component and, concurrently, every material engagement is a social interaction. People are entangled in relationships with other people, with places, and with the objects they make and use.

Early materiality theory persisted in a duality of the material and the ideal, in which ideas and ideology were first conceived and then given physical form (DeMarrais et al. 1996). More current theorizing about materiality surpasses the ways in which objects are created as meaningful simultaneously through action and idea (Meskell 2004; 2005), to embrace objects as already meaningful and "constitutive of collective action" through intrinsic properties of the thing itself (Olsen 2010:156). From this perspective of materiality, in which mind, body, object, and practice are simultaneously part of the same relational processes, meaningful objects become "partners in a social world," with the ability to affect how people interact (Fowler 2004:161). Things become part of social identities, accruing value through their production, use, and participation within the social world (Weiner 1985).

Objects have been theorized as having biographies (Appadurai 1986; Kopytoff 1986), embodying the history of their associated social identities. In this manner, these things become inalienable in their inability to be detached from certain social identities, becoming historical, unique, irreplaceable, even sacred (Weiner 1985). Appadurai (1986) distinguishes among the various biographies, economic, technical, and social, highlighting the processes by which objects become commoditized or singularized. Things can equally be commodities, inalienable objects, and sacred materials at some point in their biographies – simultaneously even – and such objects in certain contexts may have been considered active personages within the community (Appadurai 1986a; Kopytoff 1986).

Latour (2005:249) argues that "objects are made of social ties"; the opposite (or rather complementary) point could be argued that social ties are made of, and through, objects. In recent material theory, things are not simply "produced in relations" but are actually "what makes relations possible" (Olsen 2010:157). Things are not simply "a backdrop to, or embodiment of, remnants of societies and cultures," but are rather "an inseparable part of their very constitution" (Olsen 2010:149). As such, buildings and objects are implicated as partners in the social world, rather than symbols of or metaphors for a particular social group or institution. As described further below, objects, as active agents or social persons in an animated world, have the ability to transform themselves and others (Schiffer 1999).

Objects, plants, animals, cosmological phenomena, deities, ancestors, and elements entangled within social relationships have the ability to move or negotiate, age and die. Theorists have been divided as to where the animating factor for agentic objects arises: whether objects have agency in their own right or whether people imbue objects with an animating spirit (Appadurai 1986; Meskell 2004, 2005; Olsen 2010; Pels 1998). Recently, animist and relational ontologies have been brought to the foreground in archaeological theory (Alberti and Bray 2009; Latour 2005). From these perspectives, other-than-human agents were interacted with as animate beings; therefore the debate over location of animating spirit noted above becomes a moot point.

The Native American world was (and still is) populated by both human and other-than-human persons (Hallowell 1975; Harvey 2006; Deloria 1999; Walker 2008a, 2008b). As part of a relational entanglement, animating power is reciprocally transferable between objects and humans (Zedeño 2008). The Northern Ojibwa, part of the Algonquian linguistic group, recognize relationships between humans and other-than-humans as interpersonal, and include "other-than-human grandfathers" who are "sources of power to human beings through the 'blessings' they bestow, i.e., a sharing of their power which enhances the 'power' of human beings" (Hallowell 1975:144). A similar ability of an object to "bestow blessings" upon humans or act "like a spirit" is recognized by the Ho-Chunk, a Siouan-speaking group living in Wisconsin at the time of European contact (Radin 1970:4). Like the Ho-Chunk, the Osage and Omaha, also Siouan-speakers, recognize a "silent, invisible creative power," Wa-Kon-Da, that animated the cosmos and all things that lived and moved (Bailey 1995:30). Each living thing had its own unique "qualities or characteristics that either exceeded those of humans or were lacking in humans altogether" and could be gained from those elements or animals (Bailey 1995:32).

This is not to suggest a single ontology shared among all Native Americans past and present; in fact, in order to counter the argument that relationality is an essentially Native American ontology, consider how sentient ancestors are experienced in places and objects by Australian Aboriginal persons (Harvey 2006). In this ontology, "the ancestor's body is wood and stones…is the camp or country…these 'things' and places are possessed by the ancestor in the same way that my hand belongs to me…this, in part, explains why possession of ceremonial 'objects' entails…responsibility," (Harvey 2006:74). The above examples are intended to highlight the multiple animated participants within such relational ontologies in order elucidate the potential relationships that may have been available in the past. People are not just 'in the world, (sensu Heidegger 1996) but are intimately engaged in personal relationships, that are reaffirmed through daily practice, with the many different inhabitants (human and other-than) of that world. This understanding may help us better grasp that material changes are transformative of all social, political, and religious relationships, including those with other-than-humans.

Social persons, broadly defined as any entity conceptualized and treated as a person in a given context, emerge from relations and practices between humans, animals, things, and places. The creation of social persons is inseparable from the relationships of production, exchange and consumption, so that landscapes, raw materials, commodities, gifts, and tools of production are all key players in the reciprocal construction of social persons (Bruck 2006; Fowler 2004; Gallivan 2007). Further, relational ontologies provide the possibility for transmutation, or "the potential of humans and objects becoming altogether different entities," (Zedeño 2008:366). In this way, objects or animals may be persons and humans objects or animals. Identification as a specific social person may occur only at certain times, in certain places, or in the context of certain practices. As relationships change, who and what may be considered a social person may likewise change.

The construction of these material messages/messengers entangles objects, spaces, ideologies and identities through practices, performances, and experiences (Meskell 2004; 2005; Renfrew 2004). Material meanings are created through the production, use, consumption, and destruction of objects, substances, places, and spaces (Meskell 2004; 2005). Additionally, such movements may be part and parcel of the creation of new (perhaps competing) ontologies through reconfigurations of material relationships and the construction of new narratives. According to Severin Fowles, "ontology is anchored in narrative" for both Western and non-

Western peoples (Alberti et al. 2011:898), and narratives are among the material innovations that constitute revitalization movements.

Violence in Political-Religious Movements

In addition to their material basis, social-religious movements also have implications of violence. Pauketat (2009:247) argues that ‘practices of war’ are socially produced and socially productive, constructing “cultural identities, genders, or cosmologies.” These practices extend beyond the acts of battle themselves, to include daily experiences and material understandings of violence. Violence or warfare may be used to produce or transform social participants, identities, or even ontologies, perhaps as part of a larger transformative movement like revitalizations.

The interrelationship between religion and violence has recently been interrogated by Lepowsky (2004), Walker (2009), and Koziol (2010), among others. Lepowsky (2004:1) identifies “ritual violence” (symbolic or corporeal violence validated by gods or spirits) as “a key element in revitalization and oppositional politico-religious movements.” Ritual violence may likewise engage with other-than-human persons, such as ancestors, in its enactment. Practices of violence, such as warfare, also include narratives, materials, and spaces of conflict that construct an ontology of violence that defined social identities and practices (Cobb and Giles 2009; Pauketat 2009).

Walker (1998:265) highlights the ways in which violence, specifically “kratophanous” violence, is mobilized in revitalization movements. Walker (1998:265), following Eliade (1958), defines kratophanous violence as “those activities or interactions that ritually redirect or end the life histories of people, portable artifacts, or architecture in order to contest their use within an ongoing ritual tradition.” Social-religious movements, especially prophetic or millennial movements, are often associated with violence (Lepowsky 2004). Concurrently, in the spirit of recent animist and phenomenological theorizing (in which the world as experienced may include regular engagement and relationships with other-than-human persons), I expand this definition of violence to include these other-than-human subjects, material identities, social agency and the perceived stability of the world(s) with which people are engaged (Harvey 2006; Hallowell 1975; Meskell 2004).

Research into modern social movements highlights the symbolic nature of political violence, that "the cultural and emotional effects that it produces are more important than the material damage," (della Porta 2008:226). As is argued below, the material collateral of political violence is more than symbolic; instead these materials and their relational entanglements comprise the movement, the group, the nation, the identity. Social violence is here conceived of as lying along a continuum it encompasses various forms of structural violence entangled with social inequality that results in physical injury, deprivation, or psychological harm to a person or group (Waterston and Kukaj 2007). This reconceptualization of social violence includes jarringly significant alterations to social life as well as destructive actions, and allowing for the recognition of violence within political, religious, and social movements. Likewise, this repositions violence as a part of the experience of everyday life, rather than as an isolated, or even isolatable, social aspect (Pauketat 2009).

By redefining or repositioning violence to include turbulent or destructive actions which may have a jarring quality or significant alterations of social life, expanded to include non-human social agents, we allow for violence that encompasses the destruction of both human and non-human agents, perceived attacks on 'traditional' practices and beliefs, and the disruption or dissolution of social relationships. In modern social movements, physical violence has been demonstrated to erupt in response to “forms of action [that] were initially disruptive because they were unconventional” (della Porta 2008:222). In this lies the “paradox of violence in nonviolence,” where nonviolent actions invoke a perception of violence (Gorsevski and Butterworth 2011:51). Likewise, “projections onto the Other of the violence of the…imagination” allows for an escalation of violence due to expectations of the same (Harkin 2004:xxvii). Modern examples of violence in social-religious movements may be problematic due to their nature as ‘nationalistic’ or state-level-domination versus political-resistance, though the disruptive nature of and the implications of factionalization within such movements should be noted. Given the material construction of group identity, physical, social, and political violence against material identities may be embedded within a movement for political change.

Violence should be reconceptualized as more than an attack on human physicality, but as an attack against non-human persons, material identities, and the stability of the social (and perhaps cosmological) world itself. This violence is at once political, social, religious, and physical, and may be enacted through social movements such as revitalizations. Conversely, these forms of violence may result from, as much as take part in, the initiation of social movements. Such a reassessment of violence will necessarily require an investigation of the interdigitation of the processes of social movements with aspects of materiality, personhood, power, and identity. This social violence extends beyond human fatalities and includes the destruction of specific places, spaces, and objects, for example, the material co-creators of the initial Cahokian movement.

Objects have been argued to be extensions of the human body (Merleau-Ponty 1962). For example, religious paraphernalia became extensions of the body of the practitioner in mediating the cosmos; in an animated world of agentic objects and other-than-human persons, I would argue the complementary perspective where the practitioner becomes an extension of a powerful object (e.g., sacred bundle) or element (e.g., fire), acting for that thing. In either instance, the relational entanglement of the human actor and the other-than-human agents involved in religious practice creates powerful persons.

As people engage with their environment, certain places become imbued with power (and arguably, vice-versa). These powerful ritualized and politicized landscapes are important in redefining social identities (Gallivan 2007). Objects created from particular source areas are entangled with that landscape. Such objects, as pieces of those places, empower the relationships between people, place, and thing. For example, raw material source locations for the materials engaged within a social-political movement may have become, or already were, places of power and intimately linked to certain identities or persons.

Power has variously been conceptualized as 'power to' – the ability to act– or 'power over' – having social or political control or authority over other the actions of other persons or objects (Giddens 1984; McGuire 1992; Miller 1987; Shanks and Tilley 1987). The first iteration, 'power to,' is much akin to definitions of agency as an ability to act or have an effect, while the second carries connotations of dominance and coercion (Paynter and McGuire 1991). Among approaches that view power as "power over," objects play an active role in structuring social relationships and are used to express and promote dominant ideologies (Paynter and McGuire 1991). In this manner, Emerson (1997a:20) engages with power as it is "manifest in social actions and material remnants," including aspects of the human-built environment.

Power is not a thing to be possessed, though it can be attributed to particular persons or groups and has been tied to access or control of particular material objects (Emerson 1997a). In the case of Cahokia, these objects may include the production of Ramey Incised jars (Pauketat and Emerson 1991), shell beads (Pauketat 1993; Prentice 1983, 1987; Yerkes 1991), copper (Kelly et al. 2007; King 2007), and other religious paraphernalia (Pauketat 2013a). Modern theories of power consider it to be a factor of relational networks of social actors (including objects, places, and persons), constructed through acts of engagement with a meaningful world. Native American ontologies of power in particular suggest that powers exist as dispersed attributes of an interdigitated political, religious, and social life (e.g., Wa-Kon-Da) (Bailey 1995; Baltus and Baires 2012; Pauketat 2008, 2013).

This ontology allows for power to be gathered from the cosmos, objects, ancestors, and elements that are imbued with such power naturally, and deployed, typically through religious rites. As has been documented among the Osage and the Omaha of the Plains, these rites are owned and controlled by (or rather, cosmologically given to and protected by) specific clans (Bailey 1995; Fletcher and La Flesche 1992). The control of such religious rites is a potential avenue through which dispersed cosmological powers may be expanded into or expressed as political or social power. This expression may take place through the material practices of these rites in which dispersed cosmological power is gathered into particular objects, places and spaces. Additionally, this ontology allows for objects and elements to be powerful in their own right.

The gathering of powerful objects is sometimes accomplished through sacred bundles (Bailey 1995; Fletcher and La Flesche 1992; Pauketat 2013a; Zedeño 2008). A bundle consists of a group of objects gathered together “so that they may influence one another and act in concert,” (Zedeño 2008:362); bundling, therefore, is the process of gathering or relating objects together (Pauketat 2013a). As individual objects, the items within bundles had their "own properties and realms of interaction," however, when combined "their interactive capabilities integrate to become…more than the sum of its parts," (Zedeño 2008:364). These bundles entail more than simply physical objects wrapped together, but also prescriptions for the creation of and relationship with the objects, including songs, liturgical sequences, rules for opening and caring for the bundles, paint designs or costuming of participants in associated ceremonies, speech and behavior in daily life; particular buildings may likewise enhance the power of a certain bundle (Zedeño 2008).

The sacred bundles, like many religious rites, were often held in trust or protected by particular clans or societies, though personal bundles are also known (Bailey 1995; Fletcher and La Flesche 1992; Pauketat 2013a; Skinner 1913; Zedeño 2008). The creation of the bundle, or the process of gathering, is itself an alliance between the bundle creator/receiver, the supreme beings endowing the knowledge to create the bundle, and the entities that are gathered (Zedeño 2008). Additionally, some bundles require the support of a group of people in their creation and care (Zedeño 2008), enhancing their social entanglements as well as entangling power. Bundles also bestow additional rights and responsibilities among those who protect and care for them. For example, Pauketat (2013a:192) has suggested that many of the craft items made for specific religious practices and celebrations may have been restricted to bundle keepers and their kin. Other powerful groupings might also be made through practices of gathering that lie outside the auspices of a particular clan or society but rather as communally available practices.

The practice of caching (or deposition of ‘votive’ objects, Pauketat 2013a), which gathers together specific objects with their own relational histories, was fairly widespread throughout the Cahokian world (see for example Hanenberger 1986; Milner 1983, 1984a; Pauketat and Woods 1986). As discussed in further detail in Chapters 3 and 5, caches typically included stone, through in some instances were ceramic or even mineral (e.g., galena, hematite); these objects were often placed either individually or in small groups of two to four on structure floors or in former pit features. Larger caches of stone tools, mainly celts, were amassed and interred at various sites in the American Bottom and the surrounding uplands. Pauketat and Alt (2004:793) have theorized these large celt caches as inalienable objects signifying individuals, corporate groups, communities, or cultural identities who were “commemorating their part in the new macro-community or regional polity centered on Cahokia.” These objects may not have simply been representative of a person or group of people, but perhaps even considered persons or parts of persons themselves. In fact, a multitude of persons and places, identities and meanings were likely entangled and embodied within each celt. Additionally, as objects and elements that were perhaps imbued with natural powers, the gathering of these objects together in such large quantities may have 1) been a process that created a place of concentrated power, and 2) may have required persons with special abilities to perform this gathering, thus re-empowering those persons through their special relationship with these objects and elements.

A number of material objects appear to have redefined and reconstituted Cahokian identities during the initial stages of the Cahokian coalescence. Simultaneously, certain objects may have been constructed as material co-creators in the novel politico-ritual contexts of the movement. This process allowed certain social persons to become empowered as elites through practice and material entanglements with powerful objects and other-than-human persons. With the socio-political centralization at Cahokia, reorganized production patterns of certain objects appear to have resulted in the creation of certain persons as "specialists" – both in the crafting of certain objects as well as in their use (Emerson 1997b; Gregg 1975; Pauketat 1994, 1997; Pauketat and Emerson 1991; Yerkes 1991).

Historically documented revitalization movements have demonstrated their material basis, spreading, succeeding, and changing through the use of common or everyday things, materials, and elements (e.g., feathers and pigments of the initial Ghost Dance movement or the Ghost shirts and sacred pipes in re-imagined Lakota Ghost Dance). The initial Cahokian movement that resulted in the coalescence of the city took place in part through transformed domestic architecture (i.e., wall trench houses) and pottery production (i.e., shell temper). These material co-creators of this movement were further elaborated upon in the increasing politicization of the religious movement during the Stirling phase, resulting in highly iconographic pottery (Ramey Incised) and a suite of specialized political-religious buildings (L-,T-, and circular structures). It is these material collaborators of Cahokian religious-politics that I focus on in the transformations that took place between the 12th and 13th centuries at Cahokia.

I contend that the material changes noted between the 12th and 13th centuries were part of an intentional material political-religious reorganization or 'revitalization' movement. I argue this 13th century revitalization was a material means of negotiating political challenges and an atmosphere of regional violence through a religious movement. Further, this 13th century revitalization was instigated through material innovations as well as transformations that included fortifications and iconographic representations of warfare, suggesting violence became a material partner in the creation and spread of this movement. This reassessment of violence within a political-religious movement requires an investigation of the interdigitation of materiality, relationality, power, identity, and the processes of social movements, here evidenced through the archaeological remains of pottery, religious buildings and associated paraphernalia, cached objects, and burning events at and around Cahokia.

CHAPTER 3. CAHOKIAN MOVEMENTS, VIOLENCE, AND 13TH CENTURY TRANSFORMATIONS

Certain forms of social violence (including human sacrifice) were embedded within the initial rise of Cahokia and spread of Mississippian beliefs and practices (Fowler et al. 1999; Koziol 2010). Additionally, violence may have been both a material motivator for as well as enactment of subsequent politico-religious reorganizations at Cahokia. This violence extended beyond human fatalities and included the destruction of specific places, spaces, and other-than-human persons (i.e. the material collaborators of the Cahokian political-religious movements). These places, objects and people (both human and non-human), along with the identities and ideologies with which they were entangled, appear to have been targeted for violence during the late 12th century reorganization of Cahokian religious politics. In order to understand the intertwined processes of social, political, and religious change that took place in the 13th century at Cahokia, it is necessary to gain a historical perspective of the region and the relationships that were built in, with, and through the rise and spread of Cahokian Mississippian.

Cahokian Beginnings

The socio-political centralization in the American Bottom in the early- to mid-11th century, seemingly a result of the centripetal pull of an initial Cahokian political-religious movement (Pauketat 1994, 2010), reorganized social relationships, including those between humans, objects, and other-than-human agents (i.e., deities and supernatural heroes) engaged with and through this social movement. During the Terminal Late Woodland period just prior to A.D. 1050, Cahokia was a sizeable village, with a population of approximately 1,000-2,000 inhabitants, located on the banks of Cahokia Creek (Dalan et al. 2003; Emerson 1997a; Pauketat and Lopinot 1997).

Other Terminal Late Woodland villages were located throughout the American Bottom and in the surrounding uplands (e.g. East St. Louis, Janey B. Goode, Pulcher, Range) (Figure 3.1). Nearby upland areas with close Cahokian connections from the Terminal Late Woodland through the later Mississippian period include the Silver Creek drainage to the east, which drains to the Kaskaskia River, and the northern uplands near the Wood River, Cahokia Creek, and Indian Creek drainages which outlet to the Mississippi River through the American Bottom floodplain (see Figure 3.2). Cahokia-related sites have likewise been identified in Missouri, along the Big Muddy, Meramec, and Missouri Rivers (Harl 2010; O'Brien and Wood 1998).

The so-called "Big Bang," the rapid coalescence and initiation of material transformations at and around Cahokia began around A.D. 1050 (Pauketat 1994). The population growth in the American Bottom region included a large-scale movement of immigrants into the American Bottom (Alt 2006a; Slater et al. 2014); these immigrants may have had extant relationships with Cahokians formed through earlier, smaller-scale movements of people into and out of the American Bottom on the cusp of this population explosion (Benden et al. 2010). Local populations, infused with growing numbers of immigrants, coalesced at a number of the previously established villages – Cahokia preeminently – and began monumental works of construction, including earthen platforms, mortuary features, and plazas for public gatherings (Alt 2006a; Dalan et al. 2003; Emerson and Hedman 2013; Pauketat 2004).

The simultaneously social, geographical, and physical reorganization of the landscape during the late 11th century Lohmann phase included the construction and occupation of dispersed farmsteads and hamlets throughout the countryside; i.e. the 'ruralization' of the American Bottom (Emerson 1997a; 1997c; Yoffee 1995). Within the burgeoning city of Cahokia itself, social

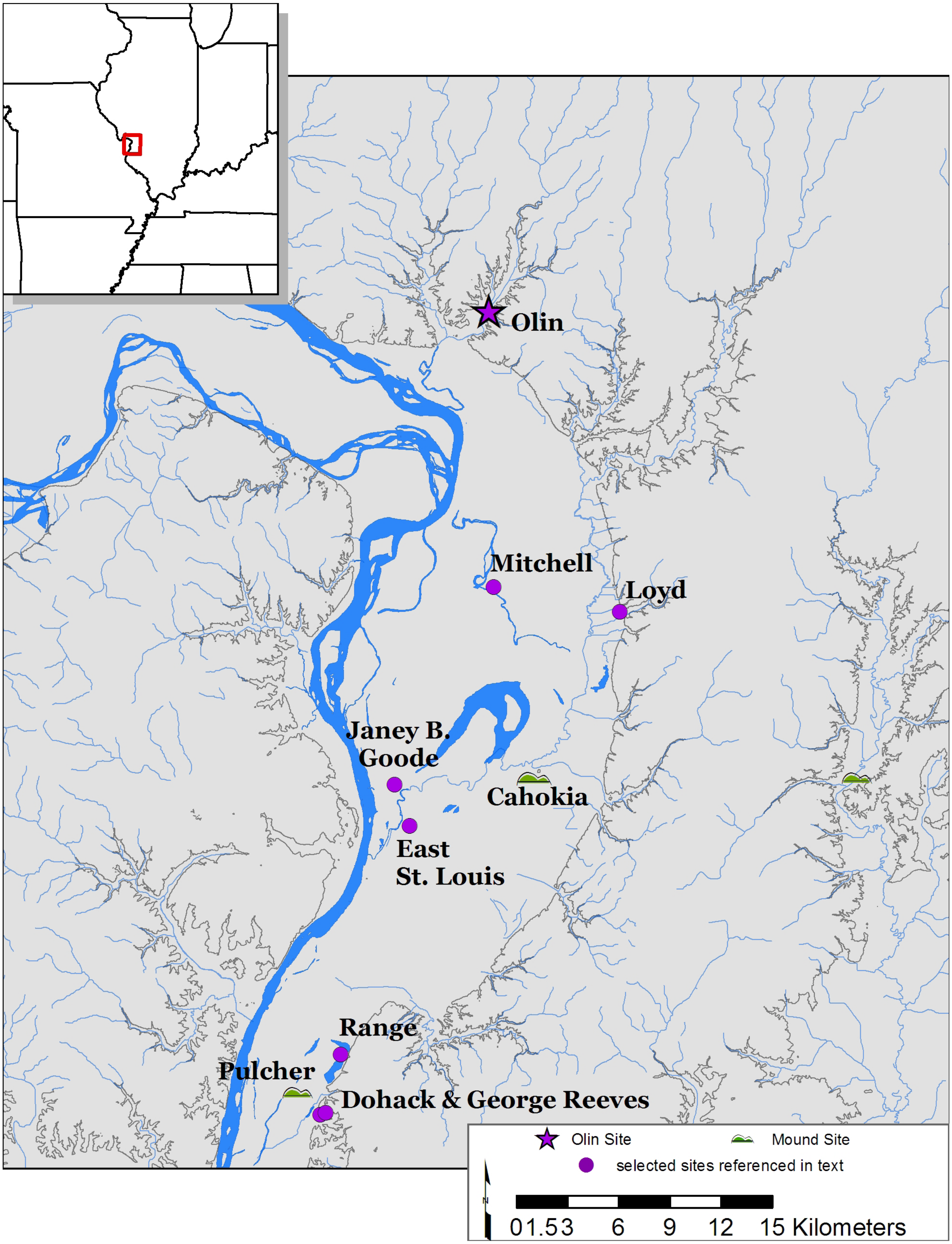

Figure 3.1. A selection of Terminal Late Woodland sites in the American Bottom area.

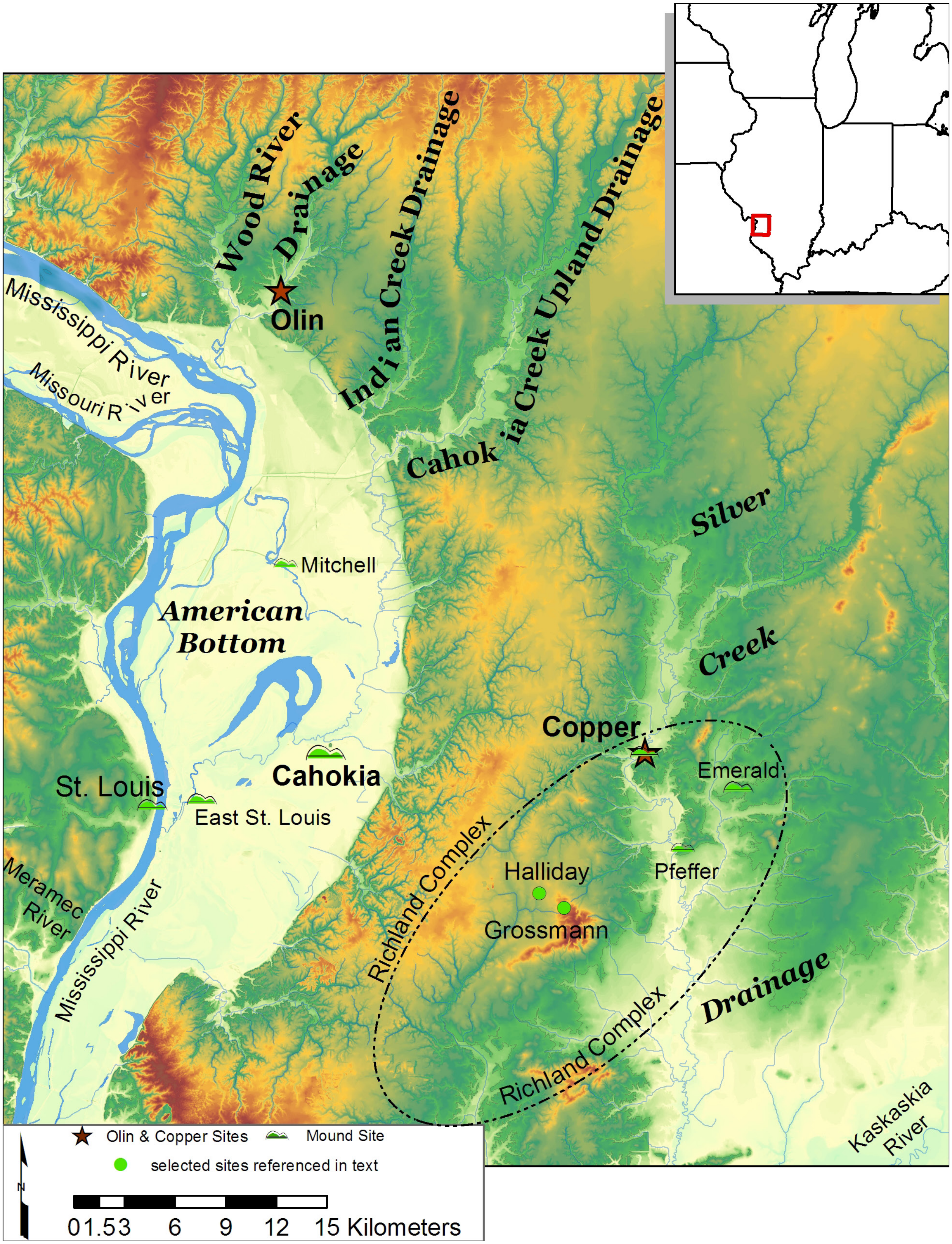

Figure 3.2. Major drainages around the American Bottom.

space was reorganized according to a new cultural logic (Fowler 1997). Rather than constructing homes in traditional courtyard groups referencing kin relationships (Kelly et al. 1990; Pauketat 2004), buildings were constructed along the newly formulated “Cahokia Grid” (Fowler 1997) with the same slightly off-set north-south alignment as the mounds now under construction (Collins 1990; Mehrer and Collins 1995; Smith 1969; Pauketat 2013a; Pauketat and Emerson 1997; Reed 1969). This Cahokian alignment has recently been suggested to be set to lunar alignments; a pattern which is repeated at other important Cahokian locations including the Emerald site in the Silver Creek drainage to the east (Pauketat 2013b; Pauketat, Alt, Kruchten, and Romain 2013).

The initial Cahokian movement actively created a dynamic new community, which integrated a diversity of ethnic and community identities, as evidenced by the appearance of immigrant populations into the American Bottom (Alt 2006a; Emerson and Hedman 2013; Slater et al. 2014). In addition to non-local pottery, foreign pottery styles constructed from local clays and “hybrid” styles (drawing from local and non-local pottery) indicate the presence of people originating from southern Indiana and southeast Missouri (Alt 2006a). During the early part of the 12th century Stirling phase, immigrants appear to have congregated in an upland region southeast of Cahokia known as the Richland Complex, located within the Silver Creek drainage (Alt 2006a,b; Pauketat 2003) (see Figure 3.2). The Halliday site, for example, was occupied by what appears to have been an enclave of foreign transplants from the southeast Missouri region (Alt 2001, 2002, 2006a). Continuing to arrange their households in courtyard groups, the residents of Halliday made non-local and hybrid pottery forms, built their houses in a combination of Cahokia and traditional styles, and consumed foods not typical of groups originating in the American Bottom region (Alt 2006a). Similarly, Yankeetown pottery, made by people hailing from the southern Indiana region, has been found at Grossmann as well as at the Emerald, Pfeffer, and East St. Louis sites (Alt 2006b; Pauketat 2005; Fortier 2007). Whether permanently relocated to the American Bottom or participating in pilgrimages to Cahokia, the immigration of people into the region would have created unique admixtures of materials, traditions, practices, beliefs, narratives, histories, and identities.

From this diversity just described, a new Cahokian community was created, enacted, and recreated through daily practices of house-construction, pottery and stone-tool production, as well as periodic social gatherings to construct mounds and bury the dead (Pauketat 2001b; Pauketat 2011a). Some of the most distinct material innovations in the early creation of Cahokia included new pottery forms and production techniques (Holley 1989; Milner et al. 1984; Pauketat 2004) and new architectural styles (Collins 1990; Emerson 1997a; Milner et al. 1984; Pauketat and Alt 2005). Prior to Cahokian coalescence, pottery was made in a diverse array of forms and incorporated pastes and production techniques that were previously regionally or locally specific. For example, pottery made in the northern American Bottom during the Terminal Late Woodland period typically used grit as a tempering agent, while pottery in the southern American Bottom was made with limestone temper (Holley 1989). The introduction of shell temper from the lower Mississippi River Valley, led to the majority of pottery being made with shell temper, though varying combinations of shell mixed with the traditional grit, grog, or limestone tempers are also found dating to the early years of Cahokia (Holley 1989; Kelly 1982; Milner et al. 1984; Pauketat 1994; Vogel 1975). From this diversity eventually arose the standardize use of shell-temper. Likewise, buildings were previously built using single-post construction techniques. This was quickly, though unevenly, replaced by wall-trench construction, concomitantly changing the dynamics of relationships formed and reaffirmed in and through building construction (Pauketat and Alt 2005).

Newly specialized religious practices reinterpreted and integrated ‘traditional’ local practices such as the chunkey game (DeBoer 1993; Pauketat 2004; Zych 2014) and the termination of structures via fire (Wilson and Baltus n.d.). These new practices were effectively changes in the ways in which people related to objects, spaces, and each other. For example, the “stones” used in the chunkey game during the Terminal Late Woodland were small, sometimes made from clay, and often found in domestic contexts (e.g., near houses, in refuse pits); coincident with the ‘Big-Bang’ the game was reinvented, utilizing highly crafted gaming pieces made from more durable and highly visible stone and were increasingly disposed of in non-domestic, communal or mortuary contexts (Pauketat 2004). The shifting context of the objects and spaces of the game underscore an entanglement with the new Cahokian politico-religious organization, the larger Cahokian community, and the cosmos in general (DeBoer 1993). These chunkey stones have been found at various sites throughout the Midwest and Midsouth, suggesting the game was part of the spread of the initial Cahokian movement (Pauketat 2004; Zych 2010, 2014).

Similarly, Wilson and Baltus (n.d.) demonstrate an increasingly centralized use of fire in the termination of important or powerful buildings (or conversely, an increasing centralization of important or powerful buildings that would thus require fire to mitigate their power at the end of their life-cycle). Prior to Cahokian coalescence, a number of structures were burned in the American Bottom region; during the urbanization and growth of Cahokia, the number of burned buildings decreased at outlying sites and the burning of buildings was increasingly associated with mound contexts at Cahokia (Wilson and Baltus n.d.).

Violence itself may have become centralized under Cahokian control as a pax Cahokiana spread through the Midwest (Pauketat 2004, 2009). Rather than ending the regional violence that appears to have taken place during the preceding Late Woodland period, Pauketat (2009) argues this violence was 'displaced'. In the recreation of regional relationships in the initial Cahokian movement, certain forms of violence were reconceptualized and politically redefined as acceptable. In this manner, violence was embedded within particular religious practices, including the use of monumental marker posts and the construction of mounds.

Among the material innovations of the initial Cahokian movement was the reinvention of mound interment. Often conceptualized as a means of constructing ancestral ties and shared histories, earthen-mound interments in the Midwest were by no means novel and in fact were citational of deep historical roots dating back nearly four millennia (Pauketat 2004; Saunders et al. 2005). In this manner, people were intentionally drawing on deep histories, traditions, and narratives in this reimagined practice. The addition of sacrificial victims, on the other hand, as exemplified by multiple series of mass burials in Cahokia's Mound 72, was an innovative embodiment of social and political violence within a religious context (Fowler et al. 1999; Koziol 2010). Four young persons who had been beheaded and had their hands removed, were buried in close proximity to the iconic "beaded blanket burial" (or rather burials) presumed to be the central feature of the mound (Fowler et al. 1999). The imagined dynamics of this group of burials has changed, however, with recent evidence indicating this "beaded blanket burial" actually consists of multiple individuals, including males, females, and even children (Hedman et al. 2013). Rather than a central burial of a supposed political leader on the beaded blanket, this burial group in Mound 72 appears to support an overarching cosmology of balance (male/female, young/

old) seen elsewhere at Cahokia (Pauketat 2008, 2013), and perhaps may be associated with a particular kin or clan group rather than a single powerful person.

In addition to embedding human sacrifice as socially acceptable violence within a religious context, this novel form of social violence figured prominently in the construction, configuration, and expansion of the new Cahokian community during the late 11th century and early 12th century. The multiple interments within Mound 72 (and by extension, potentially within many similar mounds at and around Cahokia) have been suggested to have been part of a tableau of political theater – a series of dramatizations which would have been public and highly visible (Brown 2010; Pauketat 2004, 2010b). Significantly, among those sacrificed, some may not have originated from the American Bottom (Alt 2008; Ambrose et al. 2003; Slater et al. 2014). At the same time mortuary practices and mound construction (as communal enterprises) appear to unite disparate groups, they simultaneously marked certain people as "other" through the violence enacted upon them – perhaps adding to later tensions among the newly constructed identities. These divisions may not have been drawn along 'ethnic' lines or between Cahokians and non-Cahokians, however. In fact, recent isotopic research has shown a comingling of local with few non-local persons in the group interments in Mound 72 (Slater et al. 2014). This new research suggests full participation of immigrant populations in Cahokian political-religious engagements (see also Emerson and Hedman 2013 and Hedman et al. 2013).

Elemental relationships

Relationships between earth, water, and fire were re-created or re-imagined in the re-invented mound-building tradition of the late 11th and early 12th centuries (Baltus and Baires 2012). Water-sorted silts (whether intentionally collected from wet environments or 'captured' during large rain events) were used at the base of some mounds, including Mound 49 at Cahokia

(Pauketat et al. 2010). Fire was included through reconfigured practices of termination and renewal. Re-appropriating a 'traditional' local practice of burning abandoned domestic structures to physically and spiritually cleanse the landscape (Wilson and Baltus n.d.), special-use political-religious buildings were terminated through incineration, sometimes with objects left in situ, perhaps as a means of metaphysical cleansing as well. These structures were then covered with a layer of earth, thus renewing the space while simultaneously managing powerful places and objects (Baltus and Baires 2012; Pauketat 1993a). New political-religious structures were then built over the place of the previously destroyed building, continuing a cycle in which intense acts of termination were mitigated by renewal and revival, while constructing earthen platform mounds.

The Murdock Mound, located along the eastern edge of the Grand Plaza, provides a detailed example of such termination and renewal practices. An 11th century cruciform structure at the base of the mound had been burned and quickly covered with soils while still smoldering (Smith 1969). In fact, most of the Murdock Mound structures were burned and subsequently covered with soil, including an L-shaped structure (a building type discussed in more detail below), a paired set of rectangular and circular structures, and finally, a mound-top temple that too was burned prior to capping with gumbo clay (Smith 1969).

Likewise, excavations by Preston Holder into the Stirling-phase Kunnemann Mound at the northern edge of Cahokia revealed an L-shaped structure at the base of the mound which had a storage extension or portico, woven mat wall coverings, a formal clay hearth, and numerous objects of specialized production (i.e. shell bead and shell pendant production) (Pauketat 1993a). This early-12th century temple was incinerated and buried beneath a layer of black clay, initiating a sequence of construction, destruction, and renewal. This sequence incorporated large rectangular structures with formal clay floors, a monumental post, a large circular rotunda, and a T-shaped structure (building and feature types discussed in more detail below) (Pauketat 1993a).

During the early 12th century, the early Stirling phase, the Cahokian movement simultaneously became more widespread and more politicized. This politicization may have been enacted or intensified through various formal constructions including: L-, T-, and circular shaped political-religious buildings (i.e., Emerson's "architecture of power," 1997a); the initial construction of Cahokia's Woodhenge (a means by which religious specialists could mark time, or even demonstrate control over time, seasons, and cosmological phenomena) (Pauketat 1998; Wittry 1969, 1977); and through the material objects of the Cahokian movement, including pottery (Ramey Incised), statuary (flintclay figurines), and personal adornments (Long-nose God maskettes) (Hall 1991; Emerson 1997c; Pauketat 2004; Pauketat and Emerson 1991).

With the beginning of the Stirling phase, civic- and ceremonial- sites of various sizes, identified as such by the presence of "architecture of power" and/or a particular array of religious objects (Emerson 1997a), appeared in the rural floodplain and upland areas around Cahokia. These were called "nodal" sites, as they were presumed to be places that integrated the rural population into the Cahokian political-religious system (Emerson 1997a). Through these sites, the now-overtly political-religious practices of Cahokia were insinuated into the rural areas surrounding the city, thus extending the reach of Cahokian influence to peripheral communities. These increasingly politicized practices, objects, and spaces undoubtedly contributed to increasingly politicized identities as well. What may have initially begun as a religious movement of communal practices and spaces during the preceding Lohmann phase may have become constructed as ‘politically elite’ during the Stirling phase through manipulation of relationships with the human and non-human world.

Through material engagement with natural and supernatural forces of the world, certain practices, objects, spaces, and people became increasingly entangled within relationships of power, the ancestral past, and the balance of the cosmos (Pauketat 2013a). Religious practitioners with the ability to channel, negotiate, or engage with natural and supernatural forces, ancestors, and other-than-human persons were constructed as politically powerful (Baltus and Baires 2012; Pauketat 2008). Spaces, structures, and objects used in religious events thus were inherently imbued with power through their engagement with these forces, practices, and people. For example, specific types of architecture that appear during the early Stirling phase – the T- and L- shaped structures – have been hypothesized by Susan Alt (2006b; following Collins 1990 and Porter 1974) as chiefly or priestly residences with alcoves in which religiously significant paraphernalia were stored. These buildings, through their potential association with powerful objects and persons, were thus constructed and engaged with as powerful themselves, including and requiring their termination during mound construction (as discussed above).

Nodal sites, as Emerson (1997a) referred to them, were a means by which rural populations could be integrated into the Cahokian sphere through local access to Cahokian political-religious events. In this manner, they served to bring ordinary people into contact with the powers of the Cahokian universe through the religious specialists that lived and practiced at these sites. The presence of these politically and religiously powerful places in the rural floodplain and uplands around Cahokia provided opportunities for people to witness or take part in the powerful practices of Cahokian religion and community, without necessarily having to go to Cahokia. Additionally, there are so many sites that could be identified as having “nodal qualities” that perhaps these sites and their associated persons and practices became ubiquitous as Cahokian religious-politics became embedded within people’s daily lives.

Regional Spread of the Early Cahokia Movement

The spread of the Cahokia movement included both human and material emissaries (Hall 1991; Pauketat 2004). Among the object-participants of the Cahokia movement were Ramey Incised jars, the sharp-shouldered jars, finely-made vessels iconic of the Stirling phase at Cahokia well known among Midwest prehistoric archaeologists (Figure 3.3 and Figure 3.4) (Emerson 1997c; Hall 1991; Pauketat and Emerson 1991). Citing their fine craftsmanship, their standard set of decorative motifs, and their distribution at Cahokia-related sites throughout the Midwest, researchers have suggested that these vessels were mimetic of the cosmological organization (and thus the social and political organization) of the Cahokian world (Emerson 1997c; Pauketat 2004; Pauketat and Emerson 1991). Evidence suggests these vessels were centrally produced and distributed as part of large-scale communal gatherings (Emerson 1989; Pauketat and Emerson 1991). As such, these vessels were among the material building blocks of “Cahokia”, created by specialists at, and dispersed likely as part of, communal religious gatherings (Pauketat and Emerson 1991).

Reconfigured social relationships, together with novel practices, created new social identities and agents. New identities may have included (re)making political-religious specialists who channeled and embodied cosmic, supernatural, and ancestral power as elite. New social relationships were constructed and reconfigured between humans, other-than-human agents; including ancestral deities, supernatural heroes, and the material co-creators of the Cahokian movement. Certain objects, specifically flintclay figurines and monumental wooden marker

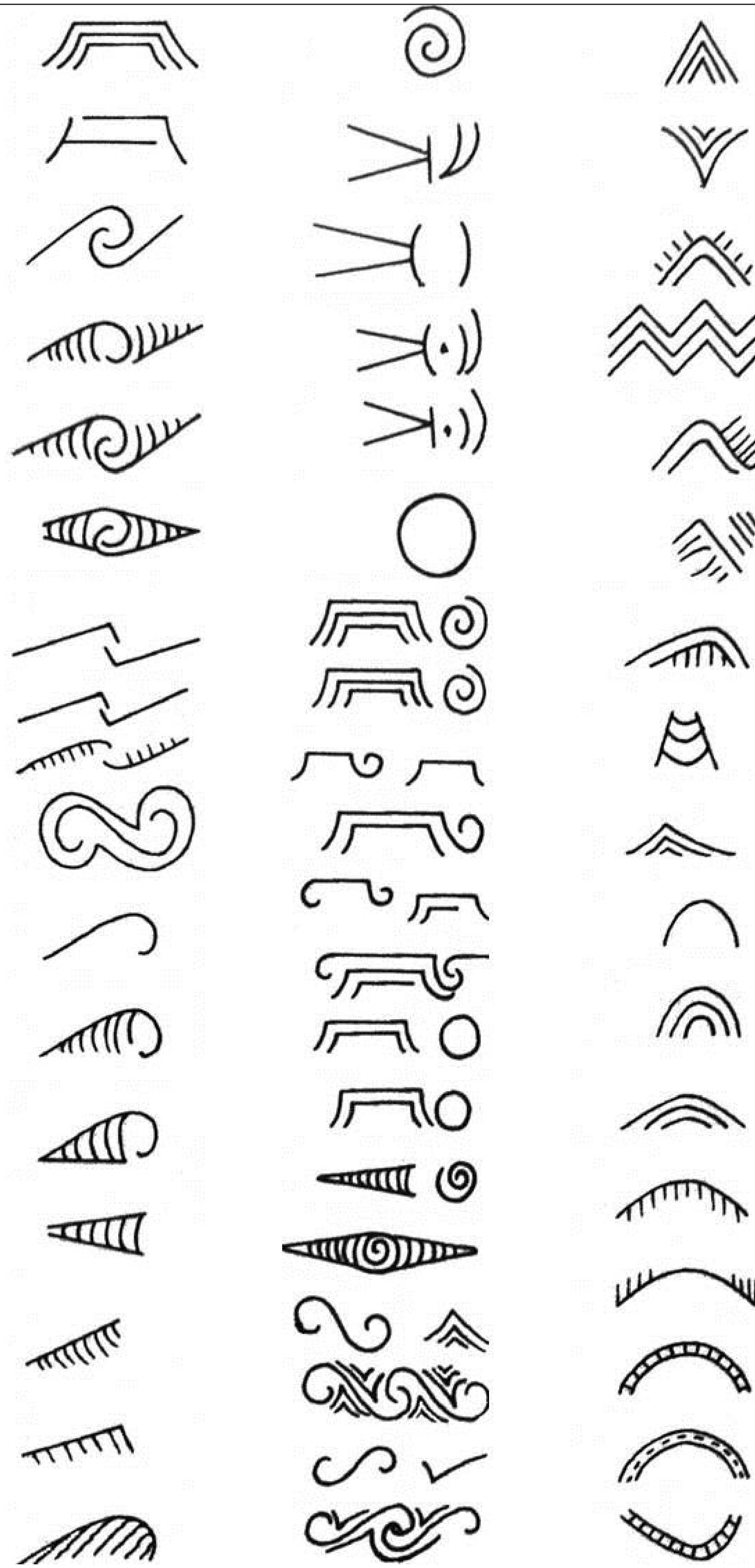

Figure 3.3. Ramey Incised jar decorative motifs (adapted from Emerson 1997c:Figure 10.8).

Figure 3.4. Ramey Incised vessels (photos taken by M. Baltus at the Gilcrease Museum, Oklahoma).

posts, appear to have embodied their own power as other-than-human agents (i.e. ancestors and deities), while in particular contexts other objects (stone hoes, axe heads, and chunkey stones) were treated as social persons (Baltus 2009a; Hargrave and Bukowski 2010; Pauketat and Alt 2005; Skousen 2010, 2012). Relationships were created or reinforced between elements (e.g. fire, water, earth) and politico-religious spaces not only in mound contexts, but in special-use buildings and large marker-post pits as well. A possible temple structure at the upland Richland Complex site of Pfeffer demonstrated a complicated infilling sequence that integrated rain-washed sediments with mixed soils packed into the deconsecrated structure basin (Kruchten et al. 2009; Otten et al. 2007; Pauketat 2013a). At the nearby Emerald site, a similar series of rain-washing episodes filled the void left by a removed center post (Alt and Pauketat 2013).

Certain social persons continue to be marked for violence in religious deposits. Female sacrifices have been found interred within the pits of monumental marker posts after they were removed at the East St. Louis site (Hargrave and Hedman 2004; Hargrave and Bukowski 2010). Following, or perhaps building on, the citation of a removed marker post in Mound 72 with the placement a pit full of women over its previous location (Fowler et al. 1999), this practice potentially (or potently) created a connection between posts-as-ancestors and, perhaps, ancestors-in-posts. The addition of a female sacrifice may have been more than simply a commemoration of its location (Alt et al. 2010). This practice may have been a means of making offering to the ancestors as an active mediation of the power of a/the post (or more specifically, filling the powerful void left after the removal of the ancestor-post) (Pauketat 2013a; Skousen 2010, 2012).

Between the mid-11th century and early 12th century, Cahokians bearing the material practices of the Cahokian Mississippian movement – including human sacrifice – spread beyond the American Bottom – often along the major river drainages. Specifically, Cahokia-related sites appear in the Meramec and Big River Valleys in Missouri, and in the Silver Creek drainage (Holley et al. 2001a,b,c) and the lower Kaskaskia River Valley (Gardner 1969), the Central Illinois River Valley (Conrad 1991; Farnsworth et al. 1991) and Apple River Valley in Illinois (Emerson 1991b). Additionally, a few sites with Mississippian occupations appear outside of the major river valleys (see Claflin 1991; Douglas 1976; Riley and Apfelstadt 1978) (Figure 3.5). Mississippian influence spread up the Mississippi River into southeastern Minnesota (Gibbon 1991), and southern Wisconsin (Goldstein and Richards 1991; Green 1997) – areas that were largely occupied by Late Woodland peoples with well-established social and religious traditions of their own, including the Effigy Mound tradition of southern Wisconsin/northern Illinois (Rosebrough 2010).

Previous researchers have suggested the appearance of Cahokians and their objects in these hinterland areas was the result of any number of different, though not mutually exclusive, processes including political dissent and migration (Emerson 1991a), resource extraction, trade, or control of trade routes (Gibbon 1991; Kelly 1991), and political domination (O'Brien 1989). Following Douglas (1976) and Riley and Apfelstatdt (1978), Pauketat (2004) has hypothesized the spread of Mississippian ideas and practices as processes of 'Mississippianization,' that may have been partially a result of Cahokian proselytizing in the northern hinterlands – spreading the Mississippian message of the Cahokian cult that emerged through the initial Cahokian religious movement.

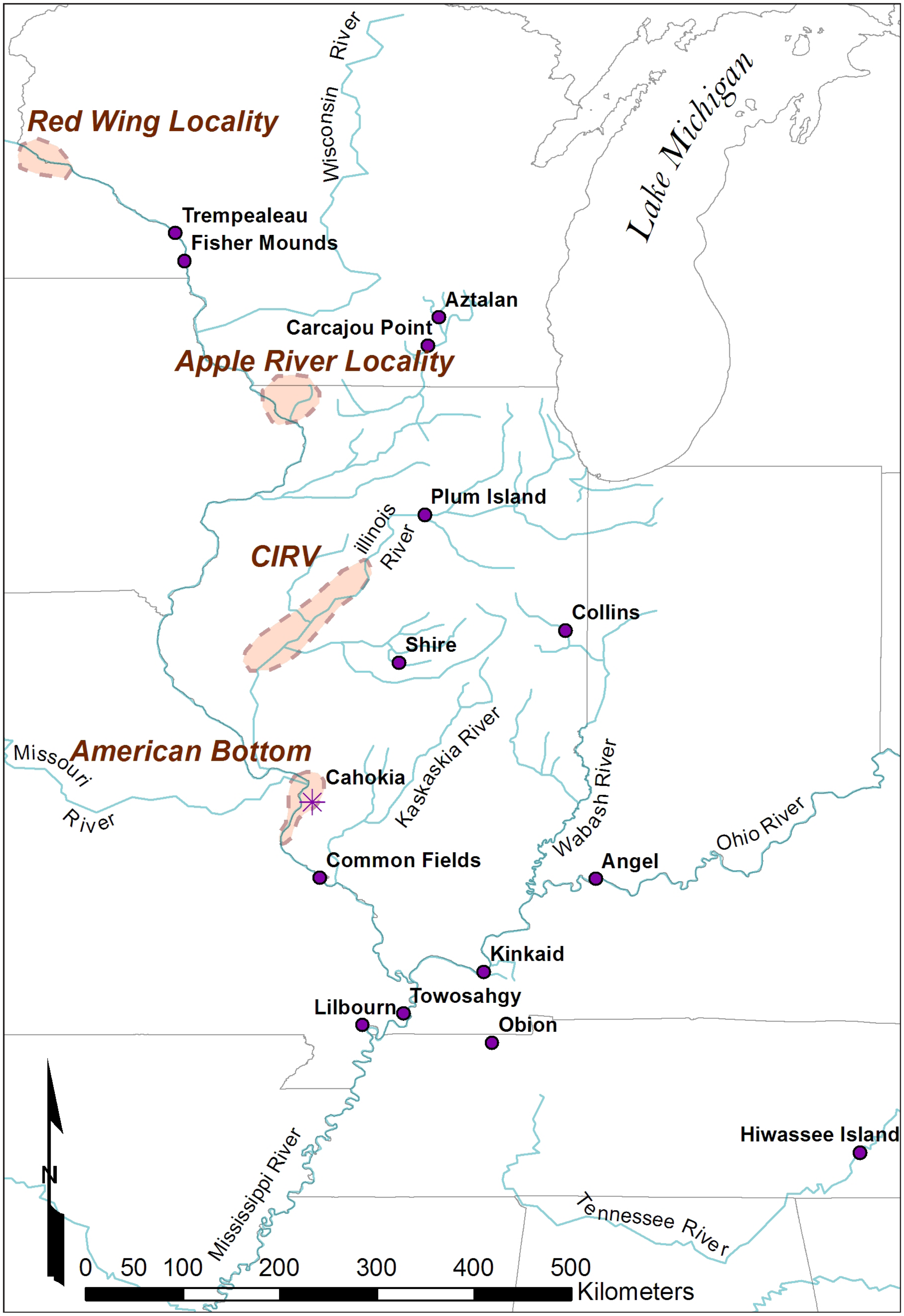

Figure 3.5. Midwest and Cahokian related sites.

Included in the Mississippian message was the introduction of redefined political violence in the form of sacrifice; a burial of four handless, headless men was excavated at the Eveland-Dickson site in the Central Illinois Valley, the location of an early Cahokian intrusion into that region (Conrad 2000; Wilson 2012). This series of burials appears to be citational of or perhaps drawing on a similar narrative as the burial of four headless, handless persons in Mound 72 at Cahokia (Brown 2010; Fowler et al. 1999; Harn 1991). There was a local interpretation of this burial practice, however; pottery vessels had been placed at or near where their heads would have been (Conrad 1991). A cross-shaped structure – like that buried below the Murdock Mound at Cahokia – was also found at Eveland, along with Powell Plain and Ramey Incised pottery, leaving little doubt as to Cahokian interaction (Conrad 1991; Harn 1994). The nature, extent, and duration of these interactions in the hinterlands, however, have long been a matter of contention. For example, Emerson (1991b) suggests that after the initial Cahokian presence in the Apple River area, people in that region appear to have maintained closer relationships with the Central Illinois River Valley than with Cahokia.

The rapid adoption of Mississippian traits at many northern sites during the mid-11th to early 12th centuries suggests the initial Cahokian presence was welcomed if not invited as people variously accepted, believed, negotiated, or rejected aspects of the new belief system carried by the Cahokian movement. Ramey Incised vessels were often imitated at hinterland sites and their decorative motifs influenced or were integrated into other jar styles to produce novel local vessel “types” (e.g., Oneota Carcajou Curvilinear, Diamond Bluff Trailed, and Grand River Trailed, Upper Mississippian Langford Trailed) (Hall 1962). It is important to note that, after initial Cahokian contact, these regions experienced their own historical trajectories and local development of regional relationships (Emerson 1991a). These new relationships also included connections among and between "Mississippianized" locals (i.e., persons, who to varying degrees, had witnessed, performed, and incorporated various aspects of Mississippian material practices) as well as with people who chose to eschew Mississippian ways (Emerson 1991a; Smoak 2006). Like many social movements, not all members of a population will be accepting of dramatic social changes, while others will elect to choose and/or adapt various aspects of a movement while rejecting others. Green (1997) noted the intrusion of Cahokians into the hinterlands may have disrupted local 'traditional' ways of life through the introduction of new social persons, new elite identities, and reconfigured power structures.

Many of the Cahokia-related sites in the northern hinterlands appear to have been short-lived, either cutting ties with Cahokia and developing independently or abandoned within a generation of Cahokian contact (Conrad 1991; Emerson 1991a; Goldstein and Richards 1991). Following Mensch's (2009) characterization of cultural violence, which includes violation of a person's embodied agency as well as their spiritual sense of the world, I suggest that the Cahokian intrusion may have brought local social identities, power relations, even the cosmos themselves into question. For example, shortly after the introduction of Mississippian lifeways into southern Wisconsin the Effigy Mound-building tradition waned (Maxwell 1950; Rosebrough 2010). This transformation of local ontologies and religious practices may be considered an act of social and political violence which eventually created violent reactions between the Cahokian-converted and adherents to local traditions. It is likely the Mississippian movement simultaneously created social divisions while it constructed the wider Cahokian community, dividing 'believers' and non-believers, leaders and followers, empowered and those less-so. Given the local development of these regions, with little Cahokian influence after initial contact, localized control of violence may have created or produced multiple enemies throughout the upper Midwest. Perhaps divisions between these newly constructed identities reached a breaking point during the mid-12th century, leading to the outbreak of regional conflict as discussed below.

Late Twelfth Century Disruption

Overt physical violence, evidenced by site abandonment, fortifications, burning events and human fatalities, occurred at and around Cahokia-related sites in the northern Midwest after AD 1150 (Barrett 1933; Conrad 1991; Milner et al. 1991; Wilson 2012). Palisades appear at the Aztalan site in southeastern Wisconsin, numerous sites in the Central Illinois River Valley, downtown Cahokia, the East St. Louis neighborhood of the Cahokian Administrative Precinct, and the nearby upland sites of Olin, Kruckeberg #1, and (presumably) Kuhn Station around the mid-12th century (ca. AD 1150) (Birmingham and Goldstein 2005; Conrad 1991; Fortier 2007; Goldstein and Richards 1991; Harn 1994; Iseminger et al. 1990; Pauketat 2005).

Concurrently, a series of bastioned compounds were constructed to the west of Cahokia's main palisade (Tract 15B) (Pauketat 2013c). These compounds were constructed over a sequence of large circular rotundas that were part of this space through the Lohmann and Early Stirling phases. The first compound (A) itself circular with bastions (Pauketat 2013c), effectively transforming the shape of a formerly political-religious building into architecture associated with violence. The subsequent compounds (B and C) were rectilinear, with circular bastions, and enclosed a large (presumably extra-domestic) structure and a series of monumental marker posts (Pauketat 2013c).

Given the Cahokian precedent for reconstructing important buildings over earlier important buildings, or in citation of powerful features (e.g., marker posts), this construction sequence from rotunda, to (essentially) bastioned rotunda, to compound may be a spatial and architectural connection in the making, entangling religious space and material elements of violence. Perhaps these compounds at Tract 15B was built not simply to protect a religious space, but was built simultaneously with the inner building as part of that religious space and the attendant practices that took place within. Given the timing of the construction of these compounds at Cahokia (presumably during the Late Stirling phase), this space may have been built around the beginning moments of the 13th century movement. This fortified compound, and the nearby palisade wall, may have been material co-creators of an ontological shift at and around Cahokia.

While the northern fortified sites, including Aztalan, Orendorf, Larson, and Star Bridge, appear to have been wholly or mostly enclosed within palisade walls (Barrett 1933; Conrad 1991), the fortifications at Cahokia and East St. Louis surround only central politico-religious spaces rather than entire domestic village spaces, suggesting the perceived threat of violence was directed at the practices and identities enmeshed with these spaces and the objects maintained there (Baltus 2009b, 2010; Fortier 2007; Iseminger et al. 1990; Pauketat 2005). For example, one of the fortification walls at East St. Louis surrounded up to 90 or more storage structures which housed non-domestic or extra-domestic stores of Ramey jars, pigments, crystals, formal bifaces, and other likely religiously charged items, suggested to have been elite stores for use in future religious events (Pauketat 2005; Pauketat, Fortier, Alt, and Emerson 2013).

In the Central Illinois River Valley, entire villages were burned to the ground, including the burning of a monumental wooden marker post at the village of Orendorf (Butler 2010; Conrad 2000). While evidence for human fatalities was widespread north of the American Bottom, similar evidence for regional warfare does not seem to exist around Cahokia, emphasizing the differences in regional relationships and historical trajectories between Cahokia and other Mississippianized regions. Rather, violence within the American Bottom during the late 12th century is somewhat ambiguous, though new evidence emerging from the recently-excavated East St. Louis precinct of Cahokia suggests some interpersonal violence occurring there (Emerson and Hedman 2013).

The only evidence for conflagration in the American Bottom exists at the East St. Louis site and among specific structures at and around Cahokia – all perhaps burned as part of a single event (Pauketat 2005). The fortification wall and storage structures at East St. Louis were burned catastrophically near the end of the 12th century (Fortier 2007; Pauketat 2005), marking a point at which previous practices of termination and renewal through fire and earth changed qualitatively (Wilson and Baltus n.d.). Likewise, specific, isolated structures were burned around the same time period at Cahokia, East St. Louis (Fortier 2007; Pauketat 2005), and the nearby Sponemann site (Jackson et al. 1992). Each of these structures contained similar contents, including what appear to have been complete vessel assemblages and household tools, as well as pigments, crystals, and pipes (Boles and Benson 2010; Collins 1990; Pauketat 1984).

Had the burning of these structures resulted from a raid or external attack, we would expect surrounding structures to have similar evidence for burning (Wilson and Baltus, n.d.). Rather, it appears that these structures were burned – possibly in related episodes, as suggested by Pauketat and colleagues (Pauketat 2005; Pauketat, Fortier, Alt, and Emerson 2013) – as a means of physically, politically, and spiritually terminating these spaces, the objects contained within, and even the practices and identities associated with them (Baltus and Baires 2012; Wilson and Baltus n.d.). These buildings were not renewed through earthen layers, nor were they reconstructed (Baltus and Baires 2012; Wilson and Bardolph 2010). Likewise by the late

12th century, T-, L-, and circular shaped structures were no longer built and used in the American Bottom region – hinting at a historical break with the previous "classic Cahokian" period (Pauketat, Fortier, Alt, and Emerson 2013). These 12th century burning events seem to initiate processes of disentanglement with previous practices and objects, performed within an already-existing conception of termination via burning – perhaps with an expectation for renewal. This renewal did not take place through layers of earth, but rather through multiple material avenues including changes in ceramics, religious paraphernalia, and politico-religious structures.

The location of the mid-to-late-12th century fortifications at Cahokia and Cahokia-related sites indicate, in the least, a threat – or perceived threat – of violence against the religious and political core of the settlement, notably the areas in which community ritual activities took place and both community and elite identities were forged. It would appear, based on the fortification of these areas, along with the termination of special use or politico-religious structures, that perhaps the creation and promotion of Cahokian ideologies and or elite/power-laden identities at Cahokia and its hinterland sites may have become a source of social tension following their dissemination into the wider region. Likewise, the material objects mobilized in the spread of the Cahokian movement may also have been targeted for termination as exemplified by the incineration of the religious storage structures at East St. Louis.

This burning may simply have been a transformative practice to end the use of a certain buildings, or, as I argue, this was an act of political violence used to terminate material agents of the Cahokian movement through the violent closing of the places in which power-laden practices took place (Baltus and Baires 2012). Such violence may have been done to mark the end of an era, as has been suggested by Pauketat and colleagues (Pauketat 2005; Pauketat, Fortier, Alt, and

Emerson 2013). Additionally, these events may also be considered moments of transformation and renewal of a re-born Cahokia, much in the same way that burning of structures in the construction of mounds may have been processes of renewal.

Certain objects and spaces used within the context of 12th century Cahokian religious-politics appear to have become powerful social agents themselves (e.g., flintclay figurines, temples) via their ability to channel and embody supra-natural powers. These objects, the figurines most specifically, were in many instances treated in ways similar to the manipulation of human bodies after death – fragmented, and/or interred. For example, at least six Cahokian female flintclay figurines are found within supra-domestic (i.e., temple or religiously affiliated) contexts at the BBB Motor (two figurines, Emerson and Jackson 1984), Sponemann (three figurines, Jackson et al. 1992), and East St. Louis sites (one complete figurine and one ambiguous figurine head, Emerson and Boles 2010). Significantly, the female figurines were often fragmented, exposed to fire, and interred within these temple contexts (Emerson and Boles 2010; Emerson and Jackson 1984; Jackson et al. 1992). Similarities may be drawn between the interment of these female figurines and the female sacrifices in Mound 72 and the Wilson Mound at Cahokia discussed below (Fowler et al. 1992; Holder 1975). The 'sacrifice' of these female figurines may have coincided with the large-scale conflagration event(s) at East St. Louis and the termination of particular religious structures. In contrast male figurines are found widely dispersed throughout the Southeast United States, coinciding with a post-AD 1200 spread of a revitalized Mississippianism throughout the southeast as discussed later.

Two mounds at Cahokia, Mound 72 and the Wilson Mound, include 12th century 'offerings' of sacrificed individuals, including men, women, and children (Baires 2013; Fowler et al. 1999; Hedman et al. 2013). Clear evidence for ritualized political violence, qualitatively different from other mass interments within the mound, was especially apparent in an early 12th century addition to Mound 72; thirty-nine people, male and female ranging in ages from teenager to late middle age (35-45), were haphazardly tossed or knocked into a specially lined pit. Some of these individuals were struck in the head with a large degree of force; some were decapitated while others were found with their fingers digging into the soil below, suggesting they did not die immediately (Fowler et al. 1999). This burial pit was immediately covered over with a series of burials on cedar litters, including piles of disarticulated individuals as well as fully articulated men, women, and children. The level of violence and disregard for aesthetics makes this mass burial stand out dramatically from the other sacrificial pits within the mound (Fowler et al. 1999).

Continued evidence for violence entangled within religious contexts is found in the Wilson Mound at Cahokia. This mound contained a series of late 12th or early 13th century 'primary' burials of three women, at least two children, a number of infants, and a dog (Baires 2013; Holder 1975; Pauketat and Alt 2007). According to the excavation notes and maps, at least one of the women appears to have died (or was killed) during childbirth – was mutilated, and placed with the amassed bundle burials prior to construction of the final mound surface (Holder 1975). One of the women had possible head trauma, while a second had been decapitated, her head placed under her arm; the legs of both women had been removed at the knees and placed on top of the upper legs (Holder 1975). This mortuary feature was then covered over with a thick cap of gumbo clay – a transformed mode of mound-building associated with the late-12th century historic break at Cahokia as discussed below.

Thirteenth Century Transformations

Directly after the late 12th-century period of overt political violence and threats of regional violence within the American Bottom, a series of drastic social, political, and religious changes appear to have taken place. Much like the sudden changes identified as the mid-10th century "Big Bang" of Cahokian initiation, the end of the 12th century marks a distinct historical break with the "classic Cahokia" period of the Stirling phase and its material manifestations, specifically Ramey Incised pots and specialized T-, L-, and circular structures.

The upland Richland Complex (see Figure 3.2), once home to villages of immigrant farmers as well as Cahokian administrators (including the Halliday, Pfeffer, Grossmann sites), was abandoned around the mid-12th century (Pauketat 2003, 2004). Around this same time, Cahokia was initially fortified (Iseminger et al. 1999) and the population at Cahokia itself has been suggested to decrease (Pauketat and Lopinot 1997). This suggestion of depopulation at Cahokia was based on two excavated areas at the site (ICT-II and Tract 15A/Dunham Tract). Recent large-scale excavations at the East St. Louis precinct support a dramatic decrease in population at Cahokia after the Stirling phase (Betzenhauser and Rohe 2012), while a number of recently excavated sites in the American Bottom have revealed Moorehead phase occupations (Betzenhauser 2009; Betzenhauser and Zych 2008; Zych and Koldehoff 2007).

Within the American Bottom proper, occupations continue through the Moorehead phase in the Sauget Industrial Park Survey (SIPS) area, including a fairly extensive occupation at the Fingers site (notes on file Illinois State Archaeological Survey). The Julien site demonstrated a continuous occupation through the Moorehead phase, with Moorehead phase occupations at the Loyd, Fish Lake, Auburn Sky, and Crowley sites (Betzenhauser 2009; Betzenhauser and Zych

2008; Milner 1984a; Vermillion 2005; Zych and Koldehoff 2007). Thirteenth century Moorehead phase occupations appear in the uplands surrounding the American Bottom, including the Olin site, Russell site, Kruckeberg #1 site, Kane Mounds, and Starr Village in the Lower Illinois River Valley (Conrad 1991; Denny 1974; Farnsworth et al. 1991; Woods and Holley 1991). Additionally, the Central Illinois River Valley, much of Silver Creek drainage, and the Kaskaskia River Valleys all have evidence for continued occupation through the late 13th centuries and perhaps later (Conrad 1991; Hargrave et al. 1983; Holley et al. 2001a,b,c; Moffat 1985, 1991, 2008).

The beginning of the 13th century has typically been marked archaeologically by conspicuous changes in both utilitarian pottery as well as extra-domestic 'visual' wares. Plain surfaced jars with sharp shoulders and rolled or short everted rims (Powell Plain) are replaced by cordmarked globular jars with lengthening rims (Cahokia Cordmarked) while the religiously charged Ramey Incised pots are replaced with shallow plates with line and chevron decorations incised on the flanges (Wells Incised). This shift has been noted architecturally as well. Construction and use of specific politico-religious structures, the specialized T-, L-, and circular structures, has not been documented after the beginning of the 13th century (Emerson 1997a). Additionally, buildings become overall larger in size and their proportions become squarer through the Moorehead phase (Collins 1990; Esarey and Conrad 1981; Trubitt 2000).

Mound construction continues in some places, including Cahokia's East Plaza (Kelly and Brown 2010; Kelly et al. 2007), while in many parts of Cahokia, mound construction changes qualitatively. Large clay caps, surmised to be used to terminate or close particular mounds, were added to many of the mounds at Cahokia instead of the earlier incremental layers of renewal. Conversely, Dalan and colleagues have determined that the "dark soil noted at the surface was not uniformly clay" and in face "can more correctly be ascribed to pedogenesis," (Dalan et al. 2003:143). At the very least, this may suggest multiple processes were occurring in terms of mound closure or construction at Cahokia. For example, mounds in the East Plaza, including Mound 34, were initiated during the Moorehead phase; this mound specifically contained a zone of stratified colluvium similar to the silt-washing episodes noted under earlier-built Mound 49 (Kelly and Brown 2010; Pauketat et al. 2010). At least one structure at the base of Mound 34 has yielded evidence for a possible copper workshop (Kelly et al. 2007).

Iconographic representations of the sun, masculinity, and warfare (Brown 2007; Pauketat 2013a) replace earlier depictions of fertility and female deities (Emerson 1997c). Where previous material aspects of Cahokian religion appear to have emphasized maintaining world balance (light/dark, male/female, life/death, Upper world/Under world) these new expressions may be experienced as unbalanced, perhaps correcting an overbalance. Sites which were important in the early coalescence at Cahokia – the Emerald site specifically – are rejuvenated with mound additions, though recent research (Pauketat 2013b; Skousen 2013)has demonstrated that there was no hiatus of occupation at the Emerald site as was previously believed (Hall 1965; Koldehoff et al. 1993), and a processional avenue identified between the Emerald site and Cahokia is potentially maintained, leading past the mid-13th century Copper site (Pauketat personal communication 2013). Sites within the greater Cahokia region, including the Central and Lower Illinois River Valleys and the Kaskaskia River Valley, demonstrate similar – though not necessarily identical – changes in pottery, buildings and iconography (Conrad 1991; Farnsworth et al. 1991; Kuttruff 1972; Moffat 1985, 1991). This evidence suggests continued regional relationships through at least intermittent interaction with the American Bottom, which is supported by evidence for continued religious practices at Cahokia and mound building at Emerald. New, or renewed, relationships are instigated; evidence from the Kane mounds in the uplands east of Cahokia, for example, suggests close ties with Langford groups to the north (Emerson and Hargrave 2000).

Previous Cahokian burial practices, including mound interment, continue, though with the added practice of stone-lined graves and ossuaries. These stone-lined graves are likened to the "stone-box graves" of the Mid-South (most specifically of central Tennessee and Kentucky [Griffin and Jones 1977; Moore et al. 2006]) though are perhaps less 'formal' and are found at particular sites in the American Bottom region (Emerson and Hargrave 2000; Griffin and Jones 1977; Milner 1984a). Stone box graves have typically been assumed to be part of post-A.D. 1300 occupations in the Mid-south, though stone-lined graves are possibly present in earlier contexts in southeastern Missouri (Collins and Henning 1996) as well as at 13th century sites in Tennessee (Braly et al. 2014).

Stone-lined graves have also been excavated at the Sweat Bee and Jasper Newman sites in the upper Kaskaskia River Valley (Moffat 1991). So-called "stone-box" graves have been excavated at a number of sites in the American Bottom, including the Pulcher, East St. Louis Stone Quarry, and Copper sites (discussed below). These features have previously been used as evidence for post-A.D. 1300 occupations, citing influence from the Mid-South, and have thus been assigned to Sand Prairie occupations (Griffin and Jones 1977; Milner 1984b). Emerson and Hargrave (2000) dispute this temporal affiliation after radiocarbon assays from human remains within stone lined graves from American Bottom sites returned calibrated dates tightly clustered between AD 1253 and 1295. Thus, the appearance of these unique mortuary features in the American Bottom and southern Illinois coincides with, or is perhaps slightly earlier than, similar graves in the Mid-south, which date to the late 13th century (late Moorehead phase in the American Bottom) (Braly et al. 2014).

Discussion

Taken together, much of the evidence suggests Cahokians made a break with particular elements of Stirling phase religious-politics at the beginning of the 13th century, disengaging themselves from many previous social, religious, and political places and objects. Seemingly the ideologies and identities entangled within these spaces, places, and things – the material co-creators of the Cahokian movement – had become points of contention within the Midwest and were perhaps targeted for violence (Baltus 2010). It would seem that the episodes of overt violence within the American Bottom region may have been targeted and directed against specific persons, places, and things, given the patterns of fortification in this region. This targeted violence may have been a means of creating distance from or terminating specific practices and identities associated with contentious 12th century politics. Seemingly, the material changes during the 13th century correspond with descriptions of revitalization movements offered in Chapter 2. These changes, perhaps even the construction of the fortifications themselves, may have been part of a movement instigated to negotiate tensions generated by the ideologies spread, identities forged, and power relations brokered by the initial Cahokian movement.

Many of the material transformations taking place at Cahokia are visible at other sites throughout the upper Midwest. At approximately the same time that Cahokia is fortified, so too are the Kincaid site in southern Illinois and the Angel site in southern Indiana (Black 1967; Cole et al. 1951). Likewise, as the American Bottom population begins to decrease in the late 12th century and throughout the 13th and 14th centuries (Milner 1990; Pauketat and Lopinot 1997), Mississippian mound centers and villages appear – fortified at their founding – to the south and west (Buchanan 2012; King 2003; Knight and Steponaitis 1998; O'Brien and Wood 1998; Welch 2006; Wesler 2001). Post-A.D. 1200 Mississippian iconography, previously referred to as part of the Southeastern Ceremonial Complex (or SECC), emphasizes themes of warfare, death, and male prowess. Many of these elements, male warriors and violence especially, are prevalent images on so-called 'SECC cult objects', with local variations, found across the greater southeast after A.D. 1200 (Cobb and Giles 2009). A surge of depictions of warrior, weaponry, and victims of violence occurred on objects associated with the SECC between A.D. 1200 and 1350, suggesting violence became a "pivotal organizing principle" of Mississippian religious-politics during this time period (Cobb and Giles 2009:93).

Contact-era histories document the entangled relationship between practices in warfare, social identities, and status (Adair 2005 [1775]). The construction of the body as a warrior in the Southeast at the time of European contact took place through new practices and narratives, as well as through material depictions that engaged a larger community in practices of violence (Cobb and Giles 2009). Given the importance of objects and narratives in the material creation of religious-political movements, perhaps these later historical examples had their roots during the Moorehead phase movement at Cahokia. Interestingly, despite the "prevalence of fortifications and bellicose iconography during the late prehistoric era," overall physical evidence for warfare is fairly low in eastern North America (Cobb and Giles 2009:99), similar to Cahokia and the American Bottom region.

Despite the lack of evidence for extant warfare in the American Bottom region during the 12th and 13th centuries, the political violence associated with the rise of Cahokia and the social violence embedded within the spread of Mississippian lifeways caused wide-spread and lasting historical repercussions. Additional waves of historical impact appear to have been instigated through the acts of "renewal" at the beginning of the Moorehead phase.

While some may argue that the Moorehead phase was the beginning of the end (Milner 1990), in many ways it appears to be more accurately a transformation; an initiation of a 'new Mississippian' brought about through termination of the 'old Cahokian' (i.e., Stirling phase) practices. While the 13th century revitalization at Cahokia may not appear to have been as successful as the earlier, somewhat aggressive, expansionism of the 12th century Cahokian movement, this later movement seems to have gained larger ground in the southeast as it spread to and (re)invigorated places like Moundville, Etowah, and Spiro. The initial 12th century Cahokian movement in the north was variously accepted, rejected, or modified, leaving a variety of new cultural 'traditions' identified archaeologically as Langford and Oneota, in its wake. The 13th century Mississippian movement, on the other hand, appears to have instigated a new way of life throughout the southeast, one in which warfare, fortification, masculinity, and violence figured prominently. The 13th century transformations associated with Cahokia (including the new and renewed relationships that were part of this transformation) are next explored through material evidence from two upland village sites – Olin and Copper – in the American Bottom region.

CHAPTER 4. ANALYZING THE OLIN AND COPPER SITES

Wide-scale political-religious re-organization at Cahokia, occurring in conjunction with social changes taking place at the local community and individual level, would have necessarily been material. Expected evidence includes changes in everyday as well as special-use pottery, domestic, extra-domestic, and public architecture, and reorganization of interpersonal relationships occurring together with changes to politico-religious buildings, paraphernalia, and organization. Expected changes in pottery include form, function or context of use, as well as decorative and technological styles (or perhaps more appropriately, the practice of production). Changes in pole-and-thatch architecture may include increases or decreases in size, deviations in shape and/or orientation, and/or changes in storage location or facilities (e.g., interior or exterior storage pits, use of rafters, small storage structures). Widespread politico-religious re-organization should likewise entail changes in episodic religious practices such as mound construction, termination/renewal performances, caching (or bundling) of particular materials, utilization of monumental marker posts, and mortuary practices, as well as changes in material culture found in contexts associated with religious practices. These changes will be explored through the following case studies.

The Uplands of the American Bottom Region

Despite the early interest in and mapping of Cahokia and its immediate environs, the uplands around Cahokia remained a little-explored region. Archaeological resources in the Silver Creek drainage to the east of Cahokia (see Figure 3.2) were recorded in the late 19th century by John Francis Snyder (1962[1877]). A local avocational archaeologist, Snyder (1962 [1877]:259-261) provided the earliest written description of the Emerald site (11S1), a Mississippian mound site located east of Cahokia and north of present-day Lebanon, Illinois (see Figures 1.2 and 3.2).

He also documented what he described as an ancient trail (though what is now considered to be a processional avenue (see Pauketat 2013a), connecting the Emerald site (11S1) with Cahokia (Woods and Holley 2000). It was not until the 1960s that transportation corridor survey projects began encroaching on the outer edges of the Cahokian community.

The northern uplands of the American Bottom were initially explored in 1963 by Patrick Munson as part of a larger Illinois State Museum project sponsored by the Illinois Archaeological Survey (Munson and Harn 1971). This pedestrian survey of the Wood River drainage concentrated primarily on the floodplain and adjacent bluffs, identifying 119 new archaeological sites (Woods and Holley 2000). Among these new sites, five were identified as Mississippian habitation sites, including the Olin site (11MS133). Six Mississippian cemeteries were likewise recorded along the bluffs, including Kane Mounds (11MS242), Schmidt Cemetery (11MS248), Sepmeyer Cemetery (11MS255), Fox Hill Cemetery (11MS259), Holsinger Cemetery (11MS284), and Kosten Cemetery (11MS285) (Woods and Holley 2000). In the 1970s archaeological survey in advance of FAP-413 construction for the Illinois Department of Transportation (IDOT) traversed the interior upland of the Wood River drainage and investigated more than 240 sites, identifying several Emergent Mississippian sites but only three Mississippian sites (Linder et al. 1978; Woods and Holley 2000).

Numerous survey projects, most in advance of IDOT construction, took place in the northern uplands throughout the 1990s and 2000s. For example, the northern extension of the FAI-270 corridor into the uplands, known as the FAP-310 project, led to the testing of at least two Mississippian sites in the uplands, including the H. Brush site (11MS957), located on a bluff top overlooking the West Fork of Wood River Creek (Figure 4.1). The Mississippian occupation of the H. Brush site included three wall-trench structures, two circular single-post structures, and

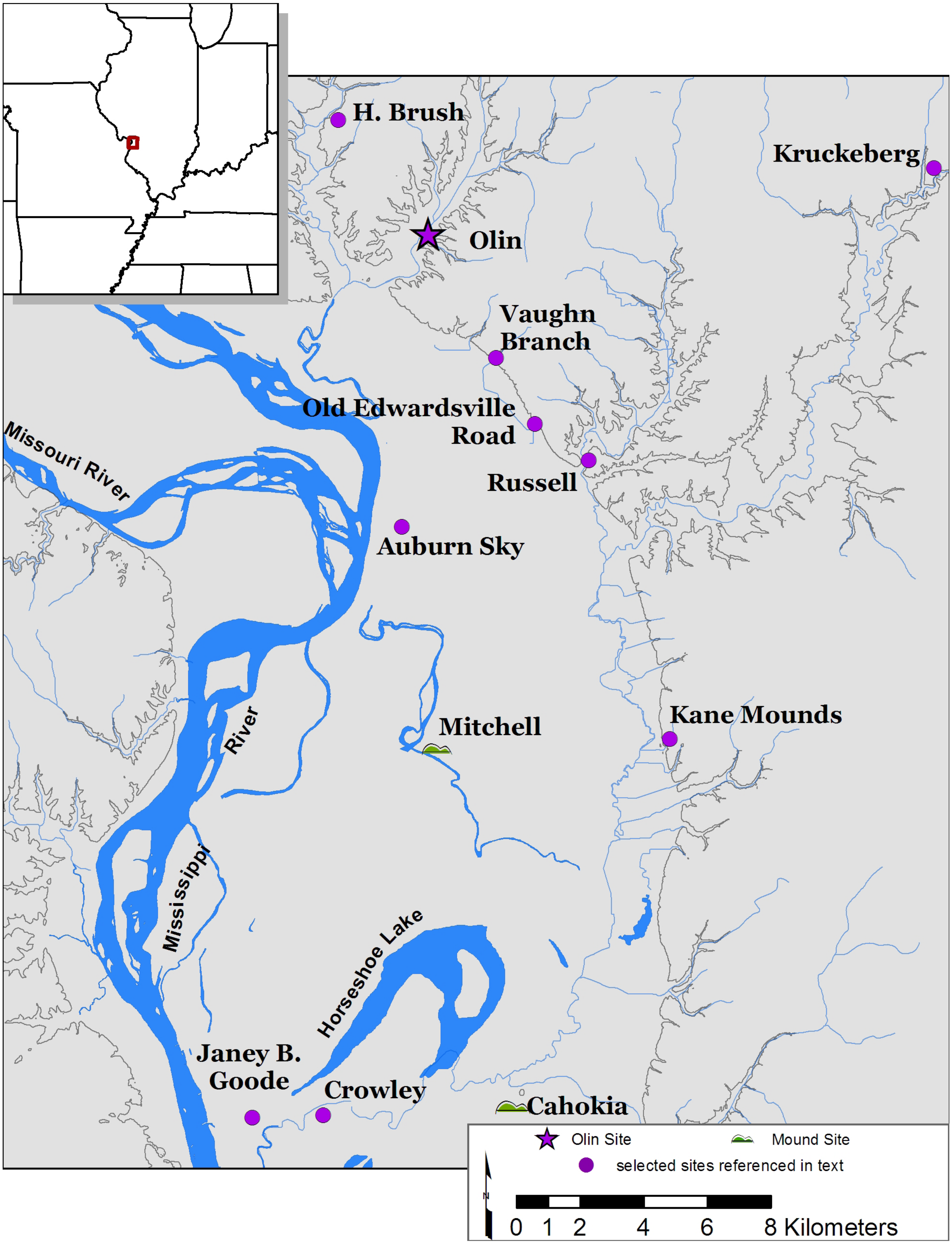

Figure 4.1. Northern American Bottom Late Stirling/Moorehead phase sites (ca. A.D. 1150-1300).

Stirling phase ceramics (Illinois State Archaeological Survey 2013). Additionally, the Russell site (11MS672), located on a bluff overlooking Indian Creek as it flows into the American Bottom, southeast of the Olin site (see Figure 4.1), was excavated in advance of a proposed residential development (Illinois State Archaeological Survey n.d.). This late Moorehead phase "nodal" site consisted of four structures, three of which had been re-built once; a burial complex was also present (Zych and Koldehoff 2007). Significantly, pottery recovered from the Russell site included Cahokia Cordmarked jars and wide-rimmed plates, in addition to other similarities, suggests possible contemporaneity with the later part of the occupation at the Olin site (see below). A number of additional Moorehead phase sites have likewise been excavated by ISAS in the northern American Bottom, including the Auburn Sky and Crowley sites (Betzenhauser 2009; Betzenhauser and Zych 2008).

The focus of archaeological surveys in the eastern uplands typically centered on the Silver Creek drainage, the largest drainage in the uplands, which flows south to the Kaskaskia River (see Figure 3.2). As mentioned earlier, the Emerald site and the processional avenue between Emerald and Cahokia were reported early on by John Francis Snyder (1962[1877]). As part of the 1950s Central Mississippi Valley Archaeological Survey, James Griffin and Albert Spaulding (1952) reported a number of sites in the Silver Creek drainage. Griffin and Spaulding were directed to these sites by local avocationalist Robert Grimm, including the Copper site (11S3) and the Emerald site (11S1) (Griffin and Spaulding 1952; Brad Koldehoff, personal communication 2014). Howard Winters and Stuart Struever (1962) tested two of the mounds at the Emerald site, including the Emerald Mound itself, in 1962. Robert Hall tested the summit of Emerald Mound in 1964 (Pauketat and Koldehoff 1983; Woods and Holley 2000). Limited excavations of the principal Emerald mound were undertaken by Timothy Pauketat in 1993 and 1996 as part of the “Early Cahokia Project” (Pauketat 1993, 2000). Further investigation of the Emerald site did not occur again until the Illinois State Archaeological Survey (ISAS) tested portions of the site in 2011, followed by recent excavations in 2012 and 2013 as part of Susan Alt’s and Pauketat’s “Discovering Cahokia’s Religion” research project (Alt and Pauketat 2013).

Further investigations of the Silver Creek drainage include a series of upland investigations by Pauketat and Alt in the so-called Richland Complex, including excavations at the Halliday (11S27), Grossmann (11S1131), and the Pfeffer (11S204) sites (Alt 2006; Kruchten et al. 2009; Pauketat 2009; Pauketat and Alt 2004). Likewise, large-scale survey and excavations were undertaken by Holley et al. (2001a,b,c) as part of the Scott Air Force Base Joint Use project. This latter project included excavations at the Faust, Knoebel, and Lembke localities as well as series of smaller localities with Late Woodland through late Mississippian occupations on the Scott Air Force Base property (Holley et al. 2001a,b,c) (Figure 4.2).

Olin Site History of Investigations

The Olin site (11MS133) is a small (less than an acre in extent) fortified village situated on a bluff spur overlooking the East Branch of the Wood River within the modern town of Bethalto, Illinois (Figure 4.3). This site is located about a mile into the uplands from the Mississippi River; approximately 27 kilometers north of Cahokia and 16 kilometers north of the Mitchell site (11MS30). The upper reaches of the Wood River drainage join the upland drainage divide with Macoupin Creek (Woods and Holley 2000). The Olin site was initially recorded as a Mississippian village with a “pure Trappist component” during Munson’s survey of the Wood River Terrace and adjacent uplands conducted in 1963 (Munson and Harn 1971:15). Located on a small rise in an agricultural field, both currently and at the time of excavation, the site is situated on Menfro silt

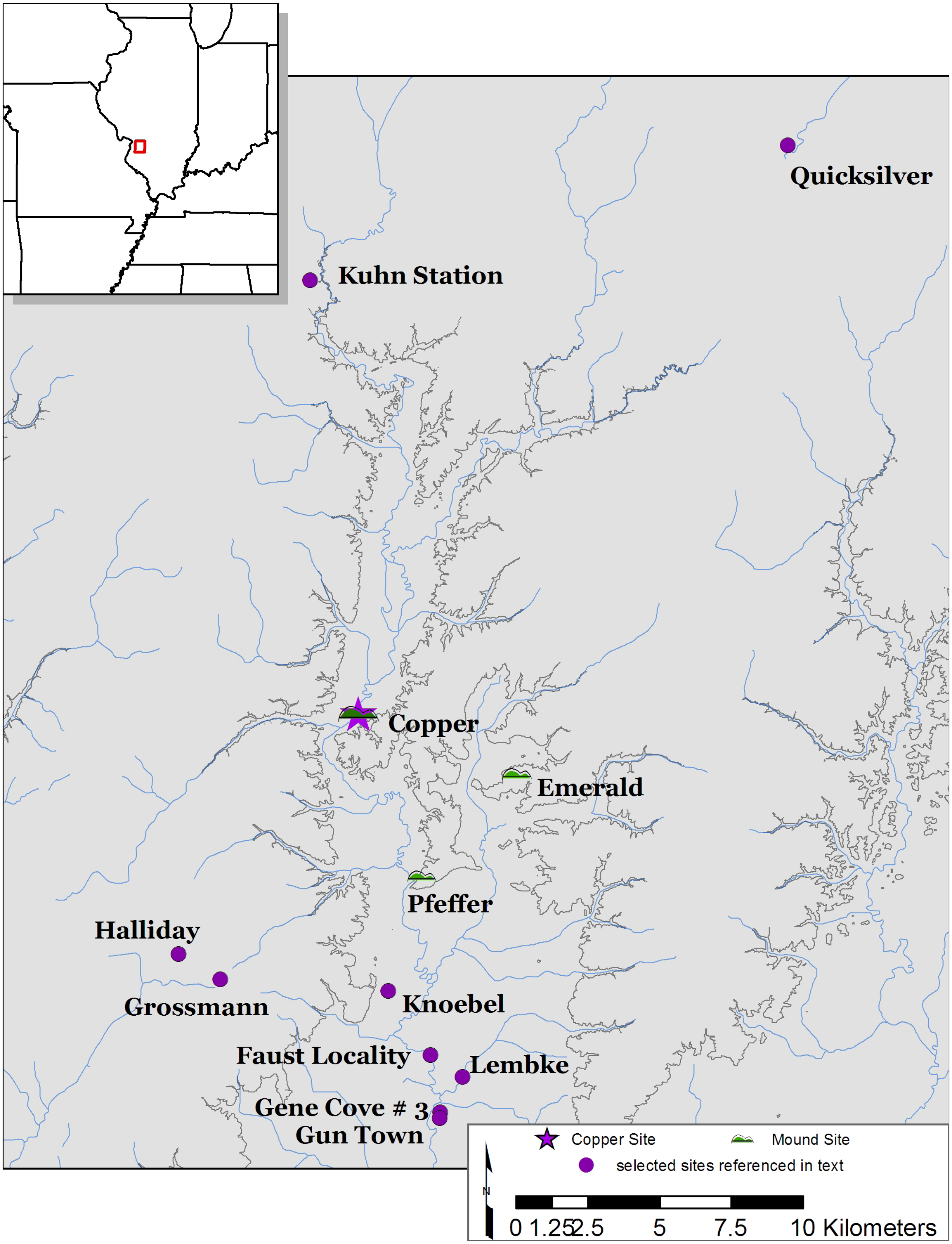

Figure 4.2. Silver Creek drainage and Richland Complex sites.

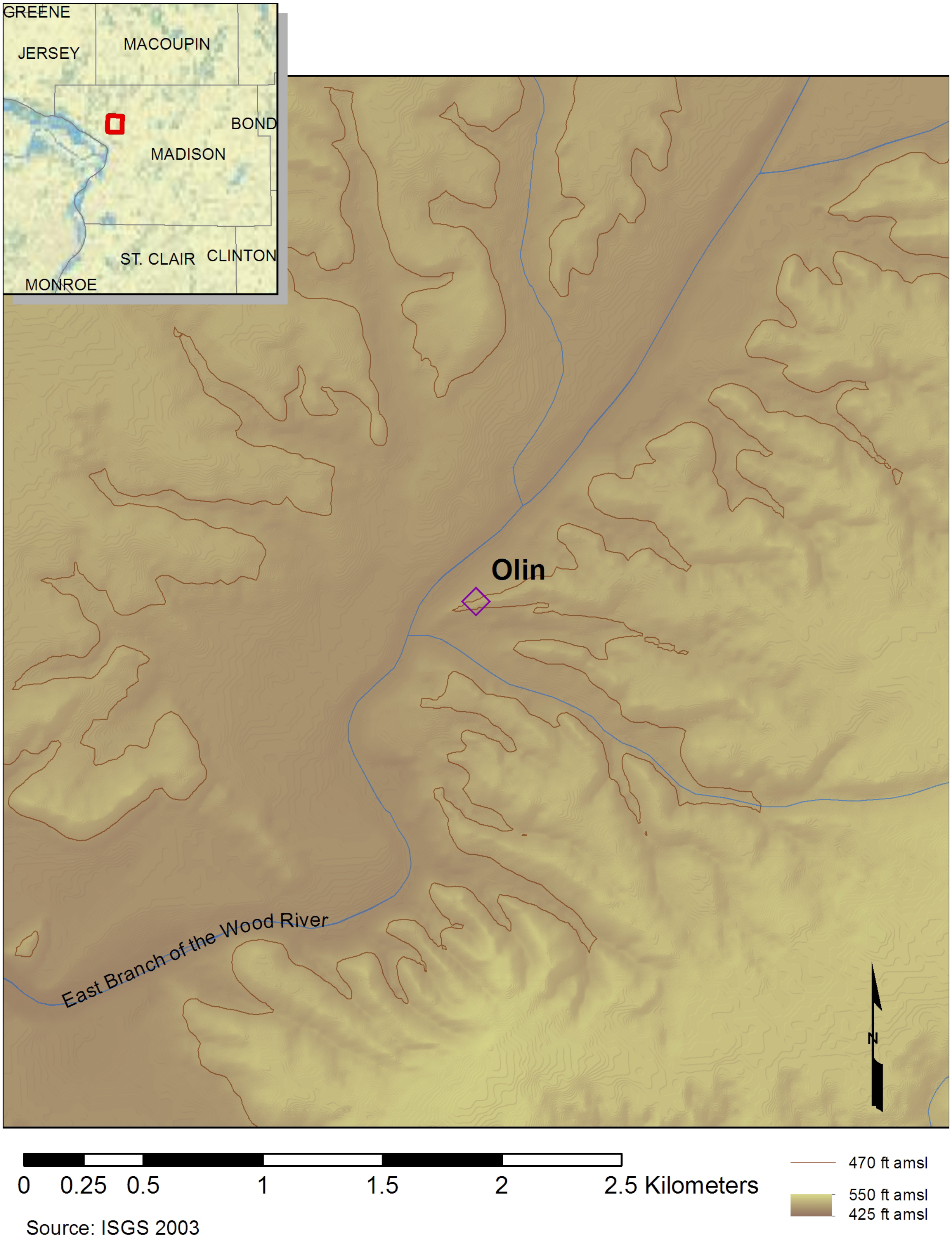

Figure 4.3. Olin site location.

loam and Hickory clay loam soils (USDA NRCS 2013). According to the records from the General Land Office Survey (GLO) (1814) the entire upland area around the site was in timber.

Between the years 1971 and 1975, the Southern Illinois University Edwardsville (SIUE) archaeological field schools excavated the Olin site under the direction of Sidney Denny (Figure 4.4; large scale maps of the site are illustrated in Appendix E). Unfortunately, few excavation notes from these excavations are known to exist. Much of the following information regarding the 1970s excavations was gained through an interview with Sid Denny in 2011. Denny (personal communication 2011) learned about the site from a collector from Wood River, Illinois, who had dug burials there in the late 1960s. A good deal of pot-hunting had taken place by collectors in the southern part of the site, especially the southwest corner. Burials were found in areas between the former interior and exterior palisade walls. Excavators from SIUE did not identify any undisturbed burials at the site (Denny, personal communication, 2011). The SIUE excavations took place in a series of excavation blocks set across the site, removing the plowzone in two-meter units, followed by the excavation of identified feature fill.

According to Denny, all feature fill was waterscreened, with some flotation samples run in buckets with screen. Waterscreening took place through ¼" to 1/8" screen. During excavation seasons, opportunistic survey also took place around the site, covering approximately one mile to the west and as far as possible in other directions. The boundaries of the site appear to have been constrained to the edge of the peninsula above the wooded creek (see Figure 4.3); few cultural materials were recovered from the surface to the west or south, downslope. The northern and eastern edges of the site were heavily eroded, likely due to modern farming activities (Denny, personal communication, 2011).

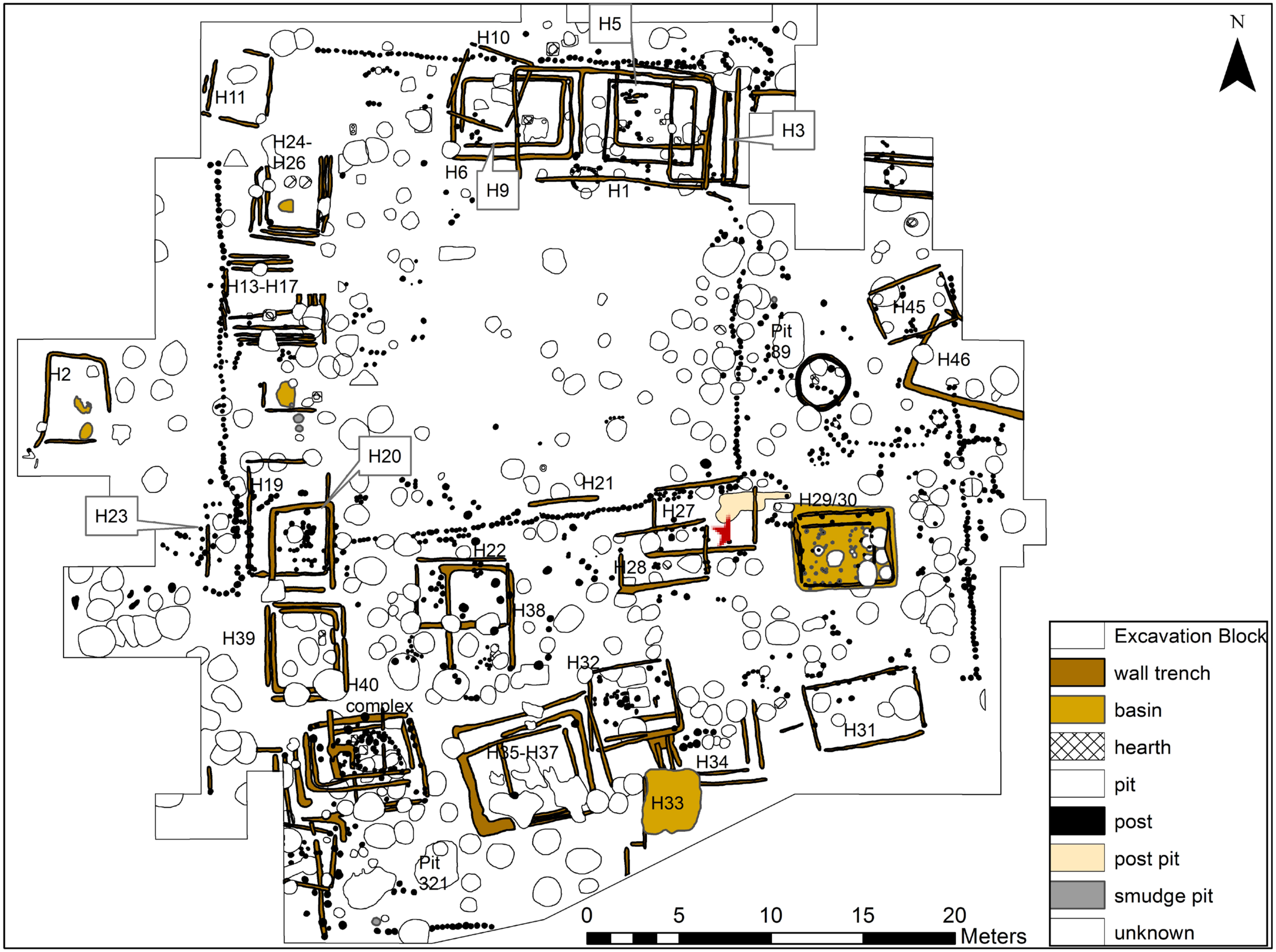

Figure 4.4. Olin site plan map (digitized from compiled site map, courtesy of S. Denny; star indicates location of H27 cache).

Late Woodland and Mississippian occupations were identified at Olin. The Late Woodland features are arranged in clusters spread across the site (though more heavily concentrated to the southern end) while Mississippian features are located around the edge of a small plaza (Figure 4.5). This plaza appeared to have been periodically swept, evidenced by the mixture of small pieces of pottery around the edge of the plaza (Denny, personal communication, 2011). There were almost no defined floors to the structures as all were very clean with only a few caches of broken material on floors; wall-trench structure trench fill was excavated in its entirety.

One floor cache of four lithic tools was located in a structure (H27) built over a large marker post (sub-house 27); this cache consisted of two polished adzes and either two knives of Crescent Hills Burlington chert (Denny, personal communication, 2011) or two adzes with a pick and a hoe (Neal Lopinot, personal communication, 2014). This cache had a single burned timber placed over the top (Denny, personal communication, 2011) (Figure 4.6). A hearth feature was identified within nearly every structure; a few of which included burned mud-dauber's nests. No burned structures were identified and there appeared to have been no burning of the palisade walls. A structure with double wall trenches, similar to one excavated at the Mitchell site (F7, Porter 1974), was excavated at Olin. Denny suggested the short wall trench in front of the fireplace of this building, which is verified photographically, perhaps acted as a reflector, suggesting extra-domestic activities took place inside this building. Likewise, Denny indicated that the large structure in the northeast corner of the plaza (H1) was the latest construction in that series of buildings.

Figure 4.5. Olin site with Late Woodland pits highlighted; all structures are Mississippian (digitized from compiled site map).

Figure 4.6. Lithic cache from H27 at Olin (field photographs courtesy of S. Denny).

Denny noted an overrepresentation of pits at the site, especially as compared to Cahokia and the Mitchell site. Numerous manos and pits with large quantities of acorn were recovered also, leading Denny (personal communication, 2011) to suggest acorns were harvested and perhaps traded. In addition to acorns, fish, deer and some corn were reported. Denny indicated that most corn was recovered from the smudge pits concentrated to the southern edge of the site (see Figure 4.4). The deer remains consisted largely of cranial vault fragments, lower leg bones, and astragulai. Few vertebrae and meat-rich portions of deer were identified during early analysis, leading Denny (1974) to suggest the site inhabitants were supplying Cahokia with deer meat. This suggestion has been demonstrated to be unlikely by a reanalysis of the faunal assemblage by Steve Kuehn, Illinois State Archaeological Survey (ISAS) (see Appendix C). Denny (personal communication, 2011) reported relatively few projectile points and a lot of hoe flakes, but no hoes.

Denny, Woods, and Koldehoff (1983) suggested two Mississippian occupations for the Olin site, following an earlier Late Woodland occupation. These Mississippian occupations included a Late Stirling through Early Moorehead phase habitation within the larger palisade, followed by a distinct Late Moorehead through early Sand Prairie phase within the smaller palisade (Woods and Holley 2000). At the 1973 Cahokia Ceramic Conference, Denny presented preliminary details of the site, including the following as described in Porter's 1974 dissertation:

> [the Olin site] can best be characterized as a compound of single post construction with circular bastions at three corners and a wide opening at the fourth or northwest corner…In the northeast corner is a complex of structures, with smaller forms apparently pre-dating the stockade. The later, largest structure conforms with the corner area...While other sets of wall trench structures are located within, under, or adjacent to the stockade, it is clear that the central area was relatively sterile. The pits shown clearly cluster as well with areas of house structures...At present the Olin site probably represents the typical

> outlying hunting and gathering camp (or village) that exploits the deer population available in this more rugged upland area of Madison County. [Porter 1974:18-19]

Following excavations, a master map of the excavated site was produced (see Figures 4.4 and 4.5), but no systematic analyses were undertaken for the Olin site. Denny (personal communication 2011) noted that several SIUE student class projects were undertaken using the results of the Olin excavations, but none have been published, nor were notes or papers on file at SIUE. The present work represents the only known formal analysis of these investigations.

Currently, the land on which the Olin site is situated is owned by the Olin Corporation, manufacturers of Winchester firearms. Attempts by the author to procure permission for further excavations were fruitless. According to Denny (personal communication, 2011), nearly the entirety of the Olin site had been excavated, with the exception of the areas around the perimeter of the site which he identified as badly eroded.

Copper Site History of Investigations

The Copper site (11S3) is located in O'Fallon Township, St. Clair County, within the undulating uplands of the Silver Creek drainage, approximately 19 kilometers east of Cahokia and nearly six kilometers northwest of Emerald Mound (Figure 4.7). Silver Creek is the largest drainage in these uplands, draining to the Kaskaskia River to the south.

The Copper site is located on an upland terrace above Silver Creek, which according to the early General Land Office survey map, was in timber, though in close proximity to upland prairie (General Land Office 1814). The Copper site has been reported as approximately six to seven acres in size, with at least four to as many as six mounds at the site, arranged in roughly

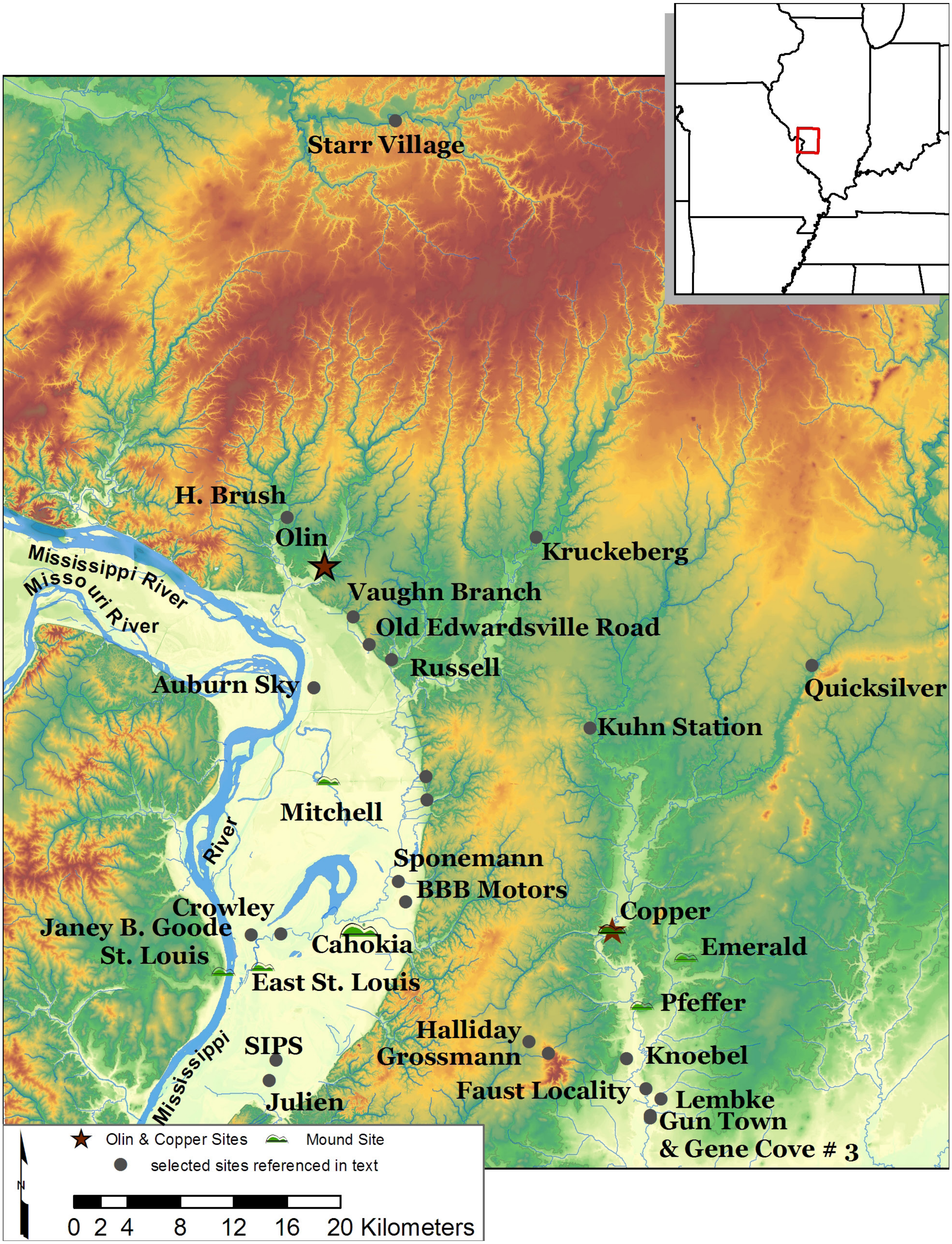

Figure 4.7. Location of Copper in relation to Cahokia, Emerald, and the American Bottom.

two parallel lines in a northeasterly direction (Figure 4.8). Soils within the site area consist solely of Menlo silt loam (USDA NRCS 2013).

The Copper site, also known as the Prine site (after the current land owner), Ping site (for a previous landowner) or Schrader site, was first recorded by Robert Grimm. Grimm was a local collector who collected the site in the late 1940s and reported his findings to James Griffin and Albert Spaulding during their 1950s Central Mississippi Valley Archaeological Survey. During their Central Mississippi Valley survey Griffin stopped in the area and was given a tour of sites by Grimm, starting with the Emerald site and ending at Cahokia (Brad Koldehoff, personal communication; Griffin and Spaulding 1952). Other collectors who frequented the site included Ray Bieri, Russell Fischer, and Ray Meiners. The site was given its current name – Copper – by Grimm who, while digging a plowed-out, burned house pit, noted a concentration of copper fragments.

A September 1942 issue of *Hobbies: The Magazine for Collectors* featured a short article by Ray Meiners and Robert Grimm detailing their collections and excavations at the Copper site. This article indicates "several small mounds" were observed, the largest of which was "about five feet high and 25 feet in diameter" (Meiners and Grimm 1942:99). Artifacts recovered from surface collection included:

> [S]mall triangular war points (including several of the Cahokia type), notched arrowheads, one arrowhead made from the tip of a deer antler, one small mortar, many hammer stones, one piece of hematite, one piece of galena, two bear teeth (ungrooved and unperforated), several whorls of marine shells, hundreds of different types of pot sherds, large quantities of broken shell and animal bones, and several celts, axes and highly polished fragments of chert spades. [Meiners and Grimm 1942:99]

Several excavated "ancient fire pits," yielded pottery sherds, the head of a bird effigy broken off a bowl, bone awls, triangular points, a red-slipped water bottle, and copper fragments, including a copper needle (Meiners and Grimm 1942). Three stone graves were excavated also

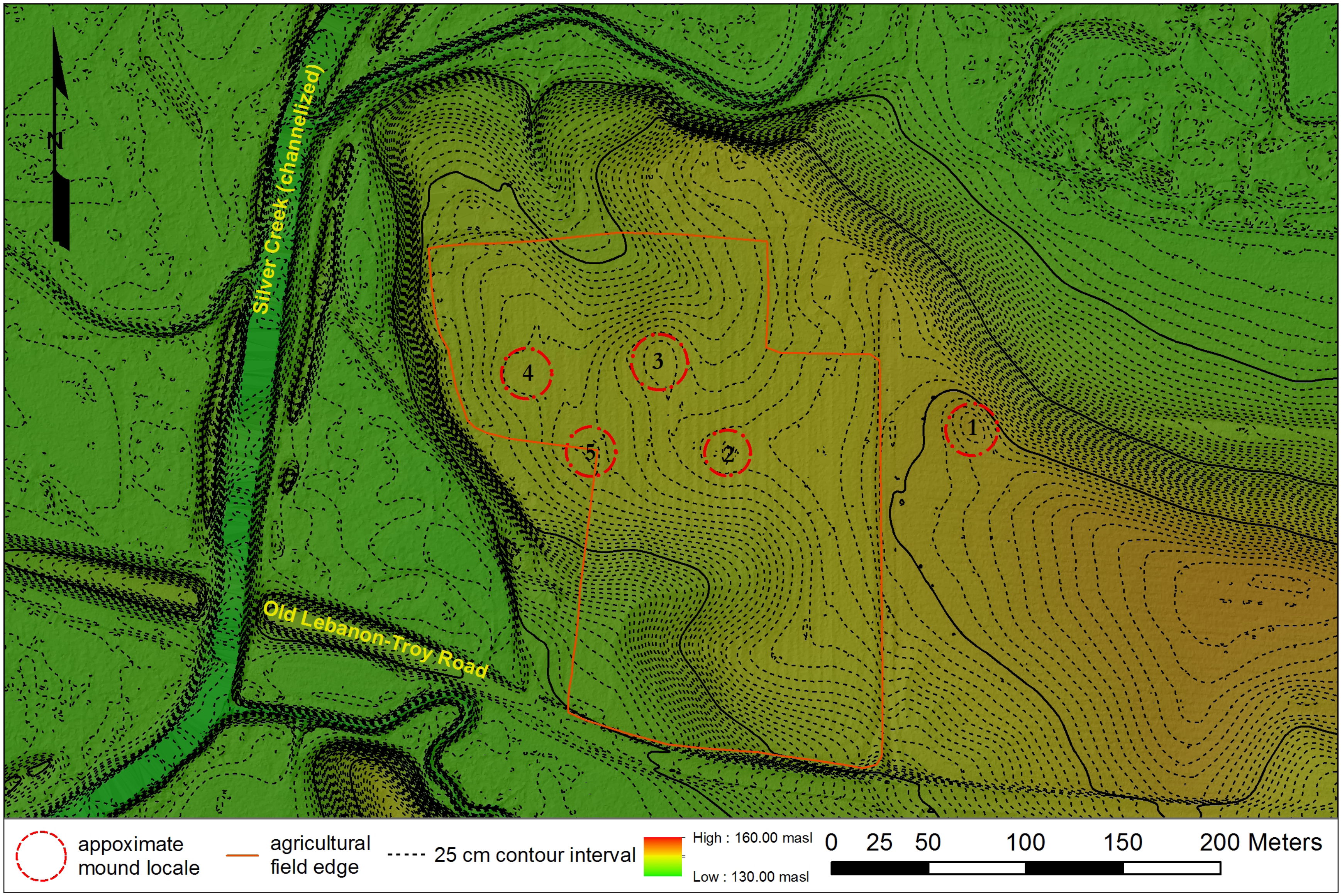

Figure 4.8. LiDAR map of Copper showing mound locations (LiDAR courtesy of Timothy Pauketat and Susan Alt, Religion and Innovation in Human Affairs grant).

by Meiners and Grimm (1942), including a large skeleton interred with a decorated bowl, as well as a small skull (likely that of a juvenile); a pileated woodpecker effigy was recovered from the cemetery area, and more copper was recovered from this area than from any other area on the site.

Meiners and Grimm's (1942) initial report to the State of Illinois tabulated four mounds under cultivation and at least a dozen stone-box graves. Materials collected by Grimm included plain and cordmarked jars, incised plates with wide rims, celts, shell beads, stemmed, side-notched, and triangular points, drills, and flaking debris. Photographs of the ceramics in Robert Grimm's collection suggest a late Mississippian occupation (Griffin and Spaulding 1952). Ray Bieri of Belleville, Illinois, likewise collected at Copper and apparently excavated in some unknown portion of the site, during the 1950s and 1960s (Pauketat and Koldehoff 1983). A surface survey of the site was performed in 1968 by Chuck McKinney who reported heavy staining evident in several parts of the field subsequent to regular agricultural plowing and disking. McKinney's collection contained chert flakes, cobble hammerstones, and sherds. The site report for the site revisit indicated the:

> [S]ite is known as the 'copper site' by local collectors. Apparently site has previously yielded copper artifacts or materials. Although artifactual evidence from site was largely Mississippian, site is reportedly a multi-component one with Archaic and Woodland occupation. Ray Bieri (Belleville) has collected a toy pot, two clay ear spools, several shell beads, a notched limestone spade, a shell hoe, a small celt and some clay effigy heads. Another collector (Fisher [sp.] of Lebanon) has reportedly collected several complete water bottles (one humpbacked variety) and several thousand flint artifacts over a long period of time. A small mound was reportedly located in the center of the site (now leveled by cultivation) and a fairly large mound feature can still be seen at the easternmost edge. [Illinois Inventory of Archaeological and Paleontological Sites 1968]

Charles Bareis (University of Illinois) performed a surface collection in 1969 (materials on file at the Illinois State Archaeological Survey Champaign, Illinois). This material assemblage consists of celt fragments, pottery sherds, chert debitage, and projectile points. Brad Koldehoff (1980) inventoried the Russell Fischer personal collection, recording chunkey stones, chert hoes, a groundstone spud fragment, and ceramic effigy vessel parts, among other artifacts. Fischer reported the Copper (or Ping) site as having a “thick village midden, several low mounds, and a series of stone box burials” (Koldehoff 1980:8). In 1983, Pauketat and Koldehoff recorded both the Bieri and Grimm collections (notes on file at the North American Archaeology Lab, University of Illinois Urbana-Champaign). Using these collections, they reported on the Silver Creek drainage in a paper given at the Midwest Archaeological Conference (Pauketat and Koldehoff 1983). Pauketat and Koldehoff also made additional recordings of the Grimm collection in 1998 (notes on file at the North American Archaeology Lab, University of Illinois Urbana-Champaign). Pauketat (personal communication, 2014) ascribes a spud and a pileated woodpecker effigy head to Fischer’s collection of the Copper site; a portion of the Fischer collection, including the above materials, is currently housed in the North American Archaeology lab at the University of Illinois.

At the onset of University of Illinois field investigations (described herein) in 2008, the site was under cultivation by a tenant farmer (Fred Kunz) as it had been for decades prior. Robert Prine (the current landowner) had used the westernmost portion of the site as pasture, which was unplowed until at least 1996 or 1997, when Timothy Pauketat and Gregory Wilson created a topographic map of the site (Pauketat, personal communication, 2014; Prine, personal communication 2008). Conversations with Mr. Prine revealed the previous owner of the site was named Ping, hence the above references to the Ping site. Mr. Prine also has in his possession a fully-grooved groundstone axe found while plowing the site area, suggesting a Middle- to Late Archaic occupation in addition to the Mississippian village.

University of Illinois Excavations at Copper

In November 2008, the author, with the assistance of Michael Hargrave of the Construction Engineering Research Laboratory of the U.S. Army Corps of Engineers and a group of volunteers, performed magnetometry and resistivity surveys over a portion of the Copper site. Survey was directed towards confirming the location of at least one mound, locating architecture, and investigating the possibility of fortification. These surveys covered portions of two reported mounds (Mound 3 and Mound 4), as well as the level area between (Figure 4.9).

At the time of geophysical survey, surface visibility was around 75% with corn stubble remaining in the field. Though Hargrave (personal communication, 2008) stated that the soils at Copper were "quiet," the resistivity results showed the edges of the mounds fairly distinctly while the magnetometry survey illustrated a number of anomalies suggestive of archaeological features (Figure 4.10 and Figure 4.11).

No evidence for fortifications were noted in the geophysics; however, in an interesting side note, the GLO map denotes a "fort or block house" located in the extreme southwest corner of Section 6 of Lebanon Township and into the extreme southeast corner of Section 1 of O'Fallon Township, just southeast of the Copper site (GLO 1814). No additional information is given for this "fort or block," and it is not mentioned in the county history in association with other historic forts in the uplands (Perrin 1911). This site, if it is a pre-European contact site, may suggest that other nearby sites may have been fortified. Additionally, as the geophysical survey did not extend

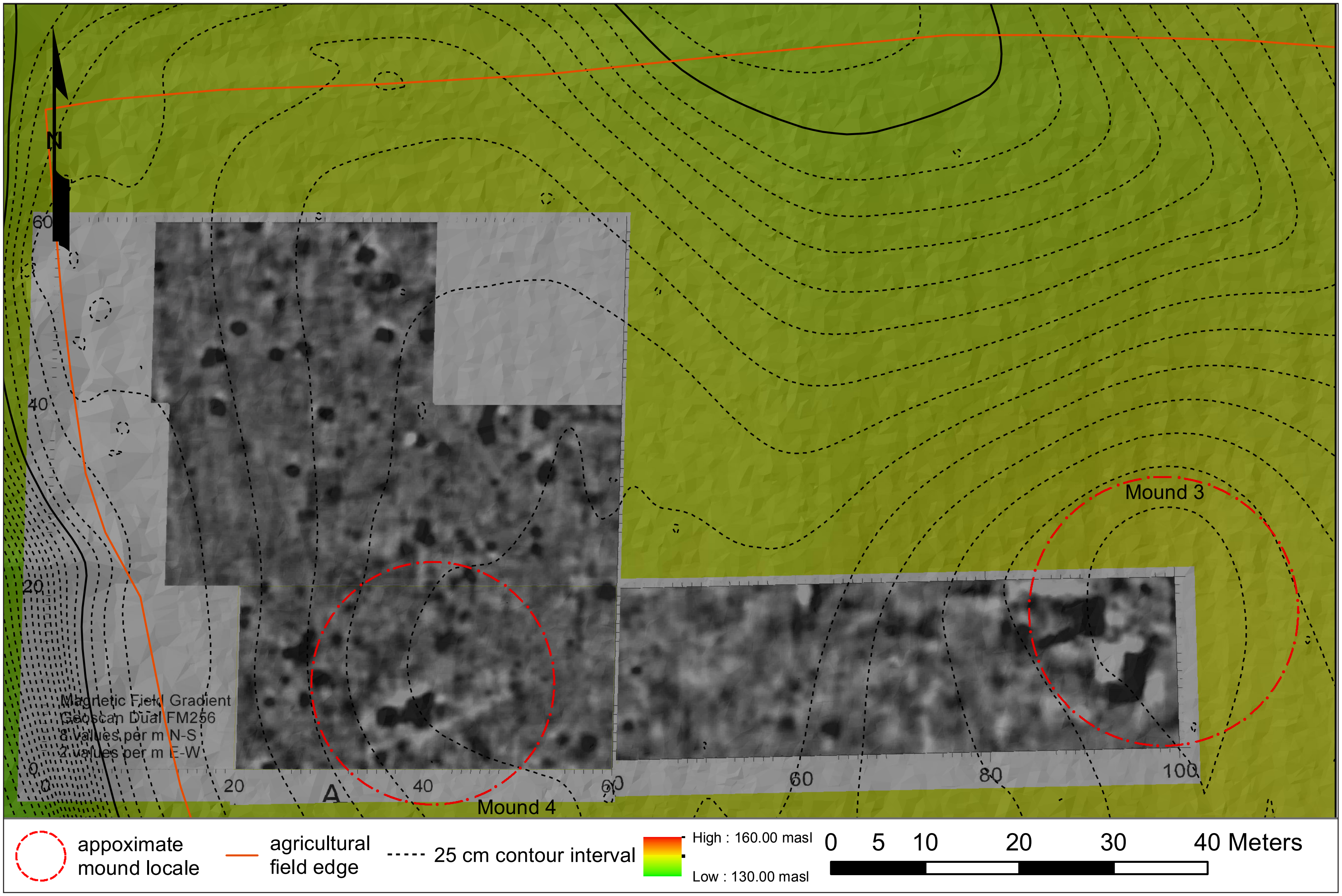

Figure 4.9. LiDAR map with geophysical results at the Copper site; approximate locations of Mound 3 and Mound 4 noted.

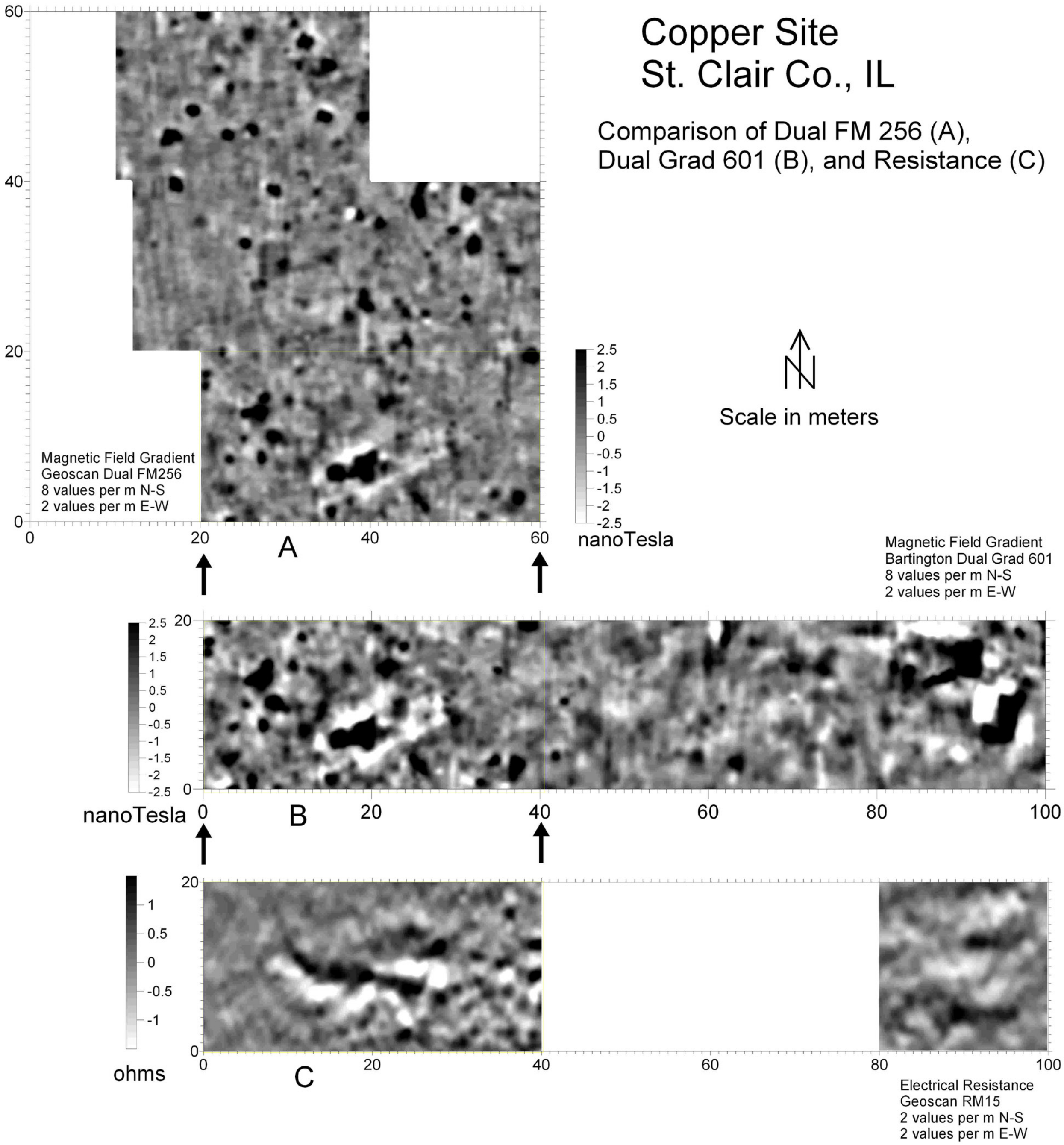

Figure 4.10. Results of 2008 geophysical survey at the Copper site (courtesy of M. Hargrave, CERL, and USACE).

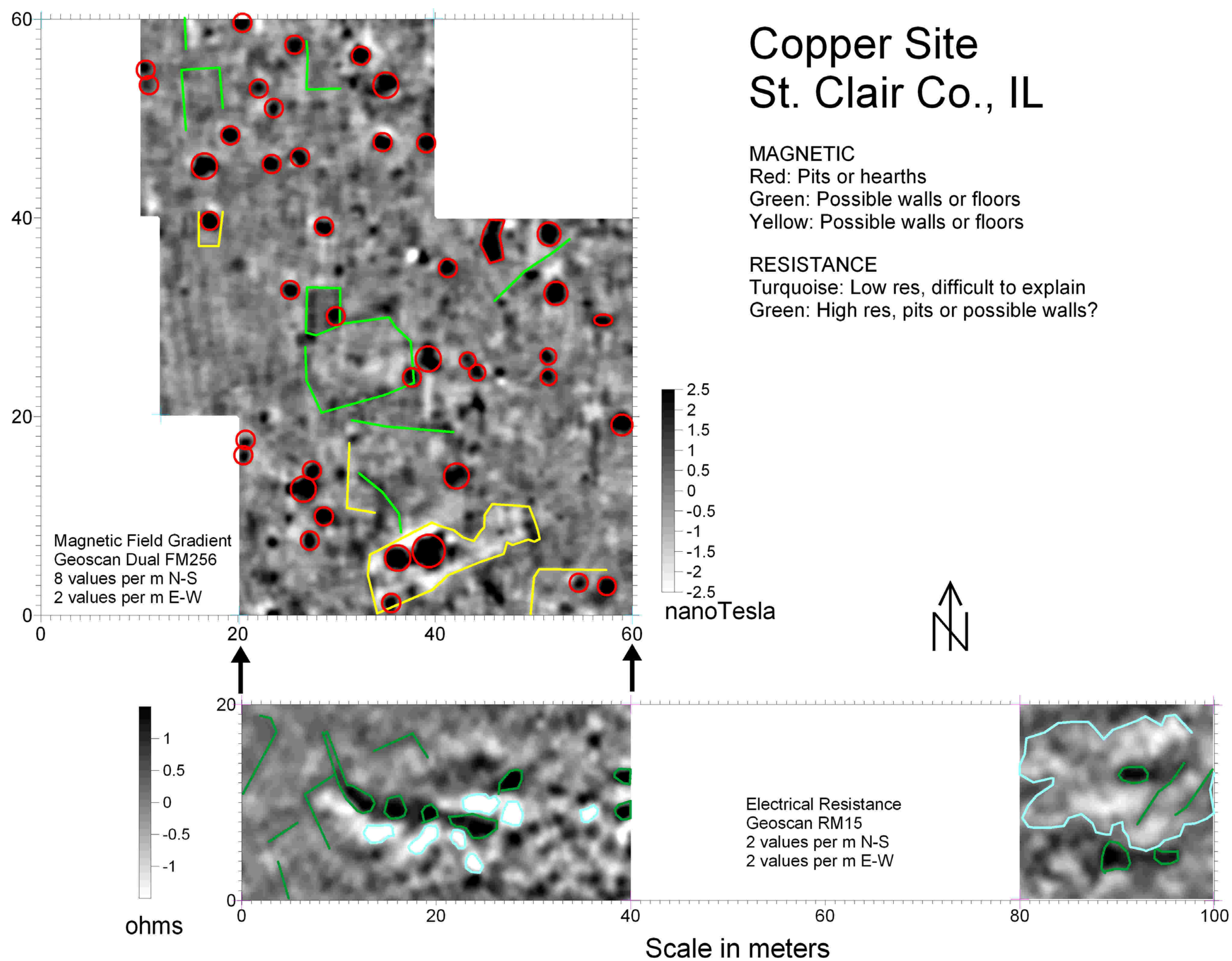

Figure 4.11. Geophysical results with possible feature highlighted; redundant magnetometry data removed (courtesy of M. Hargrave, CERL, and USACE).

into the wooded area along the edge of the terrace, the possibility for fortification at Copper may still exist.

In the spring of 2009, the author, together with Jeffery Kruchten and Thomas Zych, set out three datum points using a high differential Trimble GPS. Two additional mapping points were set out using a total station. When we returned to the site at the beginning of June, 2009 to continue mapping, two of these points had been compromised by field plowing and only one of the additional mapping points could be relocated. These two points were used to backsight and set out a mapping baseline; staked along a north-south bearing, providing reference for excavations and mapping. Excavations at the Copper site began June 9, 2009, undertaken by the University of Illinois archaeological field school under instruction of Timothy Pauketat and the direction of author. Using the magnetometry data, excavations targeted a pair of anomalies located just north of Mound 4. The agricultural field had recently been planted in corn, though much of the surface had visibility greater than 90% at the start of excavation.

Excavations began by removing the plow zone in a series of one-meter by one-meter excavation units arranged in a checkerboard fashion along the previously established baseline. Given the mixed context of the plow zone, only a sample of each unit was screened through ¼" hardware mesh. Upon identification of feature stains at the base of the plow zone in Units 3 and 13, excavations were expanded to delineate the entire extent of this feature. Eventually, an excavation block approximately 14 meters east-west by 14 meters north-south was opened up (Figure 4.12). Two structures and multiple intramural pits were exposed in this excavation block (see Chapter 6 for discussion of features). These features were mapped using points triangulated from the original baseline. Each feature was bisected, the profile photographed and mapped,

Figure 4.12. Location of excavations at the Copper site.

and second halves excavated by fill zone. All wall trenches were excavated with the exception of the inner north wall trench of Feature 4, which was left intact.

At the same time that the structures and associated pits were being excavated, single one-meter by one-meter excavation units were excavated into the approximate centers of Mound 3 and Mound 4 under permit from the Illinois Historical Preservation Agency (HSRPA 2009-05) (see Figure 4.12). Excavations were performed in arbitrary 10 cm levels unless clear cultural layers were defined; each level was photographed and, when appropriate, mapped in plan. All material from mound contexts was screened through ¼” mesh, with the exception of a series of flotation samples taken from Mound 3. These flotation samples were processed by the author in the Fall of 2011.Two samples of nutshell from sub-Mound 3 context were submitted to the Illinois State Geological Survey (ISGS) in Champaign, IL, for radiometric dating (see Chapter 5). All four profile walls of both units were photographed and mapped.

During excavations, a surface collection was made in the northern part of the site, including the area between Mound 3 and Mound 4. This collection yielded Middle Woodland materials in addition to Mississippian artifacts. Excavations were completed on the 2nd of July, 2009. The author returned to the site in March of 2011 to complete topographic mapping that had not been possible the previous years due to field conditions (i.e., tall corn) and time constraints. Methods of ceramics and feature analysis are presented next, while results of excavations and analysis are presented in Chapters 5 and 6.

Ceramic Analysis Methods

In order to address changes to pottery, an attribute analysis was performed on all ceramic material recovered from the Copper site from the 2009 excavations and all ceramics recovered from feature fill at the Olin site from the 1970's SIUE excavations. Analytical procedures commonly utilized throughout the Midwest have been largely conventionalized and grounded in the fundamentals of ceramic vessel analysis as described by Shepard (1961), Rice (1987) and Sinopoli (1991). Many of the methods and specific nomenclature used here are correspond to ceramic seriation procedures used in the American Bottom and throughout the Midwest (e.g., Holley 1989; O'Brien 1972; Pauketat 1998; Vogel 1975).

A sample of ceramics recovered from plowzone contexts at the Olin site was analyzed for comparison with feature contexts. Rim sherds were separated from body sherds; body sherds greater than ½" in diameter were quantified by temper and surface treatment only. Body sherds less than ½" in diameter were quantified by temper only. Temper types were determined macroscopically, and occasionally, with the use of a 10x powered hand lens. Identified temper types included shell (sh), grog (gg), shell-grog (sh/gg), limestone (ls), grit (gt), grit-grog (gt/gg), sand (sa) and none (no). In some instances, temper type was difficult to determine, which is indicated in the data tables with a question mark after the indefinite temper (e.g., sh?/gg). Surface treatments were recorded for exteriors and interiors of body sherds. Surface treatments included plain (pl), red-slipped (rs), dark-slipped (ds), tan-slipped (ts), cordmarked (cm), smoothed-over-cordmarked (sm/cm). Decoration was likewise recorded if present, consisting mainly of trailing and incising. Trailing was used as an inclusive term, encompassing the introduction of decorative lines to wet clay using a blunt instrument as well as what is technically defined as "excising": the removal of clay from leather-hard clay according to the traditional technological method for the typologically defined Ramey Incised vessels (see below). This lumping of trailing and excising was used to differentiate decoration added to pre-fired vessels from the addition of decoration to vessels post-firing, which was defined solely as “incising”.

Using percent of the orifice present, rim sherds were further divided into “vessels” and “non-vessels”. Mississippian vessel rims with five percent or more of their orifice present were assigned vessel numbers and profiles were drawn for those vessels. Vessel rims representing less than five percent of the orifice, and were not reliably identifiable to possible vessel type were designated “non-vessels” and were recorded separately from rims and body sherds. Other clay objects, such as rings or pottery trowels, were also included in this non-vessel category.

In addition to temper type and surface treatment, vessel rim sherds were differentiated by vessel form, vessel size, and decoration. Late Woodland vessels (vessels with grit, grit-grog, or limestone temper) were recorded solely for determining temporal affiliation of features; no further quantification beyond count and weight was utilized.

Mississippian vessel forms are determined from the vessel profile, using criteria set out by Holley (1989), Rice (1987), and Vogel (1975). Jars are defined as vessels with restricted orifices that have a height that is greater than the maximum orifice diameter. Jars are further differentiated by surface treatment (slipped, plain, or cordmarked) and rim form (rolled, everted, everted-angled, and angled). Bowls, on the other hand, have orifices that are wider than the vessel is tall; bowls are often unrestricted, but some have partially restricted orifices. Bowls are further divided by shape and angle of sidewall: incurving, outcurving, straight, outslanting, inslanting, and everted rim (Figure 4.13). Lip shape was recorded for bowls, consisting of rounded, flat, interior bevel, or exterior bevel (see Figure 4.13). Effigy bowls are represented as well, defined by the presence of

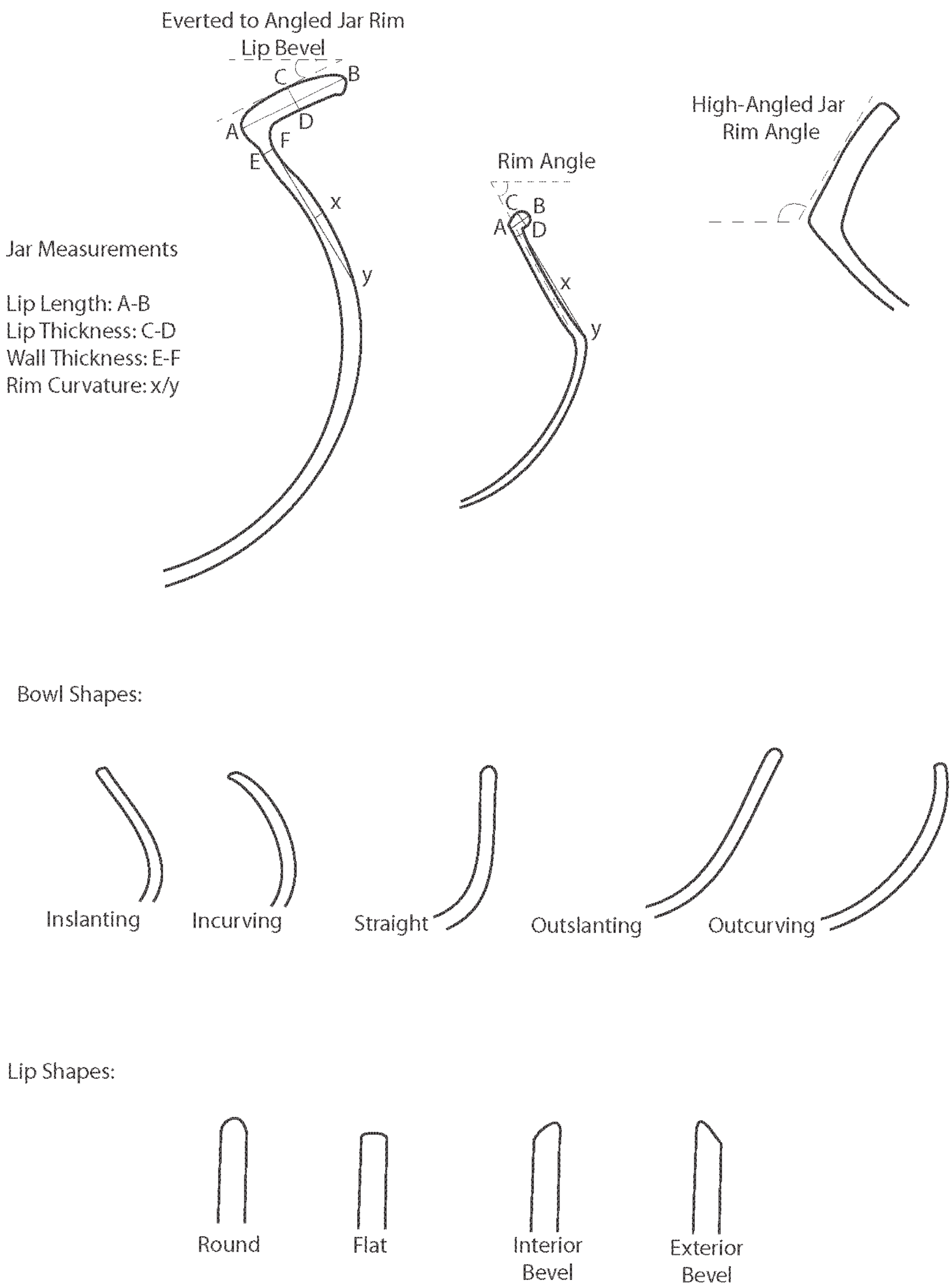

Figure 4.13. Diagram of ceramic measurements (drawn by M. Baltus).

effigy heads or tails added to the rims (or locations along the bowl rim from which such additions were broken). While bowls range on a continuum of degree of shallowness, plates and pans are defined as separate vessel types. Specifically, plates are defined as shallow vessels with a protruding lip, while pans are shallow vessels with thick walls and no protruding lip. Plates are distinguished from everted-rim bowls based on lip length and depth of vessel; a clear distinction generally occurred based on lip length alone.

Bottles are defined as vessels with restricted orifices and straight necks, and which have a distinct juncture between the neck and the rest of the body. As most bottle rims in the collections were small and did not have neck junctures, it was not possible to distinguish between jugs, short-necked and tall-necked bottles. All such vessels were therefore combined into the bottle category. This problem is similar to that noted by Holley (1989:16), where small rims without neck junctures may also resemble beakers, which are thin walled, have single rod-like handles, and are sometimes engraved or incised (formerly referred to as Tippets Bean Pots; see Griffin 1949). Likewise, beakers and straight-walled bowls were at times difficult to distinguish from one another, leading to a beaker-bowl category. Together with beakers, other special vessels included hooded bottles: asymmetrical bottles which have “small orifices on one side of the upper necks of the vessels” (Pauketat 1998: 33), seed jars (tecomate-like jars with extremely restricted orifices and rounded lips), miniature vessels (diminutive vessels constructed using the same methods and materials as larger pots), and utensils (crude thick-walled bowls or funnels that are typically grog-tempered and undecorated).

Miniature vessels were distinguished from pinch pots, which were defined as small vessels constructed by drawing the clay, generally un-tempered, and pinching it into shape. Based on their expedient construction, pinch pots may have served as practice vessels in the socialization and teaching of young potters-to-be (Kamp 2001), or perhaps may have been used as firing 'testers.' Pauketat (personal communication, 2014) suggests these vessels were perhaps offerings, a means of relating to fire. While this is possible, this does not discount the fact that they were able ability to hold matter and were recovered from pit contexts, suggesting this relationship included other aspects of consumption or containment. Pinch pots were most commonly found in Late Woodland contexts at the Olin site, suggesting this vessel type had a particular context of use or relationship during this time period.

Vessel size was estimated using a standard rim orifice diameter chart, a series of arcs drawn at two centimeter intervals against which to compare a rim segment (Rice 1987). Orifice diameter was measured at the most constricted part of the orifice (i.e., the neck on angled-neck jars and the juncture of the lip and body on everted-rim bowls and plates) (see Figure 4.13). Vessel size is an important indicator of vessel function (e.g., storage vs. cooking) as well as the number of people a vessel could serve (large group vs. individual) (Blitz 1993; Hally 1983; Pauketat 1987). A degree of error is introduced in this estimate due to unevenness of some rim orifices, especially with smaller rim segments. Orifice diameter and minimum number of vessels of rim sherds with less than five percent of the total orifice size could not be reliably determined, so these rim sherds, with the exception of plates and special vessels, were excluded from quantification as vessels and were counted as non-vessels. All plate rims were included in quantification as minimum number of plates could be reliably determined through visual comparison. Most of the non-vessels included in the analysis were either small segments of less than five percent, or were appliqués or vessel portions from which an orifice diameter could not be measured.

Vessel surface treatments were categorized by plain (pl), dark-slipped (ds), red slipped (rs), tan-slipped (ts), cordmarked (cm) or smoothed-over cordmarked (sm/cm). In cases where sherds were too weathered to determine surface treatment, they were recorded as eroded (er). Slip colors included in the 'ds' category ranged from brown to dark brown and black. Most dark-slipped (ds) vessels were within the range for the dark slipped category used in FAI-270 analyses, while tan-slipped (ts) vessels would be part of the light slipped category. Other decorations, such as lip notching, stick or finger impressions, trailing, incising, and burnishing (polishing), were likewise noted, along with type and width of tool used.

The presence of cordmarking was further distinguished into z-twist and s-twist categories, which denote the direction and method by which cordage was spun (Alt 1999; Munson and Harn 1971). While thigh-rolling predominantly produces s-twist cordage, the use of spindle whorls has been demonstrated to produce either s- or z-twist (Hurley 1979). Based on Minar's (1998) demonstration that the practice of spinning is highly resistant to change, it has been hypothesized that the shift from s- to z-twist cordage between Late Woodland and early Mississippian periods may imply other changes in technology (see also Hall 1980). Alt (1999) suggests that this directional shift of cordage twist, together with the increased frequency of spindle whorls at the end of the Terminal Late Woodland and the beginning of the Lohmann phase, indicates intensification and centralization (i.e. specialization) of fiber spinning. Based on this information, I will interpret the predominance of either s- or z-twist cordmarking in terms of method, location, and timing of cordmarked pot production. Cordage thickness and spacing were recorded for cordmarked vessels, as possible indicators of technological style (or knowledgeable practices of production) and, perhaps, separate potting groups.

In the interest of further exploring possible potting groups within the site as identified through differences in technological style, attributes such as temper size, jar rim attachment, and lip shape were recorded. Rough estimates of temper size included fine (<0.5 mm), fine-medium (0.5-1 mm), medium (1-1.5 mm), medium-coarse (1.5-2 mm), and coarse (>2 mm). Jar rim attachment methods included: continuous from body, formed separately and attached over the top of the neck/body, and formed separately and attached to the front of the neck/body (see Figure 4.13).

Regional seriation methods generated by the cumulative efforts of Fowler and Hall (1975), Vogel (1975), Holley (1989), and Pauketat (1991, 1998) were used. These seriation techniques utilize continuous attributes such as lip length (LL), lip thickness (LT), and wall thickness (WT), which were measured to the nearest 0.01 mm using digital calipers. Following Pauketat (1998), additional continuous measurements were made on jars, including rim angle and/or lip bevel. Lip length (LL) is measured as the distance from the terminus of the lip to the neck juncture, lip thickness (LT) is measured as the widest part of the lip perpendicular to the lip length, and body wall thickness (WT) is measured as the width of the vessel wall between interior and exterior of vessel from a point below the location of rim attachment (see Figure 4.13). Rim angle (RA) was measured on jars with inslanted rims and rolled or extruded lips; this measurement was recorded as the angle of the shoulder to the plane of the orifice (when inslanting) (see Figure 4.13). Conversely, lip bevel (LB) was measured for jars with everted or angled lips; this measurement was made as the angle made by the lip from the plane of the orifice (see Figure see 4.13). The rim angle of jars with highly angled rims was measured using standards of Upper Mississippian ceramic analysis (Emerson and Emerson 2013); rim angle was measured perpendicular to the plane of the orifice, recorded as degrees from zero (see Figure 4.13).

As has been demonstrated among Cahokia-area ceramics, jar rims increase in protrusion over time, becoming especially pronounced during the later (late Stirling/Moorehead) phases (Fowler and Hall 1972; Holley 1989; Milner et al. 1984; Vogel 1975). The increase in lip length is calculated using Holley's (1989) Rim Protrusion Ratio (RPR) that, similar to Pauketat's (1998) Lip Protrusion (LP) index, measures the ratio of wall thickness to lip length, controlling for vessel size.

Jar rim curvature has also been demonstrated to be time-sensitive; Lohmann and Stirling phase jars having inslanting rims while Moorehead jars are more globular with outcurved rims (Holley 1989; Pauketat 1998). The rim curvature index is measured using the length of a line drawn from neck to shoulder divided by the length of a perpendicular line drawn at the middle of the first line to the rim (see Figure 4.13). Rim curvature indices have been used to seriate Mississippian assemblages at Cahokia's Tract 15A/Dunham Tract (Pauketat 1998). Of the sample of rims from the Olin collection, few have intact shoulders, making such a measure an unreliable determination of relative date for this collection. Rim curvature was calculated for those vessels with intact shoulders and may, minimally, indicate a transition from sharp-shouldered vessels to globular jars within the assemblage.

An index of rim thickness (RT) is calculated using the wall thickness measured at a distance below the neck equal to 10% of the orifice diameter; this number is then divided by the orifice diameter to provide a rim wall thickness controlling for vessel size so that rim wall thickness is comparable among vessels (Pauketat 1998). Wall thickness differential (WTD) is likewise calculated as the difference between rim wall thickness and body wall thickness (body wall thickness divided by rim wall thickness) (Pauketat 1998). Finally, an index of lip shape, used to standardize lip length, is calculated by dividing lip length by lip thickness.

Presence and location of sooting was recorded for all vessels; this was used as an indicator of vessel use (e.g., for cooking rather than storage or serving). Other possible markers of use-wear were likewise recorded (e.g., lip chipping, heat spalls, interior striations), though these could have occurred through post-depositional taphonomic processes as well as use.

The ceramic assemblages from Olin and Copper will be compared to each other as well as to those from Cahokia. Additionally, these assemblages will be compared with other contemporaneous sites in the American Bottom, Central and Lower Illinois Valleys, and Kaskaskia Valley. There comparisons will be made with an eye towards coincidence of changes within the assemblages as well as discrepancies between. Similarities in assemblages and coinciding assemblage changes may suggest close or continued relationships between sites/regions, while discrepancies may indicate increased localization.

Feature Analysis Methods

Using maps of excavations, structure size was measured to the nearest 0.01 meter. Length and width of each structure was measured from the interior edges of the wall trenches, including each rebuilding episode where possible. A ratio of length (L) to width (W) was calculated as an index of structure shape; LW ratios approaching 1.00 are considered to be more square than rectangular in shape. The trend for increasingly square structures during the Moorehead phase has been identified at Cahokia (Collins 1990) and has been used as a seriation marker.

Interior features were noted, including interior storage pits, hearths, partitions or dividing walls, and caches of material where known. Certain interior features, partitions and caches in particular, were used to suggest possible extra-domestic use of certain structures. Presence and density of exterior features (e.g., storage pits, hearths, smudge pits) were likewise used to indicate potential activity areas of the site. Extra-domestic features such as burials, monumental marker posts, and mounds as well as non-domestic structures (circular, L-, or T-shaped) were documented as evidence for politico-religious practices. Structure size was likewise used to indicate extra-domestic structures. As with the ceramic evidence above, the features – specifically structures, mounds, and post pits – will be compared with those at contemporary sites within the American Bottom as well as other Cahokia-related sites in the Midwest.

Expectations

If the changes marking the transition from the Stirling phase to the Moorehead phase entailed wide-spread political-religious reorganization, it is expected that spaces and objects entangled with creation and spread of the 'classic' Cahokian political-religious message would be terminated or transformed. Additionally, these transformations would be expected to occur in close coincidence at all Cahokia-related sites in the American Bottom and surrounding region.

As Pauketat and Emerson (1991) have suggested, Ramey Incised pottery was a material messenger of Stirling-phase Cahokian elites, reinforcing the cosmology of Cahokia. Discontinued use of Ramey pottery would suggest termination, or perhaps reinterpretation, of the cosmological message of the Stirling phase. A negotiation of cosmological message may entail the appearance of novel pottery forms and decorative motifs on pottery used in both domestic and extra-domestic contexts. If this political-religious reorganization included the participation of new groups of people larger more inclusive political-religious structures may be expected, as well as newly introduced pottery forms, non-local pottery types, or novel technological style of pottery production. Similarly, diversity of pottery production techniques (i.e., multiple technological styles) would suggest multiple potting groups. As such, this may suggest more localized pottery production; the presence of pottery production tools (e.g., pottery trowels, caches of shell or clay, antler tines) in household contexts would likewise indicate local community production of pottery (as opposed to centralized specialized production).

The presence of fortifications provides evidence for more than extant or threatened violence within the area; fortifications may be part of the material 'ontologizing' of the revitalization message (Olsen 2010). As outlined in Chapter 2, "violence" here incorporates both physical harm towards human and non-human community members as well as social or political violence against persons and objects associated with particular religious traditions. The location of those fortifications, together with what is contained within the fortifications, minimally suggest where the (projected) concern for protection lay. It is therefore expected that entire communities would be contained within fortifications where (presumed) threat of violence was directed toward the general community, while the political-religious core of a community would be protected should the threat of violence be directed against such.

The discontinuation or transformation of particular political-religious practices would also include termination of particular structures types that were part of those practices, changes in context of particular practices (e.g., relocation of burials or caching of materials), and changes in participants (human as well as other-than-human). Termination of particular political-religious structures – particularly termination via fire – would suggest a 'cleansing' of the local landscape of such structures. As has been suggested elsewhere (Baltus and Baires 2012), fire may have been both a powerful element in and of itself, as well as a means of mitigating powerful objects and spaces. Burning of particular spaces, places, and materials associated with socially-constructed elite identities, therefore, may have been a means of negotiating, terminating, and cleansing the region from those relationships.

The appearance or emergence of new social groups in the region, including the construction of new social identities, may be evidenced by changes in domestic organization. Changes in household organization may result in changes in domestic structure size, proportion, ways of storing domestic goods, and perhaps methods of construction. These possibilities will be explored further in Chapter 6.

CHAPTER 5. TRANSFORMING CAHOKIAN ARCHITECTURE

The material and experiential engagement in Cahokian religious-politics occurred at multiple temporal scales, from daily practice to annual renewals and longer-term observances, often as performances of gathering. This gathering occurred through mound construction (inter-relating elements of earth, fire, water, and ancestors), caching (or bundling) objects (Zedeño 2008, 2009), or the joining of different social groups (clans, families, ethnic groups) for offerings of dance and feasting. Gathering is a process of uniting and relating attributes, elements, persons, and objects. Through gathering, identities are formed, places made, and polities or communities created. Cahokian religious-politics of the Stirling phase were re-made or re-imagined through material transformations at the beginning of the Moorehead phase. These transformations include changes to building types and other related features of daily-religious life, as demonstrated using the Olin and Copper sites.

Previous research has highlighted significant transformations in size, shape, and type of structures at Cahokia and Cahokia-related sites during the late Stirling phase-early Moorehead phase transition (Collins 1990; Emerson 1997a; Pauketat 2011b; Pauketat et al. 2013). A particular series of structure types, Emerson's (1997a) "architecture of power," marked "civic nodal" hamlets and villages in the American Bottom during the Stirling phase. "Ceremonial nodal" sites were differentiated from civic nodes based on their lack of L- and T-shaped structures but their presence of temples, religious paraphernalia, sometimes circular structures, and burial complexes (Emerson 1997a). Such 'nodal' sites were believed to help integrate rural Cahokians into the larger community through increased access to communal ceremonies (Emerson 1997a,b). Additionally, the insinuation of these explicitly Cahokian structures into the rural areas was a material spread of the Cahokian polity (Emerson 1997a,b).

Palisades

Palisades and other fortification constructions are often considered in strongly functionalist terms as matters of site defense and resource availability (Allen and Arkush 2006; Keeley 1996; Solometo 2006), or even in symbolic terms as offensive tactics as well as serving social, political, ideological and symbolic agendas (Blitz and Lorenz 2002; Hassig 1992; Pauketat 1998, 2009; Schroeder 2006). Defensive works of the magnitude found at larger sites are used to highlight levels of planning and coordination of labor as indicative of the strength of authority and legitimacy of labor organizers (Milner 2000). Palisades, for example, provide a place of refuge for a city's inhabitants, a means of directly protecting an important ritual and ceremonial space, as well as a means of constructing a polity as having military strength (Hassig 1992; Keeley 1996; Keeley et al. 2007; Pauketat 1998; Schroeder 2006).

Dye (2006) claims that fortifications were intended to protect storable surplus while others highlight the protection of 'spiritual surplus' through defense of mounds, plazas and temples (Emerson personal communication 2007). While the religious sanctity of a community's ritual area may have been a direct target for enemies, the fact that it is incorporated within a defensive wall indicates its importance within that community and in fact, may have been a community organizing or integrating space. These points are not mutually exclusive, as religion and politics were deeply entangled with the space, place, and things. The construction of the palisade may have symbolized the non-consensual power of each polity's elite, enacted a message of aggression to their neighbors, responded to an internal or external threat, or simultaneously performed a complex array of such meanings (Dalan et al. 2003; Iseminger et al. 1990; Schroeder 2006). Additionally, fortifications may also take part in the politicization of fear and protection – where material reminders of threats of violence are intertwined with the reassurance of protection

(Hamber 2006). As such, fortifications and iconographic representations of warfare become material discourses of fear "implicated in the play of power" and politics (Hamber 2006:139).

Archaeologists have also highlighted the ways in which spatial organization (re)creates social organization (Robbin 2002; Snead 2008), where proximity provides opportunities for personal interaction and closer social relationships. Relationships between people and their landscape are likewise constructed through daily experience and practice, as well as through historical narratives told by those landscapes (Ashmore 2004; Basso 1996; Tilley 1994). The construction of fortifications would have created new social identities and new social relations, including and communities of defense and offense. The constructions of palisades were defensive and offensive acts which created physical as well as psychological barriers between those within and those outside (Beck 2006; Iseminger et al. 1990; Trubitt 2000); these barriers may have also led to unintended divisions within the polity. Communal construction projects "provide a means of creating and perpetuating social relations," (Dalan 1998: 99); the physical act of construction, together with the lived experience of fortifications, may create and perpetuate new social relations as well as create new divisions.

As a material aspect of daily life, the landscape – especially, but not exclusively, the human-built landscape – is as much a part of what creates the social or the community as are object and human participants. The experienced landscape is itself a full participant in social relationships with humans and other-than-humans; at the same time, aspects of that landscape may also mediate social relationships between persons. For example, the fortification of only a portion of a city would effectively divide not just the interior of the palisade from the exterior, but, as Dalan et al. (2003) have pointed out, would also create a barrier between one side of a fortified precinct and another. While the collective construction of the stockade may have created feelings of community in practice, the lived experience of a divided landscape may have served to create greater fissures among an already diverse population. Additionally, such constructions may become barriers to the processes of gathering, especially of people, that were conducive to the creation of social relationships. Pauketat (2009) argues that new cultural practices and new communities of defense were constructed in the palisades in the Midwest. Fortifications were also agentic material spaces, actively segmenting communities, defining identities, and redefining "entire social and political landscapes" (Pauketat 2009:255).

Building Proportions

In addition to the changes to the built political-religious landscape, domestic structures underwent subtle changes in size and shape. Collins (1990) has demonstrated that the length-width ratios of post-Stirling phase domestic structures at Cahokia decreased over time, indicating a trend towards increasingly squarer shapes (length-width ratios of 1.30 or less), with overall larger interior floor areas. Esarey and Conrad (1981) demonstrate a similar trend for structures at Orendorf's Settlement C. In conjunction with these changing structure shapes and sizes, the number of exterior storage pits seemingly decreased, suggesting an increased use of interior space for storage. Porter (1974:59-60), even postulated the existence of two-story structures with a lower-level storage area and upper-level living space. This increased "internalization" has been suggested to reflect a decentralization of surplus storage and an increased 'individualization' or family-focused storage base (DeBoer 1988; Pauketat 1994).

Specialized Structures

The specialized buildings of these nodal sites included rectangular structures with alcoves attached to the center of one long axis (T-shaped), alcoves added to one end of a long axis (L-shaped), and circular structures. Alt (2006b) and Porter (1974) have surmised that these particular structure types served specific functions embedded within the elite-civic functions of these site types. Porter (1974:173) initially surmised an association between L-shaped structures with pre-mound areas, suggesting "this unique form is tied to ceremonial use, but probably in the form of a special storage and/or place for visitors." Building on this, Alt (2006b) suggested that the L- and T-shaped structures were the residences of ritual-specialist elites and the alcoves of these buildings served as storage areas for ritual paraphernalia. L-shaped structures appear to have been present during the Terminal Late Woodland in the American Bottom; one L-shaped single post structure was excavated at the Robinson's Lake site (Kelly et al. 1984; Milner 1984c). L-shaped structures appear to have been slightly more limited in their distribution. These structure types have been discovered at Cahokia (Collins 1990), Mitchell (Porter 1974), and at the upland villages of Knoebel (Bareis 1976) and Grossmann (Alt 2006b). L-shaped structures were mound summit constructions within the Kunnemann Mound (Pauketat 1998) and sub-mound structures at the Mitchell site (Porter 1974). Finally, an L-shaped structure (Structure 19) was also discovered at the Marty Coolidge site (Kuttruff 1972).

T-shaped structures have been found at Cahokia (Collins 1990; Pauketat 1994; Salzer 1975), Horseshoe Lake (Gregg 1975), Mitchell (Porter 1974) and in the Richland Complex upland sites of Christy Schwaegel (11S1588), Grossmann (11S1131; Alt 2006b), Halliday (11S27; Alt 2006b), Knoebel (11S71, Alt 2006b; Holley et al. 2001c), Pfeffer (11S204), and John Faust #2 (11S239; Holley et al. 2001a). Local variations of T-shaped structures have been excavated at the northern hinterland sites of Aztalan (Barrett 1933) and John Chapman (11JD12, Millhouse 2012). A T-shaped structure (Structure 6) was also noted at the Marty Coolidge site, located in the hinterlands of the Kaskaskia River Valley (Kuttruff 1972). A cruciform structure, arguably a variation on the T-shaped structure, was excavated at the Eveland site in the Central Illinois River Valley (Conrad 1991); radiocarbon dates taken from nutshell on the floor of this structure returned a calibrated median date of A.D. 1130 (Bender et al. 1975). A nearly identical cruciform structure was discovered at the base of the Murdock Mound at Cahokia (Smith 1969).

Circular structures tend to fall into two size classes: large circular structures comparable to the "rotundas" noted at Contact-era and Historic Creek Native American villages (Hudson 1976; Porter 1974) and small circular structures presumed to have been used as sweatlodges, based on similarities with extant structures in the Southeast at the time of European contact as well as among historic Native groups (Creek, Hudson 1976; Winnebago [Ho-Chunk], Radin 1970[1923]; Choctaw, Swanton 2001[1931]). Based on Pauketat's (1993) correlation between circular structures, elite structures, and mounds at Cahokia, Emerson (1997a) included these probable sweatlodges within his "architecture of power" complex in the Cahokian countryside. Pauketat (1994:180-181) suggests that these "circular sweat lodges may represent a new ritual context for the negotiation of conflicting ideologies and thus reproduction of the new Cahokian order," using what "was probably one of the oldest foci of negotiation with self available" (DeBoer and Kehoe 1999; see also Hall 1997).

Small circular structures are found with both single-post and wall trench construction; in some instances circular structures were built with a double wall trench (e.g., Fingers, Olin, and Cahokia's Powell Tract). Small circular structures have been found at Cahokia (O'Brien 1972;

Pauketat 1998, 2013), Mitchell (Porter 1974), Labras Lake (Phillips et al. 1980, cited in Mehrer 1982), Julien (Milner 1984a), Vaughn Branch (Jackson and Millhouse 2005), Old Edwardsville Road (Jackson and Millhouse 2005), Fingers, and the Richland Complex site of Pfeffer. Small circular structures have also been identified at the hinterland sites of Aztalan in Wisconsin (Barrett 1933), at the Eveland and Larson sites in the Central Illinois River Valley (Conrad 1991), at the Mansker site in Randolph County (Piesinger 1972), and at the Bridges site in the Kaskaskia drainage (Hargrave et al. 1983). At least two small circular wall-trench structures were excavated at the southeastern Missouri site of Lilbourn (Cottier 1977a). One of which pre-dated the late-twelfth century as it was superimposed by a series of burned single-post structures with radiocarbon dates ranging from A.D. 1115-1312 (Cottier 1977b).

Large circular structures are clearly more inclusive than the small circular structures, but appear to have been more limited in location and temporal affiliation. Large rotunda structures appear to be restricted to large mound centers; such structures have been excavated at Tract 15B at Cahokia (Pauketat 2013c), at the Mitchell site (Porter 1974), and at Kincaid (Welch et al. 2007). At least two rotundas, a smaller structure replaced by a later structure dating to the early Stirling phase, were excavated at Cahokia's Tract 15B. The latest rotunda appears to have been replaced by a bastioned compound with curvilinear walls and finally a rectangular compound with bastions enclosing a large politico-religious building (Pauketat 2013c). Circular structures were used in the Southeast at the time of European contact; such structures were variously used as rotundas or public houses, winter dwellings, or regular domiciles (Swanton 1946; Williams 1930).

A final specialized structure type, the large rectangular buildings comparable to the "council houses" of contact-era Southeast (Swanton 2001), rounds out the political-religious architecture of Cahokian Mississippian. These structures were already part of the community organization of the Terminal Late Woodland American Bottom (Fish Lake, Fortier et al. 1984; Range Site, Kelly 1990) and are found throughout the Lohmann and Stirling phases at Cahokia (Pauketat 1998, 2013), Mitchell (Porter 1974), and Emerald (Pauketat, personal communication). Many of the large rectangular structures at Cahokia were part of the Tract 15A and Tract 15B areas of downtown Cahokia that had been re-appropriated during the Stirling phase for civic-level purposes (Pauketat 1998, 2013). Large council houses were excavated at the Eveland site, a mid-eleventh to mid-twelfth century site in the Central Illinois River Valley; interestingly, large council houses in Settlement C of the Orendorf site, a mid-twelfth to mid-thirteenth century site in the Central Illinois Valley were eventually replaced by smaller, less inclusive structures (Conrad 1991). Settlement D at the Orendorf site also included large council houses, a circular structure, and a "cruciform building"; this settlement was burned, including the central-plaza marker post (Conrad 1991).

Marker Posts

A number of specialized structures in the Mississippian world were paired with large marker posts. Such monumental marker posts appear to have had their beginnings as smaller posts marking the center of courtyard groups during the Emergent Mississippian period (Tract 15A Cahokia, Pauketat 1998; Range, Kelly 2007). Past and recent theories regarding these marker posts suggest ties to ancestral identities, perhaps as ancestors themselves (Hall 1997; Hargrave and Bukowski 2010; Pauketat 2013a; Skousen 2012). Pauketat (2013), using the historic depth of marker post and ancestor-pole associations, highlights the physical connection they make between earth and sky, past and present. These values perhaps emerged from the materials themselves as the posts were often constructed of cypress or cedar, long-lived, tall, straight-growing species. Post pits were typically not in-filled with primary household trash, but were instead filled with "whatever soil was available or later washed into the pit"; as such, many post pits did not contain diagnostic material and cannot be attributed to a particular phase affiliation (Pauketat 1998:122). An infilling process different from storage or other pits and structure basins seemingly highlights their special nature, as they were not considered to be valid disposal places for everyday trash, but incorporated generally clean soils and intentional additions.

The center of a small Lohmann phase plaza on Cahokia's Tract 15A was marked by at least two posts (Pauketat 1998), suggesting these features were becoming increasingly entangled with larger public spaces and practices. The increasing politicization of large posts occurred through the Stirling phase where they were often free-standing markers, located in or near plazas, associated with politico-ritual buildings and on mound summits (Knoebel, Bareis 1976; Orendorf, Conrad 1991; Mound 72, Fowler et al. 1999; Bridges, Hargrave et al. 1983; Pfeffer, Pauketat 2009; Kunnemann Mound, Pauketat 1993; Tract 15A, Pauketat 1998; Tract 15B, Pauketat 2013c; Mitchell, Porter 1974; Monks Mound, Reed 1969).

Nowhere were the increasingly political implications of large wooden posts more apparent than in the Stirling phase entanglement of ancestors and time through the construction of the woodhenge. At the interface of the Lohmann to early Stirling phase, certain areas of the site were reorganized to create public spaces, including Tract 15A where a series of woodhenges were constructed. These appeared as a series of at least four circles or arcs of evenly-spaced wooden posts of rot-resistant red cedar – a material with temporal implications itself (Pauketat 2004, 2013). Several more circles are hypothesized to exist in the Tract 15A-Dunham Tract area. Based on radiocarbon assays and diagnostic pottery recovered from the post pits of the woodhenges and feature superpositioning, all of the Post-Circle Monuments were constructed during the Stirling phase (Pauketat 1998).

Various explanations of these constructions include World Center shrines (Hall 1985), surveying apparatus (Fowler et al. 1999), or solar calendars (Wittry 1969). Seemingly, these multiple interpretations are not necessarily incongruent; likely the woodhenges held multiple meanings, simultaneously acting to center and direct supernatural powers, organize space, and predict celestial events. Regardless, the woodhenges were material controls of space and time on the Cahokian landscape. The presence of material time-keepers as predictive mechanisms would have served to "formalize" the ritual calendar thus creating an "authority" of time and scheduling. The ritual calendar as determined by these structures may have been given primacy over local (and newly arrived) understandings of cosmic, ritual, and social time.

The woodhenges, while perhaps creating and legitimizing elite power through their control of time (Rice 2007), may have also served to standardize a ritual calendar through which to coordinate the vast number of people immigrating, or even pilgrimaging to Cahokia. A standardized calendar would serve to coordinate rituals over time and distance, serving to unite large numbers of disparate people, in the spirit of creating an integrated Cahokian community, replacing a number of different social histories with perhaps just one. The materialization of, and therefore control over, sacred time may have appeared to imbue leaders with the ability to manipulate cosmic order, thereby legitimizing their ability to manipulate social order. The imposition of time on the landscape may have impacted the rhythms of everyday experience

(Thomas 1996). Likewise, perceptions of the passage of time are often altered by material constructions of time-prediction or time-recording. The Cahokian woodhenges were dismantled by the end of the Stirling phase and that area of Tract 15A was reclaimed for domestic occupation during the Moorehead phase.

As a side-note, in an animated world where marker post ancestors helped organize and ground the Cahokian community (Pauketat 2013a; Skousen 2010, 2012), and woodhenges constructed with large posts gathered together people, time, and the cosmos (Hall 1985; Fowler et al. 1999; Pauketat 1998; Wittry 1969; see Chapter 3), it is interesting to consider the possible relationships of palisades beyond the necessarily functional. While the posts used for palisade or compound construction may not have had the same identities as those of marker posts or woodhenges, the power contained within the living trees they once were and the properties that they share with posts and woodhenges may have been conceptualized as part of their strength as fortifications.

Artifact Caches and Other Termination Practices

An additional aspect associated with Cahokian structures is the common practice of caching objects in the wall trenches and on the floors of both domestic and extra-domestic buildings. This appears to have been done during deconstruction or demolition of a building, sometimes in conjunction with termination by fire (Pauketat 2005; Wilson and Baltus n.d.). Oftentimes intact objects stashed in pits or trenches were assumed by archaeologist to have been "reserves" that had been forgotten or left behind when people moved (Pauketat 2004); however the pattern within the American Bottom and other Cahokia-related sites suggests otherwise. Cached objects are commonly stone hoes or celts, though complete ceramic vessels, chunkey stones, projectile points, knives, and figurines have likewise been recovered from seemingly intentional deposition on floors, wall trenches, or storage pits. In some cases, artifact caches were created en masse as a possible communal performance (Pauketat and Alt 2004). This practice was prevalent through the Lohmann and Stirling phase, as large caches of celts have been recovered from Cahokia, East St. Louis, the Lohmann site, and the Grossmann site (Hoehr 1950; Moorehead 2000; Pauketat and Alt 2004; Esarey and Pauketat 1992; Titterington 1938), though while small local caches do not appear to have changed during the Moorehead phase, the practice of gathering large masses of objects under the auspices of a Cahokian political-religion does not seem to have continued. This suggests people's individual relationships with these objects and their entanglements with domestic structures, spaces, and the termination of such did not change with the larger politico-religious changes, however, the large scale association with a centralized Cahokia may have.

Olin Feature Data

At least 47 structures (including rebuilds) and over 370 pits were excavated at the Olin site, 11MS133 (Figure 5.1). At least 100 of the identified pits were associated with the Late Woodland occupation of the site; all of the buildings excavated were Mississippian. Most of these structures and their related pit features were positioned around a 45-meter square open plaza area. Given the number of pit features, and the lack of excavation notes for most, information for these features will be presented in tabular form later in this chapter with a short discussion of a select few features.

Structures

The initial occupation of the site appears to have been fully enclosed within the larger palisade with rectangular bastions, while the smaller inner palisade with circular bastions was associated with a slightly later point in a continual occupation. This was Denny's observation based on excavations and field impressions and seems to be supported by superpositioning and

Figure 5.1. Olin site Map.

structural relationships. Given the incorporation of the palisade into the site plan as part of the founding of the Olin site suggests a number of possibilities, including the possibility the site's occupants were retreating into a relatively defensible upland location or the site was situated to be a Cahokian outpost protecting the "frontier" of the American Bottom (especially if the nearby Kruckeberg #1 site was likewise fortified). The lack of burned structures or burning associated with this palisade, in fact, the lack of evidence for any physical violence whatsoever, may suggest the presence of this wall was multi-faceted.

Buildings that appear to have been associated with the initial Mississippian occupation of Olin were cardinally oriented (north-south or east-west) (H2, H3?, H9, H13, H19, H33, H38, circular structure) (see Figure 5.1). Remnant basin fill in H33 contained cordmarked jars with high rim protrusion ratios (see Chapter 6), reinforcing the likelihood that this structure was part of the early occupation of the site. The small circular structure on the east side of the site contained two small firepits located just off-center. The presence of these firepits reinforces the idea that this structure may have been a sweatlodge. A larger marker post was erected southeast of the sweatlodge. The marker post and sweatlodge may have been associated with one another given these two appear to have been the only Mississippian features in the eastern portion of the site, or at least at the eastern edge of the plaza within the outer palisade. The isolation of these two features at Olin may have re-emphasized the experience of them as powerful spaces with clear separation from the other areas of the site.

Two structure series located along the western edge of the plaza may also have been non-domestic or extra-domestic structures. These buildings were rebuilt in place two to three times each (resulting in three to four structures at those locations), setting them apart from the other buildings that tended to be rebuilt only once or twice. While the possibility exists that these two structures (and their subsequent rebuilds) may have been paired, the superpositioning of the inner palisade wall over the western walls of the H13-H17 series suggests that they were not contemporaneous. The H13-H17 series predated the inner palisade wall, while the H24-H26 series is located more easterly, with approximately three meters between the structure's western wall and the palisade wall. This placement suggests the H24-26 series was built and used (perhaps replacing the H13-17 series) while the inner palisade wall was in use. Their similarities, therefore, suggest related uses where one set of structures replaced the other set for a given purpose or activity. These spaces and attendant practices clearly had (or were given) importance as they were shifted to be included within the inner palisade wall. This same privilege was provided only to the paired structures located at the northern edge of the plaza. The construction of this inner palisade effectively segmented the Olin community (sensu Pauketat 2009), separating physically, socially, and religiously those persons and practices located within the inner palisade and those intentionally excluded.

Given the frequency with which structure series H13-17 and H24-26 were rebuilt, as compared to the other buildings at the site, it could be suggested that these structures: 1) served a particular purpose, as they are the only buildings rebuilt in the same position every time, and 2) were rebuilt (or renewed) at a greater frequency than was typical for a domestic dwelling, especially if the H24-26 series replaced the H13-17 series when the inner palisade wall was built. This particular building may have been intentionally dismantled and reconstructed, perhaps as part of a regular practice of renewal of a special building. Porter (1974: 148) makes an argument for an annual (or otherwise-regularly-scheduled) rebuilding of specialized structures at the Mitchell site, though Porter's argument focused on buildings associated with mound contexts.

A pit, Pit 154, located near the H13-H17 complex contained evidence for potential craft working, including small pieces of mica, copper, and a lithic drill fragment. The drill fragment was recovered from Pit 68, likely affiliated with the H13-H17 complex. Small bits of copper were recovered from Pit 166, located within H24-H26. Additional fragments of mica were recovered from Pit 26, also located in the northwest corner of the site. Copper working was noted as a prominent activity in the Moorehead phase sub-Mound 34 area at Cahokia as well (Kelly and Brown 2010; Kelly et al. 2007). The copper-working associated with Mound 34 may have been part of the early production of the "Southeastern Ceremonial Complex" (SECC) of material cult objects found throughout the Mississippian world of the greater southeast (Kelly et al. 2007). These "SECC" objects included copper plates depicting images of warriors and violence, which Charles Cobb and Bretton Giles (2009) suggest were part of an ontological shift (re)constructing the body and identity of the warrior.

The practice of copper-working at Olin may suggest a fairly close connection with Cahokia as well as a continued spatial segregation of particular craft or material specialists as these particular materials were restricted to the northwest corner of the site. The potential for extra-domestic activity in the creation or 'awakening' of powerful elements and objects (Olsen 2010:85) may give additional insight as to why those structures were 1) rebuilt so often in the same place; and 2) shifted to be included within the inner palisade. The inner palisade was thus a co-creator of the plaza space as restricted, in which specific activities took place that may have involved powerful material connections to Cahokia, the greater southeast, and the cosmos in general.

A formal square hearth (as suggested by the mapped circle-in-square) appears to have been associated with the last construction in this structure series (H17), reinforcing the extra-domestic nature of this structure. House 6, the larger rebuild of H9, likewise appears to have had a formal firepit with an area of burned floor adjacent to the firepit. If the mapped shapes are to be believed, these formal firepits appear to be similar to a square puddled clay hearth at the Copper site (see below). This supposition is supported by photographs of at least one square hearth during excavations of the Olin site (Figure 5.2); unfortunately no feature information was given for or pictured in these photographs. A square hearth like that at Copper and perhaps here at Olin was excavated by Robert Hall on the summit of Emerald Mound (also a Moorehead phase occupation) (Hall, personal communication, 2009). A double-square hearth is depicted inside H39, near the offset wall. No photos of this feature has been found, therefore it is unknown whether this was a formal puddled-clay hearth or not. A series of less-formal firepits (suggested by the simple circular or slightly rectangular shape) appear to have been affiliated with H5 (as they are located too close to the wall trenches of H7 to feasibly be affiliated with that structure).

Figure 5.2. Field photo of square hearth at Olin.

As part of a continuous occupation, many of the first buildings were reconstructed in place as enlarged and/or slightly shifted structures (H6, H14/15/16/17, H22) (see Figure 5.1). H22 appears to be the only example of a 90 degree re-orientation in place. At some point during or shortly following this sequence, the large marker post associated with the sweatlodge was removed and a rectangular wall trench structure (H27) was built over its location. A similar sequence of events has been noted at East St. Louis, Cahokia, and at the Sauget Industrial Park Sites (SIPS) complex, where the placement of the subsequent structure cites the presence of the previous marker post (Fortier and Finney 2007; Kruchten and Galloy 2010; Pauketat 2013a; Skousen 2012). In some cases these large posts are erected and actually incorporated into the structure itself (e.g., Copper site, Baltus 2009c; Emerald site, Pauketat and Skousen 2012; Mitchell site, Porter 1974). H27, in addition to marking the location of the post, may have been paired with the sweatlodge. Porter (1974:80) indicated that "larger domestic family structures" at the Mitchell site "maintained some form of sweat lodge or storage sheds adjacent to the dwellings." Following the suggestions of Emerson (1997), Pauketat (1993), and others (Waring 1968) the structures associated with sweatlodges may have been more than typical domestic dwellings. Rather, these may have been the domiciles of politico-religious leaders or practitioners where extra-domestic activities took place.

Following (or forcing) the abandonment of H27, the inner palisade was constructed over the location of this building, as well as over the H13-H16 structure series and H19. Photographic evidence shows the posts of the palisade jogging slightly to the south to avoid overlapping with the northern wall trench of H27 (Figure 5.3). Upon its termination, a cache of lithic tools was buried in the floor of H27 and a burned log placed over its location (as discussed below). Based on its location and orientation, H28 appears to replace the defunct H27, having been shifted to the

Figure 5.3. Excavation photo of H27.

southwest to accommodate the presence of the inner palisade wall. Contemporaneity between the inner palisade and H28 is presumed based on shared orientation (slightly SW-NE). This inner palisade appears to have intentionally excluded the sweatlodge, H27, and the previous location of the large marker post. The shifting location of structure series H13-H17 to structure series H24-26 in order to be included within the smaller inner palisade highlights the intentional exclusion of the location of the circular sweatlodge. This specialized circular structure was not just discontinued or terminated, but even the site of its former location was avoided in the reconstruction of the palisade while other extra-domestic structures (H24-H26) were shifted to be included. While the location of this circular structure was clearly excluded in the construction of the inner palisade, physically rejecting the building as well as its associated practices and identities, the power of such a building may have still been felt. This power may have been experienced as dangerous, given the fact that no other building was constructed over its location.

Possible reasons for the reduction in total area enclosed by the second palisade include a reduction in population (though the existence of H28 and other buildings suggests continued occupation outside of this inner palisade) or reduced access to wood for the posts (though Olin was located in an area that would likely have been fairly heavily wooded according to historic GLO maps for this area (General Land Office 1810). The only structures present within the inner palisade were the H24-H26 series, H6 and/or H5. Two partial structures or screens were also identified within the inner palisade: H21 located near the southern edge of the plaza, and H18 located near the western wall of the inner palisade. A formal firepit (F66) and smaller firepit (F171) were associated with each of these partial structures, suggesting they were once complete buildings but the remaining wall trenches were not identified during excavations. Houses 31 and 34 shares a similar orientation as H28 – mirroring that of the inner palisade, suggesting they were built around the same time as H28. In fact, most of the buildings at the far southern edge of the site (with the exception of H33 and perhaps some of the undefined and unexcavated structures) share an orientation with the inner palisade. This suggests some of these structure (H31, H34, and perhaps some of the earlier structures in the H40 complex) were constructed while the wall was standing and this rough orientation was maintained after the inner palisade was no longer in place.

Sometime shortly after the construction of H28 to replace H27, H30 was built with proportions suggesting a nearly square structure. Concurrently, H32, also with nearly square proportions, may have been constructed, superimposing H34. These structures, along with perhaps H28, and H31 appear to form a small courtyard or grouping in the southeast corner. Significant to this proposition, a small marker post (Pit 221) is located next to H30 and its subsequent rebuild H29. Ceramics from H29 have similar rim protrusion ratio/lip protrusion (RPR/LP) indices (see Chapters 4 and 6) as those from H20 and the H40 complex suggesting rough contemporaneity among them. H20 superimposes the inner palisade wall, as does Pit 221, suggesting these buildings were part of the occupation of the Olin site after the inner wall was discontinued.

One structure, H39, was referred to in the excavation notes as the “Double Wall House”; this building appears to have had two walls at initial construction rather than an in-place rebuild. House 39 appears to have either an offset entryway along the eastern wall, or a possible fireplace-reflecting screen in this location (Denny, personal communication 2011), reinforcing the idea that the inner and outer wall trenches of this structure were coterminous. A similarly-constructed large double-wall structure was excavated at Mitchell (F7, Porter 1974). Ceramics recovered from this double-wall structure at Olin suggest a later occupation as does the more-square proportions. House 39 likely post-dates H20 given the close proximity of that structure. This structure, together with the marker post associated with H29/30 may indicate that at least some politically-religious important activity areas shifted to the southern end of the site. A nearby pit, associated with either H20 or H39, contained a deposit of hematite, supporting supposition of the extra-domestic activities occurring in this area.

In the northern part of the site, H11 appears to have superimposed the inner palisade (though the palisade was not mapped in this location, it is likely that later construction activities in this portion of the site obliterated earlier features). The pit inside of H11 contained slipped jars with low rim protrusion ratios, reinforcing a later occupational affiliation of these features. The orientation of H11 is not too dissimilar from H10, which also superimposed this inner palisade. H41, located in the far southwest corner of the site, and large structure H46 at the eastern end of the site were also similarly oriented.

H1 superimposed H10 and was the last structure in the series of what were likely specialized structures located in the northeast corner of the site. H1 had an interior dividing wall; this together with its large size suggests it may have been an extra-domestic structure. The dividing wall may have separated the internal space into dwelling and a sanctum sanctorum like the inner "apartment" of Creek principle structures on the square grounds (Bartram 1995). Additionally, hematite had been deposited in one of the wall trenches of this structure, perhaps animating or engaging that structure for its future purpose if deposited during construction, or, conversely, deconsecrating it as a powerful building if deposited during removal of its walls.

While H1 is oriented to the interior palisade, it post-dates this wall (as demonstrated through the superpositioning of H10). This citation (through orientation) of the palisade wall may have been intentional, though, conversely this orientation may be due to its construction over the former structures in that corner of the site. The later occupation at Olin may have been more concentrated in the southern end of the site, including a possible mortuary complex. Some structures, including H10, H11, and finally H1, were built at the northern end of the site. Within an ontology of oppositional powers and cosmic balance, perhaps the placement of H1 at the northern end of the site and the opposing location of mortuary related features at the southern end of the site was intended to maintain balance within the site (similar to the opposition between the sweatlodge and the possible craft-specialist dwelling at the initiation of occupation).

The sequence of large, nearly square buildings (H35-37) in the southern part of the site, may correspond to the initiation of mortuary activity in this area (discussed further below). Only one burial was formally excavated by Denny and the SIUE field school, though Denny (personal communication, 2011) mentioned burials (in the plural) as located between the inner and outer palisades in this southern area. House 36 appears to have been the first in this structure complex; a small piece of galena had been deposited in the northern wall trench of this structure. House 36 and subsequent rebuilds had a slightly stronger orientation towards the northwest, shared only by H45. The size of the final structure in this series, H35, suggests perhaps this was a council-house or other potentially public building. No large center post is depicted on the map of this structure; however two larger posts are present near the northeast and southwest corners. Additionally, this structure had been heavily looted, the result of which may have obliterated any evidence for a center post. Craft activities may have occurred in this area of the site as well during the later occupations, as suggested by a minimum of two chipped-stone drills recovered from Pits 315 and 353.

House 45, which superimposed H46, may be contemporaneous with H1 as it appears to have been oriented towards this structure. These structures, along with possibly H35 and/or H44, appear to have been part of the final occupation of the site. A concentration of wide-rim plates with fine-line incising was recovered from the southwest corner of the site, supporting a late occupation of the nearby structures (see Chapter 6).

The orientation of structures associated with the initial occupation of the site should be noted. Many of these structures are oriented roughly to cardinal directions (Table 5.1). These orientations were measured from the site map (which was presumably mapped on a grid

Table 5.1. Structure Data From 11MS133 (degrees from UTM N; structures with L:W Ratio greater than 1.29 are italicised)

Structure	Also Known As	Length (m)	Width (m)	Orient.	Area (m²)	L:W Ratio	Comments
H1	*Red House*	*10.25*	*5.5*	*86°*	*56.38*	*1.83*	*Possibly last in series*
H2	*H1*	*4.5*	*3*	*358°*	*13.35*	*1.33*	*located outside of inner palisade*
H3	*Light Green House*	*6*	*3.38*	*358°*	*20.28*	*1.6*	*Below H1, Above H5*
H4	*Yellow House*	*5*	*3.88*	*88°*	*19.40*	*1.33*	*possibly over H1*
H5	Orange House	4.5	4	91°	18.00	1.11	Under H3?
H6	*Dark Green House*	*5.5*	*4*	*86°*	*22.00*	*1.37*	*Under H10 (H9 rebuild)*
H7							Indeterminate Wall Trench - part of H1?
H8		5	ind	ind			Under H3
H9	*Blue House*	*5*	*3.25*	*86°*	*16.25*	*1.4*	*Under H10*
H10	Purple House	3.5	3.25	16°	11.38	1.18	located over H6/H9 and under H1; over inner palisade
H11	Blue House Annex	3.75	3	5°	11.25	1.14	over NW corner of inner palisade
H12		ind	ind	86°			possibly part of H8?
H13		3.75	3	86°	11.25	1.25	Inner structure
H14		4.25	3.5	86°	14.88	1.21	H13 rebuild
H15		*4.5*	*3.25*	*86°*	*14.63*	*1.38*	*H14 rebuild*
H16		4.63	4.3	86°	19.91	1.08	H15 rebuild
H17		5	4	86°	20.00	1.25	H16 rebuild/outer structure
H18		ind	3	ind			partial structure S of H13-17
H19	*WT 73-6 A, B, C*	*5.75*	*4*	*356°*	*23.00*	*1.48*	*superimposed by H20*
H20	*WT73-7; House 1 (1973)*	*4.25*	*3*	*0°*	*12.75*	*1.39*	*superimposing H19*
H21	WT73-9?	3.75	n/a	261°			single wall trench
H22	50N 80W Possible House Floor	4.5	3.38	86°	15.21	1.22	superimposing H38
H23	WT73-8?	2.75	n/a	0°			single wall trench
H24	*WT 73-3 A, B, C*	*4*	*2.75*	*1°*	*11.00*	*1.31*	*inner structure*
H25	WT 73-4 A, B, C	4.25	3.25	1°	13.81	1.16	H24 rebuild
H26	WT 73-5 A, B, C	4.75	3.75	1°	17.81	1.15	H25 rebuild (outer structure)
H27	*H8*	*5.25*	*3.25*	*260°*	*17.06*	*1.41*	*superimposing marker post; cache on floor; superimposed by H28*
H28	*H9*	*4.25*	*2.75*	*258°*	*11.69*	*1.43*	*superimposing H27*
H29	House 1 (1974)	4.95	3.88	260°	19.21	1.24	H30 rebuild

Table 5.1. Structure Data From 11MS133 (Continued)

Structure	Also Known As	Length (m)	Width (m)	Orient.	Area (m²)	L:W Ratio	Comments
H30	House 2 (1974)	3.88	3	260°	11.64	1.14	Inner structure
H31	*House 3 (1974)*	*5.75*	*3.5*	*252°*	*20.13*	*1.41*	*SE corner*
H32	House 4 (1974);	4.25	3.75	257°	15.94	1.13	superimposed by H35, superimposing H34
H33	*WT C, G*	*5.5*	*4*	*86°*	*22.00*	*1.35*	*superpositioning with H34 (indeterminate?)*
H34	House 4; WT A,B, D, E, F	3.88/5	Ind.	257°			superpositioning with H33 (indeterminate)
H35	WT L, I, K	7	5.75	252°	40.25	1.15	outer structure/H37 rebuild
H36	WT M	5	4.25	342°	21.25	1.11	inner structure
H37	WT H, J, N	5.25	4.25	252°	22.31	1.21	inner structure
H38	*47.5N 80W Possible House Floor*	*5.5*	*3.13*	*356°*	*17.22*	*1.53*	*superimposed by H22*
H39	Double Wall House	4.25/ 4.88	3.25/ 4.0	356°	13.81/ 19.52	1.2/ 1.17	
H40	*85W 42.5N?*	*5.5*	*3.25*	*252°*	*17.88*	*1.44*	*outer structure superimposing H43*
H41		*4?*	*2.88*	*99°*	*11.52?*	*1.31*	*south of H40 complex*
H42		*5*	*2.5*	*252°*	*12.50*	*2*	*inner structure superimposing H43*
H43		4.5	3.5	343°	15.75	1.13	superimposed by H42/H42
H44		6.5	4.75	252°	30.88	1.25	outermost structure in H40 complex
H45	WT T, U, V	4	2.88	242°	11.52	1.26	superimposing H46
H46		*>6.25*	*4.25*	*101°*	*>26.56*	*1.47*	*superimposed by H45*
Sweat lodge		2.38	3.38		8.04		
Wall Trenches	WT P, Q, R, S			86°			superimposing Pit 364

oriented to magnetic north) and presented in degrees from UTM north. The magnetic declination for this area in 1971 (approximately 4° east of UTM) was calculated using the National Oceanic and Atmospheric Administration (NOAA) online calculator for estimated value of magnetic declination (NOAA 2014). The roughly cardinal orientation is shared by a number of Late Stirling/ Early Moorehead phase buildings at Cahokia's Tract 15B (Pauketat 2013c) and ICT-II (Collins 1990), and at Moorehead phase sites in the northern American Bottom, including the Auburn

Sky, Crowley, and Russell site (Betzenhauser 2009; Betzenhauser and Zych 2008; ISAS, notes on file; Zych and Koldehoff 2007). This near-cardinal orientation is similar to that ascribed to the Cahokia Grid that was enacted in the early construction of Cahokia (Fowler 1997). The shared orientation suggests this may have been part of a region-wide Moorehead phase reorganization that occurred simultaneously with the (re)appearance of sites in the floodplain and surrounding uplands.

Length-width ratios at Olin range from 1.0 to 2.0, with an average length–width ratio of 1.30 (see Table 5.1; Figure 5.4). The frequencies of length-width ratios at Olin indicate a clear modal peak at 1.10-1.19. With the exception of the two outliers at 1.83 (H1) and 2.0 (H42), which appear to represent possible special-use buildings given their large size, most of the buildings with L-W ratios greater than 1.3 appear to be of late Stirling phase construction type. The modal peak between 1.10 and 1.19 appears to represent a number of the later structures at the site.

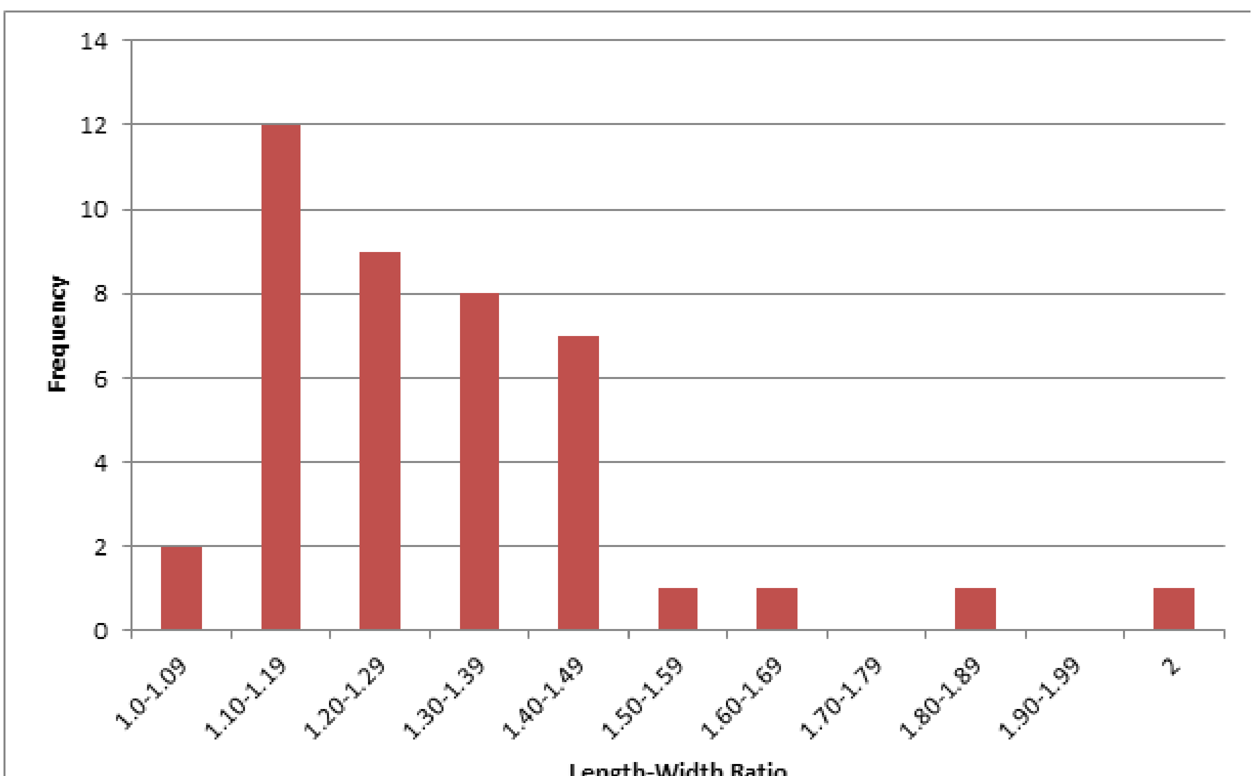

Figure 5.4. Frequencies of structure length-width ratios at Olin.

Comparing structure floor area to length-width ratio indicates clear clustering with four outliers (Figure 5.5). These outliers include structures H1, H35, H42, and H44. House 1 was the latest structure in a series of buildings along the northern edge of the plaza. Given its large size and interior division, this building was likely a non-domestic or extra-domestic structure. Houses 35, 42 and 44 were potentially special use structures as well, given their proximity to the burial(s) located in the southwest corner of the site. With the exception of these outliers, the structures appear to be distributed in a nearly mirror-like fashion around the length-width ratio of 1.29 (see Figure 5.5). Most of these structures with length-width ratios less than 1.29 appear to be part of the later occupation of the site as suggested by superpositioning, changed structure orientation, and associated ceramics (including H10, H11, and the H35 complex). The mirroring of length-width ratios around 1.29 may suggest the shift to more square building proportions did not necessarily happen gradually, but was introduced beginning with the construction of H30 and H32 (and perhaps H5).

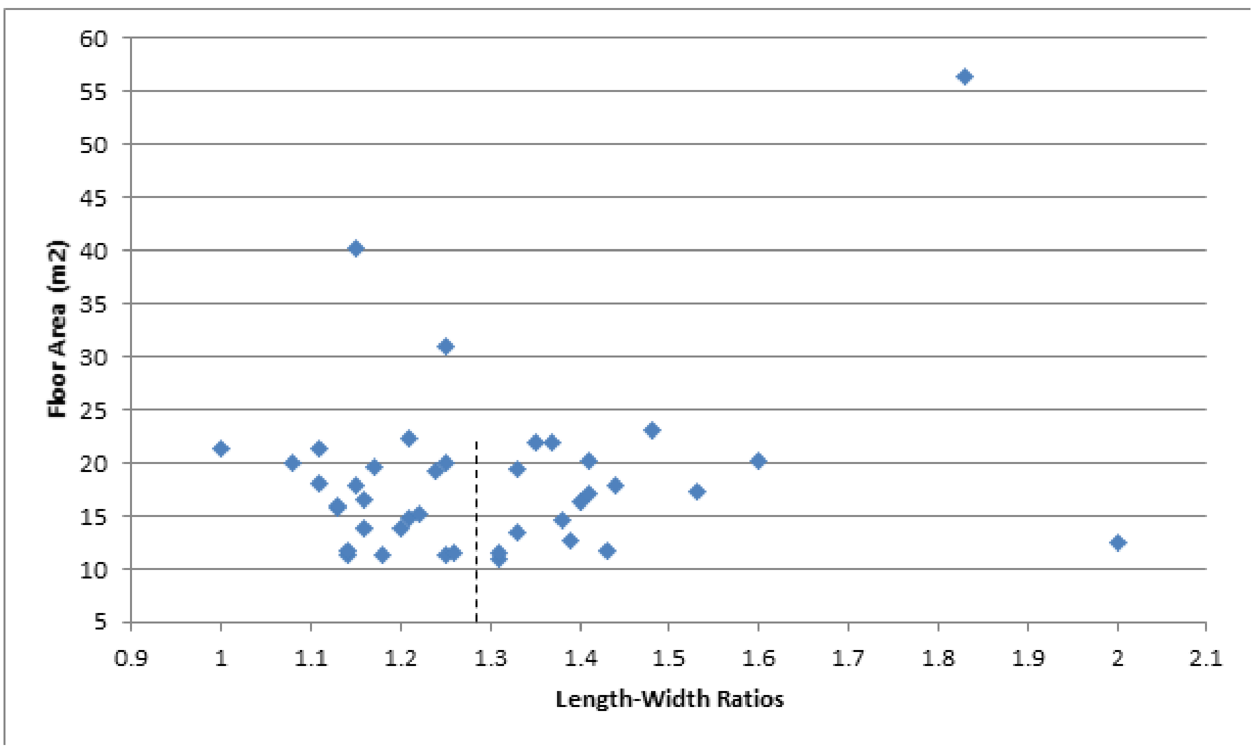

Figure 5.5. Olin structures L/W ratio compared to floor area.

Average floor area ranged from 8.04 m^2 to 56.38 m^2, with a mean average of 17.92 m^2. Olin structures fall into two size modes: 10-16 square meters and 16-24 square meters (Figure 5.6). Only two structures had interior floor areas smaller than 10 square meters, one of which was the sweatlodge and the other the initial structure in the H13-H17 complex, which may have been a specialized storage structure. Three structures were clear outliers in terms of interior floor size: House 1, House 35, and House 44. There is a strong likelihood these structures served as special purpose buildings.

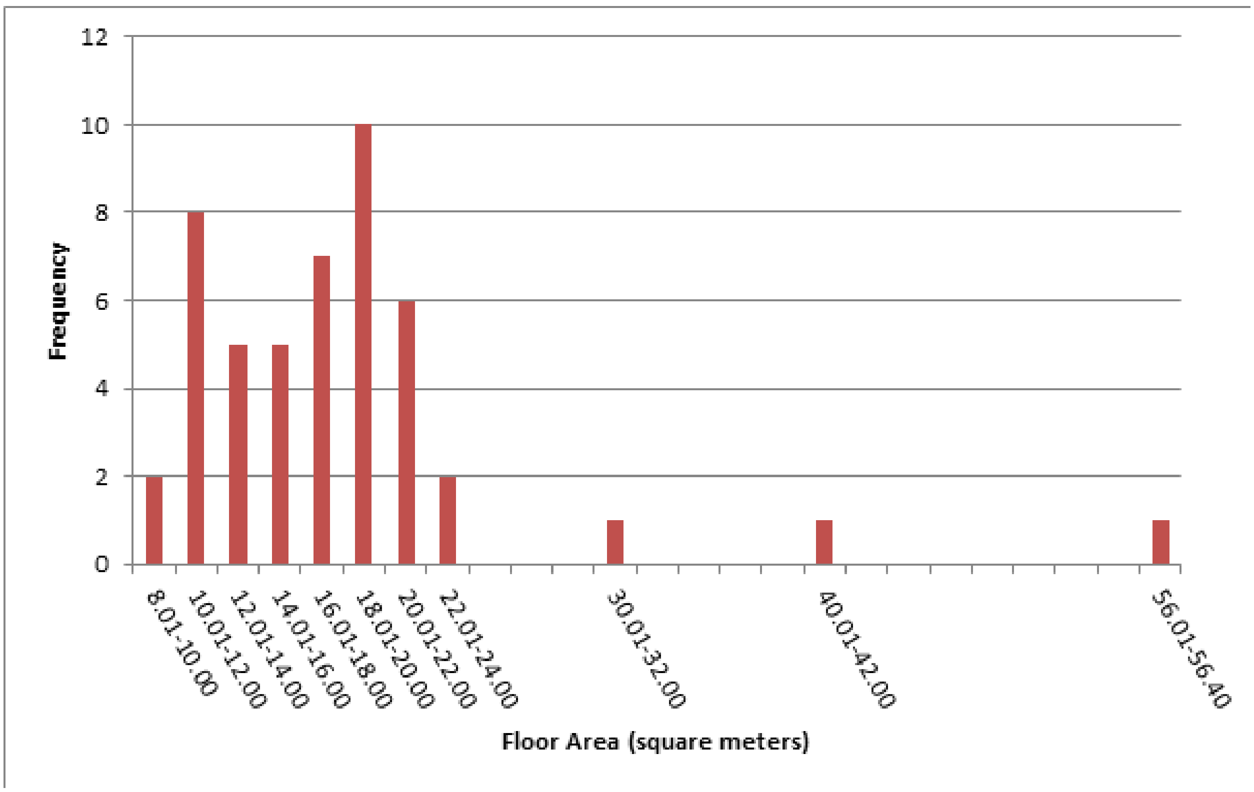

Figure 5.6. Frequency of floor area from Olin.

The frequency distribution of average length-width ratios at Stirling phase sites in the region show a range between 1.3 and 1.89, with a peak at 1.6-1.69 (Figure 5.7). The average length-width ratio for Stirling phase buidings is 1.64. Moorehead phase buildings, on the other hand, have a length-width ratio range from 1.04 to 1.79, with a modal peak at 1.2-1.29. The average length-width ratio for Moorehead phase buildings is 1.28. Overlap between Stirling phase

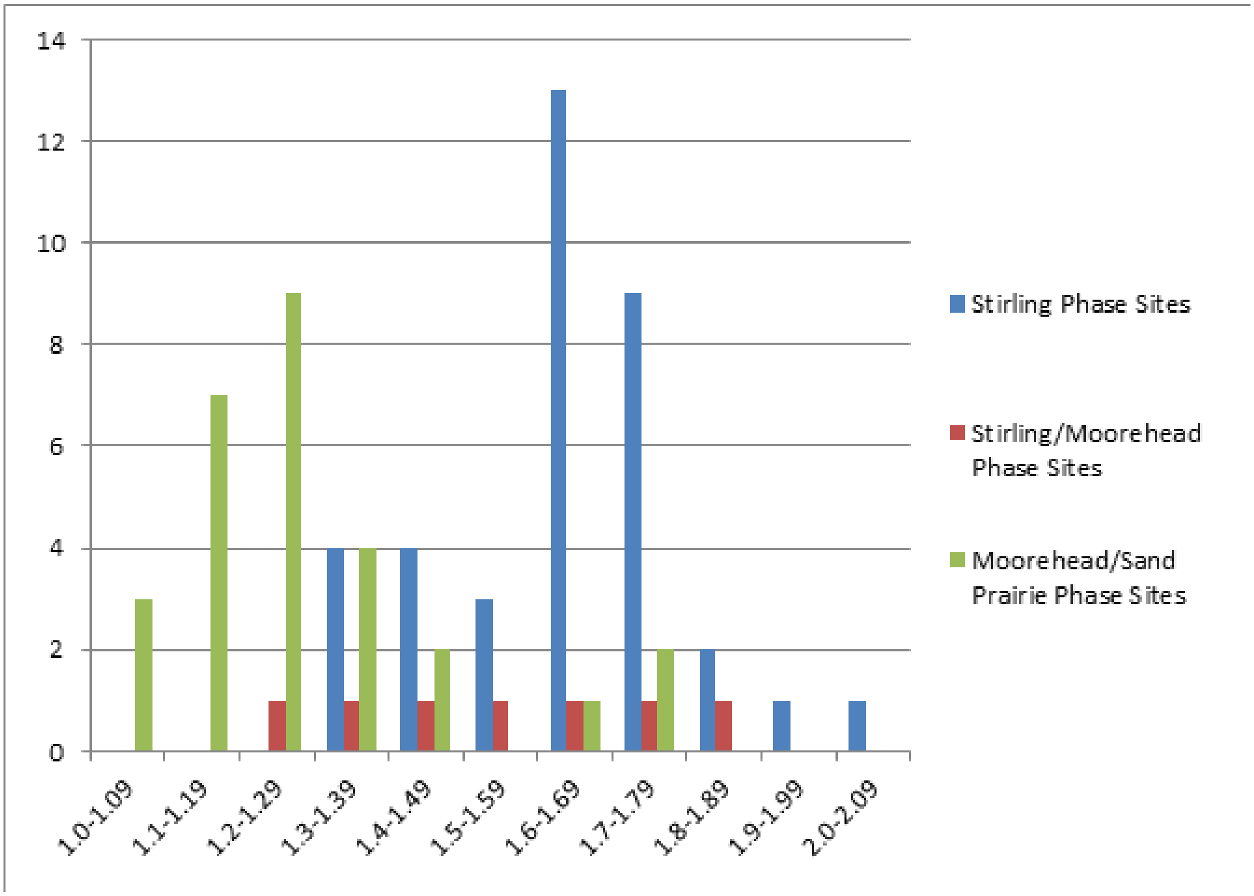

Figure 5.7. Average length-width ratios for regional structures by temporal affiliation.

structures and Moorehead phase structures occurs at 1.3, perhaps lending more significance to the division of Olin structures along the length-width ratio 1.29. The length-width ratio distribution for structures at Olin is nearly identical to that for Moorehead/Sand Prairie phase structures in the American Bottom (Figure 5.8), however those structure with length-width ratios greater than 1.29 suggest construction in a Stirling-phase style.

Three site occupations designated as Moorehead phase have length-width averages greater than 1.6; these sites consist of the early Moorehead occupations at Tract 15A and Tract 15B at Cahokia, and Old Edwardsville Road. This reinforces the persistence of rectangular building proportions at the beginning of the Moorehead phase. As the phase designation for these sites has been determined based on the presence and percentages of particular pottery types (i.e., Ramey

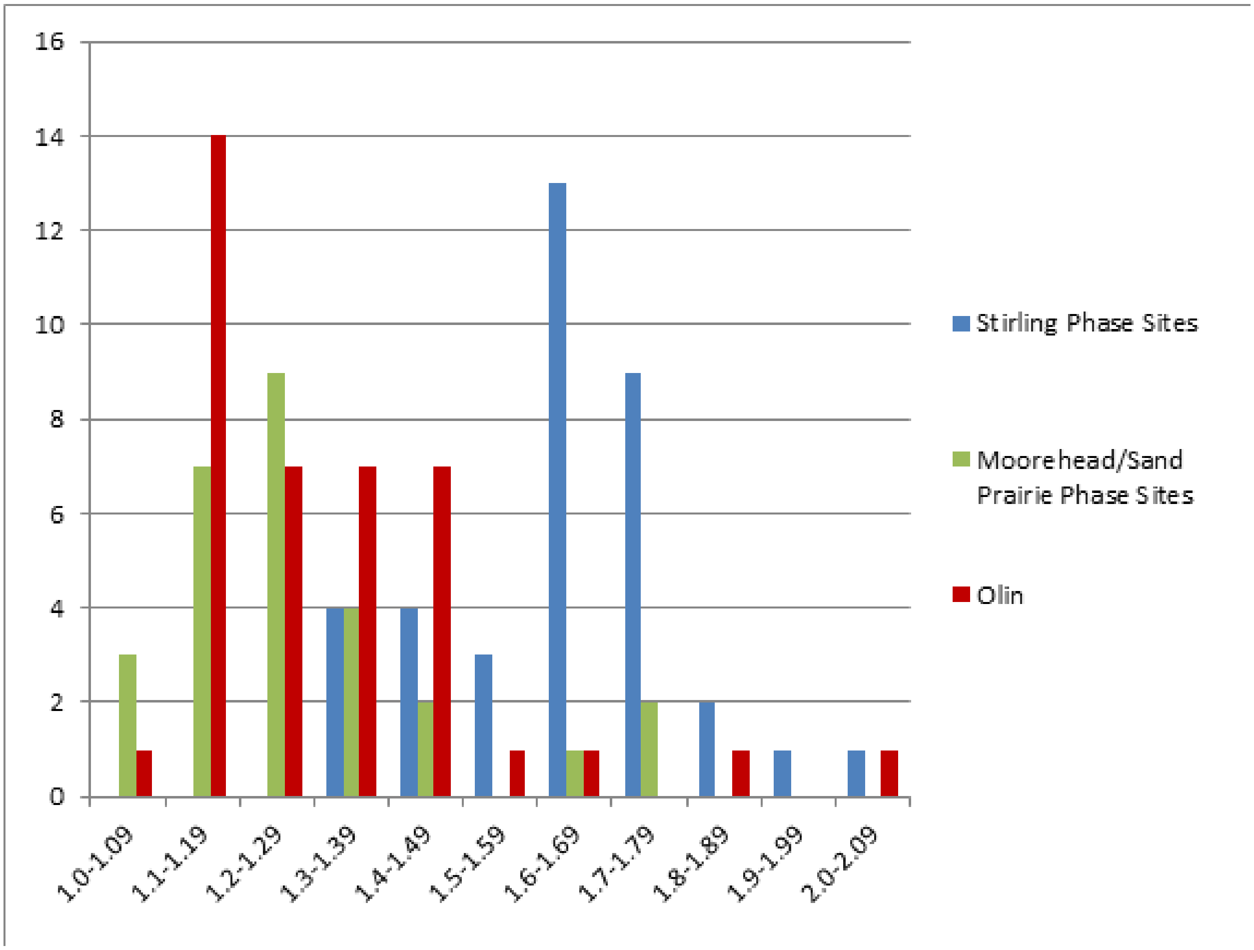

Figure 5.8. Length-width ratios of Olin structures compared to regional averages by temporal affiliation.

Incised and Cahokia Cordmarked), these outliers suggest that the late Stirling-early Moorehead transition took place in variable ways at different sites. Specificially, it would appear that shifts in ceramic types and production techniques/locations (from potentially specialized production to de-centralized local production) took place slightly earlier than changes in structure size and proportion.

The overall separation between the averages for Stirling phase structures and the averages for Moorehead and Sand Prairie phase structures may suggest this trend was not a gradual transition, though plotting all Olin structures (n=47) against the averages of the American Bottom region would suggest transitional forms at this site as they overlap both Stirling phase and Moorehead/Sand Prairie phase averages (Figure 5.9). Conversely, the distribution shown by the Olin structures may be indicative of the transition in structure proportions taking place over the course of Olin's occupation as suggested above. If this is the case, then the change in building proportions took place no earlier than the mid-Moorehead phase as suggested by the ceramics from the site. This may rather suggest a change in household organization, including increased interior storage needs, task-space, or even increased family size taking place during the later part of the Moorehead phase.

While the majority of ceramic evidence, together with the radiocarbon dates, indicate a mid-Moorehead phase occupation of Olin (see Chapter 6), most of the structures that form the initial occupation of the site had Stirling phase sizes and proportions. This pattern was repeated at the Old Edwardsville Road site (Jackson and Millhouse 2005) as well as at Cahokia

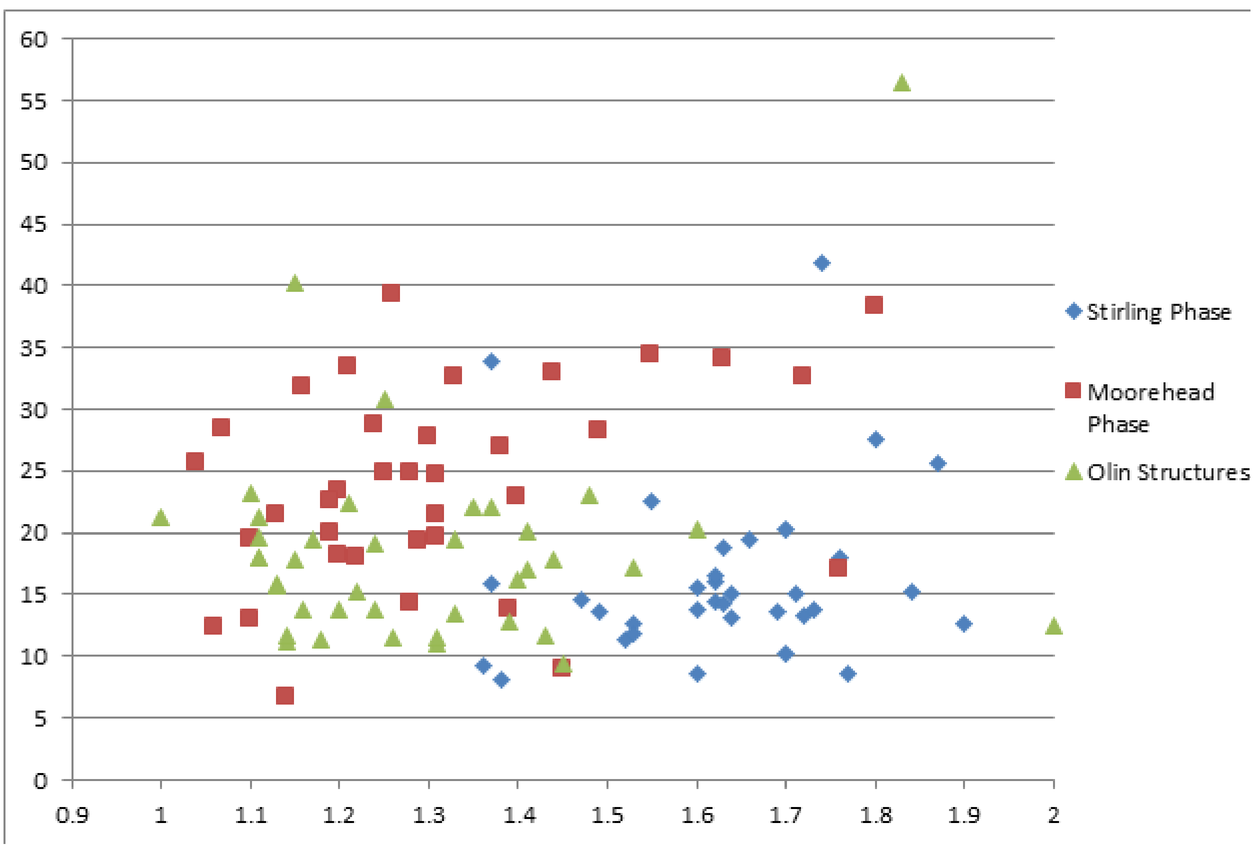

Figure 5.9. Length-width ratios of Olin buildings plotted against regional averages by temporal affiliation.

(Collins 1990; Pauketat 1998, 2013) and Mitchell (Porter 1974). This suggests that the ceramic and architectural changes that are identified archaeologically during the Moorehead phase are not parallel trajectories, but, with the exception of circular, T-, and L-shaped structures, occur independent of one another. The number of structures, attendant rebuilds, and shifting building location suggest an occupation spanning perhaps 30 to 40 years with a structure-life of 5 years or 60 to 80 years with a structure-life of 10 years (Pauketat and Lopinot 1997). This allows for increased periodicity of reconstruction for some structures, though would still allow for the sequential construction and use of H13-H17 and H24-H26 with the same reconstruction schedule as other buildings. Given these estimations and the suggested construction sequence above, the buildings with more-square proportions appear at Olin about half-way through its occupation.

No T- or L-shaped structures were present at Olin. L- and T-shaped structures were plentiful at the Mitchell site (Porter 1974); these structures likely dated to the Stirling phase occupation of that site, though the radiocarbon assays yielded dates too broad to be of use in verifying this assessment. Interestingly, L – and T-shaped structures have not been identified north of the Mitchell site within the immediate American Bottom area (not including hinterland sites north of the Lower Illinois River Valley). Rectangular structures with internal divisions may have replaced the special-shaped structures. Such buildings thus would provide a separate place for storage of sensitive religious objects such as bundles, while perhaps remaining discrete about what was kept inside. Perhaps this ‘low visibility’ may have been instituted to protect the sacred objects that create and sustain the community from targeted attack. H1, the latest building in a sequence of structures in the northeast part of the site at Olin, may have been such a structure , part of the architectural shift in material identities in the American Bottom region.

A single circular structure was present at Olin; ceramic evidence suggests this structure was part of the initial occupation of the site, though its use was discontinued during the early occupation of the site. This structure was left out of the interior fortification and the area of this structure appears to have been avoided; evidenced by a lack of additional structures constructed over its former location (or even within a five meter buffer of it until the very late occupation). In contrast, at other sites (e.g., Mitchell, Bridges) circular structures are superimposed by later Stirling phase structures (Porter 1974, Hargrave et al. 1983). In this manner, the importance of the Olin circular structure (or the importance of distancing oneself from this type of structure) may have been marked by avoidance (a "remembering by forgetting" sort of citationality, Bevan 2006; Meskell 2008). A similar sort of avoidance occurred with H27, the structure built over the large marker post. This structure, and the former post that it was related to, was clearly left out of the inner palisade, as indicated by the jogging of the palisade posts to avoid the northern wall trench of H27. This avoidance suggests this structure was not considered significant enough to include within the fortification and may have, in fact, been intentionally avoided due to the relationship history with the marker post and associated circular structure. House 27 was terminated by the placement of a cache on its floor as discussed in further detail below. This selective avoidance highlights the intentional choices made to disengage with the particular architectural identities that were part of the previous Cahokian religious-politics.

Non-Structural Features

Given the close proximity of most structures and the intensive rebuilding in certain parts of the site, determining relationships between particular buildings and exterior pits was difficult. In other cases, superpositioning between pits and structures was not determined in the field, making relationships and occupational sequence unclear. Additionally, most features did not have associated excavation notes, therefore a full pit-feature analysis cannot be done. Regardless, it is clear that there were a significant number of pits at the Olin site, especially as compared to comparable sites like Mitchell, where Porter (1974:98) noted “the use of trash pits in association with small and medium structures during the later sub-phases was limited.” Though many of the pits at Olin were from the Late Woodland occupation of the site (Figure 5.10), a large number were part of the Mississippian occupation. The general observation made regarding an increased number of interior storage pits in the Moorehead phase component of ICT-II (Collins 1990) does not appear to hold true for Olin, where structures had approximately one- to four-interior pits throughout the occupation of the site.

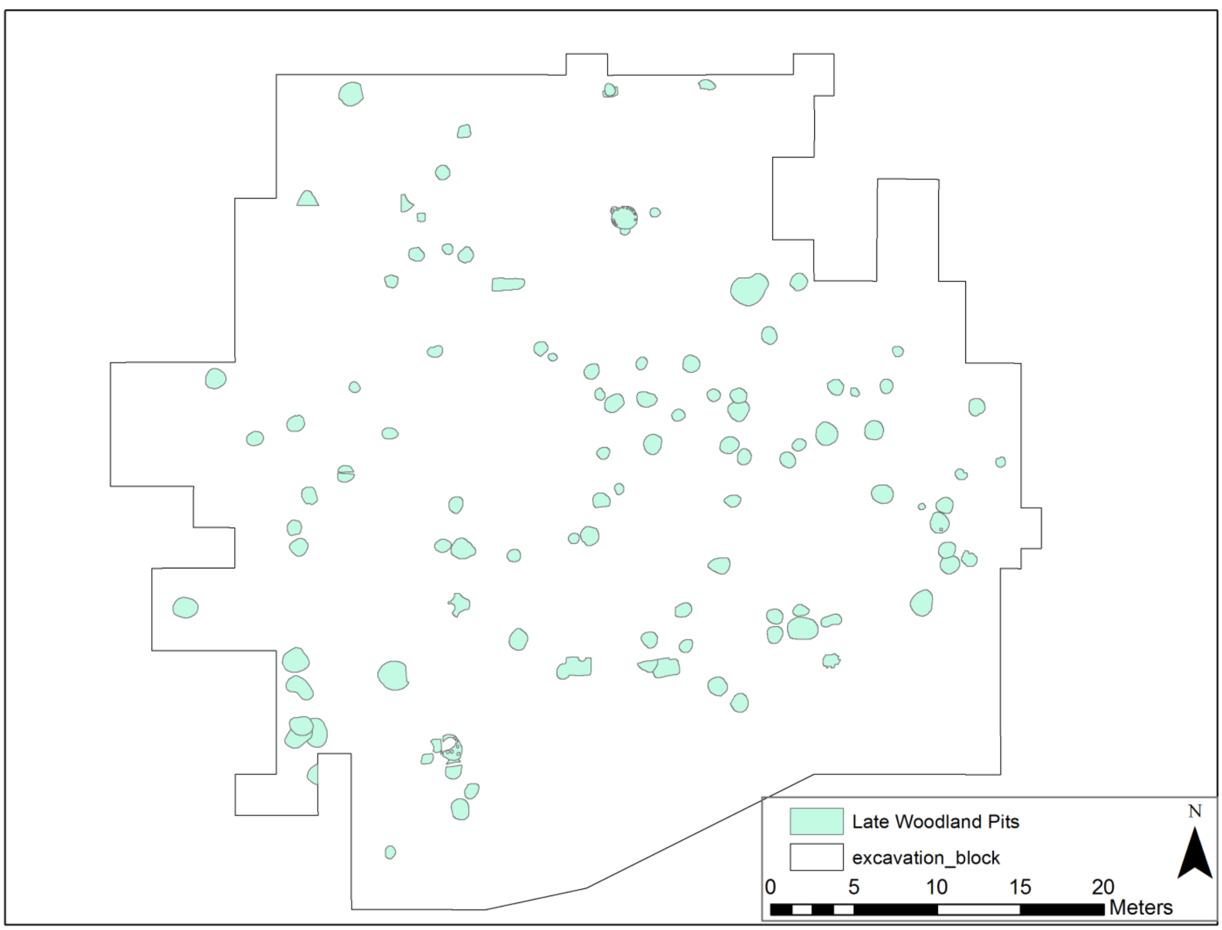

Figure 5.10. Late Woodland pits at Olin.

General morphology and temporal affiliation, if available, of pit features at Olin can be found in Table 5.2 while detailed information regarding diagnostic lithics, faunal remains and a sample of botanical materials from the site can be found in Appendices A,C, and D. There are, however, a few features that require discussion in further detail. These include the two known artifact caches, two post pits (Pit 221 and the unnumbered post under H27), a human burial (Pit 321), what Denny termed the “deer burial” (Pit 89).

Table 5.2. Pit Features From 11MS133

Feature	Feature Component	Type	Length (cm)	Width (cm)	Depth (cm)	Plan shape	Profile shape	Comments
Post Pit	Mississippian	Post						
Firepit 1		Firepit						
Firepit 2		Firepit						
Firepit 3		Firepit						
Firepit 4		Firepit						
Firepit 5		Firepit	30	30	8	circular	basin	heavily burned
Firepit 6		Firepit						
Firepit 82?	Mississippian	Firepit						
Pit 001	Mississippian	Pit	132	99	23	oval	basin	
Pit 002	Late Wood-land	Pit	132	150	10	circular	basin	
Pit 003	Late Wood-land	Pit	100	100	40	circular	cylindrical	
Pit 004	Mississippian	Pit	67	67	35	circular	basin	
Pit 005	Mississippian	Pit	129	125	12	circular	basin	
Pit 006	Mississippian	Pit	53	58	35.5	circular	cylindrical	
Pit 007	Mississippian	Pit	101	89	8	circular (irreg)	basin (irreg)	
Pit 008	Late Wood-land	Pit	105	105	50	circular	belled at 15 straight to 50	
Pit 009	Late Wood-land	Pit	112	112	22	circular	cylidri-cal with basin bottom	
Pit 010	Late Wood-land	Pit	58	58	27	circular	basin	
Pit 011	Mississippian	Pit	120	120	62	circular	basin	
Pit 012	Indeterminate	Pit	95	95	40	circular	basin	
Pit 013	Indeterminate	Pit	35	35	17	circular	basin	earliest pit of cluster
Pit 014	Indeterminate	Pit	76	76	21	circular	basin	

Table 5.2 Pit Features From 11MS133 (Continued)

Feature	Feature Component	Type	Length (cm)	Width (cm)	Depth (cm)	Plan shape	Profile shape	Comments
Pit 015	Mississippian	Pit	155	155	25	circular	basin	
Pit 016	Mississippian	Pit	60	60	33	circular	basin	
Pit 017	Mississippian	Pit	80	85	58	circular	bells at 10 cm	
Pit 018	Indeterminate	Pit	72	72	19	circular	basin	earlier than House 1/House 4 wall trench
Pit 019	Late Wood-land	Pit	35	35	25	circular	basin	
Pit 020	Indeterminate	Pit	30	30	10	circular	basin	
Pit 021	Mississippian	Pit	75	75	45	circular	cylindrical w/basin bottom	
Pit 026	Mississippian	Pit	120	120	16	circular	cylindrical	
Pit 027	Late Wood-land	Pit	100	100	20	circular	cylindrical	
Pit 028A	Mississippian	Pit	130	130	40	circular	cylindrical	
Pit 028B	Mississippian	Pit						
Pit 029	Mississippian	Pit	105	105	25	circular	cylindrical	
Pit 030	Mississippian	Pit	95	95	30	circular	cylindrical	
Pit 031	Late Wood-land	Pit	60	60	8	circular	cylindrical	
Pit 032	Mississippian	Pit	110	110	40	circular	belled	
Pit 033	Late Wood-land	Pit	90	90	45	circular	cylindrical	
Pit 034	Late Wood-land	Pit	80	80	5	circular	cylindrical	
Pit 035	Late Wood-land	Pit	100	100	40	circular	basin	
Pit 036	Mississippian	Pit	110	110	40	circular	cylindrical	
Pit 037	Late Wood-land	Pit	100	100	35	circular	cylindrical	
Pit 038	Indeterminate	Pit	47	47	3	circular	basin	
Pit 039	Mississippian	Pit	57	57	18	circular	cylindrical	
Pit 040	Indeterminate	Pit	52	52	12	circular	basin	
Pit 041	Indeterminate	Pit	58	77	11	oval (irreg)	basin	
Pit 042	Indeterminate	Pit	71	71	19	circular	basin	
Pit 043	Mississippian	Pit	105	105	24	circular	cylindrical	
Pit 044	Late Wood-land	Pit	135	135	40	circular	cylindrical	
Pit 045	Mississippian	Pit	110	110	25	circular	cylindrical	
Pit 046	Late Wood-land	Pit	77	77	70	circular	bell	
Pit 047	Mixed	Pit	100	100	24	circular	cylindrical	
Pit 048	Indeterminate	Pit	45	45	12	circular	basin	

Table 5.2 Pit Features From 11MS133 (Continued)

Feature	Feature Component	Type	Length (cm)	Width (cm)	Depth (cm)	Plan shape	Profile shape	Comments
Pit 049	Mixed/							
Mississippian	Pit	60	60	17	circular	cylindrical		
Pit 050	Late Woodland	Pit	130	75	228	rectangular	straight sided	
Pit 051	Mississippian	Pit	86	86	12	circular	cylindrical	
Pit 052	Mississippian	Pit	189	145	21	oval	basin	
Pit 053	Late Woodland	Pit	105	105	10	circular	cylindrical	
Pit 054	Mississippian	Pit	72	72	15	circular	cylindrical	
Pit 055	Mixed	Pit	56	56	20	circular	basin	grain storage pit; SE corner of house, intersection of wall trenches in annex
Pit 056	Mississippian	Pit	130	130	45	circular	basin	inside house in annex
Pit 057	Late Woodland	Pit	90	90	10	circular	basin	middle of south wall of annex
Pit 058	Mississippian	Pit	170	80	50	double circle	cylindrical	east wall of annex
Pit 059	Mississippian	Pit	125	125	40	circular	basin	
Pit 060	Late Woodland	Pit	105	105	50	circular	cylindrical	
Pit 061	Mixed	Pit	110	110	40	circular	cylindrical basin	
Pit 062	Late Woodland	Pit	30	30	15	circular	cylindrical	
Pit 063	Mississippian	Pit	80	80	15	circular	basin	
Pit 064	Mississippian	Pit	115	115	55	circular	cylindrical	
Pit 065	Mississippian	Smudge Pit	35	35	10	circular	basin	
Pit 066	Indeterminate	Pit	25	25	11	circular	basin	
Pit 067	Mississippian	Smudge Pit	26	26	12	circular	basin	
Pit 068	Mississippian	Pit	135	135	40	circular	cylindrical	
Pit 069	Mississippian	Pit	110	110	30	circular	cylindrical	
Pit 070	Late Woodland	Pit	70	70	15	circular	cylindrical	
Pit 071	Late Woodland	Pit	48	48	6	circular	basin	
Pit 072	Mixed	Smudge Pit	39	39	7	circular	cylindrical	
Pit 073	Mississippian	Pit	135	135	70	circular	cylindrical	
Pit 074	Late Woodland	Pit	95	95	70	oval-circular	cylindrical	
Pit 075	Mississippian	Pit	95	95	15	circular	cylindrical	

Table 5.2 Pit Features From 11MS133 (Continued)

Feature	Feature Component	Type	Length (cm)	Width (cm)	Depth (cm)	Plan shape	Profile shape	Comments
Pit 076	Mississippian	Pit	80	80	25	circular	basin	
Pit 077	Late Woodland	Pit	110	110	40	circular	cylindrical	
Pit 078	Mississippian	Pit	110	110	5	circular	cylindrical	
Pit 079	Late Woodland	Pit	92	68	17	oval	basin	
Pit 082	Mississippian	Pit	70	70	50	circular	cylindrical	
Pit 083	Late Woodland	Pit	50	50	30	circular	cylindrical	
Pit 084	Mississippian	Pit	95	95	25	circular	basin	
Pit 085	Mississippian	Pit	90	90	25	circular	cylindrical	
Pit 087	Mississippian	Pit	90	90	40	circular	cylindrical	
Pit 088	Mississippian	Pit	133	111	21	oval	basin	
Pit 089	Mississippian	Pit	335	260	25	oval	basin	
Pit 090	Mississippian	Pit	97	97	27	circular	cylindrical	
Pit 091	Late Woodland	Pit	80	80	20	circular	cylindrical/flat	
Pit 092	Late Woodland	Pit	205	180	3	oval	basin	
Pit 093	Late Woodland	Pit	88	88	19	circular	cylindrical/flat	
Pit 094	Late Woodland	Pit	85	85	8	circular	cylindrical	
Pit 095	Late Woodland	Pit	89	89	26	circular	cylindrical	
Pit 096	Indeterminate	Pit	122	122	9	circular	cylindrical	
Pit 097	Indeterminate	Pit	144	144	15	circular	basin	
Pit 098	Mississippian	Pit	136	136	55	circular	cylindrical/ basin bottom	
Pit 099	Late Woodland	Pit	92	92	43	circular	cylindrical/ basin bottom	
Pit 100	Late Woodland	Pit	94	94	27	circular	cylindrical	
Pit 101	Mississippian	Pit	98	98	30	circular	cylindrical	
Pit 102	Indeterminate	Pit	38	38	30	circular	cylindrical	
Pit 103	Late Woodland	Pit	99	99	37	circular	cylindrical/flat	
Pit 104	Late Woodland	Pit	99	99	36	circular	cylindrical	sterile zone at 8 cm, three cm thick
Pit 105	Late Woodland	Pit	74	74	12	circular	cylindrical	
Pit 106	Late Woodland	Pit	96	96	12	circular	cylindrical	
Pit 107	Mississippian	Pit	120	120	79	circular	cylindrical	
Pit 108	Mississippian	Pit	107	107	10	circular	cylindrical	

Table 5.2 Pit Features From 11MS133 (Continued)

Feature	Feature Component	Type	Length (cm)	Width (cm)	Depth (cm)	Plan shape	Profile shape	Comments
Pit 109	Late Woodland	Pit	90	90	12	circular	cylindrical	
Pit 110	Late Woodland	Pit	98	98	89	circular	insloping/ bell	insloping to 55 cm, w/ 90 cm diameter, then belled to 110 cm diameter
Pit 111	Late Woodland	Pit	91	91	63	circular	cylindrical	
Pit 112	Mississippian	Pit	143	107	29	oval	basin	
Pit 113	Mississippian	Pit	87	87	42	circular	cylindrical	
Pit 114	Mississippian	Pit	110	110	12	circular	basin	
Pit 115	Mississippian	Pit	151	151	60	circular	insloping/ bell	insloping to 32 cm w/ 110 cm diameter, then belled to 139 cm diameter
Pit 116	Late Woodland	Pit						
Pit 117	Mississippian	Pit	87	87	34	circular	cylindrical	
Pit 118	Late Woodland	Pit	71	71	15	circular	cylindrical	
Pit 119	Mississippian	Pit	60	60	7	circular	cylindrical	
Pit 120	Late Woodland	Pit	110	83	10	oval	basin	
Pit 121	Late Woodland	Pit	62	62	4	circular	cylindrical	
Pit 122	Mississippian	Pit	100	100	35	circular	cylindrical	
Pit 123	Mississippian	Pit	186	186	15	circular	basin	
Pit 124	Indeterminate	Pit	41	41	48	circular	basin	
Pit 125	Late Woodland	Pit	90	90	65	circular	cylindrical, slight basal bell	
Pit 126	Late Woodland	Pit	130	90	22	oval	basin	
Pit 127	Mississippian	Pit	128	128	24	circular	cylindrical	
Pit 128	Mississippian	Pit	90	80	12	oval	basin	
Pit 129	Late Woodland	Pit	138	138	56	circular	cylindrical	
Pit 130	Late Woodland	Pit	160	98	27	oval	basin	
Pit 131	Mississippian	Pit	102	102	42	circular	cylindrical	
Pit 132	Late Woodland	Pit	132	124	63	oval	basin with flat bottom	
Pit 133	Mississippian	Pit	250	153	99	oval	basin	
Pit 134	Mixed	Pit	187	144	40	oval	basin	
Pit 135	Late Woodland	Pit	160	160	19	circular	cylindrical	

Table 5.2 Pit Features From 11MS133 (Continued)

Feature	Feature Component	Type	Length (cm)	Width (cm)	Depth (cm)	Plan shape	Profile shape	Comments
Pit 136	Late Wood-land	Pit	134	134	25	circular	cylindrical	
Pit 137	Late Wood-land	Pit	85	85	26	circular	cylindrical	
Pit 138	Mississippian	Pit	110	110	13	circular	cylindrical	
Pit 139	Mississippian	Pit	128	128	34	circular	cylindrical	
Pit 140	Late Wood-land	Pit	57	57	8	oval	basin	
Pit 141	Late Wood-land	Pit	130	130	71	circular	constrict-ed/ bell	constricted to 52 cm, then belled to 64 cm diameter
Pit 142	Late Wood-land	Pit	75	75	70	circular	bell	
Pit 143	Late Wood-land	Pit	172	120	32	rectan-gular	straight to constrict-ed	
Pit 144	Late Wood-land	Pit	159	159	97	circular	basin to cylindrical	
Pit 145	Late Wood-land	Pit	87	75	52	circular	bell	
Pit 146	Mississippian	Pit	72	72	27	circular	cylindrical	
Pit 147	Mississippian	Pit	80	80	15	circular	cylindrical	
Pit 148	Indeterminate	Pit	90	90	42	circular	cylindrical	
Pit 149	Late Wood-land	Pit	75	75	27	circular	cylindrical	
Pit 150	Late Wood-land	Pit	160	160	80	circular	cylindrical	
Pit 151	Mississippian	Pit	112	112	10	circular	basin	
Pit 152	Mississippian	Pit	99	99	35	circular	bell	
Pit 153	Mississippian	Pit	146	130	24	oval	stepped straight	
Pit 154	Mississippian	Pit	100	100	62	circular	basin	
Pit 155	Mississippian	Pit	75	75	4	circular	cylindrical	
Pit 156	Late Wood-land	Pit	106	106	90	circular	compos-ite bell at 70 cm	
Pit 157	Mississippian	Pit	77	77	27	circular	cylindrical	
Pit 158	Mississippian	Pit	67	67	20	circular	basin/ cy-lindrical	firepit
Pit 159	Late Wood-land	Pit	77	77	22	circular	cylindrical	
Pit 160	Mississippian	Pit	50	45	8	slight oval	basin	firepit
Pit 161	Mississippian	Pit	81	81	22	circular	cylindrical	
Pit 162	Mississippian	Pit	180	180	15	oval	basin	
Pit 163	Mississippian	Pit	143	143	9	oval	basin	
Pit 164	Mixed	Pit	120	120	54	circular	cylindrical	

Table 5.2 Pit Features From 11MS133 (Continued)

Feature	Feature Component	Type	Length (cm)	Width (cm)	Depth (cm)	Plan shape	Profile shape	Comments
Pit 165	Late Woodland	Pit	103	103	60	circular	bell beginning at 31 cm	
Pit 166	Indeterminate	Pit	80	80	15	circular	basin	
Pit 167	Indeterminate	Pit	73	70	10	circular	basin	
Pit 168	Indeterminate	Pit	135	33	17	oval	basin	
Pit 169	Indeterminate	Pit	68	68	7	circular	basin	
Pit 170	Late Woodland	Pit	140	140	15	circular	basin	
Pit 171	Indeterminate	Pit	49	49	6	circular	basin	firepit
Pit 172	Indeterminate	Pit	65	65	46	circular	composite basin to cylindrical	
Pit 173	Indeterminate	Pit	55	55	20	circular	basin	
Pit 174	Indeterminate	Pit	58	58	29	circular	cylindrical	
Pit 175	Mississippian	Pit	65	35	16	sub-rectangular	straight side, slope bottom	
Pit 176	Mixed	Pit	88	88	21	circular	cylindrical	
Pit 177	Late Woodland	Pit	65	65	50	circular	cylindrical	
Pit 178	Late Woodland	Pit	74	74	53	circular	bell	
Pit 179	Late Woodland	Pit	115	87	85	oval	barrel?	
Pit 180	Indeterminate	Pit	49	49	18	circular	basin	
Pit 181	Indeterminate	Pit	71	71	49	circular	composite cylinder	
Pit 182	Late Woodland	Pit	100	100	35	circular	cylindrical	
Pit 183	Mississippian	Pit	110	90	62	oval	cylindrical	
Pit 184	Indeterminate	Pit	150	150	4	circular	basin	
Pit 185	Mississippian	Pit	92	92	120	circular	cylindrical, belled base	
Pit 186	Indeterminate	Pit	25	25	11	circular	basin	smudge pit
Pit 187	Late Woodland	Pit	101	69	19	oval	basin	
Pit 188	Mississippian	Pit	65	55	14	oval	basin	
Pit 189	Indeterminate	Pit						
Pit 190	Late Woodland	Pit	75	75	7	circular	basin	
Pit 191	Indeterminate	Pit	28	28	6	circular	basin	firepit
Pit 192	Mississippian	Pit	180	100	10	rough oval	basin	

Table 5.2 Pit Features From 11MS133 (Continued)

Feature	Feature Component	Type	Length (cm)	Width (cm)	Depth (cm)	Plan shape	Profile shape	Comments
Pit 193	Late Woodland	Pit	63	63	7	circular	basin	
Pit 194	Mixed	Pit	130	130	64.5	circular	cylindrical	194 and 195 actually one large pit
Pit 195	Mixed	Pit	130	130	64.5	circular	cylindrical	194 and 195 actually one large pit
Pit 196	Late Woodland	Pit	100	100	44	circular	cylindrical	
Pit 196	Late Woodland	Pit	100	100	44	circular	cylindrical	
Pit 197	Mississippian	Pit	82	79	19.5	circular oval	cylindrical	
Pit 198	Mississippian	Pit	112	112	6	circular	basin	
Pit 199	Late Woodland	Pit	110	110	29	circular	cylindrical	
Pit 200	Mississippian	Pit	90	90	8	circular	basin	
Pit 201	Late Woodland	Pit	107	107	75	circular	cylindrical	rock lined base
Pit 202	Late Woodland	Pit	89	89	55	circular	basin	
Pit 203	Mississippian	Pit	117	117	47	circular	cylindrical	
Pit 204	Mixed	Pit	90	90	15	circular	cylindrical	
Pit 205	Late Woodland	Pit	85	85	17	circular	cylindrical	
Pit 206A	Late Woodland	Pit	100	858	35	rectangular	straight to bell	
Pit 206B	Late Woodland	Pit	180	130	90	oval	bell	
Pit 207	Late Woodland	Pit	117	85	32	oval	basin	
Pit 208	Late Woodland	Pit	175	175	40	circular	cylindrical with basal bell	
Pit 209	Late Woodland/ Mississippian	Pit	96	96	11	circular	cylindrical	
Pit 210	Late Woodland	Pit	86	76	6	slight oval	cylindrical	
Pit 211	Late Woodland	Pit	105	105	10	circular	cylindrical	
Pit 212	Mississippian	Pit	102	102	35	circular	cylindrical	
Pit 213	Mississippian	Pit	73	73	36	circular	cylindrical	
Pit 214	Late Woodland	Pit	118	109	34	circular/ oval	cylindrical	
Pit 215	Mississippian	Pit	78	63	42	circular/ oval	cylindrical	
Pit 216	Mississippian	Pit	100	100	74	circular	cylindrical with basal bell	

Table 5.2 Pit Features From 11MS133 (Continued)

Feature	Feature Component	Type	Length (cm)	Width (cm)	Depth (cm)	Plan shape	Profile shape	Comments
Pit 217	Late Woodland	Pit	61	39	14	oval	basin	probably scatter from 216
Pit 218	Mississippian	Pit	83	83	18	circular	cylindrical	
Pit 219	Mississippian	Pit						
Pit 220	Late Woodland	Pit	96	96	30	circular	cylindrical	
Pit 221	Mississippian	Pit	149	47	56	rectangular	straight	erection pit
Pit 222	Late Woodland	Pit	100	100	60	circular	cylindrical	
Pit 223	Mississippian	Pit	150	150	20	circular	irregular basin	
Pit 224	Mississippian	Pit	150	150	10	circular	cylindrical basin	
Pit 225	Late Woodland	Pit	95	95	42	circular	cylindrical	
Pit 226	Mississippian	Pit	90	90	74	circular	bell	
Pit 227	Mississippian	Pit	130	130	50	circular	cylindrical	
Pit 228	Indeterminate	Pit	79	79	12	circular	basin	surrounded by posts
Pit 229	Mississippian	Pit	82	82	20	circular	cylindrical	
Pit 230		Pit						no pit? Labeled as part of 232?
Pit 231	Mississippian	Pit	60	60	55	circular	cylindrical	
Pit 232	Mississippian	Pit	180	180	39	circular	cylindrical	
Pit 233	Mississippian	Pit	105	105	15	circular	basin	
Pit 234	Mississippian	Pit	85	85	16	circular	basin	
Pit 235	Late Woodland	Pit	105	105	53	circular	cylindrical with basal bell	
Pit 236	Indeterminate	Pit	45	45	14	circular	basin	firepit
Pit 238	Late Woodland	Pit	75	75	9	circular	basin	
Pit 239	Indeterminate	Pit	103	103	15	circular	basin	
Pit 240	Mixed	Pit	93	93	22	circular	cylindrical	
Pit 241	Late Woodland	Pit	130	107	19	oval	basin	
Pit 243	Late Woodland	Pit	73	73	21	circular		
Pit 244	Mississippian	Pit	111	111	6	circular	basin	
Pit 245	Mixed	Pit	139	118	21	slight oval	basin	
Pit 246	Indeterminate	Pit	138	138	19	circular		
Pit 247	Mississippian	Pit	113	90	12	slight oval	basin	
Pit 248	Indeterminate	Pit	88	88	31	circular	basin	

Table 5.2 Pit Features From 11MS133 (Continued)

Feature	Feature Component	Type	Length (cm)	Width (cm)	Depth (cm)	Plan shape	Profile shape	Comments
Pit 249a/b	Mississippian/ Late Wood-land	Pit	182	90	20	oval	basin	
Pit 250	Late Wood-land	Pit	102	102	30	circular	basin	
Pit 252	Mississippian	Pit	123	123	21	circular	basin	
Pit 253	Mississippian	Pit	68	68	8	circular	basin	
Pit 254	Late Wood-land	Pit	100	100	23	circular		
Pit 255	Mississippian	Pit	121	121	29	circular	cylindrical	surrounded by posts
Pit 256	Mississippian	Pit	116	81	21	irregular oval		
Pit 257	Late Wood-land	Pit	79	79	13	circular		
Pit 258	Late Wood-land	Pit	117	117	30	circular		
Pit 259	Mississippian	Pit	84	84	17	circular		
Pit 260	Late Wood-land	Pit	112	112	26	circular		
Pit 261	Mississippian	Pit	67	67	14	circular		
Pit 262	Mississippian	Pit	87	87	19	circular		
Pit 263	Mississippian	Pit	49	49	12	circular		
Pit 264	Mississippian	Pit	61	61	17	circular		
Pit 265	Mississippian	Pit	77	77	23	circular		
Pit 266	Mixed/ Missis-sippian	Pit	112	111	41	square	straight	
Pit 267	Mississippian	Pit	150	150	42	circular		
Pit 268	Late Wood-land	Pit	86	86	21	circular		
Pit 269	Late Wood-land	Pit	90	90	30	circular		
Pit 270	Indeterminate	Pit	93	93	33	circular		
Pit 271	Mississippian	Pit	111	111	29	circular		
Pit 272	Mississippian	Pit	88	88	12	circular		
Pit 273	Mississippian	Pit	96	96	19	circular		
Pit 274	Late Wood-land	Pit	242	242	43	circular		
Pit 275	Mississippian	Pit	197	172	41	oval		
Pit 276	Mississippian	Pit	89	89	12	circular		
Pit 277	Mississippian	Pit	187	187	39	circular		
Pit 278	Mississippian	Pit	93	93	19	circular		
Pit 279	Late Wood-land	Pit	156	112	38	compos-ite rect-angular		77 cm circular inclusion

Table 5.2 Pit Features From 11MS133 (Continued)

Feature	Feature Component	Type	Length (cm)	Width (cm)	Depth (cm)	Plan shape	Profile shape	Comments
Pit 280	Late Wood-land	Pit						
Pit 281	Late Wood-land	Pit	100	100	23	circular		
Pit 283	Mississippian	Pit	62	62	12	circular		Firepit
Pit 284	Mississippian	Pit	107	107	40	circular		
Pit 285	Mississippian	Pit	116	116	32	circular		
Pit 286	Late Wood-land	Pit	133	133	41	circular		
Pit 287	Mississippian	Pit	49	49	10	circular		
Pit 288	Mississippian	Pit	60	60	10	circular		
Pit 289	Mississippian	Pit	86	86	126	circular	basin to bell at 53 cm	circle of rock at 70 cm with ashy fill
Pit 291	Late Wood-land	Pit	196	196	23	circular		
Pit 292	Mississippian	Pit	150	150	18	circular		
Pit 293	Mixed	Pit	87	87	34	circular		
Pit 294	Mixed	Pit	117	117	63	circular	com-posite cylinder	
Pit 295	Mississippian	Pit	182	182	19	irregular circle		
Pit 296	Mississippian	Pit	40	40	9	circular	basin	firepit; also a rect-angular pit 165 x 105 27 cm deep
Pit 297	Mississippian	Pit	98	98	13	circular		
Pit 300	Mississippian	Pit	171	171	16	circular		
Pit 301	Late Wood-land	Pit	86	86	12	circular		
Pit 302	Mississippian	Pit	90	90	31	circular		
Pit 303	Late Wood-land	Pit	106	106	16	circular		
Pit 304	Mississippian	Pit	117	117	23	circular		
Pit 310	Late Wood-land	Pit	117	117	40	circular		
Pit 311	Late Wood-land	Pit	123	123	19	circular		
Pit 312	Mississippian	Pit	138	138	21	circular		
Pit 313	Late Wood-land	Pit	128	128	43	circular		
Pit 314	Late Wood-land	Pit	75	75	13	circular		
Pit 315	Mississippian	Pit	53	53	6	circular		
Pit 318	Mixed/ Missis-sippian	Pit	140	140	53	circular	cylindrical	

Table 5.2 Pit Features From 11MS133 (Continued)

Feature	Feature Component	Type	Length (cm)	Width (cm)	Depth (cm)	Plan shape	Profile shape	Comments
Pit 319	Mixed/ Mississippian	Pit	148	148	64	circular	cylindrical	
Pit 320A	Mississippian	Pit	140	140	49	circular	basin	
Pit 320B	Late Woodland	Pit	140	140	49	circular	basin	
Pit 321	Mississippian	Burial	250	200	0	irregular	irregular	potted burial pit
Pit 324	Mississippian	Pit	97	87	21	circular	basin	
Pit 325	Mississippian	Pit	112	112	16	circular	basin	
Pit 326	Mixed	Pit	109	109	20	circular	cylindrical	
Pit 327	Mississippian	Pit	102	102	33	oval	cylindrical	
Pit 328	Mississippian	Pit	83	83	25	circular	cylindrical	
Pit 329	Mixed	Pit	125	125	82	oval circular	basin	
Pit 330	Indeterminate	Pit	86	86	23	circular	basin	
Pit 331	Late Woodland	Pit	80	80	28	circular	basin	
Pit 332	Mixed	Pit	34	34	16.5	circular	cylindrical	
Pit 333	Indeterminate	Pit	38	38	30	circular-oval	cylindrical	
Pit 334	Late Woodland	Pit	40	40	12	circular	basin	
Pit 335	Mixed	Pit	61	61	24	circular-oval	basin	
Pit 336	Indeterminate/Mississippian	Pit	31	31	9	circular	basin-cylindrical	smudge pit
Pit 337	Indeterminate	Pit	58	58	12	circular	basin	
Pit 338	Mississippian	Pit	255	255	45	oval irregular circle	basin	very uneven
Pit 339	Indeterminate	Pit	78	78	15	circular	cylindrical	
Pit 340	Mississippian	Pit	107	107	17	circular		
Pit 341	Late Woodland	Pit	111	111	37	circular	cylindrical	
Pit 342	Late Woodland	Pit	45	45	43	circular	cylindrical	
Pit 343	Mississippian	Pit	51	51	12	circular	cylindrical	
Pit 344	Mixed	Pit	129	129	33	circular	cylindrical	
Pit 345	Modern	Pit	215	118				very irregular pothole
Pit 346	Mississippian	Pit	112	112	46	circular	cylindrical	
Pit 347	Mississippian	Pit	110	110	19	circular	basin	
Pit 350	Mississippian	Pit	193	193	48	circular	cylindrical	
Pit 352	Mississippian	Pit	151	151	29	circular	cylindrical	
Pit 353	Mississippian	Pit	111	111	21	circular	cylindrical	

Table 5.2 Pit Features From 11MS133 (Continued)

Feature	Feature Component	Type	Length (cm)	Width (cm)	Depth (cm)	Plan shape	Profile shape	Comments
Pit 355	Mississippian	Pit						irregular house basin fill
Pit 356	Mississippian	Pit						irregular house basin fill
Pit 357	Mississippian	Pit	299	177	3			not a pit: sheet midden or house floor
Pit 358	Mississippian	Pit	118	118	16	circular	basin	
Pit 359	Mississippian	Pit						house basin fill
Pit 360	Mississippian	Pit	250	230	90	circular	slight bell	numerous sterile zones
Pit 361	Mississippian	Pit	65	65	10	circular	cylindrical	
Pit 362	Mississippian	Pit	83	83	37	circular	cylindrical	
Pit 363	Mississippian	Pit	90	90	37	circular	cylindrical	
Pit 367	Mississippian	Pit	100	100	15	circular	cylindrical	
Pit 364	Mixed?	Pit	130	130	10	circular	cylindrical	
Pit 365	Mississippian	Pit	165	165	10	circular	cylindrical	
Pit 366	Mississippian	Pit	75	75	35	circular	cylindrical	
Pit 368	Late Woodland	Pit	105	105	10	circular	cylindrical	
Pit 369	Indeterminate	Pit	60	60	17	circular	cylindrical	
Pit 370	Late Woodland	Pit	77	22	22	circular	cylindrical	
Pit 371	Late Woodland	Pit	110	110	30	circular	cylindrical	
Pit 372	Late Woodland	Pit	98	98	35	circular	cylindrical	
Pit 373A	Late Woodland	Pit	160	100	30	oval	basin	
Pit 373B	Late Woodland	Pit	100	93	70	circular	slight bell	
Pit 374	Mississippian	Pit	120	120	30	circular	basin	
Pit 375	Late Woodland	Pit	115	115	25	circular	basin	
Pit 376	Late Woodland	Pit	62	62	23	circular	cylindrical	

Marker Posts

As mentioned above in conjunction with H29/H30 and H27, at least two marker posts were excavated at the Olin site. One, numbered Pit 221 "erection pit", was located between H29/30 and H27 and may have been associated with basin fill or soils around H29. The map and photographs of this area suggest this was a separate feature from the marker post superimposed by H27; this post appears to be much smaller in size that the H27 marker post. Nearly 50 cm in diameter with an approximately 1 meter long insertion/extraction ramp, Pit 221 was approximately 56 cm deep with very few ceramics recovered.

The larger marker post that was clearly superimposed by H27 does not have length, width, or depth recorded for it. Measuring from the map, the post pit was potentially one meter wide and the ramp nearly 1.5 meters long. Estimating from the field photo, the pit was over a meter deep, possibly even between 1.5 and 2 meters deep. Few artifacts were recovered from sub-H27 marker post, with the exception of small sherds of red-slipped, dark-slipped, cordmarked, and plain-surfaced sherds. The majority of ceramics were grit-tempered, likely due to the excavation of this post through the previously-occupied Late Woodland settlement. This post appears to be associated with H29/H30 – most likely with the later construction if the smaller post next to H29/H30 was first in the series. The pulling and replacing of marker posts in series has been shown to be a common occurrence at and around Cahokia (Pauketat 2013c; Porter 1974), as well as other sites (including the hinterland site of Aztalan, where the series of marker posts was commemorated by a series of small conical mounds; Barrett 1933).

Artifact Caches

At least two caches of stone tools were excavated at Olin; the caches will be described in general here while the individual tools are described in Appendix A. One cache, currently known only through photographs from the site, appears to consist of a small celt and at least four rocks that may have been nutting stones or manos (as Denny had mentioned, there were quite a few manos recovered during excavation); a fragment of what appears to be FCR is located nearby. The small celt that was on display at Southern Illinois University Edwardsville appears to be the one photographed. This small celt was recovered from a unit with grid coordinates 75N and 70W. This unit corresponds to H3 interior, a wall trench of H8, and wall trenches of H1. It is unknown at this point whether these artifacts were cached on the floor of a structure or in pit fill, however, the photograph shows the cache next to a feature stain (Figure 5.11), perhaps suggesting the cache was placed on the floor of a structure adjacent to an interior pit or depression with basin fill.

Figure 5.11. Cache of celt and manos.

The second cache, mentioned above in conjunction with H27, was excavated in 1973 by Neal Lopinot (personal communication, 2014). This cache consisted of four finely made lithic tools buried in the floor of H27 with a burned timber (or possibly staff) placed over the top (Figure 5.12). The species of wood of the timber is unknown at this point. According to Denny (personal communication 2011), this cache consisted of two polished adzes and two “knives” of Crescent Quarry Burlington chert. Lopinot (personal communication 2014), on the other hand,

Figure 5.12. H27 Artifact cache at Olin.

recalls the cache as consisting of a couple of adzes, maybe a pick, and a hoe, stacked 1:2:1. Field photos indicate the top tool was a finely made adze of Crescent Hills Burlington (see Figure 5.12).

Unfortunately, only one adze of Crescent Hills Burlington and one pick of typical white Burlington are extant within the collection (Figure 5.13; see Appendix A); the “knives” or other tools were taken after the cache had been on display (Brad Koldehoff, personal communication 2014; Sid Denny, personal communication 2011).

Figure 5.13. Crescent Hills Burlington chert adze (left) and Burlington chert pick (right) from H27 cache.

Based on the field photographs of H27 with the cache in situ, the cache was placed in the southeastern portion of the structure, mirroring the placement of the marker post superimposed by H27 (see Figure 4.6). A small pit appears to be located between the post pit and the cache. While excluded from the inner palisade, the location of H27 (and thus the marker post) was still commemorated with the placement of a lithic cache. This location was not avoided, like that of the circular structure, and appears to have remained important and was engaged with – at least by those persons still living outside of the inner palisade.

Burial Pit 321

Denny (personal communication 2011) indicated that he was directed to the site by a collector who had mentioned a number of looted burials. Denny noted that there were no undisturbed burials at the site and that all burials were located outside of the interior palisade but inside of the exterior palisade. Only one full interment was excavated by Denny and the SIUE field school, Pit 321; a detailed analysis of all human remains recovered from Olin was performed by Jaime Cater under the direct supervision of Dr. Kristen Hedman and Ms. Aimée Carbaugh (all affiliated with the Illinois State Archaeological Survey). The notes and report on the analysis of these remains can be found on file at the Illinois State Archaeological Survey, University of Illinois at Urbana-Champaign. Given the overall lack of human remains recovered during the SIUE excavations, despite Denny's mention of multiple burials, it would appear that most of the other burials mentioned had been fully collected by looters.

Pit 321, a 2-meter by 2.5-meter pit located in the southwest corner of the site near the H35 and the H40 complexes, was itself heavily potted. The individual interred in this pit was an adult male, approximately 35-50 years in age. This man was represented by fragmented elements, though the majority of the individual is present with the exception of the cranium. The missing cranium is likely due to the nature of the looting that occurred. Pathologies include healed periostitis from an infection on the left femur and fused distal and intermediate phalanges resulting perhaps from trauma or perhaps arthritis. Lipping along the vertebral bodies of cranial, thoracic, and lumbar vertebrae – a degenerative process noted in older adults – was noted, as were degenerative changes to the sternal end of at least three ribs.

Ceramics recovered from Pit 321 consist of fragments of a red-slipped beaker, three mini-vessels, one dark-slipped shallow bowl, one plain jar with red-slipped interior, one Ramey Incised jar with bent-arc motif, and three slipped plates with narrow incised line decoration. Plate decorations consist of nested chevron or oppositional diagonal lines; these plates appear very similar to those recovered from the Russell site (Betzenhauser and Zych 2008), both in rim width and decorative motif. Additional artifacts include three projectile point fragments made on Burlington chert (see Appendix A).

What appears interesting for this burial, though problematic given the mixed and disturbed context due to looting, is the inclusion of a large number of faunal remains in the burial pit (see Appendix C). While some, such as a beaver incisor, may have been part of this individual's clothing or personal adornment, the mixture of numerous fish and deer remains would at first appear strange. In addition to large amounts of fish and deer, were remains of turtle shell and small mammals such as rabbit, squirrel, muskrat, gopher, and raccoon. It is the deer, however, that stands out, especially in comparison to Pit 89, discussed below. The simplest explanation, of course, for the intermingling of human and deer remains would be "feasting" associated with the interment of this man. From a relational perspective, however, where the boundaries between human and animal are blurred, there may have been a close relationship between deer-as-person or person-as-deer, something that might inform the deposition in Pit 89 as well. The only cut marks noted for the deer remains co-interred in Pit 321 are score-cuts made on metapodial shaft fragments in the production of bone tools. Additionally, Pit 340 – a feature excavated into the burial – contained small fragments of whelk shell and a fragment of a bowl or beaker, perhaps as later offerings added to this grave.

Pit 89 "Deer Burial"

This pit is a large oval pit, approximately 3.35 meters long and 2.6 meters wide, though fairly shallow at 25 cm deep. Denny (personal communication 2011) referred to this feature as the "deer burial," suggesting that there was an articulated deer recovered from this pit located in close proximity to the sweatlodge. Faunal analysis, performed by Steve Kuehn, Illinois State Archaeological Survey, identified numerous portions of at least three White-Tailed Deer, including two adults and at least one juvenile, interred within this pit along with portions of Raccoon, American Coot, and Canada Goose (see Appendix C). This feature also contained the highest concentration of diagnostic lithic artifacts (Appendix A). These artifacts include two biface fragments (one on St. Genevieve chert and one on Mill Creek chert) and seven point fragments (all on Burlington chert with the exception of one made on St. Genevieve chert). This diversity of raw materials in this feature is interesting, as the majority of diagnostic lithics at the site were made on Burlington chert that was likely locally obtained. Four additional points or point fragments made on St. Genevieve chert were recovered from various pit features.

Pit 267

This feature is a large circular pit, approximately 1.5 meters in diameter and 42 cm deep, located in the south-central portion of the site. This pit contains a number of unusual artifacts or proportions of objects. For example, an Early Archaic St. Charles point fragment, made from Salem chert, was recovered from this pit, along with a large number of vessel fragments. Pottery included at least two beaker fragments, 16 bowl fragments (including four with everted rims and one with an effigy appendage), and seven jars (including cordmarked, dark slipped, and one plain-surfaced high-rimmed jar with a handle) (see Chapter 6). Few identifiable faunal remains were excavated from Pit 267, including a white-tailed deer astragalus fragment (see Appendix C). Pit 267 is located approximately the same distance from the large marker post as Pit 89, the "deer burial," though in an opposite direction.

Radiocarbon dates

Samples from the Olin site were sent to Krueger Enterprises, Inc. of Cambridge, MA for radiocarbon dating in 1973. Most samples consisted of wood charcoal, though two samples consisted of nutshell. Samples were taken from both structure and pit contexts, though one structure date was clearly not reliable. Unfortunately, given the tendency to re-number structures at the onset of each field season, rather than continue consecutive numbering as was done with the pit features, it was not possible to determine which structures House 2 and House 3 correspond with after the final structure renumbering. The six radiocarbon assays were calibrated using Calib 7.0 (Reimer et al. 2013), providing dates ranging from A.D. 770 to A.D. 1893 (Table 5.3).

Table 5.3. Radiocarbon Assays From Olin, Krueger Enterprises, Inc., 1973.

				Calibrated Date	
Sample	Provenience	Sample Type	C14 Date	One sigma confidence	Two sigma confidence
#1	House 3	Wood Charcoal	<200 years BP	n/a	n/a
#2	House 2	Wood Charcoal	490 +/- 210 BP	AD 1283-1643	AD 1159-1893
#3	Pit 6	Charcoal	600 +/- 160 BP	AD 1223-1465	AD 1045-1094 (2.5%) AD 1120-1141 (10%) AD 1147-1648 (96.5%)
#4	Pit 43	Charcoal	750 +/- 150 BP	AD 1054-1078 (6.7%) AD 1153-1328 (74.1%) AD 1341-1395 (19.2%)	AD 986-1447
#5	Pit 74 (LW)	Nutshell	810 +/- 160 BP	AD 1032-1296	AD 894-930 (1.9%) AD 938-1432 (98.1%)
#6	Pit 31 (LW)	Nutshell	800 +/- 200 BP	AD 1024-1318 (90.7%) AD 1352-1390 (9.3%)	AD 770-1488 (99.9%) AD 1604-1608 (0.1%)

The broad ranges of dates are problematic as they span the Stirling and Moorehead phases, as well as extending earlier and later (Figure 5.14). The two earliest dates were from samples recovered from features (Pit 31 and Pit 74) that have been determined to be part of the Late Woodland occupation based on their overwhelming presence of grit-tempered pottery and minimal or lack of shell-tempered sherds. As such, these dates are not considered to reflect the Mississippian occupation. Pit 43 is located in the northwest corner of the site and is likely associated with H11, a structure that appears to be part of the later occupation of the site based on its orientation and probable superpositioning with the palisade wall (though this cannot be clearly determined as it would appear that many palisade posts were not mapped in this area. Pit 43 is a problematic feature to draw a reliable date from as it superimposed a Late Woodland pit (Pit 44), though the range of dates it provides are clearly Mississippian and are likely fairly

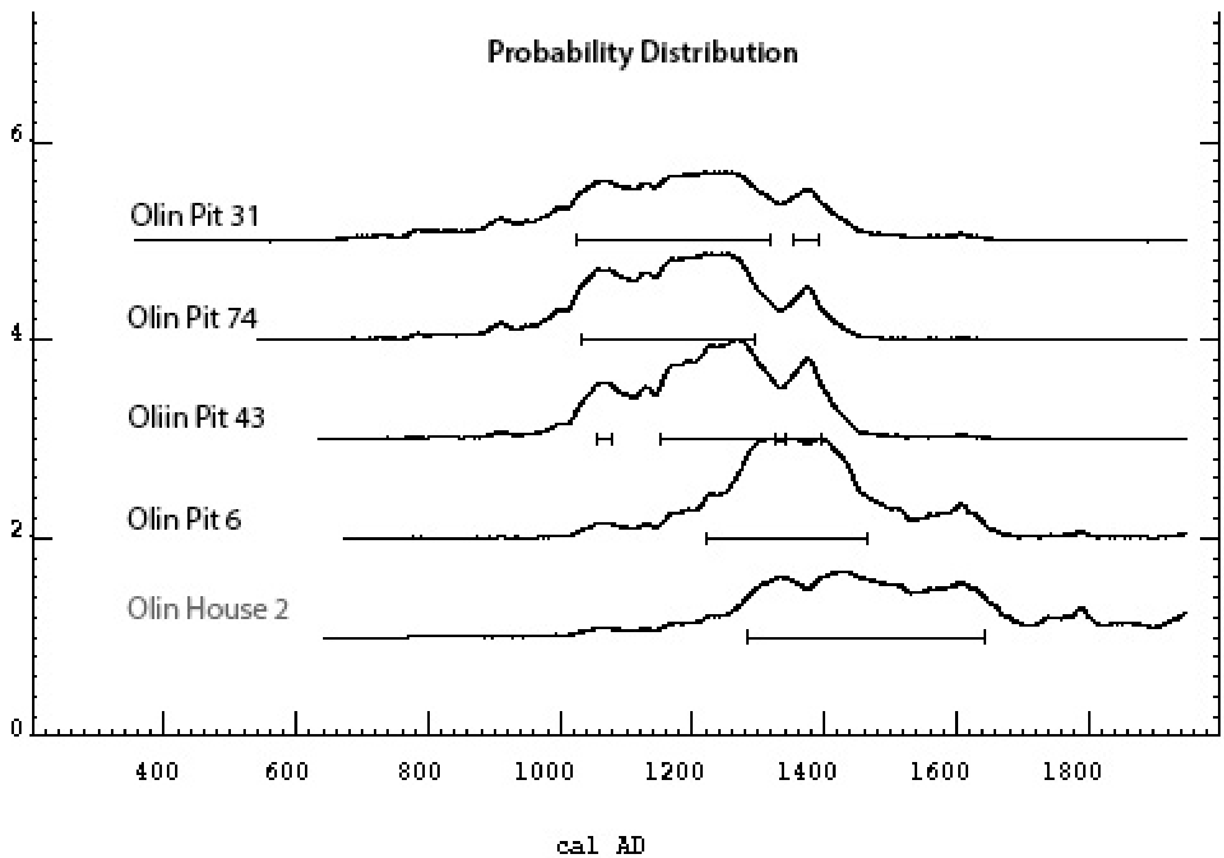

Figure 5.14. Probability distribution of calibrated radiocarbon dates from Olin (Calib 7.0).

reliable. This feature most likely dates between the mid-12th century and the early 14th century. Pit 6 is located within House 2 and is presumed to be contemporaneous with that structure. The dates provided by these two samples are comfortably within the Moorehead phase date range (and beyond).

Olin Site Feature Discussion

The Olin site appears to have been fortified at its founding, with structures built around a small, plaza area. This is a pattern that later (post A.D. 1200) Mississippian sites in the Tennessee Valley, Central Illinois River Valley, and southeast Missouri also followed (Conrad 1991; Cottier 1977; Cottier and Southard 1977; Schroedl 1998). Radiocarbon dates and ceramic evidence suggests Olin was founded at cusp of the late Stirling/early Moorehead phase transition. Olin contained a number of architectural elements that would suggest the site shared similarities with the 'nodal sites' of the Stirling phase, including a formal circular sweatlodge with associated marker post and possible extra-domestic structures with evidence for copper craft production. The earlier buildings at the site were oriented to near-cardinal directions and at least three structures have evidence for formal, square puddled clay hearths, similar to that excavated at the Copper site (discussed below).

About mid-way through the occupation of the site, the palisade was reconstructed to enclose a smaller area. This entailed what appears to have been an intentional exclusion of the formal sweatlodge, the former location of its associated marker post, and the so-called "deer burial" pit that was located near the sweatlodge. Structures located outside of this smaller inner palisade indicate a continued occupation outside of this wall, including H28, which was built with an orientation that aligned to the southern wall of this inner palisade. This later occupation included at least one possible extra-domestic structure (H29/H30) which had an associated (though much smaller) marker post. House 39, the double-wall house, may also have been in use at the same time. This structure was also a likely extra-domestic building given the square firepit with 'reflecting wall'. Both of these buildings had proportions that were more square than the earlier buildings at the site.

The latest occupations of the site included a series of buildings built on non-cardinal orientations, with more-square proportions. These include a large structure complex located in the southern part of the site (H35-H37) that may have been associated with the burials (including Pit 321) also located in this area. The final occupation of the site appears to have included H1, the large rectangular building at the northern edge of the plaza that had at least one interior dividing wall. Given the placement of this building over the location of earlier paired structures that were consistently located within the inner palisade, citing and perhaps drawing power from these previous buildings, H1 appears to have been an important extra-domestic structure. House 1 was clearly constructed after the inner palisade was no longer in use (as demonstrated by the superpositioning with H10, however H1 shared an orientation with the inner palisade wall and was perhaps also citing the location of this wall as well. The Olin site appears to have been abandoned sometime during the later part of the Moorehead phase, as indicated by the ceramics discussed in Chapter 6.

Copper Feature Data

Excavations at the Copper site (11S3) included test units excavated into two of the five mounds as well as ground-truthing the rectangular anomalies discovered during geophysical survey (see Chapter 4). As discussed in Chapter 4, a single one-meter by one-meter unit was excavated into each Mound 3 and Mound 4. Additionally, the plowzone was removed over the rectangular anomalies revealing two structures, Feature 3 and Feature 4, and their intra-mural pits (Figure 5.15). A third structure, Feature 9, was encountered during the excavation of Mound 3, however only the wall trench of this structure was excavated and no structural data could be gained.

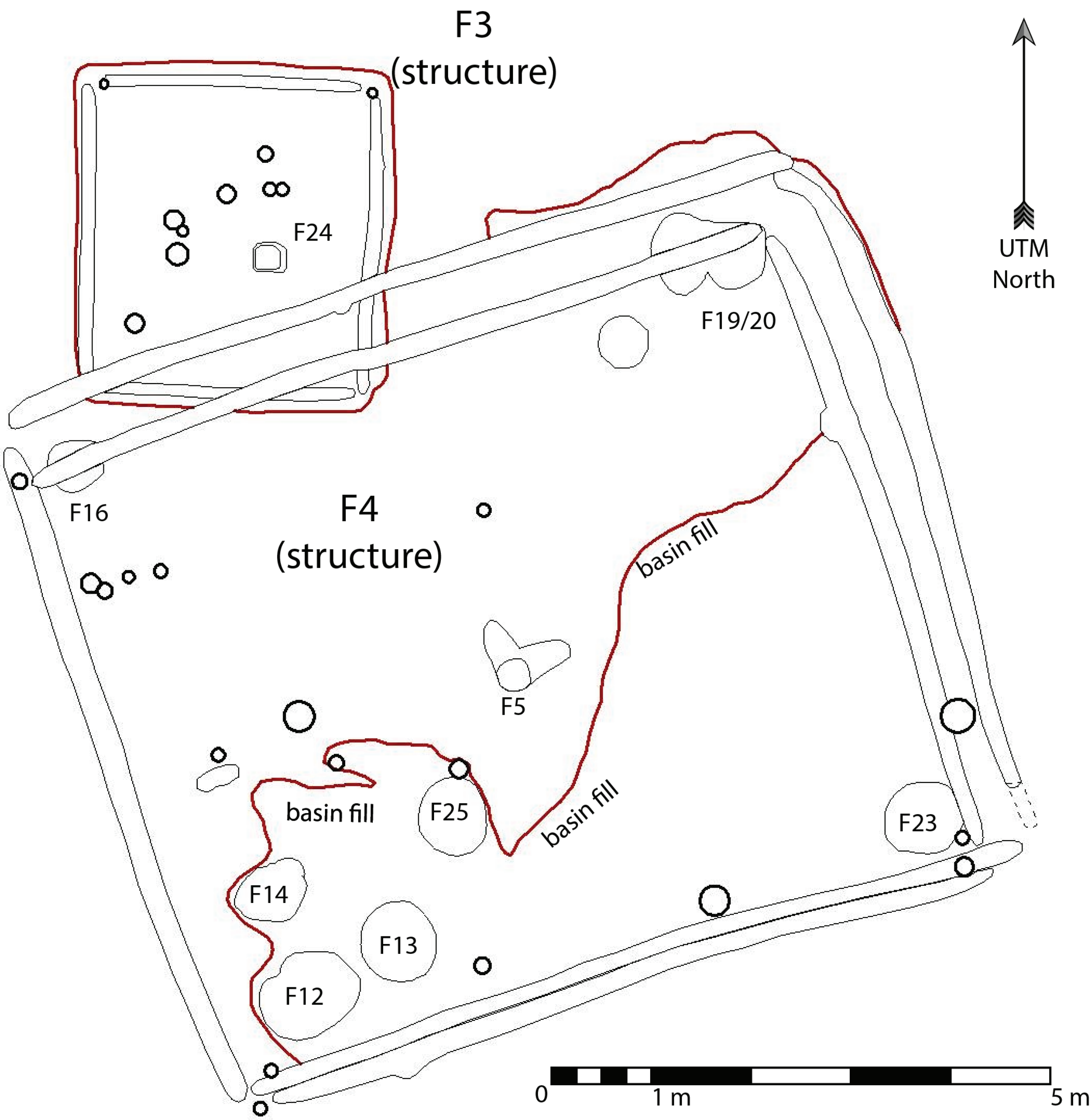

Figure 5.15. Features excavated at Copper.

Structures

Feature 3

Feature 3 was a small, nearly square structure approximately 3.54 meters long by 3.32 meters wide. This structure was oriented to the cardinal directions, with the longest axis on a north-south bearing. The basin was approximately 24 cm deep, homogeneous, and artifact rich. Among the artifacts recovered from Feature 3 were rims of a seemingly non-local jar type (e.g., the 'Shiloh Complex' vessels, see Chapter 6), as well as plates, bowls, bottles, and a beaker base. Wall trenches were approximately 12 cm wide and 34-45 cm deep with very little material recovered from them; the north and east wall trenches were the deepest.

A square puddled-clay hearth (F24) was located just east of the center of the structure, and six interior posts formed an L-shape around the north- and west-central portion of the structure (see Figure 5.15). This post formation suggests a possible screen or barrier separating the hearth area from the northern and western portion of the structure. No interior pits were present in Feature 3.

Feature 4

Feature 4 was a large, rectangular structure rebuilt once. The smaller structure was approximately 9.5 meters long by 7.5 meters wide, while the larger structure was 10.14 meters long and 8.58 meters wide. Both structures shared an orientation of 71 degrees (east of UTM north). A small amount of basin fill was present in the southeast portion of the smaller structure (designated Feature 6 in the field). This basin fill was likely intact due to a protective lens of soil that had been plowed over the feature from Mound 4. Basin fill contained a smudged-surface bowl with tab (typologized as St. Clair Plain) as well as globular cordmarked jars with red-slipped interiors and everted and angled rims (typologized as Cahokia Cordmarked). Plate rims and a bottle rim were also recovered from Feature 4 basin fill and floor contexts. Wall trenches were between 20 and 22 cm wide and 40 to 58 cm deep. The exterior wall trenches were approximately 15 cm deeper than the interior wall trenches. Posts were visible in all wall trenches, at times extending through the base of the wall trench.

A large post (Feature 5), approximately 40 cm in diameter, with insertion and extraction ramps, was located in the center of the smaller structure. A second large post was located along the southern wall of the structure, perhaps serving as a step-in post. No hearth was located within Feature 4; however five interior pits were located in the southern portion of the latest structure. Three pits (Feature 16 and Features 19 and 20) were located in the northwest and northeast corners, respectively; these pits were superimposed by the northern wall of the smaller construction episode of Feature 4. Given the location of the pits in the corners (mirroring the location of Features 12 and 23), it would appear that the smaller structure was the latest iteration of this building.

Hearths

Feature 24

Feature 24 was a formal hearth located within Structure 3. This feature was square in shape and constructed of puddled clay; the clay was fired red and had a burned base. The soil inside the hearth was filled with charcoal, and three plain-surfaced shell-tempered body sherds and four pinch pot sherds were recovered. Circular puddled clay hearths were excavated at the Orendorf site (Conrad 1991) and Cahokia (Kunnemann mound; Pauketat 1993), while square hearths appear to be a Moorehead phase innovation in the American Bottom region. A similar square formal puddled-clay hearth was excavated by Dr. Robert Hall from a Moorehead phase context on the summit of Emerald Mound (Hall, personal communication, 2009) and at least three square hearths were excavated at the Olin site (discussed above).

Posts

Feature 5

Feature 5 was the center post of Feature 4; this post was approximately 40 cm in diameter and 90 cm deep and had one insertion and one extraction ramp. One ramp was 48 cm long, the other 56 cm. The fill of the post pit and insertion/extraction ramps was a homogenous dark gray brown clay loam and contained artifacts that were largely red (hematite, burned sandstone, heat-treated chert) or white (burned limestone, Burlington chert). Without making any direct connections, it should be noted that these colors have historical significance among some Southeastern Native groups as part of the duality of war (red) and peace (white) (Dye 1995; Hudson 1976). Additionally, the inclusion of red objects in this post parallels the increased use of red slipping on pottery as part of the Moorehead phase revitalization (see Chapter 6). Only a few small pieces of grit-tempered pottery sherds were recovered from the fill of the post pit and the ramp, suggesting rapid in-filling with nearby soils. Contrasting with the center posts of the large rectangular structures excavated at Emerald, there were no layered lenses of fill in Feature 5.

Feature 19

Feature 19 was initially identified as an oval pit located in the northeast corner of Feature 4, in close proximity to Feature 20, and was superimposed by the interior wall. Feature 19 was approximately 103 cm long, 69 cm wide and 34 cm deep. Most of the artifacts, consisting largely of small pottery sherds and pieces of sandstone, were recovered from the upper fill zone of the feature. In plan, Feature 19 appeared to have a relationship of superpositioning with Feature 20. As with Feature 20, sterile looking soil led excavators to believe they had reached the bottom of the feature; further evaluation of the profile map suggests this was a ramp for a large marker post (Feature 20). The northern half of this feature, along with the inner north wall of Feature 4, was left unexcavated.

Feature 20

Feature 20 was initially identified as an oval pit located in the northeast corner of Feature 4 near Feature 19. This feature was approximately 94 cm long and 70 cm wide and was superimposed by the inner north wall trench of Feature 4. In excavation, this pit was fairly deep, excavated to a depth of 56 cm, and had at least three fill zones, including charcoal and burned clay flecks. Sterile-looking soil led excavators to believe they had reached subsoil with a soil disturbance (i.e., bioturbation) below the feature. Photographic evidence later suggested this feature was not completely excavated; rather, the feature seems to have extended deeper than what has been mapped, making it likely that this feature was a large marker post (Figure 5.16).

Figure 5.16. Feature 20 photograph, probable marker post at Copper.

Pits

Feature 12

Feature 12 was an oval shaped pit, approximately 120 cm long, 98 cm wide, and 53 cm deep, located in the southwest corner of Feature 4. This pit was filled in one episode and contained charcoal, burned clay, and sandstone (perhaps refuse from hearth cleaning). The western side of the pit was deeper with the pit base slanting from the interior of the structure to the east. This pit is similar to Feature 23 in the southeast corner of Feature 4; both features contained Cahokia Cordmarked jars and had similar inslanting profiles. Feature 12 may have had a similar function to Feature 23, as discussed below.

Feature 13

Feature 13 was a shallow (21 cm deep) circular pit located in the southwest corner of Feature 4. This 98 cm long and 90 cm wide pit contained a single fill episode of dark soil with burned clay, charcoal, sandstone, bone, sherds and chert. A piece of galena was recovered from the surface scraping near Feature 13 and likely originated from this feature. Feature 13 may have been affiliated with the later, smaller, Feature 4.

Feature 14

Feature 14 was a shallow (19 cm deep) circular pit approximately 78 cm by 71 cm in diameter located in the southwest corner of Feature 4. The single fill episode contained sandstone, chert flakes, and bone. Like Feature 13, Feature 14 may have been associated with the later, smaller, Feature 4.

Feature 16

Feature 16 was a circular pit, approximately 60 cm in diameter, located in the northwest corner of Feature 4, superimposed by the interior wall trench of Feature 4. This was a fairly deep pit, approximately 72 cm deep, with multiple fill episodes. Along with pieces of sandstone, small fragments of shell-, grog-, and grit-tempered body sherds were recovered from Feature 16. Feature 16 was likely affiliated with the earlier, larger, Feature 4.

Feature 18

Feature 18 was a shallow (12 cm) circular pit located in the northeast corner of Feature 4. This approximately 60 cm diameter pit appeared to have been filled with basin fill from Feature 4 as the majority of artifacts were recovered near the shovel-scraped surface. Artifacts included bone, pottery, chert and sandstone fragments.

Feature 21

Feature 21 was a small circular pit located just west of the center post of Feature 4. This pit was approximately 44 cm diameter, and was fairly shallow at about 24 cm deep. This pit consisted of a single fill episode with a few flecks of burned sandstone.

Feature 23

Feature 23 was a large (185 cm long by 100 cm wide) oval pit located in the southeast corner of Feature 4. This appeared to have been a deep (67 cm) storage pit with a slope from the structure interior (to the west) into the deeper part of the pit near the structure wall (similar to Feature 12). Large pottery sherds were recovered from Feature 23, including a cordmarked pan fragment similar to that recovered from the base of Mound 3 and a grooved-paddled or simple-stamped jar rim (see Chapter 6). Feature 23 appears to be superimposed by the inner wall trench of Feature 4, indicating an association with the earlier, larger structure. If this is the case, then it would appear that Feature 12 and Feature 23 may have functioned in similar ways, with one feature replacing the other. Feature superpositioning and average RPR/LPs for ceramics from these pits (see Chapter 6) suggest Feature 12 was used as part of the reconstructed Feature 4 and replaced Feature 23 which was used during the earlier iteration of this building.

Feature 25

Feature 25 was a shallow (8 cm) basin of mottled fill near Feature 15. The feature was 92 cm long and 84 cm wide, and contained charcoal and burned clay flecks with some burned hematite. Burned bone was present, but there were no recoverable artifacts. This circular feature may have been the remaining base of a larger pit or possibly a shallow depression in the floor of Feature 4.

Mounds

Mound 3

Mound 3 was the second largest mound at the Copper site, located at the top of a natural slope to the northwest (see Figure 4.12). A one-meter by one-meter excavation unit at the top of this platform mound revealed a mound-summit structure represented by a single wall trench approximately 19 cm wide at the surface and 69 cm deep (measured from ground surface). This wall trench extended north-south through the center of the excavation unit and, based on the north wall profile of the unit, basin fill appears to extend to the west. This mound-top structure cut through basket-loaded mound fill of light and dark soil (Figures 5.17 and 5.18).

At the base of the mound, the profile indicates a surface that had been intentionally cleared of topsoil. Gray silt was placed over this new surface, likely wet when added as evidenced by the iron staining and leaching into the subsoil; these soils are clearly not natural as the soil

Figure 5.17. Mound 3 north wall profile photograph.

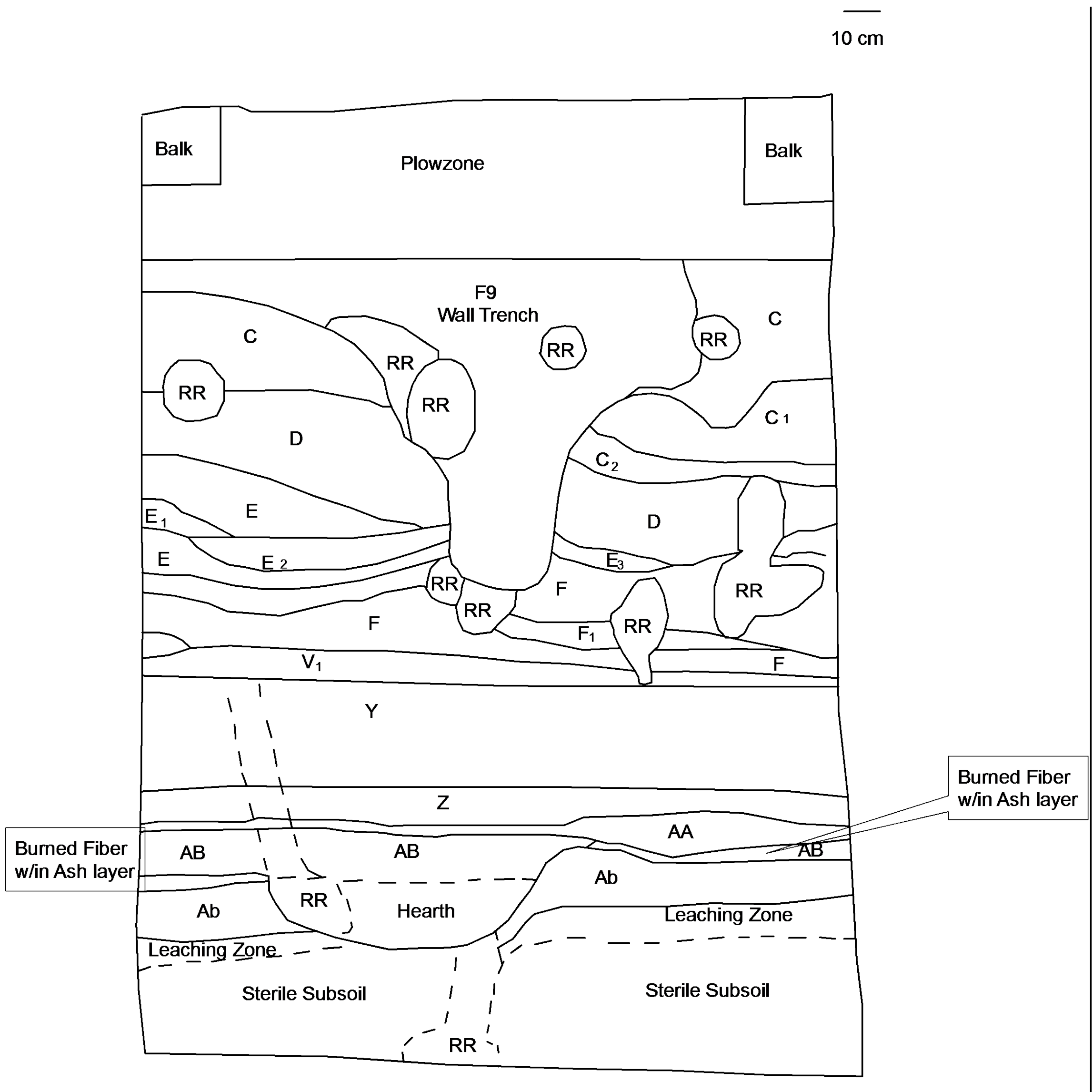

Figure 5.18. Mound 3 north wall profile map (dashed lines indicate diffuse boundaries); (see Table 5.4 for corresponding fill zone soils).

profile provided by the USDA soil survey indicates a natural soil profile consisting of silt loam and silty clay loam. Pure silt is not included in this profile. These silts also appear to have been packed down as evidenced by the undulating surface that they created (Figure 5.19).

Figure 5.19. Mound 3 west wall profile photograph in detail.

A small feature was excavated into this surface (Figure 5.20); this feature was most likely a hearth, as it was lined with burned earth in plan view. Directly on top of the packed in silt lens was a series of thin layers of gray silt, yellow silt, and charcoal flecks. This appears to have likewise been packed over the gray silt as it also had a slightly undulating surface and was dense. This series of dark and light lenses extended near, but not into the hearth feature. Additionally, a thin (1 to 1.5 cm thick) lens of burned material (possibly fur or fiber matting, though no textural pattern could be distinguished in the field) was placed over these lenses of light/dark/charcoal; this material also extended up to, but not into, the small pit or hearth feature visible on the north

Figure 5.20. Mound 3 north wall profile photograph in detail.

profile wall of the unit. A two- to eight centimeter thick lens of ash, charcoal, ashy silt, pottery, and bone was then layered on top of the burned material; this ash zone filled in the small pit or hearth feature and created a flat surface (see Figure 5.20). This ash lens also extended into a possible postmold, visible on the south profile wall of the unit (Figure 5.21). The ash fill was slightly undulating with silt washing into low areas.

A thin (1 to 2 cm) lens of dark gray-brown (10YR4/1 to 4/2) ashy silt was layered over the ash and debris zone. Upon this ashy silt, an approximately five centimeter lens of mottled yellow zone was packed. A compact surface with iron staining formed the upper surface of this yellow mottled zone. This surface was suspected to be a utilized surface as a black slipped burnished bowl rim was recovered from the top of surface. A thick, approximately 15 centimeters, zone of

Figure 5.21. Mound 3 south wall photograph in detail.

homogeneous gray silt with small artifacts and charcoal flecks was packed on top of this utilized surface. Again, I suspect these soils were added wet, contributing to the iron staining forming at the interface of this zone and the one below; a final compact floor or surface capped this thick gray silt zone (see Figure 5.19). Basket-loaded mound construction, consisting of alternating light yellow and dark gray soils, was begun on top of this upper floor/surface (Figures 5.22 through 5.27). Woodland grit- or sand-tempered sherds were recovered from these soils as well as shell-tempered pottery, indicating they were taken from a previously-occupied area of the site. The east wall profile suggests at least two basket-loaded construction episodes with a developed surface between them. Feature 9 was then constructed on the mound summit with very deep (47 to 52 cm deep) and wide (15 to 20 cm wide) wall trenches, suggesting this was a structure of some magnitude.

Figure 5.22. Mound 3 east wall profile photograph.

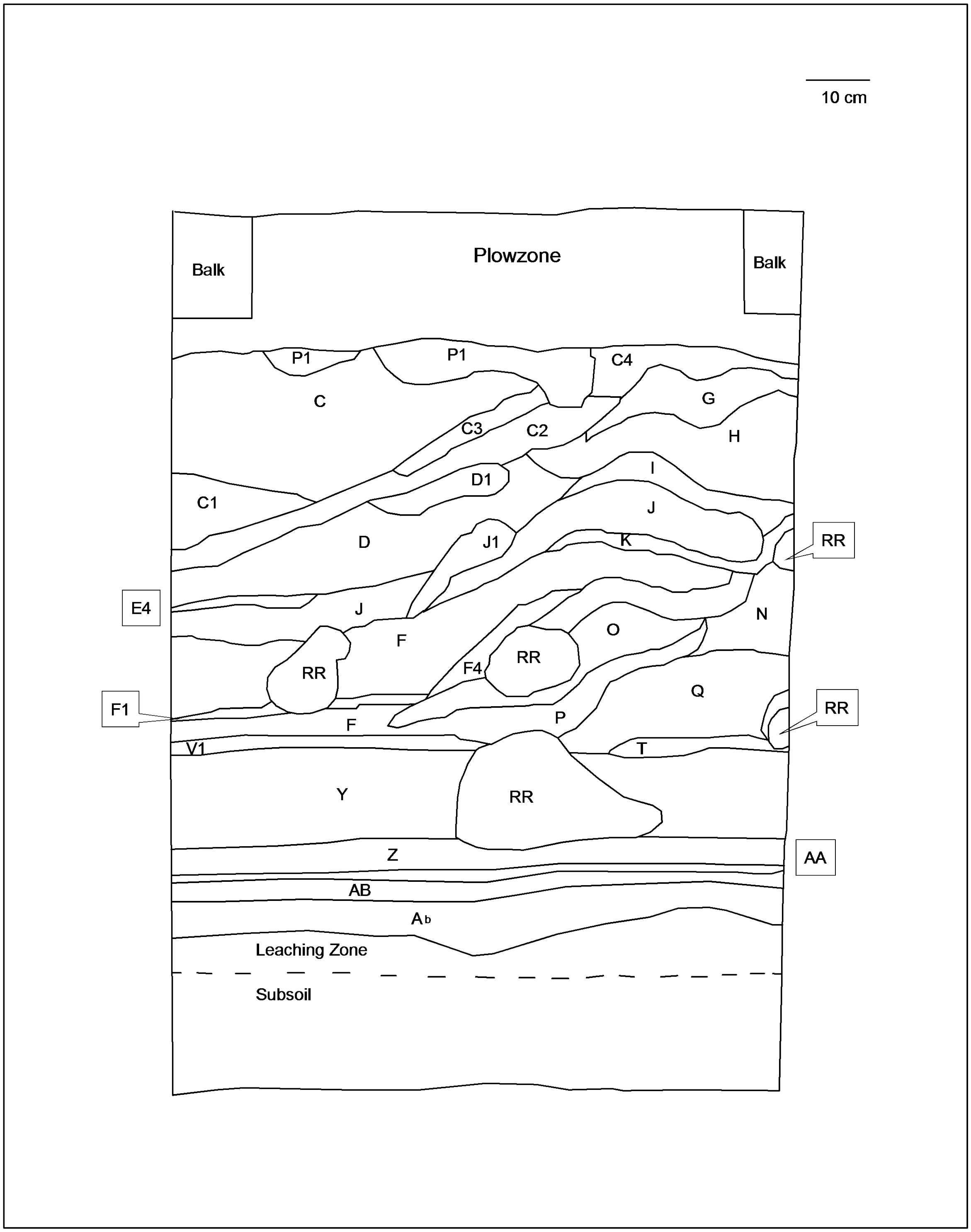

Figure 5.23. Mound 3 east wall profile map (dashed line indicates diffuse boundary) (see Table 5.4 for corresponding fill zones).

Figure 5.24. Mound 3 west wall profile photograph.

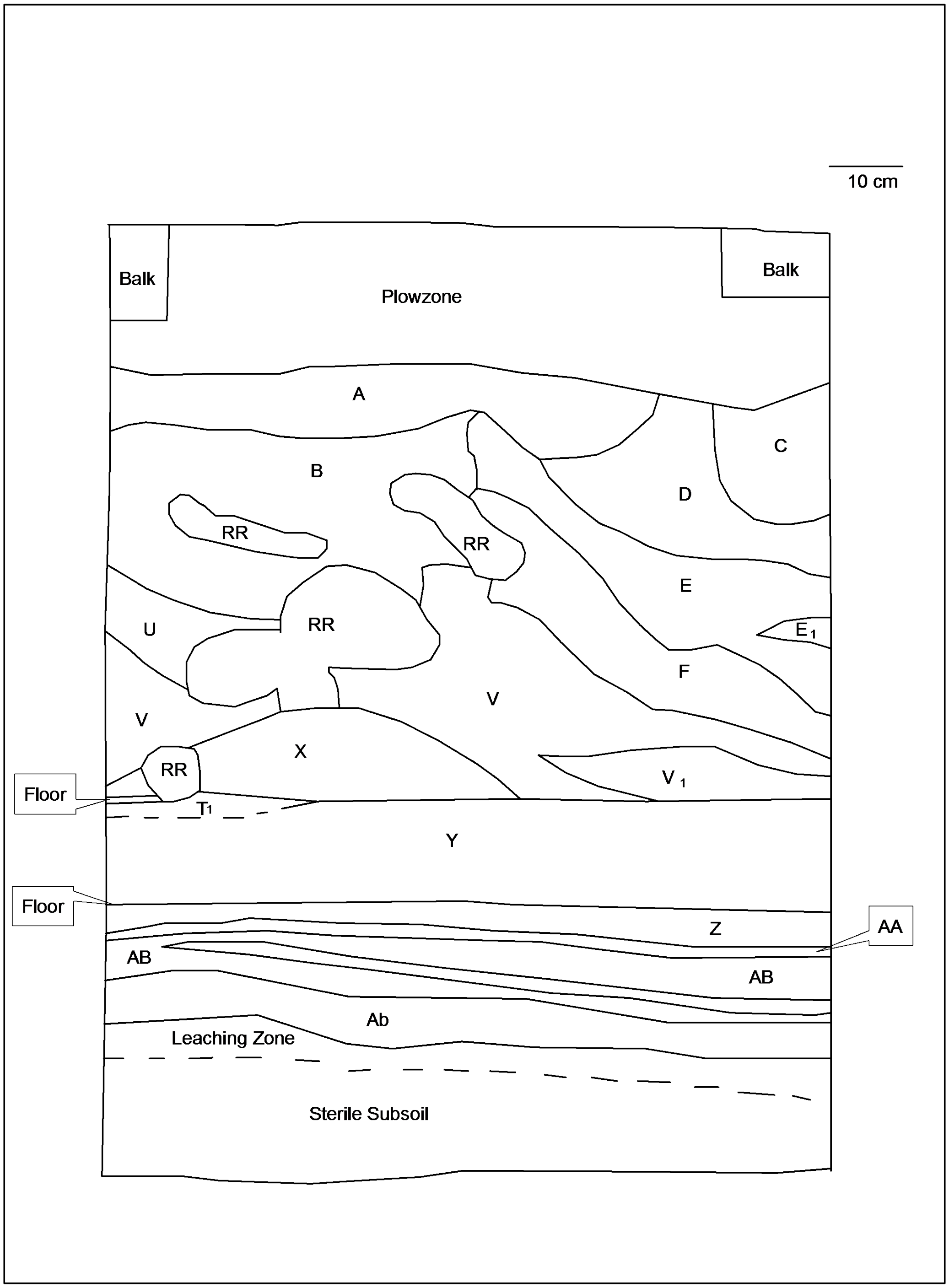

Figure 5.25. Mound 3 west wall profile map (dashed line indicates diffuse boundary) (see Table 5.4 for corresponding fill zone soils).

Figure 5.26. Mound 3 south wall profile photograph.

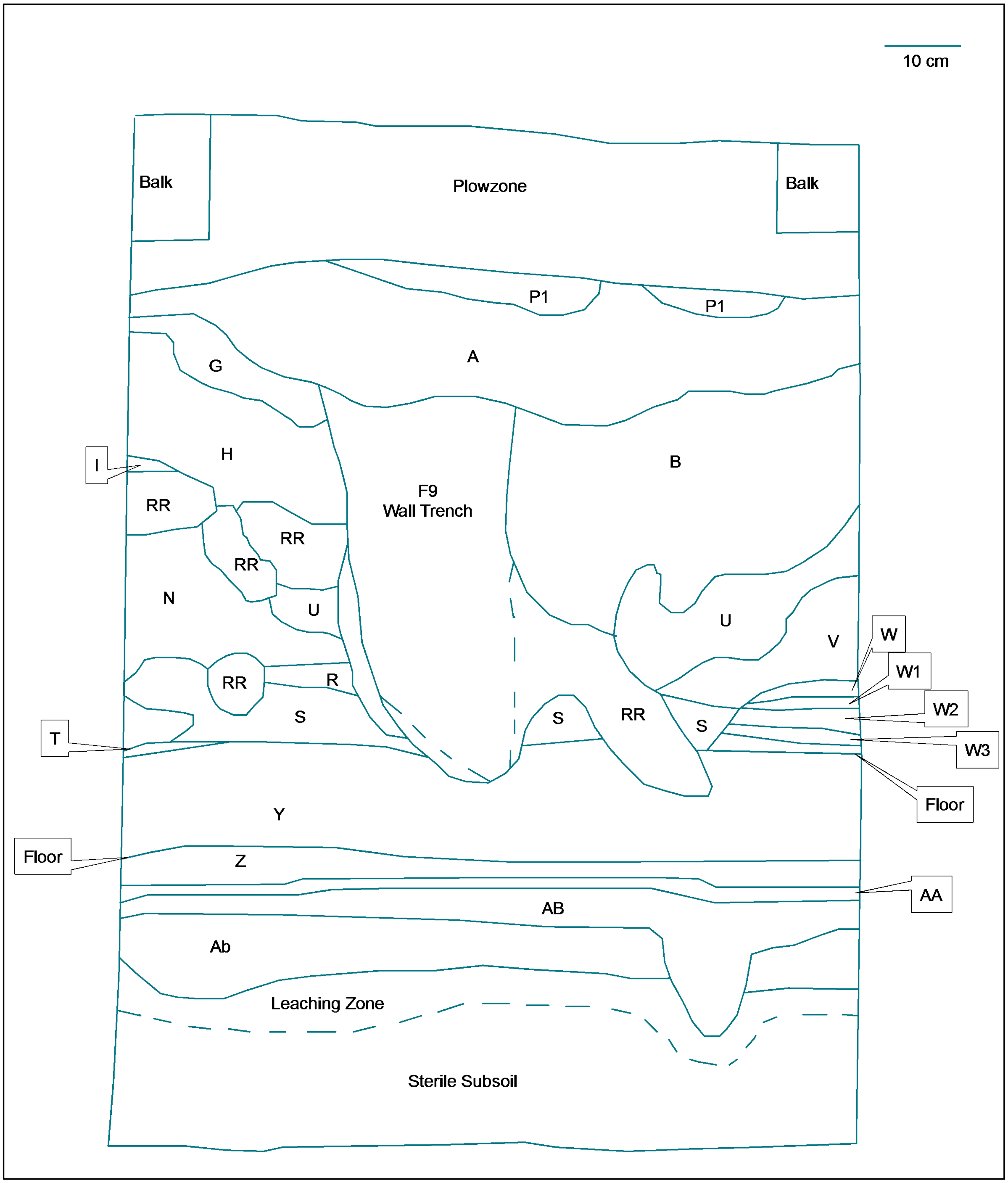

Figure 5.27. Mound 3 south wall profile map (dashed line indicates diffuse boundary) (see Table 5.4 for corresponding fill zone soils).

Table 5.4. Soil Descriptions For Mound 3 Excavation Unit Profiles

Strata	Description
A	10 YR 3/2 silty loam with very few fine mottles of 10 YR 5/6 silty clay and few fine to medium charcoal and burnt clay flecks
B	10 YR 3/2 silty clay loam with common fine to medium mottles of 10 YR 4/4 silty clay and common fine charcoal flecks
B1	Equal amounts of medium to large mottles of 10 YR 3/2 silty clay loam and 10 YR 4/4 silty clay
C	10 YR 4/3 silty clay loam with common medium to large mottles of 10 YR 4/2 silty clay loam and common fine charcoal flecks
D	10 YR 4/3 clayey silt with common fine, medium and large mottles of 10 YR 4/2, 10 YR 5/4, and 10 YR 4/4 silty clay
D1	10 YR 4/3 silty clay loam with few fine mottles of 10 YR 5/6 and 10 YR 3/2 silty clay loam
E	10 YR 4/3 silt with common medium to large mottles of 10 YR 4/2 silty loam, 10 YR 5/4 silt, 10 YR 6/2 silt, 10 YR 5/6 silty clay and very few charcoal and burned sandstone flecks
E1	10 YR 4/2 silt with common fine to medium mottles of 10 YR 4/3 and 5/3 silty loam
E2	10 YR 4/3 silt with common medium to large mottles of 10 YR 5/6, 5/3, and 5/4 silty loam
E3	10 YR 5/3 silt with common fine to medium mottles of 10 YR 5/2 and 10 YR 4/1 silt
E4	10 YR 5/2 silty loam with common fine to medium mottles of 10 YR 4/2 and 4/3 silty loam
F9 WT	10 YR 3/2 silty clay loam with few to common fine mottles of 10 YR 5/4 and 4/4 silty clay loam and very few fine charcoal, burnt clay and burnt hematite flecks
F	10 YR 4/2 silty clay loam with many fine, medium and large mottles of 10 YR 4/3, 5/4, 6/4, and 5/3 silty loam
F1	10 YR 3/1 loamy silt grading to 10 YR 5/2 silt with few fine mottles of 10 YR 4/3 silty loam
G	10 YR 4/3 silty clay loam with common fine to medium mottles of 10 YR 4/4 clay
H	10 YR 4/2 silty clay loam with few fine mottles of 10 YR 4/4 silty clay loam
I	10 YR 4/3 loamy silt with common medium to large mottles of 10 YR 4/2 loamy silt
J	10 YR 4/2 silty clay loam with common medium to large mottles of 10 YR 4/3 silty clay loam and 10 YR 4/1 silty clay loam
J1	10 YR 4/2.5 silty clay loam with few very fine mottles of 10 YR 4/4 silty clay
K	10 YR 4/3 clayey silt with common fine to medium mottles of 10 YR 4/2 clayey silt
L	10 YR 4/3 silty loam with common medium to large mottles of 10 YR 4/2 silty loam
M	10 YR 4/2 silty loam with common medium to large mottles of 10 YR 4/3 silty clay loam
N	10 YR 4/1 loamy silt with few fine mottles of 10 YR 5/4 silt
O	10 YR 4/2 silty loam with few fine mottles of 10 YR 4/3 and few fine to medium mottles of 10 YR 4/1 silt
P	Equal medium to large mottles of 10 YR 4/2 silty loam and 10 YR 4/3 silty loam
Q	10 YR 4/1 silt with many medium to large mottles of 10 YR 6/2 and 5/2 silt
R	10 YR 5/2 loamy silt with few large mottles of 10 YR 4/2 and 4/1 loamy silt
S	10 YR 4/2 silt with few medium to large mottles of 10 YR 5/4 silt
T	10 YR 5/3 loamy silt with few large mottles of 10 YR 6/3 and 5/2 silt
U	10 YR 5/2 silt with many medium to large mottles of 10 YR 5/3 silt and 10 YR 4/2 silt
V	10 YR 4/2 silty loam with many fine to large mottles of 10 YR 6/3 silty clay
V1	Equal large mottles of 10 YR 4/1, 4/2, 4/4, and 5/3 silty loam
W1	10 YR 5/3 silt
W2	10 YR 5/2 silt with common fine mottles of 10 YR 5/3 silt
W3	10 YR 4/1 silt with few fine mottles of 10 YR 5/3 silt

Table 5.4. Soil Descriptions For Mound 3 Excavation Unit Profiles (Continued)

Strata	Description
X	10 YR 4/2 loamy silt with few large mottles of 10 YR 4/3 silt and 10 YR 5/3 silt
Y	10 YR 4/1 silt with common large mottles of 10 YR 4.5/1 ashy silt
Z	10 YR 4/2 ashy silt with many fine, medium, and large mottles of 10 YR 6/3 silt
AA	10 YR 4/2 grading to 10 YR 4/1 ashy silt
AB	Ashy lens with mixture of 10 YR 3/1, 4/1, and 5/1 ashy silt and many medium to large charcoal chunks and common medium mottles of 10 YR 4/2 ashy silt, and, in most of the west and north walls, a 1 to 1.5 cm thick black burned lens of fiberous material
Ab	Buried A horizon, 10 YR 3/1 loamy silt with few fine to medium mottles of 10 YR 5/2 silt
Leaching Zone	10 YR 5/2 silt
Sterile Subsoil	10 YR 5/3 silt
RR	Rodent Run

Mound 4

Mound 4 was a small mound located near the western edge of the site. A one-meter by one-meter unit excavated into the summit of this mound revealed basket-loaded mound fill of light and dark soils with flecks of burned and unburned hematite (Figure 5.28 and 5.29). Beneath the mound fill was a feature (Feature 8) containing sand-tempered, rocker-stamped Middle Woodland pottery sherds, small flecks of hematite, burned sandstone, and a small amount of bone. Feature 8 appeared higher in the northeast corner of the unit and sloped downward in the other walls, suggesting that this feature could be part of a previous Middle Woodland mound (Figure 5.30 and Figure 5.31). On top of Feature 8 was a yellow mantle followed by a darker mantle, which were then capped with basket loads of light and dark soil (Figures 5.32 and 5.33]. A small amount of shell-tempered pottery was recovered from the basket-loaded fill of Mound 4, indicating Mississippian origin for those additions. At the very least, Feature 8 was part of the Middle Woodland occupation of the site; seemingly the location of this feature was cited by the Mississippian occupants of Copper by the construction of a mound over the top of it.

Figure 5.28. Mound 4 west wall profile photograph.

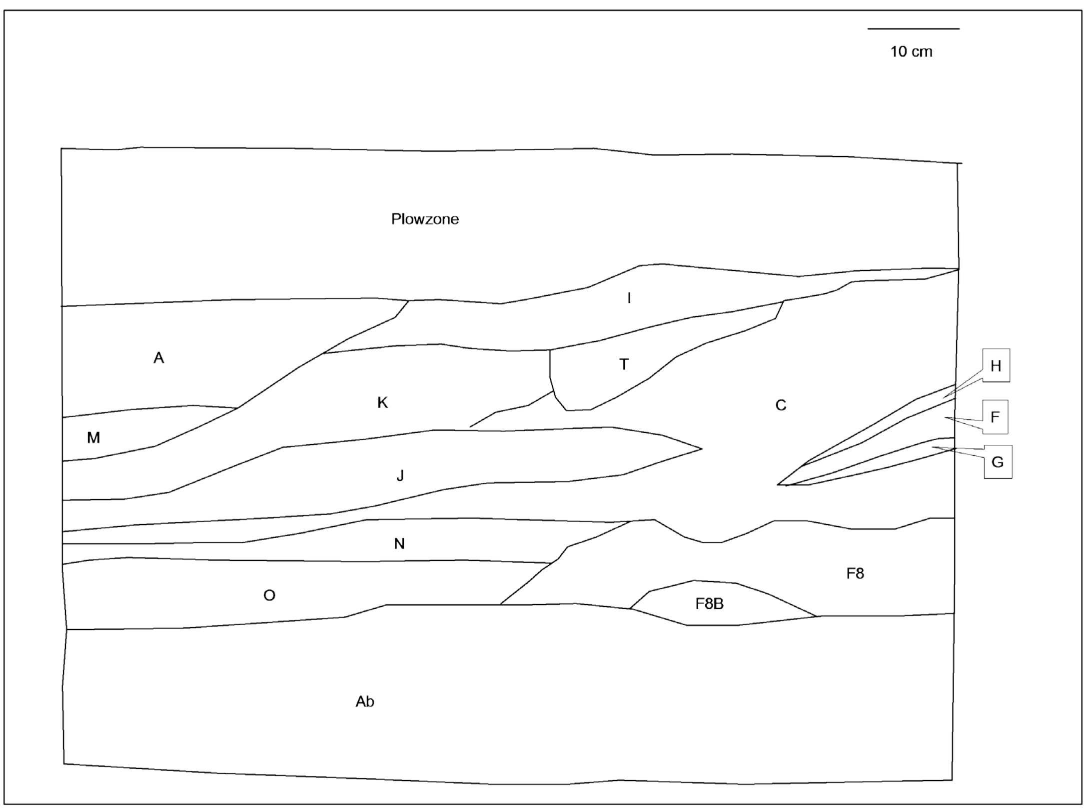

Figure 5.29. Mound 4 west wall profile map (see Table 5.5 for corresponding fill zone soils).

Figure 5.30. Mound 4 east wall profile photograph.

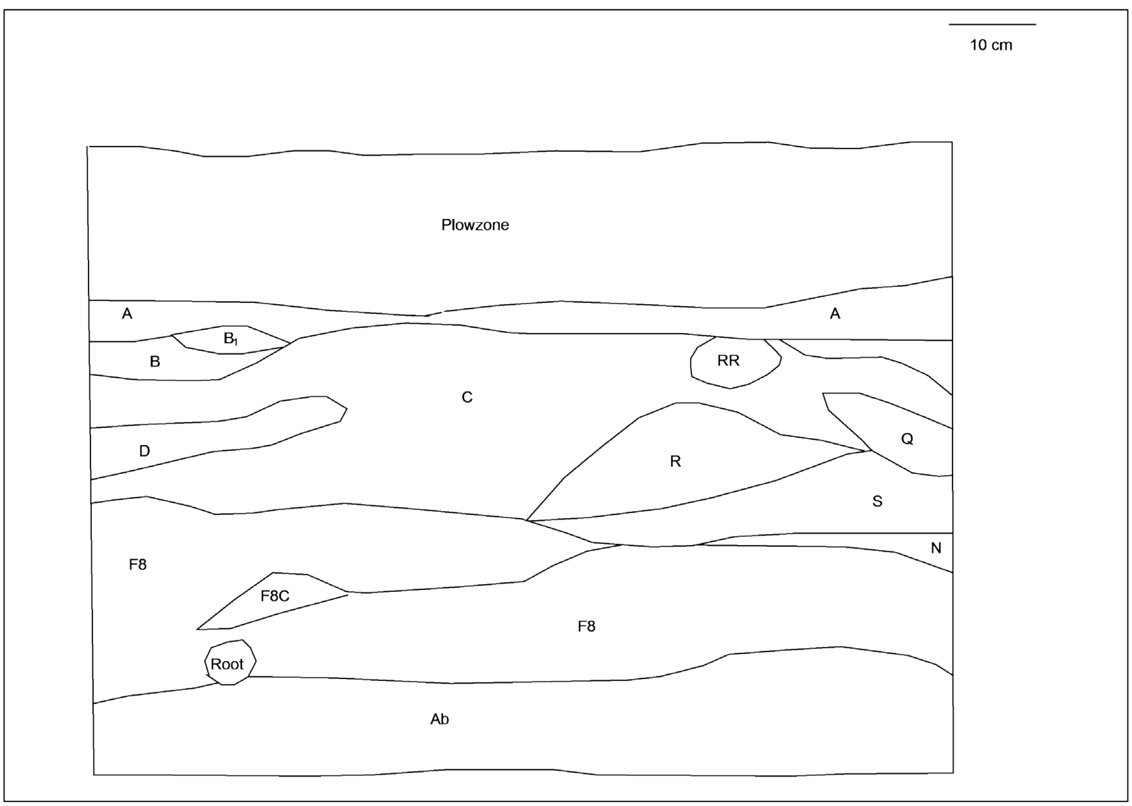

Figure 5.31. Mound 4 east profile map (see Table 5.5 for corresponding fill zone soils).

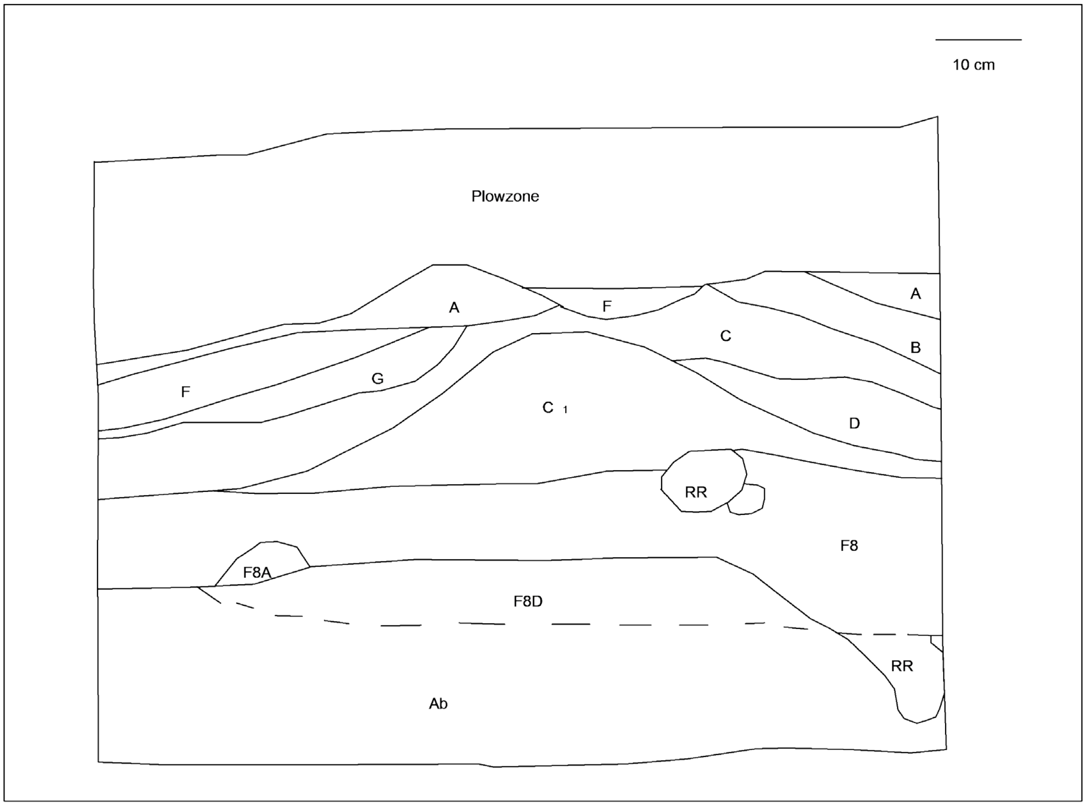

Figure 5.32. Mound 4 north wall profile map (dashed line indicates diffuse boundary) (see Table 5.5 for corresponding fill zone soils).

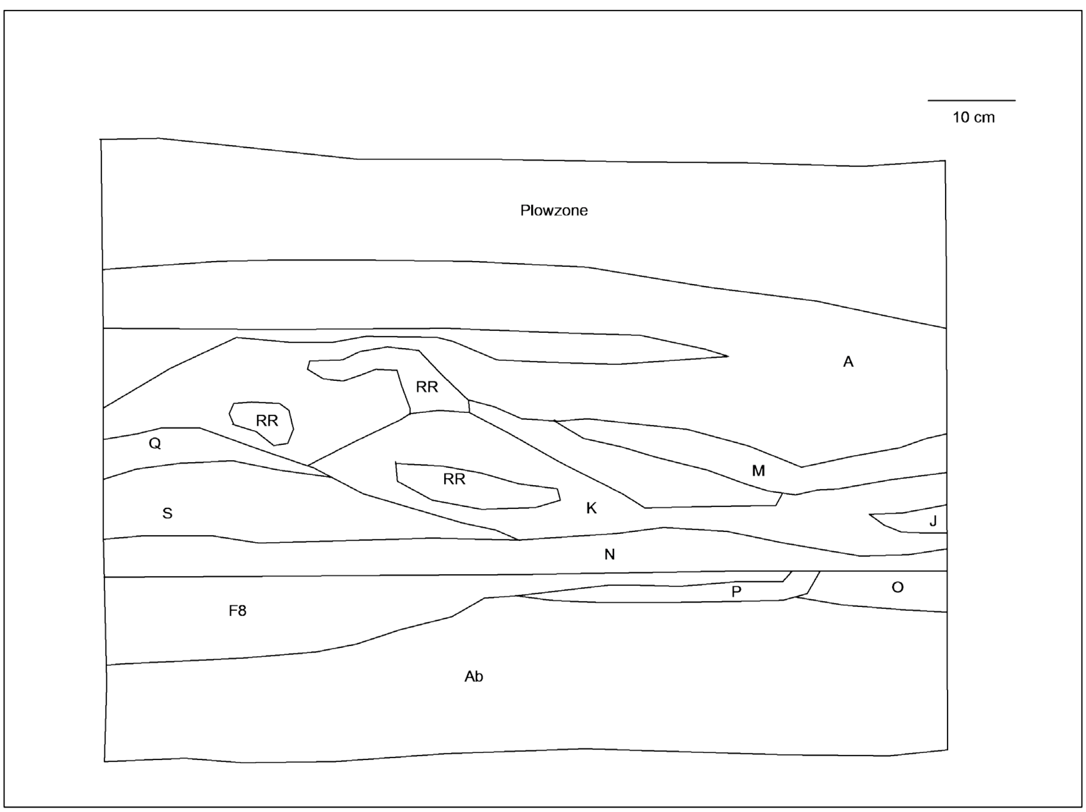

Figure 5.33. Mound 4 south wall profile map (see Table 5.5 for corresponding fill zone soils).

Table 5.5. Soil Descriptions For Mound 4 Excavation Unit Profiles

Strata	Description
A	10 YR 3/3 silty loam with few fine charcoal flecks and few fine mottles of 10 YR 5/6 clay loam
B	10 YR 4/4 silty loam
B1	10 YR 4/2 silty loam
C	10 YR 4/3 clay loam with many fine to coarse mottles of 10 YR 4/6 clay loam and few charcoal and burnt sandstone flecks
C1	10 YR 3/4 silty loam with many fine mottles of 10 YR 4/3 silty loam
D	10 YR 4/2 silty loam with many fine mottles of 10 YR 4/6 silty loam
F	10 YR 4/4 clay loam with many fine mottles of 10 YR 3/2 silty loam
G	10 YR 4/6 clay loam with many fine mottles of 10 YR 3/2 silty loam
H	10 YR 4/3 silty loam
I	10 YR 4/3 clay loam with many coarse mottles of 10 YR 5/6 clay loam
J	10 YR 4/4 clay loam
K	10 YR 3/2 silty loam
M	10 YR 3/4 clay loam with few fine charcoal flecks and many coarse mottles of 10 YR 4/6 clay loam
N	10 YR 3/6 clay
O	10 YR 3/3 silty clay loam
P	10 YR 3/6 silty loam
Q	10 YR 4/3 silty loam with many very fine mottles of 10 YR 5/4 silty loam and few charcoal flecks
R	10 YR 5/6 silty loam
S	10 YR 4/4 silty loam with many very fine mottles of 10 YR 3/3 silty loam
T	10 YR 3/3 clay loam
F8	10 YR 3/3 silty loam with few hematite flecks, burnt sandstone flecks, and charcoal flecks
F8A	10 YR 3/2 silty loam with few medium mottles of 10 YR 4/6 clay loam
F8B	10 YR 4/6 silty loam
F8C	10 YR 5/4 clay loam with few fine mottles of 10 YR 5/3 silty loam
F8D	10 YR 4/4 clay loam with few coarse mottles of 10 YR 4/6 clay loam
Ab	Buried A horizon – 10 YR 4/3 silty loam

Copper Site Radiocarbon Dates

Samples for radiocarbon dating from the Olin site were sent to the Illinois State Geological Survey (ISGS) in Champaign, IL. Two samples (CI-623 and CI-624) were taken from a concentration of nutshell near the base of Mound 3. Both samples were taken from the same nutshell concentration and were directly associated with pan rims, bowl rims, and a high rim angled-neck jar (see Chapter 6). The third radiocarbon assay was taken from a piece of wood charcoal recovered from the basin fill of Feature 3. Ceramics from Feature 3 included at least three high-rim angled neck jars that fit with Holley et al.'s (2001) "Shiloh Complex" (see Chapter 6). The three radiocarbon assays provided dates ranging from A.D. 777 to 1154 (one sigma range, calibrated using Calib 7.0, Reimer et al. 2013) (Table 5.6 and Figure 5.34).

Table 5.6. Radiocarbon Assays From Copper, Illinois State Geological Survey

ISGS #	Sample #	Provenience	Sample Type	C14 Date	Calibrated Date	
					One sigma confidence	Two sigma confidence
6981	CI-625	Feature 3	Wood Charcoal	990 +/- 70 BP	AD 987-1056 (48.8%) AD 1076-1154 (51.2%)	AD 896-926 (4.5%) AD 924-1208 (95.5%)
6982	CI-624	Mound 3a	Nutshell	1030 +/- 70 BP	AD 898-924 (12.9%) AD 945-1046 (71.7%) AD 1093-1120 (12.9%) AD 1140-1147 (2.6%)	AD 778-790 (0.8%) AD 826-840 (0.7%) AD 863-1169 (98.4%) AD 1178-1181 (0.1%)
6883	CI-623	Mound 3b	Nutshell	1150 +/- 70 BP	AD 777-792 (9.3%) AD 802-844 (22.7%) AD 856-969 (68%)	AD 694-703 (0.9%) AD 707-746 (5.8%) AD 763-1017 (93.3%)

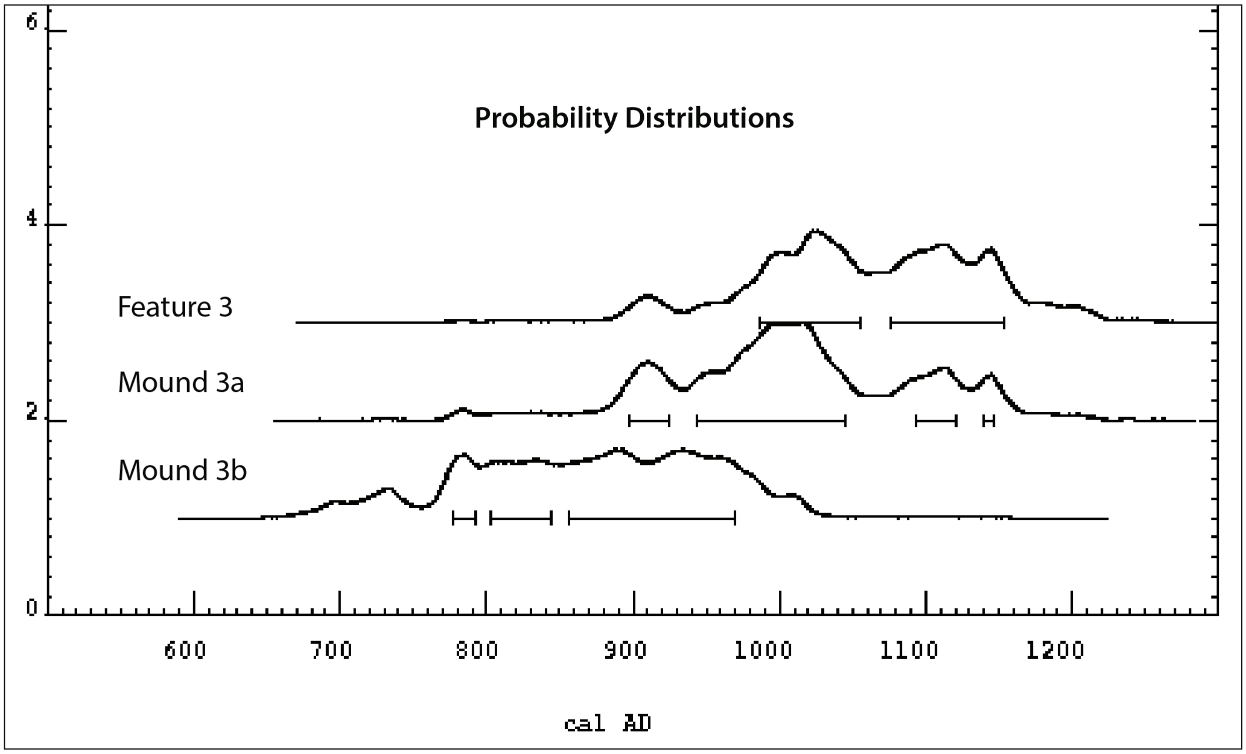

Figure 5.34. Probability distribution for radiocarbon assays from the Copper site.

Copper Site Feature Discussion

While excavations at the Copper site were minimal, some suggestions regarding changes in structures during this time period can be made. Clearly, no domestic structures were excavated in this portion of the site, though local collectors have suggested additional (burned) structures were located in the southern portion of the site (see Chapter 4). As such, I am not able to comment on changes in typical domestic dwellings at Copper during this time period. The non-domestic structures excavated (Feature 3 and Feature 4) clearly indicate the replacement of one type of specialized structure – the small square building with formal hearth – with a large, more inclusive public structure of the “council house” type. Both structures are located near Mound 4 and were potentially companion structures for activities associated with that mound. The single wall trench of Feature 9 indicates the continued construction of mound-summit buildings during the occupation of the Copper site. Geophysical survey of the areas around Mound 3 and Mound 4 suggest potential for other large, non-domestic structures. No circular structures were identified during excavations, however, the geophysical survey of the area between Mounds 3 and 4 do show circular anomalies that require ground-truthing.

Prior to excavation, the Copper site was presumed to have a Sand Prairie phase (A.D. 1275-1350) occupation based on ceramics recovered by local collectors (Koldehoff et al. 1983). The calibrated radiocarbon dates for the base of Mound 3 and the basin fill of Feature 3 are anomalously early for Sand Prairie. One date from beneath the mound appears to be too early overall as it pre-dates the Mississippian period, the second mound date and the date from Feature 3 cluster pretty tightly. These dates indicate mound construction may have dated to the late part of the 12th century (late Stirling phase) or very early 13th century (early Moorehead phase). While the possibility exists for Mound 3 to have been an early construction while Features 3 and 4 represent a later re-occupation of the site, this does not seem likely. The rim sherd of a pan with cordmarked exterior was recovered in direct association with the dated nutshell below the mound while a nearly identical rim sherd was recovered from the fill of a pit located in Feature 4 (Feature 23), indicating contemporaneity between the base of the mound and the in-filling of this pit. Likewise, the possibility remains that these dates are not reliable due to contamination or the inherent imperfections of radiocarbon dating.

The profile of Mound 3 at Copper suggests continuity with previous mound-construction techniques, though perhaps with some minor changes. Elements of water, earth, and fire continue to be related through the construction of this mound, much like Mound 34 and Mound 49 at Cahokia (Kelly and Brown 2010; Pauketat et al. 2010). It is the water-laid silts that appear to be most interesting in the case of Mound 3 at Copper. While previous in-silting may have occurred as a result of large-scale rain events at other mounds and in non-mound contexts (such as the Pfeffer temple or the Emerald center post) as evidenced by thin, laminated bands of silt with some water-washed sands, and iron staining at the boundaries, the base of the Copper Mound 3 was initiated with a thick homogenous lens of gray silt with no water-washed sands or banding. As such, I argue that these soils were intentionally collected from a water-logged location and sorted for cleanliness and consistency (not too-dissimilarly from the gathering and sorting of clay for pottery production). I believe these wet silts were then packed into the base of the mound (possibly even into the basin of a pre-mound structure) to create an initial platform or clean surface upon which to begin. Ash, charcoal, and burned materials were then added over the top of this surface prior to the addition of basket loads of oppositional soils. While water, fire, and earth were commingled, perhaps the relationships among them shifted slightly – previously rain from the Upper World was combined with soils from the Under World while now wet silts were collected from the watery Under World. Instead of terminating a submound structure via burning in situ, the watery submound surface of Copper Mound 3 was packed with ash and charcoal.

Feature evidence from the Olin and Copper sites, while supporting some of the general trends noted for the Cahokia area (increasingly square buildings, discontinuation of “architecture of power”, incorporation of marker posts into public structures) also suggests diversity in the historical trajectory of structure and pit use in the uplands. Occupants of the Olin site actively rejected Cahokian “architecture of power” during the early part of the occupation of the site, while the occupants of the Copper site were active participants in the architectural transformation through the construction of a large rectangular council house structure. Both sites also share unique architectural trends that appear to have occurred briefly during the Moorehead phase:

the use of formal square puddled hearths, and a building orientation reminiscent of the early reorganization of the urban Cahokian landscape.

CHAPTER 6. THE MOVEMENT IN THE MUNDANE: TRANSFORMING CERAMIC RELATIONSHIPS

Pottery is multi-relational, participanting in the everday relationship of production and consumption of food, while also active agents in extra-domestic practices of commensal politics and religious offering. As objects that entangle elements (earth, fire, water), forces (chemical and mechanical transformation from liquid to solid), identities (gender, class, ethnicity), relationships (potting groups, domestic groups, religious community) and practices (production, cuisine, ettiquette), ceramic vessels are multidimensional keys to understanding these past practices, relationships, and processes. As an additive technology, pottery retains the steps of production, the material biography or chaine opertoire, that result in a final product (Dobres 1999; Dobres and Hoffman 1994). Likewise, pottery retains evidence of use, the scars of its biography, so-to-speak, which provide clues regarding the practices, the persons, and the other things with which that object was engaged.

Moreover, the process of pottery production and use – like any material practice – is equally a process of relating; potting relates earth to water to fire to food to body in a multitude of configurations. As such, changes in the material components of pottery and food production and use are equally changes in the social, political, and religious relationships in which pottery and food are engaged. This is especially true in instances in which food is prepared and consumed publicly in the practice of so-called "commensal politics" of feasting (Dietler 2001), though I would argue that commensal politics may occur even within small group settings, specifically during the initiation and spread of a religious movement in which food and pottery are engaged. Changes in pottery are thus social, political, and religious transformations enacted in daily practice and experience (perhaps through ‘utilitarian’ pottery) and potentially initiated by individuals or small groups of pottery producers.

Technological style, the knowledgeable practices of production, has shown to be more closely indicative of group identity (or at least of learning-group-identity or production-group identity) than solely decorative style (Hegmon et al. 2000; Lechtman 1977). Technological style includes the recipe of the paste (e.g., clay source, temper type, size, amount, and combination, and the method and grammer of production, decoration, and firing). Technological style has been demonstrably useful in the American Bottom and other, Mississippianized, areas of the Midwest and Midsouth as a means of identifying particular potting traditions and movements of potting groups (Alt 2006a; Millhouse 2012; Zych 2013). Technological style, identified through attribute analyses as opposed to typological analyses, may equally be useful in identifying changes in production technique that suggest new potting groups or, conversely, newly introduced pottery styles made by local potters.

Attributes of Cahokian ceramics have also been instrumental in constructing a Cahokian chronology. This dynamic chronology, decades in the making, is based on ceramic seriation and suite of corroborating radiocarbon dates (Table 6.1). Initial ceramic distinctions were made between “Old Village” and “Trappist” foci, following the Midwest Taxonomic System, by James Griffin (1949). This division incorporated Powell Plain (shell-tempered plain or slipped jars with sharp shoulders and rolled lips), Ramey Incised (shell-tempered slipped and polished jars with sharp shoulders, rolled lips, and incised decoration on the shoulders), and Monks Mound Red (limestone-tempered red-slipped vessels) into the “Old Village” focus. The “Trappist” focus thus included St. Clair Plain (plain-surfaced shell-tempered globular vessels), Cahokia Cordmarked

Table 6.1. American Bottom Chronology (adapted from Holley 1989)

Date	Fortier et al., (2006)	ICT - II (Holley 1989)	FAI-270 (Kelly et al. 1984; Milner et. al. 1984) North	FAI-270 South	Fowler and Hall (1972)	O'Brien (1972)	Hall (1966)	Vogel (1964)	Griffin (1949)
A.D. 1600			Vulcan	Vulcan	Unnamed				Trappist Focus
A.D. 1500	Vulcan / Bold Counselor		Vulcan	Vulcan	Sand Prairie	Period VI	Trappist	*Late*	Trappist Focus
A.D. 1400	Bold Counselor / Sand Prairie		Sand Prairie	Sand Prairie	Sand Prairie	Period V	Trappist	Mississippian	Trappist Focus
A.D. 1300	Moorehead	Moorehead	Moorehead	Moorehead	Moorehead	Period V	*Late* Stirling	Mississippian	Trappist Focus
A.D. 1200	Stirling	*Late* Stirling	Stirling	Stirling	Stirling	Period IV	Stirling *Early*	*Early*	Old Village Focus
A.D. 1100	Lohmann; Edelhardt, Lindeman; Merrel, George Reeves	Stirling *Early*; Lohmann	Lohmann	(Lindhorst)	Fairmount	Period IV	Early Cahokia		Old Village Focus
A.D. 1000	Loyd, Range; Collinsville, Dohack	Lohmann	Edelhardt; Merrel	Lindeman; George Reeves	Fairmount	Period III	Early Cahokia	Merrell	Old Village Focus
A.D. 900	Sponemann		Loyd	Range; Dohack	Unnamed (Jarrot)	Period II		Loyd	
A.D. 800	Patrick		Patrick	Patrick	Patrick	Period I			
A.D. 700	Patrick		Patrick	Patrick	Patrick	Period I			
A.D. 600									

(shell-tempered globular jars with cord-roughened surfaces and everted to angled rims), Cahokia Red Filmed (shell-tempered vessels with red slipping), Well's Incised (shell-tempered plates with incised decoration on the flange), Tippets Bean Pot (beakers with handles), and salt pans.

This was further refined by Joseph Vogel (1964; 1975), Robert Hall (1966) and Patricia O'Brien (1972), among many others. Vogel (1964) presented a succession of the major ceramic types in an evolutionary schema, from grit-tempered cordmarked and plain vessels of the Late Woodland, through the shell-tempered plain-surfaced vessels of the Late Mississippian period. Interestingly, Vogel (1964) depicts Cahokia Cordmarked jars and Wells Incised plates outside of his evolutionary trajectory of all other vessel types in his diagram of the American Bottom ceramic sequence. O'Brien (1972) seriated the ceramics into Periods I-IV using data from salvage excavations at Cahokia's Powell Tract. These periods ranged from the Late Woodland occupation of the Powell Tract with grit- and grit-grog- tempered pottery (Period I), through the appearance of shell-tempered pottery, and finally, with a recognition of a small Upper Mississippian occupation (Period IV) (O'Brien 1972).

The 1971 Cahokia Ceramics Conference resulted in an agreed upon sequence of ceramic chronology, including the currently used Stirling, Moorehead, and Sand Prairie phases (Fowler and Hall 1975). The Stirling phase was here equated to the early part of what had been defined as "Old Village," while the later part of "Old Village" became the Moorehead phase and the "Trappist" phase corresponded largely with the Sand Prairie phase. Ceramic types identified as part of the redefined Moorehead phase include the appearance of a "shell-tempered, cordmarked pottery (Cahokia Cordmarked)" and the "shell-tempered bean pot form with handles (Tippets Bean Pot);" additionally, "Wells Incised is anticipated during this period with a black-polished plate with very narrow rims and broad trailing" (Fowler and Hall 1975:7). These latter ceramics are described as in use through the (then) newly-named Sand Prairie phase, with increasingly-wider-rimmed plates with narrow incised decoration. Consensus at the Cahokia Ceramics Conference also led to the shifting of O'Brien's Period V to follow Period I (see Table 6.1).

Analysis of extensive artifact assemblages excavated during the FAI-270 project (Bareis and Porter 1984) led to a refinement in the chronology, specifically in the earlier phases – identifying a Terminal Late Woodland sequence and succeeding early Mississippian Lohmann phase. In the analysis of ceramic material from Cahokia's ICT-II, George Holley (1989) identified an earlier and a later component to the Stirling phase. In so doing, Holley (1989:161) noted that the separation between the early Stirling and the late Stirling was a statistical one and each subdivision may not be temporally symmetrical. Similarly, Timothy Pauketat (1998) recognized an earlier (M1) and later (M2) component to the Moorehead phase during analysis of Tract 15A/Dunham Tract material. Most recently, a recalibration of the radiocarbon dates for American Bottom sites led to the current iteration of the chronology, with the earliest Mississippian phase, the Lohmann phase, beginning at A.D. 1050, the Stirling phase between A.D. 1100-1200, the Moorehead phase between 1200-1300, and a final "rump phase" of Mississippian known as Sand Prairie phase between 1300-1375 (Fortier et al. 2006; Woods and Holley 1991). This final Sand Prairie phase of the chronology was retained throughout the various reconfigurations; however, the identifying markers of this phase can all be encompassed within the Moorehead phase, leaving the validity of this phase distinction to be questioned.

Importantly, the division between what are now known as the Stirling phase and the Moorehead phase, which has been based largely on macroscopic ceramic differences, has been maintained throughout, as demonstrated by the chronologies depicted in Table 6.1. This underscores the real material transformations that occurred (marked by clearly different ceramics) at the onset of the Moorehead phase. These transformations can be compared to the material changes that marked the beginning of the Mississippian period in the American Bottom, including changes in pottery, methods of house construction, and intra-site spatial organization that unified Cahokia as a city during the Lohmann phase.

As discussed in Chapter 2, the movement of particular ceramic wares, most specifically Ramey Incised jars, has often been used to support the supposition of Cahokian migrations and interactions (Hall 1991; Kelly 1991; Pauketat and Emerson 1991b; Wilson et al. n.d.). Given its entanglement with the "Classic" Stirling phase Cahokian religio-political influence on the region and a seemingly standardized technological style among Ramey Incised vessels between sites spread across the Midwest (Pauketat 2013c), Ramey vessels have been suggested to be created by specialized artisans (Emerson 1989; Pauketat and Emerson 1991). Furthermore, Pauketat (2013:192-193) suggests the production of decorated pottery, especially Ramey Incised, "was also likely restricted to clans in possession of certain sacred bundles." The production of "craft" objects or even seemingly everyday tools used for particular purposes, specific groups of people with social obligations, and places, were intertwined through and with cosmically or religiously charged objects like bundles. The relationships created through gathering the requisite parts for religious practices may have been one of the major threads that held Cahokia together as a city. Such objects, through the necessary practices in which they were engaged, would have become objects of both religious and political power. Indeed, Ramey Incised jars were constitutive elements of Cahokian religious-politics.

As part of the large-scale social changes that took place during the Stirling-to-Moorehead phase transition, domestic and extra-domestic pottery types changed dramatically. These transformations included the reduction in iconographic motifs and eventual discontinuation of Ramey Incised vessels, the appearance of a new quotidian vessel type (Cahokia Cordmarked), and the appearance of new serving vessel types (everted-rim bowls, plates, platters) in conjunction with new iconographic motifs (sunburst and alternating diagonal lines). Holley (1989:215) suggests that "during the Moorehead phase, the potter retooled the craft and created essentially new products… aspects of these new products 'look back' to the Woodland heritage…perhaps result of the limitations of technology and tradition." Conversely, this may have been an intentional citation of a pre-Stirling era, as much of the pottery production appears to return to the local potting groups and perhaps non-specialized potters.

The following data demonstrate these trends in ceramics between the Late Stirling and the early Moorehead phase around the Cahokia area. Specifically, the ceramic data from the Olin and Copper sites suggest a number of these changes take place at varying rates and in differing proportions at each site. The material changes in the ceramic assemblage were material innovations simultaneously rejecting particular Stirling phase material political-religious entanglements while creating new material relationships of pottery production, and food and drink consumption. These new relationships were not solely with other persons or with the finished product of the vessel, but with new elements and ingredients as well.

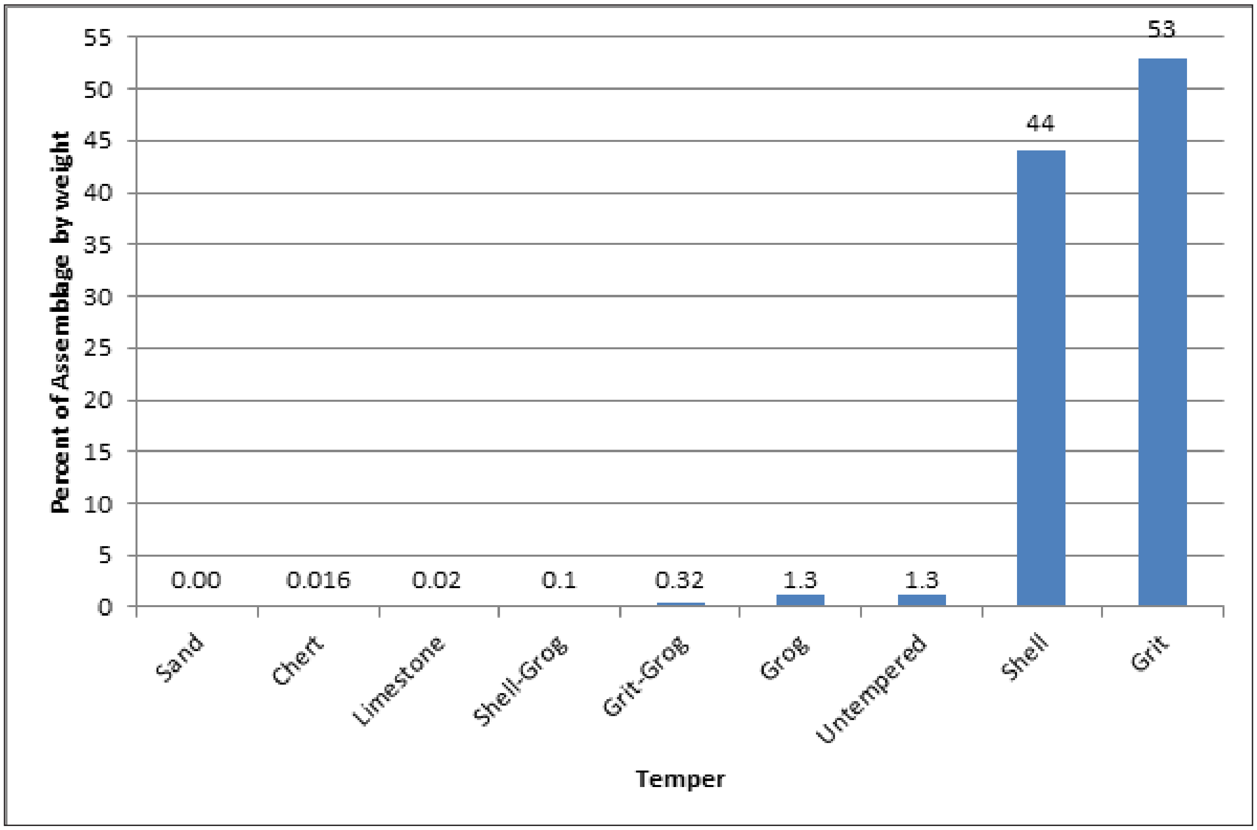

Figure 6.1. Temper types of body sherds at Olin.

Olin Ceramics Data

Body Sherds

A total of 35,874 body sherds, weighing 82223.9 g (82.2 kg), were analyzed from the Olin site. The majority (53 % by weight) of body sherds were shell tempered, though owing to a fairly significant Late Woodland occupation of the site, approximately 44 percent of body sherds by weight were grit-tempered (Figure 6.1). Approximately 1.3 percent of body sherds are untempered fragments of pinch pots, with another 1.3 percent tempered with grog. Less than one percent of the assemblage was comprised of shell-grog, grit-grog, limestone, chert or sand tempering. All sherds tempered with forms of grit (including chert, sand, and limestone) were presumed to be from the Late Woodland occupation and were therefore not analyzed beyond tabulating temper and surface treatment.

The combination of shell and grog temper has been shown to become more prevalent during the later Moorehead phase (Holley 1989).Comparing temper with surface treatment among body sherds, shell-grog-tempered sherds tended to have plain surfaces, indicating (Appendix B Table B.1). The incorporation of increased amounts of grog temper may indicate reduced access to shell for tempering, especially at a fortified site like Olin, though given the abundant availability of other water resources (e.g., fish, see Appendix C), this does not seem to be the case here. Perhaps this tempering difference is an indication of shifting relationships of potting groups and potting knowledge within the region. Grog temper may suggest new groups of potters present in the American Bottom, as this was a common tempering agent to the south, including sites in central and eastern Tennessee (Garland 1992). The combination of tempering agents may be a hybrid practice, similar to the combined grit-and-shell or limestone-and-shell tempering used during Cahokia's initial coalescence (Holley 1989). This tempering agent may have in part become an element in the Moorehead phase revitalization; much like the use of shell-tempering may have been the physical inclusion of the watery underworld into the vessel, perhaps the use of grog became a means by which to physically insert the past (as bits of crushed pots) into the present (the newly made vessel).

Among the shell, shell-grog, and grog-tempered body sherds, cordmarking was the most common surface treatment (51% by weight, 46.5% by count) (see Appendix B Table B.1). This predominance in cordmarking is significantly greater than that noted for the nearby Old Edwardsville Road site (8.5% by count; Jackson 2003) as well as for Cahokia's ICT-II (10.1 % by count; Holley 1989) and Tract 15A-DT M1 subphase assemblage (12 %; Pauketat 1998). Pauketat's (1998:217) M2 subphase at Tract 15A-DT had similar proportions of cordmarked exterior surfaces (48%). While the high percentage of cordmarking may be a factor of location (Olin is located the furthest north of most excavated and analyzed Moorehead phase sites in the American Bottom and in closer proximity to the Lower Illinois River Valley) these proportions also support a mid-Moorehead phase or later occupation of Olin. Minimally, Olin appears to have a later Moorehead phase occupation than that of ICT-II and Old Edwardsville Road (though see below for argument against the assignment of a Moorehead phase occupation of Old Edwardsville Road).

Plain surfaced body sherds comprise 22.5% of the body sherds, dark slipped 14.2%, red slipped 9.6%, and tan slipped just under 1%. In addition to these general surface treatments, four body sherds (235.9g) appear to have been painted with red stripes, one which has two intersecting stripes in what may be a cross-like design. Four body sherds (8.6 g) have incised exterior surfaces with no slipping, while one sherd (2.7g) appears to have been net-impressed.

The ratio of dark slipped body sherds to light slipped (red or tan) is approximately 1.34, similar in proportion to that noted in the Moorehead phase assemblage at ICT-II (1.5; Holley 1989). As Holley (1989) has suggested, light slips – especially red slipping which had been common prior to the Stirling phase – regained prevalence during the Moorehead phase. While this return to red slipping may have been citational of pre-Stirling practices in the material revitalization movement, it also suggests changing relationships with and between the elements used in producing this slip (e.g., hematite, water, air, and fire). The decreased use of dark slips (produced in a covered, reducing environment) and an increase in light slips (produced in an open, oxidizing environment) may be entwined with the move towards openness and inclusivity that begins with the Moorehead phase. Furthermore, red slipping was perhaps becoming entangled with the violence-as-revitalization, given the associations between the color red and warfare in the greater southeast at the time of European contact (Dye 2006; Hudson 1976).

Forty-six (55.3 g) of the body sherds were decorated with incised or trailed lines, typically representing fragments of Ramey Incised jars or Mound Place Incised bowls. Mound Place Incised is a type of bowl with incised lines around the rim, usually with head or tail effigy adornos; this vessel type is typically found in southeast Missouri, western Kentucky, and central and eastern Tennessee (Garland 1992; Phillips et al 1951) and has been recovered from Moorehead phase assemblages at Cahokia and the American Bottom region (Holley 1989; Pauketat 1998, 2013; Phillips et al. 1951). Decorative motifs were difficult to garner from small body sherds and will therefore be discussed in the context of decorated vessels.

Non-vessels

Non-vessels, as defined in Chapter 4, consist of portions of rims that are smaller than 5% of the orifice, fragmentary portions of questionably identifiable vessel types, ceramic objects and appendages. Approximately 762 non-vessels were recovered from 11MS133, including 18 ceramic objects (Appendix B Table B.2), appendages (Appendix B Table B.3), and 744 portions of vessels too small to further analyze (Appendix B Table B.4).

Tentatively identifiable non-vessel portions appear to represent fragments of vessels roughly proportionate to the assemblage represented by larger rim sherds. Vessel portions include lips, rims, appendages, and body sherds. At least 12 non-vessels are decorated with incised lines using a narrow sharp tool; an additional five non-vessels are trailed with blunt tools. Ceramic objects include spindle whorls and a pottery trowel, supporting local production of both fiber and pottery. Ceramic rings, possibly for personal adornment, were also recovered.

Vessels

A total of 560 shell-tempered vessels, weighing 10,441.73 g, were analyzed from the Olin site. Ceramics recovered from Olin represent the full range of Middle Mississippian vessels, including jars (n=242, 6569.56 g), bowls (n=185, 1880.16 g), beakers (n=38, 306.63 g), beaker/ bowls (n=8, 16.87 g), bottles (n=39, 481.20 g), hooded bottles (n=3, 68.24 g) , plates (n=8, 156.43 g), pans (n=25, 917.55 g), pinch pots (n=21, 169.17 g), 'utensils' (e.g., crude bowls, funnels, etc.; n=11, 536.3 g), miniature vessels (n=12, 72.39 g) and seed jars (n=2, 2.43 g). Grit tempered vessels were ennumerated and used to determine feature phase association, but further analyses were not performed.

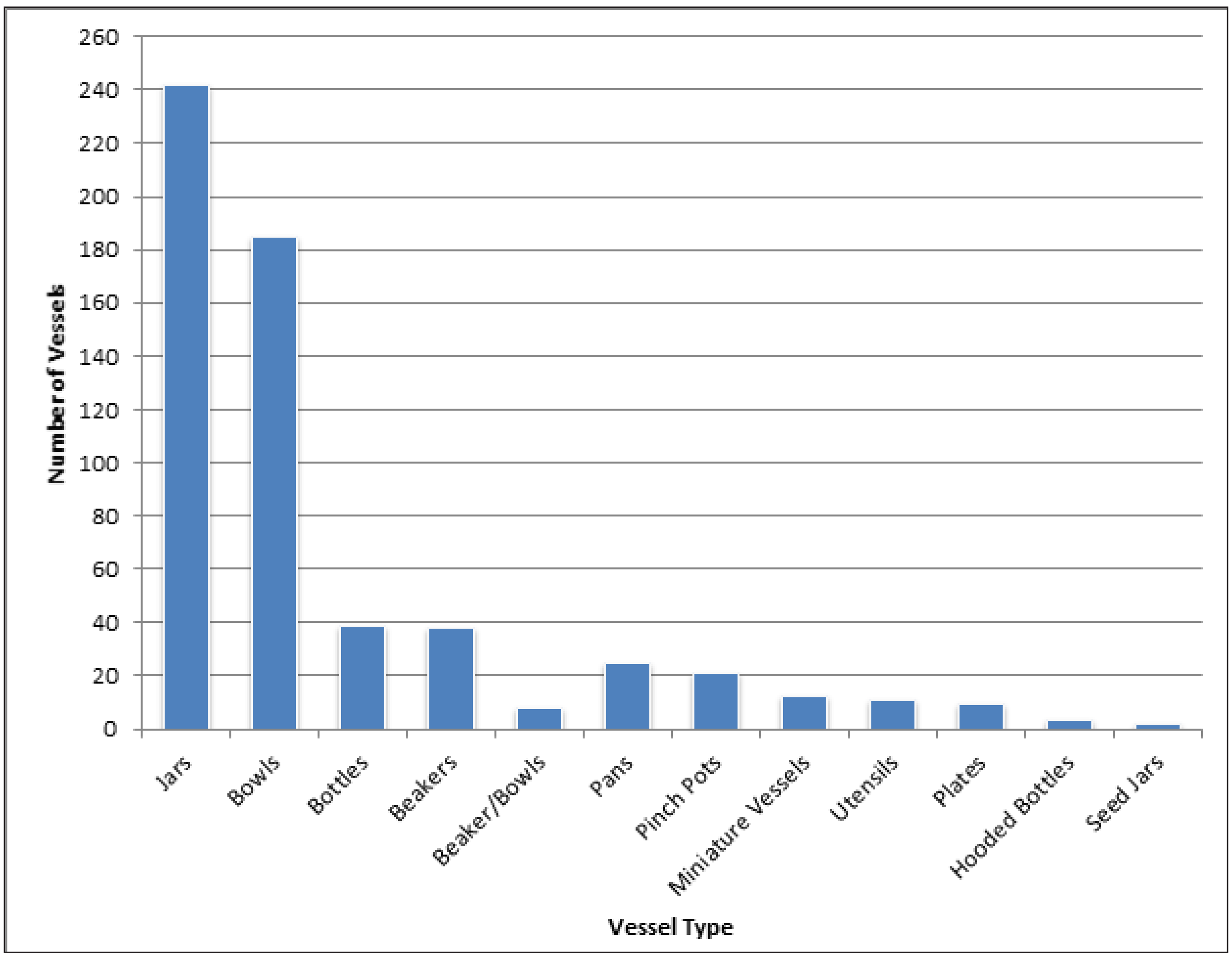

Figure 6.2. Vessel assemblage from Olin.

The majority of vessels (43.2%) consist of jars while bowls comprise the second most popular vessel category (33%) (Figure 6.2). Bottles and beakers form just over 6% of the assemblage each, while pans form 4.4% and plates 1.4%. Pinch pots are popular vessel types, comprising 3.5% of the Mississippian assemblage (additional pinch pots were recovered from Late Woodland features), while miniature vessels and utensils make up about 2%. Special vessels like hooded bottles and seed jars together comprise less than 1%.

Comparing vessels commonly used for cooking and storage (i.e., jars) with those presumably used for serving (i.e., bowls, plates, beakers, hooded bottles), the service-to-utility ratio is equal (1.00). This ratio is significantly higher than the mean service-to-utility ratio of 0.59 reported for American Bottom assemblages by Wilson et al. (n.d.). Pauketat (2013c:205) has noted a similar trend of decreasing jars in proportion to serving wares at Cahokia's Tract 15B, suggesting perhaps a "new intensity or publicity" of serving and eating practices. This trend is noted most strongly in the East Plaza area at Cahokia, where service vessels are roughly three times more prevalent than utility vessels (Hamlin 2004). This East Plaza area was a nexus of Moorehead phase occupation including mound building and copper craft production, presumably as part of the Moorehead phase revitalization.

Jars

A total of 242 vessels are identified as shell-tempered jars, weighing 6569.56 g; no grog or grog-shell jars were identified as Mississippian vessels. This trend is similar to Holley's (1989:205) observation for Cahokia's ICT-II assemblage that "the use of shell-and-grog tempering for jars… was insignificant," as opposed to Fowler and Hall (1972) and Porter (1974) who noted it for Moorehead phase jars elsewhere at Cahokia and at the Mitchell site.

The majority of jars have everted, everted-angled, and angled rims at Olin; only six rolled-lip jars (all slipped) are present, therefore jars are categorized based on exterior surface treatment: cordmarked, slipped, plain/eroded. Ten jars with high-angled or nearly vertical rims are present; two high-angled/vertical-rim jars are cordmarked, six are slipped (including two lobed), and two are plain. High-angled or near-vertical rims are commonly found within Upper Mississippian (i.e., Oneota, Fisher/Huber, Fort Ancient) assemblages of northern Illinois, western and southern Indiana, and southern Ohio (Emerson and Emerson 2013; Griffin 1943; Hall 1962; Pollack 2004). Similar vessel types are found in small proportions throughout the American Bottom sequence (Holley 1989).

Cordmarked Jars

The majority of jars (49%, n=118, 4070.04 g) have cordmarked exteriors (Appendix B Table B.5). Seventeen of the cordmarked jars have plain interiors, the remainder are red slipped as is typical of the so-called “Cahokia Cordmarked” vessel type. Cordmarked jars with plain interiors appear to be an increasing trend through the Moorehead phase (Pauketat 2013c), however red slip appears to have been an important component of not just this pottery type, but many other vessel types, as a material innovation of the Moorehead phase. Rim Protrusion/Lip Protrusion Ratios (RPR/LP, discussed below) for cordmarked jars with plain interiors at Olin range between 0.21 and 0.372, with a mean average of 0.29, supporting a later jar style.

Where identifiable, coradage twist was recorded; approximately 38 jars have s-twist cordmarking while 43 had z-twist (see Appendix B Table B.5). While thigh-rolling predominantly produces s-twist cordage, the use of spindle whorls has been demonstrated to produce either s- or z-twist (Hurley 1979). Based on Minar’s (2001) demonstration that the practice of spinning is highly resistant to change, it has been hypothesized that the shift from s- to z-twist cordage between Late Woodland and early Mississippian periods may imply technological change (Hall 1980). Alt (1999) suggests that this directional shift of cordage twist, together with the increased frequency of spindle whorls at the end of the Terminal Late Woodland and the beginning of the Lohmann phase indicates intensification and centralization (i.e., specialization) of fiber spinning (Alt 1999). A return to s-twist cordmarking during the Moorehead phase, on the other hand,

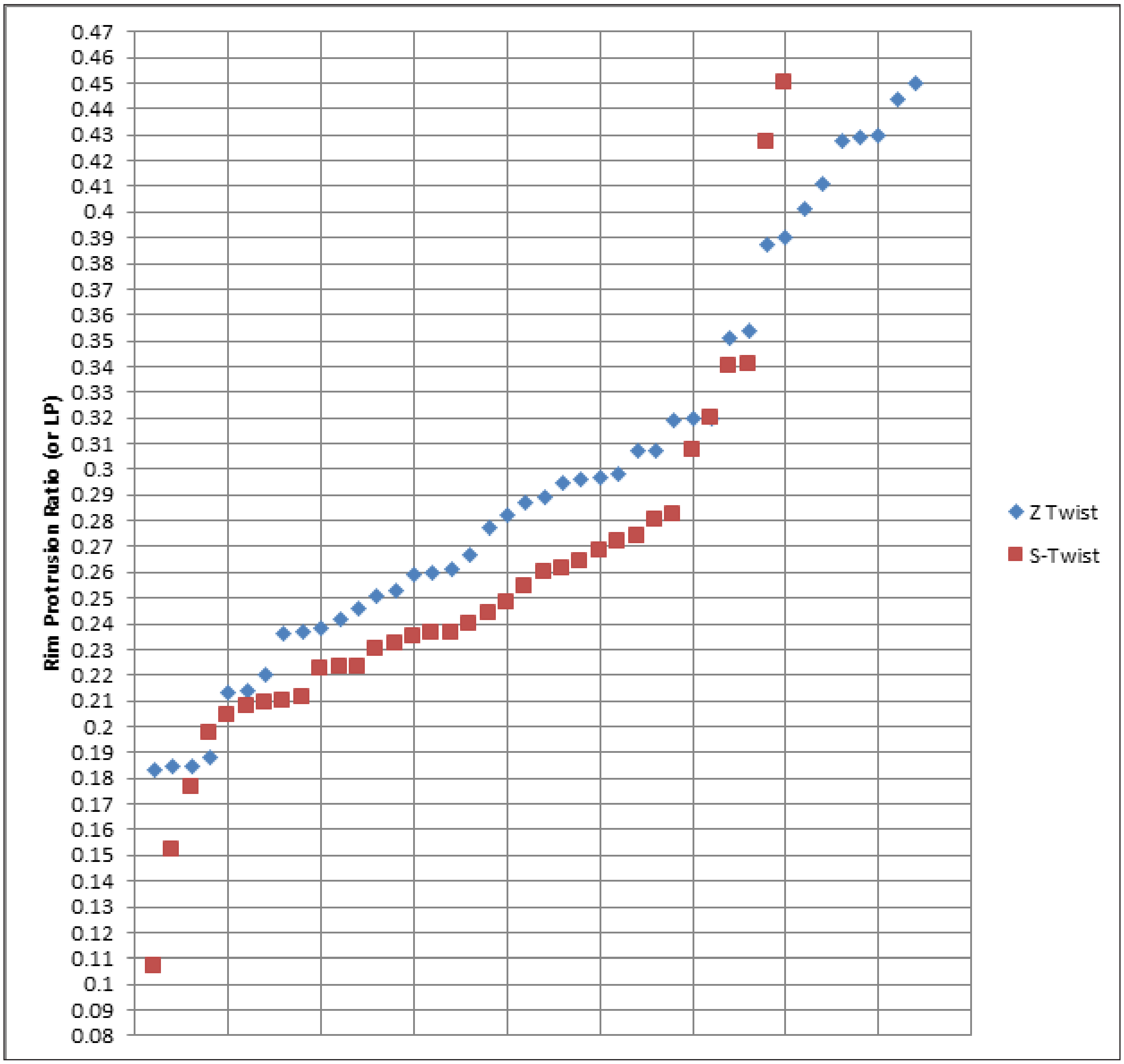

Figure 6.3. Rim/Lip Protrusion Ratios by cordmarking twist on cordmarked jars from Olin.

suggests the opposite – a decreased use of spindle whorls and perhaps decentralization of fiber-production (Alt 2002, as cited in Pauketat 2004). Cordmarked jars at Olin may support this supposition. Most z-twist jars had higher Lip/Rim Protrusion Ratios than those of s-twist jars, suggesting earlier production though there is overlap between the two twist-types at each end of the Rim/Lip Protrusion spectrum (Figure 6.3). This transition from z- to s-twist jars over the course of the Olin site occupation suggests a decreased centralization of cordage production did not occur as part of the initial material transformation of the Moorehead phase.

Approximate cord width and spacing between cordage impressions was recorded where possible, indicating trends associated with cordwrapped paddles used in vessel production. Cordage ranged from 0.77 mm to 2.24 mm wide with a mean width of 1.39 mm and a standard deviation of 0.32 mm. A histogram of cordage width distributions indicates a concentration at 1.2-1.29 mm with minor peaks at 1-1.09 mm, and 1.5-1.69 mm; only five vessels have cordmarking with cordage wider than 2 mm (Figure 6.4). Typically, cordage width and spacing between cordage did not differ drastically. Spacing ranged from 0.30 mm to 2.15 mm, with a mean spacing of 1.25 mm and a standard deviation of 0.38 mm (Figure 6.5).

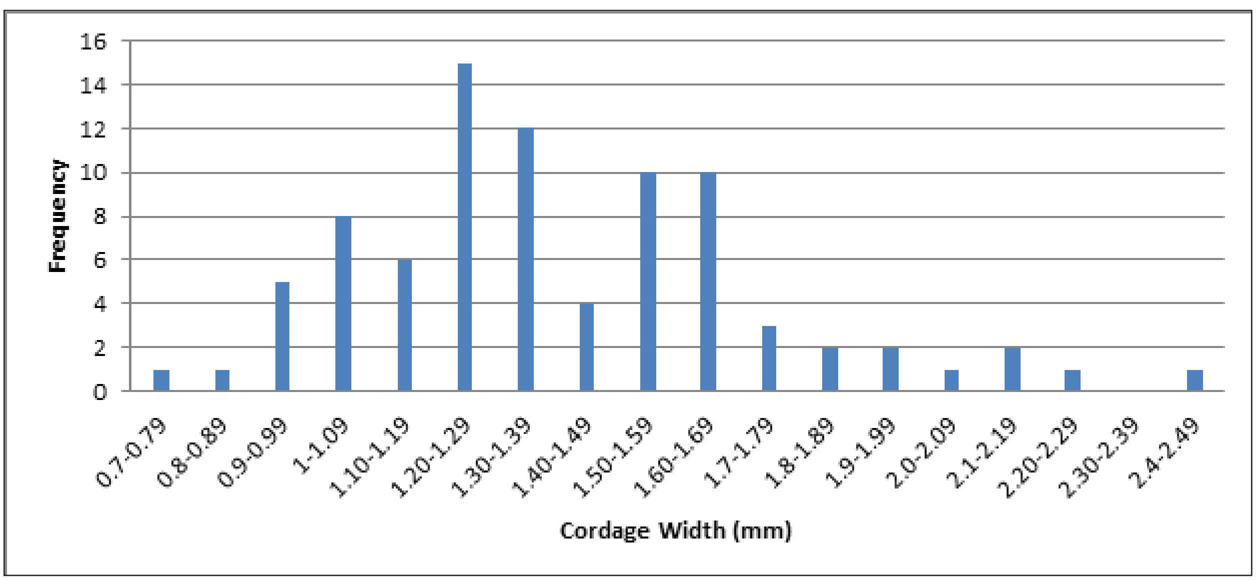

Figure 6.4. Distribution of frequencies of cordage width on cordmarked jars from Olin.

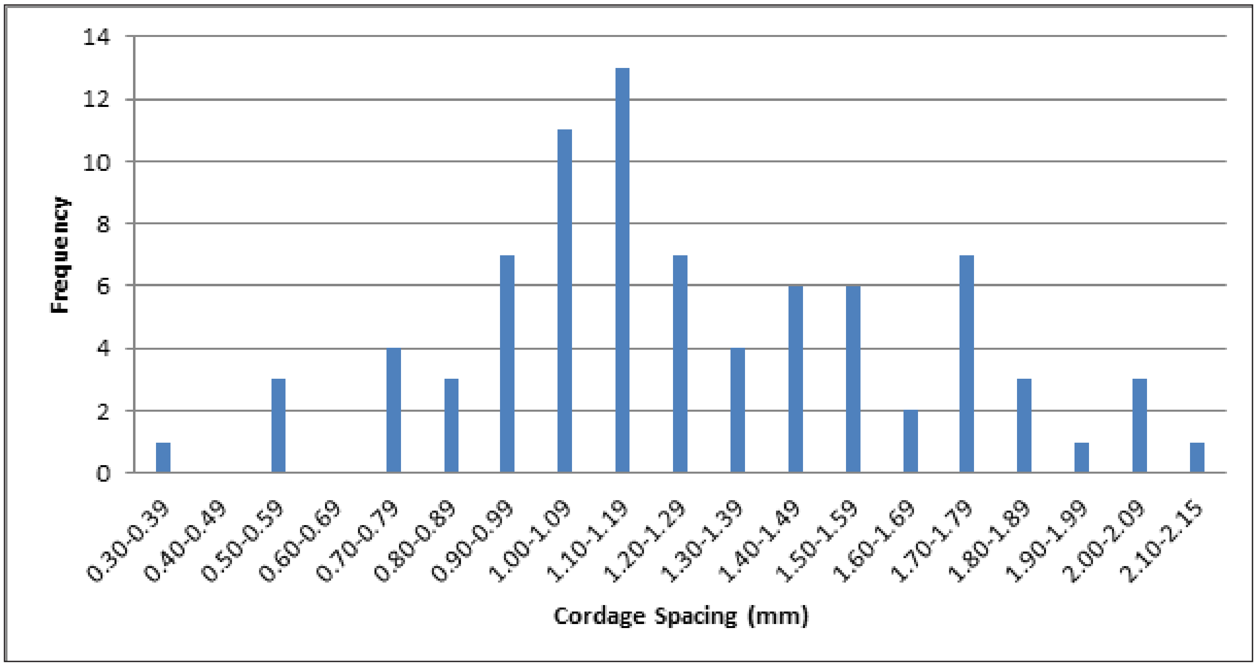

Figure 6.5. Distribution of frequencies of cordage spacing on cordmarked jars from Olin.

While the ranges in cordage width and spacing vary, the narrow range of variation suggests paddles, in general, were fairly tightly and regularly wrapped with cordage, presumably to make a solid paddle surface with which to work. Additionally, there seems to be no clustering of cordage widths or spaces, suggesting this may not have differed among or between potting groups, likely even varying by individual pottery. This perhaps further suggests paddles were not consistently wrapped or perhaps even maintained as one would expect to find groupings of similarly-paddled vessels). This variation supports the supposition that cordmarked jars were locally made rather than centrally produced.

All cordmarked jars have everted-angled or angled rims. Method of rim attachment generally conforms to one of three methods: coil of clay added to top of already formed vessel, coil of clay attached to the exterior of already formed vessel, or continuous from neck (folded or bent/angled) (see Figure 4.13). Importantly, not all cordmarked vessels demonstrate separate manufacture of rim from vessel (contra Holley 1989). Cordmarked jars with continuous-from-neck rims indicate continuity with previous manufacturing techniques of rolled- or extruded-rim jars, while the jars with added rims may be novel construction techniques. Extra clay was sometimes added to the neck exterior to bolster the rim or added to the end of the rim to extend the lip or create lip tabs. Of the cordmarked jars where rim attachment method could be determined, 51 vessels (46.7%) have rims formed separately and attached to the top of the vessel, 42 (38.5%) have rims formed separately and attached to the exterior of the vessel, and 16 vessels (14.6%) have rims continuous from, or folded/angled-out-from neck (see Appendix B Table B.5). Again, this step in the production of cordmarked jars suggests variation typical of local production, rather than specialized central production, of these vessels, and reinforcing the individual participation in the movement through daily practices and experiences.

Appendages were generally limited to handles and lip tabs (slight triangular or rounded additions to the end of lips at particular points around the rim). One instance of an effigy handle (H20-2) was present; a lizard effigy handle was applied to the rim of a vessel recovered from the wall trench of House 20 (Figure 6.6). Lizard effigy handles were common among Fort Ancient style pottery from western Indiana/central Ohio region (Griffin 1943), though an occasional

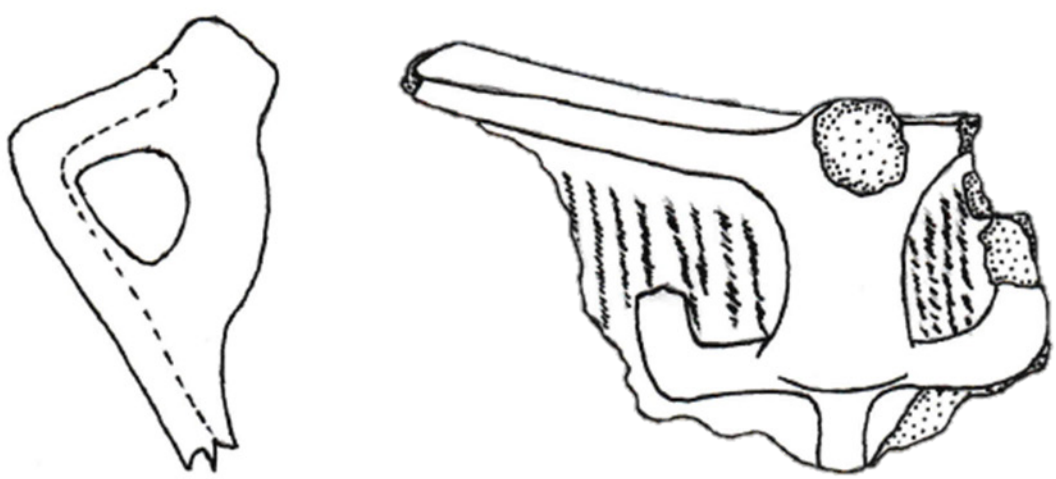

Figure 6.6. Lizard effigy handle from Olin.

lizard effigy handle has been found within American Bottom assemblages (e.g., East St. Louis, Betzenhauser personal communication 2013) as well as within burial contexts at Dickson Mounds (Harn 1980:Figure 25). A lizard effigy was appliqued to a plate rim excavated from Tract 15B at Cahokia; an additional plate rim from Tract 15B had a human head effigy applique, similar to those excavated from the Obion site in Tennessee (Garland 1992; Pauketat 2013c).

Two examples of jars with finger-impressed lip decoration were recovered from the floor of House 6 (H40-5) and from Pit 89 (89-3); finger-impressed lips were a common decorative technique among Upper Mississippian assemblages (Baltus 2013; Emerson and Emerson 2013; J.W. Griffin 1946), though are rare in American Bottom assemblages. A similar Cahokia Cordmarked jar with finger-impressed lip was excavated at the Moorehead phase Lawrence Primas site, also located in the northern American Bottom.

The majority of cordmarked jars with measurable rim curvatures had globular forms (88%, n=37) (Holley 1989; Pauketat 1998); only five cordmarked jars had rim curvatures measuring approximately zero or with low positive rim curvatures which indicate flat- or sharp-shouldered vessels (Appendix B Table 6). No clear spatial pattern was present in the distribution of these vessels across the site. In general, these flatter-shouldered cordmarked jars were recovered from features with low average Lip Protrusion/Rim Protrusion Ratios (between 0.256 and 0.313) which fits with the Moorehead phase occupation of the site, though their inslanted rims would suggest retention of a late Stirling phase production style (Pauketat 2005). These vessels may have been produced by persons familiar with the production techniques used to make Ramey Incised and Powell Plain jars. Perhaps the shape of the vessel was not a key messenger of the Moorehead revitalization, but rather this occured in the process of cordmarking the exterior. Three of the five cordmarked jars with inslanting rims had Z-twist cordmarking, one vessel had indeterminate cordmarking, while the fifth had S-twist cordmarking.

The mean orifice diameter for cordmarked jars is 22 cm, identical to the mean orifice diameter for Late Mississippian jars from Cahokia's Tract 15B (Pauketat 2013c) and comparable to the mean orifice diameter for Moorehead phase jars at Cahokia's ICT-II (21.5 cm; Holley 1989). Sizes of cordmarked jars, estimated using orifice diameters, are divided into small, medium, and large jars based on distribution of orifice diameters (Figure 6.7). Small jars have orifice diameters

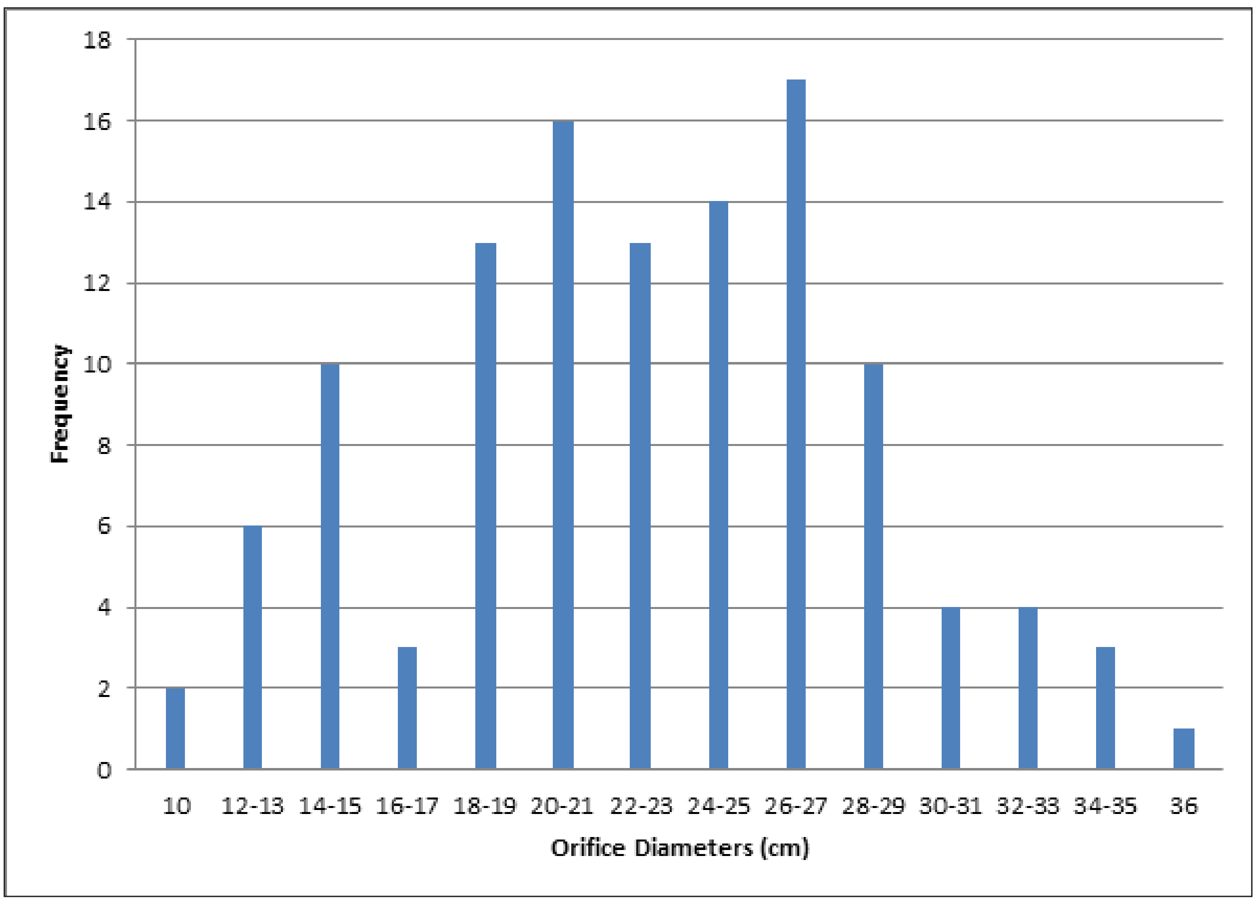

Figure 6.7. Frequency distribution of orifice diameters of cordmarked jars from Olin.

ranging from 10 to 17 cm, medium jars have orifice diameters between 18 and 29 cm, large jars between 30 and 36 cm. The majority of jars (71.6%) are of medium size (n=83), while small jars comprise 18.1% (n=21) and large jars 10.3% (n=12). While Pauketat (2013c) recorded a bimodal distribution for jars at Tract 15B, the majority of vessels there likewise fell into the medium-size range.

Typically the largest jars of an assemblage are often identified as probable storage vessels (Holley 1989), however three of the four vessels with 32-33 cm orifice diameters and two of the three vessels with 34-35 cm orifice diameters have evidence for exterior sooting. Perhaps while a few of these very large cordmarked jars had been used for storage, nearly half of them may have been used for cooking; perhaps for a large group.

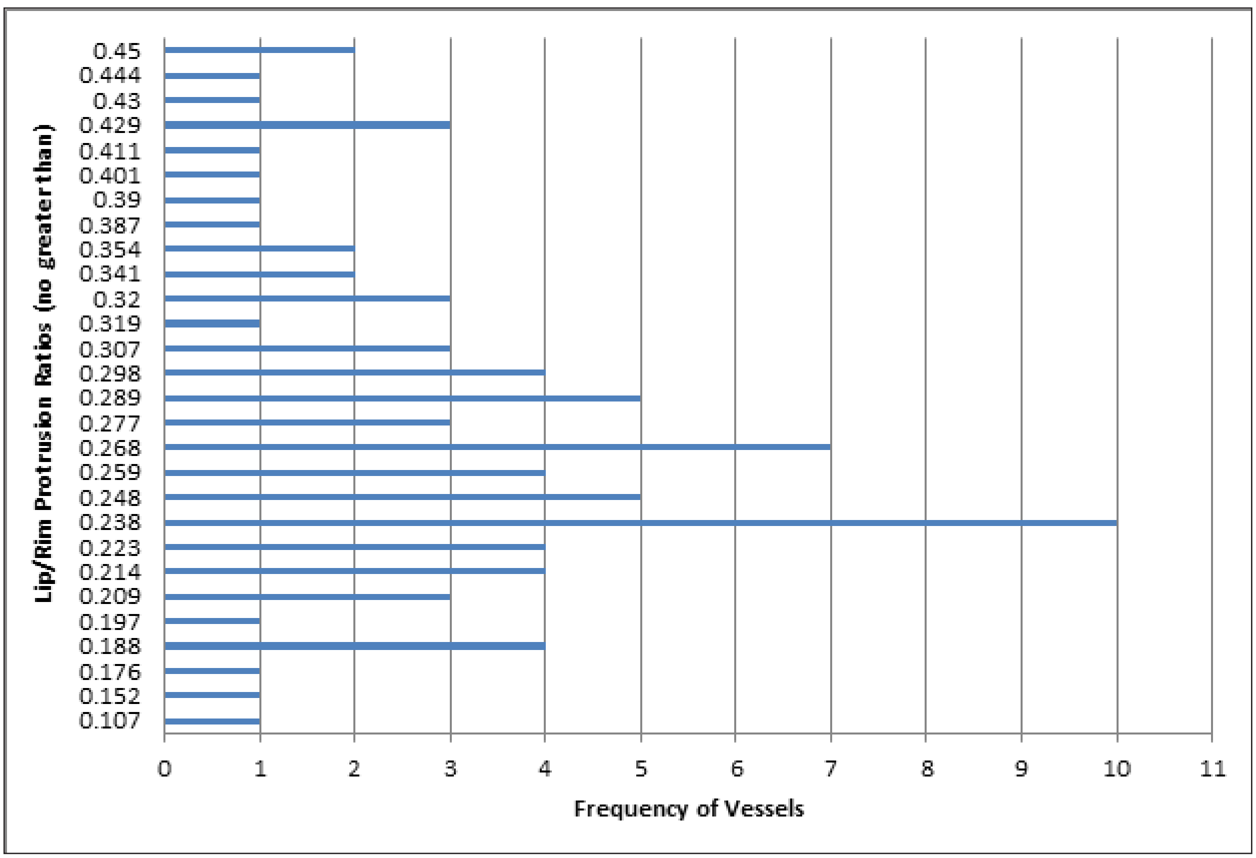

Figure 6.8. Frequency of rim/lip protrusion ratios of cordmarked jars from Olin.

Lip lengths range from 1.1 cm to 3.27 cm, with a mean of 2.2 cm. This mean length is identical to that for Moorehead phase jars from the Southside excavations at East St. Louis (Pauketat 2005), which was determined to be suggestive of the early Moorehead phase. Rim/lip protrusion ratios (RPR/LP) for cordmarked jars from Olin ranged from 0.107 to 0.45 with a mean RPR/LP of 0.275 (Figure 6.8). The distribution of frequencies of rim/lip protrusion ratios

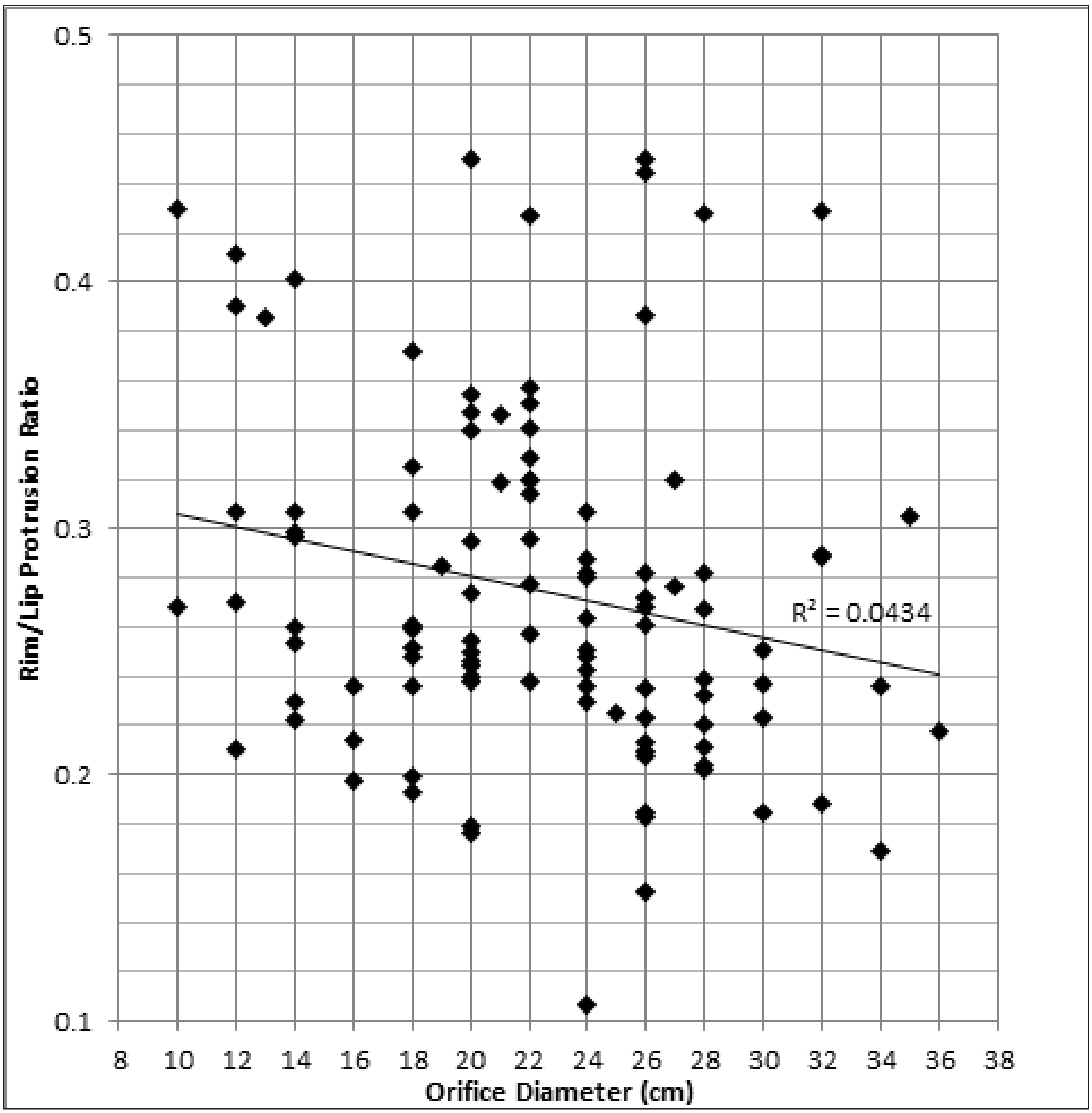

Figure 6.9. Scatter plot of rim/lip Protrusion to orifice diameter for cordmarked jars from Olin.

among cordmarked jars show concentrations of vessels with RPR/LPs overall lower than those documented for Moorehead phase jars at ICT-II (Holley 1989).

Plotting rim/lip protrusion ratios against orifice diameter for cordmarked jars indicates there is no correlation between the two for the Olin assemblage (Figure 6.9). This contrasts again with Holley's (1989) findings for the Moorehead phase ceramics at Cahokia's ICT-II. This suggests diversity not just within the Olin jar assemblage, but also diversity in the production methods of cordmarked jars between Cahokia and Olin. The cordmarked jars at Cahokia (ICT-II specifically) may have been made according to different standards as well as by different potting groups.

Likewise, Holley (1989:151) has suggested that late Stirling phase angled-rim jars "lack the appliqued bolster to the exterior that occurs on most Moorehead jars of the same type." Fewer bolstered rims than unbolstered were present at Olin. Plotting the RPR/LPs of both bolstered and unbolstered jars demonstrates a nearly identical curve (Figure 6.10), while the mean RPR/LPs are nearly identical (0.2739 for bolstered rims, 0.2745 for unbolstered). Based on this evidence, I would suggest that these may not be temporal differences, but perhaps differences in manufacturing technique between or among potters.

Slipped Jars

Twenty-five percent of the jars at Olin (n=61, 1479.34 g) have slipped exteriors. Twenty-one of those slipped jars (34.4%) are dark brown, fourteen (23%) have very dark brown/black slip, thirteen (21.3%) have tan slip, and thirteen (21.3%) have red slip (Appendix B Table B.7). The dark-slipped to light-slipped ratio of these vessels is approximately 1.35. All but three slipped jars had everted-angled or everted rims; the three jars with rolled lips were light-slipped vessels (two tan, one red).

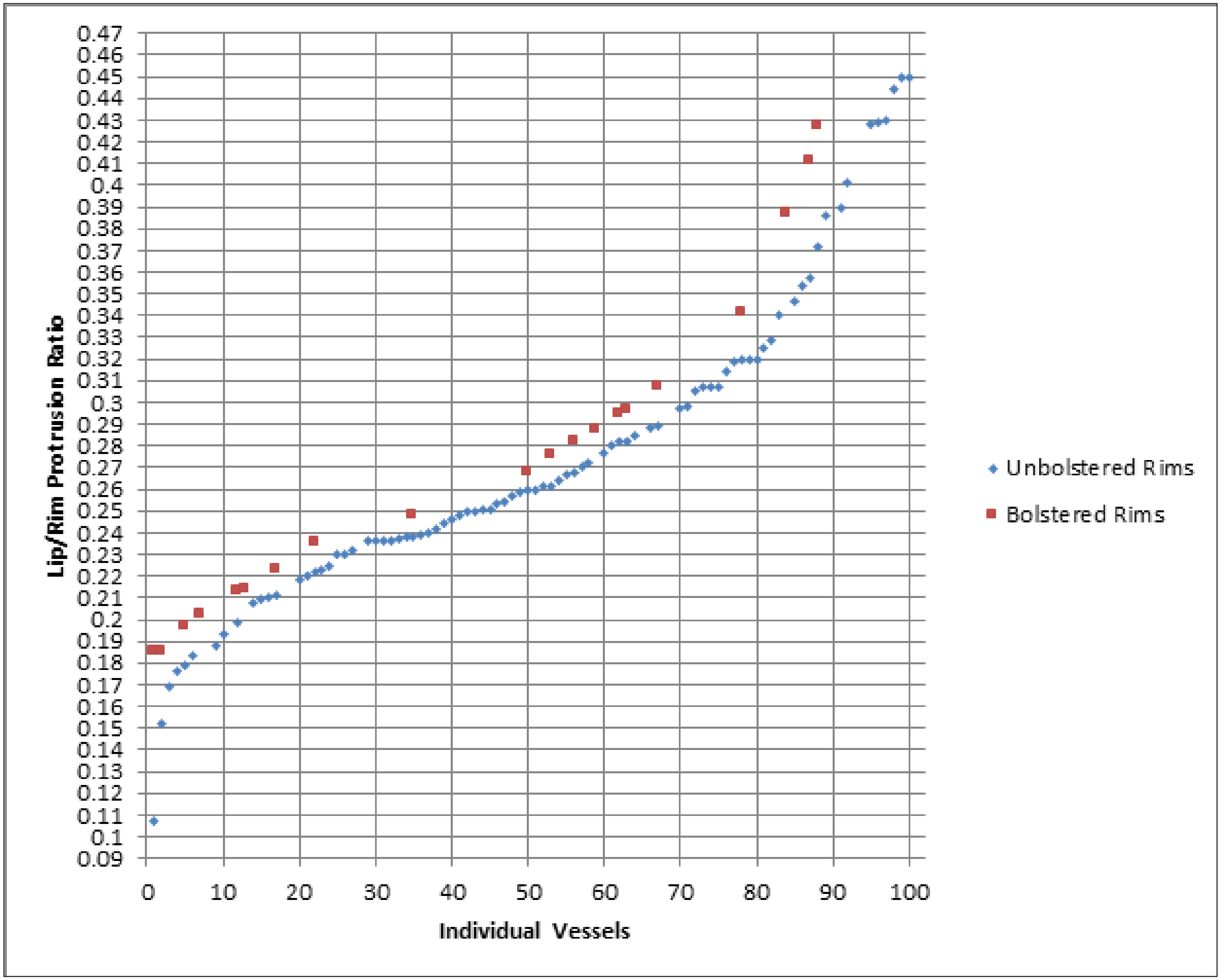

Figure 6.10. Rim/Lip Protrusion Ratios of bolstered and unbolstered rims on cordmarked jars from Olin.

Decorative additions to the slipped vessels included burnishing, lip tabs, trailed lines (indicative of Ramey Incised), handles, and one example of lip notching (see Appendix B Table B.7). Forty-one slipped jars (67%) had burnished exteriors; nearly all (93%, n=13) dark brown/black slip jars were burnished. Likewise, 76 percent (n=16) of the dark brown slipped jars and nearly 70 percent (n=9) of the tan slipped jars were burnished; only 23 percent (n=3) of the red-slipped jars were burnished. Eleven slipped jars have trailing diagnostic of the Ramey Incised vessel type. Two vessels (V213-1 and V213-2) were lobed jars with dark-slipped exteriors. Lobed, or "squash/ pumpkin effigy" vessels appear to exist in small numbers throughout the Mississippian period in the American Bottom (Emerson and Jackson 1984; Jackson et al. 1992; Milner 1984a). Two lobed jars were recovered from the northside excavations at East St. Louis (Jackson and Finney 2007); lobed jars were also recovered from burial contexts at Dickson Mounds in the Central Illinois River Valley (Harn 1980), as well as at the Washausen site in the southern American Bottom (Betzenhauser, personal communication, 2009). One of the lobed jars at Olin, and an additional six slipped jars, have handles. Handles are mostly narrow strap handles with one example of a wide strap handle on a tan-slipped jar.

Trailed-line decoration on slipped jars is restricted to the Ramey Incised type, with the exception of one high-angled rim jar with a handle (V203-3). It is possible this trailing is related to or part of lobing, though not enough of the shoulder is present to identify as such. None of the vessels identified as Ramey Incised have rolled rims; all are consistent with everted-angled or angled rims, suggesting post-Stirling phase production. Holley (1989) notes a decline in rolled-rim Ramey vessels between the early and late Stirling phase components at Cahokia's ICT-II.

Trailed lines were made with narrow to medium-width blunt tools. Trailed-line decorative motifs on the Ramey Incised jars recovered from Olin are very limited; where motif can be determine, they all consist of a single arc or nested arcs. This trend is comparable to that found in the Late Stirling phase assemblage from the East St. Louis southside excavations and the nearby Late Stirling/Early Moorehead phase Old Edwardsville Road site (Jackson and Millhouse 2003; Pauketat 2005). The lack of variation suggests the message presumably embedded within these later Ramey Incised jars was perhaps becoming simplified (or even mono-vocal) as compared to the variety of motifs on earlier Stirling phase Ramey jars.

Orifice diameter, rim angle or lip bevel, lip length and wall thickness were measured on all slipped jars when possible (Appendix B Table B.8). Likewise, rim curvature, lip thickness, lip/rim protrusion, lip shape, rim thickness and wall-thickness differential were calculated when possible. Where rim curvature can be measured, the majority (72%, n=18) of slipped jars have sharp or flattened shoulders. The nine slipped jars with negative rim curvatures range from nearly flat-shouldered to globular vessels. Of the Ramey Incised vessels with measurable rim curvature, five have sharp or flattened shoulders typical of the vessel type, while two approach the shape of globular jars, including the rim recovered from burial feature Pit 321 in association with wide-rimmed plates (see Chapter 5). If the production of Ramey vessels was centralized, or under the jurisdiction of a particular group of people, the production of Ramey-style jars with more globular proportions suggests that some of the changes in jar production technique extended to both local non-centralized and centralized or restricted production of jars during the Moorehead phase. A similar hybridity of vessel form and surface treatment was noted among the cordmarked jars that were made with flat or sharp shoulders.

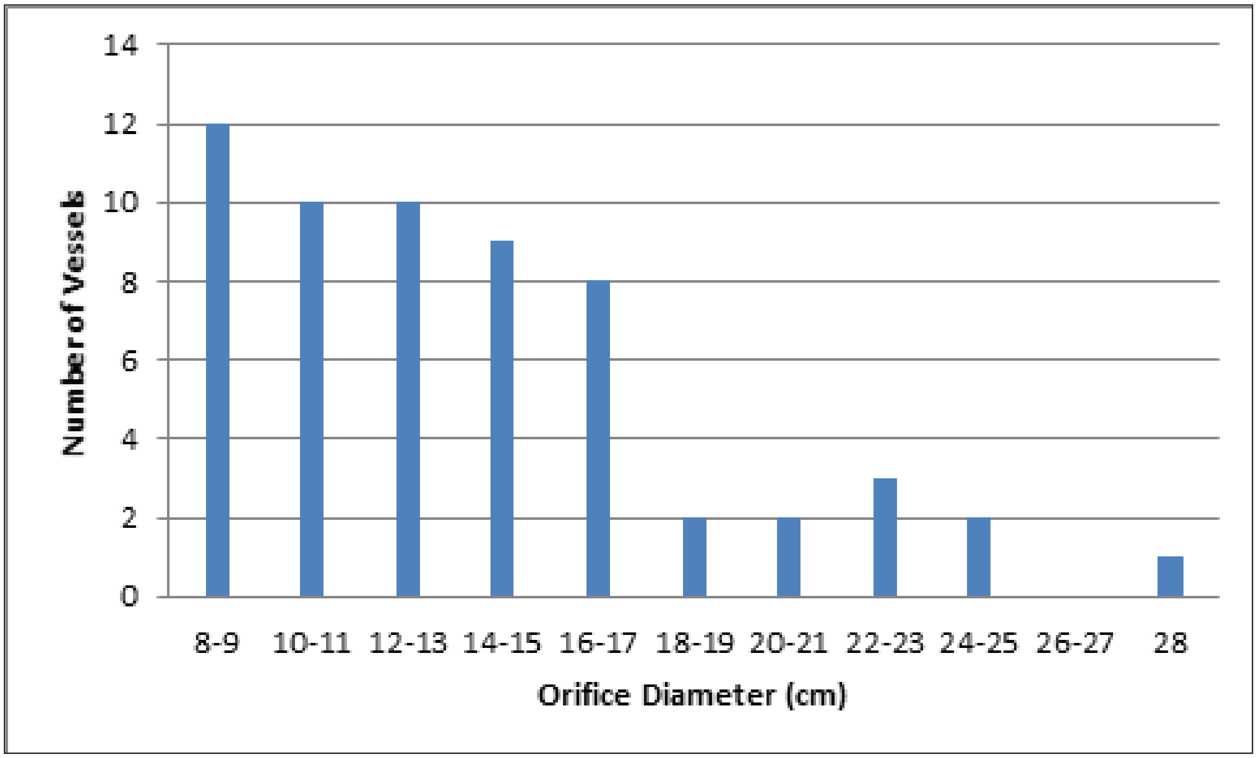

Figure 6.11. Frequencies of orifice diameters of slipped jars from Olin.

Orifice diameters of slipped jars range from 10 cm to 28 cm, with a mean orifice diameter of about 13 cm. Based on a histogram of orifice diameter frequencies, slipped jar sizes were categorized as small (10 cm – 17 cm), medium (18 cm – 25 cm), and large (greater than 26 cm) (Figure 6.11). It is notable that the majority of slipped jars (83.1%, n=49) are small vessels. Only nine slipped jars can be considered medium-sized, while only a single example of large slipped jar is present. The concentration of small slipped jars as compared to small cordmarked jars suggests differences in use. Perhaps the slipped jars were more often intended for special (or restricted) individual or small-group-use. The single large slipped jar was potentially a storage vessel as no sooting was noted on its exterior.

The Ramey Incised jars specifically have orifice diameters ranging from 8 to 14 cm, with a mean average of about 12 cm. Similar to the nearby Vaughn Branch site, the Ramey Incised vessels are slightly smaller than the rest of the slipped jars which have a mean orifice diameter of nearly 14 cm when the Ramey jars are removed. One Ramey outlier has an orifice diameter of 22 cm. This larger Ramey jar is from Pit 216, a later feature superimposing the southern wall of H29/H31. In addition to being the largest Ramey-like jar, this vessel also has the lowest LP/RPR

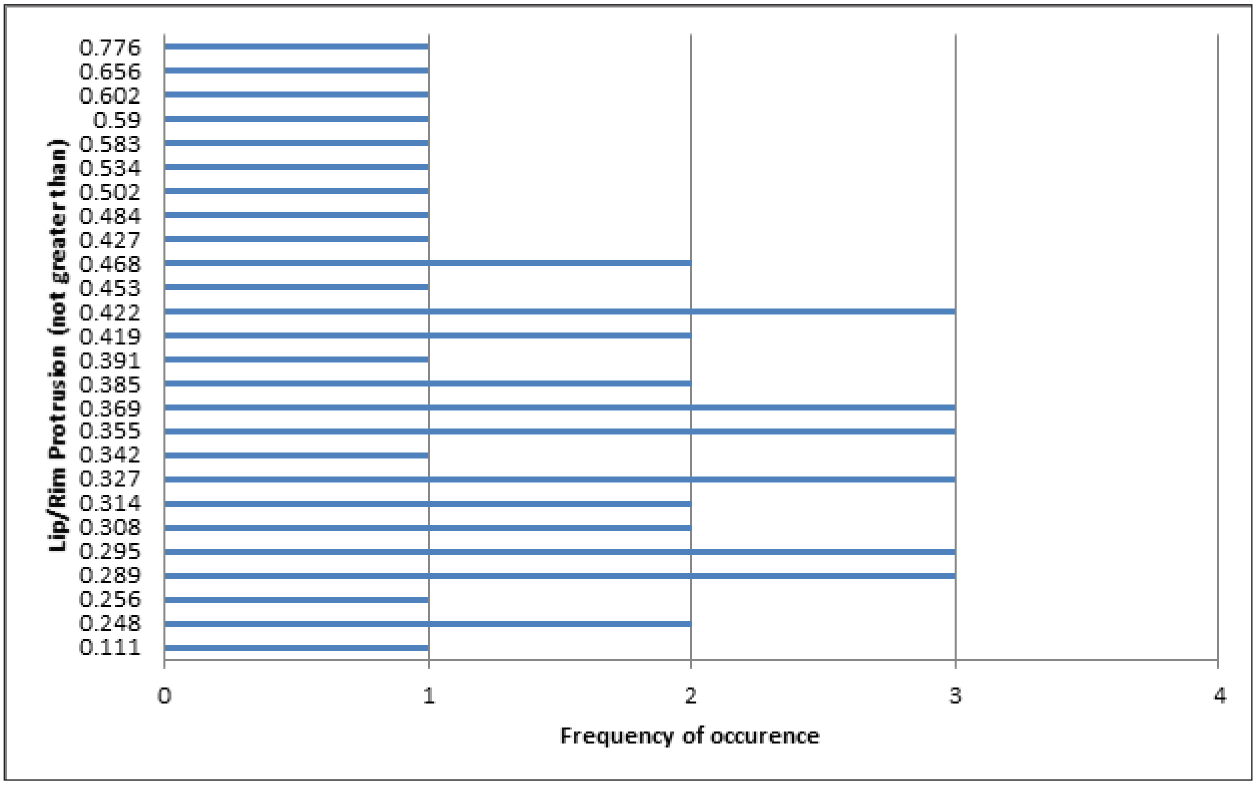

Figure 6.12. Histogram of Lip/Rim protrusion ratios for slipped jars from Olin.

among the Ramey vessels at Olin. Pit 216 also yielded one high-angled-rim jar and a very large effigy bowl.

Rim/Lip Protrusion ratios for slipped jars ranged from 0.111 to 0.776, with a mean RPR/LP of 0.4195 (Figure 6.12). This average RPR/LP is much more similar to that measured for Moorehead phase jars at Cahokia's ICT-II (0.421) than Olin's cordmarked jars were.

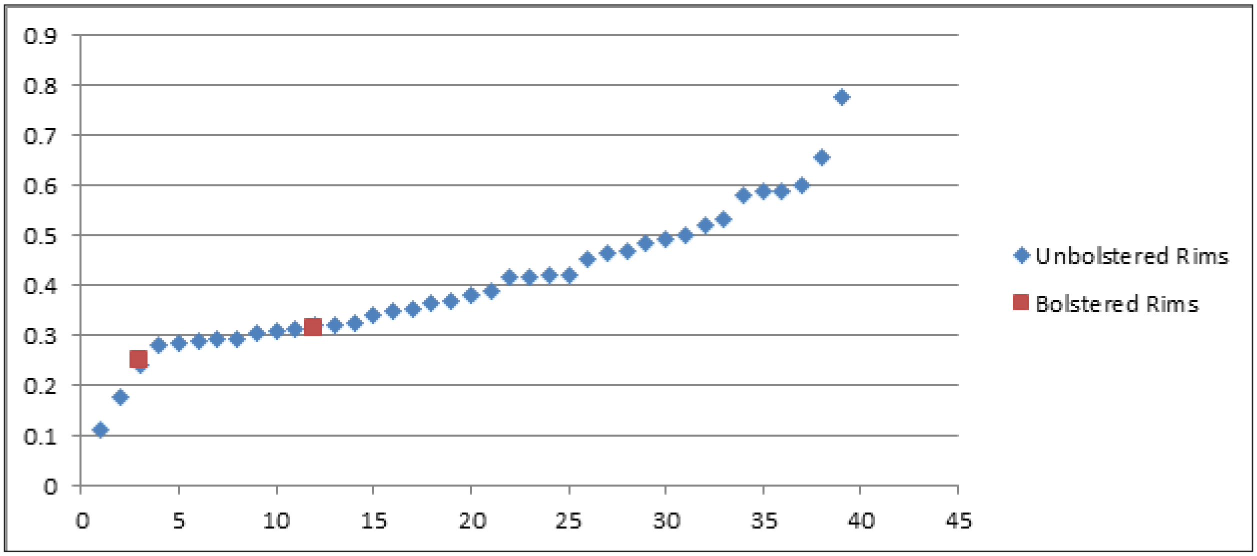

Figure 6.13. Rim/Lip Protrusion ratios plotted by bolstered or unbolstered rims on slipped jars from Olin.

Only two bolstered rims were among the slipped jars. Though the RPR/LPs for these vessels fell within the range for unbolstered rims, they are on the lower end of the range, suggesting this trend may occur later in the progression of slipped jars (Figure 6.13). Perhaps techniques used to make cordmarked jars were increasingly used on other vessels as a means of supporting a longer rim in what appears to be a trend of overlapping production techniques between the previous Ramey Incised jars and the new Cahokia Cordmarked jars.

Plain/Eroded Jars

Sixty-three jars (1009.18g) had eroded (n=46) or plain (n=17) exteriors. Many of the eroded jars consisted of vessel rims broken off just below the neck, preventing determination of surface treatment and were therefore categorized as eroded (Appendix B Table B.9). Fifty plain/eroded jars have red-slipped interiors; a single vessel has dark brown slip on the interior. Of the three plain-surfaced jars with measurable rim curvatures, two vessels have negative numbers indicating globular shoulders, while one vessel has a rim curvature of zero, suggesting a flat-shouldered jar (Appendix B Table B.10).

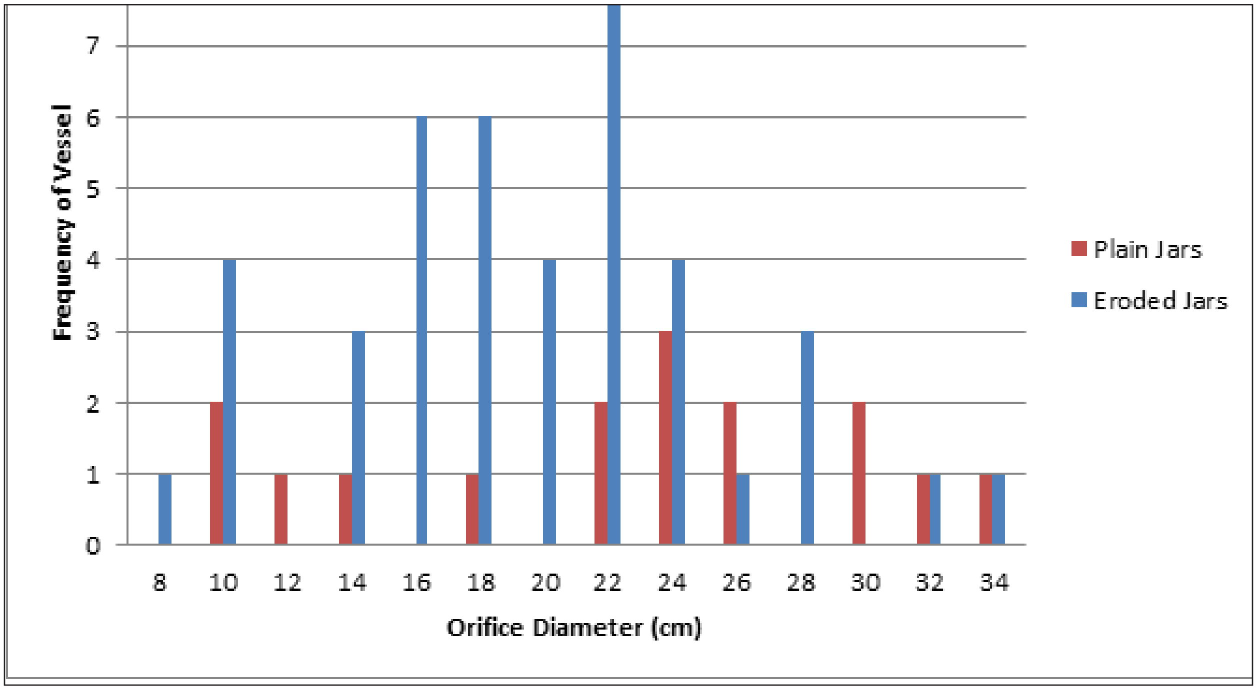

Figure 6.14. Frequency distribution of orifice diameters of plain and eroded jars from Olin.

Orifice diameters for plain jars range from 10 to 34 cm, with a mean average of 21 cm, similar to that recorded for cordmarked jars. Plain jar sizes fall into three size modes as well: small jars (10-14 cm), medium jars (18-26 cm) and large jars (30-34 cm) (Figure 6.14). The majority of plain jars (50%) were of medium size (n=8), while small and large jars were equally represented (n=4 each). Again, while large vessels are often assumed to be storage vessels, three of the four large plain-surfaced jars exhibit sooting on their exteriors, suggesting use in cooking. Rim/lip protrusion ratios for plain jars range from 0.242 to 0.403, with a mean average of 0.296. This mean is slightly higher than that recorded for cordmarked jars.

All Jars

The rim/lip protrusion ratios of all jars from Olin have a combined range from 0.201 to 0.502, with a mean average of 0.305 and standard deviation of 0.102. This is a much lower mean RPR/LP than that measured for Moorehead phase jars at Cahokia's ICT-II (0.421) (Holley 1989). A comparison of RPR/LPs between all plain, slipped, and cordmarked jars at Olin shows a

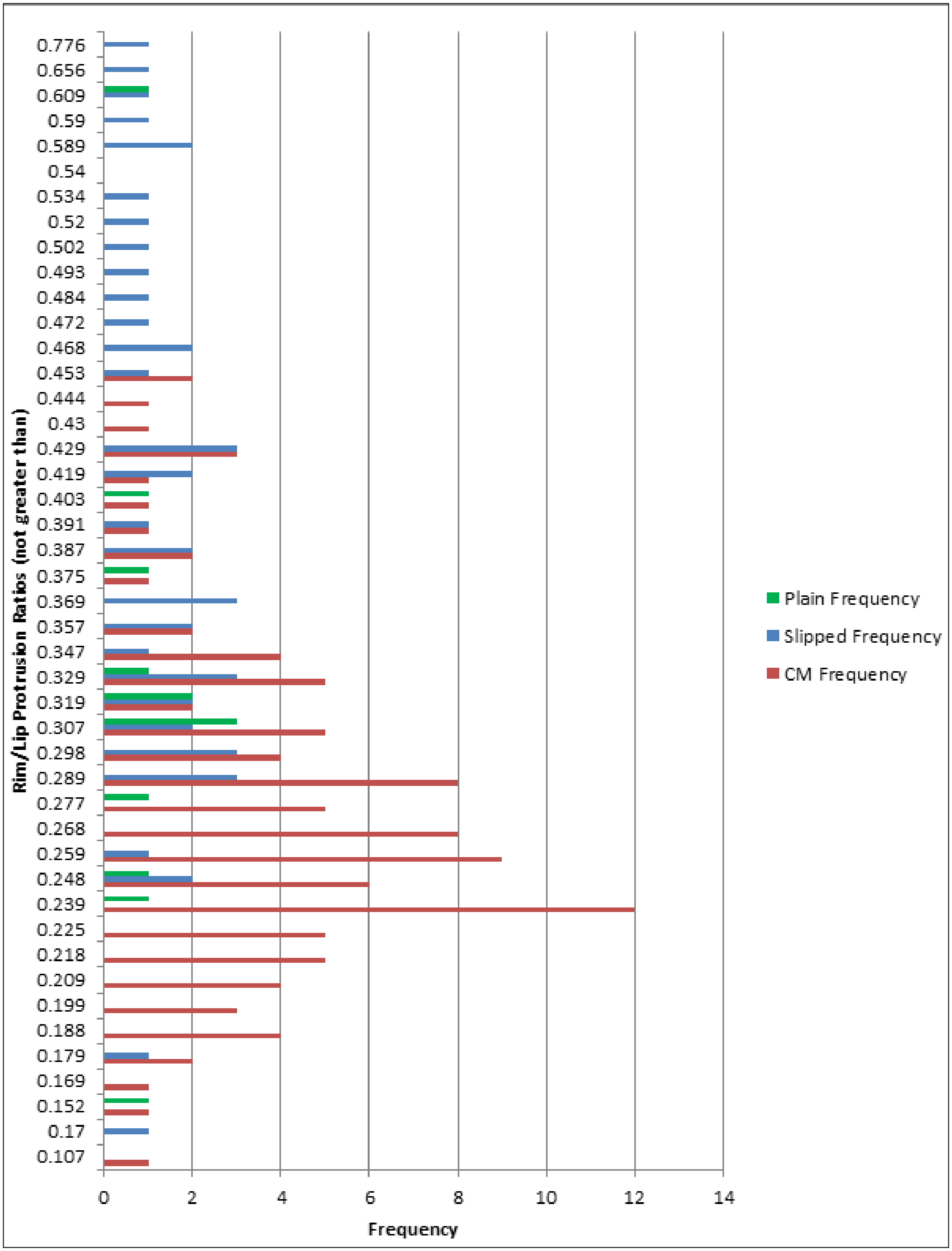

Figure 6.15. Frequency of Rim/Lip Protrusion Ratios among plain, slipped, and cordmarked jars from Olin.

clear difference between slipped and cordmarked jars (Figure 6.15) (eroded jars share a similar pattern in orifice diameter and RPR/LP with cordmarked jars, suggesting these rims – generally broken at the neck attachment – were likely cordmarked below the neck). While there is a good deal of overlap between slipped and cordmarked jars, cordmarked jars show a fairly normal bell curve with a peak centered on a RPR/LP of 0.239, while slipped jars show a peak between 0.289-0.329 with a greater distribution toward the higher RPR/LP numbers. Plain jar RPR/LPs tend to be concentrated in the range at which slipped and cordmarked jar RPR/LPs overlap, ranging between 0.239 and 0.403 (with outliers at 0.152 and 0.609).

The features that contain cordmarked jars with high RPR/LPs (>0.3, suggesting earlier production) overwhelmingly do not also contain slipped jars (i.e., only six of the 22 features with high RPR/LP cordmarked jars also have slipped or plain jars). Likewise, features that have slipped jars with low RPR/LPs (<0.3, suggesting later production) do not generally contain cordmarked jars (four of 13 features also have cordmarked jars). While there seems to be overlap in time period during which both slipped jars and cordmarked jars were made, as suggested by overlap in RPR/LPs, there seems to be little overlap in features in which these early cordmarked and late slipped jars are deposited. Spatially, these features are not isolated or separated within the site, though many of the pits containing early cordmarked jars and no slipped jars are located towards the southern part of the site (Figure 6.16). Potentially, this may indicate some separation between slipped and cordmarked jars in their contexts of use and disposal. Later slipped jars may be associated with extra-domestic contexts while earlier slipped jars were used in both extra-domestic and domestic contexts. Most of these later slipped jars are associated with the latest occupation of the site (in H11, near H32 and H40 complex) (see Chapter 5).

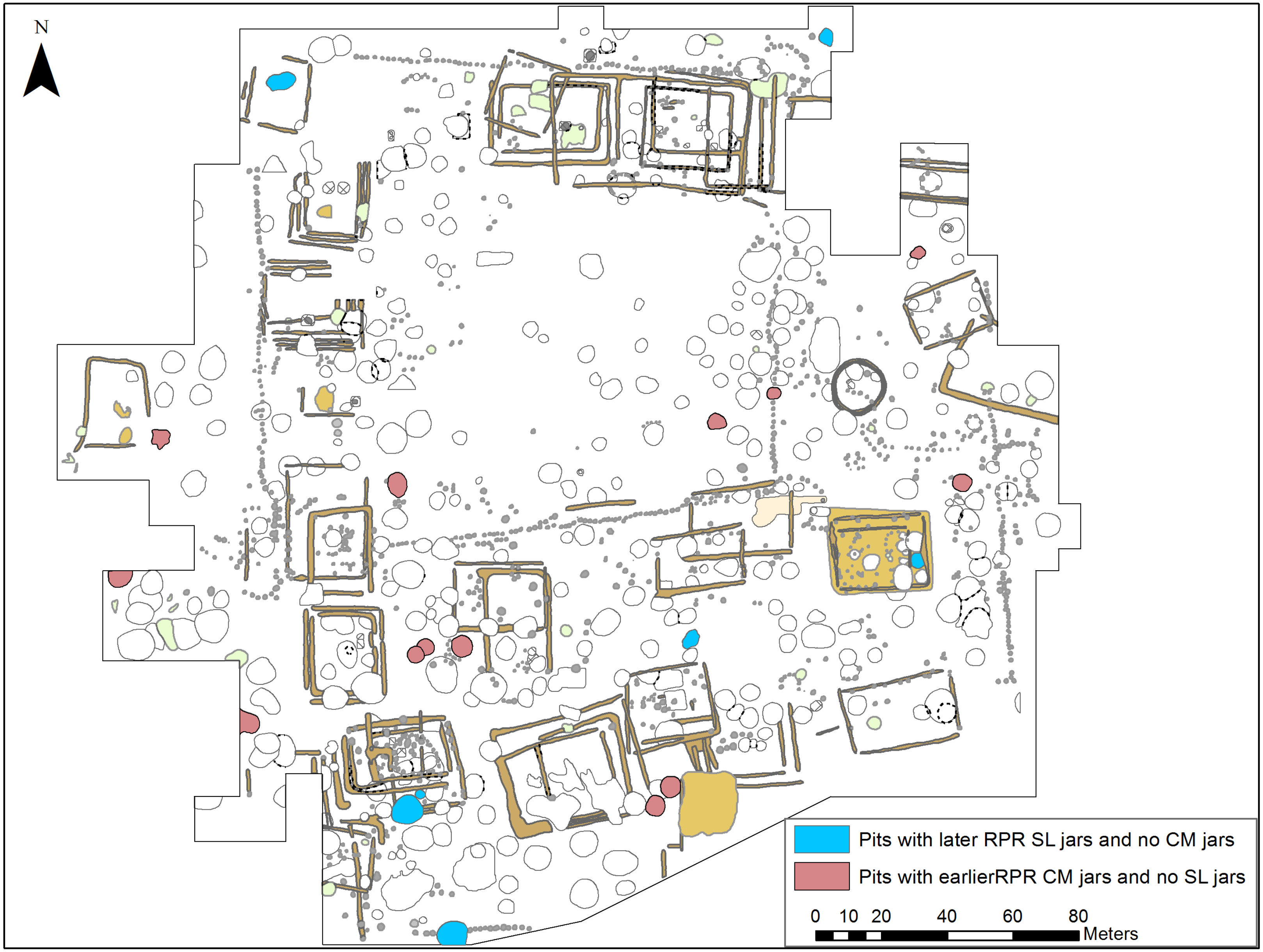

Figure 6.16. Map of depositional differences between earlier cordmarked jars and later slipped jars, based on Rim/Lip Protrusion Ratio.

Handles were present on 14 jars (Appendix B Table B.11). Handles were equally found on cordmarked jars (n=6) or slipped jars (n=6) while only two plain-surfaced jars had handles. The majority of slipped vessels with handles were dark-slipped (n=4) while two were tan slipped. The majority of handles (78.5%) were narrow strap handles (n=11), while three handles were wide strap handles. No loop handles were recovered from Olin, which is in strong contrast to the ICT-II assemblage where loop handles were the most common (Holley 1989).

Rim/lip protrusion ratios for jars with handles are fairly tightly arranged between 0.22 and 0.3223 (Figure 6.17). Two outliers with RPR/LPs of 0.152 (Vessel H38-1, a plain vessel with red-slipped interior) and 0.4755 (V213-2, a dark-slipped lobed jar) were also present. The mean average for jars with handles was 0.2824. These overall low RPR/LPs would suggest they are part of the later occupation of the site. This would corroborate Vogel's (1975:55) observation

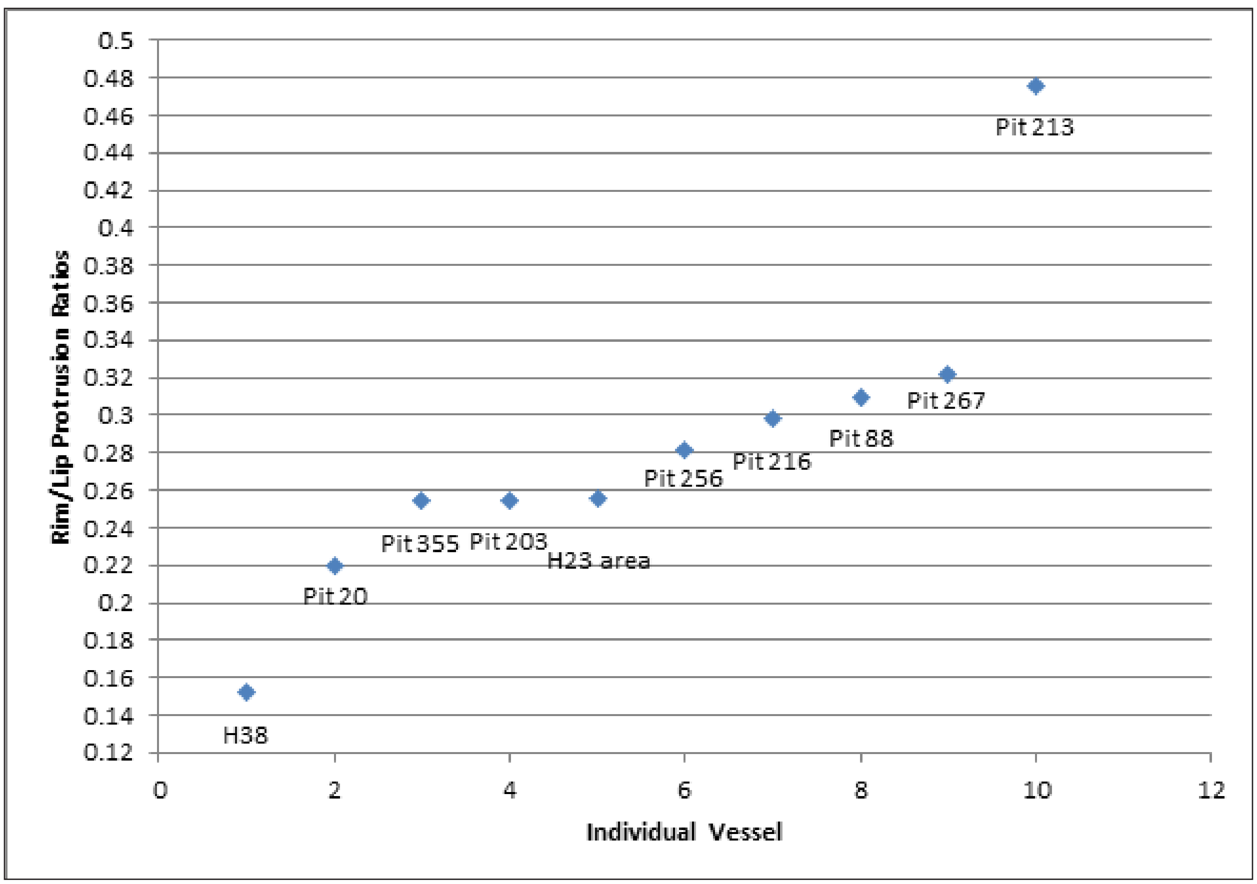

Figure 6.17. Rim/Lip protrusion ratios of handled vessels from Olin.

that handles appeared to be restricted to later Mississippian contexts, suggesting handles were "perhaps being introduced coincidentally with the type Cahokia Cordmarked." Though found in small numbers throughout the American Bottom temporal sequence, handles appear to have become more common during the Moorehead phase. Handles were common elements on Upper Mississippian jars from northern Illinois, western and southern Indiana, and southern Ohio (Baltus 2013; Emerson and Emerson 2013; Faulkner 1972; Griffin 1943).

Rim/lip protrusion ratios were averaged for each feature that contained jars. A sample of these are shown graphically in Figure 6.18, and while all features for which RPR/LP is available are listed in order from highest RPR/LP (earlier) to lowest RPR/LP (later) in Table 6.2.

Serving Wares

Beakers

Thirty-eight beakers, weighing approximately 306.63 g, were recovered from feature context at Olin (Appendix B Table B.12). All beakers have slipped exterior surfaces, ranging from tan to red to dark brown and dark brown/black. The majority of beakers (42.1%, n=16) have dark brown slipped exteriors, 31.6% (n=12) are red slipped, 18.4% (n=7) have dark brown/black slip, and 7.9% (n=3) have tan slip (see Appendix B Table B.12). All beakers are also slipped on the interior of the vessel; generally, the interior slip is the same as the exterior, though some instances occur where it is apparent either the interior or the exterior has been reduced so as to make the slip darker. No clear pattern is distinguishable; therefore this may have been an incidental (even post-depositional) occurrence.

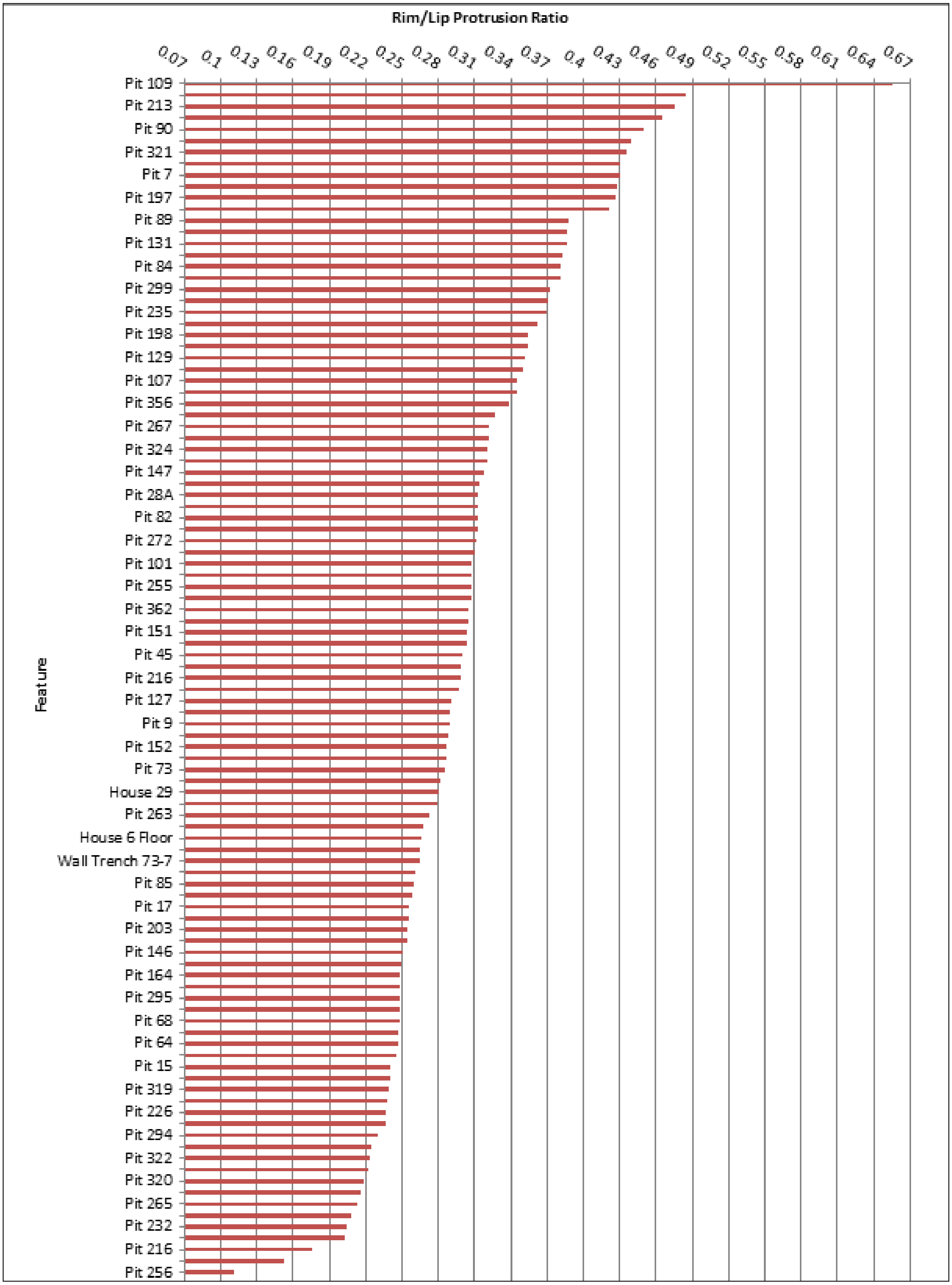

Figure 6.18. Rim/Lip Protrusion Ratios by feature at Olin.

Table 6.2. Average RPR/LP For Features At Olin

Feature	RPR/LP
Pit 109	0.656
Pit 367	0.485
Pit 213	0.4755
Sweatlodge	0.465
Pit 90	0.45
Pit 69	0.439
Pit 321	0.435
Pit 323	0.43
Pit 7	0.43
Pit 325	0.428
Pit 197	0.427
Pit 192	0.4213
Pit 89	0.388
Pit 276	0.387
Pit 131	0.386
Pit 133	0.383
Pit 84	0.381
House 24	
(WT 73-3C)	0.381
Pit 299	0.3726
Pit 289	0.3705
Pit 235	0.369
Pit 273	0.362
Pit 198	0.354
House 2 WT	0.3536
Pit 129	0.351
Palisade posts	0.35
Pit 107	0.3455
Pit 302	0.3445
Pit 356	0.3385
Pit 350	0.327
Pit 267	0.3223
Pit 288	0.322
Pit 324	0.32
House 23?	
(WT 73-8)	0.32
Pit 147	0.318
Pit 357	0.314
Pit 28A	0.313
Pit 360	0.313
Pit 82	0.313
Pit 293	0.312
Pit 272	0.311
Pit 88	0.31
Pit 101	0.308
Pit 122	0.307
Pit 255	0.307
Pit 267	0.307
Pit 362	0.305
Pit 315	0.305
Pit 151	0.304
House 32 Basin	0.303
Pit 45	0.3
Pit 275	0.298
Pit 216	0.298
Pit 51	0.297
Pit 127	0.29
Pit 153	0.29
Pit 9	0.29
Pit 215	0.288
Pit 152	0.287
Pit 43	0.287
Pit 73	0.286
Pit 256	0.282
House 29	0.28
Pit 36	0.28
Pit 263	0.273
Pit 139	0.268
House 40 Complex Floor	0.266
Pit 277	0.265
House 20	
(WT 73-7)	0.265
Pit 63	0.261
Pit 85	0.26
Pit 6	0.258
Pit 17	0.256
House 23 area	0.2558
Pit 203	0.2545
Pit 355	0.254
Pit 146	0.251
Pit 286	0.2495
Pit 164	0.248
Pit 247	0.248
Pit 295	0.248
Pit 56	0.248
Pit 68	0.248
Pit 134	0.247
Pit 64	0.247
Pit 115	0.246
Pit 15	0.24
Pit 253	0.24
Pit 319	0.239
Pit 114 and 119	0.237
Pit 226	0.236
Pit 318	0.236
Pit 294	0.23
Pit 259	0.225
Pit 322	0.223
Pit 20	0.222
Pit 320	0.218
House 27 postholes	0.215
Pit 265	0.213
Pit 274	0.208
Pit 232	0.204
Pit 227	0.203
Pit 216	0.176
House 38 Floor 47.5N 80W	0.152
Pit 256	0.111
Pit 128	0.107

Nearly all (n=32) beakers show evidence for burnishing on the exterior. It is most common for red-slipped beakers to not be burnished; six out of the 12 red-slipped beakers show no sign of burnishing, while only one dark-brown-slipped beaker appears to not be burnished. One tan slipped beaker (V82-3) has a trailed-line decoration consisting of parallel horizontal lines around the rim made with a narrow-width blunt tool (similar to Mound Place Incised bowls). Two red slipped beakers have fine-line-incised decoration, made with narrow-width, sharp tools on already slipped and fired vessels. This combination of traits are consistent with the Cahokia Red Engraved Beaker type once considered to be the 'classic Tippet's Bean Pot' definitive of the 'Trappist phase' at Cahokia (now the late Stirling through Moorehead phase) (Griffin 1949; Pauketat 2013c; Vogel 1964, 1975). Decorative motifs of these fine-line incised beakers appear to be variations of the sunburst design similar to that recovered from Cahokia's Tract 15A (see Appendix B) (Pauketat 1998). Cahokia Red Engraved Beaker, especially those with human-arm-and-fist handles, appeared concurrent with Cahokia Cordmarked pottery, suggesting that this particular form of beaker was likewise a material innovation associated with the Moorehead phase revitalization.

Figure 6.19. Hand and arm beaker handles from Olin.

Only one beaker rim from Olin, a tan-slipped vessel, retains evidence for a handle; however, six broken beaker handles were recovered from feature context at the site, half of which are dark slipped. Two additional handles are red-slipped and sculpted into the shape of human arms with hands at the end (Figure 6.19). This form has been found from unknown contexts at Cahokia

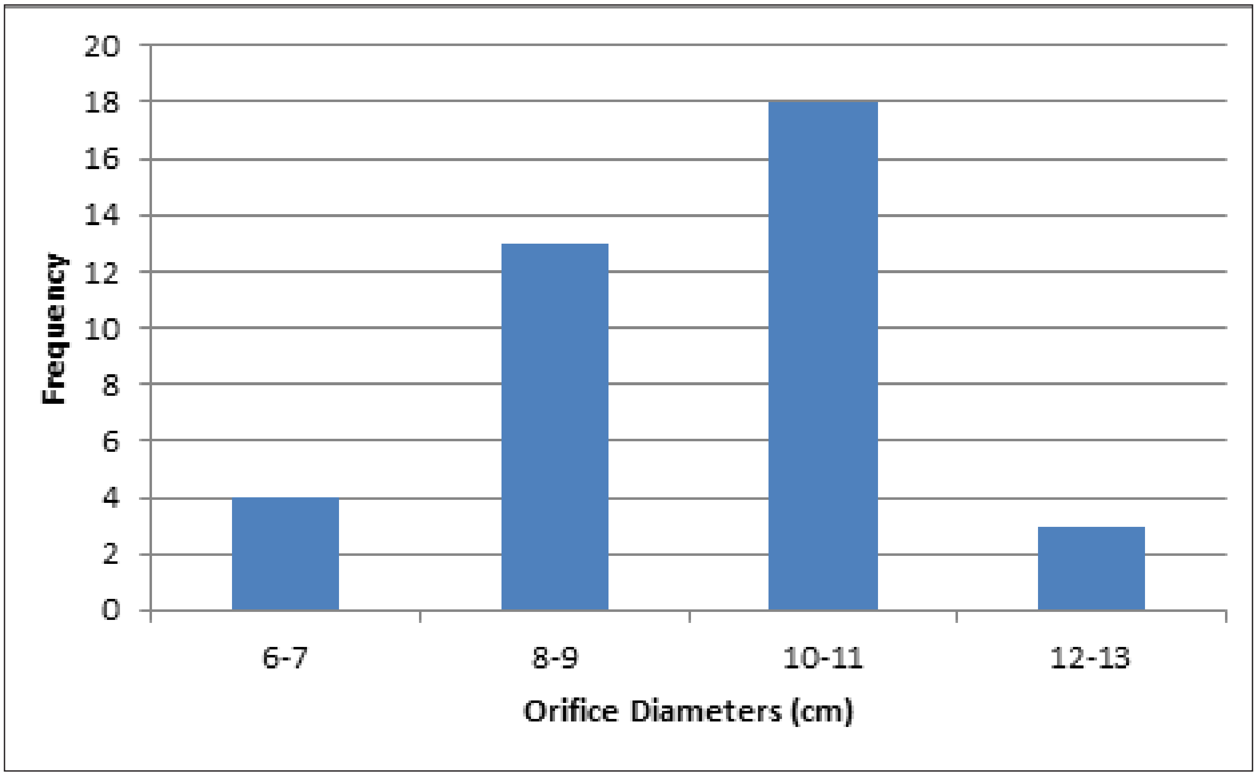

Figure 6.20. Frequency of orifice diameters for beakers from Olin.

(Titterington 1938), at sites in the Lower and Central Illinois River Valley (Harn 1980), as well as at the Herrell Village site in Missouri (Adams 1949) and the Obion site in Tennessee (Garland 1992).

Rounded lips appear to have been the norm (68%, n=26), while flat (n=4), flat-exterior beveled (n=2), round-exterior beveled (n=2), exterior beveled (n=1) and interior beveled (n=1) lips are also present (Appendix B Table B.13). Beakers range in orifice diameter from 6 cm to 13 cm with a mean average of approximately 9 cm and standard deviation of just over 2 cm. The majority (81.5%, n=31) of beakers have orifice diameters between 8 and 11 cm. the narrow range

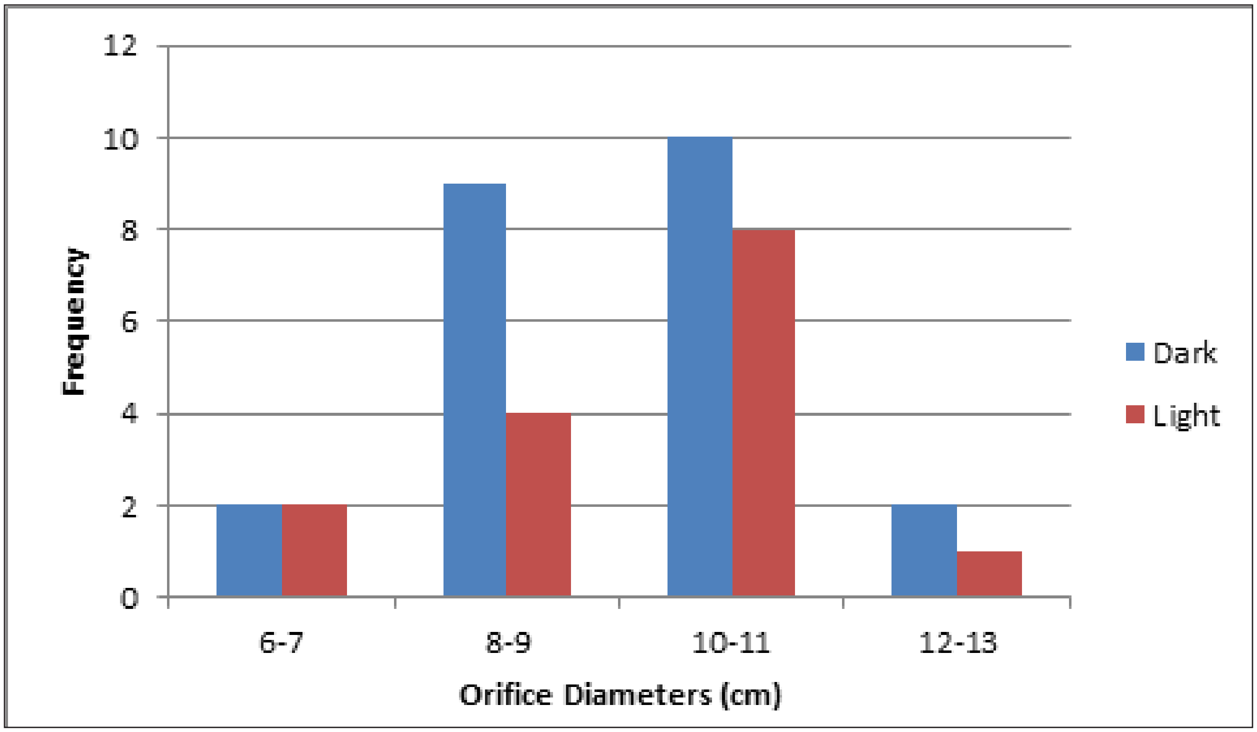

Figure 6.21. Frequency of Olin beaker orifice diameters by slip color; 'dark' includes dark brown and black, 'light' includes red and tan.

of orifice diameters and continuous range of size modes suggest this vessel type has a fairly standard size (Figure 6.20). Average beaker size at Olin appears to be slightly smaller than that of beakers recovered from Tract 15B, which had a mean average orifice diameter of 11 cm.

Comparing frequencies of orifice diameter by slip color shows similar distributions for both light slipped beakers and dark slipped beakers (Figure 6.21). This would seem to indicate that, even if the dark slipped/light slipped ratio and quality of decoration change over time, the standard size of beakers does not.

Recent residue analyses of a selection of beakers from throughout the Cahokia region have revealed these vessels were used to consume Black Drink, a highly caffeinated beverage used in religious contexts for purification (Crown et al. 2012). The consumption of this beverage, and in fact the plants necessary for making it, has its roots in the greater southeast; yet another indication for increased southern connections after the Stirling phase.

Bowl/Beakers

Given the overall similarities in temper and surface treatment among finely-made bowls and beakers, a number of vessels, especially those represented by small rim sections, were indistinguishable as to whether they were bowls or beakers, thus resulting in this category. Eight vessels (16.87g) are categorized as bowl/beakers (Appendix B Table B.14). The majority (62.5%, n=5) of bowl/beakers have dark brown slip, two are red-slipped, while one is dark brown/black-slipped. All but one bowl/beaker demonstrate evidence for burnishing; no other decoration is present. Orifice diameters range from 10 cm to 16 cm, with a mean average of 12.8 cm and a standard deviation of 2.7 cm. Lips are most often rounded (n=6) while two vessels have flat lips.

Bowls

Comprising the largest portion of the serving wares found at Olin, 185 bowls (1880.16 g) were recovered (Appendix B Table B.15). Bowls vary greatly in shape, but generally conform to restricted forms (incurving, inslanting) or unrestricted forms (straight, outcurving, outslanting). Approximately 24.3% of the bowl assemblage is comprised of restricted forms, including 16 inslanting (133.91 g) and 29 incurving bowls (285.05 g). Unrestricted forms comprise approximately 23.8% of the bowl assemblage, including ten straight walled bowls (46.41 g), 32 outcurving bowls (259.18 g), and two outslanting bowls (21.60 g). Additional bowl types include effigy bowls, everted rim bowls, and shallow inslanting bowls, all of which are unrestricted, probable serving vessels. Thirteen bowls (7%, 203.79 g) have effigy forms, 23 bowls (12.4%, 444.15 g) have everted rims, and 16 vessels are shallow inslanting (8.6%, 134.19g). Of the shallow inslanting bowls, approximately eight are indistinguishable from plates due to their small size and are designated shallow bowls/plates. The vessel shape of forty-four bowls (24%, 329.45 g) cannot be determined due to small size or damage to the orifice.

Nearly all (91%, n=119) restricted and unrestricted bowls are slipped, and burnishing is present on 76.2% (n=62) of these vessels, reinforcing their likely use as serving vessels. Dark slips are the most common on these bowl types, consisting of dark brown (47%, n=56) and dark brown/black slip (25.2%, n=30). Light colored slips consist of red (17.6%, n=21) and tan (12.6%, n=15). An additional three bowls have cordmarked exteriors, similar to grit-tempered Late Woodland bowls also found at Olin. Decorations present on straight, inslanting, incurving, outcurving, and outslanting bowls consist of lip tabs (n=11) or lugs (n=2), trailed lines (n=14) or incised lines (n=2). Trailed line decorations are equally made with narrow (n=7) to medium blunt tools (n=7). Where motif could be determined, trailed decorations consist of horizontal parallel lines around the rim consistent with the Mound Place Incised pottery type. Incised decorations are present only on red-slipped bowls using a narrow, sharp tool, with indeterminate motifs. This appears similar to the decorative technique used on the so-called Cahokia Red Engraved Beakers recovered from Olin and may be part of a shared material innovation.

Shallow bowls are most often dark brown- (n=9) or dark brown/black-slipped (n=5); a single red slipped shallow bowl is present. Burnishing is the only decoration present on these vessels, recorded on nine of the dark slipped vessels. Effigy bowls likewise tend to be dark brown (n=6) or dark brown/black-slipped (n=3), though three red slipped effigy bowls were recovered. Effigies most often consist of bird heads or tails (n=7); where bird heads are present, they are identifiable as either ducks/waterbirds or raptors. An interesting pattern emerged among the Olin effigy bowls: duck effigies face inward to the vessel, while raptors are placed facing outward.

This pattern does not hold elsewhere in the Cahokian world, as at least one duck effigy vessel from Cahokia's Tract 15B faces outward (Pauketat 2013c). Two vessels appear to be possible shell-effigy bowls, though these are represented by small portions of the vessel making that distinction difficult. One possible effigy bowl has a finger-trailed or impressed exterior in nested concentric circles resulting in an intaglio interior (Appendix B – V358-1). One red-slipped effigy bowl, with missing adorno, has a possible sunburst design incised into the post-slipped, post-fired exterior surface, again, similar in technique and motif to the so-called Cahokia Red Engraved beakers recovered from the site.

Everted-rim bowls follow a similar pattern in which the majority (77%) of vessels are dark brown (n=6) or dark brown/black-slipped (n=4); two are red slipped and one is tan slipped. The single tan-slipped everted-rim bowl is deeper than is typical for this vessel type (Appendix B – V43-1). Thirteen of these vessels exhibit burnishing on their exteriors. Eleven everted-rim bowls have narrow to medium blunt-tool trailed line decorations on their flange. All but one of these trailed decorations consist of short diagonal lines around the flange; a single example of sideways chevrons (similar in effect to the forked eye motif) is present on one of the red-slipped bowls (Appendix B – V226-3).

Lip forms for bowls include flat, rounded, interior-beveled, exterior-beveled, peaked, and rounded to exterior- or interior-beveled (Appendix B Table B.16). Most bowls (46.5%) have round lips, or flat lips (38.1%); round to interior-beveled lips comprise 5.2% and exterior beveled lips comprise 3.2%, while the other lip forms make up about 1% each. Lip shape does not appear to correlate with any particular bowl type.

Bowl lip thickness ranges from 3.15 mm to 8.05 mm, with a mean average of 4.93 mm and a standard deviation of 0.85 mm (see Appendix B Table B.15). Bowl lips are typically thin as the majority of bowls are finely made; no apparent differences in lip thickness exist among bowl

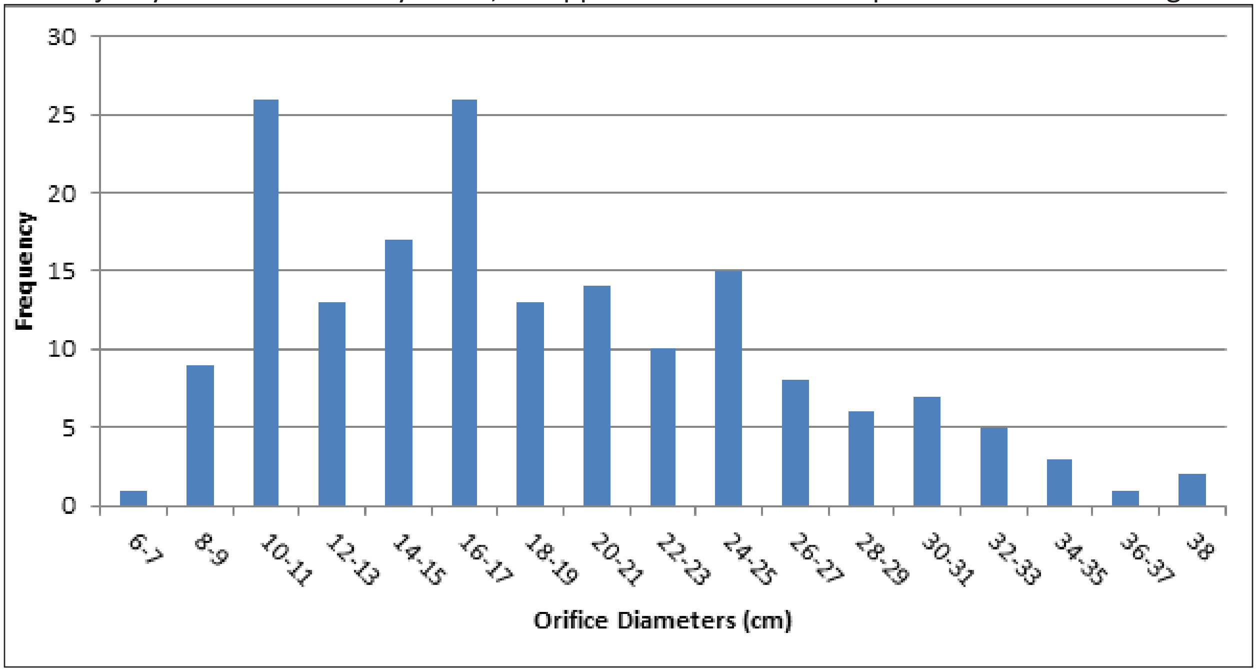

Figure 6.22. Frequency distribution of orifice diameters of all bowls from Olin.

types with the exception of two outliers; V195-1, a shallow bowl/plate, has a with lip thickness of 7.9 mm and V253-3, is a large inslanting bowl with a lip thickness of 8.05 mm. It is possible that V195-1 may actually be a plate, while V253-3 could potentially fit in with the “utensil” or crude bowl category. No correlation appears to exist between lip thickness and orifice diameter for bowls.

Orifice diameters of bowls range from 5 cm to 39 cm, with a mean average of 18.25 cm and a standard deviation of 7.35 cm (see Appendix B Table B.17). A histogram of orifice diameters shows a roughly tri-modal distribution of bowl sizes: small bowls with orifice diameters between 6 and 13 cm, medium bowls between 14 and 23 cm, and large bowls between 24 and 38 cm (Figure 6.22).

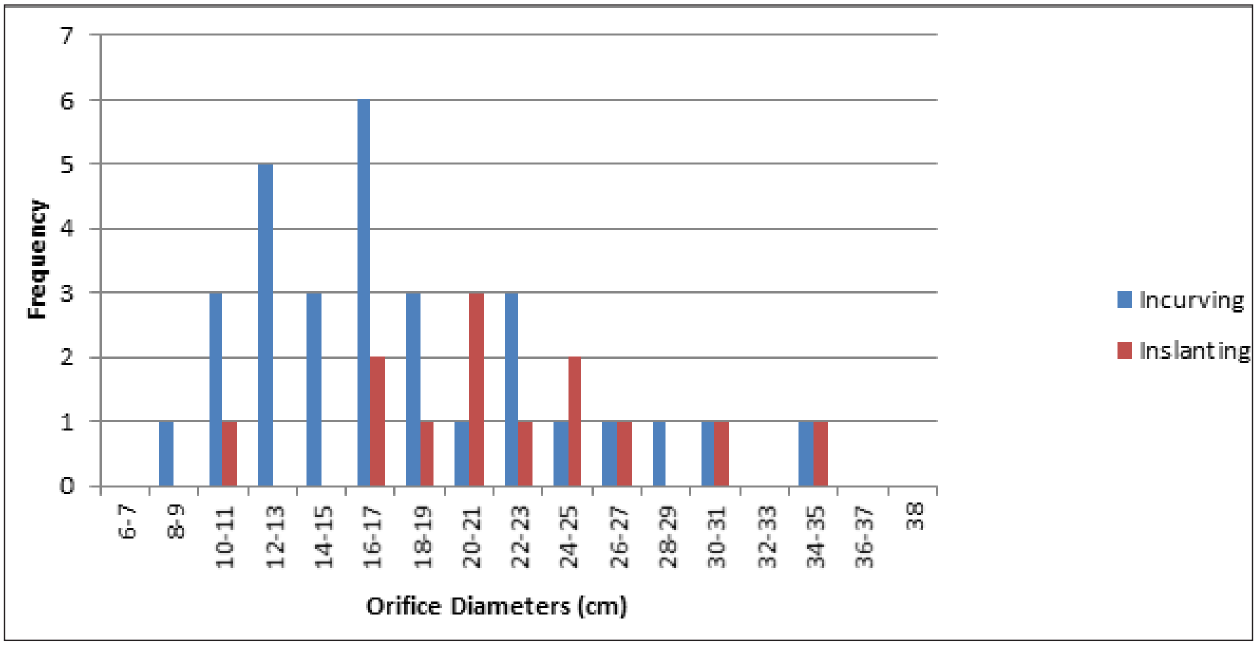

Figure 6.23. Frequency of orifice diameters for restricted-orifice bowls (incurving and inslanting) from Olin.

While the size differences among all bowls is not especially clear when compiled into one chart, separating these vessels into restricted and unrestricted forms show a clearer pattern. Orifice diameters of restricted bowls demonstrate the full range of bowl sizes. The majority (53.3%, n=16) of incurving bowls are of medium size, while 30 % (n=9) are small bowls, and 16.7% (n=5) are large bowls (Figure 6.23). Orifice diameters of inslanting bowls follow a similar

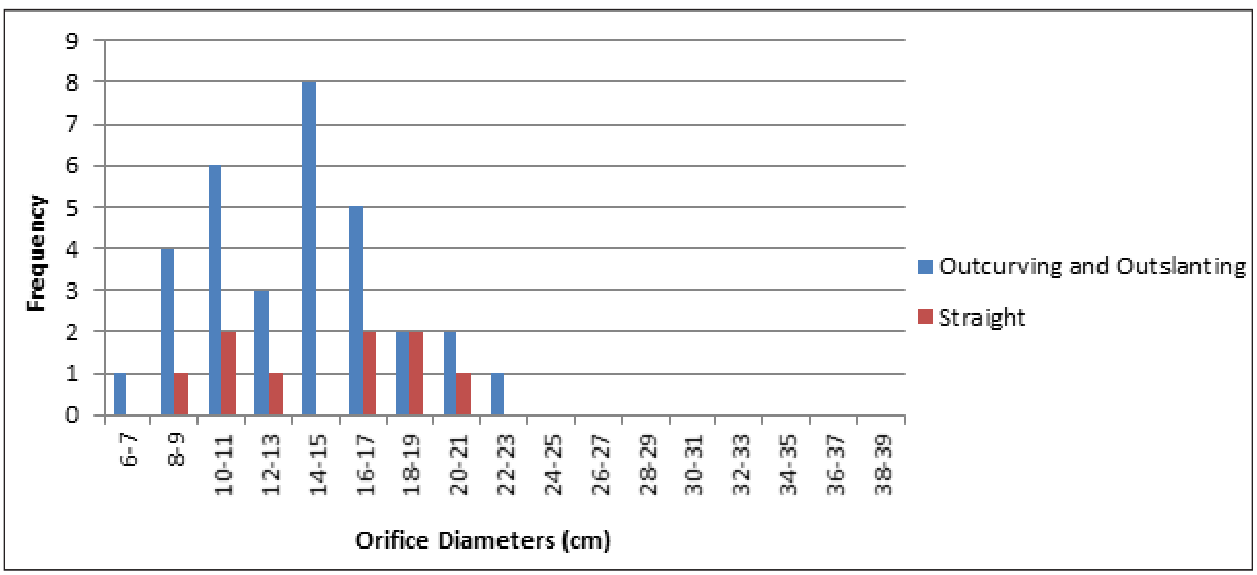

Figure 6.24. Frequency of orifice diameters of unrestricted bowls (outcurving/outslanting and straight-walled) from Olin.

distribution. Most inslanting bowls are of medium size (n=7) while five bowls are of large size; only a single example of small inslanting bowl exists.

Unrestricted bowls tend to be smaller overall than restricted bowls and the probable serving bowls discussed below. Among the unrestricted bowls, straight-walled bowls demonstrate two clear size modes: small bowls with orifice diameters between 8 and 13 cm and medium bowls with orifice diameters between 16 and 21 cm (Figure 6.24). Straight-walled bowls are nearly equally divided between the two size modes.

Outcurving/outslanting bowls also show a somewhat similar bimodal distribution: small bowls range between 6 cm to 13 cm, medium bowls between 14 and 23 cm. There are slightly more medium-sized outcurving/outslanting bowls (n=18) than small outcurving/outslanting bowls (n=14).

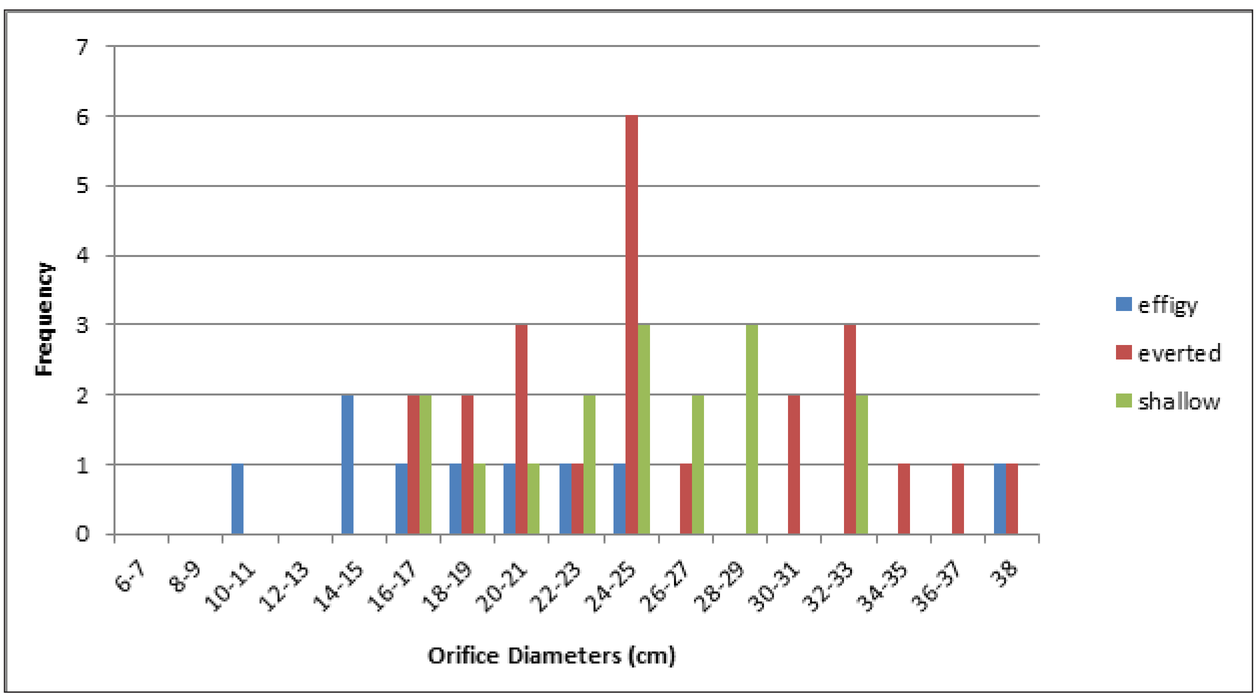

Figure 6.25. Frequency of orifice diameters for everted rim, effigy, and shallow bowls from Olin.

Among special bowl types presumably used for serving purposes (e.g., effigy bowls, everted-rim bowls, and shallow bowls), the vessels tend towards the larger sizes (Figure 6.25). Nearly all effigy bowls (77.8%, n=7) are of medium size, between 14 and 25 cm; a single small effigy bowl and a single large effigy bowl are present. Everted rim bowls are likewise slightly skewed towards larger sizes. A bimodal distribution of everted rim bowls shows medium sized bowls with orifice diameters between 16 and 27 cm and large sized bowls between 30 and 38 cm. A greater number of medium everted-rim bowls are present (n=15), with approximately half as many large (n=8) sizes. Shallow bowls, on the other hand, consist mostly of large vessels (62.5%, n=12), while medium (25%, n=4) comprise the remainder. There are no differences in orifice diameter range or distribution between shallow bowls and shallow bowl/plates. This skew towards larger sizes of effigy, everted-rim, and shallow bowls supports their likely use as serving wares, especially in a larger group setting.

As probable serving vessels, the frequency of everted rim bowls at Olin (n=23) is high compared to the Late Stirling phase occupation at Cahokia's ICT-II (n=2) and even to the Moorehead phase occupation there as well (n=8) (Holley 1989). The Moorehead 1 phase at Tract 15A yielded only two everted-rim bowls (designated as Wells "plates"), while the Moorehead 2 phase yielded an additional two (Pauketat 1998). This vessel type appears briefly at the Late Stirling phase/Moorehead phase transition, perhaps embedded within new practices as part of the Moorehead phase revitalization of Cahokia.

The high frequency of everted rim bowls at Olin suggests this was an important vessel type for activities here that differed from, or were more intense than, those which took place at ICT-II or Tract 15A. The plaza and extra-domestic structures (see Chapter 5) at Olin indicate a broad span of public and extra-domestic practices. This supposition may be supported by the recovery of four separate everted-rim bowls from Pit 267. This large pit feature contained diverse vessel fragments, including numerous bowls, a large amount of hickory nutshell, chenopodium, and maize. This pit is located nearly equidistant from H22, H28, and H32 and may be associated with those structures. Pieces of a cross-mending everted-rim bowl were likewise recovered from nearby Pits 256 and 247, also potentially associated with H32.

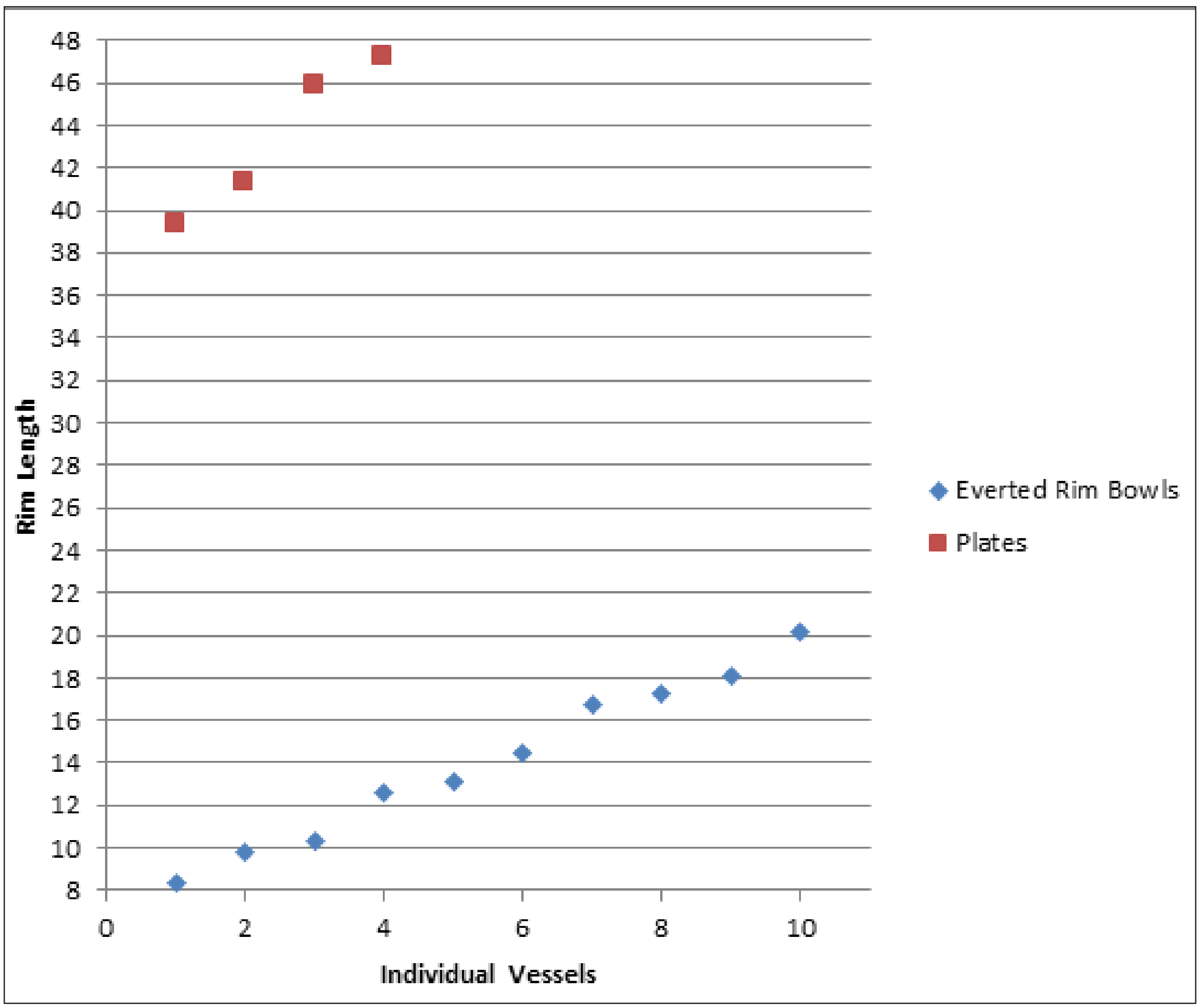

Figure 6.26. Scatter plot of everted rim bowl and plate rim length from Olin.

Rim lengths of everted rim bowls range from 8.38 mm to 23.06 mm, with a mean average of 13.08 mm and standard deviation of 3.95 mm. Vogel (1975:104) has suggested these vessel types were the initial form in a "continuous formal (and probably chronological) series leading to Crable Deep Rimmed Plate." A scatter plot of everted-rim bowl rim length and plate rim lengths shows a clear separation between everted-rim bowls and plates, with no "transitional" rim lengths present at Olin (Figure 6.26). Similar vessels of this type, though not identical, have been recovered from the Obion site in Tennessee (typologized as O'Byam Incised var. unspecified) (Garland 1992) and from the Matthews site in southeast Missouri (Walker and Adams 1946),

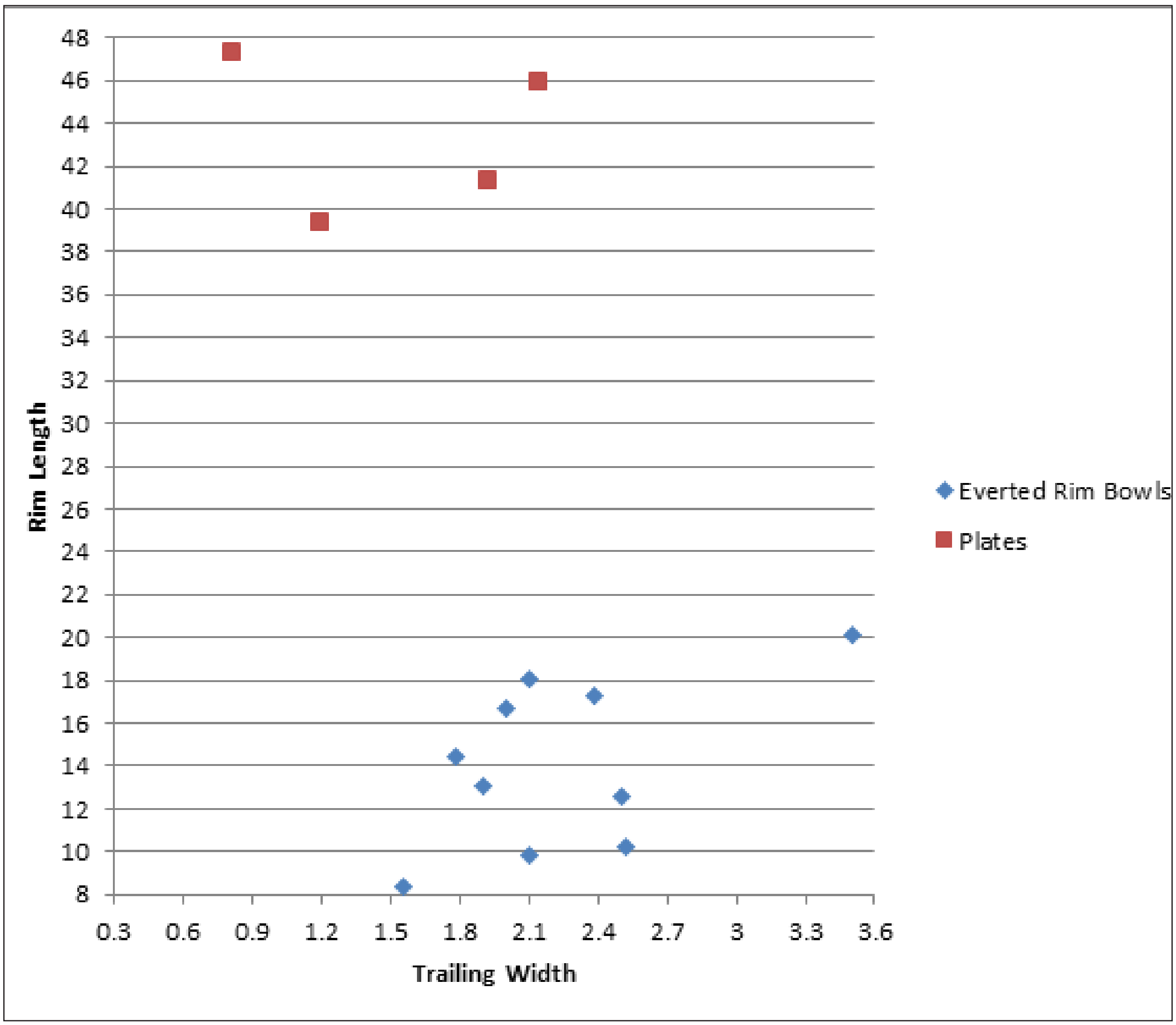

Figure 6.27. Rim length to trailing width on everted-rim bowls and plates from Olin.

highlighting yet another southern connection beginning during Cahokia's Moorehead phase transition.

A similar scatter plot, incorporating trailing width shows the same separation, as well as slightly wider trailing among the everted-rim bowls (Figure 6.27). This scatter plot also shows that, among everted bowls, the trend (while not strongly correlated) appears to be wider trailing on longer rims, while among plates there is almost no correlation (though sample size likely precludes any determination of pattern). In general, this suggests that rather than being similar vessels along an evolutionary continuum, everted-rim bowls and plates may actually be separate technologically. The extreme differences in decorative motif would likewise suggest this. Conversely, the possibility exists that the plates recovered from Olin derive from a slightly later reoccupation of the site, including the burial in Pit 321 (see Chapter 5). Regardless, the rim lengths of everted-rim bowls and plates at Olin do not converge. Plates may be a material innovation that enhanced the serving capacity of everted rim bowls with added space for iconographic capacity.

Plates

Nine plates, weighing 177.23 g, were recovered from Olin, largely from the southwestern area of the site (Appendix B Table 1B.6). Three plates were recovered from the looted burial (Pit 321), while additional plates were recovered from nearby Pits 318 and 323, suggesting this area of the site saw the latest occupation (see Figure 4.4). While the small possibility exists that vessels from the same features (Pit 321 and Pit 323) are fragments of the same plate, variation in lip thickness, rim angle, and orifice diameter suggest they are all separate vessels. Likewise, visual comparison among rim sherds does not indicate enough similarity to warrant identification as single vessels.

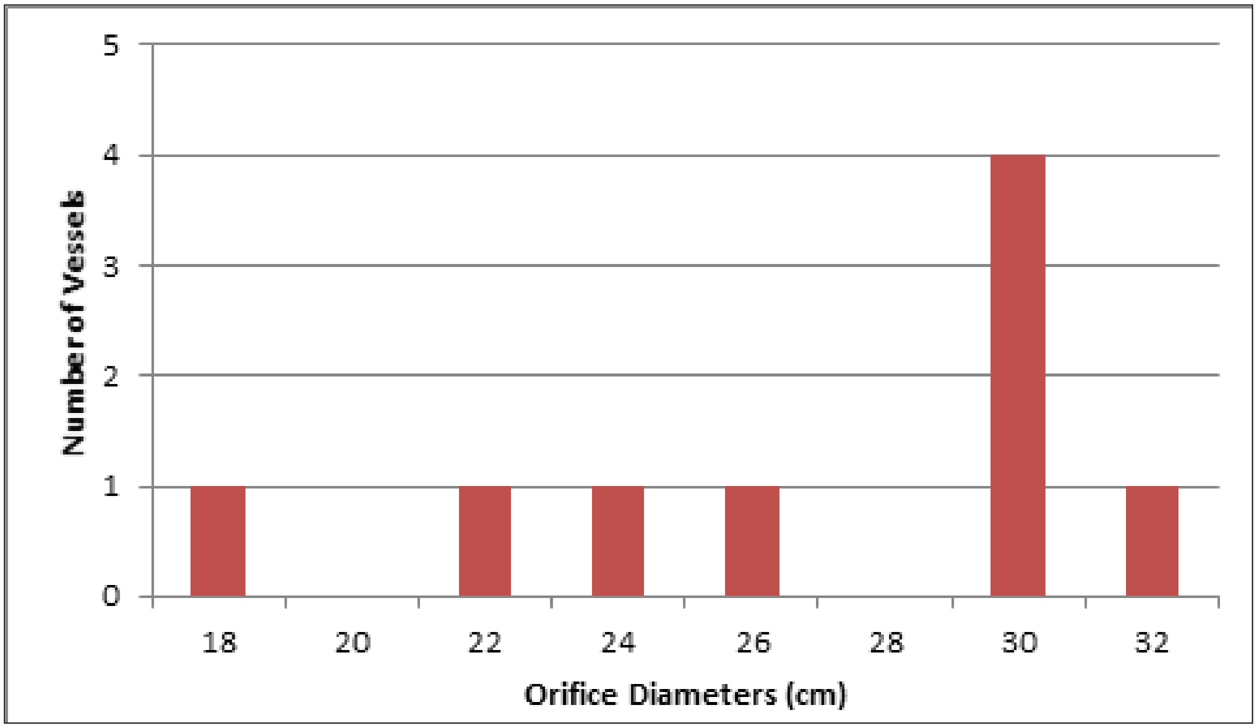

Figure 6.28. Frequency of orifice diameters of plates from Olin.

Plate size ranges from greater than 18 cm orifice diameter to at least 32 cm orifice diameter, with a mean average of nearly 27 cm and a standard deviation of 4.70 cm. The limited sample size precludes any reliable determination of modal distribution; however, there is a clear concentration of plates with a 30 to 32 cm orifice diameter (Figure 6.28).

On the three vessels where it was measurable, lip length ranged from 39.3 mm to 47.2 mm, resulting in a mean average of 43.4 mm and a standard deviation of 3.74 mm. This suggests the plates recovered at Olin are fairly similar in lip length. All plates, with the exception of one eroded vessel, have slip on both interior and exterior surfaces. Interior slip is nearly equally divided between dark slip and red slip; exterior slip is most often dark (n=6) (see Appendix B Table B.16). Decoration consists of narrow trailed lines, made with a sharp (n=2) or blunt (n=5) tool. Decorative motifs are most often single or nested diagonal lines set in opposition to each other to resemble chevrons, though one vessel (V323-5) has a variation on this that resembles oppositional-diagonal trailing common to Upper Mississippian (Fisher phase) jars (see Appendix B).

Pans

In addition to everted-rim bowls and plates, pans were important vessel types in the Olin assemblage. Pans have been part of the American Bottom ceramic assemblage, in small numbers, since the Terminal Late Woodland. While sometimes called ‘salt pans’ with the supposition that salt was harvested by evaporating water from salt springs using these vessels (Muller 1997), these vessels were also likely used for baking or parching (Pauketat 2004; Pauketat 2013c). Griddles or other large shallow or flat vessels with a large surface area are commonly used for baking breads from starchy, gluten-free ingredients, like corn or nuts (Hodder 2012:56). According to Holley (1989), this vessel type increased in importance during the later part of the Mississippian period, concomitantly with an increased reliance on acorns and other nuts (Simon and Parker 2006). Approximately 25 pans, weighing 917.55 g, were recovered from Olin (Appendix B Table B.18). All pans have plain or eroded exteriors and all but one are red-slipped on the interior. Fifty-six percent (n=14) of the pans exhibit sooting on their exterior surface, supporting the likelihood these vessels were used for baking or parching.

Orifice diameters range from 20 cm to 50 cm, with a mean average of 35.5 cm and a standard deviation of 7.8 cm. Lip thicknesses range from 7.35 mm to 13.6 mm, with a mean average of 9.93 mm and a standard deviation of 1.64 mm. Most lips (60%, n=15) are flat or round (24%, n=6); one vessel has a flat-to-exterior-beveled lip while a second has a round-to-exterior beveled lip.

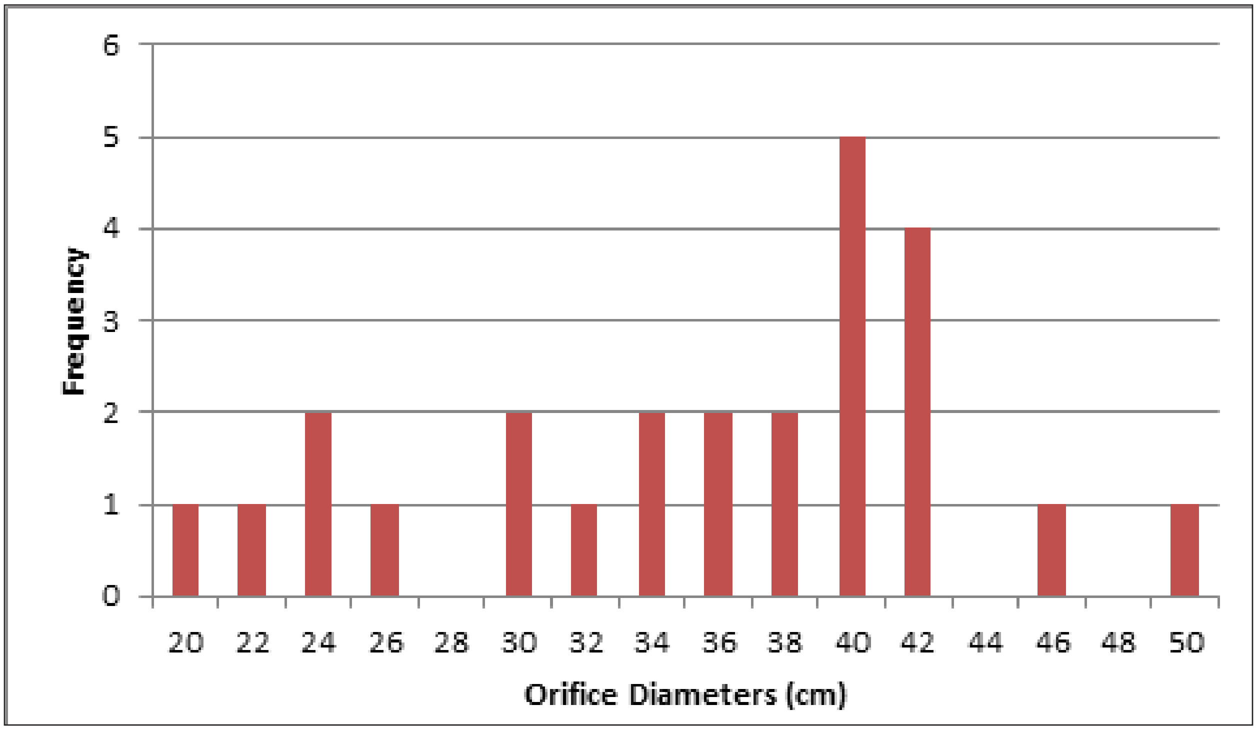

Figure 6.29. Frequency of orifice diameters of pans from Olin.

A histogram of orifice diameter frequency demonstrates a weak distribution into roughly three size modes for pans at Olin (Figure 6.29). Small pans have orifice diameters between 20 and 26 cm, medium pans between 30 and 42 cm, and large pans orifice diameters greater than 46 cm.

Extra-Domestic Vessels

Hooded Bottles

Three hooded bottles (68.24 g) were recovered from features at Olin (Appendix B Table B.20). All are dark slipped with burnished exteriors. One vessel portion consists of a slightly cambered top of the 'hood' which had a small knob or nub at the top (Appendix B, V17-5). This vessel was recovered from Pit 17, which appears to have been an interior pit of H1. A second vessel likewise has an adorno attached to the back of the 'hood' which presumably depicts a hairstyle extending down the back of the head of an anthropomorphic bottle (Appendix B, V127-10). This vessel was recovered from Pit 127, located at the western edge of the site near H23.

Hooded bottles are typically associated with the presentation of food or drink, though likely in restricted contexts (Pauketat 2013c).

Mini-vessels

Twelve vessels (72.39 g) are classified as mini-vessels, based on size as well as construction technique (Appendix B Table B.24). At least two vessels are grog tempered while one is shell/grog tempered. The remaining vessels are tempered with shell with the exception of V223-1, which has no visible temper. Eight of these vessels are miniature versions of jars, three are miniature bowls and one is a miniature version of a bottle. The majority (n=8) of the mini-vessels have slipped exteriors; four vessels have brown to black slipped exteriors while four are red slipped. The only decoration present is burnishing, visible on only four, mostly dark-slipped, mini-vessels. One of the mini-jars (V232-4) had a rolled lip; like the regular-size jars with rolled lips at the site, this vessel was light-slipped.

With the exception of V43-10 and V74-3, the miniature vessels are concentrated in the southern portion of the site, especially the southwestern. Three miniature jars alone were recovered from the looted burial (Pit 321), while an additional four were recovered from pits in that vicinity. The relationship between miniature vessels and an area of the sites around a probable mortuary facility suggests these vessels were most-often used in non-domestic contexts.

Orifice diameters of mini-vessels range from 5 cm to 10 cm, with a mean average of 7 cm and standard deviation of 1.54 cm (Appendix B Table B.24). Though perhaps unreliable due to their diminutive size, the Rim/Lip Protrusion Ratios of the miniature jars tend to be high, ranging from 0.434 to 0.545, within the typical range of Late Stirling phase vessels.

Other Non-serving Wares

<u>Bottles</u>

Thirty-nine bottles, 481.2 g, were recovered from Olin (Appendix B Table B.19). Twenty bottles are red-slipped, 15 bottles have dark slipped exteriors, two of which are cordmarked below the neck, and two bottles are tan-slipped. All tan-slipped bottles are burnished, and all but two of the dark brown slipped bottles are burnished. Only five red-slipped bottles exhibit evidence for burnishing, following the pattern of unpolished red slipped vessels demonstrated by Cahokia Red Engraved Beakers, certain bowls, and the interiors of Cahokia Cordmarked jars.

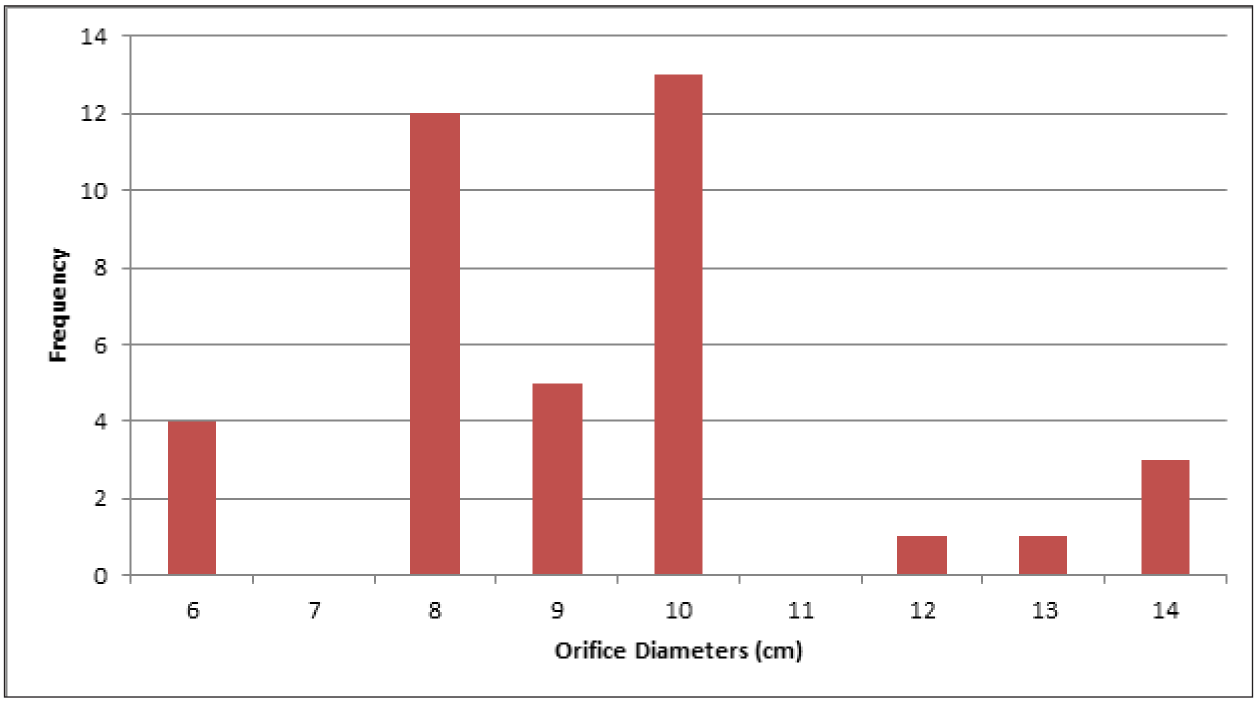

Figure 6.30. Frequency distribution of bottle orifice diameters from Olin.

The only other decoration present among the bottles in the Olin assemblage was a set of trailed lines at the neck of H39-3. Where determinable, most bottles at Olin had short- to medium-length necks, though one vessel (V224-2) was clearly a long-neck bottle, which is more similar to southern bottle styles during the late Mississippian period. This vessel was recovered from the southeastern corner of the site near H29/H30.

Orifice diameters range from 6 cm to 14 cm, with a mean average of 9.28 cm and a standard deviation of 2.04 cm (Figure 6.30). There are three clear size modes for bottles: small bottles with orifice diameters of 6 cm, medium bottles with orifice diameters between 8 and 10 cm, and large bottles with orifice diameters between 12 and 14 cm. The majority of bottles (77%, n=30) are of medium size, while only 12.8 percent (n=5) are large bottles and 10.2 percent (n=4) are small bottles.

Seed jars

Only two possible seed jars or constricted-orifice vessels were recovered (Appendix B Table B.21). One such vessel has an orifice diameter of 6 cm, a plain exterior and plain interior. The second vessel has an orifice diameter of 10 cm with plain exterior and red-slipped interior. Seed jars were more common during the early part of the Cahokian chronology and typically form a minimal part of the vessel assemblage during the Moorehead phase.

Utensils/Crude wares

Eleven vessels (536.3 g) were identified as crude bowls (similar to Pauketat's 1998 'utensil' category) (Appendix B Table B.22). These vessels had thick walls, and were often grog or grog/shell tempered; only two crude bowls were solely shell tempered. The majority (n=9) of crude bowls had plain exterior surfaces; one bowl (V15-3) was red-brown slipped and burnished, while one (VH13-1) was cordmarked with s-twist cordage. No additional decoration is present, suggesting these vessel forms are likely not funnels, which tend to have vertical trailed lines radiating from the orifice. Amid the non-vessels from Olin were two appendages that could possibly be funnel-lid knobs. Orifice diameters range from 10 to 34 cm with a mean average of 16.3 cm and a standard deviation of 6.6 cm. All lips are flat, with a lip thickness range 7.86 to 14.20 mm and mean average of 9.38 mm (Appendix B Table B.23)

Pinch Pots

Pinch pots, generally untempered, casually made small vessels, were common at the Olin site. Forty-five pinch pots (415.52 g) were analyzed, though slightly more than half (n=23) of those vessels were from Late Woodland or mixed context pits scattered across the site (Appendix B Table B.26). All of the pinch pots from Mississippian contexts are untempered, with the exception of one vessel, which is either sand-tempered or made from paste with a heavy sand content, and a second that has possible shell tempering.

Among pinch pots from Mississippian contexts at Olin, orifice diameters range from 2.5 cm to 13 cm, with a mean average of 7 cm. Lip thickness range from 2.63 mm to 8.46 mm with an average of 4.60 mm. Most pinch pots (n= 10) have rounded lips, though flat (n=4), exterior

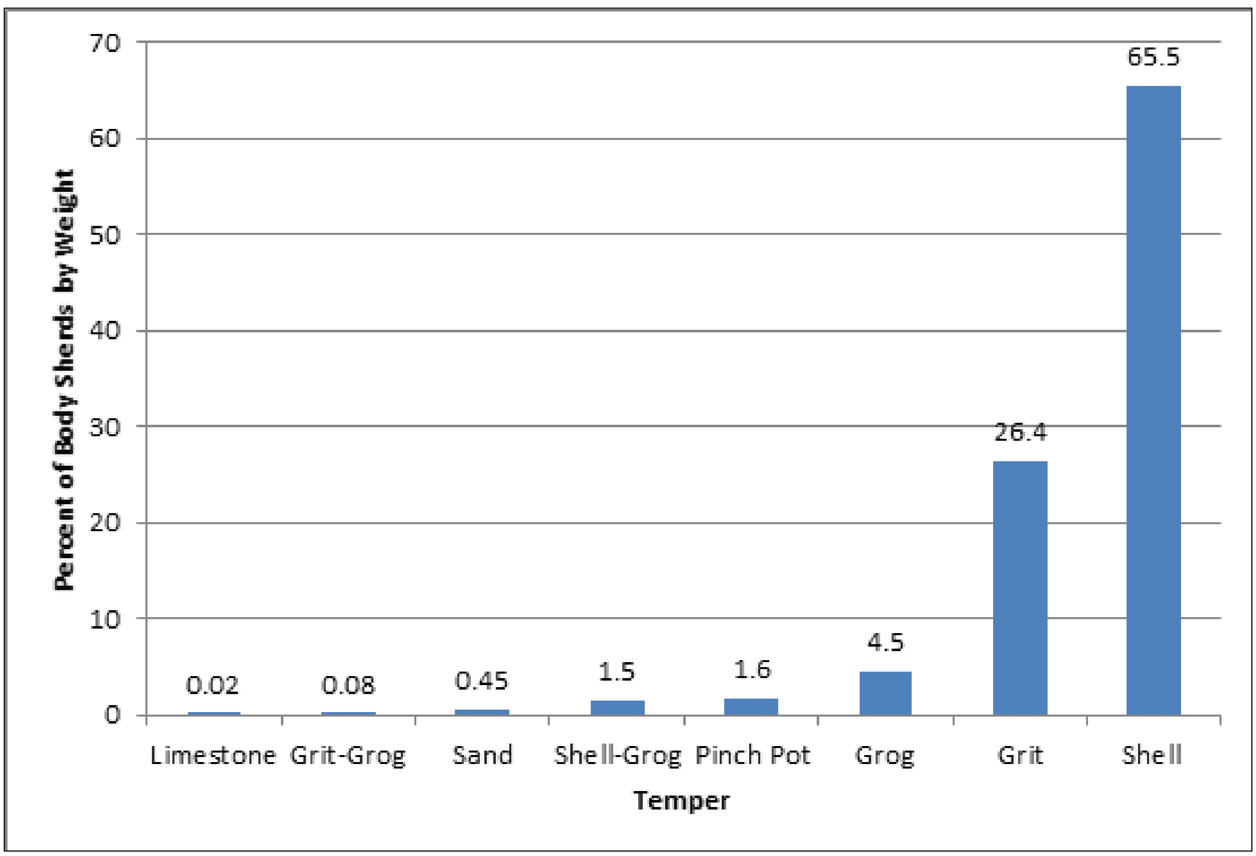

Figure 6.31. Percentage of body sherd temper types by weight from Copper.

beveled (n=2), and interior beveled (n=1) are also present. With the exception of a single S-twist cordmarked pinch-pot from the floor of House 6, all pinch pots have plain surfaces.

Copper Site Ceramic Data

Body Sherds

A total of 1,893 body sherds, weighing 4478.5g, were recovered from 11S3, the Copper site (Appendix B Table B.27). The majority of body sherds by weight were shell tempered (Figure 6.31). The grit, limestone, and sand-tempered sherds are indicative of Middle and Late Woodland occupations of this landscape. As mentioned above, an increase in grog tempering took place during the later part of the Mississippian period. This increase is demonstrable at the Copper site, with a higher percentage of both shell-grog and grog tempered body sherds in the assemblage.

The majority of shell, shell-grog, and grog-tempered sherds by weight (57.8 %, 1782.3 g) have plain exterior surfaces, followed by 31.2% (961.1g) cordmarked exteriors. Approximately 11% of the body sherds have slipped exterior surfaces, consisting of 5.8% (178 g) dark slipped, 4.8% (147.4 g) red slipped, and less than 1% (12.7 g) tan slipped. Nearly equal proportions of dark and light slip follow the regional trend of increasingly common use of light slips during the later Mississippian period.

Seventeen sherds, weighing 78.6 g, are decorated (Appendix B Table B.28). The majority of decorated sherds are grit or sand tempered, indicative of the Middle and Late Woodland occupations of this site. With one exception, all decorated shell-tempered sherds are trailed. One grog-tempered sherd is incised, and one is rocker stamped (based on decorative technique, this last sherd is likely Middle Woodland). Trailed decorations are mainly made with blunt tools, with one finger-trailed sherd from Feature 3. Finger trailing is rare in the American Bottom; however, it is a common decorative technique of Upper Mississippian assemblages in southern Wisconsin, northern Illinois, and western Indiana (Baltus 2013; Emerson and Emerson 2013; Faulkner 1972; Griffin 1943; Hall 1962).

Non-Vessels

Approximately 68 non-vessels (342.7 g) were recorded, including appendages (Appendix B Table B.29), vessel portions with questionable identification or too small to analyze, and ceramic objects (Appendix B Table B.30). Bottles, bowls, Mississippian jars, pinch pots, plates, jar/bottle, and pans are recorded among the non-vessels, roughly proportional to the assemblage as represented by larger rim fragments. Eleven Middle and Late Woodland jars are recorded and twenty-three vessels are indeterminate as to form.

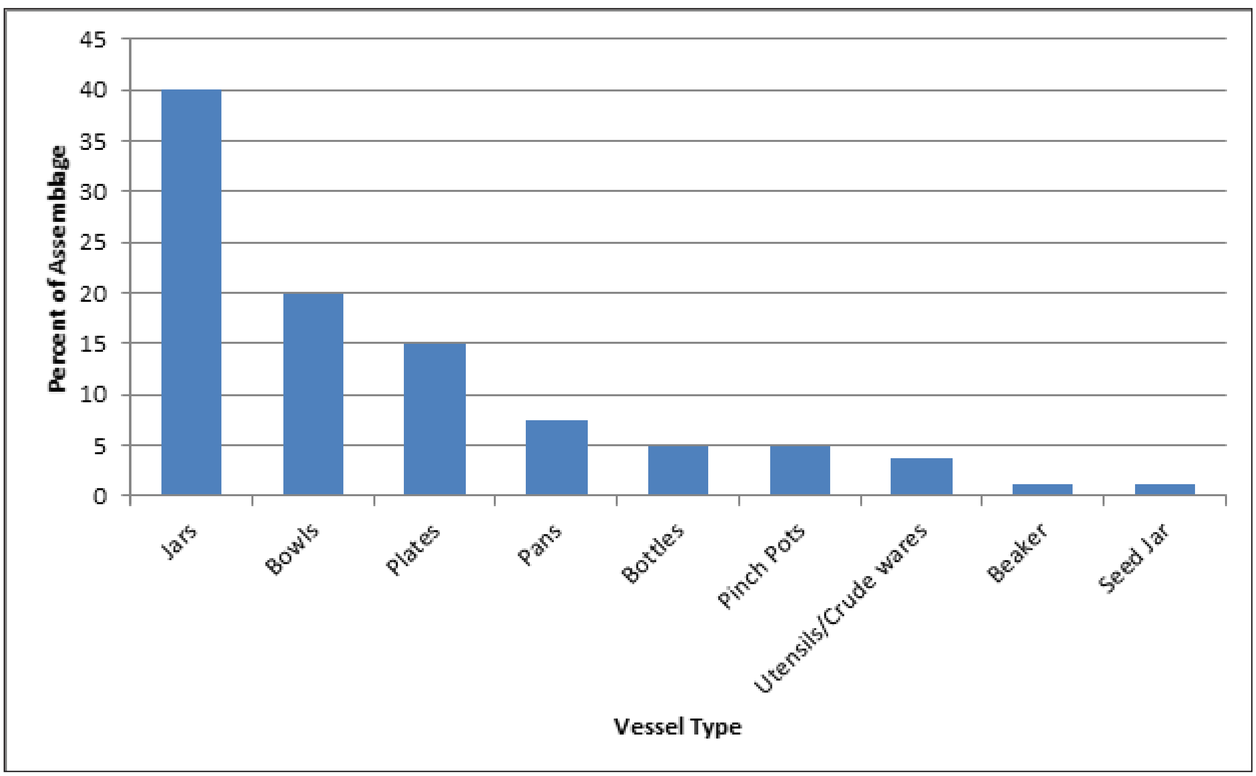

Figure 6.32. Vessel assemblage from Copper.

Vessels

The vessel assemblage from 11S3, the Copper site, consists of 80 vessels weighing 2548.3 g. As is typical, the majority (40%) of vessels is comprised of jars (n=32, 1347.10 g) (Figure 6.32). Bowls (n=16, 412.5 g) and plates (n=12, 277.9 g) made up 20% and 15% respectively. Only six pans (7.5%, 298.8 g), four bottles (5%, 29.4g), four pinch pots (5%, 55 g), and three utensils/crude vessels (3.8%, 59.4 g) were recovered. A single example each of beaker (53.3 g), seed jar (8.6 g), and miniature vessels (6.3 g) were also recovered. Using a conservative estimate of serving vessels (i.e., bowls, plates, beakers), the service-to-cooking ratio for the Copper assemblage is 0.91. Pans appear ambiguous in this estimation, as the sooting suggests use for cooking, while their properties and context suggest possible use as serving wares. As such, this vessel type is not considered in the determination of the service-to-cooking ratio.

Figure 6.33. Possible Grooved-paddled jar from Copper.

Jars

Thirty-two shell-tempered jars, weighing 1347.10 g, were recovered from mound, plowzone, and feature contexts at the Copper site. The majority of jars (50%, n=16, 603.90 g) have plain exterior surfaces, ten jars (31.3%, 660 g) have cordmarked (cord-roughened) exteriors, five jars (15.6%, 62 g) have eroded exteriors, one jar has a smoothed-over-cordmarked exterior, and one jar (V23-2) has an unusual exterior surface treatment (Figure 6.33). The exterior impressions on this vessel have even, smooth margins and u-shaped profiles suggesting grooved paddling rather than cordwrapped paddling (Schneider personal communication, 2013). Grooved paddles were popular pottery production tools at Upper Mississippian Oneota sites during the 13th century, and Fort Ancient during the 14th-15th centuries (Griffin 1943; Hall 1962). This exterior surface treatment may also have been produced using a thong- or root-wrapped paddle, a variation sometimes referred to as “simple stamped” in the literature (Evans 1955). No jars with slipped exterior surfaces were recovered from Copper.

Decoration on jars consists largely of handles and lip tabs; a single vessel (V3-19) has trailed lines and lip notching in addition to a handle (Appendix B Table B.31). All handles consist of narrow strap handles; no loop handles were recovered from Copper. At least three handles are bifurcated or have two small nodes attached to the top with a groove between (Appendix B V3-19). Various forms of bi-knobbed or bifurcated handles were recovered from the Northside excavations at East St. Louis (Jackson and Finney 2007), though in execution were visibly different. A bifurcated handle was recovered from the southern ridge of the Fingers site south of Cahokia on a Ramey Incised jar (Kelly 1995) and a dark-slipped jar with a “bi-knobbed” handle was recovered from a Moorehead phase context at Fingers (University of Illinois Urbana-Champaign field school excavations, analysis forms on file with ISAS). The handles from the Fingers site appear to be more similar to those at Copper than those depicted for East St. Louis. Pauketat (1993:77) suggested that this handle type “may be reliable diagnostics” of the early Stirling phase as they were found in these temporal contexts at Cahokia’s ICT-II, Tract 15A, and Kunnemann Mound as well as Labras Lake, and Mitchell, though the Moorehead phase handle from Fingers would seem to contradict this. The addition of lip-notching on some of the jars with bifurcated handles suggests this combination may be a non-local style. Jars with bifurcated or bi-knobbed handles are also known from the Obion site, located in western Tennessee (Garland 1992).

Shell-tempered cordmarked jars were recovered from feature contexts and plowzone only; no cordmarked jars were recovered from mound contexts (Appendix B Table B.32). Cordmarking on the jars recovered is generally vertical, with S-twist cordage where identifiable. Where measurable, the cordmarking cordage thickness ranged from 1.25 mm to 2.2 mm, with a mean average of 1.79 mm and standard deviation of 0.60 mm. Spacing between cordmarking ranged from 1.3 to 1.55 mm, with a mean average of 1.43 and a standard deviation of 0.06. Both cordage width and spacing between cordmarking is greater on Copper site jars than that noted for the Olin site.

Six (60%) of the cordmarked jars have red-slipped interiors; the single possible grooved-paddled jar was likewise red-slipped on the interior. If the trend for decreased interior slipping through time holds true, the majority of cordmarked vessels with interior slip would counter previous suggestions of a Sand Prairie phase, or even a very late Moorehead phase, occupation of this portion of the Copper site.

Orifice diameters of cordmarked and grooved-paddled jars ranged from 10 cm to 40 cm, with a mean average of 27.1 cm and standard deviation of 9.24 cm (Appendix B Table B.33). All cordmarked jars had angled or everted–angled rims. Among the cordmarked jars, the majority of rims were attached over the top of the neck (n=6) or attached to the exterior of the vessel (n=5). Six of these jars had a bolster of extra clay added to the exterior of the neck. The rim of a single cordmarked jar was continuous from the neck, with additional clay added to the exterior.

All cordmarked/grooved paddled jar rims have angled rims; there are no examples of vertical or everted rims among this vessel type. As such, lip bevels were measured rather than rim angles. Lip bevels ranged from 18° to 45°, with a mean average of 31.36°. Rim curvatures of the cordmarked/grooved-paddled jars were all negative numbers indicating globular vessel shape. No hybrid forms of sharp-shouldered vessels with cordmarked exteriors were recovered from Copper. Lip/rim protrusion ratios ranged from 0.199 to 0.333. These low lip/rim protrusions fit well with Moorehead phase jar assemblage at ICT-II as well as with the Olin assemblage as discussed below.

Two plain-surfaced jars had red-slipped interiors (Appendix B Table B.34). One jar had a lip tab; the second vessel had a notched lip, trailed lines in what appeared to be an arc motif near the neck of the jar, and a bifurcated handle. The area below the trailed lines appeared to possibly be lobed or made to appear like a lobed jar (Appendix B V3-19). While Pauketat (2005:199-200) describes a black-slipped, everted-rim, notched-lip jar from the East St. Louis Southside excavations as having vestigial attributes (specifically those of pre-Mississippian “Late Bluff” jars), the association of lip-notching with these plain-surfaced jars at Copper appears to be a non-local style, especially as being so far removed in time from the “Late Bluff” vessel type.

Two additional vessels from Feature 3 were similar to this apparently non-local, vessel style. While these jars do not appear typical for the American Bottom during this time period, they do seem to coincide with those described by Holley et al. (2001b) as “Shiloh Complex” vessels at the nearby Lembke site.

Orifice diameters of plain or eroded jars ranged from 10 cm to 30 cm, with an average orifice diameter of 22.5 cm and standard deviation of 6.24 cm (Appendix B Table B.35). Eight plain and eroded surface jars from Copper had vertical or high-angled rims, while 12 jars had angled rims. Lip bevels were measured for plain and eroded jars with angled rims. These lip bevels ranged from 4° to 79° with a mean average of 35.5°; this range is greater than that measured for cordmarked jars, though the mean average is nearly the same.

Vertical or high-angled rimmed jars were concentrated in Feature 3, with a single vessel recovered from the lower levels of Mound 3 and one recovered from Feature 12, a pit within Feature 4. This distribution suggests this vessel type was used in events associated with the construction of Mound 3 as well as those taking place in Feature 4; events which took place after Feature 3 was no longer in use as this vessel type was found in the basin fill of that feature. Jars with high-angled or vertical rims were measured using methods common for Upper Mississippian ceramics (Emerson and Emerson 2013; also see Chapter 4). Rim angles for these jars ranged from 97° (nearly vertical) to 143° (widely angled), with a mean average of 116.5°. For comparison, rim angles for the roughly contemporaneous mid-13th century Upper Mississippian site of Joe Louis (11CK284), located in northeastern Illinois, ranged from 50° to 152°, with a mean average of 110° (Baltus 2013). Jar rim angles from Hoxie Farm Fortified Village (11CK4), a late 13th to early 14th century Upper Mississippian village located near Joe Louis, ranged from 80° to 140° with a mean average of 106°, and rim angles from the Fisher site, located near the Upper Illinois River, ranged from 70° to 166° with a mean average of 115° (K. Emerson, personal communication 2013).

Rim attachment was slightly different for plain-surfaced jars than for cordmarked jars. In these cases, rims were either added over the top of the vessel (n=6), continuous from the neck (n=5), or added to the exterior of the vessel (n=2). Rim attachment did not correlate with either angled or high-angled/vertical-rim jars. One vessel in each of these categories also had a bolster of extra clay added to the exterior at the neck. A single example existed of the jar rim being added to the interior of the neck; this occurred on a jar with a high-angled/vertical-rim (V3-26).

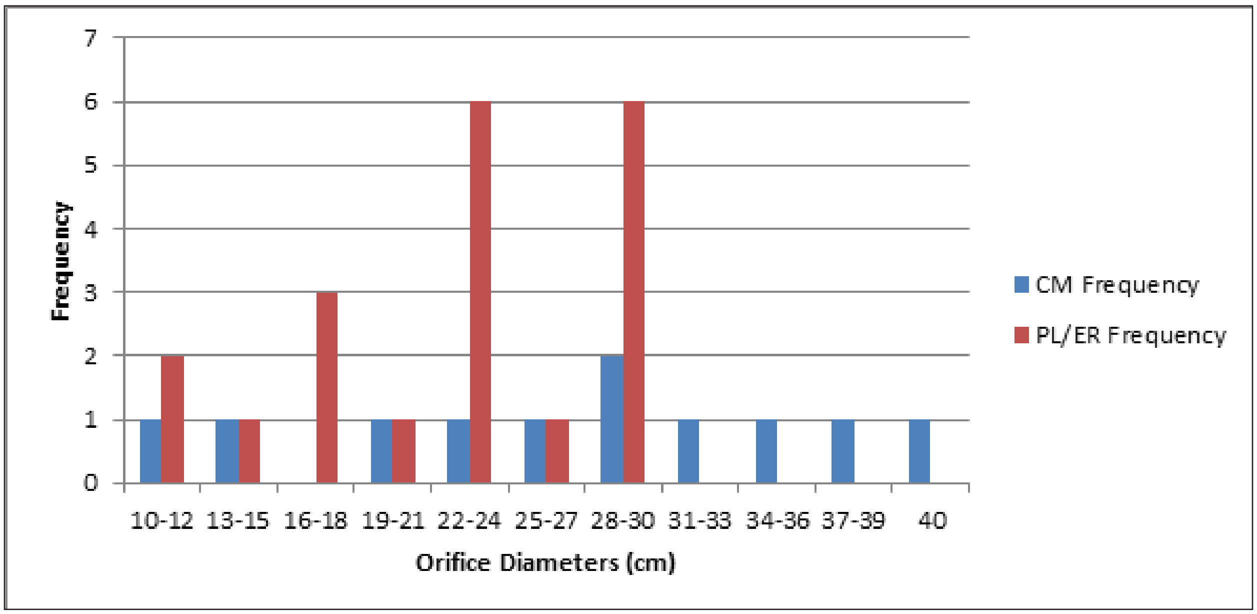

Figure 6.34. Frequency of orifice diameters for jars from Copper.

A histogram of orifice diameters of all jar types suggests three size modes: small jars (10-15 cm), medium jars (16-30 cm), and large jars (31 – 40 cm) (Figure 6.34). Cordmarked jars are represented by all vessel sizes, while plain and eroded jars are only present as small and medium jars. Cordmarked jars are nearly evenly divided between medium (n=5) and large (n=4), while only two small cordmarked jars were recovered. Exterior sooting is present only on small and medium-sized cordmarked jars, suggesting the large cordmarked jars were used as storage

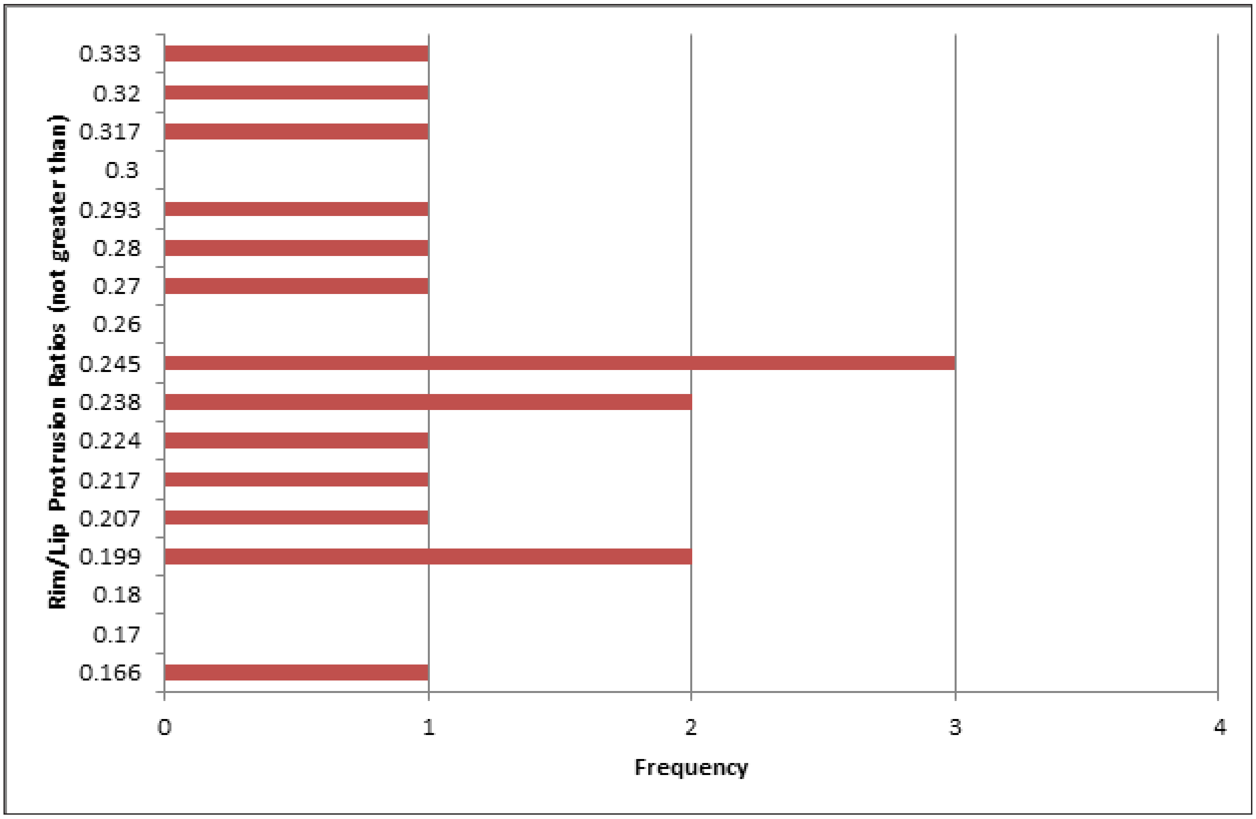

Figure 6.35. Rim/lip protrusion ratios for all jars from Copper.

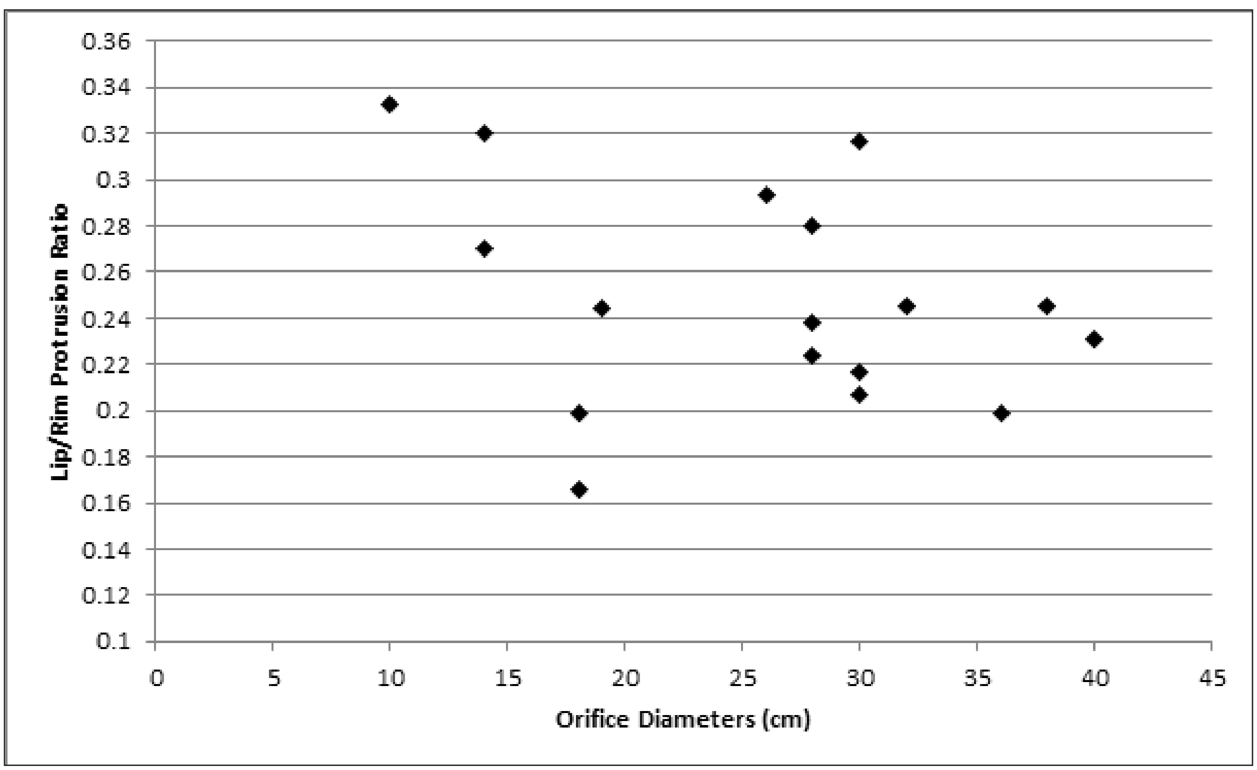

Figure 6.36. Rim/lip protrusion ratios to orifice diameters for all jars from Copper.

vessels. Likewise, the majority (85%, n=17) of plain and eroded jars are medium-sized, while 15% (n=3) are small. Only two plain-surfaced jars exhibit sooting; both are medium-sized vessels.

Rim/lip protrusion ratios for all jars from the Copper site range from 0.166 to 0.333, with a mean average of 0.249 and standard deviation of 0.047 (Figure 6.35). The mean average for plain jars is 0.212 while the mean average for cordmarked jars is slightly higher at 0.268. Both jar types fall within the lower end of the range for Moorehead phase. No correlation was evident between RPR/LPs and orifice diameter for jars from Copper, again indicating that vessel size exerted little to no influence on rim length (Figure 6.36).

As mentioned earlier in conjunction with the plain-surfaced jars, bifurcated handles from at least three separate vessels were recovered from Copper. Bifurcated handles were supposedly a Lohmann-early Stirling phase horizon marker at Cahokia (Holley 1989; Pauketat 1993, 1998); however, this handle form seems to reappear during the Moorehead phase. Bifurcated handles were also a trait of Madisonville Fort Ancient ceramics from Indiana/Ohio (AD 1400) (Griffin 1943) and at the Obion site in Western Tennessee (Garland 1992). All of the bifurcated handles from Copper were of the narrow strap variety and fairly homogeneous in their proportions.

The jars on which these bifurcated handles were attached are consistent with those described by Holley et al. (2001b) as part of the “Shiloh Complex” at the nearby Lembke site. As mentioned in the report for the Lembke site, Holley and colleagues were reluctant to assign a temporal affiliation for the “Shiloh Complex” as the vessel variation noted may have been due to different ethnic identities and pottery traditions (Holley et al. 2001b:267). Regardless, seeing resemblances to Central Illinois River Valley Mississippian as well as Oneota ceramics, Holley et al. (2001b:438) assign these ceramics to a terminal (post-Sand Prairie) phase in the Silver Creek drainage. Additionally, they supply a radiocarbon date of AD 1295-1450 from a structure (F122) at 11S86 (Lembke #2) that was associated with Shiloh Complex ceramics (Holley et al. 2001b:362). The presence of similar jars at the Copper site, associated with Moorehead phase ceramics and buildings, suggests an earlier appearance in this region.

Serving Wares

Bowls

A total of 16 bowls, weighing 412.5g, were recovered from Copper (Appendix B Table B.37). Bowls are nearly evenly split between restricted forms (n=8) and unrestricted forms (n=7). All but two bowls are shell tempered; these two outcurving bowls have grog temper.

Five bowls are dark slipped, four of which are burnished and have dark-slipped interiors as well. One (grog tempered) bowl appears to have been smudged (intentionally reduced), though no added slip is visible. Three bowls have lip tabs while one possible effigy bowl (V3-15) has a funneled 'spout' handle (Appendix B, V3-15). Likewise, one of the outcurving bowls, V10-1, has an irregular orifice and a portion of the vessel is pushed outward from the interior (Appendix B, V10-1); this bowl may be a shell effigy vessel. Lip shapes are typically round (n=8) or flat (n=6), with two examples of outward beveled-flat on outcurving bowls. Significantly, no everted rim bowls are present in the Copper site assemblage. Lip thicknesses range from 4.16 mm to 11.1 mm, with an average of 6.7 mm (Appendix B Table B.38). The bowls recovered from Copper tend to be slightly thicker than those recovered from Olin, suggesting fewer "fineware" vessels at Copper.

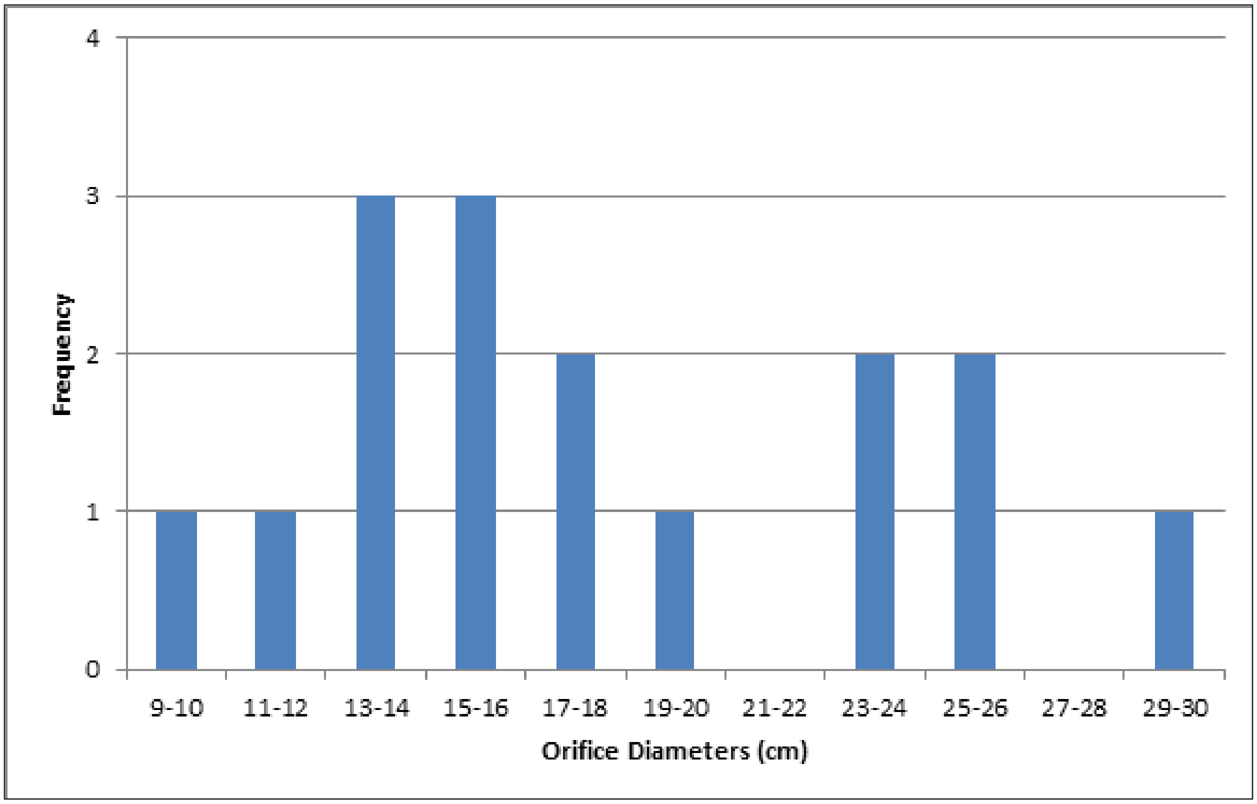

Figure 6.37. Frequencies of bowl orifice diameters from Copper.

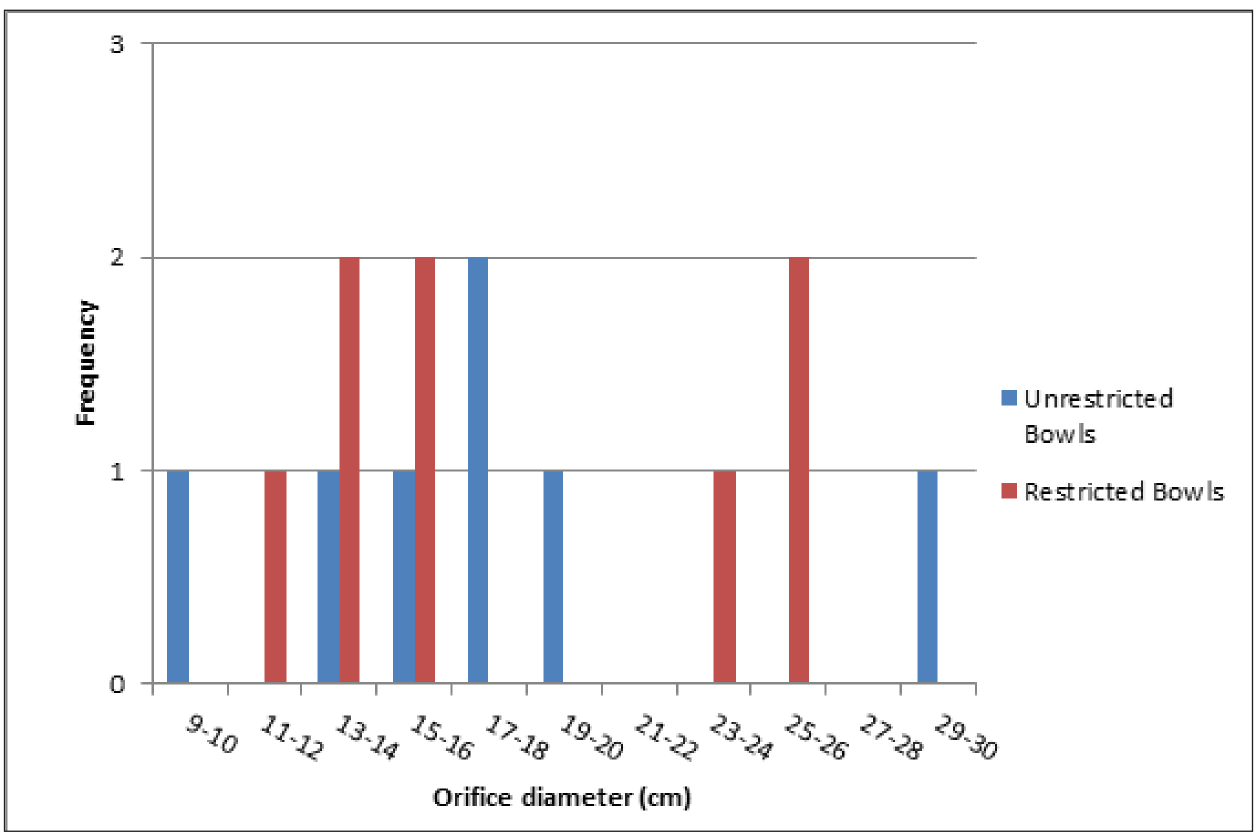

Figure 6.38. Frequency distribution of unrestricted versus restricted bowls.

Orifice diameters of bowls from the Copper site ranged from 9 cm to 30 cm, with a mean average of 18.6 cm. A histogram of orifice diameters for bowls from Copper suggests three vessel sizes: small bowls with orifice diameters between 9 and 12 cm, medium bowls with orifice diameters between 13 and 20 cm, and large bowls with orifice diameters between 23 and 30 cm (Figure 6.37). The majority (56.3%, n=9) of bowls are medium sized while 31.3% (n=5) are large bowls; only two vessels (12.5%) are small bowls. When restricted and unrestricted bowl forms are compared, the bimodal distribution remains the same, though there are more large-size restricted bowls than unrestricted (Figure 6.38).

Figure 6.39. Effigy adornos from Copper

Two effigy adornos were recovered from Feature 4; as neither have large (or any) portions of the vessel they belong to, they are designated non-vessels, though they are most likely rim adornos for effigy bowls (Appendix B Table B.39). One of the effigies has a wide bill oriented horizontally, giving it a resemblance of a Spoonbill (Figure 6.39), a rare effigy type for Mississippian bowls in the American Bottom as this bird is native to the southeast and Gulf Coast of North America. The second effigy is the more common duck-head effigy with wide crest, often resembling the hooded merganser or the wood duck (see Appendix B). In conjunction with the possible Spoonbill effigy, the merganser would be a more noteworthy possibility, as both birds are diving birds and may reference the earth-diver narrative of world origins (Hall 1997). A similar narrative may have been part of the Moorehead revitalization movement, performed in the construction of mounds using water-logged soils as discussed in Chapter 5. Likewise, duck head effigies were increasingly popular during the Moorehead phase and have been recovered from Tract 15A-DT at Cahokia (Pauketat 1998), the Lower Illinois River Valley (Perino 1971), the Central Illinois River Valley (Harn 1980), even from sites in Missouri (Adams 1941).

Figure 6.40. Plate motifs from Copper.

Plates

Twelve plates, weighing 277.9 g, were recovered from feature and plowzone contexts at Copper (Appendix B Table B.40). No plates were recovered in conjunction with either Mound 3 or Mound 4. No plates have evidence for sooting, indicating their use was solely in the capacity of serving.

The majority of plates (n=9) have slipped exteriors, only three plates are plain. Seven of the slipped plates have dark brown exteriors and interiors; the other two slipped plates are red slipped on both surfaces. Two of the dark brown slipped plates (V20-2 and V20-3) have trailed line decorations on their flange. This decoration was done with medium-width blunt tools, with a nested chevron or oppositional diagonal motif (Figure 6.40). One of the red-slipped plates (V4-9) also has a trailed line decoration; a narrow-width blunt tool was used to make a series of diagonal lines on the flange. A second red-slipped plate (V3-27) has an incised line decoration, made with a narrow-width sharp tool. The motif on this plate consists of chevrons with vertical lines between (see Figure 6.40). This decorative motif is similar to those found on O'Byam Incised plates from the Midsouth (Garland 1992).

Plate orifice diameters range from 24 cm to 54 cm, with a mean average of 34.6 cm and a standard deviation of 7.7 cm (Appendix B Table B.41). In three instances, orifice diameter could not be determined; therefore rim diameter was measured instead. If the lip lengths are subtracted from the rim diameters, a rough estimate of orifice diameter can be determined (given in parentheses); this was used to estimate vessel size.

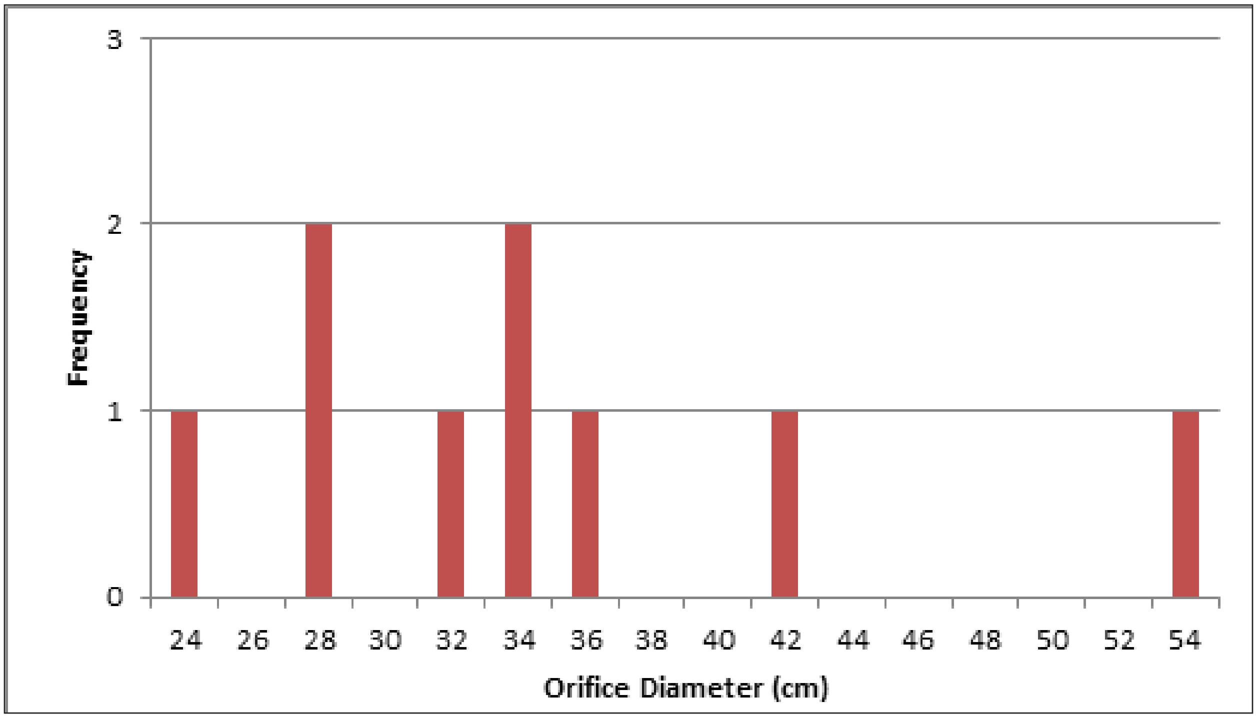

Figure 6.41. Frequency of orifice diameters of plates from Copper.

Plates recovered from Copper are wide-rimmed; lip lengths range from 38 mm to 75.25 mm, with an average length of 51.9 mm and standard deviation of 11.74 mm. No correlation between orifice diameter and lip length could be found, again indicating that vessel size did not affect lip length. Lip length appears to vary more greatly with the Copper plates than those from Olin, though this may likely be a factor of differences in sample size.

Based on a histogram of plate orifice diameters, it is possible that there are at least two, if not three, plate size modes: small plates with orifice diameters less than 30 cm, medium plates with orifice diameters between 32 and 36 cm, and large plates with orifice diameters greater than 38 cm (though given the very small sample, these size modes may not be accurate) (Figure 6.41). The majority of plates (n=6) are of the medium size. This distribution of orifice diameters is roughly similar to that at Tract 15B, though a small number of plates with orifice diameters less than 21 cm is present in that assemblage (Pauketat 2013c).

Pans

Six pans were recovered from Copper, weighing 298.8 g (Appendix B Table B.42). The majority (n=4) have plain exteriors; two pans have S-twist cordmarked or fabric-impressed exteriors. No pans have exterior slipping and all but two of the Copper pans have sooted exteriors. Half of the pan rims were recovered from a single fill zone near the base of Mound 3, in close association with burned nutshell. A cordmarked/fabric-impressed pan very similar to one recovered from this Mound 3 fill was recovered from Feature 23 suggesting rough contemporaneity between the construction of Mound 3 and the in-filling of Feature 23 (see Chapter 5). Both pans from Feature 23 have red-slipped interiors. The high number of pans recovered from the base of the mound suggests these vessels became increasingly important in practices of commensality tied to mound construction, perhaps as larger serving platters in addition to use for parching or

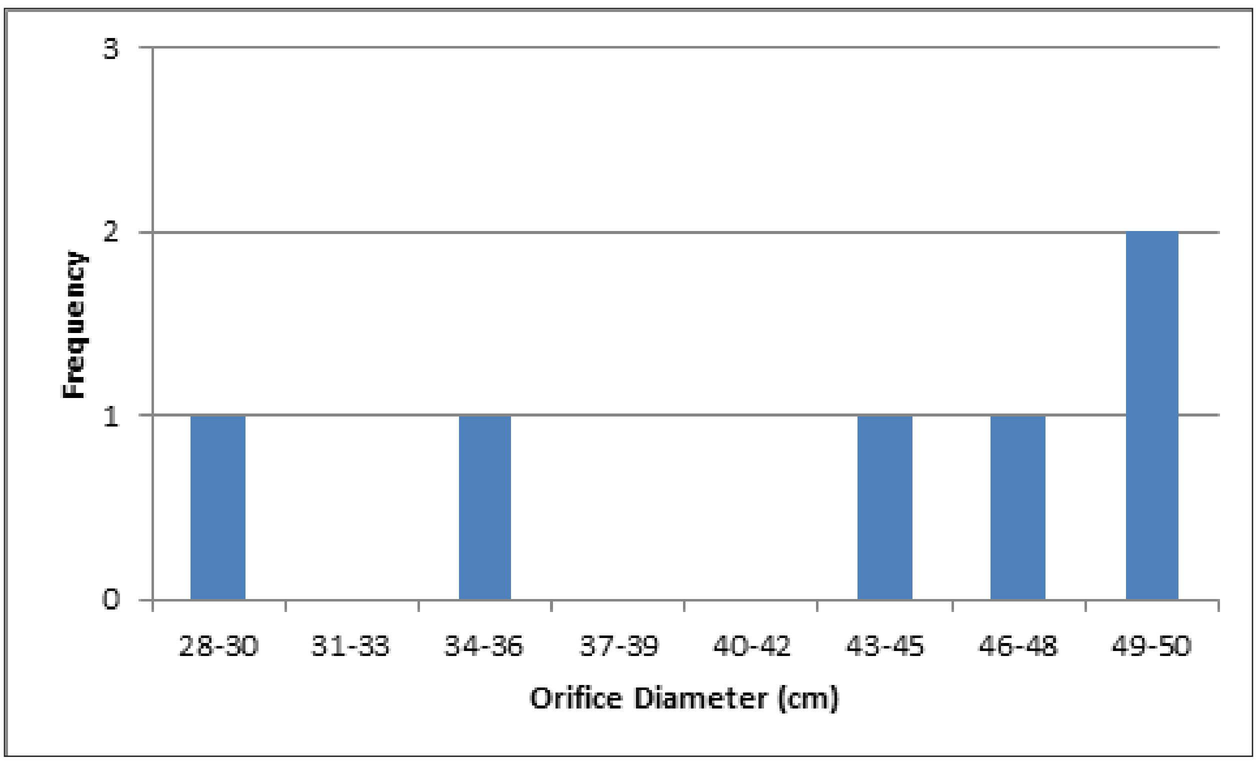

Figure 6.42. Frequency of orifice diameters for pans from Copper.

baking. Additionally, the close association between the sub-mound pans and large amounts of nutshell seems to support the possibility these vessels were used to process nut-based foods.

Lip thicknesses for pans ranged from 10.36 mm to 15.15 mm, with an average lip thickness of 12.51 mm and a standard deviation of 1.74 mm. This suggests that pans tend to have a narrow range of thickness at the lip, though no correlation could be found between lip thickness and orifice diameter. Pan orifice diameters range from 28 cm to 50 cm with a mean average of 42.5 cm. A histogram of orifice diameters suggests two size modes for pans: small pans with orifice diameters between 28 and 36 cm, and large pans with orifice diameters between 43 and 50 cm (Figure 6.42). The sample size for pans is small; however, therefore these size modes may not be accurate. The pan sizes are continuous with those of the plates discussed above, suggesting perhaps overlap in serving capabilities; though pans appear to likewise be used for cooking while plates serve solely as serving vessels. It may be this combination of parching or baking particular foods for shared consumption – a practice that occurred prior to the Moorehead phase – and an increased concern in the presentation of these particular foods was interconnected with the innovation of plates during this time period.

Special Vessels

Special vessels recovered from Copper include a single beaker base (53.5 g), a single seed jar/constricted bowl (8.6 g), and a single miniature vessel (6.3 g) (Appendix B Table B.43). The mini-vessel, a plain surfaced vessel with a six cm orifice diameter, was recovered from Feature 4. The beaker – recovered as a large portion of base and body, but no rim – was from Feature 3. The plain-surfaced seed jar was recovered from backdirt near Feature 4. Beakers and miniature vessels are commonly associated with serving special food and drink, supporting the suggestions made in Chapter 5 for public or extra-domestic use of Features 3 and 4.

Non-Serving Ware

Bottles

Four bottles were recovered from Copper, weighing 29.4 g; as two of these vessels are represented by neck sherds without rims, they are not assigned vessel numbers (Appendix B Table B.36). All bottles are shell tempered, with grog added to one (non-vessel from F4). Differences in temper type and abundance are apparent in this shell-grog tempered vessel (i.e., more grog than shell is present in the body, more shell than grog in the rim) indicating that these two portions of the vessel were formed separately (and possibly from different pastes) prior to attachment. Most of the bottles (n=3) are slipped; two are dark slipped and one is red-slipped. Orifice diameters range from 5 cm to 11 cm, with two very clear size modes (5-6 cm and 10-11 cm).

Utensils

Three crude wares or utensils, weighing 54.9 g, were recovered from Feature 3, Mound 3 and plowzone contexts (Appendix B Table B.44). Two of these vessels are crude bowls – one red-slipped shell tempered bowl with an orifice diameter of 31 cm and one a plain-surfaced grog tempered bowl with an orifice diameter of 12 cm. The third vessel is a crude grog/shell-tempered beaker with plain surfaces and eight centimeter orifice diameter.

Ceramic Data Discussion

The ceramics from both the Olin site and the Copper site would suggest a Moorehead phase occupation at the earliest – especially given the overlap in Rim/Lip Protrusion Ratios for jars from Copper and Olin (Figure 6.43). If slipped jars from Olin are removed from consideration, which seem to skew the RPR/LPs higher at that site, there is an even greater parity between RPR/LPs from Olin and Copper (Figure 6.44).

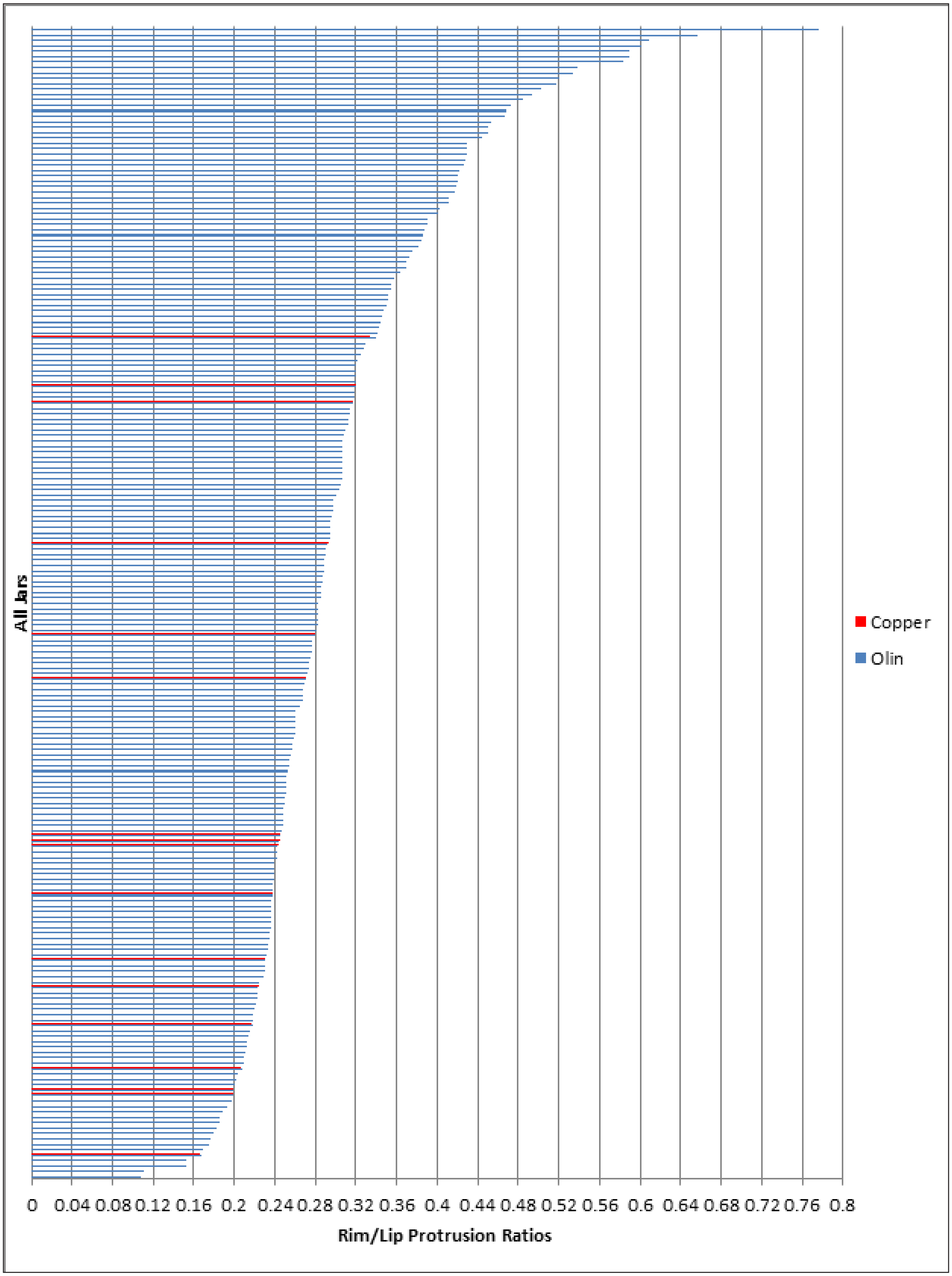

Figure 6.43. Rim/lip protrusion ratios for all jars from Olin and Copper.

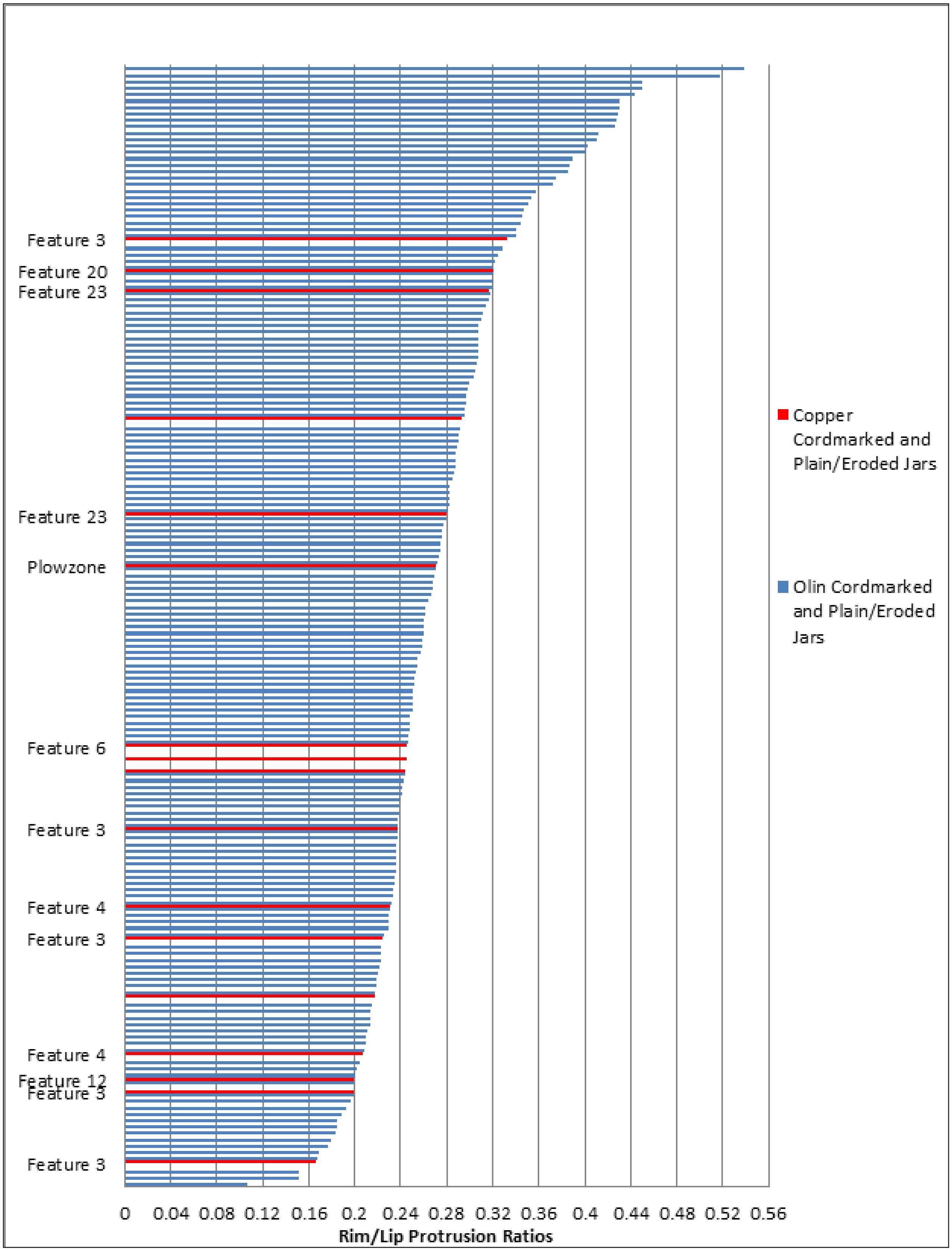

Figure 6.44. Rim/Lip Protrusion Ratios for cordmarked and plain/eroded jars only from Olin and Copper.

In this comparison, it appears that ceramics recovered from the fill of Features 3 and 4 are later in the occupational sequence at Copper, while ceramics from the fill of Features 20 and 23 are likely earlier. The earlier in-filling of Feature 20 (probable marker post pit) and Feature 23 coincides with the superpositioning of Feature 4, suggesting Feature 20 was filled in prior to the construction of Feature 4 and Feature 23 was part of the initial construction and use of Feature 4 (see Chapter 5). Additionally, the ceramics recovered from Feature 12 at Copper are similar to those recovered from the fill of Feature 4, suggesting 1) this pit was part of the later reconstruction of Feature 4, replacing Feature 23; and 2) Feature 12 was in-filled at or around the same time that Feature 4 was decommissioned and filled in with refuse.

Taking into consideration the radiocarbon dates from each site (see Chapter 5), it may be probable for the occupation of these sites to overlap temporally, though with perhaps a slightly later date for Features 3 and 4 at Copper (perhaps during what Pauketat 1998 termed the M2 at Tract 15A-DT). If this is the case, the differences in assemblage may suggest differences in occupant identities rather than temporal differences. As has been demonstrated with historic, as well as modern, political-religious movements, they spread unevenly among different groups of people, actively creating new social identities. The radiocarbon dates from Copper are considered problematic; therefore, more dates are needed to clarify the appearance of globular cordmarked jars in the region.

The data presented in this chapter suggests a number of patterns emerging during the Moorehead phase transition. Both the Olin and the Copper site assemblages consist of nearly equal proportions of service and utility wares. Only the East Plaza at Cahokia had more serving wares (nearly three times more) than utility wares during this time period (Hamlin 2004). This increased emphasis on serving wares indicates both a new intensity of commensality as well as transformations in the cuisine that is being presented and shared, as suggested by Pauketat (2013c). These new foods may include nut-based foods, as nutshell comprises a greater percentage of Moorehead phase botanical assemblages in the floodplain than those of previous occupations in the American Bottom region. Additionally, nutshell was found in direct association with pans in the sub-mound fill of Mound 3 at the Copper site; nuts and other forest resources had continued to be an important resource in the Silver Creek drainage throughout the Cahokian chronology (Simon and Parker 2006). This shift in foodways in the American Bottom floodplain follows closely after the conflagration at East St. Louis, in which storage structures containing large amounts of shelled corn and "virtually no other plant foods" were burned (Simon and Parker 2006:241). Maize continues to be an important food resource, however, with an increase in the diversity of maize varieties during the Moorehead phase (Simon and Parker 2006).

In addition to the increased emphasis on serving wares, Cahokia Cordmarked jars replaced the highly iconographic Ramey Incised jars. Cahokia Cordmarked jars suggest a return to pre-Stirling phase production techniques, including cordmarking and red-slipping. This re-engagement with red slip is noted throughout the Olin and Copper assemblages on certain bowls, beakers, and even bottles. It would appear that red slip, often unburnished, and in some cases tan slip, began to replace the dark slipped and highly polished vessels of the Stirling phase. This does not simply seem to be a disjuncture as dark slipping was not comprehensively rejected or discontinued, but rather the color red, and perhaps hematite itself (and its attendant qualities and relationships), appears to be a material participant in the Moorehead phase political-religious movement.

Finally, a number of vessels, especially everted-rim bowls, plates, and Mound Place Incised bowls, indicate regional relationships focused on the mid-south. The region these vessels are found in stretches from the southern part of the Central Illinois River Valley, to southeastern Missouri, western Kentucky, through central Tennessee. Many of these regions also use grog as a tempering agent in their ceramics; the use of grog and grog-shell temper increased throughout the Moorehead phase perhaps indicating an intensifying southern connection during this time period. This connection is further supported by increasingly square buildings and square puddled hearths in the Moorehead phase American Bottom region as well.

CHAPTER 7. TRANSFORMED THINGS, TRANSFORMED ONTOLOGIES

Intentional political change is not a "modern" process of a post-colonial world. As was described in Chapter 2, revitalization movements were part of the religious-political history of Native North America and likely occurred prior to European contact. In fact, this sort of political reorganization can be found in the allegory of Osage tribal history:

> After living for a long period of time under this form of government, the people were again seized with a desire to 'move to a new country' (a term expressive of a slow movement that preceded a change in the government of the tribe)… the military branch of the tribal government in the course of its development passed through two stages, each one of which was spoken of as a 'departure to a new country'...In order to preserve the tribal existence, a movement toward reorganization became necessary…In this reorganization certain offices were established and distributed…The reorganized government proved effective in the maintenance of peace and order within the tribe and in upholding the dignity of the people as an organized body, but it was burdened with ceremonial forms which did not admit of the prompt action often necessary for moving against aggressive and troublesome enemies. The priests, becoming conscious of this defect, again made a 'move to a new country' to bring their organization to final completion… In the progress of time the priests made a third 'move to a new country.' At this time the civil branch of the tribal government was instituted. [Bailey 2005: 68-70]

While I understand this narrative is not a strictly historical depiction of Osage political reorganization, some clues regarding political-religious change may be gleaned from it. First, this highlights the dynamic nature of political organization, where changes were made deliberately to maintain peace, order, and dignity as well provide for the timely response in times of conflict. Secondly, this demonstrates the religious and social entanglements of government in the distribution of certain offices and ceremonial responsibilities among the clans. Thirdly, this shows how the entanglement between religious ceremony and political violence (warfare) was a factor in political reorganization. Finally, given the implication of narrative as a material collaborator in political power plays, this suggests ways in which political-religious elites or factions may control the direction and effects of the changes driven by social-religious movements, by co-opting those changes and couching them within the larger narrative of social benefit. Bailey (1995:277) states that "the allegorical story of the tribe makes it clear that the priests had on several occasions reorganized their socioreligious institutions," suggesting the power to do so was derived from their control of powerful knowledge and objects.

The changes that occurred in the transition from the 12th to 13th centuries A.D. in the American Bottom appear to have been targeted at the material co-agents in the Stirling phase religious-politics. These material partners, together with their human counterparts, were perhaps those previously encompassed within the protective walls of palisades at Cahokia, East St. Louis, and the Olin site. While too few structures were excavated from the Copper site to make large comparisons with those at the Olin site, these two sites do provide evidence for transformations in public or extra-domestic buildings and ceramic assemblages during the Moorehead phase. Additionally, these two sites may provide a better understanding of potential site, building, and material variation in the American Bottom region within the processes of transformation and persistence of particular practices.

Material Evidence for Violence

Beginning in the mid-12th century, Cahokia and communities with Cahokian ties began raising fortification walls (Iseminger et al. 1990). In some cases, the majority of the local community was included within fortifications (e.g., Aztalan, Olin, Kincaid), while the fortifications at Cahokia were limited to the core of the site, protecting Monks Mound, the Grand Plaza, and the mounds and elite structures surrounding the plaza (Barrett 1933; Birmingham and Goldstein 2005; Butler et al. 2011; Conrad 1991; Fortier 2007; Goldstein and Richards 1991; Harn 1994; Iseminger et al. 1990; Pauketat 2005). A series of bastioned compounds were located to the west of Cahokia's palisade on Tract 15B; these compounds were built in an area in which large rotunda structures previously stood (Pauketat 2013c). In fact, the first compound (Compound A) may have had curvilinear walls – suggesting perhaps it was constructed in the manner of a rotunda with circular bastions added. The subsequent compounds (Compounds B and C) were rectilinear, though still had circular bastions much like those of the palisade. Located within each of these compounds was a large, non-domestic structure and a series of associated marker posts (Pauketat 2013c).

At East St. Louis, a palisade surrounded a number of small storage structures containing extra-domestic stores; this palisade was burned around the mid-12th century (Fortier 2007; Pauketat 2005; Pauketat, Fortier, Alt, and Emerson 2013). At the very least, palisades appear to have been protecting particular spaces and objects – those entangled with politico-religious practices and elite identities (Baltus 2009b). This concern for protection seems to suggest that it was those spaces, objects, and identities that may have been under threat of violence in the region.

In addition to protecting particular spaces, the presence of fortifications at Cahokia, East St. Louis, and perhaps especially, at Olin would have divided space and people in very real ways. At Cahokia, the palisade delineated an interior and exterior to the Grand Plaza and Central Mound Precinct; it likewise divided the site, creating an obstacle with which people would need to negotiate in their daily movements. The initial palisade at Olin, however, appears to have encompassed the entirety of the site as it is known. This shift from inclusion to one of exclusion, protecting only the central plaza area at Olin while occupation continued outside of the walls, seems like it would have greater impacts on social relationships that, given the small size of the site and proximity of the structures, were likely more intimate than relationships between people living on opposite sides of Cahokia's Central Precinct.

The palisade construction episodes at Olin site appear to differ from those at Cahokia. Whereas the initial palisade and fortified compounds at Cahokia were constructed with circular bastions, followed by later constructions utilizing rectangular bastions, the Olin palisade demonstrates an opposite construction sequence. This differentiation in construction technique may suggest an increasingly disconnected relationship with Cahokia (though the ceramics do not seem to suggest such a disconnect), or the impetus for constructing and maintaining rectangular bastions versus circular at Cahokia was not felt at Olin.

Many 13th century palisaded sites in the American Bottom and southeast Missouri (e.g., Olin, Cahokia, East St. Louis, Kincaid, Lilbourn, Towosahgy) have evidence for occupations superimposing fortification systems, indicating a period of relative peace following the threat of violence at these sites (Butler et al. 2011; Chapman and Evans 1977; Collins 1990; Cottier 1977a; Cottier and Southard 1977; Fortier 2007; Pauketat 2005). Some later-occupied communities, on the other hand, were burned to the ground and not reoccupied (e.g., Orendorf, Common Field), while other sites were founded with no evidence for fortification (e.g., Russell, Copper), suggesting perhaps the violence within the region was selective rather than indiscriminate (Betzenhauser and Zych 2008; Buchanan, personal communication; Conrad 1991; Zych and Koldehoff 2007). Shortly after, or in conjunction with, the burning of the palisade and storage structures at East St. Louis, large-scale changes in ceramics, structures, and population distribution began to take place (Pauketat 2011b). I have suggested elsewhere that these particular changes were made by choice to negotiate the threat of violence against material identities associated with the overtly political Stirling phase elite (Baltus 2010).

Architectural Transformations and Continuities

Overall trends previously noted for Moorehead phase include increasing structure size and increasingly square shapes (Collins 1990; Esarey and Conrad 1981; Trubitt 2000). Structure data gathered from Olin and Copper was compared with other Stirling and Moorehead phase sites in the region for which such data was available (Table 7.1). The initial comparisons were made for structural size and proportions, with additional comparisons of special-use buildings, monumental posts, and artifact caches.

The mean floor areas for the phases and sub-phases gathered from the sites listed in Table 7.1 tend to support Trubitt's (2000) observation that structure sizes increased greatly during the beginning of the Moorehead phase, though I disagree with her overly-simplified supposition that larger structures are indicative of increased status. As Figure 7.1 shows, the mean floor area steadily increases through the Stirling phase with a more dramatic increase with the Stirling-to-Moorehead phase transition.

When average floor areas are plotted against average length-width ratios for the sites listed in Table 7.1, Stirling phase sites clearly cluster together, while Moorehead and Sand Prairie phase structures form a separate cluster (Figure 7.2). The two "Moorehead" phase sites that trend with the Stirling phase sites are the Crowley site, which is comprised of a single structure, and the Old Edwardsville Road site, where the phase determination was made by the presence of certain types of pottery (i.e., Cahokia Cordmarked jars). Similarly, the two Stirling phase sites that cluster with the Moorehead/Sand Prairie sites are East St. Louis Southside and Tract 15A at

Table 7.1. Mean Average Structure Attributes For Various American Bottom Sites (*dimensions measured from report figures)

Site	Phase	Length (m)	Width (m)	L/W Ratio	Area (m²)	Citation
Cahokia Political-Administrative Complex						
ICT-II	Early Stirling	5.42	2.92	1.85	15.88	Collins 1990
	Late Stirling	6.35	3.5	1.81	22.75	
	General Stirling	5.07	3.83	1.31	19.6	
	Moorehead	4.8	4.04	1.19	19.9	
Tract 15A/ Dunham Tract	Stirling	3.90	2.20	1.77	8.60	Pauketat 1998
	Stirling-Moorehead	8.3	4.6	1.8	38.2	
	Moorehead 1	7.42	4.56	1.63	34.04	
	Moorehead 2	6.8	4.69	1.44	32.99	
	General Moorehead	6	4.4	1.38	26.86	
Tract 15B	Stirling	7.1	4.65	1.74	41.77	Pauketat 2013
	Moorehead	7.43	4.27	1.72	32.62	
ESTL Southside	Stirling	6.80	5.00	1.37	33.93	Pauketat (ed) 2005
ESTL Northside	(Late) Stirling	5.57	3.51	1.47	14.59	Fortier (ed) 2007
Southern American Bottom						
Fingers (South and West)	Stirling	5.04	3.15	1.62	16.06	Kelly 1995;
	Stirling/Moorehead	2.74	2.40	1.14	6.58	Koldehoff 2001;
	Moorehead	5.47	4.17	1.31	24.60	UIUC/ISAS notes on file
Curtiss Steinberg Road	Stirling	4.79	2.78	1.72	13.33	Kelly 1995
	Stirling/Moorehead	6.34	5.26	1.21	33.35	Koldehoff 2001
	Moorehead	4.91	4.36	1.13	21.40	ISAS notes on file
All-in-a-Row	Stirling	5.64	3.20	1.76	18.05	Koldehoff 2001
	Moorehead	5.26	4.05	1.30	21.36	
Baby Moon	Stirling	6.92	3.70	1.87	25.60	ISAS notes on file
	Moorehead	4.23	3.30	1.28	14.20	
Centreville	Early Stirling	4.92	2.23	2.21	11.30	Koldehoff 2001
	Late Stirling	5.01	2.90	1.80	14.57	ISAS notes on file
	Stirling/Moorehead	4.80	2.84	1.69	13.63	
	Moorehead	6.60	4.95	1.33	32.67	
Mousette-Goose	Stirling/Moorehead	4.38	3.14	1.39	13.75	Koldehoff 2001
Goose Ditch	Stirling	4.73	3.06	1.52	11.30	Koldehoff 2001
	Stirling/Moorehead	6.48	4.35	1.49	28.18	ISAS notes on file
Fish Lake	Moorehead	5.97	4.8	1.24	28.66	Betzenhauser 2011
Julien	Stirling	4.92	2.98	1.64	15.01	Milner 1984
	Moorehead	4.82	3.74	1.29	19.29	

Table 7.1. Mean Average Structure Attributes For Various American Bottom Sites (Continued)

Site	Phase	Length (m)	Width (m)	L/W Ratio	Area (m²)	Citation
	Moorehead/Sand Prairie	5.59	4.43	1.28	24.87	
	Sand Prairie	5.51	4.42	1.25	24.88	
Florence Street	Moorehead/Sand Prairie	5.17	4.35	1.2	28.13	Emerson, Milner, and Jackson 1983
Range	Stirling	4.73	2.79	1.73	13.76	Hanenberger 2003
Divers	Stirling	5.01	3.15	1.64	16.22	Freimuth 2010; Porter 1974
Northern American Bottom and Surrounding Uplands						
Sponemann Ceremonial Complex	Stirling	4.62	3.44	1.37	15.88	Jackson, Fortier, and Williams 1992
Sponemann Residential Complex	Stirling	4.32	2.95	1.49	13.58	Jackson, Fortier, and Williams 1992
Sponemann	Sand Prairie	4.25	3.99	1.06	12.37	Jackson, Fortier, and Williams 1992
Mitchell	Stirling	6.67	3.76	1.80	27.62	Porter 1974
	Stirling/Moorehead	6.79	4.62	1.55	34.35	
Loyd	Moorehead (w/out Council House)	4.53	3.5	1.31	16.01	Vermillion 2001
	Moorehead (w/ Council House)	4.91	3.78	1.31	19.57	Vermillion 2001
Vaughn Branch	Stirling	5.03	2.96	1.71	15	Jackson and Mill-house 2003
Old Edwardsville Road	Late Stirling/Early Moorehead	5.4	3.11	1.76	16.99	Jackson and Mill-house 2003
Russell	Late Moorehead	4.64	3.83	1.22	17.95	ISAS notes on file
Crowley	Moorehead	3.59	2.47	1.45	8.9	Betzenhauser 2009
Quicksilver	Stirling/Moorehead	5.54	3.16	1.78	17.77	Moffat 2008
St. Thomas	Moorehead	5.52	5.14	1.07	28.37	Kruchten and Vanderford 2005
Lawrence Primas	Moorehead	6.1	4.7	1.30	28.67	Woods and Pauketat 1986*
Olin	Moorehead	4.85	3.60	1.31	17.88	
Eastern Uplands (Silver Creek Drainage and Kaskaskia River)						
Grossman	Stirling	4.81	2.81	1.69	13.68	Alt 2006
Copper	Moorehead (without Council House)	3.54	3.32	1.07	11.75	
	Moorehead (with Council House)	7.73	6.47	1.17	56.67	
Lembke #2	Stirling	3.6	2.25	1.38	8.11	Holley et al. 2001
	Moorehead	5.88	4.5	1.30	27.66	
	Moorehead/Sand Prairie	4.6	4.2	1.10	19.51	

Table 7.1. Mean Average Structure Attributes For Various American Bottom Sites (Continued)

Site	Phase	Length (m)	Width (m)	L/W Ratio	Area (m^2)	Citation
Eastern Uplands (Silver Creek Drainage and Kaskaskia River)						
Lembke #3	Stirling	3.53	2.6	1.36	9.17	Holley et al. 2001*
William Lembke Jr. #2	Stirling	5.3	2.88	1.84	15.30	Holley et al. 2001*
	Moorehead	5.95	5.19	1.16	31.83	
Vesta Lembke	Stirling			1.60	13.70	Holley et al. 2001
J. Sprague Locale A	Stirling			1.53	12.62	Holley et al. 2001
J. Sprague Locale B	Stirling			1.7	20.20	Holley et al. 2001
J. Sprague Locale C	Stirling			1.63	18.88	Holley et al. 2001
	Moorehead			1.10	12.90	
J. Sprague Locale D	Stirling			1.63	14.31	Holley et al. 2001
J. Sprague Locale E	Stirling			1.55	22.58	Holley et al. 2001
	Moorehead			1.20	23.27	
J. Sprague Locale F	Stirling			1.90	12.63	Holley et al. 2001
J. Sprague Local G	Stirling			1.60	8.53	Holley et al. 2001
J. Sprague Locale H	Stirling			2.05	21.13	Holley et al. 2001
J. Sprague Locale I	Stirling			1.60	15.60	Holley et al. 2001
Marty Coolidge	Stirling	4.16	2.45	1.70	10.25	Kuttruff 1972
	Moorehead	5.08	4.90	1.04	25.67	
Bridges	Stirling			1.53	11.79	Hargrave et al. 1983
	Stirling/Moorehead			1.40	22.84	
	Moorehead			1.26	39.22	
	Moorehead/Sand Prairie			1.19	22.56	

Cahokia. Two of the East St. Louis structures are "special" buildings (i.e., L- and T-shaped), while the third structure is a fairly large building (34 m^2 floor area) and, given its location, perhaps may not be a typical domestic dwelling. Likewise, Tract 15A was generally a non-domestic area during the Stirling phase, which may account for the greater than typical floor area. Of the site occupations that were designated Stirling/Moorehead, most (Tract 15A, Curtiss Steinberg, Goose Ditch, Bridges) cluster with the Moorehead/Sand Prairie sites, while Centreville, Quicksilver, and Mousette-Goose cluster with the Stirling phase sites.

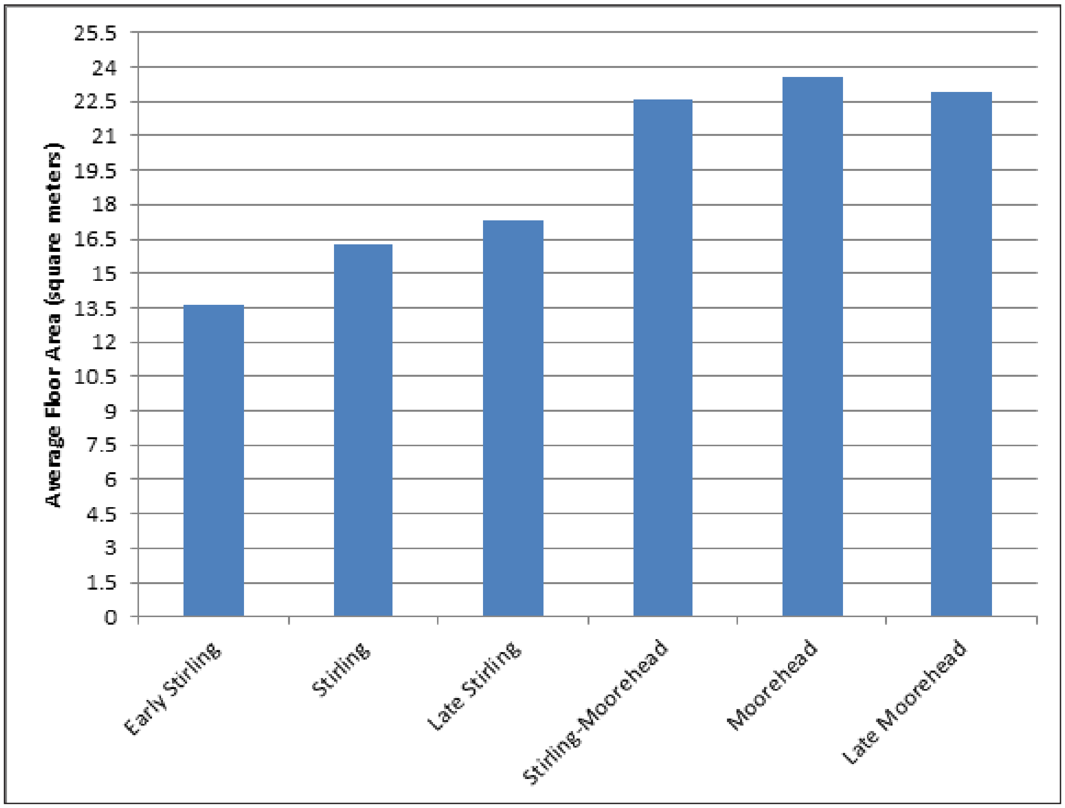

Figure 7.1. Average floor area for American Bottom region.

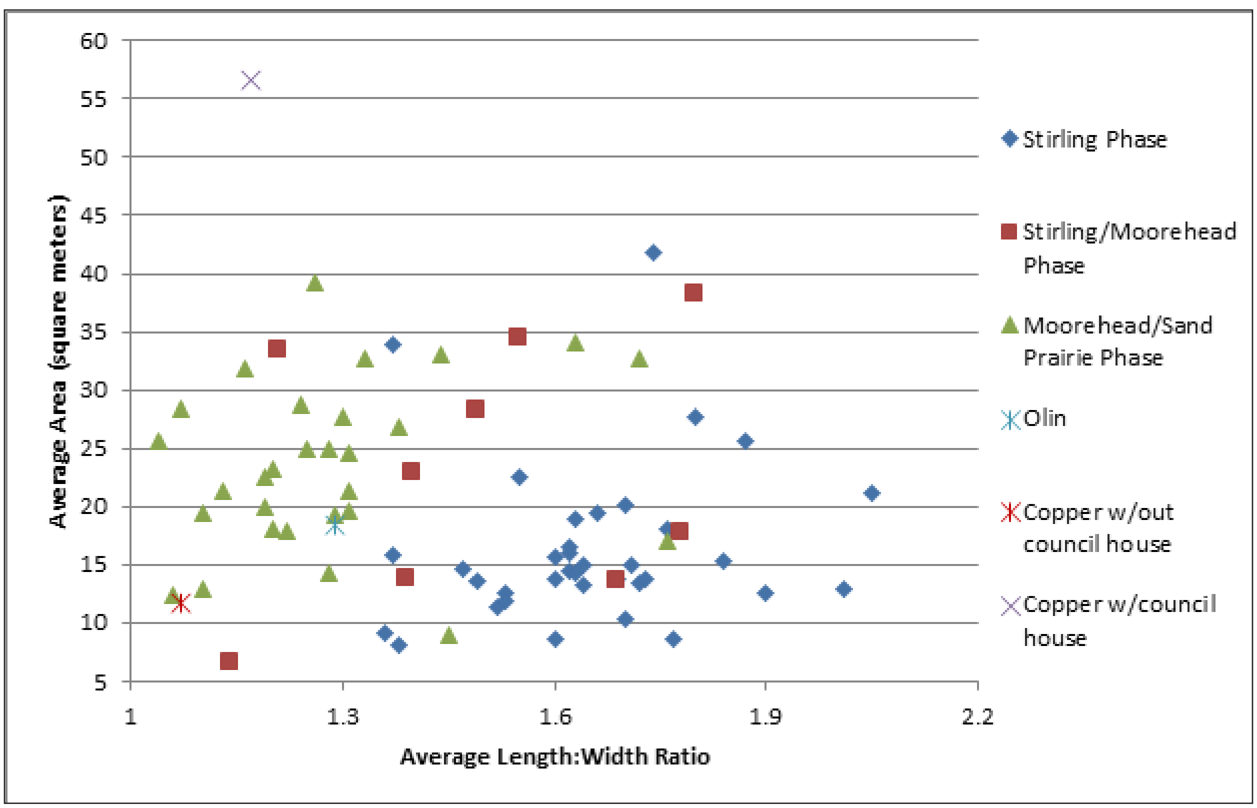

Figure 7.2. Length-Width ratio compared to structure floor area for various American Bottom region sites.

Average structure size and shape for both Olin and Copper fall in line with the Moorehead/ Sand Prairie phase sites (see Figure 7.2). The average floor area versus average length-width ratio for the Olin is very similar to that reported for the Moorehead phase occupation of the Julien site (Milner 1984a). The Copper site, on the other hand, is very similar to the Sand Prairie occupation at Sponemann when only the small structure is considered. When the large council-house is included, the average floor area is greatly skewed. The two structures at Copper are clearly non-domestic buildings and may not adhere to the pattern (as suggested by structures from Tract 15B, East St. Louis, and Old Edwardsville Road). What is apparent, especially at Olin, is that changes to shape and size of domestic (and even potentially extra-domestic) buildings do not occur immediately at the beginning of the Moorehead phase.

The overall separation between the average building sizes during the Stirling phase and the average building sizes during the Moorehead/Sand Prairie phase may suggest this trend was not a gradual transition. Plotting all of the Olin structures against the averages of the American Bottom region suggests this shift in building size began to take place during the occupation of the site, as they overlap both Stirling phase and Moorehead/Sand Prairie phase averages (Figure 7.3). If this is the case, then the change in building proportions took place no earlier than the mid-Moorehead phase as suggested by the ceramics from the site. This may rather suggest a change in household organization, including increased interior storage needs, task-space, or even increased family size taking place during the later part of the Moorehead phase.

As this increase in structure size and changes in building proportions do not occur simultaneously with, but rather follow, the initial Moorehead phase material transformations, the potential changes in household organization may have occurred as a result of transformed social

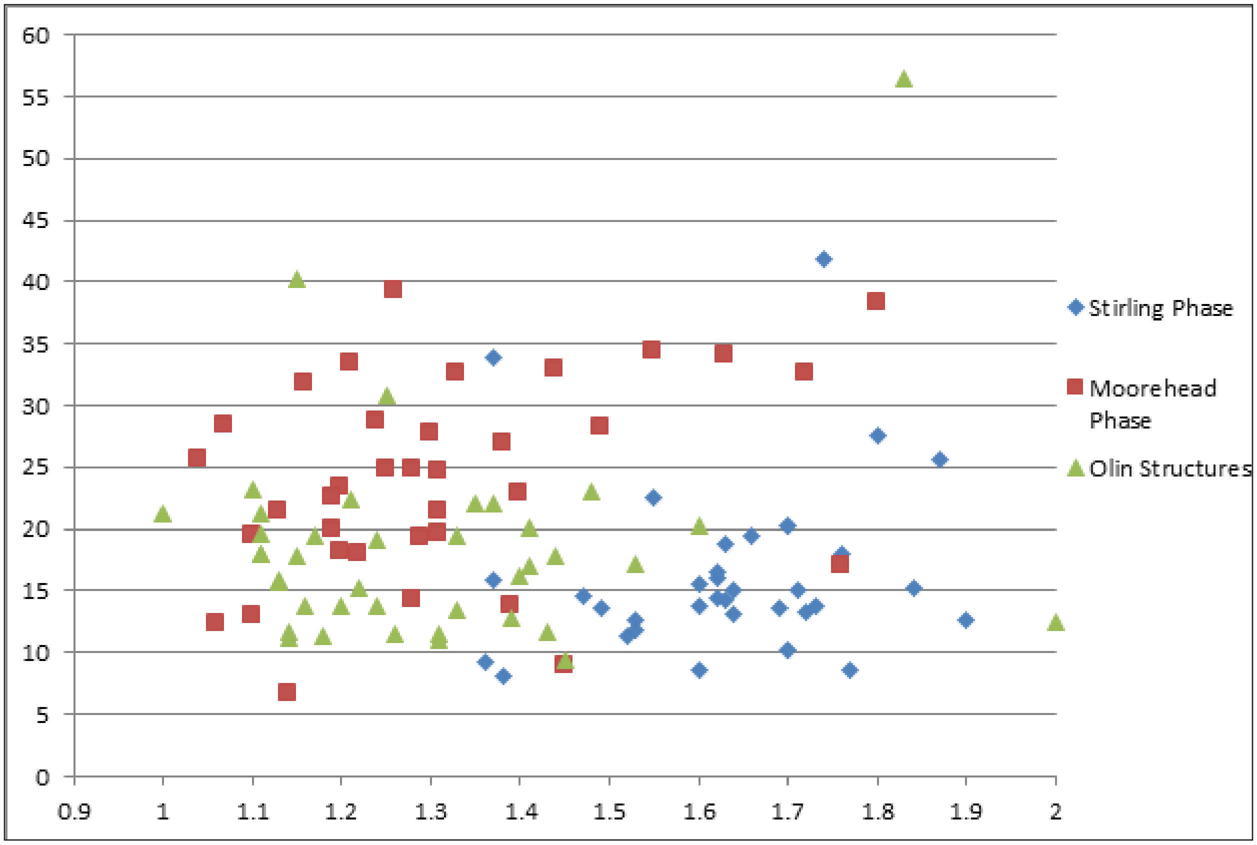

Figure 7.3. Length-width ratios to floor area for Olin structures as compared to other sites in the region.

relationships during the Moorehead phase political-religious re-organization. This lag between the ceramics and building changes would suggest they were either unrelated transformations, or perhaps the initial changes that took place at the beginning of the Moorehead phase has lasting impacts that eventually changed household organization that impacted building proportions. These changed social relationships and attendant spatial organization may have been an unintended consequence of the intentional material transformations that were enacted at the beginning of the Moorehead phase.

In conjunction with the revitalization of particular pre-Stirling phase trends in ceramics and political-religious buildings, it appears that structure orientation returned to nearly cardinal directions for a short period at some sites during the Moorehead phase. This is demonstrated at both Olin and Copper, as well as at Cahokia's Tract 15B and a number of American Bottom sites (e.g., Russell, Auburn Sky, Crowley, and Florence Street) (Betzenhauser 2009; Betzenhauser and Zych 2008; Emerson et al. 1983; Pauketat 2013c; Zych and Koldehoff 2007). This does not appear to have been a region-wide phenomenon, though, as other sites of similar time period (e.g., Fingers South, Cahokia's ICT-II) are not cardinally oriented (Collins 1990). This trend, like everted-rim bowls, may have been short-lived or even restricted to particular sites. This variation in site orientation, as well as the lagging changes in other forms of architecture highlight the targeted nature of change that took place with the transition from the late Stirling to early Moorehead phases.

Targeted Transformations and the Architecture of Power

During the Stirling T- and L-shaped structures have been well documented at Cahokia, Mitchell, and in the Silver Creek uplands (Faust South, Knoebel, Pfeffer, Grossmann) (Alt 2006b; Holley et al. 2001a, 2001c; Pauketat 1998, 2013; Porter 1974; Zych personal communication 2008), though these structure types were not common. The latest of these building types may be found in the northern American Bottom, which previously did not see a large Stirling phase occupation north of the Mitchell site. A late L-shaped structure was burned at the Loyd site, while a late circular structure was burned at the Old Edwardsville Road site. The circular structure at Olin, perhaps one of the latest in the American Bottom area given the mid-Moorehead phase occupation of much of the site, does not appear to have been burned. Sweatlodges and their associated practices were extant among Contact-era Native American groups in the Midcontinent and Southeast (e.g., Omaha, Fletcher and La Flesche 1992; Creek, Hudson 1976; Ho Chunk, Radin 1970), as were circular structures (both small structures and large rotundas).

These specialized structures, once entangled with Cahokian religious-politics of the preceding Stirling phase were no longer constructed after the beginning of the Moorehead phase. Instead, these structures were replaced by communal structures reminiscent of pre-Cahokian times. The late-Stirling to early Moorehead phase transition is clearly the moment of termination for the L-, T-, and circular shaped structures at Cahokia as well as at nodal sites throughout the American Bottom. After the late-Stirling phase, it would appear that these specialized structures, integral material components of Cahokian political ascendancy as "architecture of power," (Emerson 1997), were discontinued. The sole public structures remaining after the beginning of the 13th century appear to have been the large rectangular council houses that had been part of the American Bottom political-religious landscape prior to Cahokian coalescence. The circular structure at Olin appears to have been part of the initial site occupation right around the beginning of the 13th century. This building was clearly discontinued shortly after the site's founding, and appears to have been intentionally "forgotten" by re-building the palisade wall to exclude it. Other late Stirling/early Moorehead circular structures are found at Vaughn Branch, Old Edwardsville Road, Loyd, and Julien (Jackson and Millhouse 2003; Milner 1984a; Vermillion 2002). Likewise, a late Stirling/early Moorehead L-shaped structure was excavated at the Loyd site as well; this building was burned and replaced by a large rectangular structure (Vermillion 2005).

It is noteworthy that the late circular structure at Old Edwardsville Road (Jackson and Millhouse 2003), the late L-shaped structure at Loyd (Vermillion 2005), and a potentially late L-shaped structure at Cahokia's Tract 15A (Pauketat 1998) were burned. Significantly, the three circular structures from Vaughn Branch, Old Edwardsville Road and Loyd, were all burned.

Evidence from the, on the other hand, is somewhat equivocal. A circular sweatlodge was excavated at the Larson site in the Central Illinois River Valley (CIRV), a fortified village presumed to post-date the burned Orendorf site nearby (Conrad 1991). Conrad suggests a post-A.D. 1250 date for the Larson site, however radiocarbon assays from that site published in Radiocarbon (Bender et al. 1975:123-124) provide a median calibrated date range from 1115-1190. While Harn (1978) claims these dates are too early, the dates cluster closely within the Larson site, as well as with the Orendorf dates (median calibrated range from 1085-1180) (Bender et al. 1975: 122-123). If these dates are correct, then the circular structure at the Larson would fall within the range for the later circular structures in the American Bottom, perhaps suggesting a similar termination of these buildings in the CIRV.

The construction and use of circular structures appears to have been discontinued at other sites to the south of the American Bottom around this time as well. At the Lilbourn site, a fortified village near the Missouri Bootheel, at least two small circular structures were found in conjunction with wall-trench structures (Cottier 1977a). One small circular structure was discovered under the burned remains of two later building. Radiocarbon dates for those later buildings ranged from the mid-1100s to the mid-1300s, suggesting the circular structure was in use at least up to the mid-1100s in this region. Given the divergent histories of these regions after initial Cahokian contact, a similar pattern of targeted termination of these particular forms of architecture supports the possibility of a regional revitalization movement with broader impacts beyond the American Bottom region itself.

The burning of structures in the American Bottom appears to have served as a form of termination and cleansing (Baltus and Baires 2012; Wilson and Baltus n.d.); as no other structures were built in place of these circular structures it may be such that they were cleansed from the landscape with the intention of 'disremembering' them (Bevan 2006). Such a cleansing could have been an act of cultural violence associated with warfare or internal factionalization, though it was a clearly targeted act of termination; this would suggest a cleansing performed in preparation for a new future, though potentially violent nonetheless. Violence in this manner may be equated with that of human and other-than-human sacrifices, a termination that brings about a new beginning, balancing life and death.

While specialized L- and T-shaped structures were terminated in the American Bottom, and potentially elsewhere in the region, they may have been replaced by structures with similar interior storage that was less visible from the exterior of the structure. A number of buildings dating to the Late Stirling and Moorehead phase, including H1 at Olin, were constructed with interior dividing walls. Similar buildings from this time period include a large structure with two interior divisions at the Julien site (Milner 1984a), while additional examples can be found at Cahokia's Tract 15A (Pauketat 1998), Tract 15B (Pauketat 2013c), and ICT-II (Collins 1990). Perhaps one of these interior rooms continued to serve as an alcove or closet for the storage and protection of religious paraphernalia, including perhaps bundles (Pauketat 2013a,c). Such interior "apartments" were noted by William Bartram (1995) in the principle building on the Creek square grounds. As mentioned previously, structures with internal divisions may have replaced the special-shaped structures; while providing a separate place for storage of sensitive religious objects such as bundles, these buildings may have remained discrete about what was kept inside. Perhaps this 'low visibility' may have been instituted to protect the sacred objects that create and sustain the community from targeted attack. Conversely, the more discrete nature of storing sensitive religious objects may have been part of the political-religious reconfiguration of Cahokia, with its apparent emphasis on inclusivity in opposition to the overtly political material-structure of the Stirling phase. This manner of housing such objects would have been less visible, perhaps intended to maintain a more socially balanced (i.e., less emphasis on political power) community.

The L-, T-, and circular structure types, along with other material objects implicated in the religious-politics of the Stirling-phase discussed below, were not only entangled with particular elite identities constructed through politico-religious practices, they were identified as the politics themselves. As such, these objects and spaces became targets of violence. This violence does not seem to have been the result of external attack, as little evidence suggests extant warfare occurred around Cahokia. Only particular building types, rather than typical dwellings, were burned or terminated. The termination of these structures, as well as the construction of palisades, may have been strategic material transformations enacted by internal factions or by political-religious elites as a means of negotiating power through the intentional disentanglement with previous political-religious material practices. Much in the same way that “Mound construction…was not a consequence of a process” but “was itself part of the ‘political’ negotiation process,” (Pauketat 2001:85), so perhaps was the construction of fortification walls at particular sites in the American Bottom region.

An additional feature to note in regards to potential special structures: formal square hearths. Puddled hearths are known from earlier structure contexts at Cahokia, including the Stirling phase structures in the Kunnemann Mound where, in addition to other puddled hearths, one circular hearth had grooves forming a square around it, suggesting an enclosing box or screen (Pauketat 1993a). Similar square puddled hearths have been excavated at the Hiwassee Island site in Tennessee, however circular puddled hearths were more common there as well (Lewis and Kneberg 1970). A “heavily puddled clay hearth” was also part of a large public building in Settlement C at Orendorf (Conrad 1991). The square puddled hearths at Emerald, Olin, and Copper, may potentially be part of a Moorehead phase innovation, suggesting a new, or renewed, relationship with fire or fire-based production during this period. These square hearths also form another material connection the Moorehead phase movement has with the south, with similar hearth construction at sites in Tennessee (Garland 1992; Lewis and Kneberg 1970).

A number of structures in the Mid-south also tended toward more square shapes. Evidence presented above for the Olin site suggests that while the size of structures were comparable to those for other Late Stirling/early Moorehead phase, their proportions retained the more rectangular form of the preceding Stirling phase. In fact, most of the buildings at Olin (and perhaps at Old Edwardsville Road as well) retained Stirling phase proportions until perhaps midway through the site’s occupation. Given a probable early to mid-Moorehead founding of Olin, this shift in building proportions did not occur until the mid-to-later part of the phase (though again, the temporal division of these subphases are yet unknown). Overall, this would indicate that the material transformations at the beginning of the Moorehead phase directed at specialized L-, T-, and circular structures and Ramey Incised ceramics did not extend to domestic structures. These changes likewise did not seem to impact extra-domestic structures that were not overt signatories of the politicized Cahokian religion, as indicated by the heavily rebuilt structures protected by the smaller, inner palisade at Olin.

The potential household reorganization or changes in building construction technique may be a topic for future research, however, I offer two possibilities here: 1) given the evidence for extra-regional interaction and immigration during the Moorehead phase, perhaps this new style of building construction was introduced into the area from outside the region (the Mid-south in particular, especially given the presence of stone-lined graves and non-local pottery at Copper); or 2) changing social relationships in pottery production, commensality, and perhaps decentralized religious practices, changed the way in which people relate to their space and to each other within household contexts as an unintended consequence of earlier, intentional material changes. These possibilities are of course not mutually exclusive.

This move towards inclusiveness may be seen in the continued use of large rectangular council houses. As the only political-religious structures that continued to be used across the Stirling-Moorehead transition, these structures appear to have varied greatly in size and shape, perhaps each being constructed to suit a particular number of people that varied from site to site. Whereas the number of people allowed into the extra-domestic L-, T-, and circular structures at one time was necessarily limited, the larger rectangular structures would have allowed for gatherings of greater numbers. Comparing the council house structure (Feature 4) at Copper to other such large buildings in the region, it is most similar in size and proportion to Structure 151/152 from the nearby Richland Complex site of Grossmann (Table 7.2). An interesting trend appears among these large structures; regardless of temporal affiliation, their length-to-width ratios tend to be low, indicating large public structures approached a more square shape.

Table 7.2. Large Rectangular Structures Dating To The Stirling And Moorehead Phases In The American Bottom Region

Site	Phase	Feature #	Length (m)	Width (m)	L/W Ratio	Area (m^2)	Citation
Grossmann (11S1131)	Stirling	249	8.54	8.48	1.01	72.42	Alt 2006b
		151/152	10.04	8.79	1.14	88.25	
		248	11	10.91	1.01	120.01	
		216	10.84	10.45	1.04	113.28	
ESTL Southside (11S706)	Stirling	21/157	12.2	9	1.36	109.8	Pauketat 2005 (ed)
J. Sprague site (11S238)	Late Stirling	23				116	Holley et al. 2001b
Mitchell	Stirling/Moorehead	2A	9	5	1.8	45	Porter 1974
		7	12.8	12.7	1.01	162.56	
		32	9.85	7.25	1.36	71.41	
		38C	11	8	1.38	88	
		55	10	9.8	1.02	98	
		56	13.8	>13.5	Ind.	>186.3	
William Lembke Jr. #2 (11S235)	Stirling/Moorehead	12			1.1	43.5	Holley et al. 2001b
Loyd (11MS74)	Moorehead	2	8	6	1.33	48	Vermillion 2005
Copper (11S3)	Moorehead	4a	9.5	7.5	1.27	71.25	
		4b	10.14	8.58	1.18	87	
Lembke (11S86)	Moorehead	30			1.4	44.46	Holley et al. 2001b
Fingers (11S333)	Moorehead	72	8.4	6.1	1.37	51.24	notes on file at ISAS
Julien Site (11S63)	Moorehead	31	7.30	5.65	1.29	41.25	Milner 1984
Tract 15A/Dunham Tract Cahokia	Stirling	3	18.6	12.3	1.51	228.78	Pauketat 1998
		148	9.9	9.5	1.04	94.05	
	Moorehead	32	9.3	5.2	1.79	48.36	
	Moorehead	305	8.1	6.6	1.23	53.46	
Tract 15B Cahokia	Late Stirling/Early Moorehead	358	>19	20	Ind.	>380	Pauketat 2013
	Late Moorehead	119	8.90	6.70	1.33	59.63	
	Moorehead/Sand Prairie						
	37	>9.5	6.8	1.40	>64.60		
		85	8.50	6.35	1.34	53.98	
	Sand Prairie	43/56	7.66	6.77		1.13	51.86

These particular structures were also part of the pre-Cahokian political-religious landscape; they did not appear as part of the suite of buildings that appeared during the Stirling phase. It may be significant, however, that the overall size of these structure types appears to decrease during the Moorehead phase. Where these structures once had interior areas upwards of 80 to 100 square meters (and even 200 meters at Cahokia's Tract 15A) during the Stirling phase, the typical area through the Moorehead phase was between 40 to 60 square meters (see Table 7.2).

These inclusive spaces and practices were part of the initial Mississippian movement during the early- to mid- 11th century and may have been featured prominently in the Moorehead phase "revitalization". Mound construction continued in large part at the Mitchell site (Porter 1974) as well as at Copper and Emerald (Skousen 2013), while these activities continued in the East Plaza at Cahokia as well (Kelly 1997; Trubitt 2000). In fact, construction on Mound 34 at Cahokia appears to have been initiated during the Moorehead phase (Kelly and Brown 2010). Mound construction and related activities have long been associated with community building. The fact that mound building not only persists in some places but was perhaps renewed during the Moorehead phase suggests an ongoing re-creation of Cahokian material relationships and identities.

Marker Posts

Large marker posts were part of the political-religious landscapes of both the Olin and the Copper sites. A large marker post was associated with the early to mid-Moorehead phase sweatlodge structure at the Olin site, perhaps as part of the site's founding. This post was perhaps pulled upon the termination of the sweatlodge, however a new building was constructed over the post's location, thus marking its place as powerful. This structure (H27) was likewise commemorated with a cache of lithic tools upon its termination. The inner palisade was constructed in a way that forced the abandonment of H27 and excluded the location of this initial marker post. A second, smaller, marker post was raised next to a later structure in the vicinity of the original marker post.

Similarly, a large marker post was located near, and possibly associated with, Feature 3, the small square structure with formal square hearth, at the Copper site. Though not excavated in its entirety, this feature appears to have been a post with one insertion or removal ramp. The post, like Feature 3, was then superimposed by the large council house structure with its own large interior post. Large marker posts were present at Cahokia's Tract 15A through the Moorehead phase, though in decreased numbers. No posts were associated with the early Moorehead (M1) occupation of Tract 15A, while a single post was associated with a later Moorehead (M2) structure; no Moorehead phase post pits were known for Tract 15A-DT (Pauketat 1998). Conversely, the number of marker posts at Cahokia's Tract 15B dating to the Moorehead phase increase in comparison to earlier time periods, though temporal control over subphase variation was not possible (Pauketat 2013b). Following the late 13th century, however, the use of free-standing marker posts appears to have decreased in the American Bottom region while large rectangular "council house" structures more often incorporated large center posts.

In the Silver Creek uplands, a large marker post appears to have formed the center of the J. Sprague community likely affiliated with the "Big House" (a large council-house structure) as well with subsequent special-use structures (Holley et al. 2001a). This "Big House" also had a large center support post of its own; this building likely dated to the Stirling phase as it was superimposed by a large special-use late Stirling phase structure that was burned (Holley et al. 2001a). Outside of the immediate American Bottom region, the continuity of larger marker posts is demonstrated. At the Bridges site, a Stirling through Sand Prairie phase site located in the Kaskaskia drainage, a marker post was a central focus of a small plaza, located in proximity to the large "council-house" structure. At least three circular structures were also present at the Bridges site, including one that was superimposed by a heavily re-built rectangular structure in proximity to the series of large rectangular structures (Hargrave et al. 1983).

During the Stirling phase, and increasingly in the Moorehead phase, large posts were incorporated into the rectangular "council house" structures as center support posts. In the American Bottom floodplain, large posts were utilized as the center posts of large rectangular buildings at Mitchell (Porter 1974) and Cahokia (Pauketat 1998). The "council house" structures with large center posts were part of the Stirling phase occupation of Emerald Mound site, located in the Silver Creek uplands. The center post of one such structure was so large it was surmised to extend above the roof of the structure; the post mold left after the center post was removed was intentionally allowed to silt in and included the burial of a young person (Alt 2014; Alt and Pauketat 2013). The practice of interring a young adult, usually women, in the space left by the removal of large marker posts has been noted at Cahokia and East St. Louis as well (Hargrave and Bukowski 2010).

The use of possible ancestor posts, or a material identity of a community or group, as support features of council house structures would suggest a reconfiguration of architectural identity. Additionally, following Pauketat (2013a), if posts form the physical connection between earth and sky, this may reconfigure the relationship of the roofs with the floors of these large 'council house' structures as that of the sky to the earth, encompassing the world within the building. It may, therefore, be significant that free standing marker posts become increasingly rare after the Moorehead phase and are no longer present in this area afterwards. This Upper World connection through ancestor posts appears likewise to have been maintained throughout the Moorehead phase.

While marker posts do continue to be raised in exterior locations at sites throughout the Moorehead phase, the incorporation of these features into large public structures – along with their ability to relate the Upper World and the Under World (Pauketat 2013a) and their identities as ancestors (Hargrave and Bukowski 2010; Skousen 2010, 2012) – appears to have become more common during this period. This new relationship between marker post and building may have had many connotations; in some ways, this may be similar to the use of interior-divided structures as opposed to specialized L- or T-shaped buildings for storage of powerful religious objects. This process of bringing these important persons indoors may have simultaneously been a means of keeping them safe, while creating a powerful relationship for that building and all who interact with and within it.

Like sweatlodges and their attendant practices, sacred trees, poles, or posts were documented historically as part of religious practices of a number of disparate groups (Hall 1997). For example, in the Southeast at the time of contact, the Muskogee had sacred poles to which offerings were made and who participated in decisions made in movements of the group (Grantham 2002). Among the Omaha, a sacred pole or tree was engaged with in a ceremony intended to reinforce community unity, a performance that had its roots in an earlier period of the Omaha when they depended upon the cultivation of corn (Fletcher and La Flesche 1992; Hall 1997).

Caches and Other Termination Practices

The practice of caching objects (often stone tools) was something that appears to have remained little-changed as it was expressed in daily life. The practice of gathering, or relating, particular objects and depositing them on house floors or in wall trenches was common throughout the Lohmann through Moorehead phases. During the early part of Cahokia (Lohmann and Stirling phases), this practices was taken to a new level, gathering massive numbers of celts together and depositing them as one (Hoehr 1950; Moorehead 2000; Pauketat and Alt 2004; Esarey and Pauketat 1992; Titterington 1938). While this was perhaps a community-integrating practice, it may also have been a means of unifying towards a particular goal for the greater good. If two celts together created a powerful connection, imagine what 70 or more could accomplish! Such large-scale caches do not appear to continue into the Moorehead phase however, though the deposition of individual caches does.

Cached objects found associated with structures were typically lithic tools – often stone hoes and celts, through picks and adzes were also common. For example, many of the structures excavated in the Sauget Industrial Park Survey (SIPS) site area had celts or hoes deposited on their floors or in their wall trenches at abandonment (ISAS, notes on file). Oftentimes these objects were placed in or near the northern corners of the buildings, which date from the Stirling through early Moorehead phase (maps and notes on file at the Illinois State Archaeological Survey).

Caches were likewise present of the floors of particular structures at Cahokia's Tract 15A, dating from the Lohmann through Moorehead phase (Pauketat 1998). A large early Moorehead (M1) phase structure at Tract 15A had a complete celt associated with the northern portion of the building, while three other buildings in this occupation were cleaned out and burned (Pauketat

1998). One later Moorehead phase (M2) structure at Tract 15A had a cache of two hoe blades on the floor; this structure had an internal division or platform and superimposed or incorporated a large post into its construction. Pauketat (1998:120) suggests that the Moorehead phase buildings at Tract 15A “seem to have been abandoned in a manner that resulted in incinerated domiciles with domestic utensils and refuse left behind in the dwelling.” The Lawrence Primas site, located in the northern American Bottom, likewise had a number of stone tools deposited on the floor of the structure prior to burning (Pauketat and Woods 1986). Individual caches are also known in the Silver Creek drainage; for example, two celts were deposited on the floor of a Moorehead phase building at the Lembke site, aligned end to end along a north-south axis, with two Ramey knife fragments offset to the west (Holley et al. 2001b).

Perhaps the continued practice of gathering small groups of objects in local caches demonstrates continuity of personal relationships with the cosmos, deities, and other material and human participants in the perpetuation of daily life through decentralized religious practices. This decentralization of particular ways of relating can also be noted in the practice of structure burning.

The burning of structures – likely as a means of physically and spiritually cleansing their location – was practiced during the Terminal Late Woodland period. Wilson and Baltus (n.d.) have demonstrated that this trend decreased through the Lohmann and Early Stirling phases at sites around Cahokia and was increasingly restricted to specialized structures often incorporated within mound construction. They have suggested that this practice, like that of the chunkey game, was increasingly controlled by Cahokian religious specialists as part of the politicization of previously communal practices. During the Late Stirling and into the Moorehead phase, the number of buildings terminated by fire increased (Wilson and Baltus n.d.). This increased number of burned Late Stirling structures is likely inflated by the East St. Louis storage structures that were burned in a single episode; however, the higher frequency of burned structures in the Moorehead phase may suggest that termination via fire was another religious practice that was decentralized or returned to local control (Wilson and Baltus n.d.). I would suggest here that perhaps powerful buildings (and their attendant practices) that necessitated termination by fire were themselves more widely distributed during the Moorehead phase.

The particulars involved in the practice of burning these structures changed slightly as well. Prior to the Moorehead phase, buildings were either cleaned out completely prior to burning, or were burned with a full assemblage while caches were placed in unburned structures as another form of termination. This suggests a separation between the two practices previously. After the Moorehead phase, burned structures more often included caches of artifacts on their floors, indicating a new combination of termination practices that included both cached objects and fire.

Ceramic Partners in Political-Religious Transformation

Overall trends demonstrated by the pottery assemblages at the Olin and Copper sites include a transformation from centrally produced Ramey Incised jars to locally produced Cahokia Cordmarked jars, and a return of pre-Stirling phase traits like cordmarking and red-slipping, and an increased emphasis on serving wares. Following the trend previously noted in public political-religious buildings, included in these material innovations was a shift to increased inclusivity both in vessel form (e.g., restricted orifice Ramey jars to unrestricted orifice everted-rim bowls, to plates and pans) as well as decorative motif (e.g., complicated iconography of Ramey jars to simplified designs on everted-rim bowls).

The distinction maintained between Stirling and Moorehead phase ceramics are based on real physical differences between the two assemblages. Much of this distinction hinges on the disappearance of sharp-shouldered, highly polished and decorated jars with rolled or everted lips (i.e., Ramey Incised) and the appearance of globular, shell-tempered jars with cordmarked exteriors and red-slipped interiors (i.e., Cahokia Cordmarked). These vessel forms do overlap each other; however the timing and length of this overlap has yet to be clarified. As discussed in Chapter 6, shell-tempered jars with cordmarked exteriors began appearing in small numbers during the mid- to late Stirling phase at and near Cahokia (Holley 1989; Jackson 1992; Pauketat 2005), suggesting the replacement of Ramey Incised jars and their undecorated counterpart, Powell Plain, may have begun at this time. Potentially, the Late Stirling phase begins after the initial construction of the Cahokia palisade around Monks Mound and the Grand Plaza (Holley 1989). This is premised on the superpositioning between the second palisade construction at Cahokia and Structure 4, a burned building with a mix of rolled, everted, and angled rim jars as well as both Ramey Incised and early Cahokia Cordmarked jars (Pauketat 1987). Calibrated radiocarbon dates for this structure place it in the Late Stirling to mid-Moorehead phase range (AD 1154-1266, at one standard deviation) (Pauketat 1987, dates recalibrated by the author).

The uneven distribution and appearance of Moorehead phase pottery types – specifically cordmarked jars with angled or everted rims and everted rim bowls –at sites that are considered to be Stirling phase based on radiocarbon dates and/or structure sizes and proportions suggests these new pottery types were introduced and adopted at different times in different places but were eventually largely used within a generation (or less). This pace of pottery transformation shares similarities with those that took place during the transition from early Cahokian coalescence to the politicized Stirling phase. This discounts the idea that globular cordmarked jars are simply a later manifestation of an evolutionary sequence from sharp-shouldered polished jars.

Jars comprise about 40% of the vessel assemblage for both the Olin and the Copper sites, comparable to the Moorehead phase assemblage recovered from Cahokia's ICT-II (Holley 1989). The presence of a small number of Ramey Incised vessels, the number of everted-rim bowls, and the small number of wider-rimmed plates at the Olin site suggest an assemblage largely dating to the mid-Moorehead phase (though again, the timing of the early versus late subdivision in the Moorehead phase is yet unknown). Similarly, based on the lack of Ramey Incised vessels and everted rim bowls, and the presence of a fair number of wider-rimmed plates, the Copper site occupation appears to be mid-Moorehead or perhaps slightly later Moorehead. No wide-rimmed Crable style plates, such as those that were typical of the Central Illinois River Valley late Mississippian period, are present at the site precluding a very late Moorehead occupation. Such plate types are found at the nearby Lembke site, however, and are attributed to the "Sand Prairie" phase occupation of that site (Holley et al. 2001b).

Changes in vessel form are notable within the Olin assemblage; these changes do not simply include changes to vessel shape and surface treatment, but rather changes in the relationships of production and the physical engagement with the materials. This includes a shift to mostly cordmarked pottery fairly early in the occupation of Olin, as there are few features that contain only slipped jars with no cordmarked sherds. Likewise, the majority of jar forms were globular form, a vessel form produced through coil-and-paddle technique. Additional evidence for local production of these globular forms is present in the form of a pottery trowel was recovered from the southern part of Olin. Spindle whorls were also recovered, though in small numbers.

These suggest local fiber production as well, though this may have discontinued during the site's occupation given the shift from z-twist cordage back to s-twist demonstrated on the cordmarked jars at the site.

Most of the cordmarked jars recovered from both Olin and Copper were made from oxidized pastes, often with iron flecking, that differ macroscopically from the Ramey Incised jars and other dark-slipped vessels with reduced pastes. If these are indeed upland clays as opposed to bottomland clays, local pottery production may have required the creation of new relationships with local clay source areas. While the iron inclusions in the clay may have been natural, they may also have been a desired element given the re-emphasis on red slipping during the Moorehead phase.

A dramatic decrease in the presence of Ramey Incised jars is apparent between the late Stirling/early Moorehead phase and the later part of the Moorehead phase. At Cahokia, Ramey Incised jars comprise 36% of the late Stirling phase jar assemblage at the Kunnemann Tract (Pauketat 1993), 27% of the late Stirling phase vessel assemblage at Tract 15A/Dunham Tract (Pauketat 1998), and 20% of the late Stirling assemblage at ICT-II (Holley 1989). The East St. Louis Northside excavations yielded Ramey jars that comprise about 22.1% of the jar assemblage, while the Southside excavations yielded Ramey jars that comprise 18% of the assemblage; this proportion may likely change in light of the recent excavations across a larger swath of the East St. Louis site. Ramey Incised jars make up 27% of the early Moorehead phase (M1) jar assemblage at Cahokia's Tract 15A/Dunham Tract, and 25% of the Stirling/early Moorehead jar assemblage at Tract 15B (Pauketat 1998, 2013).

Between the early Moorehead and the late Moorehead, the presence of Ramey Incised jars decreased about five-fold in the American Bottom region. Holley (1989) reported Ramey Incised vessels as comprising 4.6% of the Moorehead phase jar assemblage at Cahokia's ICT-II. A scant 4% of the late Moorehead phase jar assemblage from Tract 15B is comprised of Ramey Incised, and no Ramey vessels were recovered from late Moorehead (M2) contexts at Tract 15A/ Dunham Tract (Pauketat 1998). Pauketat (2013) suggests the production and use of Ramey Incised jars ceased by A.D. 1250, if not earlier. In fact, it is quite likely that production ceased prior to this mid-Moorehead phase decrease and those vessels that are after the mid-Moorehead phase were perhaps "heirloom" vessels still in use.

At the Vaughn Branch site, a late Stirling phase site located near Olin in the northern American Bottom, Ramey Incised vessels made up only 12.2% of the jar assemblage (Jackson and Millhouse 2003). Compared to Cahokia, this proportion of Ramey Incised is low for this time period, however this may be due to differences in activities that took place at the site, the type of site it was, or, significantly, the identities of persons occupying the site and relationship with/ proximity to Cahokia. Especially as the proximal Old Edwardsville Road site, which has long been presumed to be an early Moorehead phase occupation, has 21.7% of the jar assemblage comprised of Ramey Incised (Jackson and Millhouse 2003). Additional evidence from Old Edwardsville Road suggests a Late Stirling phase occupation regardless of the presence of Cahokia Cordmarked pottery, in which case the high proportion of Ramey Incised vessels would be comparable to this time period at Cahokia.

At the Olin site itself, Ramey Incised jars comprise 4.5% of the jar assemblage, fitting with the trend at Cahokia for the mid-Moorehead phase. The Ramey vessels from the Olin site demonstrate a simplified or decreased number of motif options. During the early Stirling phase, when Ramey vessels began to proliferate, designs were “varied and include possibly unique geometric specimens as well as the more typical curvilinear renderings” (Holley 1989:113). The late Stirling phase at ICT-II demonstrated an increase in frequency of Ramey Incised jars “with more diversified designs” (Holley 1989:160). Decoration more frequently appeared on other vessel types as well during this time period, including bowls, beakers, and bottles (Holley 1989). By the later part of the Moorehead phase, prior to complete discontinuation, decorative motifs appear to have become more restricted, including nested arches, some variations of the scroll, and, at Tract 15B, carved lines and dots. Similarly restricted designs are notable on Ramey vessels excavated from the Schild cemetery (Perino 1971; materials located at the Gilcrease Museum, Tulsa Oklahoma).

No Ramey vessels were present in the Copper site assemblage. Significantly, only one small sherd of possible Ramey Incised was recovered from the upland mound center of Emerald, east of Copper, despite the extensive seemingly extra-domestic Stirling phase occupation (Pauketat personal communication). No Ramey Incised vessels were recovered from the Copper site, on the other hand. Initially, this would have been believed to be due to the ‘Sand Prairie’ date of occupation, however, archaeological research by Holley and colleagues (2001a) on the Scott Air Force Base have demonstrated a low density of Ramey Incised vessels at the Faust Locality, also in the Silver Creek drainage; here, excavations yielded six Ramey Incised sherds for the entire locality. A single Ramey example was likewise recovered from a probable Moorehead phase context at the nearby Lembke locality (Holley et al. 2001b). The nearby Emerald site is also apparently lacking in Ramey Incised vessels (Pauketat, personal communication 2014) despite recent excavations placing the larger occupation of the site in the Stirling phase with a re-use of the principle mound during the Moorehead phase (Alt and Pauketat 2013; Hall, personal communication 2009; Skousen 2013).

Given the close material entanglement between Ramey Incised vessels and the religious-politics of the Stirling phase, it seems surprising that these vessels are found in such small numbers in the Silver Creek area, especially with the close proximity of Cahokian outposts or nodal-sites such as the Grossmann, Pfeffer, and Knoebel sites (Alt 2006b; Bareis 1976; Holley et al. 2001c). Each of these sites had L- or T-shaped structures suggestive of an active Cahokia political-religious presence in the uplands. Additionally, over 70 celts were gathered together at the Grossmann site, entangling social persons and material power with place on the landscape in a specific early Cahokian idiom (Pauketat and Alt 2004). This diminished presence of Ramey Incised jars is also surprising given the processional avenue between Emerald and Cahokia (Pauketat, personal communication 2013) and the supposition that Ramey Incised vessels were dispersed as, and along with, participants in Cahokian ceremonies (Pauketat and Emerson 1991). Since the overall density of Ramey Incised jars in the Silver Creek area around Copper is low, the lack of Ramey Incised vessels at this site would therefore be a poor indicator for temporal affiliation of the site. Radiocarbon assays for the Copper site returned highly problematic dates, placing the construction of one of the mounds and the termination of one of the structures anywhere from the late Lohmann phase through the very early Moorehead phase.

Despite the apparent differences in presence of Ramey Incised jars between Olin and Copper, a comparison of mean, median and mode RPR/LPs shows the greatest similarity between the jar assemblages between these sites lies with the cordmarked, plain, and eroded jars. As mentioned previously, the slipped vessels from Olin skew the site towards higher RPR/LPs (Figure 7.4). While the slipped vessels from Olin do not appear to be part of a drastically earlier occupation (as few features contain only slipped jars with no cordmarked), these vessels may have been brought to the site at its founding (along with practices associated with the circular sweatlodge) or were produced prior to the material transformations of the Moorehead phase.

Based on the overlap of RPR/LPs of slipped vessels (most of which had flat shoulders/ insloping rims typical of Ramey Incised and Powell Plain jars) with those of cordmarked vessels (most of which were globular in shape, typical of Cahokia Cordmarked), it would appear that cordmarked vessels began replacing Ramey Incised and Powell Plain jars during the early part of

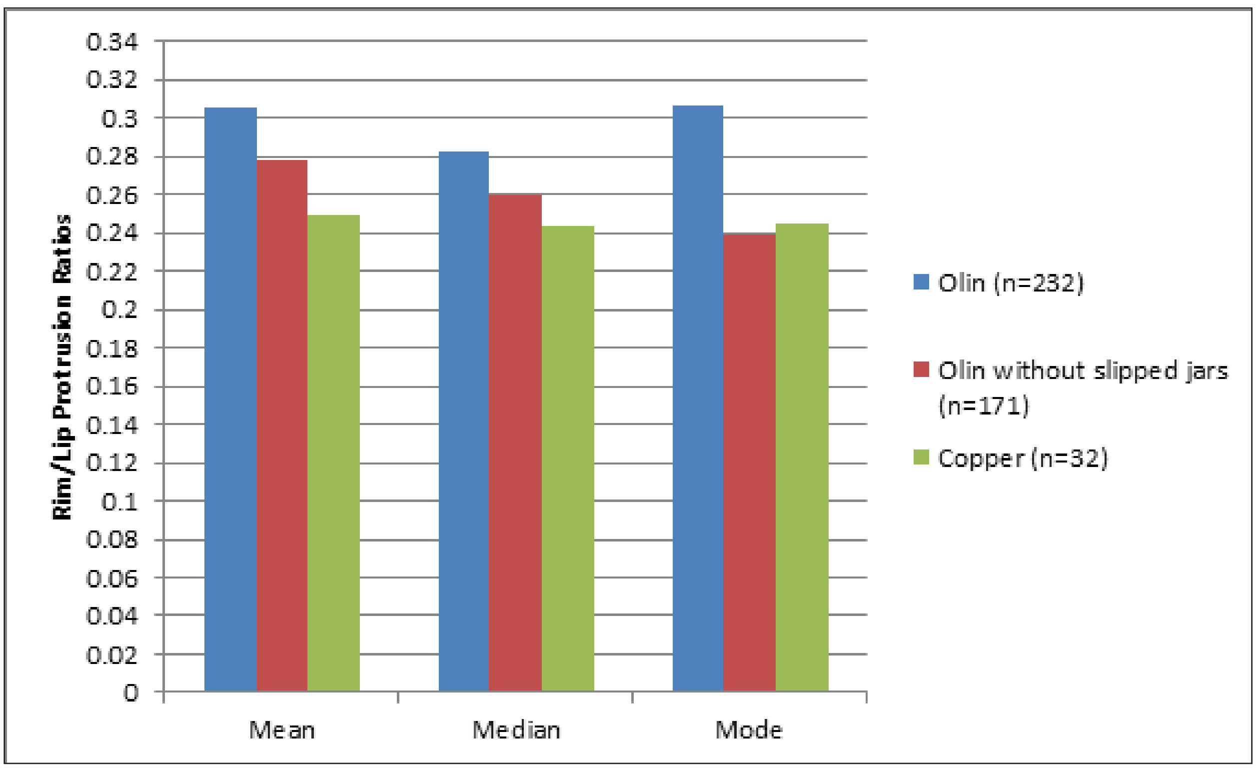

Figure 7.4. Mean, median, and mode rim/lip protrusion ratios.

Olin's occupation. This initial occupation appears to have occurred during the very late Stirling phase (as suggested by the structures) or early Moorehead phase (as indicated by the pottery assemblage and radiocarbon dates).

At Cahokia, this transition from slipped jars to cordmarked may coincide with the construction of the palisade at Cahokia, as suggested by the superpositioning between Structure 4 and the second palisade wall. Slipped jars were eventually discontinued altogether. No slipped jars were present in the Copper assemblage, though the cordmarked jars there overlap in RPR/LP with the cordmarked jars at Olin. This seemingly sudden transition also included the adoption of everted-rim bowls, a short-lived trend during the early Moorehead phase, and wider-rimmed plates.

Ramey Incised pottery was once a widely-traveling material co-creator of the religious-politics of Cahokia's Stirling phase. These vessels were also a means of inviting Cahokian religious-politics into the home, as they once made up about a quarter of jar assemblages in the Cahokia area during the Stirling phase. This vessel type was clearly discontinued by the middle of the Moorehead phase; in fact, the miniscule percentage of Ramey in jar assemblages at that time (around 4% at Olin and Cahokia) would seem to reflect a rapidly dwindled presence of a vessel no longer in production or widely used. The narrative these last few Ramey vessels told also appears to have been simplified at this point, as decorative motifs were greatly decreased in variety and most often consisted of nested arcs and chevrons (a common decorative motif of the Upper Mississippian groups in the region, incidentally). The centralized production of Ramey pottery has long been suggested (Pauketat and Emerson 1991), perhaps like other specialized objects involved in religious practices, the production of these vessels was under the jurisdiction of a particular clan, sodality, or other group (Bailey 1995; Fletcher and La Flesche 1992; Pauketat 2013a) (or perhaps multiple groups produced a particular set of designs, which may help explain the limited design set during the Moorehead phase).

The material disentanglement with the Ramey Incised vessels and their part in the creation, spread, and maintenance of the Stirling phase religious-politics of Cahokia may not have been strongly felt in the Silver Creek drainage, since these material actors did not have a strong presence to begin with. People in the northern American Bottom, likewise, may not have felt this transition as strongly as locations closer to Cahokia, as there was not a strong Stirling phase occupation in this area until later in the Stirling phase (e.g., Vaughn Branch site, Jackson and Millhouse 2003), though Ramey Incised appears to have formed a significantly larger portion of the jar assemblage in this area than in the Silver Creek drainage.

If the production of vessels like Ramey Incised were restricted to particular clans or kin groups associated with particular bundles, as has been suggested by Pauketat (2013a), these groups, bundles, and jars were deeply engaged with Cahokian religious-politics of the Stirling phase. Discontinuation of Ramey vessels at the beginning of the Moorehead phase would suggest an unraveling of the entanglements between bundles, vessels, and kin group or clan that held and protected those bundles. Given the similarities in decorative technique between Ramey jars and everted-rim bowls and plates, perhaps the potting groups in charge of producing the Ramey jars shifted to these serving vessels. Eventually, however, decoration on even these vessels became more expedient and less intensive, suggesting the release of this task to non-restricted local production.

In the production of the globular cordmarked jars with red-slipped interiors, O'Brien (1972:41) notes the "mixing of two ceramic traditions…the surface treatment of 'Bluff' ware with the tempering and red slipping techniques of the 'Mississippian' ware." Perhaps this return to Late Woodland surface treatments is an intentional emulation of past pottery production techniques, though with a 'modern' take. Similarly, this form and surface treatment may also be due to influence of Upper Mississippian groups in the region. A resurgence of red slipping (typically as interior slip) during the Moorehead phase may likewise be a reversion to pre-Classic-Cahokia (pre-early Stirling) slip colors. New technological styles, in fact, new chaine operatoire, are required to produce the novel unrestricted vessels with added rims (everted-rim bowls and plates) as well as the coil and paddled-produced globular jars (Cahokia Cordmarked).

Local production of jars does not negate the possibility for centralized production of new vessel types like everted-rim bowls or plates, or continued production of previously specialized forms. The earlier everted-rim bowls and plates carried decorations produced in a similar way to Ramey Incised, suggesting potters with knowledge of this technique were now producing these new vessels. Later plates were decorated with what appear to be expediently incised versions of similar motifs. Beakers, likewise, tend to be very similar in size and shape at Olin, suggesting a standardized size if not centralized production. These size standards for beakers are maintained during the shift from dark slipped vessels, to later red-slipped vessels, though decorating technique also demonstrates a shift towards more-expedient incising after the vessel was slipped and fired.

Both Olin and Copper demonstrate a high proportion of serving vessels to cooking/ storage vessels, following the trend for this time period. At both sites, this serving-to-cooking ware ratio is nearly 1:1. This may be a factor of extra-domestic activities forming a core of the site occupations, perhaps especially so at Copper as excavations are biased towards mound and non-domestic contexts. At the Olin site it would be expected that the greater number of structures functioned as domestic households with a focus of extra-domestic activity in the plaza area and in conjunction with special use structure such as the sweatlodge (see Chapter 5). The Olin assemblage provides a similar ratio, however, indicating that this site was more than the “white-tailed deer extraction site” once premised by Porter (1974) and public consumption was a significant aspect of activities taking place here. The increased commensality at Cahokia (Hamlin 2004; Pauketat 2013c) and at outlying sites in the American Bottom region does not seem to suggest a polity in decline; rather, together with the evidence for new (or returning) immigrants or pilgrims to the area (Slater et al. 2014), this increased public consumption suggests a greater emphasis on relating and integrating new people through food and attendant ceremony.

The types of serving vessels differed slightly between Olin and Copper, however. Bowls comprise approximately 31% of the Olin assemblage but only 20% of the Copper assemblage. Bowls are present in a higher proportion of the assemblage at both Olin and Copper than from the Moorehead phase contexts of Cahokia’s ICT-II, where they comprise only 18.1% of the vessels (Holley 1989:208). Again, the more domestic focus of the ICT-II area at Cahokia may be a factor in this disparity in proportions of serving vessels.

The majority of bowls at Olin are unrestricted (outcurving, or round-sided in Holley's terminology, and outslanting), much like the Late Stirling assemblage at ICT-II. The majority of bowls from Copper, on the other hand, are restricted (incurving and inslanting). Only about a third of the bowls from Copper are slipped, all with dark slips, while more than half of all of the bowls from Olin are slipped, mostly with dark slips. Twenty-seven red-slipped and 16 tan-slipped bowls were recovered from Olin, while no light-colored slip bowls were recovered from Copper. Effigy bowls were recovered in larger proportion (12.5%) from Copper, than from Olin (7.1%).

Everted-rim bowls are noted to appear during the late Stirling phase at Cahokia's ICT-II and increase in popularity to become "hallmarks of the Moorehead phase" (Holley 1989: 160). Everted-rim bowls were fairly popular at the Olin site – comprising 12.5% of the bowl assemblage, while plates are present in low numbers (n=8) (Figure 7.5). Holley (1989) suggests the appearance of the everted-rim bowl is simply a further elaboration of rim form that spilled over from angled-rim jars. I would argue otherwise, as this type of unrestricted vessel would suggest a serving function and, perhaps, a different kind of cuisine. Significantly, no everted-rim bowls were recovered from the Copper site, suggesting 1) Copper may have been occupied slightly later than Olin and plates had fully replaced everted-rim bowls by this point; or 2) if Copper and Olin are roughly contemporaneous, everted-rim bowls were rather spatially restricted or used by a particular group of people before being fully replaced by plates. The fact that no everted-rim bowls were recovered from Copper suggests the transition from everted-rim bowl to plate was rapid; potentially the plate form was introduced to the area while everted-rim bowls were a short-lived innovation during the Early Moorehead for serving novel cuisine necessitating plates and platters in replacement of unrestricted bowls and highly iconographic jars.

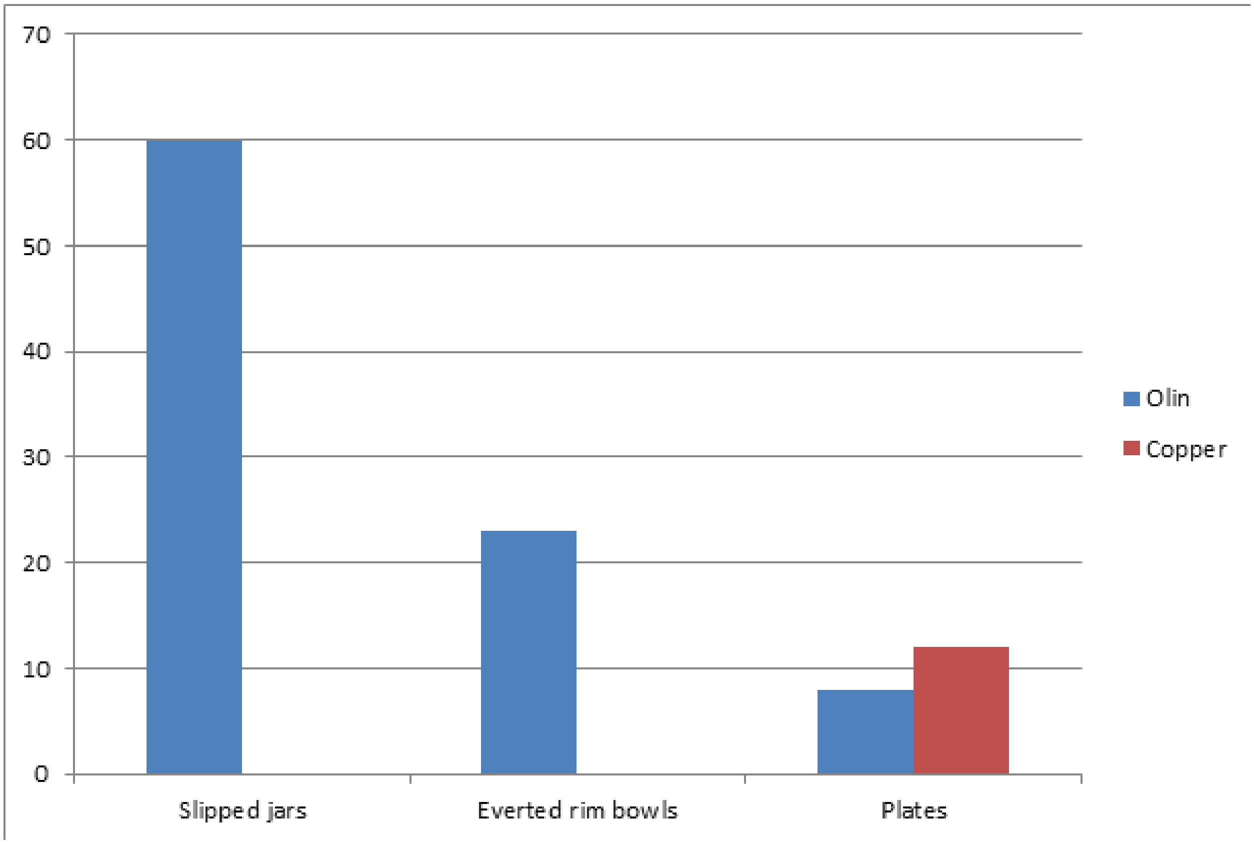

Figure 7.5. Proportions of slipped jars to everted rim bowls and plates at Olin and Copper.

In the wake of, or perhaps displacing, Ramey Incised jars as the lead ceramic participant in Cahokian religious politics were new, open and inclusive, pottery vessels in the form of everted-rim bowls and plates. The new vessels were decorated using techniques similar to those of Ramey Incised – excising a design in leather-hard clay. In opposition to the previous material co-producers of Cahokian religion, these everted rim bowls, and later plates, are open and inclusive. Decorative motifs on everted-rim bowls begins as short diagonal trailing – suggested to be (or be developed into) a sunburst design (Emerson 1997c; Pauketat 2004) – though one vessel at Olin is decorated in sideways chevrons, reminiscent of the forked-eye motif (Emerson 1997c). The plates that follow these everted-rim bowls appear to be a separate vessel type, as suggested by the clear separation in rim-wide at Olin. A scatterplot of decoration width to rim width of plates between Olin and Copper shows, while the range of trailing widths are similar, there is clustering between the sites (Figure 7.6). Likewise, there remains a clear separation between everted rim bowls and plates rather than a "gradual broadening of the plate rim and a narrowing of the lines of decoration" (Vogel 1975:104).

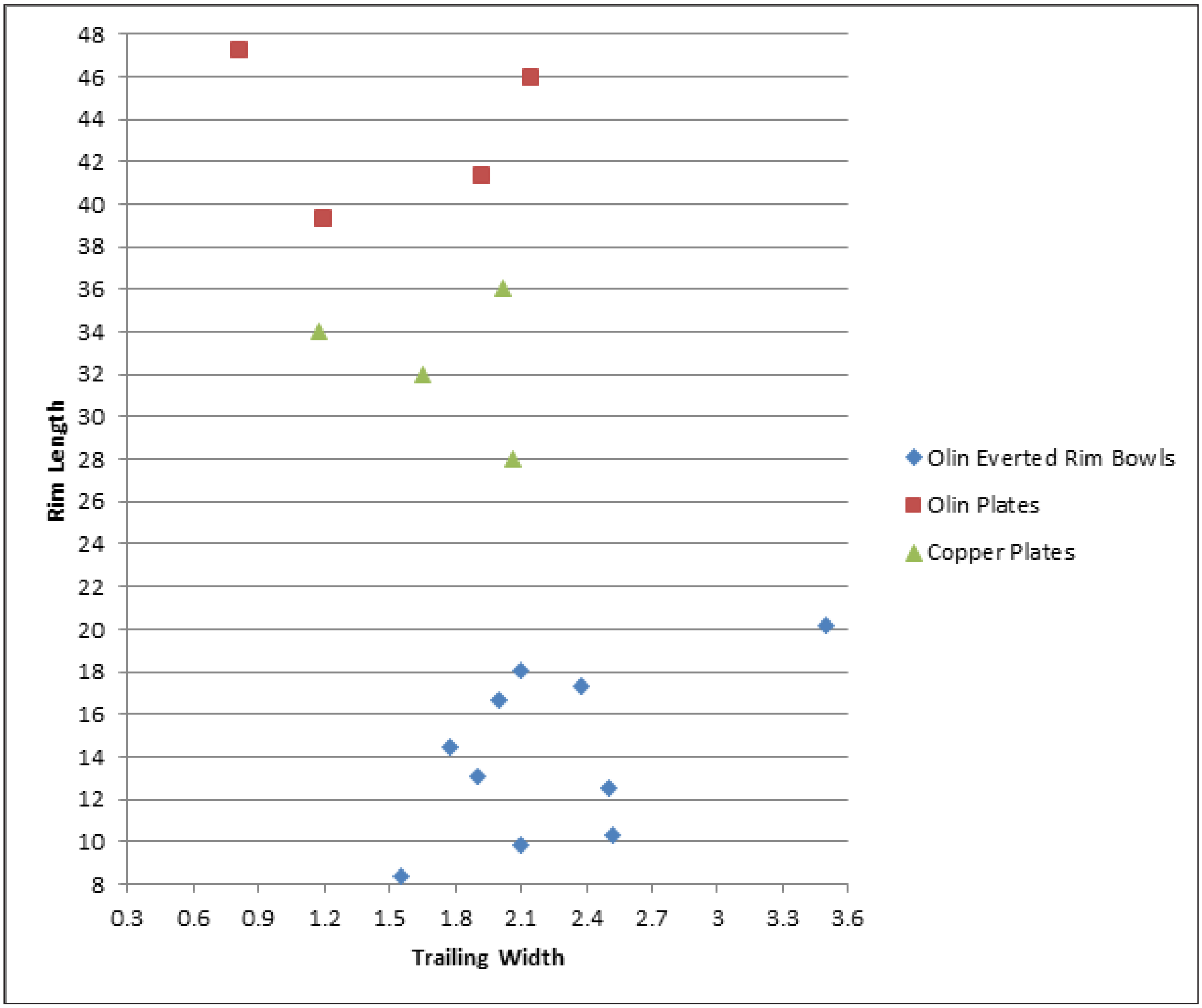

Figure 7.6. Rim width to decoration width among Olin and Copper plates.

Plates likewise engage a new set of decorative motifs, including oppositional diagonal trailing that is similar to decorations found regionally, including on Upper Mississippian Fisher phase pottery (Baltus 2013; Emerson and Emerson 2013). In addition to new depictions of Cahokian religious-politics, these vessels may also have offered new cuisine as well as a new etiquette of consumption (Pauketat 2013c). Pauketat (2004) has suggested there may have been implications to the replacement of portable vessels like Ramey jars with highly visual public vessels like plates. Importantly, plates do not have the “take home” capacity that jars do (Pauketat 2004) and therefore may be found in more ‘public’ contexts than domestic. This appears to be true at Olin, though Copper may be an unfair assessment as only extra-domestic structures were excavated.

Plates are found associated with the later occupation of the Olin site and concentrated in the southern portion of the site, including the double wall house, the burial, and a structure complex associated a small marker post. Plates at Copper, on the other hand, were associated with both Feature 3 (the small square building) and Feature 4 (the large council house), as well as Feature 20, the likely marker post superimposed by Structure 4. The plates at Copper more often included the oppositional diagonal trailing than sun symbolism. Trailed lines include both medium width and narrow, suggesting a transition between the two; a similar “middle of the road” assemblage was noted for the Moorehead phase occupation at Lembke (Holley et al. 2001b:363).

No wide-rimmed Crable plates are present at the Copper or Olin sites, however, suggesting either 1) Copper or Olin were abandoned prior to the spread of these particular vessel types originating in the Central Illinois River Valley; or 2) people living at Olin and Copper did not have a connection to people in the Central Illinois River Valley, as Crable style plates have been found at Common Field site in the southern part of the American Bottom, at the Silver Creek drainage site of Lembke, and in the Kaskaskia Valley (Buchanan personal communication, 2012; Holley 2001b). While plates may have been more inclusive in-the-moment of use, the message may have had to have been experienced first-hand to have had the social collateral that Ramey Incised jars (and their implications of Cahokian connections) had prior.

This transition may be especially important as the focus of time and energy producing decorated, slipped, and burnished vessels is shifted from slipped jars (i.e., Ramey Incised and Powell Plain) to everted rim bowls and plates within the course of perhaps a generation or less. In addition to shifting cuisine, the use of decorated plates in replacement of decorated jars may also suggest a change in the context of use. While the full decoration of Ramey Incised jars is most visible from above, and therefore most accessible to those persons putting food in or taking food out as suggested by Pauketat and Emerson (1991), it would still be partially visible on the sides of the angled shoulders to persons seated around the vessel. The decoration present on the flanges of everted rim bowls and plates, on the other hand, would only be visible from above and accessible only during individual engagement and use.

Both plates and pans figure more heavily into the ceramic assemblage at the Copper site (plates 15%, pans 7.5% of the assemblage) than they do at the Olin site (plates 1.3%, pans 4.2%). Pans, similarly, were part of the Cahokian pottery assemblage from at least the Lohmann phase, present in minimal numbers in the Lohmann phase assemblage at Cahokia's Tract 15A/Dunham Tract though not in the later phases in this location (Pauketat 1998). The lack of pans in these later occupations may have been due to the shift from residential to public space. Tract 15B likewise has a low number of pans present in the early Mississippian assemblage, whereas they make up 5% of the vessel assemblage during the Moorehead into Sand Prairie phases (Pauketat 2013c). This increased importance of pans – also seen within the Olin and Copper assemblages – may be due to an overlap in serving capability with plates. Additionally, pans were supposedly used for baking or parching (Pauketat 1998, 2013), perhaps the foods produced using these vessel types increased in importance or new cuisine was introduced that was made by these techniques.

This increased importance of pans, supported by recovery of pan sherds from sub-mound contexts and large public structure at Copper, may also be related to an overall increase in serving wares as compared to cooking and storage vessels in Moorehead phase assemblages. The recovery of pans from submound deposits at Copper, in association with large amounts of faunal material and burned nutshell, suggest these vessel types had become important in activities surrounding mound construction.

While many ceramic changes are noted in the transition from the Stirling to Moorehead phase, many other vessel types were retained, and perhaps became more involved in political-religious activities. For example, beakers became more embedded within the renewed Cahokian religious-politics of the Moorehead phase. These vessel types were used previously during the Stirling phase (Pauketat 1998) and have recently been implicated in the consumption of the Black Drink, a highly caffeinated, religiously important beverage ingested as a means of purging prior to engaging in religious rituals, political councils, gaming, or war parties (Crown et al. 2012). These Stirling phase vessels were typically dark slipped and burnished, with rounded tubular handles. During the Moorehead phase, red-slipped beakers became more prevalent, often with incised decorations including variations on the quartered circle, sunburst, or ladder motif (the so-called Cahokia Red Engraved Beaker; Pauketat 2013c), while the handles on a number of these later beakers were anthropomorphic arms ending in clenched fists. The sunburst design may reinforce imagery carried by the everted-rim bowls and plates discussed above, while the quartered circle and ladder motifs were once part of the Ramey Incised array of designs.

Both sites indicate continued interaction with groups outside of the American Bottom and incorporation of pottery production techniques or styles, as evidenced by higher rimmed/ vertical rimmed jars at both Olin and Copper, the lizard effigy handle, notched lip, and finger-impressed lips at Olin, bi-knobbed or bifurcated handles and notched lip decoration at Copper, and a possible grooved paddle vessel from Copper. The seemingly sudden adoption of globular jars with cordmarked exteriors, a form which required a shift in pottery production techniques, at the Olin site and other sites throughout the American Bottom likewise suggest interaction with and adoption of pottery production techniques of surrounding Upper Mississippian groups (Fisher, Oneota, Fort Ancient) who made these forms prior to the 13th century. High angled- to near-vertical-rimmed jars were present in both the Olin and the Copper assemblages, comprising only 4.3% of the jar assemblage at Olin (including two lobed jars), but 25% of the jar assemblage at Copper. Holley (1989:151) suggests angled-rim jars first appeared during the late Stirling phase at Cahokia's ICT-II, comprising about 7% of the jar assemblage. Holley (1989:153) suggested they resembled "later styles". Vogel (1975:52) also noted that this type had a "distinctly different pattern of distribution" and occurred "as part of the regeneration of the cordmarked vessel in the Mississippian tradition," indicating perhaps a close connection between the production of Cahokia Cordmarked jars and high-angled or vertical-rimmed jars. While three of the high-angled rim jars at Olin were dark slipped, the trend appears toward plain surfaces, such as those recovered from the Copper site. These plain-surfaced high-rim vessels are similar in form to those recovered from Upper Mississippian 13th and 14th century sites in northern Illinois, Indiana and Ohio. While definitive connections between these regions cannot be determined without provenance studies, these similarities in form are suggestive of wider regional interactions during this time period.

The variance in architectural and ceramic change around the American Bottom may have been related to differences in identity and social entanglements of the people living at these sites. Similar diversity and variation in the adoption of new architectural and ceramic styles was likewise present during Cahokia's initial coalescence as a city and was due to the varying degrees of integration and participation of diverse groups of people. For example, the ceramics at the Olin site share a number of similarities with those found at sites in the Central and Lower Illinois River Valley (Conrad 1991), while ceramics fitting Holley's (2001b) description of the "Shiloh Complex" pottery recovered from the Lembke locality have been recovered from extra-domestic features at Copper. These "Shiloh Complex" ceramics appear to have similarities with pottery of Upper Mississippian groups to the east, as do the grooved-paddled jars (see Chapter 6) (Griffin 1943; Hilgeman 2000).

As high-angled rim jars have been present in small numbers in various Cahokian assemblages throughout the sequence of Stirling and Moorehead phases, perhaps these vessels are produced by non-local ceramicists in a series of ongoing relationships between regions to the north, south, and east. If this possibility holds, this would bring into question the suppression of identity differences presumed to take place during the Stirling phase (Emerson 1997; Emerson and Hargrave 2000; Pauketat 2004). Upper Mississippian vessels were likewise recovered from features on the Powell Tract, represented by a small number of shell-tempered trailed sherds typed as Brown's (1961) Langford Trailed (now understood to be Fisher Trailed); wares that were roughly contemporaneous with the Moorehead phase.

Expanding the scope to a regional view, 13th century Middle Mississippian and Upper Mississippian relationships are suggested by pottery recovered from elsewhere in Illinois and Wisconsin. Cahokia Cordmarked vessels have been identified at the Zimmerman site in or near Upper Mississippian Fisher tradition contexts (Brown et al. 1967). Likewise, Wells Incised plates were identified at the nearby Plum Island and Osborn (Kankakee Refuse Heap) sites (Brown et al. 1967). Middle Mississippian ceramics were found in conjunction with Upper Mississippian Langford ceramics at the Sweat Bee site in the Kaskaskia River Valley, at the Noble-Wieting site in Central Illinois, and at the Fisher type site at the confluence of the Des Plaines and Kankakee Rivers, and Langford sherds have been recovered from the Oneota Walker Hooper and Carcajou Point sites in Wisconsin (Brown et al. 1967; Fricker 2013; Gardner 1969; Hall 1962; Langford 1927).

Cahokia Cordmarked jars, Wells Incised plates, and beakers (especially those with human-arm-with-fist handles) appear at sites in the Central Illinois River Valley, including Orendorf and Lawrenz Gun Club (Conrad 1991). Significantly, the Kane Mounds in the uplands east of Cahokia contain burials that appear to be a mix of local Mississippian tradition and potentially Langford-like interments (Emerson and Hargrave 2000). All together, these sites suggest broader regional relationships that cross these supposed group boundaries, a factor of late pre-Contact social complexity and potential ethnogenesis in the Upper Midwest recently discussed by Emerson (2013). Additionally, the spread of Cahokia Cordmarked jars and Wells Incised plates in some ways mimics the spread of Ramey Incised vessels during the initial Cahokia movement, uniting regions that previously demonstrated diverging historical trajectories (Emerson 1991a; Millhouse 2012). In addition to Cahokia Cordmarked jars, Wells Incised plates, Cahokia Red Engraved Beakers and Mound Place Incised bowls appear to become regionally-shared styles, uniting the southern part of the Central Illinois Valley to southeast Missouri and across central Kentucky and Tennessee, with local variations of each.

These expanding, more regionally heterogeneous, relationships (as opposed to the seeming homogeneity imposed by the Stirling phase religious-politics) may be part and parcel of the material changes taking place after the late 12th century. A move towards openness and inclusivity appears to be taking place with the Stirling-Moorehead transition. While Ramey Incised symbolism has been suggested to be a "homogenous and focused…visual portrayal of a tightly integrated Cahokian cosmos" (Emerson 1997:213), decorative motifs appear to have become increasingly simplified or generalized, shifting from designs encompassing Upper and Lower World symbolism to those focused more intently on the Upper World: arches, sunbursts, and possibly bird-like designs (oppositional diagonal trailing) that were popular among Upper Mississippian groups. Restricted-orifice Ramey jars were then replaced by unrestricted everted-rim bowls and eventually plates.

Pottery production, like all material engagements, is a process of relating. The apparent decentralization of jar production would have created a need for the formation of new relationships between potters and new materials (e.g., upland clays) (though arguably, non-Ramey pottery production likely continued among local or community groups). These new relationships may also have included new rules of engagement in the form of new production techniques, leading to the production of globular cordmarked jars with elongated everted or angled lips. I argue, however, that these new rules of production may have been (re)introduced to the American Bottom region, as these new vessel forms and their attendant methods of production require a shift in manufacturing technique from molding or slabbing to coil-and-paddling. This technique was one that was in use in areas north and east of the American Bottom during this time and harkened back to a pre-Stirling phase Cahokia.

Additional Transformations and Persistences

Some evidence at Cahokia suggests that mound construction slowed in intensity, and in some instances, were suggested to have changed qualitatively with the addition of thick caps of dark clay (Pauketat 1993; Reed 1969; Smith 1969) (though see Dalan et al. 2003:143 for a counterpoint to the "clay cap" added to some mounds). Mound construction continued at Cahokia in the East Plaza as well as in the uplands at the Emerald (Pauketat, personal communication 2014) and Copper sites. While perhaps the technique involved in the initiation of mound construction differed (at least at the Copper site), the relating of earth, water, and fire remained a significant part of construction. In fact, the construction technique used in the initiation of Copper's Mound 3, drawing wet silts from the watery Under World, may have more closely invoked narratives of world renewal (or, conversely, this may have been a means of forging a relationship with the rain-bearing Upper World).

Finally, particular emphases on female fertility and lunar cycles appear to have been thrown over for a focus on masculinity, warfare, and the sun. Female figurines, suggested to be ancestor-deities (e.g., the Corn Mother or Earth Mother) laden with symbols of fertility and the cycles of life (Emerson 1997c; Pauketat 2004), have been found, sometimes fragmented, and interred in or near temples at East St. Louis, BBB Motor, and Sponemann sites (Emerson and Boles 2010; Emerson and Jackson 1984; Jackson et al. 1992). One female figurine was recovered intact, though exposed to fire at some point prior to interment, from a burned temple at the East St. Louis site (Emerson and Boles 2010). A female figurine pipe was also found intact in a Mississippian burial at the Schild cemetery in the Lower Illinois River Valley (Emerson 1982;

1997c; Perino 1971). This figurine pipe, which has similar iconographic depictions of fertility as the Birger figurine, had also been exposed to fire prior to inclusion in the grave of a female (Emerson 1982).

Male figurines, also likely produced at Cahokia, are often depicted as warriors or priests (Emerson 1982; Emerson and Hughes 2000; Emerson et al. 2003). These male figurines have not been recovered near Cahokia, but appear to have been sent or carried into the greater Southeast. Many of these male pipes had been converted to pipes, likely after their dispersal from the American Bottom (Emerson 1983; Emerson et al. 2003). This conversion changes the relationship people may have had with these figurines. Though the nature of the relationship is unknown prior to this point, the conversion into pipe would have made these figurines participants in smoking ceremonies, mediators between fire/smoke and smoker, and providers of smoke. Smokers would have ingested smoke (essence, power) from the figurine (ancestor, deity). While this is a topic to be further explored elsewhere, the changing relationship with figurine and fire should be noted as likely taking place during the Moorehead period. Additionally, a number of male figurines, made in the Cahokia area with newly entangled relations, were dispersed into the greater south during this period (Emerson and Hughes 2000; Emerson et al. 2002, 2003).

Regional Ramifications

In speaking of the Moorehead phase, Milner (1990:30) suggests that the "integrating mechanisms that tied…constituent social groups to the paramount center were not as effective as they had been." Evidence presented here suggests that regional material relationships, though perhaps transformed, appeared to continue in much the same way. Mounds were built, not just with large clay caps like some at Cahokia, but in incremental layers relating water, earth, and fire in much the same way that earlier mounds had been built. Additionally, Moorehead phase pottery assemblages, especially at Cahokia's East Plaza but elsewhere as well, suggest an increased emphasis on commensality and presentation.

Shortly after the palisade at Cahokia was erected, evidence emerges of a divergence in local practices of spatial organization. Some neighborhoods at Cahokia, like in the ICT-II Tract, were re-oriented to local mounds and plazas, rather than the polity wide Cahokia Grid applied during the early Stirling Phase. Conversely, the area west of Monks Mound and the Grand Plaza (Tract 15B) and sites in the northern American Bottom founded during the Moorehead phase were oriented to cardinal or near-cardinal directions.

Many of the local mound and plaza complexes at Cahokia are abandoned during the Moorehead phase, while at the same time the surrounding floodplain and uplands are repopulated. Evidence also exists for the appearance of ethnically differentiated cemeteries during the Moorehead phase (Emerson and Hargrave 2000; Emerson and Hedman 2013). Pauketat (2004) points to a correlation between palisade construction at Cahokia, the reorganized Cahokian population, and a decreased regional political economy as social consequences of fortification construction. Dalan (1998) also shows a relationship between the reorganization of community structure, increased privatization of storage, the construction of the palisade, and the weakening of community-unifying central control and social decline. This decline in apparent political unity may be an unintended consequence of palisade construction in which the work of many may benefit only a few; the construction practices created a community among those who participated in building; a community which was likely separated from that of the central precinct. This construction of different communities within the larger Cahokian community may have had historical consequences.

Additional consequences of these new social entanglements are the archaeological ramifications. The succeeding 14th century 'Sand Prairie' phase as had initially been defined by Fowler and Hall (1972) had many similarities with the Moorehead phase, including increasingly square structures, wider-rimmed jars and plates, increasingly plain-surfaced jars, beakers and pans, to name a few. This phase had the addition of stone-box graves, as well, assigned to this later phase based on assumption of diffusion from the Midsouth. Radiocarbon dating of remains within stone-box cemeteries has actually yielded dates that cluster tightly in the mid-to-late Moorehead phase (Emerson and Hargrave 2000). Some of the ceramic changes identified as separating the Moorehead from the Sand Prairie – especially in the uplands east of Cahokia – may be due to new participants in the reorganized Cahokian religion rather than temporal differences. Holley (2001c:267) notes an "inability to disentangle Moorehead and Sand Prairie could be consistently due to ethnic diversity resulting in disparate but contemporaneous stylistic traditions."

This diversity has been highlighted elsewhere as (re)emerging during the Moorehead phase (Emerson and Hargrave 2000; Milner 1990; Slater et al. 2014) and, in these same places, pointed to as a potential source for factionalization and divisiveness. Conversely, given a lack of evidence at this point for this diversity becoming problematic, I highlight the socially productive moment of relationship creation and identity formation that took place as a result of the political-religious changes made at the beginning of the Moorehead phase.

Discussion

Latour (2005) has highlighted that objects are made of social ties; in this dissertation, I also emphasize Olsen's (2010) point that social ties are made with objects. As such, the material changes that archaeologists have long used to divide the Stirling phase from the Moorehead phase are not simply reflections of political-religious transformations taking place at Cahokia at the beginning of the 13th century. Rather, these material transformations are the religious changes, made intentionally (i.e., targeted at particular material objects, spaces, persons, and identities) to transform Cahokian religious-politics. The targets were objects and spaces that were deeply entangled in the increased presence of a politicized Cahokian religion, specifically Ramey Incised vessels, female figurines, and specialized L-, T-, and circular structures. These objects and spaces may have been implicated in the violence that spread throughout the region shortly after Cahokian incursions into the northern Midwest

While the production of Ramey vessels may have been abruptly discontinued, it was the female figurines and specialized structures that were perhaps met with a violent end themselves. Many female figurines were fragmented, and/or buried, while many of the late L-, T-, and circular structures had been burned. Pauketat and colleagues have elsewhere suggested that the burning of the East St. Louis storage compound and the burning of particular individual structures throughout the American Bottom region took place as a single monumental event to mark the end of an era (Pauketat 2005; Pauketat, Fortier, Alt, and Emerson 2013). I have further suggested that this was perhaps a renewal event, the beginning of something new. In this manner, violence as a material means of transformation (including acts of burning, construction of walls, and production of male warrior figurines) appears to have been part of the revitalization movement that occurred at the beginning of the Moorehead phase.

Intentional transformations like those outlined above may be best likened to a social-religious movement or revitalization. Through this movement, new social entanglements were made while retaining particular aspects of or practices reminiscent of the initial Cahokian movement, including relating earth, fire, and water in the construction of mounds, the use of inclusive rectangular council house structures, termination of structures via fire, the presencing of ancestors through marker posts, and the gathering of small groups of objects on the floors of structures at their closure.

As set forth in Chapter 3, modern theories of materiality suggest that the social is the thing; that "society" is necessarily material. Additionally, political-religious movements like revitalizations are likewise material. As such, drastic changes in the material culture are not simply changes in technology. These are transformations in the relationships that people have with their things and with each other. Likewise, changing things changes the relationships within which that thing was entangled (Hodder 2012), perhaps with unintended consequences that follow. Material transformations, such as those seen in the specialized structures and religiously-entangled ceramics between the 12th and 13th centuries around Cahokia, are thusly simultaneously social, political and religious transformations.

New social entanglements include the continued inclusion of non-Cahokian people from outside the American Bottom, including perhaps Upper Mississippian groups from north and east, as well as non-Cahokian Mississippians from the Midsouth as evidenced through pottery and mortuary practices, as well as recent isotopic analyses. These new human relationships would have brought their own social networks and ways of relating to objects and persons (human or otherwise), thus changing and extending the Cahokian entanglements. These new ways of relating may have entailed new cuisine, new relationships with the earth, and with the afterlife. These new entanglements were embedded within the process of constructing new Cahokian Mississippian identities. As new groups of people came into, and left, the American Bottom throughout the 13th and into the 14th centuries, it was this new Cahokian identity and political-religious practices that shaped the various ways of relating to the cosmos, to objects, and to other persons (human and other-than-human) that persisted beyond Cahokia.

In this dissertation, I have proposed an intentional suite of material changes made at and around Cahokia during the 13th century Moorehead phase. Additionally, I have suggested that, given the timing of these changes, they were made not simply to negotiate an atmosphere of regional violence and warfare, but actually mobilized aspects of violence as part of the movement itself. Finally, I have emphasized that these material changes do not simply reflect changes occurring to Cahokian social-political-religious organization, they are the change. These material changes were intentional attempts to effect political-religious change at Cahokia, perhaps as part of factionalization that emerged during the highly politicized Stirling phase.

CHAPTER 8. MATERIAL ENDINGS

Religious movements, essentially, are acts of relating, perhaps in new ways, between and among social agents (including mundane objects, powerful elements, other-than-human persons, and important places). Religious movements start small. Historically documented movements often began with a single prophet, a single vision. Likely there have been innumerable "revitalizations" that were envisioned throughout history but did not take hold, which breeds the question: Why did the successful movements work? As della Porta (2008:223) has suggested, successful movements occur within a larger context of political change, including "regime shifts, periods of political instability, or changes in the composition of elites." At and around Cahokia, such larger changes may have been occurring in the decades leading up to the end of the Stirling phase, including a period of persistent drought and a resurgence of regional violence. Perhaps even the "end of an era" (i.e., the death of a prominent ruler or ruling family), which was marked by the conflagration at East St. Louis as suggested by Pauketat and colleagues (2013). Regardless of its roots, the political-religious movement that spread at the beginning of the Moorehead phase was enacted materially, through similar media as the initial religious movement that spawned the city of Cahokia. These material changes were targeted at ceramics and architecture, however, unlike the Cahokian beginnings leading up to and through the Lohmann phase, the Moorehead phase transformations were targeted at specialized pottery and particular political-religious buildings. These changes also included a re-emphasis or re-imagining of practices, materials, and relationships that were part of life in the pre-Cahokian American Bottom (Table 8.1).

In current theories of object agency, materiality, and relational ontology, objects are social partners in relationships with humans; humans rely on things to live and to interact, yet things have lives outside of humans (Alberti et al. 2011; Latour 2005; Olsen 2010). Political-

Table 8.1. Material Transformations Across The Cahokian Chronology ([1] Pauketat and Lopinot 1997; [2] Pauketat 2003; Pauketat and Lopinot 1997)

Pre-Cahokia (Terminal Late Woodland)	Cahokian Beginnings (Lohmann phase)	Politicized Cahokia (Stirling phase)	Transformed Cahokia (Moorehead phase)
Chunkey game	Chunkey game	Chunkey game	?
Cordmarked jars	Diversity of jars	Burnished jars with angular shoulders	Cordmarked globular jars
Few serving vessels, only bowls	Few serving vessels, only bowls	Ramey Incised jars and bowls as serving vessels	Plates, pans, bowls, beakers as serving vessels
Marker posts in courtyards	Marker posts in plazas	Marker posts in plazas, on mounds, near important buildings	Marker posts near important buildings, sometimes as center support posts
Large rectangular structures in the center of communities	Large rectangular structures	L-,T-, circular, and large rectangular structures, sometimes with large center posts	Large rectangular structures with large center posts
Burning important buildings	Burning important buildings associated with mounds	Burning storage buildings at ESTL, burning important buildings, and burning buildings associated with mound	Burning important buildings
Unknown	Small caches	Small and large caches	Small caches
Population at Cahokia: 1,400-2,800[1]	Population at Cahokia: 10,000-16,000[2]	Population at Cahokia: 5,200-7,200[1]	Population at Cahokia: 3,000-4,500[1]

religious movements like revitalizations spread through social practices and interactions which are inherently material. Material objects are not simply utilized to spread a political-religious movement, they are the movement; the medium and the message are one (McLuhan 1964; Taylor 2007). People partner with things to create and spread such movements, though the actions of those same objects and the relationships that they foster may lead to unintended consequences.

In addition to their material basis, social-religious movements also have implications of violence. Ritual violence and "kratophanous" violence are two related means by which violence is mobilized in revitalization or politico-religious movements (Eliade 1958; Lepowsky 2004; Walker 1998). Kratophanous violence includes actions that ritually end or redirect the life histories of people, places, and things to contest their continued use in religious traditions; ritual violence is that which has been validated by gods or spirits. These acts may include violence against material identities requested by or called for in a vision or prophesy such as those often initiating religious movements, including violent acts of termination (e.g., burning, sacrifice) of social actors that were embedded within religious traditions of the Stirling phase. As a "redirection" of the life history of an object, kratophanous violence may also include the replacement of specialized pottery types used in a religious context, in contestation of that particular religious practice.

Violence may have been part of the Moorehead phase movement in another way, as religion is embedded within practices of war. Warfare extends beyond the immediate acts of attack and defense themselves to include, among other things, rituals of cleansing, sacred bundles (among Native North Americans), offerings, talismans, and prayers as part of an entangled relationality with an animated world. Given the timing of their appearance, iconography of warfare depicted in the male flintclay figurines (Emerson 1982; Emerson et al. 2003), the bastioned compound west of Cahokia's Grand Plaza (Pauketat 2013c), even the fortification walls in the American Bottom region themselves, may have been part of the revitalization as a means of reconfiguring the relationships of warfare and the material identities of persons involved.

The material co-creators of initial religious movement that resulted in the beginnings of Cahokia (i.e., wall trench houses and shell tempered pottery) were further elaborated upon in the increasing politicization of the religious movement during the Stirling phase. This process also created certain social persons as empowered elites through practice and material entanglements with powerful objects and other-than-human persons. With the socio-political centralization at Cahokia, so to were the production and use of religiously entangled objects, leading to the creation of certain persons as "specialists" both in the crafting of certain objects as well as in their religious or political use.

With the beginning of the 13th century, seemingly utilitarian globular cordmarked vessels (Cahokia Cordmarked jars) were brought to life in opposition of the highly iconographic, centrally produced Ramey Incised jars and their undecorated relation, Powell Plain jars. As this new vessel type was becoming popular, the architectural partners (L-, T-, and circular structures) in the creation of a politicized 12th century Cahokian religion were likewise terminated, as were perhaps certain political, religious, and material specialists.

The political-religious revitalization that took place at the beginning of the Moorehead phase had similar material messengers as the initial religious movement that led to the coalecence of people at Cahokial. Specifically, pottery and architecture were material co-creators of both of these movements, though the initial Cahokian movement included transformations to domestic architecture and all forms of pottery. The Moorehead phase revitalization, on the other hand, was targeted, focusing on transforming those objects and spaces that were complicit in the politicized religion of the 12th century Stirling phase.

Everyday objects, including pottery, were "actively involved in creating and 'ontologizing' the new social schisms and thoughts," (Olsen 2010:146) that were the Moorehead phase revitalization. Changes in the material components of pottery and food production and use are equally changes in the social, political, and religious relationships in which pottery and food are engaged. Commensal politics may occur at varying scales, including small group or family settings in which supposed "utilitarian" pottery is used, as well as larger group settings in which serving wares are more typical. This may be even more true during the initiation and spread of a religious movement in which food and pottery are engaged. Changes in pottery are thus social, political, and religious transformations enacted in daily practice and potentially initiated by individuals or small groups of pottery producers.

Changing pottery and changing foodways were among the innovations that created the religious movement at the beginning of the 13th century. This Moorehead phase movement around Cahokia engaged both utilitarian wares (the innovation of Cahokia Cordmarked jars) that recalled certain aspects of pre-Cahokian pottery, including cordmarked exteriors and the use of red slipping, and an increased focus on serving wares (everted-rim bowls and plates). The presumably 'utilitarian' Cahokia Cordmarked jars are recovered from a variety of contexts at the Olin site, however they are recovered only from feature fill at Copper (rather than in mound context). At Olin, these vessels tend to be larger than the slipped jars recovered from the site, suggesting they were part of the changing practices of food consumption and were intended for larger group use than the smaller slipped jars, and especially the small Ramey Incised jars.

The types of food and practices of eating were likewise part of the transformation. The use of open, unrestricted vessels like plates require a new ‘etiquette’ of both serving and consuming food. In this same manner, the movement of iconographic decorations from the sides of a restricted vessel (visible to those sitting around it, but more so to the person serving or taking food from it) to the top of the unrestricted vessel (visible only to the person taking food from it) would have changed the relationship people had with those messages.

This message appears to have been transformed in the pottery. The highly iconographic Ramey Incised jars through which cosmological order was experienced (Pauketat and Emerson 1991) were replaced by everted-rim bowls and plates that, initially, contained simplified decorations suggestive of a sunburst design. A sunburst design was often depicted on the so-called Cahokia Red Engraved beakers that also appear to have been part of the Moorehead revitalization. A re-engagement with red slip is noted throughout the Olin and Copper assemblages on certain bowls and even bottles, in addition to the Cahokia Cordmarked jars and Red Engraved beakers. It would appear that red slip, often unburnished, and in some cases tan slip, began to replace the dark slipped and highly polished vessels of the Stirling phase. Vessel appendages also appear to increase, including a number of bird effigy adornos (often ducks) on bowls, human hand-and-fist handles on beakers, and strap handles on jars.

The foods that were being served appear to have changed as well. An increase in pans, vessels likely used for baking or parching, was demonstrated at both the Olin and Copper sites. The uptick in pan use coincides with an increased use of nut resources, a drought resistent food source, throughout the American Bottom (though nuts were continuously important food sources throughout the Cahokian sequence in the uplands). Moreover, pans were found in sub-mound contexts at the Copper site in direct association with burned nutshell. This association suggests nut foods (perhaps nutbreads) were incorporated into the public food consumption that accompanied mound construction in the Moorehead phase uplands.

Unlike the broad scale architectural transformations that accompanied the religious movement creating Cahokia, the changes to buildings during the Moorehead phase revitalization targeted only the specialized L-, T-, and circular structures. Given the entangled relationship this suite of buildings had with Stirling phase religious-politics, this abrupt discontinuation of these building types suggests an intentional termination of the practices and objects that took place within or were stored in these building types, as well as perhaps the types of people who lived in these buildings. Specifically, the T-shaped structures have been surmised to be the domiciles of leaders, while the alcoves of the L- and T-shaped buildings were perhaps specialized storage areas for religious paraphrenalia (e.g., sacred bundles) (Alt 2006b). With the termination of these structure types, it would appear that either those paraphrenalia were no longer part of Cahokian religious practices, those particular people (or their institutional 'offices') were no longer identified as separate or significant persons, or those persons and their attendant religious objects vacated the American Bottom.

New people were moving into, or returning to, the region during this same time period. This has been demonstrated through isotopic analyses of human remains from burials dating to the Moorehead phase (Slater et al. 2014) as well as through the appearance of non-local pottery, and perhaps even house styles during this time. The square or nearly-square structures and puddled square hearths are architectural elements that have been identified at sites in the Midsouth. Along with the stone-lined graves, this suggests a renewed relationship between the

American Bottom region and the south. People living in these regions may been taking part in the 13th century political-religious movement in some capacity.

This Moorehead phase movement appears to have included an ontological shift that had regional and historical impacts. This shift is visible from an emphasis on material practices associated with females, fertility cults, and lunar alignments to those emphasizing masculinity, fortifications and warfare, and solar imagery. Many of these elements, male warriors and violence especially, are prevalent images on so-called “SECC cult objects,” with local variations, found across the greater southeast after A.D. 1200 (Cobb and Giles 2009). A surge of depictions of warrior, weaponry, and victims of violence occurred on objects associated with the SECC between A.D. 1200 and 1350, suggesting violence became a “pivotal organizing principle” of Mississippian religious-politics during this time period (Cobb and Giles 2009:93). Interestingly, despite the “prevalence of fortifications and bellicose iconography during the late prehistoric era” overall physical evidence for warfare is fairly low in eastern North America (Cobb and Giles 2009:99). The similarities with Cahokia and the American Bottom region

The construction of the body as a warrior in the Southeast at the time of European contact took place through new practices and narratives, as well as through material depictions that engaged a larger community in practices of violence (Cobb and Giles 2009). Given the importance of objects and narratives in the material creation of religious-political movements, perhaps these later historical examples had their roots during the Moorehead phase movement at Cahokia. If so, the transformations that perhaps began modestly, through changes in the materials, contexts, and relationships of pottery production and use, had monumental impacts on later historical trajectories of people in the Midcontinent and Southeastern United States.

In this dissertation, I demonstrate how Moorehead phase transformations were manifested through intentional material disengagement with the previous Cahokian Mississippian religious-politics and re-entanglements woven through new material practices and new social relationships. I suggest these social-political-religious changes may have been made as a means of negotiating social relationships within this context of warfare, while perhaps engaging with material elements of violence in the creation of the movement. Additionally, evidence presented here suggests that these transformations did not occur in lock-step throughout the American Bottom and into the uplands, highlighting community autonomy in the continuation of particular practices or objects that may have been present in various ways.

The 13th century was not a stagnant 'devolution' of Cahokia, but a continuing productive space (sensu Alt 2006a; Soja 1996). Transformed material practices were a renewal or reconstruction of Cahokian relationships and identities during the 13th century Moorehead phase. These changes in material relationships were widespread, bearing long-term social and political implications as people continued to move into and out of the American Bottom. Given the material construction of group identity, physical, social, and political violence against material identities was embedded within the Moorehead phase political-religious movement. The ongoing creation of new Cahokian identities during this time period is important in understanding the spread of multiple and diverse ways of being Mississippian, especially as warfare figured prominently into the social experiences and identities of various Mississippian peoples throughout the southeast from the 13th century until European contact. Many of the material practices that define Mississippian warfare in the southeast, including fortifications, iconographic representations of warriors and violence, and the use of the color red, are perhaps local interpretations of the material movement initiated during the Stirling-Moorehead phase transition in the American Bottom region.

As with historically documented, and even modern, political-religious movements, the objects, practices, and material meanings of the initial movement change from group to group, even person to person. This provides ample occasion for unintended consequences. In the American Bottom region, these consequences appear to be the unraveling of material relationships between diverse groups of people at and around Cahokia. This unraveling occurred despite an apparent attempt to (re)create the larger Cahokian community through religious practices that involve mound construction and feasting.

Material transformations to ontologies would necessarily impact the relationships that were formed within previous ontological understandings. For example, certain objects, persons, or spaces may no longer have been powerful entities, thus no longer requiring specialists to handle or negotiate with them. Without these relationships (perhaps of obligation or control), certain groups may have no longer been necessary elements for religious practices. This may be demonstrated through a localization of practices and spaces that were part of the American Bottom political-religious landscape prior to Cahokian centralization. This localization of religious practices may include the large rectangular council house structures noted at a number of floodplain and upland sites, the continued use of large marker posts – sometimes as support posts within those structures – in the construction of material identities, the greater numbers and dispersed locations of structures requiring termination via fire, and the continued practice of caching artifacts on or in houses upon termination.

It would appear that disentangling from the specialized material relationships of the 12th century Stirling phase created the loose threads. These relationships may have included ties between people in control of various religious practices and producers of their attendant paraphernalia (e.g., Ramey Incised jars, sacred bundles). Social identities previously entangled with Stirling phase religious-politics were likely terminated along with Ramey Incised jars and specialized L-,T-, and circular structures. This does not necessarily mean that their bodies were terminated (though it does not necessarily suggest the opposite either, given the evidence for violence in the later additions to Mound 72 and Wilson Mound). Likely, these disentangled relationships, as well as the transformed Mississippian world, had much to do with the continued depopulation of Cahokia and the eventual abandonment of the city.

Conclusion

Material change is part of the ongoing process of social 'becoming'; however, there are moments in which those changes appear to transform particular social beings and identities in unexpected ways. Such moments, exemplified here using the transition from 12th century Stirling phase to the 13th century Moorehead phase at Cahokia, mobilize material challenges (sometimes violence) to previous political and religious practices, and even ontological perspectives. Similar material transformations have been discussed historically as political-religious movements or revitalizations (after Wallace 1956). These movements, through some combination of unifying elements, attractive narratives, charismatic leaders, or ontological opportunities, are adopted and practiced as a means for intentional political or religious change. Religious movements themselves are acts of relating, perhaps in new ways, between and among social agents (including mundane objects, powerful elements, other-than-human persons, and important places). Data from the upland Olin and Copper sites near Cahokia demonstrate that political-religious movements, as processes of relating, take root and spread through everyday objects and local experiences. These movements are historically contingent and locally enacted, yet have long term impacts materially as well as ontologically.

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Appendix A: Diagnostic Lithic Data

OLIN SITE LITHIC DATA

Table A.1. Tools From H27 Cache At Olin

Tool	Raw material	wt (g)	length (mm)	width (mm)	thickness (mm)	Additional notes
pick	Burlington	163.4	15.9	44.5	24.6	
adze	Crescent Hills Burlington	180.6	16.2	51.7	17.2	top is ground and polished, then chipped; margins are ground except the bit and very end, which has some use wear

Table A.2. Projectile Points From Olin

Provenience	Bag Number	Point Type	Chert Type	Wt (g)	Length (mm)	Width (mm)	Notes	Temporal Affiliation
Pit 3	71-169	point fragment	St. Genevieve	8.6	na	na	Mund type check on this	Late Woodland
Pit 8	71-193	point fragment	Burlington	1.7	na	na	base portion	Late Woodland
Pit 44	72-93	tri-notched triangular point	Burlington	1.5	30.11	13.09		Late Woodland
Pit 74	74-203	stemmed point	Kinkaid	7.6	45.87	25.02	Cypress stemmed point Late Archaic/Early woodland	Late Woodland
Pit 91	73-751	triangular point fragment	Burlington	2.2	na	na	burned	Late Woodland
Pit 91	73-751	point fragment	Burlington	0.8	na	na		Late Woodland
Pit 103	73-770	point fragment	Burlington	0.7	na	na	tip only	Late Woodland
Pit 103	73-770	point fragment	Cobden	8.8	na	na	possible knife unidentified portion	Late Woodland
Pit 106	73-774	point fragment	Salem	9.1	na	na	heat altered unidentified	Late Woodland
Pit 110	73-778	point fragment Jack's Reef	Burlington	2.2	na	na	tip is missing and part of base	Late Woodland
Pit 110	73-778	point fragment	St. Genevieve	0.7	na	na	small fragment unidentifiable	Late Woodland
Pit 110	73-778	point fragment	Burlington	4.5	na	na	unidentifiable	Late Woodland
Pit 116	73-783	point fragment	Burlington	1.6	na	na	burned triangular tip and portion of side	Late Woodland
Pit 125		point fragment Jack's Reef	Burlington	2.0	na	18.03	tip is missing heat altered	Late Woodland
Pit 125		point fragment	Burlington	1.1	na	na	tip only	Late Woodland

Table A.2. Projectile Points From Olin (Continued)

Provenience	Bag Number	Point Type	Chert Type	Wt (g)	Length (mm)	Width (mm)	Notes	Temporal Affiliation
Pit 132	73-803	point fragment	Burlington	5.5	na	na	straight sides top portion is missing probably a knife	Late Woodland
Pit 132	73-803	point fragment	Burlington	2.9	na	na	tip and base are missing	Late Woodland
Pit 132	73-803	point fragment	Burlington	8.2	na	na	Mid-section probable knife	Late Woodland
Pit 135	73-805	triangular flake point fragment	Burlington	1.3	na	na	base is missing	Late Woodland
Pit 141	73-812	point frament	Burlington	2.2	na	na	tip only base is missing sort of triangular	Late Woodland
Pit 141	73-812	point fragment	Burlington	1.7	na	na	fragment of base	Late Woodland
Pit 142	73-814	Wanda point	Salem	3.1	36.75	16.65	part of base is missing	Late Woodland
Pit 142	73-814	point fragment	Burlington	2.0	na	na	tip only	Late Woodland
Pit 142	73-814	point fragment	Burlington	2.1	na	na	Mid-section heat altered unidentified type	Late Woodland
Pit 142	73-814	point fragment	Salem	3.6	na	na	damaged at tip unidenti-fed type	Late Woodland
Pit 143	73-815	point fragment	Burlington	4.7	na	na	thick chunky point burned tip and part of mid-section unidentified type	Late Woodland
Pit 144	73-816	point fragment	Burlington	3.1	na	na	base fragment	Late Woodland
Pit 145	73-817	Wanda type point	Salem	4.4	43.13	16.88	a bit burned	Late Woodland
Pit 178		flake point frag-ment	Burlington	0.7	na	na	part of base of small notched triangular point	Late Woodland

Table A.2. Projectile Points From Olin (Continued)

Provenience	Bag Number	Point Type	Chert Type	Wt (g)	Length (mm)	Width (mm)	Notes	Temporal Affiliation
Pit 178		point fragment	Burlington	1.8	na	na	part of base fragment unidentified type	Late Woodland
Pit 178		flake point fragment	Blair	0.8	na	na		Late Woodland
Pit 179	73-864	side notched triangular point	Burlington	1.6	na	na	part of base is missing heat altered is this a Jack's reef	Late Woodland
Pit 179	73-864	flake point fragment	Burlington	0.9	na	na	tip only	Late Woodland
Pit 182	73-867	flake point fragment	Burlington	0.2	na	na	base fragment	Late Woodland
Pit 182	73-867	triangular flake point fragment	Burlington	3.1	na	na	tip is missing	Late Woodland
Pit 201	74-46	point fragment	Burlington	4.8	na	na	stem portion of stemmed point	Late Woodland
Pit 201	74-46	point fragment	Burlington	1.8	na	na	burned mid-section fragment	Late Woodland
Pit 201	74-46	point fragment	Burlington	0.3	na	na	base is missing from a small flake point	Late Woodland
Pit 202	74-48	Madison point	Burlington	1.6	26.64	19.29	heat altered	Late Woodland
Pit 214	74-79	point fragment	Burlington	7.7	na	na	thick chunky point only portion unidentified	Late Woodland
Pit 214	74-79	triangular flake point fragment	Burlington	0.4	na	na	base only	Late Woodland
Pit 260	74-197	point fragment	unidentified	0.6	na	na	small portion	Late Woodland

Table A.2. Projectile Points From Olin (Continued)

Provenience	Bag Number	Point Type	Chert Type	Wt (g)	Length (mm)	Width (mm)	Notes	Temporal Affiliation
Pit 260	74-197	triangular flake point fragment	Burlington	0.8	na	na	tip and part of base is missing	Late Woodland
Pit 260	74-197	point fragment	Burlington	3.5	na	na	base and part of point tip is missing Roxana point	Late Woodland
Pit 260	74-197	point fragment	Burlington	10.2	na	na	Dickson cluster might be a Goose Lake Knife heat altered	Late Woodland
Pit 268	74-213	point fragment	Burlington	0.4	na	na	tip only	Late Woodland
Pit 268	74-213	point fragment Jack's Reef	Burlington	2.5	na	na	heat altered tip is missing	Late Woodland
Pit 269	74-215	flake point fragment	Burlington	0.7	na	na	heat altered tip is missing	Late Woodland
Pit 269	74-215	point fragment	Burlington	1.8	na	na	side notched fragment like Wanda or Roxana but not enough to make clear determination	Late Woodland
Pit 279	74-227	point fragment	Burlington	0.4	na	na	tip only	Late Woodland
Pit 279	74-227	side notched triangular point	Burlington	1.0	na	na	small flake point with flat base tip is missing	Late Woodland
Pit 299	74-245	point fragment	Burlington	3.1	na	na	base only this bag has the label Pit 299 I note your pit number for this bag number is Pit 303	Late Woodland
Pit 299	74-245	triangular flake point fragment	Burlington	0.4	na	na	base is missing his bag has the label Pit 299 I note your pit number for this bag number is Pit 303	Late Woodland

Table A.2. Projectile Points From Olin (Continued)

Provenience	Bag Number	Point Type	Chert Type	Wt (g)	Length (mm)	Width (mm)	Notes	Temporal Affiliation
Pit 299	74-245	triangular flake point fragment	Burlington	0.3	na	na	base only heat altered his bag has the label Pit 299 I note your pit number for this bag number is Pit 303	Late Woodland
Pit 299	74-245	point fragment reworked	Burlington	2.0	na	na	reworked as scraper his bag has the label Pit 299 I note your pit number for this bag number is Pit 303	Late Woodland
Pit 311	74-26	point fragment	Burlington	0.7	na	na	side portion	Late Woodland
Pit 311	74-26	point fragment	Salem	4.2	na	na	stem portion of stemmed point	Late Woodland
Pit 311	74-26	triangular flake point fragment	Burlington	1.1	na	na	small fragment unidentifiable	Late Woodland
Pit 314	74-253	point fragment	Burlington	3.8	na	na	burned tip and part of mid-section missing side notched	Late Woodland
Pit 314	74-253	point fragment	Burlington	1.8	na	na	base fragment	Late Woodland
Pit 314	74-253	triangular point fragment	Kaolin	7.8			large triangular shaped point portion on one side missing like a Dupo Knife	Late Woodland
Pit 331	75-64	side notched triangular point	Burlington	0.7	23.71	12.6		Late Woodland
Pit 331	75-64	triangular flake point fragment	Burlington	0.4	na	na	small fragment unidentifiable	Late Woodland
Pit 373 B		point fragment	St. Genevieve	0.7	na	na	burned small portion Lowe cluster point	Late Woodland

Table A.2. Projectile Points From Olin (Continued)

Provenience	Bag Number	Point Type	Chert Type	Wt (g)	Length (mm)	Width (mm)	Notes	Temporal Affiliation
Pit 375		point fragment	Burlington	3.0	na	na	side notched base is damaged tip is missing	Late Woodland
House 6 Wall trench inner west trench	74-256	side notched triangular flake point	Burlington	1.3	26.56	14.08	heat altered	Mississippian
house 32 floor	74-200	side notched triangular flake point	Burlington	0.9	26.18	14.03		Mississippian
house 32 floor	74-200	point fragment	Burlington	1.4	na	na	point and midsection base is snapped off	Mississippian
house 32 floor	74-200	point fragment	Burlington	1.9	na	na	tip is missing	Mississippian
house 32 floor	74-200	point fragment	Burlington	0.8	na	na	tip and most of point basal corner is missing triangular	Mississippian
House 29	74-112	side notched triangular point	Burlington	1.3	28.73	14.14	heat altered	Mississippian
House Floor	74-258	corner notched stemmed point TableRock	Burlington	10.5	58.56	23.54	Late Archaic form	Mississippian
House 32 floor	74-200	point fragment stemmed base	Till chert	6.1	na	na	stemmed base fragment	Mississippian
House 32 floor	74-200	point fragment base	unidentified	1.2	na	na	burned	Mississippian
House 29	74-107	triangular flake point fragment	Burlington	0.9	na	na	base is missing	Mississippian

Table A.2. Projectile Points From Olin (Continued)

Provenience	Bag Number	Point Type	Chert Type	Wt (g)	Length (mm)	Width (mm)	Notes	Temporal Affiliation
House 29	74-107	point fragment notched base	Burlington	4.0	na	na	base is missing	Mississippian
House 6 wall Trench outer west trench	74-257	point fragment	Burlington	3.1	na	na	base fragment	Mississippian
House6 floor	74-255	point fragment	unidentified	12.7	na	na	burned and reworked point fragment	Mississippian
Pit 5	71-187	point fragment	Burlington	4.9	na	na	unidentified	Mississippian
Pit 5	71-187	flake point fragment	Burlington	0.8	na	na	tip is missing	Mississippian
Pit 15	72-109	side notched triangular point	Burlington	2.0	na	na	remade from a finished point the base is snapped and small notching may have come from reworking	Mississippian
Pit 26	72-26	side notched triangular flake point	Burlington	0.8	23.34	14.90		Mississippian
Pit 26	72-26	triangular Madison point	Burlington	0.9	22.80	17.07		Mississippian
Pit 28A	72-304	triangular Madison point fragment	Burlington	1.8	na	na	tip is missing	Mississippian
Pit 28 A	72-304	triangular flake point fragment	Burlington	0.4	na	na	tip only	Mississippian
Pit 28A	72-30A	point fragment	Burlington	3.6	na	na	unidentified	Mississippian

Table A.2. Projectile Points From Olin (Continued)

Provenience	Bag Number	Point Type	Chert Type	Wt (g)	Length (mm)	Width (mm)	Notes	Temporal Affiliation
Pit 32	72-55	triangular point fragment	Burlington	0.6	na	na	tip missing	Mississippian
Pit 32	72-55	triangular point fragment	Burlington	0.6	na	na	tip missing	Mississippian
Pit 37	`72-65	flake point fragment	Burlington	2.1	na	na	base is missing	Mississippian
Pit 37	72-65	flake point fragment	Burlington	2.9	na	na	Mid-section	Mississippian
Pit 39	72-74	triangular flake point fragment	Burlington	1.0	na	14.40	tip is missing	Mississippian
Pit 43	72-92	triangular flake point fragment	Burlington	1.1	na	na	base is missing	Mississippian
Pit 43	72-92	triangular flake point fragment	Burlington	0.9	na	na	base is damaged burned	Mississippian
Pit 43	72-92	point fragment base	Burlington	4.0	na	na	stemmed base fragment	Mississippian
Pit 64	72-180	triangular flake point fragment	Burlington	1.1	20.39	na	one side is missing	Mississippian
Pit 68	72-193	triangular flake point fragment	Burlington	0.9	na	na	tip missing	Mississippian
Pit 73	72-202	side notched triangular flake point	Burlington	1.2	24.03	14.29		Mississippian
Pit 73	72-202	flake point fragment midsection	Burlington	2.5	na	na	heat altered	Mississippian
Pit 73	72-202	knife fragment	Burlington	9.9	na	na	half of a knife	Mississippian
Pit 73	72-202	biface fragment	Burlington	14.2	na	na		Mississippian

Table A.2. Projectile Points From Olin (Continued)

Provenience	Bag Number	Point Type	Chert Type	Wt (g)	Length (mm)	Width (mm)	Notes	Temporal Affiliation
Pit 89	73-748	triangular point fragment	Burlington	1.7	na	na	base is missing	Mississippian
Pit 89	73-748	triangular flake point fragment	Burlington	0.7	na	na	tip and base is missing	Mississippian
Pit 89	73-748	point fragment	Burlington	5.1	na	na	unidentified	Mississippian
Pit 89	73-748	point fragment	Burlington	3.0	na	na	unidentified	Mississippian
Pit 89	73-748	biface fragment	Mill Creek	44.5	na	na	unfinished or part of adze	Mississippian
Pit 89	73-748	biface fragment	St. Genevive	34.7	na	na	biface or core	Mississippian
Pit 89	73-748	flake point fragment	St. Genevive	0.8	na	na	tip only	Mississippian
Pit 89	73-748	point fragment	Burlington	6.0	na	na	may be base of contracting stemmed point	Mississippian
Pit 89	73-748	point fragment	Burlington	8.8	na	na	heat altered base reworked	Mississippian
Pit 117	73-785	side notched triangular point	Burlington	1.2	24.97	13.21		Mississippian
Pit 117B	73-747	triangular flake point fragment	Burlington	0.5	na	na	base section	Mississippian
Pit 117B	73-747	flake point fragment midsection	Burlington	2.1	na	na		Mississippian
Pit 122	73-791	triangular flake point fragment	Burlington	0.3	na	na	base portion only	Mississippian
Pit 127		point fragment	Burlington	1.4	na	na	tip burned	Mississippian
Pit 131	73-802	triangular flake point fragment	Burlington	2.2	na	na	tip	Mississippian

Table A.2. Projectile Points From Olin (Continued)

Provenience	Bag Number	Point type	Chert type	Wt (g)	Length (mm)	Width (mm)	Notes	Temporal Affiliation
Pit 146	73-818	side notched tri-angular point	Salem	0.8	26.60	11.41		Mississippian
Pit 162	73-835	side notched tri-angular flake point	Burlington	1.1	23.71	14.56		Mississippian
Pit 183		side notched tri-angular flake point	Burlington	0.9	18.10	15.30	small flake point	Mississippian
Pit 197	74-36	point fragment	Burlington	5.4	na	na	base of point or knife	Mississippian
Pit 203	74-62	flake point frag-ment	Burlington	0.8	na	na	Mississippian	Mississippian
Pit 216	74-77	flake point frag-ment	Burlington	0.3	na	na	base only	Mississippian
Pit 226	74-126	triangular flake point fragment	Burlington	2.5	na	na	base section	Mississippian
Pit 227	76-127	flake point frag-ment	Burlington	1.0	n	na	half of a crude triangular point	Mississippian
Pit 229	74-129	point fragment	Burlington	8.2	na	na	heat altered may be part of contracting stemmed point	Mississippian
Pit 232	74-138	point fragment	Burlington	0.4	na	na	tip only	Mississippian
Pit 247	74-168	triangular flake point fragment	Burlington	1.0	na	na	tip and base is missing	Mississippian
Pit 267	74-214	St. Charles point fragment	Salem	6.3	na	na	really thin notches	Mississippian
Pit 271	74-218	flake point frag-ment	Burlington	1.3	na	na	Mid-section fragment	Mississippian

Table A.2. Projectile Points From Olin (Continued)

Provenience	Bag Number	Point Type	Chert Type	Wt (g)	Length (mm)	Width (mm)	Notes	Temporal Affiliation
Pit 275	74-224	side notched triangular flake point	Burlington	1.3	27.69	11.93	crude flake point	Mississippian
Pit 277	74-226	point fragment	St. Genevive	15.6	na	na	contracting stemmed point	Mississippian
Pit 277	74-226	point fragment	Burlington	4.9	na	na	unidentified	Mississippian
Pit 277	74-226	side notched point	Burlington	2.3				Mississippian
Pit 277	74-226	tiny Cahokia side-notched point	Burlington	0.7			heat treated	Mississippian
H31 WT2	74-149	tiny Cahokia tri-notched point	Burlington	0.7				Mississippian
Pit 367	75-135	tiny corner notched point	Burlington	0.9			heat treated	Mississippian
Pit 285	74-232	triangular flake point fragment	Salem	0.8	na	na	tip is missing	Mississippian
Pit 285	74-23	triangular flake point fragment	Burlington	0.6	na	na	Mid-section	Mississippian
Pit 289	74-241	triangular flake point fragment	Burlington	0.5	na	na	burned part of base is missing	Mississippian
Pit 289	74-241	triangular flake point fragment	Burlington	0.9	na	na	part of base is missing	Mississippian
Pit 292	72-234	triangular point fragment	Burlington	0.8	na	na	burned tip	Mississippian
Pit 295	74-240	triangular point fragment	Burlington	1.1	na	na	tip and base is missing	Mississippian
Pit 295	74-240	point fragment	Burlington	0.8	na	na	base of notched point	Mississippian
Pit 295	74-240	point fragment	Burlington	9.3	na	na	unidentified	Mississippian

Table A.2. Projectile Points From Olin (Continued)

Provenience	Bag Number	Point Type	Chert Type	Wt (g)	Length (mm)	Width (mm)	Notes	Temporal Affiliation
Pit 295	74-240	point	Burlington	15.8	na	na	unidentified could be part of knife	Mississippian
Pit 304	74-249	side notched triangular flake point	Burlington	1.1	20.28	13.80	crude thick flake point	Mississippian
Pit 304	74-249	triangular flake point fragment	Burlington	0.7	na	na	base is missing	Mississippian
Pit 304	74-249	crude flake point	St. Genevive	2.4	na	na	very crudly made	Mississippian
Pit 312	74-246	point fragment	Burlington	4.8	na	na		Mississippian
Pit 312	74-246	flake point fragment midsection	Burlington	2.7	na	na		Mississippian
Pit 320	75-22	triangular flake point fragment	Burlington	1.7	na	na	base only side notched	Mississippian
Pit 320	75-22	triangular flake point fragment	Burlington	0.9	na	na	Mid-section fragment	Mississippian
Pit 321	75-25	triangular flake point fragment	Burlington	0.3	na	na	tip only	Mississippian
Pit 321	75-25	triangular flake point fragment	Burlington	0.7	na	na	base only side notched	Mississippian
Pit 321	75-25	point fragment	Burlington	12.1	na	na	large point fragment unidentified	Mississippian
Pit 323	75-47	side notched triangular flake point	Burlington	0.5	16.69	9.68		Mississippian
Pit 324	75-48	triangular flake point fragment	Burlington	1.1	25.11	na	part of base is snapped off burned	Mississippian
Pit 327	75-57	triangular flake point fragment	Burlington	0.6	21.33	na	part of base is snapped off heat altered	Mississippian

Table A.2. Projectile Points From Olin (Continued)

Provenience	Bag Number	Point Type	Chert Type	Wt (g)	Length (mm)	Width (mm)	Notes	Temporal Affiliation
Pit 327	75-57	flake point fragment midsection	Burlington	1.5	na	na	heat altered	Mississippian
Pit 327	75-57	flake point fragment	Burlington	0.5	na	na	base is missing	Mississippian
Pit 327	75-57	flake point fragment	Burlington	0.7	na	na	base is missing burned	Mississippian
Pit 327	75-57	flake point fragment	Burlington	0.3	na	na	thin flake fragment with no base	Mississippian
Pit 328	75-61	flake point fragment	Burlington	0.3	na	na	point tip	Mississippian
Pit 332	75-62	side notched triangular point	Burlington	2.4	32.00	14.33		Mississippian
Pit 332	75-62	point fragment base	Burlington	1.0	na	na		Mississippian
Pit 338	75-71	triangular flake point fragment	St. Genevive	1.7	na	na	burned	Mississippian
Pit 340	75-73	flake point fragment	Burlington	0.5	na	na	burned fragment of base missing	Mississippian
Pit 340	75-53	point fragment	St. Genevive	2.1	na	na	Mid-section fragment	Mississippian
Pit 347	75-81	side notched triangular Wanda point	Burlington	1.1	27.26	11.88	this is a late woodland type but may also be made in Mississippian	Mississippian
Pit 353	75-84	side notched triangular flake point	Burlington	0.8	20.14	12.24		Mississippian
Pit 355	75-85	triangular flake point fragment	Burlington	1.4	na	na	Late Woodland or Mississippian point type	Mississippian

Table A.2. Projectile Points From Olin (Continued)

Provenience	Bag Number	Point Type	Chert Type	Wt (g)	Length (mm)	Width (mm)	Notes	Temporal Affiliation
Pit 355	75-85	triangular flake point fragment	Burlington	2.2	na	na		Mississippian
Pit 360	74-97	triangular point small Madison	Burlington	0.5	17.55	11.75		Mississippian
Pit 360	74-97	side notched triangular Wanda point	Burlington	1.4	26.72	12.39	part of tip is missing late woodland point but probably made in the Mississippian also	Mississippian
Pit 365	75-115	point fragment	Salem	11.3	na	na	like a Mund point	Mississippian
Pit 367	75-11	side notched triangular point	Burlington	1.1	22.22	11.95		Mississippian
Pit 61	72-167	point fragment	Burlington	1.3	na	na	unidentified	Mixed
Pit 61	72-167	point fragment	Burlington	5.7	na	na	reworked side notched point with concave base	Mixed
Pit 134	73-805	biface fragment	Burlington	24.6	na	na	in two pieces part of knife maybe Ramey knife	Mixed
Pit 204	74-87	point fragment	Burlington	3.0	na	na		Mixed
Pit 318	75-15	crude flake point with side notching	Burlington	1.5	25.07	14.32		Mixed
Pit 318	75-15	side notched triangular flake point	Burlington	0.5	19.61	10.76		Mixed
Pit 318	75-15	side notched triangular flake point	Burlington	1.2	22.84	11.01		Mixed
Pit 329	75-62	triangular point fragment	Unidentified	3.5	na	na	burned crude flake point	Mixed

Table A.3. Minerals From Olin

Provenience	Bag Number	Point Type	Chert Type	Wt(g)	Length (mm)	Width (mm)	Notes	Temporal Affiliation
Pit 3	71-169	biface preform	Burlington	26.6	59.29	31.63		Late Woodland
Pit 33	72-57	biface fragment	Blair	9.0	na	na		Late Woodland
Pit 110	73-778	biface fragment knife	Burlington	8.1	na	na		Late Woodland
Pit 144	73-816	biface	Burlington	32.6	66.12	30.33		Late Woodland
Pit 179	73-864	burned biface fragment	Burlington	8.0	na	na		Late Woodland
Pit 260	74-197	biface fragment	Burlington	16.8	na	na		Late Woodland
Pit 274	74-211	biface fragment	gravel	2.9	na	na	burned	Late Woodland
Pit 311	74-26	biface fragment	Mill Creek	32.6	na	na		Late Woodland
Pit 303	74-245	utilized flake knife	Burlington	1.2	na	na		Late Woodland
Pit 303	74-245	utilized flake knife	Burlington	1.1	na	na		Late Woodland
Pit 303	74-245	utilized flake knife	Burlington	1.5	na	na		Late Woodland
Pit 232	74-138	large scraper	unidentified	30.0			raw material is reddish-yellow with iron staining	Mississippian
Pit 355	75-85	large scraper	Burlington	11.9				Mississippian
Pit 355	75-85	abrader	sandstone	128.1			multiple U-shaped abrasions; possibly burned	Mississippian
Pit 315	74-254	perforator	Burlington	1.7				Mississippian
Pit 36	72-64	drill tip	Burlington	1.1				Mississippian
Pit 68	72-193	drill fragment	Burlington	0.4	na	na	tip only	Mississippian
Pit 232	74-138	drill	Salem?	3.2				Mississippian
Pit 315	74-254	drill	Burlington	1.5	34.69	12.30		Mississippian
Pit 312	74-246	microdrill	Burlington	0.2				Mississippian

Table A.3. Minerals From Olin (Continued)

Provenience	Bag Number	Point Type	Chert Type	WT(G)	Length (MM)	Width (MM)	Notes	Temporal Affiliation
Pit 353	75-84	drill	Burlington	2.5	39.71	14.28		Mississippian
Pit 32	72-55	triangular knife	Burlington	10.2	53.09	27.75	reworked like a Sugar Loaf Knife patrick phase heat altered	Mississippian
Pit 294	74-248	large scraper	Mill Creek	21.2				Mixed
Pit 293	74-244	large scraper	Burlington	14.0				Mixed
Pit 294	74-248	drill	Burlington	1.5			heat treated	Mixed

Table A.4. Groundstone From Olin

PROVENIENCE	BAG NUMBER	RAW MATERIAL	WT (G)	LENGTH (MM)	WIDTH (MM)	THICKNESS (MM)	BIT (MM)	POLL (MM)	NOTES
unknown		diabase?	94.12	69.02	44	18.99	39.19	28.21	
Feature 1	71-186-E	basalt?	381.69	101.5	55.05	36.23	54.45	35.4	battered poll
	73-642	basalt?	666.2	131.9	67.95	39.36	70.73	54.93	battered poll
Pit 117a	73-796	groundstone celt fragment diabase	67.0						
52.5N 65W	73-650	slate bannerstone fragment	11.9						

Appendix B: Ceramic Data

OLIN SITE CERAMIC DATA

Table B.1. Surface Treatment Of Shell, Grog, And Shell-Grog Body Sherds From Olin

	Plain		Red Slipped		Dark Slipped		Tan Slipped		Cordmarked	
Temper	Ct	Wt (g)	Ct	Wt (g)	Ct	Wt (g)	Ct	Wt (g)	Ct	Wt (g)
Shell	5799	7537.19	1560	3562.62	2980	5270.47	138	358.47	9327	18780.81
Shell-Grog	17	84	1	2	0	0	0	0	0	0
Grog	186	777.71	4	10.9	3	12.3	0	0	41	252.16
TOTAL	6002	8398.9	1565	3575.52	2983	5282.77	138	358.47	9368	19032.97

Table B.2. Clay Objects Recovered From Olin

Feature	Object	Portion	Temper	Ext surf	Int surf	Wt (g)	Comments
Pit 373A	ceramic bead	whole	none	pl	pl	3	16.1 mm diameter bead with 2.5 mm diameter hole
Pit 180	ceramic cone	body	grit	pl	pl	5.16	grit tempered ceramic cone with hole through center (mold for copper point? Tinkling cone? Ornament?)
Pit 319	ceramic disk	body	shell	ds	er	2.1	1/4 of ceramic disk
Pit 295	ceramic disk	body	grit	cm	pl	12.5	
Pit 43	ceramic disk		shell	ds	ds	2.98	
Pit 277	ceramic ring	body	none	pl	pl	0.7	ceramic ring or pinch pot strap handle (more likely the first)
Pit 358	ceramic ring	body	none	pl	pl	0.9	ceramic ring with 6 cm diameter, tan paste
Pit 367	ceramic ring	body	grog	ds	ds	2.5	dense gray paste at core, buff at surfaces; little temper; ceramic ring or possible strap handle? 2.5 cm diameter
Pit 138	ceramic ring	body	none	pl	pl	1.6	buff paste with hematite or other flecks/inclusions;
Pit 360	clay coil bead	body	none	pl	pl	0.9	
Pit 267	clay disk	body	shell	ds	ds	3.9	shaped but not ground
Pit 214	clay object	none	none	pl	pl	2.3	possible punctate/ hole bored laterally through the sherd
Pit 133	foot?ear-spool?	body	shell	pl	pl	3.4	sparse temper
47.5N 107.5W	gaming piece		none	pl	pl	30	3.5 cm diameter, 2.04 cm thick
Unknown	pipe	bowl	none	pl	pl	20.1	
Pit 294	pottery trowel	trowel	shell	pl	pl	107	hematite or other inclusions in paste
Pit 28A	spindle whorl	body	shell	cm	rs	3.27	
Pit 328	spindle whorl	body	grit	cm	pl	6.5	uni-directional drilled hole
Pit 37	stopper		grog	pl	pl	27.4	reduced; grass or matting impressions on one side

Table B.3. Ceramic Appendages Recovered From Olin

Feature	Vessel Form	Vessel Part	Temper	Ext surf	Int surf	Wt (g)	Comments
Pit 271	beaker	handle	shell	ds	er	8.2	possible hematite or other inclusions in paste
Pit 292	beaker	handle	shell	ds	er	7.1	
Pit 345	beaker	handle	shell	pl	pl	7.48	human hand effigy - small patches of polish on front of thumb near index finger and on back of hand near wrist and top of first knuckle
Pit 346	beaker	handle	shell	rs	er	7.5	handle riveted through to interior of vessel
Pit 5	beaker	handle	shell	rs	na	14.71	human hand effigy handle; broken edg-es worn/ground
Pit 15	effigy bowl	effigy	shell	rs	rs	5.8	tail of bird effigy bowl
Pit 158	effigy	arm?	none	pl	pl	4.7	finger indents along buff clay coil
Pit 107	beaker or effigy	handle	shell	ds	pl	0.7	
Pit 202	effigy bowl	effigy	shell	ds	ds	9.8	duck head effigy - wood duck?
Pit 203	effigy bowl	effigy	shell	ds	ds	8.1	raptor-like bird though beak bro-ken; bird facing out - formed separately and attached to rim; orifice diame-ter >30 cm
Pit 257	effigy bowl	effigy applique	shell	rs	rs	3.7	possible tail effigy - has circular appli-que in center of tail
Pit 267	effigy bowl	effigy applique	shell	ds	ds	9.6	bird tail effigy, red slip visible under dark slip
Pit 286	effigy bowl	effigy applique	shell	ds	ds	12.6	raptor-like bird with broken beak, bird facing outward; gray paste
Pit 313	effigy bowl	effigy	shell	ts	pl	12.4	effigy adorno - neck only
Pit 256	ind	handle/lug	shell	pl	pl	1.1	
Pit 266	ind	appendage	none	pl	pl	3.5	
Pit 365	ind	handle	shell	er	er	0.4	
Pit 99	jar	handle	shell	rs	pl	3.14	
Pit 249	jar	handle	shell	pl	er	1.4	6.9mm thick 17.66mm wide
Pit 267	jar	handle	shell	rs	er	1.8	loop handle riveted to vessel
Pit 320	jar	body/handle	shell	er	rs	10.3	sooted
Pit 355	jar	handle	shell	er	er	4.6	W 17.25, T6.18

Table B.3 Ceramic Appendages Recovered From Olin (Continued)

Feature	Vessel Form	Vessel Part	Temper	Ext surf	Int surf	Wt (g)	Comments
Pit 355	jar	handle	shell	pl	rs	11	strap handle formed separately and attached; buff paste; surfaces to be welded were cordroughened for attachment
Pit 216	pinch pot	handle	none	pl	pl	0.5	slight upcurve
Pit 251	pinch pot	handle	none	pl	pl	1.7	solid coil handle
Pit 256	pinch pot	handle	none	pl	pl	0.5	7.95mm wide, 6.92mm thick, 13.69mm long
Pit 256	pinch pot	handle	none	pl	pl	3.2	11 mm wide, 8.6mm thick, 33.75mm long
Pit 257	pinch pot	handle	none	pl	pl	1	
Pit 365	pinch pot	tab handle	none	pl	pl	3.8	
Pit 373A	pinch pot	handle	none	pl	pl	4.8	
Pit 365	utensil	foot/ handle	grog	pl	pl	14.1	foot of crudware vessel, knob of funnel lid, orpottery trowel handle
Pit 366	utensil	foot/ handle	grog	pl	pl	24.7	foot of crudware vessel, knob of funnel lid, or pottery trowel handle; coil at center formed separately for rivet with clay added around to form foot/handle and secure to body

Table B.4. Non-vessel Rim And Body Fragments From Olin

Feature #	Vessel Form	Vessel Part	Temper	Ext surf	Int surf	Wt (g)	Comments
Pit 127	beaker	body	shell	rs	rs	39.6	incised decoration - sharp tool, narrow; sunburst pattern?
Pit 129	beaker	rim	shell	rs	rs	1.6	incised decoration ~0.8 mm wide; n=2
Pit 133	beaker	body	shell	rs	rs	8.2	incised sunburst decoration - sharp tool, narrow line
Pit 320	beaker	body	shell	rs	rs	4.6	incised decoration - narrow, sharp tool, indeterminate motif (ladder variation?)
H32 Floor	beaker	rim	shell-grog	rs	rs	1.1	incised
H32 basin	beaker/ bowl	body	shell	rs	rs	5.5	incised decoration - fine lines scratched into fired sherd after slip - sunburst design
Pit 107	beaker/ bowl	rim	shell	ds	ds	0.7	burnished
Pit 275	beaker/ bowl	rim	shell	ds	ds	1	
Pit 275	beaker/ bowl	rim	shell	ds	ds	0.4	
Pit 275	beaker/ bowl	rim	shell	ds	ds	0.5	
Pit 28A	beaker/ bowl	rim	shell	ds	ds	0.6	
Pit 295	beaker/ bowl	rim	shell	rs	rs	1.7	
Pit 299	beaker/ bowl	lip	shell	ds	ds	0.3	
Pit 43	beaker/ bowl	rim	shell	rs	rs	0.8	
Pit 43	beaker/ bowl	rim	shell	rs	rs	0.7	
Pit 60	beaker/ bowl	rim	shell	ds	ds	0.5	
Pit 98	beaker/ bowl	rim	shell	ds	ds	0.6	
Pit 131	beaker/ bowl	rim	shell	rs	er	0.2	
Pit 133	beaker/ bowl	rim	shell	rs	rs	1	
Pit 138	beaker/ bowl	rim	shell	ds	ds	0.5	
Pit 153	beaker/ bowl	lip	shell	ds	ds	0.7	
Pit 360	beaker/ bowl	lip	shell	rs	rs	0.7	
H34 (WTF)	beaker/ bowl	rim	shell	ds	ds	0.3	
Pit 127	bottle	neck, shoulder	shell	cm	pl	58.2	orifice about 12 cm; z-twist cordage
Pit 197	bottle	neck	shell	ds	ds	10.7	burnished
Pit 216	bottle	neck	shell	rs	pl	3.2	
Pit 232	bottle	neck, shoulder	shell	ds	rs	44.9	10 cm orifice, -0.066 rim curvature
Pit 240	bottle	neck	shell	ds	ds	3.8	possibly dark slip over red
Pit 253	bottle	neck	shell	ds	pl	3.5	incised ~.60 mm
Pit 299	bottle	lip	shell	pl	pl	3.1	buff paste

Table B.4 Non-vessel Rim And Body Fragments From Olin (Continued)

Feature #	Vessel Form	Vessel Part	Temper	Ext surf	Int surf	Wt (g)	Comments
Pit 299	bottle	neck, shoulder	shell	cm/ds	pl	11.07	cm shoulder and below (z-twist), burnished dark slip on neck
Pit 312	bottle	neck	shell	ds	pl	6	
Pit 321	bottle	body	shell	pl	pl	5.6	
Pit 361	bottle	neck	shell	rs	rs	3.6	reduced interior
Pit 363	bottle	rim	shell	ds	rs	1.5	red slip under dark slip on exterior
Pit 43	bottle	neck/shoulder	shell	ds	pl	7.06	gray paste with bur-nished dark slipped exterior; 8-10 cm orifice diamter (est. - no lip)
Pit 45	bottle	neck/shoulder	shell	rs	pl	58.13	burnished red slip exterior
Pit 252	bottle/ beaker	rim	shell	ds	ds	1	8-10 cm orifice
Pit 267	bottle/ beaker	body	shell	rs	rs	8.8	
Pit 267	bottle/ beaker	rim	shell	rs	rs	1.8	
Pit 267	bottle/ beaker	rim	shell	rs	er	1.4	
Pit 274	bottle/ beaker	rim	shell	rs	pl	1.5	10-12 cm diameter
Pit 295	bottle/ beaker	rim	shell	rs	rs	0.9	
Pit 300	bottle/ beaker	rim	shell	rs	er	2.1	hematite or other inclusions in paste
Pit 43	bottle/ beaker	rim	shell	ds	pl	2.3	
Pit 98	bottle/ beaker	lip	shell	er	ds	0.6	
Pit 323	bottle/ bowl	rim	shell	rs	pl	1.7	
37.5N 95W	bowl	rim	shell	ds	rs	2.3	exterior slip may be red but reduced
42.5N 92.5W House Floor	bowl	rim	shell	rs	rs	5.8	effigy
H32 Floor	bowl	rim	shell	rs	rs	2.8	has inward spout; n=3
House 1 Area	bowl	rim	shell	ds	ds	1.7	
House 29	bowl	rim	shell	ts	ts	1	
House 29	bowl	rim	shell	rs	rs	0.6	
House 29	bowl	rim	shell	rs	rs	1.3	parallel incised lines ~0.95mm
House 29	bowl	rim	shell	er	ds	0.8	effigy
Pit 110	bowl	rim	shell	rs	rs	1.71	unevenly smudged or reduced red slip with incised hori-zontal line parallel to rim
Pit 133	bowl	rim	shell	rs	rs	1.7	burnished
Pit 134	bowl	lip	shell	er	rs	0.4	

Table B.4 Non-vessel Rim And Body Fragments From Olin (Continued)

Feature #	Vessel Form	Vessel Part	Temper	Ext surf	Int surf	Wt (g)	Comments
Pit 156	bowl	rim	grit	cm	pl	1.5	large cordage >3.5mm
Pit 165	bowl	rim	grit	cm	pl	3.6	
Pit 187	bowl	rim	grit	cm	pl	312.9	n=7; whole vessel in pit
Pit 203	bowl	rim	shell	ts	ts	1.3	
Pit 203	bowl	rim	shell	ds	ds	1.2	
Pit 203	bowl	lip	shell	er	rs	1.3	
Pit 216	bowl	rim	shell	ds	ds	6.2	n=2; 28 cm orifice diameter
Pit 216	bowl	rim	shell	ds	ds	1.7	
Pit 226	bowl	rim	shell	ds	ds	0.9	
Pit 232	bowl	rim	shell	rs	rs	0.8	14-16 cm orifice diameter; lip slightly rolled and flattened to exterior
Pit 232	bowl	rim	shell	ds	ds	0.6	22-26 cm orifice diameter; lip slightly rolled to exterior
Pit 233	bowl	rim	shell	ds	ds	2.1	
Pit 249	bowl	lip	shell	pl	pl	0.8	
Pit 256	bowl	rim	shell	ds	ds	3.7	
Pit 267	bowl	rim	shell	ds	ds	1.6	
Pit 267	bowl	rim	shell	ds	ds	3	possible effigy - small tab
Pit 267	bowl	neck	shell	ds	ds	0.9	
Pit 267	bowl	rim	shell	ds	ds	3.9	
Pit 275	bowl	rim	shell	ds	ds	2.3	
Pit 275	bowl	rim	shell	er	ds	0.7	
Pit 276	bowl	rim	shell	ds	ds	0.5	
Pit 277	bowl	rim	shell	ds	ds	1.4	red slip under dark slip at lip
Pit 277	bowl	rim	shell	ds	ds	0.8	
Pit 285	bowl	rim	shell	ds	ds	0.9	red slip under dark
Pit 293	bowl	tab	shell	rs	rs	3.7	
Pit 293	bowl	rim	shell	pl	pl	0.1	
Pit 299	bowl	rim	shell	pl	pl	1.4	
Pit 299	bowl	rim	shell	er	er	0.8	
Pit 300	bowl	rim	shell	er	er	1.8	
Pit 304	bowl	rim	shell	ds	ds	1.2	
Pit 318	bowl	rim	shell	rs	er	3.3	hole created during manufacture - ~7.83 mm pushed in from exterior
Pit 318	bowl	rim	shell	ds	ds	1.2	burnished

Table B.4 Non-vessel Rim And Body Fragments From Olin (Continued)

Feature #	Vessel Form	Vessel Part	Temper	Ext surf	Int surf	Wt (g)	Comments
Pit 321	bowl	lip	shell	ds	ds	0.6	
Pit 321	bowl	rim	shell	er	rs	3.6	
Pit 360	bowl	rim	shell	ds	ds	2	burnished
Pit 360	bowl	rim	shell	ds	ds	1.4	burnished
Pit 364	bowl	rim	shell	er	er	0.5	
Pit 371	bowl	rim	grit	pl	pl	2.5	n=2
Pit 373A	bowl	rim	grit	cm	pl	3.5	
Pit 373A	bowl	rim	grit	cm	pl	1	
Pit 373A	bowl	rim	shell	er	rs	1.1	lip tab/lug
Pit 373B	bowl	rim	grit	cm	pl	2.5	
Pit 82	bowl	rim	shell	rs	rs	1.7	reduced/smudged over red slip
Pit 82	bowl	lip	shell	ds	ds	1.4	horizontal trailed lines; lip widens for for effigy or tab attachment
Wall Trench R	bowl	rim	shell	pl	pl	2.2	
Pit 275	cambered bowl?	rim	shell	er	ds	11.5	possible cambered bowl - cambered portion appears to be added coil pinched out; gray paste
Pit 253	crude bowl	rim	shell	er	er	4.3	thick and chunky with square lip
Pit 365/366	crude bowl	rim	shell	pl	pl	4.1	crude bowl
Pit 227	effigy	indeterminate	shell	ds	pl	1.3	burnished; hooded bottle or shell nub
Pit 285	effigy	body	shell	ds	pl	1.4	possible top-knot or ear of hooded bottle; gray paste
Pit 342	effigy	body	shell	ds	ds	0.7	
Pit 252	effigy bowl	body	shell	ds	ds	1.7	burnished circular applique (like eye?); gray paste, abundant temper
Pit 139	everted rim bowl	rim	shell	ts	ts	2.6	burnished surfaces, trailed line decoration on flange; orifice diameter >28 cm
Pit 294	everted rim bowl	rim	shell	ds	ds	1.4	
Pit 134	everted rim bowl	lip	shell	ds	ds	0.6	
Pit 154	everted rim bowl	lip	shell	er	er	1	red slip at lip
Pit 318	everted rim bowl	lip	shell	er	er	2.7	trailed lines 2.5mm wide

Table B.4 Non-vessel Rim And Body Fragments From Olin (Continued)

Feature #	Vessel Form	Vessel Part	Temper	Ext surf	Int surf	Wt (g)	Comments
Pit 321	everted rim bowl	lip	shell	er	ds	2.2	
Pit 321	everted rim bowl	rim	shell	ds	ds	4.2	
Pit 318	hooded bottle	rim	shell	pl	pl	3.9	4 cm diameter
House 32 Basin L1	Ind.	lip	shell	pl	pl	1.4	
House 6 Floor	Ind.	rim	shell	er	rs	1.1	
House 6 Floor	Ind	rim	shell	er	rs	0.5	
Pit 107	ind	shoulder	shell	ds	pl	3	gray paste, burnished exterior, parallel horizontal lines incised with narrow sharp tool
Pit 107	ind	lip	shell	ds	ds	0.3	
Pit 107	ind	lip	shell	ds	ds	0.5	burnished
Pit 115	ind	rim	shell	rs	rs	0.9	
Pit 126	ind	rim	shell	rs	rs	0.1	
Pit 133	ind	lip	shell	er	rs	4	square lip with red slip; sooted
Pit 133	ind	lip	shell	ds	ds	4.7	
Pit 146	ind	lip	shell	er	rs	0.9	
Pit 153	ind	lip	shell	er	er	0.3	
Pit 153	ind	lip	shell	er	rs	0.1	
Pit 154	ind	rim	shell	ds	ds	1.4	
Pit 154	ind	lip	shell	ds	ds	0.3	
Pit 154	ind	rim	shell	ds	ds	0.9	n=2
Pit 154	ind	lip	shell	er	ds	0.6	
Pit 216	ind	lip	shell	er	er	1.7	
Pit 219	ind	lip	shell	er	er	1	
Pit 227	ind	lip tab	shell	rs	er	2	lip tab
Pit 232	ind	rim	shell	ts	ds	1.2	>14 cm orifice diameter; lip slightly rolled to exterior
Pit 235	ind	lip	shell	er	er	0.3	
Pit 247	ind	body	shell	rs	er	1.6	incised exterior; inclusions
Pit 267	ind	rim	shell	er	er	0.2	
Pit 267	ind	rim	shell	er	er	0.4	
Pit 289	ind	body	shell	er	ds	2.2	
Pit 289	ind	body	shell	ds	ds	1.9	n=3
Pit 28A	ind	body	shell	ts	ds	3.7	incised decoration, indeterminate motif
Pit 311	ind	lip	shell	ds	ds	0.3	

Table B.4 Non-vessel Rim And Body Fragments From Olin (Continued)

Feature #	Vessel Form	Vessel Part	Temper	Ext surf	Int surf	Wt (g)	Comments
Pit 312	ind	lip	shell	rs	pl	0.2	
Pit 318	ind	lip	shell	er	ds	0.5	
Pit 318	ind	rim	shell	er	er	1.5	
Pit 318	ind	lip	shell	er	er	1.5	
Pit 318	ind	lip	shell	rs	er	0.2	
Pit 318	ind	rim	shell	er	rs	0.6	
Pit 318	ind	lip	shell	er	rs	0.2	
Pit 318	ind	lip	shell	pl	pl	1.8	squared lip
Pit 318	ind	lip	grog	er	rs	0.3	
Pit 319	ind	lip	shell	ds	pl	2	
Pit 320	ind	rim	shell	cm	rs	1.3	
Pit 320	ind	lip	shell	ds	ds	0.7	
Pit 321	ind	lip	shell	er	pl	0.5	
Pit 321	ind	lip	shell	er	pl	1	
Pit 321	ind	lip	shell	er	rs	1.5	
Pit 321	ind	lip	shell	ds	ds	0.9	lip tab
Pit 321	ind	lip	shell	er	er	0.9	
Pit 323	ind	lip	shell	pl	pl	1.4	
Pit 324	ind	lip	shell	ds	ds	0.3	
Pit 327	ind	lip	shell	er	pl	0.4	
Pit 344	ind	lip	shell	er	rs	0.4	
Pit 345	ind	rim	shell	sl	sl	0.8	
Pit 346	ind	rim	shell	pl	er	1.5	
Pit 346	ind	lip	shell	er	er	0.8	
Pit 346	ind	rim	shell	ds	ds	3.5	
Pit 346	ind	lip	shell	rs	rs	0.3	
Pit 347	ind	rim	shell	er	rs	1.1	
Pit 347	ind	lip	shell	ds	er	1	
Pit 353	ind	lip	shell	ds	ds	1.6	
Pit 355	ind	rim	shell	er	rs	1.1	rolled lip to exterior
Pit 355	ind	rim	shell	cm	rs	0.8	
Pit 355	ind	lip	shell	er	er	1.2	
Pit 356	ind	lip	shell	rs	rs	0.3	
Pit 36	ind	rim	shell	ds	ds	0.4	
Pit 360	ind	rim	shell	ds	ds	2.5	burnished
Pit 360	ind	lip	shell	er	pl	1.8	
Pit 360	ind	lip	shell	pl	rs	1.2	
Pit 360	ind	lip	shell	pl	pl	2.6	
Pit 365	ind	lip	shell	er	rs	1.1	

Table B.4 Non-vessel Rim And Body Fragments From Olin (Continued)

Feature #	Vessel Form	Vessel Part	Temper	Ext surf	Int surf	Wt (g)	Comments
Pit 43	ind	rim	shell	ds	ds	1.3	
Pit 43	ind	rim	shell	rs	pl	1.2	burnished
Pit 6 House 1	ind	rim	shell	rs	pl	2.6	
Pit 69	ind	lip	shell	rs	pl	0.8	
Pit 88	ind	lip	shell	pl	rs	0.3	
Pit 88	ind	lip	shell	pl	pl	0.2	
Pit 89	ind	lip	shell	rs	rs	0.7	
Pit 89	ind	lip	shell	rs	er	0.4	
Pit 89	ind	lip	shell	er	er	1.5	
Wall Trench R	ind	lip	shell	pl	pl	0.3	
WT 73-7; H21?	ind	rim	shell	er	rs	0.1	
unknown	jar	rim	grit	cm	pl	3	interior dowel impressed lip
unknown	jar	rim	grit	pl	pl	20.4	lip lug
unknown	jar	rim	shell	er	rs	6.6	
unknown	jar	rim	grit	cm	pl	28.4	exterior plain dowel impressed; bosses below lip
60N 105W	jar	lip	shell	er	rs	9.4	
60N 105W	jar	rim	shell	er	rs	8.5	
60N 92.5W	jar	rim	shell	cm	pl	5.7	
60N 92.5W	jar	shoulder	shell	ds	ds	2.5	
H39 Inner North Wall	jar	rim	shell	cm	rs	14	n=2; hematite or other inclusions in paste; rim attached to top of vessel; LL: 21.73 LT: 7.45 WT: 5.56
H20 WT73-7	jar	rim	shell	cm	rs	9	s-twist
House 1 Area	jar	lip	shell	er	rs	4.2	
House 29	jar	rim	shell	er	rs	1.8	
House 29	jar	rim	shell	er	rs	0.3	
House 32 basin	jar	lip	shell	cm	rs	13.6	
House 32 Basin L1	jar	rim	grit	cm	pl	1.1	superior dowel impressed lip
House 4 Floor	jar	rim	grit	cm	pl	2.2	interior lip impressed
Marker Post and Erection Pit	jar	rim	grit	cm	pl	1.1	superior lip notches
Palisade Wall	jar	rim	grit	cm	pl	0.5	

Table B.4 Non-vessel Rim And Body Fragments From Olin (Continued)

Feature #	Vessel Form	Vessel Part	Temper	Ext surf	Int surf	Wt (g)	Comments
Pit 100	jar	rim	grit	Dec	er	0.7	
Pit 101 and Pit 103	jar	rim	grit	cm	pl	2.1	Madison County Shale
Pit 106	jar	rim	grit	pl	pl	0.6	exterior cord-wrapped stick impression on lip
Pit 107	jar	rim	grit	pl	pl	1.9	flattened lip
Pit 107	jar	lip	shell	er	rs	0.4	
Pit 107	jar	lip	grit	er	er	0.2	
Pit 107	jar	lip	grit	cm	pl	0.5	
Pit 109	jar	rim	grit	cm	pl	1.4	superior lip notching; n=2
Pit 113	jar	rim	shell	er	rs	1	sooted
Pit 116	jar	rim	grit	cm	pl	1.6	exterior lip slashes
Pit 116	jar	neck	grit	cm	pl	2.6	bosses
Pit 116	jar	rim	grit	cm	pl	3.6	exterior lip impressed (finger?)
Pit 122	jar	lip	shell	er	rs	0.2	
Pit 122	jar	lip	grit	pl	pl	0.7	square lip
Pit 123	jar	neck	shell	cm	rs	5.32	
Pit 125	jar	rim	shell	er	rs	3	lip rolled under
Pit 125	jar	lip	grit	cm	pl	1.5	interior dowel impressed lip
Pit 127	jar	neck/ shoulder	shell	ds	pl	2.4	incised line sharp tool ~1.06mm
Pit 127	jar	neck, shoulder	shell	cm	rs	22.7	orifice about 18 cm; s-twist cordage
Pit 127	jar	lip	shell	er	rs	1.2	soot at lip
Pit 127	jar	neck/ shoulder	shell	cm	er	3.4	
Pit 129	jar	rim	grit	cm	pl	7.4	interior cord-wrapped stick impressed
Pit 129	jar	rim	grit	cm	pl	5.9	exterior dowel impressed; bosses
Pit 129	jar	shoulder	shell	ds	pl	2.7	trailed parallel line decoration, 1.5-1.9 mm wide
Pit 129	jar	rim	grit	cm	pl	1.5	interior cord-wrapped stick impressed
Pit 131	jar	neck	shell	pl	pl	12	
Pit 132	jar	rim	grit	cm	pl	0.8	
Pit 133	jar	lip	shell	er	rs	3.6	
Pit 133	jar	rim	shell	er	rs	5.8	Rim attached to top and ext of vessel
Pit 133	jar	neck	shell	cm	rs	9.3	
Pit 133	jar	lip	shell	er	rs	0.4	rolled lip

Table B.4 Non-vessel Rim And Body Fragments From Olin (Continued)

Feature #	Vessel Form	Vessel Part	Temper	Ext surf	Int surf	Wt (g)	Comments
Pit 134	jar	rim	grit	cm	pl	0.9	interior cord-wrapped dowel impressed
Pit 134	jar	rim	grit	cm	pl	1.5	
Pit 134	jar	rim	grit	cm	pl	1.7	
Pit 136	jar	rim	grit	cm	pl	1.3	superior lip punctates with sharpened dowel
Pit 137	jar	rim	grit	cm	0	1.7	interior/superior dowel impressed
Pit 137	jar	rim	grit	er	er	0.3	dowel impressed
Pit 139	jar	rim	shell	er	rs	3.6	
Pit 140	jar	rim	grit	cm	pl	1.1	exterior cord-wrapped dowel impressed
Pit 140	jar	rim	grit	cm	pl	0.5	
Pit 143	jar	body	grit	cm	pl	26.73	Marion Thick vessel fragment; coarse temper, orange-yellow paste; vertical cm with s-twist
Pit 146	jar	neck	shell	ds	pl	2.3	LL: 10.35 LT 2.88 WT 4.62
Pit 147	jar	lip	shell	er	rs	0.9	
Pit 147	jar	lip	shell	pl	pl	5.1	LL: 16.06 LT 6.25 WT 5.96
Pit 15	jar	lip	shell	ts	ts	2.05	gray paste,
Pit 15	jar	lip	shell	pl	rs	1	
Pit 150	jar	rim	grit	cm	pl	1.4	exterior cord-wrapped dowel impressed
Pit 150	jar	rim	grit	cm	pl	0.5	superior dowel impressed
Pit 151	jar	rim	shell	er	er	2.9	
Pit 151	jar	neck	shell	cm	pl	9.06	
Pit 152	jar	lip	shell	er	rs	1.6	lip rolled under
Pit 152	jar	neck	shell	cm	pl	1.2	
Pit 153	jar	lip	shell	ds	ds	0.3	
Pit 154	jar	lip	limestone	er	er	1.9	
Pit 162	jar	shoulder	shell	sm/cm	pl	5.98	buff paste; -0.052 rim curvature
Pit 162	jar	shoulder	shell	pl	pl	28	compact buff paste; 10 cm orifice diameter
Pit 164	jar	rim	shell	er	rs	6	
Pit 17	jar	lip	shell	pl	er	0.9	
Pit 177	jar	rim	grit	cm	pl	8.6	
Pit 177	jar	rim	grit	cm	pl	1.9	

Table B.4 Non-vessel Rim And Body Fragments From Olin (Continued)

Feature #	Vessel Form	Vessel Part	Temper	Ext surf	Int surf	Wt (g)	Comments
Pit 177	jar	rim	grit	cm	pl	1.5	exterior dowel impressed
Pit 177	jar	rim	grit	cm	pl	17.4	exterior cord-wrapped dowel impressed
Pit 187	jar	rim	shell	er	rs	3.16	
Pit 190	jar	rim	grit	cm	pl	2.9	
Pit 190	jar	rim	grit	pl	pl	5.2	
Pit 190	jar	rim	grit	cm	pl	9.1	
Pit 190	jar	rim	grit	pl	pl	4.8	
Pit 190	jar	rim	grit	pl	pl	3.5	
Pit 190	jar	rim	grit	pl	pl	1.7	
Pit 192	jar	neck	shell	rs	rs	2.8	
Pit 192	jar	neck	shell	rs	rs	2.4	
Pit 192	jar	rim	grog	cm	pl	6.5	
Pit 193	jar	rim	grit	cm	pl	1.2	
Pit 195B	jar	rim	grit	cm	pl	1.5	exterior lip impressed
Pit 196	jar	body	grit	sm/cm	pl	43.8	n=2; Marion Thick
Pit 196	jar	rim	grit	cm	pl	5.7	
Pit 197	jar	rim	grit	cm	pl	3.7	bosses
Pit 197	jar	rim	grit	cm	pl	2	exterior cord-wrapped dowel impressed
Pit 197	jar	rim	grit	cm	pl	1.6	exterior dowel impressed
Pit 198	jar	rim	grit	cm	pl	1.5	
Pit 201	jar	neck, shoulder	shell	er	er	3.4	hematite or other inclusions in paste
Pit 201	jar	rim	grit	cm	pl	3.7	uneven lip
Pit 201	jar	rim	grit	cm	pl	0.5	
Pit 201	jar	rim	grit	cm	pl	1.8	
Pit 203	jar	rim	grit	cm	pl	6.4	
Pit 203	jar	rim	shell	ds	ts	1.2	rolled lip
Pit 203	jar	lip	shell	er	rs	2.3	
Pit 203	jar	lip	shell	er	rs	2.6	lip folded and attached to exterior
Pit 203	jar	rim	grit	cm	pl	3	
Pit 203	jar	rim	grit	er	pl	0.8	interior dowel impressed
Pit 204	jar	rim	grit	cm	pl	2.3	
Pit 205	jar	rim	grit	cm	pl	1.5	exterior cord-wrapped dowel impressed

Table B.4 Non-vessel Rim And Body Fragments From Olin (Continued)

Feature #	Vessel Form	Vessel Part	Temper	Ext surf	Int surf	Wt (g)	Comments
Pit 207	jar	rim	grit	cm	pl	1.4	interior lip impressed
Pit 207	jar	rim	grit	cm	pl	1.8	squared lip
Pit 212	jar	neck	shell	er	rs	4.92	
Pit 213	jar	lip	shell	er	rs	2.3	sooted exterior
Pit 213	jar	neck	shell	cm	rs	1.2	s-twist cordage
Pit 215	jar	rim	shell	er	rs	1.8	
Pit 216	jar	rim	shell	ds	pl	2	
Pit 216	jar	lip	shell	er	rs	1	
Pit 220	jar	rim	grit	cm	pl	0.5	interior lip impressed
Pit 226	jar	lip	shell	er	er	2.4	n=2
Pit 227	jar	lip	shell	ds	ds	1.8	
Pit 227	jar	lip	shell	er	er	3.9	
Pit 233	jar	body	shell	cm	rs	5.9	lip missing
Pit 235	jar	rim	grit	cm	pl	1.9	interior cord-wrapped dowel impressed
Pit 241	jar	neck	shell	cm	er	4.7	
Pit 244	jar	neck	shell	cm	rs	3.9	
Pit 245	jar	neck	shell	ts	ts	1.6	10 cm orifice diameter
Pit 245	jar	rim	grit	er	pl	0.6	interior cord-wrapped dowel impressed
Pit 247	jar	shoulder	shell	ds	ds	3.3	burnished
Pit 247	jar	rim	shell	er	rs	3.6	
Pit 247	jar	rim	shell	er	rs	3.5	
Pit 247	jar	lip	shell	er	rs	3.7	inclusions
Pit 249	jar	rim	grit	cm	pl	4.1	interior cord-wrapped dowel impressed
Pit 249	jar	rim	grit	cm	pl	2.6	
Pit 249	jar	lip	shell	er	rs	2.7	
Pit 250	jar	body	grit	cm	pl	15.6	Marion Thick
Pit 252	jar	rim	grit	cm	pl	2.2	interior dowel impressed
Pit 252	jar	rim	shell	er	rs	1.3	lip missing
Pit 253	jar	shoulder	shell	ts	pl	6.1	
Pit 253	jar	rim	shell	er	rs	1.7	lip missing
Pit 253	jar	rim	shell	er	rs	1.6	lip missing
Pit 254	jar	rim	grit	cm	pl		interior lip impressed

Table B.4 Non-vessel Rim And Body Fragments From Olin (Continued)

Feature #	Vessel Form	Vessel Part	Temper	Ext surf	Int surf	Wt (g)	Comments
Pit 255	jar	rim	grit	sm/cm	pl	3	interior cord-wrapped dowel impressed
Pit 256	jar	shoulder	shell	rs	rs	4.2	hematite flecks or other inclusions visible at surfaces; 10 cm orifice diameter
Pit 256	jar	body	shell	cm	rs	8.2	broken handle; cm 1.5-2.6mm wide; inclusions
Pit 256	jar	neck	shell	ts	pl	3.6	8-10 cm orifice diameter
Pit 256	jar	rim	shell	er	rs	6.9	
Pit 256	jar	rim	shell	er	ds	1	
Pit 256	jar	rim	shell	pl	ts	0.7	
Pit 256	jar	neck	shell	pl	rs	1.3	
Pit 258	jar	rim	grit	cm	pl	3.4	
Pit 258	jar	rim	grit	cm	pl	5.2	sm/cm over lip
Pit 258	jar	rim	grit	cm	pl	3.6	sm/cm over lip
Pit 258	jar	shoulder	grit	cm	pl	24	
Pit 261	jar	shoulder	shell	ds	pl	5	burnished dark brown/black slip; narrow trailing at top of shoulder
Pit 263	jar	neck	shell	ds	pl	1.2	
Pit 266	jar	rim	grit	cm	pl	0.6	
Pit 266	jar	rim	grit	pl	pl	1.8	squared lip
Pit 266	jar	rim	grit	cm	pl	3	exterior lip impressed
Pit 266	jar	neck	shell	er	rs	4.5	lip missing
Pit 266	jar	rim	grit	cm	pl	4.4	22 cm orifice diameter; exterior cordwrapped dowel impressed
Pit 267	jar	rim	shell	er	rs	0.9	
Pit 267	jar	lip	shell	rs	er	8.2	
Pit 267	jar	neck	shell	er	rs	2.8	
Pit 267	jar	rim	shell	rs	er	3.8	
Pit 267	jar	body	shell	cm	rs	2.5	
Pit 267	jar	rim	shell	er	rs	4.8	lip missing
Pit 267	jar	shoulder	shell	rs	pl	8.4	hematite or other inclusions
Pit 267	jar	rim	shell	rs	er	0.9	
Pit 267	jar	rim	shell	er	er	1.3	
Pit 268	jar	body	grit	pl	pl	4.7	two rows of cord-wrapped dowel impressions
Pit 269	jar	rim	shell	rs	er	4.9	

Table B.4 Non-vessel Rim And Body Fragments From Olin (Continued)

Feature #	Vessel Form	Vessel Part	Temper	Ext surf	Int surf	Wt (g)	Comments
Pit 27	jar	lip	grit	pl	pl	0.9	square lip
Pit 271	jar	rim	shell	er	rs	2.7	hematite or other inclusions
Pit 271	jar	neck	shell	er	rs	0.7	
Pit 273	jar	rim	grit	cm	pl	2.4	superior lip impressed
Pit 273	jar	rim	grit	cm	pl	1.5	
Pit 273	jar	rim	shell	er	rs	1.5	
Pit 273	jar	rim	shell	rs	rs	1.1	
Pit 273	jar	rim	shell	er	rs	3.6	
Pit 274	jar	lip	shell	pl	pl	0.8	n=2
Pit 274	jar	rim	grit	cm	er	0.4	
Pit 274	jar	neck	shell	cm	rs	1.7	
Pit 274	jar	rim	grit	pl	er	0.6	
Pit 275	jar	rim	shell	pl	rs	3.3	
Pit 275	jar	lip	shell	er	rs	1.8	
Pit 275	jar	rim	shell	ds	pl	7.5	
Pit 275	jar	rim	shell	er	rs	2	
Pit 275	jar	lip	shell	er	er	2.4	bottom of lip only
Pit 276	jar	rim	shell	er	rs	5	lip folded and attached
Pit 277	jar	body	shell	cm	rs	7	
Pit 277	jar	lip	shell	er	er	1.5	
Pit 279	jar	rim	grit	pl	pl	1.5	lug/tab on lip
Pit 283	jar	lip	shell	er	rs	3.4	
Pit 283	jar	lip	shell	er	er	3.4	
Pit 285	jar	rim	shell	cm	er	4.5	
Pit 285	jar	rim	shell	er	rs	5.9	buff paste
Pit 286	jar	lip	shell	er	rs	0.6	
Pit 286	jar	rim	grit	cm	pl	0.8	
Pit 286	jar	neck	shell	cm	rs	12	s-twist cordmarking; soot on neck and shoulder
Pit 286	jar	rim	grit	cm	pl	3.4	interior dowel impressed
Pit 289	jar	rim	grit	cm	pl	1.8	bosses
Pit 28A	jar	rim	grit	cm	pl	4.3	exterior dowel impressed; bosses
Pit 28A	jar	lip	shell	er	rs	4.6	
Pit 28A	jar	neck	shell	ds	ds	5.9	
Pit 28A	jar	rim	grit	cm	pl	10.5	exterior cord-wrapped dowel impressed; bosses
Pit 28A	jar	lip	shell	er	rs	4.6	

Table B.4 Non-vessel Rim And Body Fragments From Olin (Continued)

Feature #	Vessel Form	Vessel Part	Temper	Ext surf	Int surf	Wt (g)	Comments
Pit 28A	jar	lip	shell	er	rs	1.7	
Pit 28A	jar	body	shell	cm	rs	3.27	spindle whorl
Pit 291	jar	lip	shell	er	er	1.8	
Pit 293	jar	rim	grit	pl	pl	0.9	clay rolled/smushed over on both sides of lip
Pit 293	jar	lip	shell	er	rs	1.5	
Pit 294	jar	rim	grit	cm	pl	1.4	interior cord-wrapped dowel impressed
Pit 294	jar	rim	grit	cm	pl	3.3	exterior cord-wrapped dowel impressed
Pit 294	jar	rim	grit	cm	pl	1	exterior cord-wrapped dowel impressed
Pit 295	jar	rim	grit	cm	pl	0.7	
Pit 296	jar	rim	grit	cm	pl	2	
Pit 296	jar	rim	grit	sm/cm	pl	2.2	squared lip
Pit 296	jar	rim	grit	sm/cm	pl	2.2	squared lip
Pit 296	jar	rim	grit	cm	pl	2	
Pit 299	jar	rim	grit	cm	pl	1.8	bosses
Pit 299	jar	rim	shell	ds	ds	0.7	
Pit 300	jar	lip	shell	er	pl	1.1	
Pit 301	jar	rim	grit	er	pl	1	interior reed im-pressed
Pit 301	jar	rim	grit	er	pl	1.1	interior reed im-pressed
Pit 302	jar	lip	shell	er	rs	6.4	dense paste, hematite or other inclusions in paste
Pit 303	jar	rim	grit	cm	er	1.1	
Pit 31	jar	rim	grit	pl	pl	0.4	interior lip im-pressed
Pit 311	jar	rim	shell	rs	rs	3.8	
Pit 312	jar	neck	shell	cm	rs	6.9	
Pit 313	jar	rim	shell	er	rs	1.9	
Pit 314	jar	neck	shell	er	rs	1.7	
Pit 315	jar	lip	grit	pl	pl	0.6	
Pit 318	jar	rim	shell	ds	ds	0.9	rim attached to exterior/front of vessel
Pit 318	jar	rim	shell	rs	rs	0.2	
Pit 318	jar	neck	shell	pl	pl	8.5	
Pit 318	jar	body	grit	er	pl	0.2	
Pit 318	jar	rim	grit	sm/cm	pl	0.6	interior dowel im-pressed

Table B.4 Non-vessel Rim And Body Fragments From Olin (Continued)

Feature #	Vessel Form	Vessel Part	Temper	Ext surf	Int surf	Wt (g)	Comments
Pit 318	jar	rim	grit	pl	pl	0.8	
Pit 318	jar	neck	shell	er	pl	2.8	
Pit 318	jar	lip	shell	er	rs	0.5	
Pit 318	jar	lip	shell	er	rs	0.3	
Pit 318	jar	rim	shell	rs	pl	1.4	slip over top; rim added to exterior/ front of vessel
Pit 318	jar	lip	shell	er	rs	6.8	extra clay over top of lip
Pit 318	jar	neck	shell	cm	rs	10.1	hematite or other inclusions in paste; rim missing but was attached to exteri- or/front of vessel
Pit 318	jar	rim	shell	er	rs	3.6	rim attached to exterior/front of vessel
Pit 318	jar	rim	shell	rs	rs	2.6	rim attached over top of vessel
Pit 318	jar	rim	shell	er	rs	4.7	
Pit 319	jar	rim	grit	cm	er	1.6	interior cord- wrapped dowel impressed; bosses
Pit 319	jar	rim	grit	cm	er	0.4	
Pit 319	jar	rim	grit	cm	er	1.9	bosses
Pit 319	jar	rim	grit	er	er	0.4	
Pit 319	jar	rim	grit	cm	pl	1.7	exterior dowel impressed
Pit 319	jar	rim	grit	cm	pl	2.3	interior reed im- pressed
Pit 319	jar	rim	grit	cm	pl	0.7	exterior cord- wrapped dowel impressed
Pit 319	jar	body	grit	cm	pl	1	
Pit 319	jar	rim	grit	cm	pl	0.9	
Pit 32	jar	rim	grit	cm	pl	0.7	interior lip im- pressed
Pit 32	jar	rim	shell	er	pl	1.6	
Pit 320	jar	rim	shell	er	rs	4.7	rim attached to exterior/front of vessel
Pit 320	jar	rim	shell	ds	ds	0.7	burnished
Pit 320	jar	rim	grit	cm	pl	8.5	superior cord- wrapped dowel impressed; bosses
Pit 320	jar	rim	shell	er	er	2	
Pit 320	jar	rim	grit	cm	pl	17.3	14 cm orifice diam- eter; exterior dowel impressed; bosses
Pit 320	jar	rim	shell	ts	pl	4.3	

Table B.4 Non-vessel Rim And Body Fragments From Olin (Continued)

Feature #	Vessel Form	Vessel Part	Temper	Ext surf	Int surf	Wt (g)	Comments
Pit 320	jar	rim	grit	cm	pl	38.6	20 cm orifice; exterior cordwrapped dowel impressed
Pit 320	jar	rim	grit	cm	pl	26.4	16 cm orifice diameter; exterior cordwrapped dowel impressed
Pit 320	jar	lip	shell	er	er	0.9	
Pit 321	jar	lip	shell	rs	ts	0.4	
Pit 321	jar	lip	shell	er	rs	2.3	
Pit 321	jar	rim	grit	cm	pl	0.5	squared lip
Pit 321	jar	rim	grit	cm	pl	0.4	
Pit 321	jar	rim	grit	cm	pl	2.6	punctates
Pit 321	jar	rim	grit	cm	pl	4.3	exterior lip slashes; s-twist cordmarking
Pit 321	jar	rim	grit	cm	pl	2.4	s-twist cordmarking
Pit 321	jar	rim	grit	cm	pl	0.9	s-twist cordmarking
Pit 321	jar	rim	grit	cm	pl	35.8	s-twist cordmarking
Pit 321	jar	rim	grit	cm	pl	2.9	interior cordwrapped dowel impressed; s-twist cordmarking
Pit 321	jar	rim	grit	cm	pl	1.6	exterior lip slashes
Pit 321	jar	rim	grit	pl	pl	1.6	
Pit 321	jar	rim	grit	cm	pl	6.7	exterior lip slashes; s-twist cordmarking
Pit 321	jar	rim	grit	cm	pl	9.8	s-twist cordmarking; bosses
Pit 321	jar	body	grit	cm	pl	5.4	s-twist cordmarking; bosses
Pit 321	jar	lip	shell	er	er	7.8	
Pit 321	jar	rim	grit	cm	pl	1.1	exterior lip impressed
Pit 323	jar	rim	grit	cm	pl	2.2	
Pit 323	jar	rim	grit	cm	pl	0.7	superior lip impressed
Pit 323	jar	rim	grit	cm	pl	0.7	interior lip impressed
Pit 323	jar	lip	shell	rs	rs	1.1	
Pit 324	jar	shoulder	shell	rs	ds	4.9	burnished exterior and interior
Pit 324	jar	rim	grit	cm	pl	0.5	interior cordwrapped dowel impressed
Pit 324	jar	rim	grit	cm	pl	0.6	interior cordwrapped dowel impressed
Pit 325	jar	rim	shell	er	rs	5.5	hematite or other inclusion

Table B.4 Non-vessel Rim And Body Fragments From Olin (Continued)

Feature #	Vessel Form	Vessel Part	Temper	Ext surf	Int surf	Wt (g)	Comments
Pit 326	jar	rim	grit	cm	pl	2.8	exterior cord-wrapped dowel impressed
Pit 327	jar	lip	shell	er	rs	0.8	
Pit 327	jar	lip	shell	er	rs	1.7	
Pit 327	jar	lip	shell	er	rs	0.7	
Pit 327	jar	lip	shell	er	rs	1.9	
Pit 327	jar	lip	shell	er	rs	2	
Pit 327	jar	rim	grit	cm	pl	11.3	exterior lip impressed; bosses
Pit 331	jar	rim	grit	cm	pl	0.6	
Pit 331	jar	rim	grit	cm	pl	4	exterior cord-wrapped dowel impressed lip; bosses
Pit 331	jar	rim	grit	cm	pl	5.7	exterior lip impressed; bosses
Pit 338	jar	shoulder	shell	cm	rs	12.1	bolster of clay added under neck
Pit 338	jar	lip	shell	pl	pl	1.5	
Pit 338	jar	lip	shell	pl	rs	1.6	
Pit 338	jar	rim	grit	cm	pl	0.4	
Pit 338	jar	rim	grit	cm	pl	0.7	exterior cord-wrapped lip impressed
Pit 341	jar	rim	grit	cm	pl	6.7	exterior dowel impressed
Pit 342	jar	rim	grit	cm	pl	0.5	interior plain dowel impressed
Pit 342	jar	rim	grit	pl	pl	5.5	n=3
Pit 342	jar	rim	grit	cm	pl	1.4	flat lip; possible tab
Pit 342	jar	neck	shell	er	rs	2.6	
Pit 345	jar	rim	shell	er	sl	0.5	
Pit 345	jar	shoulder	shell	cm	rs	28	cm 1.02 mm wide, 1.08 mm apart; deep and even cordmarking
Pit 346	jar	lip	shell	er	rs	1.5	
Pit 346	jar	lip	shell	er	rs	1.1	
Pit 346	jar	neck	shell	er	rs	3.4	
Pit 347	jar	rim	shell	ds	ds	1.2	
Pit 347	jar	lip	shell	er	rs	4.2	attached to front/exterior of vessel
Pit 347	jar	neck	shell	er	rs	4.1	
Pit 347	jar	rim	grit	cm	pl	3.6	hole
Pit 347	jar	lip	shell	er	rs	2.1	
Pit 347	jar	rim	grit	cm	pl	0.6	

Table B.4 Non-vessel Rim And Body Fragments From Olin (Continued)

Feature #	Vessel Form	Vessel Part	Temper	Ext surf	Int surf	Wt (g)	Comments
Pit 347	jar	rim	shell	er	rs	1.6	
Pit 351	jar	lip	shell	er	rs	0.3	
Pit 355	jar	rim	grit	pl	pl	4.7	exterior engraved dowel impressed
Pit 355	jar	lip	shell	er	rs	3	
Pit 355	jar	rim	shell	er	rs	1.6	
Pit 355	jar	rim	shell	er	rs	0.8	
Pit 355	jar	neck	shell	er	er	0.5	
Pit 355	jar	neck	shell	er	rs	0.6	
Pit 355	jar	neck	shell	pl	er	1.2	rim attached to top of vessel
Pit 356	jar	rim	shell	ds	pl	8.8	Ramey jar; burnished dark brown slip
Pit 356	jar	rim	grit	cm	pl	2.9	exterior lip impressed
Pit 358	jar	rim	grit	cm	pl	0.7	interior cord-wrapped dowel impressed
Pit 358	jar	neck	shell	er	rs	1.3	
Pit 36	jar	shoulder	shell	ds	pl	4	burnished, trailed line (blunt, narrow) in nested inverted arc motif
Pit 36	jar	neck	shell	cm	rs	6	
Pit 360	jar	rim	grit	cm	pl	1.3	exterior dowel impressed
Pit 360	jar	rim	grit	cm	pl	0.4	
Pit 360	jar	rim	grit	cm	pl	0.8	interior dowel impressed
Pit 360	jar	rim	grit	pl	pl	1.2	interior cord-wrapped dowel impressed
Pit 360	jar	rim	grit	pl	pl	5.3	interior cord-wrapped dowel impressed
Pit 360	jar	rim	grit	cm	pl	2.6	
Pit 360	jar	rim	grit	cm	pl	3.8	
Pit 360	jar	lip	shell	er	er	0.2	
Pit 360	jar	rim	shell	cm	rs	2.1	
Pit 360	jar	rim	grit	cm	pl	1.6	interior impressed
Pit 360	jar	neck	shell	cm	rs	4.7	
Pit 360	jar	rim	shell	er	er	3	
Pit 360	jar	rim	shell	er	rs	1.7	
Pit 360	jar	shoulder	shell	rs	rs	3.1	sharp shoulder with diagonal incised lines, sharp tool ~1 mm

Table B.4 Non-vessel Rim And Body Fragments From Olin (Continued)

Feature #	Vessel Form	Vessel Part	Temper	Ext surf	Int surf	Wt (g)	Comments
Pit 360	jar	rim	grit	cm	pl	0.6	exterior plain dowel impressed
Pit 360	jar	rim	grit	cm	pl	1.2	exterior plain dowel impressed
Pit 360	jar	rim	grit	cm	pl	36.7	
Pit 360	jar	rim	grit	cm	pl	36.1	
Pit 360	jar	rim	grit	cm	pl	7.7	
Pit 360	jar	rim	grit	cm	pl	6.1	exterior lip impressed
Pit 361	jar	lip	shell	er	rs	1.9	
Pit 363	jar	body	shell	ds	ds	15.6	horizontal trailed lines
Pit 363	jar	rim	grit	cm	pl	0.5	
Pit 363	jar	lip	shell	rs	rs	4	
Pit 364	jar	rim	grit	cm	pl	0.3	
Pit 364	jar	rim	grit	pl	pl	1.6	
Pit 365	jar	lip	shell	er	rs	2	sooted
Pit 365	jar	lip	shell	er	rs	1.2	
Pit 366	jar	neck	shell	er	rs	8.8	
Pit 367	jar	rim	shell	er	rs	1.1	
Pit 367	jar	lip	shell	er	er	2.3	
Pit 367	jar	neck	shell	rs	pl	5	reduced
Pit 367	jar	lip	shell	er	rs	0.5	
Pit 367	jar	lip	shell	er	rs	2.5	
Pit 367	jar	rim	shell	pl	rs	7.6	burnished; sooted
Pit 367	jar	rim	shell	cm	rs	5.4	
Pit 367	jar	lip	shell	er	rs	2.3	
Pit 368	jar	rim	grit	cm	pl	1.8	exterior cord-wrapped dowel impressed
Pit 37	jar	lip	grit	pl	pl	0.6	
Pit 37	jar	rim	grit	cm	pl	1.3	
Pit 371	jar	rim	grit	pl	pl	17.9	3 prong lip lug
Pit 372	jar	rim	grit	cm	pl	0.9	exterior cord-wrapped dowel impressed
Pit 372	jar	rim	grit	cm	pl	4.2	exterior cord-wrapped dowel impressed; mend hole
Pit 372	jar	rim	grit	cm	pl	1.1	exterior cord-wrapped dowel impressed
Pit 373A	jar	rim	grit	pl	pl	4.9	

Table B.4 Non-vessel Rim And Body Fragments From Olin (Continued)

Feature #	Vessel Form	Vessel Part	Temper	Ext surf	Int surf	Wt (g)	Comments
Pit 373A	jar	rim	grit	cm	pl	0.7	interior cord-wrapped dowel impressed
Pit 373A	jar	rim	grit	cm	pl	1.4	cm over lip
Pit 373A	jar	rim	grit	cm	pl	2.9	exterior dowel impressed
Pit 373A	jar	rim	grit	cm	pl	7.3	superior lip impressed
Pit 373A	jar	rim	grit	cm	pl	15.1	exterior cord-wrapped dowel impressed; bosses; hole
Pit 373A	jar	rim	grit	cm	pl	23.2	
Pit 375	jar	rim	grit	cm	pl	4.5	exterior cord-wrapped dowel impressed
Pit 43	jar	rim	shell	er	rs	3.8	
Pit 44	jar	rim	grit	cm	pl	1.4	superior cordmarking on lip; bosses
Pit 5	jar	shoulder	shell	ds	pl	6.08	burnished dark slip
Pit 6 House 1	jar	rim	shell	er	pl	4.8	
Pit 60	jar	lip	grit	cm	pl	0.7	rounded lip
Pit 67	jar	lip	shell	ds	ds	0.5	
Pit 68	jar	lip	shell	ds	er	0.8	
Pit 68	jar	rim	shell	ds	pl	0.38	lip rolled/pulled out from body
Pit 69	jar	neck	shell	er	ts	4.69	
Pit 74	jar	lip	grit	cm	pl	0.7	interior tool impressed lip
Pit 79	jar	rim	grit	pl	pl	2.1	
Pit 8	jar	rim	shell	er	rs	8.64	gray paste at core with buff surfaces; orifice greater than 32 cm
Pit 82	jar	rim	shell	er	rs	1.6	
Pit 82	jar	rim	shell	er	rs	1	
Pit 84	jar	rim	grit	cm	pl	0.5	diagonal exterior lip impression
Pit 87	jar	shoulder	shell	cm	pl	2	similar in construction to jar in 72-32; broken handle
Pit 88	jar	lip	shell	er	pl	2.1	
Pit 88	jar	rim	shell	er	rs	1.5	lip folded over and attached to exterior of vessel
Pit 88	jar	lip	shell	er	pl	1.4	
Pit 88	jar	body	shell	cm	rs	1	10.8
Pit 89	jar	lip	shell	pl	pl	0.6	sooted

Table B.4 Non-vessel Rim And Body Fragments From Olin (Continued)

Feature #	Vessel Form	Vessel Part	Temper	Ext surf	Int surf	Wt (g)	Comments
Pit 89	jar	lip	shell	er	rs	1.1	
Pit 89	jar	lip	shell	er	rs	0.8	
Pit 89	jar	lip	shell	er	ds	1	
Pit 90	jar	lip	shell	er	rs	3.2	
Pit 90	jar	rim	grit	pl	pl	2.6	possible use polish on exterior, interior and lip
Pit 93	jar	rim	grit	sm/cm	pl	1	interior lip impression
Pit 97	jar	rim	shell	er	rs	4.35	
Pit 97	jar	rim	grit	cm	pl	1.1	exterior lip impression
Pit 98	jar	rim	grit	pl	pl	3.5	lip notching
Pit 98	jar	rim	shell	rs	rs	0.3	
Pit 98	jar	lip	shell	er	rs	0.3	
Pit 98	jar	lip	shell	rs	rs	3.1	
Pit 98	jar	rim	grit	pl	pl	8.2	squared lip
Pit 99	jar	rim	shell	er	rs	1.1	
Pit 99	jar	rim	grit	pl	pl	2.35	Late Woodland jar
Pit 99	jar	lip	grit	cm	pl	1.45	Late Woodland jar, interior dowel impressed lip
Pit 99	jar	neck	shell	cm	rs	2	
Trench 11	jar	rim	grit	cm	pl		exterior cord-wrapped dowel impressed
Wall Trench 73-8; H21?	jar	shoulder	shell	er	pl	4.92	burnished interior; gray paste
Wall Trench 73-8; H21	jar	shoulder	shell	ds	ds	3.59	trailed lines - parallel horizontal lines below neck
Wall Trench I	jar	neck	shell	pl	rs	1.3	
Wall Trench M	jar	rim	shell	cm	rs	2.6	rim attached to exterior of vessel
Wall Trench M	jar	rim	grit	cm	pl	3.4	
House 6 Floor	jar/ bottle	shoulder	shell	rs	pl	17.17	red slip at lip and neck (suggests bottle?); rim constructed of coil added to top of vessel at neck to create rim or coil added to interior of neck to reinforce rim
House 3 Wall Trench 3	lobed jar	neck, shoulder	shell	ts	pl	8.23	compact gray paste; 18 cm orifice diameter, burnished exterior, rim curvature -0.081

Table B.4 Non-vessel Rim And Body Fragments From Olin (Continued)

Feature #	Vessel Form	Vessel Part	Temper	Ext surf	Int surf	Wt (g)	Comments
Pit 267	mini-vessel	lip	shell	rs	rs	0.4	10 cm orifice diameter
Pit 300	mini-vessel	rim	shell	rs	rs	0.3	
Pit 363	mini-vessel	body	shell	ds	pl	3.7	burnished dark slip over red; 6 cm orifice diameter
Pit 133	pan	rim	shell	er	rs	7	sooted
Pit 133	pan	lip	shell	er	rs	3.2	
Pit 251	pan	rim	none	pl	pl	0.6	
Pit 299	pan	rim	shell/ grog	pl	pl	4.5	
Pit 299	pan	rim	shell	rs	rs	1.8	
Pit 320	pan	neck	shell	ts	pl	5	
Pit 320	pan	rim	shell	ds	ds	4.5	
Pit 327	pan	lip	shell	er	rs	2.8	
Pit 36	pan	rim	shell	pl	rs	1.6	sooted exterior
Pit 363	pan	rim	shell	pl	rs	7.5	deep; sooted exterior
Ind	pinch pot	rim	none	pl	pl	34.6	
60N 92.5W	pinch pot	shoulder	shell	pl	pl	9.1	
H39 Outer West Wall	pinch pot	rim	none	pl	pl	1.5	4 cm diameter
House 29	pinch pot	rim	none	cm	pl	2.6	
House 29	pinch pot	rim	none	pl	pl	1.1	
Pit 101	pinch pot	rim	none	pl	pl	0.4	
Pit 109	pinch pot	rim	none	pl	pl	2	
Pit 127	pinch pot	rim	none	pl	pl	4.7	oblique reed punctates around neck ~2.8 mm wide
Pit 132	pinch pot	rim	none	pl	pl	2.6	
Pit 132	pinch pot	rim	none	pl	pl	1.1	
Pit 136	pinch pot	rim	none	cm	pl	4.9	
Pit 154	pinch pot	rim	none	pl	pl	0.7	
Pit 156	pinch pot	rim	none	pl	pl	2.8	dentate stamp or horizontal slashes; n=2
Pit 17	pinch pot	lip	grog	pl	pl	1.5	
Pit 187	pinch pot	rim	none	pl	pl	22.6	
Pit 196	pinch pot	rim	none	pl	pl	0.8	
Pit 203	pinch pot	rim	none	sm/cm	pl	8	
Pit 204	pinch pot	rim	grit	pl	pl	2.5	
Pit 213	pinch pot	rim	none	pl	pl	2.2	
Pit 214	pinch pot	rim	none	pl	pl	1.1	
Pit 214	pinch pot	rim	none	pl	pl	1.7	

Table B.4 Non-vessel Rim And Body Fragments From Olin (Continued)

Feature #	Vessel Form	Vessel Part	Temper	Ext surf	Int surf	Wt (g)	Comments
Pit 224	pinch pot	rim	none	pl	pl	2.1	
Pit 249	pinch pot	rim	none	pl	pl	2.4	
Pit 250	pinch pot	body	none	cm	pl	15.9	inclusions
Pit 250	pinch pot	rim	none	cm	pl	2.9	
Pit 258	pinch pot	rim	none	sm/cm	pl	10.8	
Pit 266	pinch pot	rim	none	pl	pl	3	interior lightly sooted
Pit 266	pinch pot	rim	none	pl	pl	3.4	interior sooted
Pit 274	pinch pot	rim	none	pl	pl	1.4	n=2
Pit 274	pinch pot	rim	shell	pl	pl	1.4	
Pit 279	pinch pot	rim	none	pl	pl	1.2	
Pit 279	pinch pot	rim	none	pl	pl	1.8	
Pit 286	pinch pot	rim	none	pl	pl	0.9	
Pit 289	pinch pot	rim	none	pl	pl	0.6	
Pit 295	pinch pot	rim	none	pl	pl	1.4	
Pit 311	pinch pot	lip	none	pl	pl	0.8	
Pit 311	pinch pot	rim	none	pl	pl	4.4	
Pit 312	pinch pot	rim	none	pl	pl	2.8	
Pit 320	pinch pot	rim	none	pl	pl	11.3	
Pit 320	pinch pot	rim	none	pl	pl	11.3	
Pit 320	pinch pot	rim	none	pl	pl	5.5	
Pit 320	pinch pot	rim	none	pl	pl	2.8	
Pit 320	pinch pot	rim	none	pl	pl	0.5	
Pit 360	pinch pot	rim	none	pl	pl	4.9	
Pit 360	pinch pot	rim	none	pl	pl	1.1	
Pit 360	pinch pot	rim	none	sm/cm	pl	1.9	
Pit 360	pinch pot	rim	none	pl	pl	2	sandy paste
Pit 364	pinch pot	rim	sand	pl	pl	0.6	
Pit 373A	pinch pot	rim	none	pl	pl	3	
Pit 373A	pinch pot	rim	none	pl	pl	0.7	
Pit 373B	pinch pot	rim	none	pl	pl	2.2	
Pit 373B	pinch pot	rim	none	pl	pl	7.4	
Pit 373B	pinch pot	rim	none	sm/cm	pl	2.7	
Pit 5	pinch pot	rim	none	pl	pl	1.6	
Pit 82	pinch pot	rim	none	pl	pl	1.3	
Pit 99	pinch pot	rim	none	pl	pl	1.5	reduced
unknown	plate	rim	shell	ds	ds	6.6	
Pit 138	plate	lip	shell	ds	ds	2.5	burnished
Pit 203	plate	lip	shell	ds	ds	0.5	

Table B.4 Non-vessel Rim And Body Fragments From Olin (Continued)

Feature #	Vessel Form	Vessel Part	Temper	Ext surf	Int surf	Wt (g)	Comments
Pit 294	plate	lip	shell	rs	trailed	1.4	narrow blunt trailed lines - possible nested chevron motif
Pit 318	plate	rim	shell	ds	ds	9.2	medium blunt trailed line chevron motif
Pit 36	plate	rim	shell	rs	rs	5.08	trailed line (blunt, narrow)
Pit 313	plate/ shallow bowl	rim	shell	ds	ds	1.1	trailed line on rim
Pit 9	plate/ shallow bowl	lip	shell	ds	ds	1.37	dark gray compact paste, burnished surfaces, 18 cm orifice diameter
Pit 253	utensil	rim	shell	er	er	5.6	crude bowl

Table B.5. Visual Attributes Of Cordmarked Jars From Olin

Vessel #	Feature	CM Orient	CM Twist	CM Width	CM Space	Int Slip	Ext Soot	Rim attach	Dec/ Appliq	# of sherds	Wt (g)
5-1	Pit 5	Vert	Z	1.45	1.17	n/a	N	front/ ext, extra clay at end of lip		2	101.73
5-2	Pit 5	Dia	S	1.09	1.2	n/a	Y	top		1	36.13
7-1	Pit 7	Dia	Z	1.22	1.2	red	Y	front/ext		8	37.89
9-5	Pit 9	Vert	ind.			red	Y	top		1	9.07
15-1	Pit 15	Vert	S	1.61	1.15	red	Y	front/ext, extra clay added to neck ext		1	90.23
15-2	Pit 15	Vert	S	1.45	1.17	red	Y	top		1	35.81
15-4	Pit 15	Vert				red	N	top		1	9.4
17-1	Pit 17	Vert	S	1.31	1.47	red	Y	top		1	46.4
17-2	Pit 17	Vert	Z	1.32	1.25	red	N	top	lug	1	46.38
17-6	Pit 17	Vert	S	0.94	1.4	red	Y	top		1	77.22
20-1	Pit 20	Vert	S	1.22	1.83	n/a	N	folded out from body	handle	1	17.42
28-1	Pit 28A	Vert	Z	0.95	0.94	red	N	front/ext		1	16.59
28-2	Pit 28A	Vert	Z	1.5	1.31	red	Y	top		1	43.66
28-3	Pit 28A	Vert	Z	1	1.1	red	N	top		1	45.93
28-4	Pit 28A	Vert	Z	1.2	1.31	n/a	Y	angled out from neck, extra clay added to lip		1	17.57
28-5	Pit 28A	Vert				red	Y	front/ext		1	21.47
28-9	Pit 28A	Vert	S			red	N	front/ext		1	64.6
36-1	Pit 36	Vert	S	0.77	0.75	red	Y	front/ext	lip tab	1	33.88
36-2	Pit 36	Vert	Z	1.2	1.13	red	Y	front/ext, slight bolster of clay at neck		1	55.11
37-2	Pit 37	Vert				red	N	indeterminate		1	12.3
51-2	Pit 51	Vert	Z	1.32	1.44	red	Y	front/ext, extra clay added to neck ext		1	39.96
51-3	Pit 51	Vert				red	N	top, extra clay below lip		1	23.83
68-2	Pit 68	Vert	S	1.45	0.5	red	Y	top		1	17.37
69-4	Pit 69	Vert				red	N	front/ext, clay added		1	12.1

Table B.5 Visual Attributes Of Cordmarked Jars From Olin (Continued)

Vessel #	Feature	CM Orient	CM Twist	CM Width	CM Space	Int Slip	Ext Soot	Rim attach	Dec/ Appliq	# of sherds	Wt (g)
73-1	Pit 73	Vert	S	1.25	0.98	red	Y	top		1	52.12
84-1	Pit 84	Dia	Z	1.33	1.7	n/a	Y	top		1	14.7
88-3	Pit 88	Vert				red	Y	top	handle	1	6.53
88-4	Pit 88	Vert				red	N	indeterminate		11	21.2
89-1	Pit 89	Vert				n/a	Y	front/ext		1	60.33
89-2	Pit 89	Vert	Z	1.69	1.5	red	N	folded under and smoothed at neck	finger impress	2	22.1
89-3	Pit 89	Vert	S	1.24	0.75	red	Y	continuous from neck, extra clay added or folded under lip	lip tab	2	25.78
90-1	Pit 90	Vert	S	1.29	0.96	red	Y	top, extra clay added at end of lip for tab		1	15.18
101-2	Pit 101	Vert	S	1.25	1.1	red	Y	continuous from neck, small amount of clay rolled under at lip		3	12.85
114-2	Pit 114 and 119	Vert	Z	1.11	1.5	red	Y	front/ext		1	58.85
115-2	Pit 115	Vert	Z	0.93	1.03	red	Y	top		1	5.92
122-3	Pit 122	Vert	Z	1.13	1.06	n/a	Y	top		1	13.48
127-1	Pit 127	Vert	Z	1.5	1.47	red	Y	continuous from neck, clay added over/around top of lip		1	57
127-2	Pit 127	Vert	Z	1.5	0.94	red	Y	front/ext		1	51.08
127-3	Pit 127	Vert	S	1.5	1.18	red	Y	front/ext		1	67.16
127-4	Pit 127	Vert				n/a	N	top		1	24.57
127-5	Pit 127	Vert	Z	1.3	1.3	red	Y	top		1	29.52
128-1	Pit 128	Vert	S	0.96	1.76	red	N	top		1	33.5
131-1	Pit 131	Vert		2.4	1.25	red	N	top		1	7.4
134-2	Pit 134	Vert	Z	1.5	1.8	red	N	top		1	12.1
146-1	Pit 146	Vert		1.25	0.75	red	Y	top	lip tab	1	35.6
147-1	Pit 147	Vert	S	1.3	0.8	red	Y	continuous from neck		1	10.7
147-2	Pit 147	Vert				red	N	top		1	11.2

Table B.5 Visual Attributes Of Cordmarked Jars From Olin (Continued)

Vessel #	Feature	CM Orient	CM Twist	CM Width	CM Space	Int Slip	Ext Soot	Rim attach	Dec/ Appliq	# of sherds	Wt (g)
152-1	Pit 152	Vert	Z	1.26	1.09	red	Y	top		1	88.19
152-2	Pit 152	Vert	S	1.05	1.07	red	Y	top		3	26.25
152-3	Pit 152	Vert	S	1.06	1.15	n/a	Y	top		1	9.68
164-1	Pit 164	Vert				red	Y	front/ext		1	13.1
192-3	Pit 192	Vert				red	Y	top		1	5.3
197-1	Pit 197	Vert	S	1.39	0.95	red	Y	top, extra clay added to neck ext		1	66.4
198-1	Pit 198	Vert	Z	1.92	1.56	n/a	Y	top		1	81.99
203-1	Pit 203	Vert	S	1.06	1.8	red	Y	continuous from neck, extra clay added over top		1	11.5
203-2	Pit 203	Vert	S	1.5	1.13	red	Y	top		1	65.4
215-1	Pit 215	Vert		1.5	2	n/a	N	front/ext		1	6.3
216-1	Pit 216	Vert	S	1.13	1.19	red	Y	top, extra clay at neck ext		1	70.4
216-2	Pit 216	Vert	Z	1.4	1.6	red	Y	front/ext		1	91.1
216-3	Pit 216	Vert		1.3	1.03	n/a	N	top	handle	1	12.1
216-4	Pit 216	Vert	S	1.25	1.13	red	N	front/ext		1	14.8
216-5	Pit 216	Dia/ Vert	S	1.6	1.05	red	Y	continuous from neck		1	45.3
226-1	Pit 226	Vert-Dia	S	1.88	1.9	red	N	front/ext		1	38
227-1	Pit 227	Vert	Z	2.15	1.2	red	N	front/ext		1	109.9
227-3	Pit 227 and pz	Vert				red	N	front/ext		1	27.9
232-1	Pit 232	Dia	S	1.31	1.01	red	Y	n/a		1	78.2
247-1	Pit 247	Vert	Z	1.8	2	red	Y	front/ext		1	64.07
253-1	Pit 253	Vert	S	1.6	1.65	red	Y	top		1	40.7
255-1	Pit 255	Vert				red	Y	top, extra clay added to neck ext		1	18.1
259-1	Pit 259	Vert		1.67	1.72	red	Y	top		1	33
265-1	Pit 265	Vert	Z	1		red	Y	angled out from neck, extra clay added to neck ext		1	51.5

Table B.5 Visual Attributes Of Cordmarked Jars From Olin (Continued)

Vessel #	Feature	CM Orient	CM Twist	CM Width	CM Space	Int Slip	Ext Soot	Rim attach	Dec/ Appliq	# of sherds	Wt (g)
267-1	Pit 267	Vert	Z	1.2	0.8	red	N	angled out from neck, extra clay added below rim and to front of vessel		1	26.5
267-2	Pit 267	Vert	S	1.68	1.75	red	Y	top		1	61.6
267-3	Pit 267	Vert		1.72	1.14	red	Y	front/ext		1	29.93
267-4	Pit 267	Vert	S	1.62	1.08	red	Y	front/ext		1	48.98
272-2	Pit 272	Vert	Z	1.9	1.41	red	Y	front/ext		1	60.8
272-4	Pit 272	Vert	Z	1.25		red	N	top		1	35.1
273-1	Pit 273	Vert	Z	1.51	1.53	red	Y	continuous from neck folded over to ext.		1	21.3
273-2	Pit 273	Vert	Z	1.05	1.06	red	Y	front/ext, extra clay added at neck		1	6.9
274-1	Pit 274	Vert	S	1.55	0.75	n/a	Y	top		1	33.8
276-1	Pit 276	Vert	Z	1.2	0.95	red	Y	folded out from neck, extra clay added at neck ext		1	35.47
277-4	Pit 277	Vert				red	Y	front/ext		1	12.5
286-2	Pit 286	Vert				red	N	front/ext		1	2.8
289-6	Pit 289	Vert				red	Y	folded over from neck, clay added around top and exterior		1	16.1
294-4	Pit 294	Vert	S	2.1	2.15	red	Y	top		1	28.4
318-6	Pit 318	Vert				red	Y	front/ext		1	19.8
319-3	Pit 319	Vert				red	Y	top		1	9.8
320-1	Pit 320	Vert	Z	2.2	1.75	red	Y	top, extra clay added at neck/ bottom of rim	lip tab	1	99.8
320-2	Pit 320	Vert	S	1.73	1.28	red	Y	front/ext, extra clay added to neck ext		1	54.9
320-3	Pit 320	Vert	Z	2.08	0.83	red	Y	top, extra clay added to neck exterior		1	26.6
320-4	Pit 320	Vert				red	Y	continuous from neck with extra clay added for lip and tab		1	12

Table B.5 Visual Attributes Of Cordmarked Jars From Olin (Continued)

Vessel #	Feature	CM Orient	CM Twist	CM Width	CM Space	Int Slip	Ext Soot	Rim attach	Dec/ Appliq	# of sherds	Wt (g)
320-5	Pit 320	Vert				red	Y	top, extra clay added to form lip		1	22.8
320-6	Pit 320	Vert				red	Y	top		1	13.8
324-1	Pit 324	Vert	Z	1.51	1.71	n/a	Y	top	handle	1	46.5
325-2	Pit 325	Vert	Z	1.3	1	red	Y	top		1	21.3
327-2	Pit 327	Vert				red	N			1	4.5
355-1	Pit 355	Vert	S	1.3	2	red	Y	front/ext		1	73.3
356-3	Pit 356	Vert		1.61	1.3	red	N	front/ext		1	18.4
357-3	Pit 357	Vert	S	1.6	1.49	red	N	front/ext		1	64.6
362-1	Pit 362	Vert				red	Y	front/ext		1	24
H23-1	House 23 area	Vert				n/a	N	top		1	19
H2-1	Wall Trench House 2	Vert				red	N	indeterminate		1	3.3
H23-2	House 23 area	Vert	Z	1.76	1.52	red	N	front/ext		1	28.6
H23-5	House 23 area	Vert		0.87	1.04	red	Y	continuous from neck, extra clay added at lip		1	37.7
H20-2	Wall Trench 73-7	Vert	Z			n/a	Y	front/ext	effigy handle	1	26.5
H29-3	House 29	Vert	Z	1.14	1.23	red	Y	top		1	40.9
H29-4	House 29	Vert	S	1.68	1.72	red	N	front/ext, extra clay added to neck ext		1	23.7
H29-4	House 29	Vert	S			red	N	top	handle	1	8.5
H29-7	House 29	Vert	Z	1.09	0.51	red	Y	top		1	39
H32-5	House 32 Basin	Vert	Z	1.14	1.54	red	N	front/ext		1	18

Table B.5 Visual Attributes Of Cordmarked Jars From Olin (Continued)

Vessel #	Feature	CM Orient	CM Twist	CM Width	CM Space	Int Slip	Ext Soot	Rim attach	Dec/ Appliq	# of sherds	Wt (g)
PZ-19	67.5N 67.5W	Vert	Z	1.18	0.5	red	N	front/ext		1	60.4
PZ-22	70N 65W	Vert	Z			red	N	n/a	lip tab	1	38.4
PZ-23	55.5W 51N	Vert	Z	0.95	0.3	red	Y	front/ext		1	52
PZ-3	60N 92.5W	Vert	Z			red	N	n/a		1	30.4
PZ-4	60N 92.5W	Vert				n/a	N	n/a		1	24.7
PZ-5	70N 90W	Vert	S			red	Y	n/a		1	28.4
SL-3	Sweat lodge	Vert		1.37	1.13	red	Y	front/ext		1	13.7
WT 73-8-3	WT 73-8	Vert	S	1.28	0.9	red	N	front/ext		1	14.46

Table B.6. Metric Attributes Of Cordmarked Jars From Olin

Vessel #	Orifice Dia (cm)	% of Orifice	RA (deg)	LB (deg)	LL (mm)	WT (mm)	RC	LT (mm)	LP	LS	RT (mm)	WTD
5-1	24	15%		22	26.2	7.7	0	8.19				
5-2	18	10%		20	22.8	6.07	-0.003	5.3				
7-1	10	20%		14	11.1	4.79	-0.049	5.1	0.43	2.173	0.48	0.568
9-5	22	5%		17	26.6			7.16		3.71		
15-1	26	15%		25	23.2	5.17	-0.04	7.21	0.223	3.21	0.04	0.635
15-2	14	10%		26	23.4	6.08	-0.033	7.86	0.26	2.974	0.503	
15-4	22	3%		11	26.4	6.27		6.55	0.238	4.03	0.288	
17-1	28	7%		38	24.9	7.03		8.34	0.282	2.99	0.247	
17-2	22	20%		29	25	6.92	0.025	6.3	0.277	3.97	0.264	
17-6	26	15%		34	27.3	5.71	-0.059	6.17	0.209	4.43	0.245	0.664
20-1	14	10%		2	24.2	5.38		4.96	0.222	4.875	0.396	
28-1	14	10%		24	18.6	4.7	-0.009	5.31	0.253	3.5	0.258	
28-2	26	7%		23	18.2	8.19	-0.017	8.99	0.45	2.03	0.252	
28-3	28	10%		34	26	6.94	0	7.29	0.267	3.568	0.209	
28-4	12	15%		32	14	4.29	-0.075	5.21	0.307	2.681	0.342	0.934
28-5	24	8%		27	27.2	6.25		8.94	0.23	3.037		
28-9	28	13%		37	22.6	5.75	-0.06	13.53			0.166	1.34
36-1	26	10%		34	23.7	6.43		8.3	0.272	2.851	0.182	
36-2	24	10%		27	21.1	6.04	-0.044	5.88	0.287	3.582	0.235	0.621
37-2	24	6%			24.1			9.29				
51-2	22	10%		21	22.9	6.78	-0.019	5.99	0.296	3.83	0.224	
51-3	26	10%		28	22.6	6.37	0	7.18	0.282	3.15	0.195	
68-2	24	5%		15	19.6	5.49		7.9	0.28	2.482	0.19	
69-4	27	5%		52	22.5	6.19		8.33	0.276	2.719		
73-1	26	15%		39	29.8	4.52	-0.027	5.49	0.152	5.423	0.17	
84-1	14	9%		27	17.2	5.1	-0.025	4.4	0.297	3.91	0.395	0.532
88-3	12	3%		27	20.4	7.82		5.52	0.27	3.7	0.652	

Table B.6 Metric Attributes Of Cordmarked Jars From Olin (Continued)

Vessel #	Orifice Dia(cm)	% of Orifice	RA (deg)	LB (deg)	LL (mm)	WT (mm)	RC	LT (mm)	LP	LS	RT (mm)	WTD
88-4	14	10%						5.98				
89-1	18	15%		44	21.3	6.92		9.15	0.325	2.328	0.346	
89-2	14	15%		37	12.3	4.91		4.87	0.401	2.515	0.325	
89-3	22	7%		13	21.7	7.4		7.06	0.341	3.078	0.326	
90-1	20	10%		33	14	6.29		6.22	0.45	2.248	0.296	
101-2	33	5%						5.4				
114-2	30	15%		36	26.9	6.38		10.39	0.237	2.59		
115-2	20	3%		20	22.1	5.44		6.77	0.246	3.264	0.257	
122-3	18	8%		33	21.3	6.54		5.63	0.307	3.782	0.316	
127-1	26	12%		33	28.7	5.31		6.84	0.185	4.19	0.147	
127-2	24	6%		34	21.8	6.14	-0.057	6.02	0.282	3.621	0.23	0.748
127-3	28	15%		29	26.7	6.19	-0.021	8.98	0.232	2.97	0.156	
127-4	18	10%		25	16.2	6.01		7.36	0.372	2.194	0.287	
127-5	12	15%		30	13.5	5.26	-0.08	4.54	0.39	2.974	0.361	0.797
128-1	24	7%		32	23	5.99	-0.043	7.23	0.107	3.174	0.197	
131-1	13	5%		15	14.7	5.68		5.5	0.386	2.673	0.437	
134-2	18	5%		45	24.2	6.25		7.03	0.259	3.437	0.272	
146-1	24	10%		22	22.7	5.7		5.75	0.251	3.944	0.207	1.115
147-1	14	10%		14	19.6	6.03		5.84	0.307	3.36	0.407	
147-2	22	5%		16	15.8	5.2		2.46	0.329			
152-1	26	15%		35	30.3	5.55	-0.019	7.85	0.183	3.859	0.18	
152-2	16	12%		23	28.8	6.79		4.7	0.236	6.123	0.353	
152-3	12	12%		9	18.8	3.96		5.1	0.21	3.692	0.304	
164-1	24	6%		39	24.9	6.18		7.69	0.248	3.238		
192-3	19	3%		23	22.8	6.5		6.9	0.285	3.304		
197-1	22	17%		38	19.2	8.2	-0.036	6.17	0.427	3.112	0.273	
198-1	20	15%		30	23.7	8.39	-0.069	7.82	0.354	3.027	0.327	0.601

Table B.6 Metric Attributes Of Cordmarked Jars From Olin (Continued)

Vessel #	Orifice Dia(cm)	% of Orifice	RA (deg)	LB (deg)	LL (mm)	WT (mm)	RC	LT (mm)	LP	LS	RT (mm)	WTD
203-1	18	10%		21	20.6	5.09		5.51	0.248	3.73	0.201	
203-2	18	20%		31	21	5.48		6.33	0.261	3.318	0.279	0.757
215-1	32	3%		24	19.5	5.61		5.96	0.288	3.263		
216-1	26	18%		39	26	6.09		8.02	0.235	3.237	0.202	
216-2	32	12%		33	22.3	6.43		6.58	0.289	3.383	0.18	0.645
216-3	22	5%		39	19	5.95		5.81	0.314	3.263	0.23	
216-4	20	10%		22	20	4.88		5.6	0.244	3.57	0.188	
216-5	20	15%	98		27.5	4.84	-0.058	4.7	0.176	5.847	0.23	
226-1	34	7%		22	25.2	5.94	-0.052	7.3	0.236	3.445	0.119	0.955
227-1	32	14%		33	26.7	5.02	-0.051	11.52	0.188	2.313	0.152	
227-3	36	3%		22	27.6	6.02		12.22	0.218	2.598		
232-1	28	12%		21	30.7	6.27		7.86	0.204	3.906	0.137	
247-1	28	12%		25	20.8	4.57	-0.04	12.18	0.22	1.707	0.144	
253-1	20	13%		15	20.7	4.98	-0.031	7.68	0.24	2.701	0.234	
255-1	24	10%		40	22.4	6.86		7.54	0.307	2.967		
259-1	25	6%		35	24.5	5.5	-0.068	5.92	0.225	4.13	0.222	0.827
265-1	26	15%		35	23.2	4.95	-0.043	5.76	0.213	4.028	0.186	0.692
267-1	12	28%		34	14.2	5.84		5.4	0.411	2.63	0.482	
267-2	30	15%		14	26.5	5.92		8.23	0.223	3.22	0.148	
267-3	22	10%		39	29	7.43		8.67	0.257	3.339	0.294	
267-4	28	12%		41	29.6	6.25	0.012	9.36	0.211	3.158	0.206	
272-2	26	10%		30	18.3	8.11	-0.026	8.24	0.444	2.216	0.279	
272-4	24	12%		28	25.7	6.06	-0.029	7.3	0.236	3.521	0.231	
273-1	32	5%		13	18.6	7.97		8.63	0.429	2.154	0.205	
273-2	20	5%		28	21.4	21.4		5.38	0.295	3.981	0.229	
274-1	26	8%		33	32.7	6.8		9.95	0.208	3.283	0.211	
276-1	26	5%		41	17.4	6.72		7.09	0.387	2.449	0.167	

Table B.6 Metric Attributes Of Cordmarked Jars From Olin (Continued)

Vessel #	Orifice Dia(cm)	% of Orifice	RA (deg)	LB (deg)	LL (mm)	WT (mm)	RC	LT (mm)	LP	LS	RT (mm)	WTD
277-4	20	5%		25	23.9	5.97		5.46	0.25	4.374		
286-2	10	3%		41	21.7	5.81		5.87	0.268	3.69		
289-6	28	5%		37	24.4	4.91		8.62	0.202	2.825		
294-4	14	22%		35	20.6	4.74	-0.062	4.98	0.23	4.137	0.339	0.707
318-6	18	5%		19	25.5	6.01		10.18	0.236	2.504	0.327	
319-3	28	5%		40	24.7	5.9		6.81	0.239	3.606		
320-1	30	18%		37	26.2	4.86	-0.024	9.1	0.185	2.88	0.152	
320-2	26	12%		27	22.7	6.09	-0.058	10.14	0.268	2.24	0.192	1.008
320-3	16	10%		30	22.3	4.76	-0.059	5.72	0.214	3.892	0.249	1.194
320-4	18	10%		12	28.3	5.46		6.81	0.193	4.16	0.244	
320-5	34	5%		26	29.7	5.01		7.83	0.169	3.787		
320-6	18	11%		26	25.8	5.13		6.63	0.199	3.893		
324-1	22	12%		38	20	6.4		9	0.32	2.223	0.246	
325-2	28	5%		23	20.1	8.62		3.91	0.428	5.15	0.21	
327-2	14	5%						8.2				
355-1	20	20%		35	22.2	5.65	-0.024	6.22	0.254	3.571	0.269	
356-3	22	7%		50	19	6.79		6.13	0.357	3.103		
357-3	24	15%		48	21	5.55	-0.04	5.9	0.264	3.566	2.333	
362-1	35	3%		12	23.2	7.07		10.14	0.305	2.289		
H23-1					27.2	6.78		7.2	0.25	3.771		
H23-2	21	3%		43	20.2	6.45	-0.012	7.67	0.319	2.638	0.293	
H23-5	20	3%		65	18.3	3.29	-0.046	6.14	0.179	2.987	0.193	1.42
H2-1	18	3%			20.4	5.14		6.16	0.252	3.31		
H20-2	20	5%		25	20	4.75		5	0.238	3.996	0.237	
H29-3	22	8%		34	22	7.04	-0.029	5.48	0.32	4.018	0.228	
H29-4	16	10%		24	21.5	4.25		8.28	0.197	2.6	0.304	
H29-4	20	5%		18	19.9	6.77		4.99	0.34	3.996	0.336	

Table B.6 Metric Attributes Of Cordmarked Jars From Olin (Continued)

Vessel #	Orifice Dia(cm)	% of Orifice	RA (deg)	LB (deg)	LL (mm)	WT (mm)	RC	LT (mm)	LP	LS	RT (mm)	WTD
H29-7	26	9%		44	26.8	6.98	-0.016	8.58	0.261	3.118	0.24	
H32-5	30	5%		51	24.5	6.16		5.87	0.251	4.174		
PZ-19	18	20%		21	20.2	5.27	-0.039	5.71	0.26	3.545	0.253	0.569
PZ-22	24	10%		30	26.4	6.4		7.27	0.242	3.635	0.261	
PZ-23	14	20%		36	14.9	4.42	-0.041	6.91	0.298	2.149	0.78	0.987
PZ-3	22	10%		29	22.4	7.87		6.25	0.351	3.59	0.341	
PZ-4	21	10%		27	23.9	8.24		9	0.346	2.658		
PZ-5	20	10%		24	20	5.48	-0.032	0.274	0.274	3.135	0.272	0.851
SL-3	20	10%		60	12.3	4.25		8.35	0.347	1.467	0.174	
WT 73-8-3	27	3%		15	20.3	6.5		6.49	0.32	3.126	0.21	

Table B.7. Visual Attributes Of Slipped Jars From Olin (Ramey Incised Vessels Are Italicized)

Vessel #	Feature	Temper Size	Ext slip	Dec/ Applique	Ext Soot	Int Slip	Int burnish	Rim attach	# sherds	Wt (g)
28-10	Pit 28A	Fine	red	lip tab		red		indeterminate	1	1.9
51-1	*Pit 51*		*tan*	*burnished trailed*		*tan*		*Angled rim continuous from neck, extra clay added to bottom of lip*	*1*	*3.65*
56-1	Pit 56	Fine-Med	drkbrn	burnished	Y			continuous from neck, extra clay added to lip and below	1	16.5
63-1	Pit 63	Fine-Med	red	burnished	Y	red	Yes	top	1	21.74
69-3	*Pit 69*	*Fine-Med*	*drkbrn/ black*	*Burnished trailed*				*Everted rim attached to front/ext*	*2*	*11.58*
73-2	Pit 73	Fine	drkbrn	burnished	Y	n/a		folded out from neck	1	5.06
74-2	Pit 74	Fine-Med	red	lip notching		red		High-angled rim, indeterminate attachment	22	225.7
82-2	Pit 82	Fine	drkbrn/ black	burnished	Y	dkbrn/ black	Yes	folded out from neck	1	9.05
84-2	Pit 84	Fine	tan			n/a		Rolled lip, from neck	1	3.8
84-3	Pit 84		red			red		indeterminate	1	3.3
84-4	Pit 84		red	burnished		red	Yes	indeterminate	1	2.1
88-2	Pit 88		red/ brown		Y	n/a		indeterminate	1	18.86
89-4	Pit 89		drkbrn			n/a		continuous from neck	1	8.27
89-13	Pit 89	Fine-Med	tan	burnished		n/a		lip folded under	1	18.68
89-19	Pit 89		red			red		indeterminate	1	1.21
101-1	Pit 101	Fine-Med	drkbrn/ black	burnished		dkbrn/ black	Yes	front/ext	1	1.16
107-1	Pit 107		red			red		indeterminate	1	1.8
109-1	Pit 109		red			n/a		Rolled lip, from neck	1	1.35
129-1	*Pit 129*	*Fine*	*drkbrn/ black*	*Burnished trailed*		*dkbrn*		*Angled rim*	*1*	*10.7*
133-6	Pit 133	Fine-Med	tan	burnished	Y	n/a		clay added to interior	1	10.2
143-1	Pit 143	Fine	tan	burnished		red		Rolled lip, from neck	1	19.61
146-2	Pit 146	Fine-Med	drkbrn	burnished handle		dkbrn		indeterminate	1	3

Table B.7 Visual Attributes Of Slipped Jars From Olin (Ramey Incised Vessels Are Italicized) (Continued)

Vessel #	Feature	Temper Size	Ext slip	Dec/ Applique	Ext Soot	Int Slip	Int burnish	Rim attach	# sherds	Wt (g)
152-4	Pit 152	Fine-Med	drkbrn	burnished		n/a		top	1	4.82
162-1	Pit 162	Fine	drkbrn	burnished		dkbrn		rolled out from neck	2	5.72
192-4	Pit 192	Fine-Med	tan			tan		folded out from neck	1	5
192-5	*Pit 192*	*Fine-Med*	*drkbrn*	*trailed*		*dkbrn*		*Everted/angled attached to front/ext*	*1*	*9.7*
203-3	Pit 203	Fine	drkbrn	burnished handle trailed		none		High-angled rim continuous from neck	2	11.1
213-1	Pit 213	Fine	drkbrn/ black	burnishedlobed		dkbrn/ black	Yes	top	1	24.1
213-2	Pit 213	Fine	drkbrn	burnishedhandle, lobed		none		top	2	12.5
216-6	*Pit 216*	*Fine*	*drkbrn*	*burnishedtrailed*		*dkbrn*	*Yes*	*Everted/angled folded out from neck*	*1*	*3.4*
216-7	*Pit 216*	*Med-coarse*	*drkbrn*	*Burnished trailed*		*n/a*		*Angled attached to top*	*1*	*9.5*
216-8	Pit 216	Fine-Med	tan			n/a		top	1	6.2
235-1	Pit 235		drkbrn			dkbrn		top	1	9.7
256-1	Pit 256	Fine	drkbrn/ black	burnished handle		dkbrn		continuous from neck	1	16.1
256-2	*Pit 256*	*Fine*	*drkbrn*	*burnished trailed*				*Angled folded out from neck*	*2*	*7.8*
267-15	Pit 267		drkbrn			red		indeterminate	1	5.4
299-1	Pit 299	Fine	tan	burnished		tan	Yes	top	1	5
299-3	Pit 299	Fine	drkbrn/ black	burnished		dkbrn/ black	Yes	n/a	1	6.5
299-8	Pit 299	Fine	tan	burnished		n/a		top	1	9.4
302-2	Pit 302	Fine	drkbrn	burnished		n/a		top	1	8.9
312-1	Pit 312	Fine-Med	red			n/a		Continuous from neck	1	1
315-1	Pit 315		red			red		continuous from neck	4	19.3
315-2	*Pit 315*		*drkbrn/ black*	*burnished trailed*		*dkbrn*		*Angled attached to front/ext*	*3*	*24.2*
320-7	Pit 320	Fine-Med	drkbrn	burnished				front/ext	1	10.1

Table B.7 Visual Attributes Of Slipped Jars From Olin (Ramey Incised Vessels Are Italicized) (Continued)

Vessel #	Feature	Temper Size	Ext slip	Dec/ Applique	Ext Soot	Int Slip	Int burnish	Rim attach	# sherds	Wt (g)
321-8	*Pit 321*		*drkbrn/ black*	*burnished trailed*		*n/a*		*Angled continuous from neck*	*1*	*4.6*
327-3	Pit 327	Fine	drkbrn/ black	burnished		n/a		continuous from neck	1	5.3
350-9	Pit 350	fine, med, lg	red	burnished		n/a	Yes	top	1	171.08
356-1	*Pit 356*	*very fine-fine*	*drkbrn*	*burnished trailed*		*n/a*		*Angled, attached to top*	*1*	*16.4*
357-2	Pit 357		tan		Y	n/a		front/ext	1	24.1
360-3	Pit 360	very fine-fine	drkbrn/ black	burnished		dkbrn/ black	Yes	top	1	3.1
363-1	Pit 363	Fine	tan	burnished handle		tan		continuous from neck	1	29
367-4	Pit 367	very fine-fine	drkbrn/ black	burnished	Y	n/a		front/ext	1	85.3
SL-2	Sweat lodge		drkbrn	burnished		n/a		continuous from neck	1	462
H23-4	House 23 area	Fine	drkbrn	handle		dkbrn		continuous from neck, extra clay added to lip for handle extension	1	12.1
H2-2	Wall Trench House 1	Fine	tan	burnished			Yes	top	1	7.3
H2-3	Wall Trench House 1	Fine-Med	red			dkbrn		front/ext	1	4.5
H24-1	*House 24 (WT 73-3C)*	*Fine*	*drkbrn*	*burnished trailed*		*red*		*Everted/angled attached to front/ext*	*1*	*4.7*
H32-8	House 32 Basin		drkbrn	burnished		dkbrn	Yes	folded out from neck	1	3
PP-1	Palisade posts	Fine	drkbrn/ black	burnished	Y	n/a		front/ext	1	9.2
PZ-14	52.5N 95W	Fine	tan	burnished handle				n/a	1	11.5
PZ-15	52.5N 95W		drkbrn/ black			n/a	Yes	rolled?	1	12.5

Table B.8. Metric Attributes Of Slipped Jars From Olin (Ramey-Incised Vessels Are Italicized)

Vessel #	Orifice Dia (cm)	% Of Orifice	RA (deg)	LB (deg)	LL (mm)	WT (mm)	RC	LT (mm)	LP	LS	RT (mm)	WTD
28-10	14	6%		22	11.26	4.16		4.55	0.369	2.475		
51-1	*14*	*5%*		*8*	*12.53*	*3.94*	*0.068*	*5.77*	*0.314*	*2.172*	*0.236*	
56-1	22	7%		50	19.45	4.82	0	7.17	0.248	4.035	0.21	
63-1	24	8%		16	19.46	5.55	0.031	5.55	0.285	3.506	0.205	
69-3	*9*	*13%*		*24*	*9.38*	*5.65*	*-0.074*	*6.25*	*0.602*	*1.66*	*0.627*	*0.561*
73-2	8	10%		23	10	4.19		5.2	0.419	1.923	0.594	
74-2	24	8%	113		51.71			6.45				
82-2	8	15%		18	9.88	4.78	0.013	4.28	0.484	2.31	0.506	0.541
84-2	16	5%		38	8.37	4.94	0	4.8	0.59	1.744	0.292	0.698
84-3	18	5%						4.21				
84-4	17	3%		14	16.43	4.21		4.2	0.256	3.9		
88-2	12	24%		24	13.47	5.69	0	5.53	0.422	2.436	0.474	
89-13	13	22%		29	13.4	5.59	-0.011	6.45	0.417	2.078	0.392	0.525
89-19	20	3%			10.65	3.23		5.22				
89-4	16	9%		90	13.66	7.3		7.15	0.534	1.91	0.421	
101-1	14	3%		17	13.56	4.17		5.52	0.308	2.457		
107-1	16	3%			13.19	6.22		7.67	0.472	1.72		
109-1	9	5%		25	6.2	4.07	-0.03	3.33	0.656	1.862	0.406	0.611
129-1	*14*	*10%*		*34*	*14.35*	*5.03*		*6.01*	*0.351*	*2.388*	*0.336*	
133-6	8	6%	113				0.017	5.65				
143-1	15	15%	151		5.67		0					
146-2	11	5%										
152-4	8	15%		28	8.88	4.62	-0.02	4.35	0.52	2.041	0.6	0.505
162-1	8	15%						5.93				
192-4	10	15%		32	10.09	4.97	0.028	5.43	0.493	1.858	0.439	0.784
192-5	*10*	*15%*		*14*	*9.4*	*5.54*	*0.034*	*4.96*	*0.589*	*1.895*	*0.453*	*0.605*
203-3	8	10%	106		37.9			8.72				

Table B.8 Metric Attributes Of Slipped Jars From Olin (Ramey-Incised Vessels Are Italicized) (Continued)

Vessel #	Orifice Dia (cm)	% Of Orifice	RA (deg)	LB (deg)	LL (mm)	WT (mm)	RC	LT (mm)	LP	LS	RT (mm)	WTD
213-1	8	15%	114		21.6	3.77	-0.103	3.94	0.175		0.405	1.009
213-2	8	25%	94		33.75	2.62		3.42	0.776		0.433	
216-6	*8*	*10%*	*105*	*22*	*8.04*	*3.76*		*4.77*	*0.468*	*1.686*	*0.506*	
216-7	*22*	*10%*		*26*	*15.3*	*5.28*		*5.95*	*0.24*	*2.571*		
216-8	16	10%		42	14.52	4.28		5.36	0.295	2.709		
235-1	20	7%		28	13.32	4.18		4.85	0.369	2.746	0.239	
256-1	11	15%	98		45.98	5.11		4.06	0.111			
256-2	*10*	*15%*		*28*	*11.66*	*3.29*	*0.025*	*4.32*	*0.282*	*2.699*	*0.317*	
267-15	18	5%		8	14.55	6.11		6.56	0.42	2.218	0.271	
299-1	16	5%		38	15.92	5.24		5.2	0.342	3.062		
299-3	10	10%		46	12.22	4.71		4.41	0.385	2.771	0.461	
299-8	12	10%		36	11.42	4.46	0	4.16	0.391	2.745	0.387	
302-2	12	14%		36	10.74	4.51		6.05	0.42	1.775	0.297	
312-1	13	3%		29	7.28	4.3		4	0.59	1.83	0.25	
315-1	10	15%		61	12.05	3.86		4.6	0.32	2.62	0.366	
315-2	*12*	*15%*		*34*	*12.8*	*3.7*	*0.022*	*6.51*	*0.289*	*1.966*	*0.303*	
320-7	16	10%		29	14.41	4.25	0.007	4.95	0.295	2.911	0.244	
321-8	*8*	*8%*		*29*	*10.53*	*4.92*	*-0.083*	*4.32*	*0.467*	*2.438*	*0.58*	*0.696*
327-3	6	14%		32	8.61	4.6	-0.018	5	0.545	1.722	0.782	0.772
350-9	28	27%		28	21.13	6.92	0.031	8.03	0.327	2.631	0.18	0.67
356-1	*10*	*15%*		*20*	*12.5*	*4*	*0*	*4.19*	*0.32*	*2.983*	*0.394*	*0.736*
357-2	22	11%		38	15.56	5.66	0.016	5.81	0.364	2.678	0.238	
360-3	10	8%		32	14.42	4.52		4.39	0.313	3.285	0.364	
363-1	14	7%	110		57.21	6.28		7.22				
367-4	12	45%		13	12.36	5.6	-0.021	4.95	0.453	2.497	0.411	0.578
H23-4	12	9%			36.85							
H2-2	12	5%		35	16.52	5.07		4.41	0.307	3.75	0.403	

Table B.8 Metric Attributes Of Slipped Jars From Olin (Ramey-Incised Vessels Are Italicized) (Continued)

Vessel #	Orifice Dia (cm)	% Of Orifice	RA (deg)	LB (deg)	LL (mm)	WT (mm)	RC	LT (mm)	LP	LS	RT (mm)	WTD
H2-3	14	5%		26	11.04	5.54		4.82	0.502	2.29	0.374	
H24-1	*12*	*10%*		*46*	*11.03*	*4.2*		*5.96*	*0.381*	*1.851*	*0.35*	*0.61*
H32-8	14	3%		17	10.36	3.68		5.71	0.355	1.814	0.243	
PP-1	16	7%		15	14.04	4.91	-0.024	6.07	0.35	2.313	0.286	
PZ-14	12	9%		29	12.81	3.78		6.51	0.295	1.968	0.308	
PZ-15	14	7%	116			4.89	0					
SL-2	10	8%		24	9.8	5.71		5.54	0.583	1.769	0.571	

Table B.9. Visual Attributes Of Plain and Eroded Jars from Olin

Vessel #	Feature	Temp Size	Ext surf	Dec/ Applique	Ext Soot	Int Slip	Int Smooth	Int Soot/ Residue	Rim attach	# sherds	Wt (g)
5-3	Pit 5		er			n/a		Y	front/ext	1	17.68
6-2	Pit 6		er		Y	red	Y		front/ext	1	15.6
9-6	Pit 9		er			n/a			top	1	10.8
43-12	Pit 43		er			red	Y		indet	1	6.58
63-2	Pit 63	Fine-Med	er		Y	red		Y	front/ext	1	13.85
64-3	Pit 64		er			red			front/ext	1	9.72
68-1	Pit 68	Med-coarse	er		Y	red		Y	top and folded to neck ext	1	24.38
68-7	Pit 68		er			red			indet	1	1.91
82-5	Pit 82		er			red			top	1	13.96
85-1	Pit 85		er			red			top	1	3.93
89-14	Pit 89	Med	er			n/a			top	1	3.03
107-2	Pit 107	Fine-Med	er		Y	red			indet	1	9.1
115-1	Pit 115		er			red			indet	1	2.08
127-7	Pit 127		er		Y	red			top	1	6.2
133-5	Pit 133	Med-coarse	er			red		Y	indet	1	6.2
133-9	Pit 133	Med-coarse	er		Y	red			top	1	17.5
134-1	Pit 134	Fine-Med	er		Y	red			top	1	15
139-1	Pit 139		er		Y	red		Y	top	1	19.3
139-3	Pit 139	Fine-Med	er		Y	red		Y	continuous from neck, clay added to int/top	1	2.7
151-1	Pit 151		er		Y	red			top, extra clay added at exterior	1	15.74
153-2	Pit 153	Med-coarse	er			red			front/ext	1	5
263-1	Pit 263		er		Y	red			extra clay add-ed at neck	1	31.7

Table B.9 Visual Attributes Of Plain and Eroded Jars from Olin (Continued)

Vessel #	Feature	Temp Size	Ext surf	Dec/ Applique	Ext Soot	Int Slip	Int Smooth	Int Soot/ Residue	Rim attach	# sherds	Wt (g)
267-14	Pit 267	Fine	er			red			continuous from neck	1	2
272-1	Pit 272	Fine-Med	er		Y	red			top	1	9.8
275-1	Pit 275		er		Y	red			continuous from neck	1	4.6
275-2	Pit 275		er			red			indet	1	8.9
277-1	Pit 277 Pit 275		er		Y	red			continuous from neck, clay added to lip	1	12.5
277-5	Pit 277	fine, med, lg	er			red			indet	1	4.6
286-1	Pit 286		er			red		Y	front/ext	1	9.7
289-2	Pit 289	Fine-Med	er			red			indet	1	2.1
293-1	Pit 293	Fine	er		Y	n/a			lip rolled from neck	1	1.3
295-1	Pit 295		er			n/a			top	1	11.6
302-1	Pit 302		er		Y	red		Y	top	1	14.2
322-2	Pit 322		er		Y	red			front/ext	1	20.7
323-1	Pit 323		er	lip tab		red			top	1	42.3
367-7	Pit 367	Fine	er			n/a			continuous from neck	1	4.5
H23-3	House 23 area	fine, med, lg	er			red			top	1	12.4
H40-5	House 40 complex Floor		er	finger impress		red			top, extra clay added to lip	1	11.26
H40-6	House 40 complex Floor		er			red			indet	1	8.65

Table B.9 Visual Attributes Of Plain and Eroded Jars from Olin (Continued)

Vessel #	Feature	Temp Size	Ext surf	Dec/ Applique	Ext Soot	Int Slip	Int Smooth	Int Soot/ Residue	Rim attach	# sherds	Wt (g)
H40-7	House 40 complex Floor		er		Y	red			front/ext	1	5.32
H27-1	House 27 post holes		er		Y	red			indet	1	4.38
H20-1	Wall Trench 73-7	fine, med, lg	er			red			top	1	16
H29-3	House 29								top	1	7.8
H29-6	House 29		er						front/ext	1	13.8
PZ-10	47.5N 97.5W		er			red			n/a	1	19.5
PZ-12	47.5N 107.5W		er						n/a	1	11.3
PZ-9	95.5N 67.5W		er			red			front/ext	1	7.38
45-2	Pit 45	Med-coarse	pl			red			front/ext	1	12.56
82-1	Pit 82	fine, med, lg	pl		Y	red	Y		top, clay added at neck	2	120.8
88-1	Pit 88	fine, med, lg	pl		Y	red			top	1	44.57
89-12	Pit 89	Fine	pl			n/a	Y	Y	continuous from neck, lip folded outward	1	35.5
133-7	Pit 133	Fine-Med	pl			red		Y	clay added to interior and angled out	1	14.2
133-8	Pit 133	Med-coarse	pl		Y	dkbrn			top	1	10.6
153-5	Pit 153	fine, med, lg	pl		Y	red			front/ext	1	30.9

Table B.9 Visual Attributes Of Plain and Eroded Jars from Olin (Continued)

Vessel #	Feature	Temp Size	Ext surf	Dec/ Applique	Ext Soot	Int Slip	Int Smooth	Int Soot/ Residue	Rim attach	# sherds	Wt (g)
192-9	Pit 192	Med-coarse	pl		Y	red			front/ext	1	8.4
247-2	Pit 247		pl		Y	red		Y	top, bolster of clay at neck	1	32.49
267-16	Pit 267	fine, med, lg	pl	handle	Y	n/a	Y	Y	continuous from neck	1	54.9
288-1	Pit 288		pl		Y	red	Y		top	1	7.9
293-2	Pit 293	Fine-Med	pl			red			folded out from neck with extra clay added at end of lip	1	20
321-7	Pit 321		pl			red			continuous from neck with extra clay added at neck exterior	1	4
322-1	Pit 322		pl			n/a				1	11.2
H38-1	House 38 Floor 47.5N 80W	Fine-Med	pl	handle	Y	red			front/ext	1	36.2
PZ-17	60N 65W		pl			n/a			n/a	1	34
PZ-8	70N 90W		pl			red			n/a	1	18

Table B.10. Metric Attributes Of Plain And Eroded Jars From Olin

Eroded Jars												
Vessel #	Feature	Orif Dia(-deg)	% of Orifice	LB (deg)	LL (mm)	WT (mm)	RC	LT (mm)	LP	LS	RT (mm)	WTD
107-2	Pit 107	22	7%	8	22.88	5		5.28	0.22	4.33		
115-1	Pit 115	20	3%	21	22.14			4.87		4.55		
127-7	Pit 127	14	5%	21	20.5	5.76		5.42	0.28	3.78		
133-5	Pit 133	17	5%					6.75				
133-9	Pit 133	30	3%		28.42	6.65		8.32	0.23	3.15		
134-1	Pit 134	22	10%	28	21.61	5.08		5.91	0.24	3.66	0.19	
139-1	Pit 139	24	6%	31	25.9	8.2		6.95	0.32	3.73	0.32	
139-3	Pit 139	11	5%	26	13.5	2.96		4.82	0.22	2.8	0.27	
151-1	Pit 151	18	12%	33	22.54	6.85		8.66	0.3	2.6		
153-2	Pit 153	18	3%	15	20.64	5.98		8.66	0.29	2.38		
263-1	Pit 263	33	6%	52	24.9	6.8		9.95	0.27	3.66		
267-14	Pit 267	10	7%	31	11.09	4.57		3.71	0.41	2.99	0.47	
272-1	Pit 272	17	6%	42	23.72	6.03		6	0.25	3.95		
275-1	Pit 275	16	3%	22	18.74	6.44		6.69	0.34	2.8		
275-2	Pit 275	20	3%	11	23.56	5.94		7.19	0.25	3.28		
277-1	Pit 277 and Pit 275	26	8%	32	21.92	5.23		7.17	0.24	3.06		
277-5	Pit 277	14	6%	24	16.14	4.96		6.38	0.31	2.53		
286-1	Pit 286	18	9%	34	22.02	5.08		6.44	0.23	3.42		
289-2	Pit 289	10	5%	29	13.65	7.36		5.79	0.54	2.36		
293-1	Pit 293	10	8%					4.46				
295-1	Pit 295	34	5%	53	21.76	5.4		5.32	0.25	4.09		
302-1	Pit 302	24	6%	28	26.05	7.02		6.65	0.27	3.92		
322-2	Pit 322	22	10%	48	24.29	5.42		7.14	0.22	3.4		
323-1	Pit 323	22	12%	29	26.41	11.35		8.46	0.43	3.12		
367-7	Pit 367	8	10%	11	10.19	5.27		6.08	0.52	1.68	0.66	

Table B.10 Metric Attributes Of Plain And Eroded Jars From Olin (Continued)

Vessel #	Feature	Orifice Dia (cm)	% of Orifice	LB (deg)	LL (mm)	WT (mm)	RC	LT (mm)	LP	LS	RT (mm)	WTD
43-12	Pit 43	20	3%	33	20.53	5.89		8.18	0.29	2.51		
5-3	Pit 5	22	5%	42	24.12	6.58		6.04				
6-2	Pit 6	24	10%	33	17.5	4.51		7.04	0.26	2.49		
63-2	Pit 63	28	3%	12	26.91	6.36		10.03	0.24	2.68		
64-3	Pit 64	23	3%	28	27.4	6.76		8.09	0.25	3.38		
68-1	Pit 68	28	9%	26	27.54	4.61		7.93	0.17	3.47		
68-7	Pit 68	20	3%		18.39	5.46		5.3	0.3	3.47		
82-5	Pit 82	24	5 %	10	26.64	5.67		7.35	0.21	3.62		
85-1	Pit 85	16	5 %	20	17.7	4.61		5.3	0.26	3.34		
89-14	Pit 89	30	3%	20	20.33	6.3		7.05	0.31	2.88		
9-6	Pit 9	22	8%	41	23.29	6.76		7.59	0.29	3.07		
H23-3	House 23 area	28	5%	36	25.398	6.98		8.59	0.28	2.96		
H40-5	House 40 complex Floor	30	5%	48	30.45	6.98		6.22	0.23	4.9		
H40-6	House 40 complex Floor	19	5%	26	25.78	7.28		6.55	0.28	3.94		
H40-7	House 40 complex Floor	15	5%	35	21.8	6.24		6	0.29	3.63	0.42	
H27-1	House 27 post holes	16	3%	19	22.45	4.83		6.97	0.22	3.22		
H20-1	House 20 (WT 73-7)	30	5%		22.81	6.63		7.27	0.29	3.14		
H29-3	House 29	16	6%	30	18.67	4.37		5.77	0.234	3.24		
H29-6	House 29	18	15%	46	19.53	3.88		6.91	0.2	2.83		
PZ-10	47.5N 97.5W	30	3%			6.64		10.04				
PZ-12	47.5N 107.5W	23	3%	27	24.81	4.99		8.13	0.2	3.05		

Table B.10 Metric Attributes Of Plain And Eroded Jars From Olin (Continued)

Vessel #	Feature	Orifice Dia (cm)	% of Orifice	LB (deg)	LL (mm)	WT (mm)	RC	LT (mm)	LP	LS	RT (mm)	WTD
PZ-9	95.5N 67.5W	18	5 %	27	22.39	5.41		5.3	0.24	4.23		
45-2	Pit 45	25	5 %	35	19.36	5.81		5	0.3	3.87	0.17	
Plain Jars												
82-1	Pit 82	24	15%	47	24.28	5.89	-0.055	7.18	0.24	3.38	0.23	0.76
88-1	Pit 88	30	12%	39	25.98	6.18		7.37	0.24	3.53	0.15	
89-12	Pit 89	18	15%		33.92	5.09		7.33				
133-7	Pit 133	10	10%		10.41	5.3		4.76	0.61	2.19		
133-8	Pit 133	14	10%	27	16.32	5		7.05	0.31	2.32	0.33	
153-5	Pit 153	32	8%	19		6.45		7.44			0.17	
192-9	Pit 192	26	5%	36	17.97	5.71		6.85	0.32	2.62		
247-2	Pit 247	24	9%		26.3	7.25		7.47	0.28	3.52		
267-16	Pit 267	22	8%		17.46	5.36		7.06	0.31	2.47	0.24	
288-1	Pit 288	10	5%	53	15.76	5.08		6	0.32	2.63	0.51	
293-2	Pit 293	22	10%	44	18.79	5.87		5.72	0.31	3.29		
321-7	Pit 321	12	5%	19	11.71	4.72		6.37	0.4	1.84		
322-1	Pit 322	30	3%					9.17				
H38-1	House 38 Floor 47.5N 80W	34	5%	18	22.71	3.46		6.35	0.15	3.58	0.1	
PZ-8	70N 90W	26	5%			6.64	0	7.45			0.17	
PZ-17	60N 65W	18	12%	57	17.93	6.72	-0.029	8.91	0.38	2.01	0.38	

Table B.11. Jar Handles From Olin

Vessel #	Feature	Ext surf	Ext slip	Decoration	Handle Type	Int Slip	Handle Width (mm)	Handle Thickness (mm)	Handle Height (mm)
20-1	Pit 20	cm	n/a	handle	Narrow Strap	n/a	12.55	8.36	38.4
88-4	Pit 88	cm	n/a	handle	Narrow Strap	red	13.22	9.72	ind
203-2	Pit 203	cm	n/a	handle	Narrow Strap	red	15.3	10.71	37.6
203-3	Pit 203	sl	drkbrn	burnished, handle, trailed	Narrow Strap	none	9	5.6	31
213-2	Pit 213	sl	drkbrn	burnished, handle, lobed	Narrow Strap	none	7.7	5.18	25.85
216-5	Pit 216	cm	n/a	handle	Narrow Strap	red	13.78	7.76	36.25
267-16	Pit 267	pl	n/a	handle	Narrow Strap	n/a	23.83	14.82	59.21
256-1	Pit 256	sl	drkbrn/ black	burnished, handle	Narrow Strap	dkbrn	9.08	5.17	35.48
H23-4	House 23 area	sl	drkbrn	handle	Narrow Strap	dkbrn	7.94	5.2	24.66
H38-1	House 38 Floor 47.5N 80W	pl	n/a	handle	Narrow Strap	red	15.6	7.8	35.4
PZ-14	52.5N 95W	sl	tan	burnished, handle	Narrow Strap		11.3	6.37	25.32
363-1	Pit 363	sl	tan	burnished, handle	Wide Strap	tan	14.91	6.31	61.69
PZ-19	67.5N 67.5W	cm	n/a	handle	Wide Strap	red	15.38	7.64	38.72
355-1	Pit 355	cm	n/a	handle	Wide Strap	red	17.02	6.84	36

Table B.12. Vissual Attributes Of Beakers From Olin

Vessel #	Feature	Temper Size	Ext slip	Decoration	Int Slip	Int Burnish	# sherds	Wt (g)
6-1	Pit 6		drkbrn	burnished	dkbrn	Y	3	15.19
7-2	Pit 7		drkbrn	burnished	dkbrn	Y	1	4.8
9-2	Pit 9	Fine	drkbrn	burnished	dkbrn	Y	1	1.42
26-1	Pit 26	Fine	drkbrn	burnished	dkbrn	Y	2	12.6
28-8	Pit 28A		drkbrn	burnished	dkbrn	Y	2	5.73
28-11	Pit 28A	Fine	tan	burnished, handle	dkbrn		2	32.3
28-12	Pit 28A	Fine	drkbrn	burnished	dkbrn	Y	1	5.1
36-6	Pit 36		red	burnished	dkbrn	Y	1	1.2
43-3	Pit 43		red	burnished	red		1	3.38
43-4	Pit 43		drkbrn	burnished	dkbrn		2	11.18
43-5	Pit 43	Fine	drkbrn/ black	burnished	dkbrn		1	2.18
43-6	Pit 43		drkbrn	burnished	dkbrn	Y	1	1.25
43-7	Pit 43		drkbrn/ black	burnished	dkbrn/ black		1	2.2
43-8	Pit 43	Fine	drkbrn/ black	burnished	dkbrn/ black		2	11.25
43-9	Pit 43		drkbrn/ black	burnished	dkbrn/ black	Y	1	1.35
68-5	Pit 68	Med-coarse	drkbrn	burnished	dkbrn	Y	1	5.63
69-2	Pit 69	Fine-Med	drkbrn	burnished	dkbrn		1	8.17
82-3	Pit 82	Fine	tan	burnished, trailed	tan	Y	2	11.48
89-11	Pit 89	Fine	drkbrn	burnished	dkbrn		1	6.95
98-4	Pit 98	Fine-Med	red-tan	burnished	red-tan		1	6.5
123-1	Pit 123	Fine-Med	red	burnished	red		1	9.9
143-2	Pit 143	Fine	drkbrn/ black	burnished	dkbrn	Y	1	3.55
224-1	Pit 224	Fine-Med	drkbrn	burnished	dkbrn		1	3.4
261-1	Pit 261	Fine-Med	drkbrn	burnished	dkbrn	Y	1	30.2

Table B.12 Visual Attributes Of Beakers From Olin (Continued)

Vessel #	Feature	Temper Size	Ext slip	Decoration	Int Slip	Int Burnish	# sherds	Wt (g)
266-1	Pit 266	Fine	red	burnished	red	Y	1	2.2
267-17	Pit 267	Fine	red		red		1	9.4
267-18	Pit 267		drkbrn		rd		1	0.7
271-3	Pit 271	Fine	tan	burnished	tan	Y	3	22.93
273-3	Pit 273	Fine	drkbrn/ black	burnished	dkbrn/ black	Y	1	1.3
274-2	Pit 274		red		red		1	5.1
291-1	Pit 291	Fine-Med	drkbrn/ black	burnished	dkbrn	Y	1	2.5
321-2	Pit 321	Fine-Med	red		red		1	1.1
350-8	Pit 350		red	incised	red		11	12.4
357-1	Pit 357		red		red		1	3.8
367-8	Pit 367	very fine-fine	red	incised	red		2	13
H29-8	House 29		drkbrn	burnished	dkbrn	Y	1	
H32-10	House 32 Floor		red-brown	burnished	red-brown		1	57
H32-11	House 32 Floor		drkbrn	burnished	dkbrn	Y	1	32.8

Table B.13. Metric Attributes Of Beakers From Olin

Vessel #	Feature	Orifice Diater (cm)	% of Orifice	WT (mm)	LT (mm)	Lip Form
6-1	Pit 6	10	10%		4.62	rounded
7-2	Pit 7	6	8%		3.06	rounded
9-2	Pit 9	9	5%		3.81	rounded
26-1	Pit 26	10	10%		4.11	rounded
28-8	Pit 28A	8	10%	3.66	3.55	rounded
28-11	Pit 28A	10	20%	4.93	4.99	rounded
28-12	Pit 28A	10	3%	4.36	3.22	rounded
36-6	Pit 36	11	3%		3.94	rounded
43-3	Pit 43	6	15%		3.68	round-exterior bevel
43-4	Pit 43	10	10%		4.39	rounded
43-5	Pit 43	10	5		4.63	rounded
43-6	Pit 43	12	3		4.23	rounded
43-7	Pit 43	8	10		3.67	rounded
43-8	Pit 43	10	9		4.55	rounded
43-9	Pit 43	8	3		2.97	rounded
68-5	Pit 68	10	8		4.42	rounded
69-2	Pit 69	10	8	4.46	6.01	rounded
82-3	Pit 82	9	15		4.83	rounded
89-11	Pit 89	8	10		3.4	exterior-bevel
98-4	Pit 98	10	5		4.1	Rounded
123-1	Pit 123	8	15		3.63	rounded
143-2	Pit 143	9	10		3.86	round-exterior bevel
224-1	Pit 224	10	8		3.69	rounded
261-1	Pit 261	10	15		5.03	flat
266-1	Pit 266	8	10		4.47	flat-exterior bevel
267-17	Pit 267	10	10		3.5	rounded
267-18	Pit 267	7	7		2.92	rounded
271-3	Pit 271	12	10		4.83	flat
273-3	Pit 273	8	9		4.32	flat
274-2	Pit 274	10	10		5.85	Interior-bevel
291-1	Pit 291	8	8		4.12	rounded
321-2	Pit 321	8	5		3.81	rounded
350-8	Pit 350	6	10		3.12	flat
357-1	Pit 357	10	5		3.88	rounded
367-8	Pit 367	11	10		3.54	rounded
H29-8	House 29	8	5		4.1	rounded
H32-10	House 32 Floor	10	15		3.93	rounded
H32-11	House 32 Floor	13	25		3.7	rounded

Table B.14. Bowl/Beakers From Olin

Vessel #	Feature	Temper Size	Ext slip	Decoration	Int Slip	Orifice Dia (cm)	% of Orifice	LT	Lip Form	# sherds	Wt (g)
36-7	Pit 36		drkbrn	burnished	dkbrn	16	3%	5.2	flat	1	1.2
36-9	Pit 36		red		dkbrn	15	3%	4.09	flat	1	3.2
64-1	Pit 64		drkbrn/black	burnished	red	14	5%	3.65	rounded	1	0.73
89-10	Pit 89		drkbrn	burnished	dkbrn	16	3%	5.02	rounded	1	2.01
115-4	Pit 115		drkbrn		dkbrn	12	5%	5.21	rounded	1	5.29
340-1	Pit 340	Fine	red	burnished	red	10	5%	4.05	rounded	1	1.3
360-1	Pit 360	Fine-Med	drkbrn/black	burnished	dkbrn/black	10	5%	3.21	rounded	1	1.6
FP2-1	Firepit 2	Fine	drkbrn	burnished	dkbrn	10	5%	4.03	rounded	1	1.54

Table B.15. Visual Attributes Of Bowls From Olin

Outcurving bowls										
Vessel #	Feature	Temper Size	Bowl shape	Ext surf	Ext slip	Decoration	Int Slip	Int Burnish	# sherds	Wt (g)
6-1	Pit 6		outcurving	sl	drkbrn	burnished	dkbrn	Y	3	15.19
9-1	Pit 9	Fine	outcurving	sl	drkbrn	burnished	dkbrn	Y	1	1.71
28-6	Pit 28A		outcurving	sl	tan	burnished	tan		1	3.91
64-2	Pit 64		outcurving	sl	tan	burnished	tan		1	2.11
82-4	Pit 82	Fine	outcurving	sl	drkbrn/ black	burnished	dkbrn/black	Y	1	10.4
87-1	Pit 87	Fine	outcurving	sl	drkbrn/ black	burnished, trailed	dkbrn/black	Y	1	6.9
89-5	Pit 89		outcurving	cm	n/a		n/a		4	31.4
107-6	Pit 107	Fine-Med	outcurving	sl	drkbrn/ black	trailed	n/a		1	2.2
133-3	Pit 133	Fine	outcurving	sl	drkbrn	burnished	dkbrn	Y	1	3.8
138-1	Pit 138	Fine	outcurving	sl	drkbrn	burnished, trailed	dkbrn	Y	1	3
153-3	Pit 153	Fine	outcurving	sl	drkbrn		n/a		1	1.8
162-2	Pit 162	Fine	outcurving	sl	tan	burnished, trailed	tan		1	6.18
188-4	Pit 188	Fine	outcurving	sl	drkbrn	burnished	dkbrn	Y	1	4.3
262-1	Pit 262	Fine	outcurving	sl	drkbrn/ black	burnished	dkbrn		1	9.7
262-2	Pit 262	Fine-Med	outcurving	sl	tan		tan		1	6.5
265-2	Pit 265	Fine	outcurving	sl	drkbrn/ black	burnished	dkbrn		1	4.3
266-2	Pit 266	Fine	outcurving	sl	tan	burnished	tan	Y	1	5.1
267-22	Pit 267		outcurving	er	n/a		red		1	4.2
267-24	Pit 267	Fine-Med	outcurving	sl	drkbrn	burnished	red	Y	1	20.9
275-6	Pit 275	Fine-Med	outcurving	sl	drkbrn	lip tab	dkbrn		1	1.8
276-3	Pit 276		outcurving	er	n/a		n/a		1	2.5
289-5	Pit 289	Fine	outcurving	sl	drkbrn/ black	burnished	dkbrn/black		2	5.6

Table B.15 Visual Attributes Of Bowls From Olin (Continued)

Vessel #	Feature	Temper Size	Bowl shape	Ext surf	Ext slip	Decoration	Int Slip	Int Burnish	# sherds	Wt (g)
299-6	Pit 299	Fine	outcurving	sl	drkbrn/ black	burnished	dkbrn/black	Y	2	22.5
299-7	Pit 299	Fine-Med	outcurving	sl	drkbrn/ black	burnished, lip tab	dkbrn/black	Y	2	20.6
366-2	Pit 366	Fine	outcurving	sl	drkbrn/ black	burnished	dkbrn/black	Y	1	17.1
323-7	Pit 323	Fine-Med	outcurving	sl	red		red		1	4.4
325-1	Pit 325	Fine	outcurving	sl	drkbrn/ black	burnished	dkbrn/black	Y	2	9.4
367-6	Pit 367	Fine	outcurving	sl	drkbrn/ black	burnished	dkbrn/black	Y	1	4.7
H23-6	House 23 area	Fine	outcurving	sl	drkbrn	burnished	n/a		1	2.68
H32-3	House 32 Basin		outcurving	sl	drkbrn	burnished	dkbrn	Y	1	17.4
H39-1	H39 Outer North Wall	Fine	outcurving	Sl	drkbrn/ black	burnished	Dkbrn		1	2.1
WT 73-8-2	Wall Trench 73-8; H21?		outcurving	sl	red	burnished, trailed	red		1	4.8
Outslanting bowls										
139-2	Pit 139	Fine	outslanting	sl	drkbrn	burnished	dkbrn	Y	1	8
253-2	Pit 253	Fine-Med	outslanting	sl	drkbrn		dkbrn	Y	1	13.6
Straight bowls										
9-3	Pit 9	Fine	straight	sl	drkbrn	burnished, trailed	dkbrn	Y	1	1.87
17-3	Pit 17		straight	sl	tan	burnished	tan		1	5.16
28-7	Pit 28A		straight	sl	drkbrn	burnished, trailed	dkbrn	Y	1	4.88
89-8	Pit 89		straight	sl	drkbrn	burnished	dkbrn		1	2.5
192-1	Pit 192	Fine	straight	sl	drkbrn	lip tab	dkbrn		1	4.9
267-20	Pit 267	Med	straight	sl	tan	burnished	tan		1	16
318-4	Pit 318	Fine	straight	sl	red	trailed	red-tan		1	1.8

Table B.15 Visual Attributes Of Bowls From Olin (Continued)

Vessel #	Feature	Temper Size	Bowl shape	Ext surf	Ext slip	Decoration	Int Slip	Int Burnish	# sherds	Wt (g)
347-2	Pit 347	Fine	straight	sl	drkbrn/ black	burnished	dkbrn/black	Y	1	2.5
360-2	Pit 360	very fine-fine	straight	sl	drkbrn/ black	burnished	dkbrn		1	3
H32-9	House 32 Floor		straight	sl	red		red		2	3.8
Incurving bowls										
5-4	Pit 5		incurving	sl	drkbrn	burnished	dkbrn/black		1	16.69
36-10	Pit 36		incurving	sl	red		red		1	23.4
76-1	Pit 76		incurving	sl	drkbrn		red		1	39.7
89-6	Pit 89		incurving	cm	n/a		n/a		1	3.12
152-5	Pit 152		incurving	sl	drkbrn		dkbrn	Y	1	4.38
152-6	Pit 152	Fine	incurving	sl	drkbrn	burnished	dkbrn	Y	1	11.37
115-3	Pit 115		incurving	sl	drkbrn/ black	burnished	dkbrn/black	Y	1	1.62
154-2	Pit 154	Fine-Med	incurving	sl	red		dkbrn	Y	1	5.8
188-1	Pit 188		incurving	sl	drkbrn	burnished, lip tab	dkbrn	Y	1	9.8
188-3	Pit 188		incurving	sl	drkbrn/ black	burnished	dkbrn	Y	1	4.3
201-1	Pit 201	Med-coarse	incurving	er	n/a		n/a		1	5.3
232-2	Pit 232		incurving	sl	drkbrn	burnished	dkbrn		1	2.71
267-11	Pit 267		incurving	sl	drkbrn		dkbrn		1	8.87
267-23	Pit 267		incurving	sl	drkbrn	burnished	dkbrn		1	30.3
279-1	Pit 279	Fine	incurving	sl	drkbrn/ black	burnished	dkbrn	Y	1	8.4
294-1	Pit 294	fine, med, lg	incurving	sl	drkbrn		dkbrn		1	12.8
294-2	Pit 294	Fine-Med	incurving	sl	drkbrn		dkbrn		1	6.6
294-3	Pit 294	Med	incurving	sl	drkbrn	burnished	dkbrn/black		1	16.4
312-2	Pit 312	Fine	incurving	sl	drkbrn	burnished, lip tab	dkbrn	Y	1	5.6

Table B.15 Visual Attributes Of Bowls From Olin (Continued)

Vessel #	Feature	Temper Size	Bowl shape	Ext surf	Ext slip	Decoration	Int Slip	Int Burnish	# sherds	Wt (g)
313-1	Pit 313	Fine	incurving	sl	drkbrn	trailed	dkbrn		1	2.3
323-8	Pit 323	Fine	incurving	sl	drkbrn/ black	burnished	dkbrn	Y	1	5.4
324-4	Pit 324		incurving	pl	n/a		n/a		1	4.7
345-2	Pit 345	Fine	incurving	er	n/a		dkbrn/black	Y	1	6.35
350-4	Pit 350	Fine	incurving	sl	drkbrn	burnished	dkbrn		1	3.9
350-7	Pit 350		incurving	sl	drkbrn	trailed	dkbrn		1	12.9
361-1	Pit 361	Fine-Med	incurving	sl	drkbrn/ black	burnished	dkbrn/black	Y	1	8.2
H40-2	House 40/42/43/44 Floor	Fine	incurving	sl	drkbrn	burnished	dkbrn	Y	1	16.7
H40-3	House 40/42/43/44 Floor	Fine	incurving	sl	drkbrn	burnished	dkbrn		1	4.25
H40-4	House 40/42/43/44 Floor		incurving	sl	drkbrn	burnished	dkbrn	Y	1	3.19
Inslanting bowls										
5-12	Pit 5		inslanting	sl	drkbrn	burnished	red	Y	1	1.49
28-12	Pit 28A	Fine	inslanting	sl	drkbrn	burnished	dkbrn	Y	1	5.1
45-1	Pit 45	Fine-Med	inslanting	sl	drkbrn	burnished	red		1	6.66
82-6	Pit 82	Fine	inslanting	sl	drkbrn	burnished	dkbrn	Y	1	2.5
89-7	Pit 89		inslanting	sl	red		red	Y	1	5.68
89-9	Pit 89		inslanting	sl	red	burnished	red		1	4.13
98-1	Pit 98	Fine	inslanting	sl	drkbrn	burnished	dkbrn	Y	1	5.2
218-1	Pit 218	Fine	inslanting	sl	drkbrn/ black	burnished	dkbrn		4	35.7
229-1	Pit 229	Fine-Med	inslanting	sl	drkbrn	burnished	dkbrn	Y	1	4.3
289-4	Pit 289	Med-coarse	inslanting	sl	drkbrn/ black	burnished	dkbrn		1	6.2
367-5	Pit 367	very fine-fine	inslanting	sl	drkbrn/ black	burnished, lip tab	dkbrn/black	Y	1	8

Table B.15 Visual Attributes Of Bowls From Olin (Continued)

Vessel #	Feature	Temper Size	Bowl shape	Ext surf	Ext slip	Decoration	Int Slip	Int Burnish	# sherds	Wt (g)
H26-1	House 26 (Wall Trench 73-5A)		inslanting	sl	drkbrn	burnished	n/a		1	5.4
H32-7	House 32 Basin		inslanting	sl	drkbrn	burnished	red	Y	1	27
PZ-20	67.5N 67.5W	Fine	inslanting	sl	red	burnished	red	Y	1	9
327-1	Pit 327	Med	inslanting	sl	drkbrn/ black	burnished	dkbrn/black	Y	1	1.9
Indeterminate bowls										
33-5	Pit 33		n/a	sl	drkbrn	burnished	dkbrn		1	0.94
43-11	Pit 43	Fine	n/a	sl	drkbrn/ black	burnished	dkbrn	Y	1	1.26
47-2	Pit 47		n/a	sl	drkbrn	burnished	dkbrn		1	2.81
54-1	Pit 54	Fine	n/a	sl	drkbrn/ black	burnished, lug	dkbrn	Y	1	5.4
59-1	Pit 59	Fine-Med	n/a	sl	drkbrn		dkbrn		1	47.3
67-1	Pit 67		n/a	er	n/a	lip tab	tan		1	3.92
68-6	Pit 68		n/a	pl	n/a		n/a		1	4.05
98-3	Pit 98	Fine	n/a	sl	red	burnished	red		1	2.9
113-1	Pit 113		n/a	sl	drkbrn/ black	burnished	dkbrn/black	Y	1	3.08
135-2	Pit 135	Fine-Med	n/a	sl	drkbrn	lug	dkbrn		1	2.9
153-1	Pit 153	Fine	n/a	sl	drkbrn	burnished	dkbrn		1	1.5
153-4	Pit 153	Fine-Med	n/a	sl	drkbrn		dkbrn		1	1.8
192-8	Pit 192		n/a	cm	n/a		n/a		1	8.3
216-10	Pit 216	Fine-Med	n/a	sl	drkbrn/ black	burnished	dkbrn	Y	1	6.4
227-4	Pit 227	Fine-Med	n/a	sl	red	burnished	red	Y	1	3.6
233-2	Pit 233	Med-coarse	n/a	sl	red	burnished	red	Y	1	3.1
249-1	Pit 249	Fine-Med	n/a	sl	red	burnished	red		1	3.7
267-10	Pit 267		n/a	sl	red		red		1	4.79

Table B.15 Visual Attributes Of Bowls From Olin (Continued)

Vessel #	Feature	Temper Size	Bowl shape	Ext surf	Ext slip	Decoration	Int Slip	Int Burnish	# sherds	Wt (g)
267-21	Pit 267	Fine-Med	n/a	sl	drkbrn/ black	burnished, lip tab	dkbrn		1	3.5
267-25	Pit 267		n/a	sl	tan	burnished, lip tab	tan	Y	1	4.1
267-5	Pit 267		n/a	sl	drkbrn	burnished	dkbrn	Y	1	6.77
267-6	Pit 267		n/a	sl	drkbrn	burnished	red	Y	1	6.82
267-7	Pit 267		n/a	sl	drkbrn	burnished	dkbrn		1	21.18
267-8	Pit 267		n/a	sl	drkbrn	burnished	dkbrn		1	20.69
275-3	Pit 275	very fine	n/a	sl	tan	burnished, trailed	tan	Y	1	30.8
275-4	Pit 275		n/a	sl	tan	burnished, trailed	tan		47	74.6
275-5	Pit 275	Med-coarse	n/a	cm	n/a		red		1	3.3
276-2	Pit 276		n/a	sl	drkbrn	burnished	dkbrn	Y	1	10.35
277-3	Pit 277	Fine	n/a	sl	tan	burnished, lip tab	tan	Y	1	1.9
289-3	Pit 289	Fine	n/a	sl	drkbrn	burnished, trailed	dkbrn		1	0.9
291-2	Pit 291		n/a	cm	n/a		n/a		1	33.2
300-3	Pit 300	Fine-Med	n/a	sl	red	lip tab	n/a		1	1.4
318-1	Pit 318	Fine-Med	n/a	sl	red	incised	red		5	7.2
318-3	Pit 318	Fine	n/a	sl	red		n/a		1	1
319-1	Pit 319	Fine	n/a	sl	drkbrn		dkbrn		1	0.9
323-3	Pit 323	Fine	n/a	er	n/a		n/a		1	0.8
323-6	Pit 323	Fine	n/a	sl	drkbrn/ black	burnished	dkbrn		1	1.2
324-5	Pit 324		n/a	pl	n/a		n/a		1	7.2
338-1	Pit 338	Fine	n/a	er	n/a		n/a		1	1.9
345-4	Pit 345		n/a	sl	tan	burnished, trailed	tan	Y	1	1.39
347-3	Pit 347	Fine	n/a	sl	drkbrn/ black	burnished	dkbrn/black	Y	1	1

Table B.15 Visual Attributes Of Bowls From Olin (Continued)

Vessel #	Feature	Temper Size	Bowl shape	Ext surf	Ext slip	Decoration	Int Slip	Int Burnish	# sherds	Wt (g)
H29-1	House 29		n/a	sl	red		red		1	5.6
H32-1	House 32 Basin		n/a	sl	red		red		1	1.4
H32-2	House 32 Basin		n/a	sl	red		red		1	2
PZ-13	47.5N 107.5W		n/a	sl	red	incised	red		1	2.4
PZ-6	75N 90W		n/a	sl	drkbrn		dkbrn		1	7
PZ-7	70N 92.5W		n/a	sl	red-tan		red-tan		1	3.7
Effigy Bowls										
162-3	Pit 162	Fine	effigy	sl	drkbrn	burnished	dkbrn	Y	1	27.3
216-9	Pit 216	Fine	effigy	sl	drkbrn	burnished, effigy	dkbrn		1	15.2
267-13	Pit 267		effigy	sl	drkbrn/ black	burnished, effigy	dkbrn/black	Y	1	18.5
285-1	Pit 285	Med	effigy	sl	drkbrn	burnished, effigy	dkbrn	Y	1	19.6
226-2	Pit 226	very fine-fine	effigy	sl	drkbrn/ black	burnished, effigy	dkbrn/black		1	34.8
350-1	Pit 350		effigy	sl	red	effigy	red		1	4.6
284-1	Pit 284	Fine-Med	effigy	sl	drkbrn	burnished, effigy	n/a		1	2.6
358-1	Pit 358	Fine-Med	effigy	sl	drkbrn	burnished, trailed	dkbrn	Y	2	8.7
110-7	Pit 110	Fine	effigy	er	n/a	effigy	dkbrn	Y	1	9.56
36-4	Pit 36		effigy	sl	drkbrn/ black	burnished, effigy	dkbrn/black	Y	1	23.4
H32-6	House 32 Basin		effigy	sl	red	effigy, incised	red		1	13.5
286-3	Pit 286	Fine-Med	effigy	sl	drkbrn	burnished, effigy	red		1	15.8
345-1	Pit 345		effigy	sl	red	effigy	red		1	10.23

Table B.15 Visual Attributes Of Bowls From Olin (Continued)

Vessel #	Feature	Temper Size	Bowl shape	Ext surf	Ext slip	Decoration	Int Slip	Int Burnish	# sherds	Wt (g)
					Everted Rim Bowls					
5-6	Pit 5		everted rim	sl	drkbrn	burnished, incised	dkbrn		1	4.85
9-4	Pit 9		everted rim	er	n/a		n/a		1	9.38
43-1	Pit 43	Fine	everted rim	sl	tan		tan	Y	1	19.26
63-3	Pit 63		everted rim	sl	red	burnished, trailed	red		1	3.36
63-4	Pit 63		everted rim	sl	drkbrn	burnished	brown	Y	1	13.1
68-3	Pit 68	Fine-Med	everted rim	sl	drkbrn	burnished	dkbrn	Y	1	8.08
68-4	Pit 68		everted rim	sl	drkbrn		dkbrn		1	5.71
77-1	Pit 77		everted rim	pl	n/a	trailed	tan	Y	1	6.5
107-5	Pit 107	Fine	everted rim	sl	drkbrn	burnished	dkbrn	Y	1	20.7
226-3	Pit 226	very fine-fine	everted rim	sl	red	trailed	red		1	11.3
233-1	Pit 233	Fine	everted rim	sl	drkbrn	burnished	dkbrn		1	15.7
247-3	Pit 247 & 256		everted rim	sl	drkbrn	trailed	dkbrn		1	2.14
267-9	Pit 267		everted rim	sl	drkbrn	burnished	dkbrn	Y	1	33.85
267-12	Pit 267		everted rim	sl	drkbrn		dkbrn		1	3.82
267-26	Pit 267	Fine-Med	everted rim	sl	drkbrn	burnished, trailed	dkbrn		1	8.6
267-27	Pit 267	Fine	everted rim	sl	drkbrn	burnished, trailed	dkbrn	Y	1	76.9
304-1	Pit 304		everted rim	sl	drkbrn	trailed	dkbrn	Y	1	4.7
325-3	Pit 325	Fine-Med	everted rim	sl	drkbrn		dkbrn		1	13.8
347-1	Pit 347	Fine-Med	everted rim	sl	drkbrn/ black	burnished, trailed	dkbrn/black	Y	1	5.1
356-2	Pit 356	Fine	everted rim	sl	drkbrn/ black	burnished	dkbrn/black		1	32.1
365-1	Pit 365	Fine-Med	everted rim	sl	drkbrn/ black	burnished, trailed	dkbrn/black	Y	1	35.4
367-2	Pit 367	Med-coarse	everted rim	sl	drkbrn/ black	burnished, trailed	dkbrn/black	Y	1	94.9
PZ-2	60N 92.5W		everted rim	sl	drkbrn		dkbrn		1	14.9

Table B.16. Metric Attributes Of Bowls From Olin

Outcurving Bowls								
Vessel #	Feature	Bowl shape	Orifice Dia (cm)	% of Orifice	LL (mm)	WT (mm)	LT (mm)	Lip Form
6-1	Pit 6	outcurving	10	10%			4.62	rounded
9-1	Pit 9	outcurving	16	3%			4.09	rounded
28-6	Pit 28A	outcurving	8	7%		5.5	5.86	rounded
64-2	Pit 64	outcurving	10	5%			3.99	round-exterior bevel
82-4	Pit 82	outcurving	20	5%			4.62	rounded
87-1	Pit 87	outcurving	14	5%			5.57	rounded
89-5	Pit 89	outcurving	20	7%			5.52	rounded
107-6	Pit 107	outcurving	9	15%			3.76	round-interior bevel
133-3	Pit 133	outcurving	10	7%			4.26	rounded
138-1	Pit 138	outcurving	14	5%			5.15	rounded
153-3	Pit 153	outcurving	10	5%			4.62	rounded
162-2	Pit 162	outcurving	14	7%			4.87	rounded
188-5	Pit 188	outcurving	17	7%			4.31	flat
262-1	Pit 262	outcurving	22	5%			5.1	flat
262-2	Pit 262	outcurving	16	8%			3.68	rounded
265-2	Pit 265	outcurving	14	5%			3.96	flat
266-2	Pit 266	outcurving	12	5%			3.7	rounded
267-22	Pit 267	outcurving	10	5%			4.68	rounded
267-24	Pit 267	outcurving	14	6%			4.4	rounded
275-6	Pit 275	outcurving	7	10%			3.41	rounded
276-3	Pit 276	outcurving	12	5%			4.72	flat
289-5	Pit 289	outcurving	15	5%			4.52	flat
299-6	Pit 299	outcurving	15	5%			4.44	flat
299-7	Pit 299	outcurving	18	10%			4.7	round-exterior bevel
323-7	Pit 323	outcurving	10	5%			5.78	rounded
325-1	Pit 325	outcurving	12	15%			5.06	rounded
366-2	Pit 366	outcurving	14	3%			5.37	flat
367-6	Pit 367	outcurving	10	5%			4.27	flat
H39-1	House 39 Double Wall Trench Outer North Wall	outcurving	18	5			4.98	rounded
H23-6	House 23 area	outcurving	9	10%			4.84	flat
H32-3	House 32 Basin	outcurving	16	10%			5.03	rounded
WT73-8-2	Wall Trench 73-8	outcurving	19	5%			5.13	rounded

Table B.16. Metric Attributes Of Bowls From Olin (Continued)

Vessel #	Feature	Bowl shape	Orifice Dia (cm)	% of Orifice	LL (mm)	WT (mm)	LT (mm)	Lip Form
Outslanting Bowls								
139-2	Pit 139	outslanting	8	12%			4.4	rounded
253-2	Pit 253	outslanting	16	15%			5.5	flat
Straight Bowls								
9-3	Pit 9	straight					4.77	flat
17-3	Pit 17	straight	16	5%			5.76	flat
28-7	Pit 28A	straight	18	5%		2.8	3.92	flat
89-8	Pit 89	straight	20	3%			5.01	flat
192-1	Pit 192	straight	12	10%			4.5	round-interior bevel
267-20	Pit 267	straight	18	10%			4.2	rounded
318-4	Pit 318	straight	8	10%			3.96	rounded
347-2	Pit 347	straight	10	7%			4.16	rounded
360-2	Pit 360	straight	16	7%			4.37	flat
H32-9	House 32 Floor	straight	11	9%			4.13	round-interior bevel
Incurving Bowls								
5-4	Pit 5	incurving	12	12%			5.08	rounded
36-10	Pit 36	incurving	22	13%		3.8	5.3	rounded
76-1	Pit 76	incurving	26	13%			5.08	rounded
89-6	Pit 89	incurving	24	3%			6.51	flat
115-3	Pit 115	incurving	8	5%			4.82	round-interior bevel
152-5	Pit 152	incurving	16	5%			5.2	rounded
152-6	Pit 152	incurving	22	5%			4.85	flat
154-2	Pit 154	incurving	18	6%			5.95	flat
188-1	Pit 188	incurving	28	3%			6.52	flat
188-3	Pit 188	incurving	16	7%			4.91	flat
188-4	Pit 188	incurving	22	5%			5.1	flat
201-1	Pit 201	incurving	18	3%			5.65	flat
232-2	Pit 232	incurving	10	7%			4.19	rounded
267-11	Pit 267	incurving	12	3%			5.08	rounded
267-23	Pit 267	incurving	30	12%			5.25	int. beveled
279-1	Pit 279	incurving	17	5%			5.46	flat
294-1	Pit 294	incurving	20	5%			6.56	flat
294-2	Pit 294	incurving	34	3%			5.85	flat
294-3	Pit 294	incurving	16	8%			5.96	flat
312-2	Pit 312	incurving	10	15%			4.23	flat
313-1	Pit 313	incurving	12	5%			5.27	flat
323-8	Pit 323	incurving	10	10%			4.46	flat

Table B.16. Metric Attributes Of Bowls From Olin (Continued)

Vessel #	Feature	Bowl shape	Orifice Dia (cm)	% of Orifice	LL (mm)	WT (mm)	LT (mm)	Lip Form
324-4	Pit 324	incurving	12	3%			5.78	rounded
345-2	Pit 345	incurving	14	5%			5.39	flat
350-4	Pit 350	incurving	17	3%			4.81	rounded
350-7	Pit 350	incurving	18	5%			5.65	flat
361-1	Pit 361	incurving	13	3%			4.45	flat
H40-2	House 40/42/43/44 Floor	incurving	14	10%			4.53	flat
H40-3	House 40/42/43/44 Floor	incurving	14	6%			4.91	round-exterior bevel
H40-4	House 40/42/43/44 Floor	incurving	16	5%			5.49	rounded
Inslanting Bowls								
5-12	Pit 5	inslanting		3%			3.67	flat-interior bevel
28-12	Pit 28A	inslanting	10	3%			3.22	rounded
45-1	Pit 45	inslanting	16	5%			4.24	flat
82-6	Pit 82	inslanting	18	5%			4.29	rounded
89-7	Pit 89	inslanting	24	7%			6.71	flat
89-9	Pit 89	inslanting	20	3%			4.89	ext. beveled
98-1	Pit 98	inslanting	34	3%			5.69	rounded
218-1	Pit 218	inslanting	24	7%			4	rounded
229-1	Pit 229	inslanting	16	5%			4.77	flat
253-3	Pit 253	inslanting	31	3%			8.05	round-interior bevel
289-4	Pit 289	inslanting	27	3%			5.35	rounded
367-5	Pit 367	inslanting	22	5%			3.98	flat-exterior bevel
H26-1	House 26 (Wall Trench 73-5A)	inslanting	20	5%			4.16	ext. beveled
H32-7	House 32 Basin	inslanting	20	3%			5.05	flat
PZ-20	67.5N 67.5W	inslanting	30	5%			5.56	rounded
327-1	Pit 327	inslanting	10	8%			3.3	flat
Indeterminate Bowls								
33-5	Pit 33	n/a	26	3%			4.25	rounded
43-11	Pit 43	n/a	14	3%			4.22	rounded
47-2	Pit 47	n/a					5.48	rounded
54-1	Pit 54	n/a	14	6%			5.57	flat
59-1	Pit 59	n/a	24	10%			4.99	rounded
67-1	Pit 67	n/a	26	3%			5.09	flat

Table B.16. Metric Attributes Of Bowls From Olin (Continued)

Vessel #	Feature	Bowl shape	Orifice Dia (cm)	% of Orifice	LL (mm)	WT (mm)	LT (mm)	Lip Form
68-6	Pit 68	n/a					4.05	rounded
98-3	Pit 98	n/a	26	5%			6.26	flat
113-1	Pit 113	n/a	28	3%			4.92	flat
135-2	Pit 135	n/a	10	10%			5.2	rounded
153-1	Pit 153	n/a	10	8%			3.33	flat
153-4	Pit 153	n/a	25	3%			5.61	rounded
192-8	Pit 192	n/a	16	5%				
216-10	Pit 216	n/a	12	9%			4.18	flat
227-4	Pit 227	n/a	16	5%			5.76	flat-interior bevel
233-2	Pit 233	n/a	12	5%			4.08	rounded
249-1	Pit 249	n/a	16	5%			4.59	rounded
267-10	Pit 267	n/a	14	5%			5.22	round-interior bevel
267-21	Pit 267	n/a	10	8%			5.65	flat
267-25	Pit 267	n/a	18	5%			3.78	rounded
267-5	Pit 267	n/a	22	5%			5.82	flat
267-6	Pit 267	n/a	10	5%			4.68	rounded
267-7	Pit 267	n/a	28	6%			5.7	flat
267-8	Pit 267	n/a	30	8%			5.75	flat
275-3	Pit 275	n/a	14	15%			4.06	rounded
275-4	Pit 275	n/a	10	15%			4.68	round-interior bevel
275-5	Pit 275	n/a	16	7%			5.36	rounded
276-2	Pit 276	n/a	20	15%			4.3	rounded
277-3	Pit 277	n/a	10	8%			3.99	flat
289-3	Pit 289	n/a	8	5%			4.51	flat
291-2	Pit 291	n/a	20	10%				
300-3	Pit 300	n/a	10	5%			5.66	flat
318-1	Pit 318	n/a	9	5%			6.52	round-interior bevel
319-1	Pit 319	n/a	10	5%			3.31	rounded
323-3	Pit 323	n/a	8	10%			4.28	rounded
323-6	Pit 323	n/a	10	5%			5.05	flat
324-5	Pit 324	n/a	10	10%			4.93	peaked
338-1	Pit 338	n/a	12	5%			3.97	rounded
345-4	Pit 345	n/a	10	5%			5.56	ext. beveled
347-3	Pit 347	n/a	10	5%			4.64	flat
H29-1	House 29	n/a	30	3%			4.69	rounded
H32-1	House 32 Basin	n/a	12	3%			4.51	rounded

Table B.16. Metric Attributes Of Bowls From Olin (Continued)

Vessel #	Feature	Bowl shape	Orifice Dia (cm)	% of Orifice	LL (mm)	WT (mm)	LT (mm)	Lip Form
H32-2	House 32 Basin	n/a		3%			4.98	rounded
PZ-13	47.5N 107.5W	n/a	10	5%			5.01	ext. beveled
PZ-6	75N 90W	n/a	16	10%			4.9	rounded
PZ-7	70N 92.5W	n/a	16	6%			5.39	rounded
Effigy Bowls								
36-4	Pit 36	effigy	20	3%			6.2	flat
110-7	Pit 110	effigy	18	3%				
162-3	Pit 162	effigy						
216-9	Pit 216	effigy	16	6%			5	rounded
226-2	Pit 226	effigy	24	7%			5.2	rounded
267-13	Pit 267	effigy	22	3%			5.4	flat
284-1	Pit 284	effigy						
285-1	Pit 285	effigy	10	15%			3.7	peaked
286-3	Pit 286	effigy	39	5%			6.4	rounded
345-1	Pit 345	effigy		3%			5.2	ext. beveled
350-1	Pit 350	effigy					4.6	rounded
358-1	Pit 358	effigy	14	6%			5.5	rounded
H32-6	House 32 Basin	effigy	15	7%			5.2	rounded
Everted Rim Bowls								
5-6	Pit 5	everted rim	20	4%	10.3	5.1	5.9	everted
9-4	Pit 9	everted rim	38	5%	23.1	5.6	7	everted
43-1	Pit 43	everted rim	16	5%	9.53	5.1	3.5	everted
63-3	Pit 63	everted rim	24	5%	13.1	3.4	4.3	everted
63-4	Pit 63	everted rim	34	5%	13.5	3.4	3.7	everted
68-3	Pit 68	everted rim	26	3%	10.7	5.7	3.2	everted
68-4	Pit 68	everted rim	30	3%	14	5.8	4.9	everted
77-1	Pit 77	everted rim	17	10%	14.4	4.5	4.8	everted
107-5	Pit 107	everted rim	25	8%	8.99	4	4.1	everted
226-3	Pit 226	everted rim	22	7%	17.3	5.5	5.1	everted
233-1	Pit 233	everted rim	32	5%	14.1	5.1	5	everted
247-3	Pit 247 and Pit 256	everted rim	18	7%	12.6	5.4	4.5	everted
267-9	Pit 267	everted rim	32	5%	8.71	4.4	4	everted
267-12	Pit 267	everted rim	24	3%	9.33	4.4	3.5	everted
267-26	Pit 267	everted rim	18	8%	9.84	4.9	3.4	everted
267-27	Pit 267	everted rim	20	6%	8.38	4.5	3.5	everted
304-1	Pit 304	everted rim	20	5%	16.7	5.5	5.3	everted
325-3	Pit 325	everted rim	36	7%				

Table B.16. Metric Attributes Of Bowls From Olin (Continued)

Vessel #	Feature	Bowl shape	Orifice Dia (cm)	% of Orifice	LL (mm)	WT (mm)	LT (mm)	Lip Form
347-1	Pit 347	everted rim	24	5%			6.6	everted
356-2	Pit 356	everted rim	24	10%	13.5	5.3	4.8	everted
365-1	Pit 365	everted rim	30	10%	20.2	6	5.3	everted
367-2	Pit 367	everted rim	32	18%	18.1	4	5.8	everted
PZ-2	60N 92.5W	everted rim	24	5%	11.5	4.9	4.7	everted
Shallow Bowls								
197-3	Pit 197	inslanting	22	8%			5.19	flat
223-3	Pit 223 and Pit 218	inslanting	24	8%			4.59	rounded
232-5	Pit 232	inslanting	32	4%			5.29	rounded
272-3	Pit 272	inslanting	26	5%			5.7	rounded
299-5	Pit 299	inslanting	16	6%			4.85	flat
321-9	Pit 321	inslanting	28	5%			5.46	flat
323-2	Pit 323	inslanting	16	3%			6.72	rounded
H29-5	House 29	inslanting	28	3%			5.05	Flat

Table B.17. Plates Recovered From Olin

Vessel #	Feature	Ext Surf	Ext Slip	Decoration	Int Slip	Orifice Dia (cm)	% of Orifice	LL (mm)	WT (mm)	LT (mm)	Lip Form	# sherds	Wt (g)
318-5	Pit 318	sl	drkbrn	trailed	dkbrn	24	10%	39.3	5.6	6.7	flat	1	27.4
321-1	Pit 321	er	n/a	trailed	red	26	3%			8.6	round-ext bevel	1	9.8
321-11	Pit 321	sl	red	trailed	red	22	3%			6.7	flat	1	12.7
321-12	Pit 321	sl	drkbrn	trailed	red	30	15%	47.2	3.9	7.4	flat-ext bevel	1	66.4
323-4	Pit 323	sl	drk-brn/black	burnished trailed	dkbrn	>18	3%			8.2	flat	1	1.8
323-5	Pit 323	sl	drk-brn/black	burnished trailed	dk-brn/black	>30	3%	41.3		7.2	round	1	6.9
H8-5	House 8 post holes	sl	red	trailed	red	30	3%			6.6	flat	1	3.93
H39-2	House 39 Double Wall House Inner North Wall	Sl	drkbrn	trailed	drk-brn	30	6	45.87		7.08	Round	2	20.8
PZ-18	52.5N 67.5W	sl	drkbrn		dkbrn	32	7%			5.5	round	1	27.5

Table B.18. Pans Recovered From Olin

Vessel #	Feature	Temper size	Ext surf	Ext Soot	Int Slip	Orifice Dia (cm)	% of Orifice	LT (mm)	Lip Form	# sherds	Wt (g)
5-5	Pit 5		pl	Y	red	40	4%	11.1		1	10
36-5	Pit 36		pl		red	50	5%	8.65	flat	1	67.6
54-2	Pit 54		pl		n/a	22	3%	7.66	round	1	12.5
138-2	Pit 138		pl	Y	red	40	5%	13.6	flat	2	65
154-1	Pit 154	Med-coarse	pl	Y	red	34	7%	10.16	round	1	32
192-2	Pit 192	Med-coarse	pl		red	42	3%	11.78	flat	1	8.6
203-6	Pit 203	Fine-Med	pl		red	40	5%	9.42		1	40.7
216-11	Pit 216		pl	Y	red	40	3%	9.86	flat	1	21.5
224-3	Pit 224	Med-coarse	pl	Y	red	38	6%	9.9	flat	1	32.9
289-7	Pit 289	fine, med, coarse	pl	Y	red	36	10%	7.35	flat	1	38.9
289-8	Pit 289		pl	Y	red	35	5%	8.96	flat	1	49.9
295-2	Pit 295	fine, med, coarse	pl	Y	red	29	5%	10	flat	1	10.9
319-5	Pit 319		er	Y	red	42	7%	11.25	round-ext. bevel	1	50
327-5	Pit 327	fine, med, coarse	er		red	42	5%	11.47	flat	2	67
327-6	Pit 327	Med-coarse	pl	Y	red	42	9%	10.41	flat	1	73.3
350-5	Pit 350		pl		red	30	3%	11.13	flat	1	7
350-6	Pit 350		pl		red	32	3%	13.14	flat	1	36.4
355-2	Pit 355	Med-coarse	er	Y	red	36	5%	11.41	flat	6	82.5
366-3	Pit 366	Med-coarse	pl		red	38	5%	8.08	round	1	27.4
367-1	Pit 367	Med-coarse	pl	Y	n/a	46	12%	9.91	round	1	134
SL-1	Sweat-lodge		pl		red	20	3%	8.8	round	1	6.85
H29-1	House 29		pl		red	24	5%	9.24	flat-ext. bevel	1	5
H29-2	House 29		pl		red	24	5%	9.11	flat	1	10.1
PZ-1	60N 92.5W		pl	Y	red	40	3%	7.72	round	1	20.8
PZ-21	67.5N 67.5W		pl	Y	red	26	3%	8.21	flat	1	6.7

Table B.19. Bottles Recovered From Olin

Vessel #	Feature	Temp Size	Ext surf	Ext slip	Decoration	Int Slip	Orifice Dia (cm)	% of Orifice	LT (mm)	Lip Form	# sherds	Wt (g)
5-7	Pit 5		sl	drkbrn	burnished	dkbrn	8	5%	3.8	flat	1	3.4
5-8	Pit 5		sl	tan	burnished	tan	6	7%	3.07	rounded	1	2
17-4	Pit 17	Fine-Med	sl	drkbrn	burnished	red	13	3%	5.74	round-interior bevel	1	4.83
36-3	Pit 36		sl	drkbrn	burnished	dkbrn	6	15%	3.61	int. beveled	1	5.6
43-2	Pit 43		sl	red	burnished	n/a	8	7%	6.46	flat	1	14.28
88-5	Pit 88		pl	n/a		red	10	5%	4.92	rounded	1	3.85
98-2	Pit 98	Fine	sl	red		red	10	5%	4.53	rounded	1	2.5
113-2	Pit 113		er	n/a		red	10	10%			1	5.02
119-1	Pit 119		sl	red		red	10	15%	5.43	rounded	1	7.22
131-2	Pit 131	Fine-Med	sl	red		red	10	5%	3.64	flat	1	1.1
131-3	Pit 131	Fine-Med	sl	drkbrn	burnished	dkbrn	8	8%	4.5	rounded	1	4
133-10	Pit 133	Med-coarse	cm	drkbrn		n/a	10	8%	5.61	flat	1	35.9
133-4	Pit 133	fine, med, lg	sl	red		red	10	10%	6.58	flat	1	8.2
188-2	Pit 188		sl	drkbrn	burnished	dkbrn	14	7%	4.81	rounded	1	3.8
188-5	Pit 188		sl	red	burnished	red	14	6%	4.54	rounded	1	3.8
203-4	Pit 203	very fine	sl	drkbrn	burnished	red	8	5%	4.25	flat	1	1.8
203-5	Pit 203		sl	drkbrn	burnished	dkbrn	8	5%	3.94	rounded	2	2
224-2	Pit 224	very fine-fine	sl	drkbrn	burnished	red	9	8%	3.6	rounded	1	18.3
227-2	Pit 227	Med-coarse	sl	red	burnished	red	9	30%	7.75	flat	1	84
232-3	Pit 232		sl	red		red	9	8%	5.28	flat	1	4.44
256-3	Pit 256	fine and coarse	sl	red		red	6	10%	5.15	rounded	1	4.3
267-19	Pit 267		sl	red		red	10	6%	3.91	rounded	2	4.8
271-1	Pit 271		sl	red		n/a	8	8%	6.09	rounded	1	1
274-2	Pit 274		sl	red		red	10	10%	5.85	int. beveled	1	5.1
285-2	Pit 285	Med-coarse	sl	drkbrn	burnished	red	8	50%	4.68	round-interior bevel	2	43.25

Table B.19. Bottles Recovered From Olin (Continued)

Vessel #	Feature	Temp Size	Ext surf	Ext slip	Decoration	Int Slip	Orifice Dia (cm)	% of Orifice	LT (mm)	Lip Form	# sherds	Wt (g)
299-4	Pit 299		sl	tan	burnished	n/a	10	12%	5.69	flat	1	6.9
299-9	Pit 299	Fine	sl	drkbrn	burnished	dkbrn	10	10%	3.69	rounded	1	19.1
300-1	Pit 300	Fine-Med	sl	red	burnished	red	8	15%	4.79	rounded	1	18.2
319-2	Pit 319		sl	red		red	8	10%	4.02	rounded	1	6.7
Table 19 (cont)												
Vessel #	Feature	Temp Size	Ext surf	Ext slip	Dec	Int Slip	Orifice Dia	% Orifice	LT (mm)	Lip Form	# sherds	Wt (g)
324-2	Pit 324		sl	red		red	6	5%	4.74	flat	1	0.8
324-3	Pit 324		sl	red		red	8	8%	5.11	rounded	1	1.99
327-4	Pit 327	Fine-Med	sl	red		red	8	15%	6.17	flat-interior bevel	1	9.7
346-1	Pit 346	Fine	sl	drkbrn	burnished	dkbrn	14	5%	3.8	rounded	1	8.6
350-10	Pit 350		sl	red		red	9	35%	6.08	flat	1	64.1
366-1	Pit 365 and 366	Fine-Med	sl	drkbrn		dkbrn	10	10%	6.39	flat	1	5
H39-3	House 39 Inner North Wall	Med-coarse	Sl	Drkbrn	Trailed, cm?	n/a	10	25%	6.34	Exterior bevel	1	35
H23-8	House 23 area	Fine-Med	sl	red		red	8	10%	7.32	flat	1	14.2
H40-1	House 40/42/43/44 Floor		sl	drkbrn	burnished	n/a	9	10%	6.28	flat	1	6.32
PZ-14	57.5N 97.5W		sl	red	burnished	red	12	10%	4.39	rounded	1	10.1

Table B.20. Hooded Bottles Recovered From Olin

Vessel #	Feature	Temper Size	Ext surface	Ext slip	Decoration	Int Slip	Orifice Dia (cm)	% of Orifice	WT	# sherds	Wt (g)
17-5	Pit 17		sl	drkbrn	burnished	n/a			4.01	1	29.03
114-1	Pit 118	Fine-Med	sl	drkbrn	burnished	n/a	4	20%		2	6.61
127-10	Pit 127	Fine-Med	sl	drkbrn	burnished, effigy	n/a				1	32.6

Table B.21. Seed Jars Recovered From Olin

Vessel #	Feature	Temper Size	Ext surface	Int Slip	Orifice Dia (cm)	% of Orifice	LT (mm)	Lip Form	# sherds	Wt (g)
108-1	Pit 108		pl	red	10	6%	4.98	rounded	1	1.23
318-2	Pit 318	Fine-Med	pl	n/a	6	9%	5.74	flat	1	1.2

Table B.22. Visual Attributes Of 'Utensils' From Olin

Vessel #	Feature	Temper	Bowl shape	Ext surf	Int Smooth	Lip Form	# sherds	Wt (g)
15-3	Pit 15	shell/ grog	inslanting	plain	Y	flat	4	288.81
87-2	Pit 87	shell/ grog	n/a	plain		flat	1	4.6
115-5	Pit 115	grog	n/a	plain		flat	2	56.49
133-2	Pit 133	shell/ grog	n/a	plain		flat	1	10
219-1	Pit 219	shell/ grog	inslanting	plain		flat	3	15.1
277-2	Pit 277	grog	incurving	plain		flat	1	22.2
289-1	Pit 289	shell/ grog	n/a	plain		flat	2	19.9
294-5	Pit 294	shell/ grog	inslanting	plain	Y	flat	1	25.8
367-3	Pit 367	grog	straight	plain	Y	flat	1	27.9
H39-4	H39 WT1	shell	straight	plain		flat	1	7.3
H13-1	67.5N 97.5W H13/ 14/15/16/17 Floor	shell	n/a	cord-marked		flat	4	58.2

Table B.23. Metric Attributes Of 'Utensils' From Olin

Vessel #	Feature	Orifice Dia (cm)	% of Orifice	LT (mm)	Lip Form	# sherds	Wt (g)
15-3	Pit 15	20	3%	11.2	flat	4	288.81
87-2	Pit 87	34	3%	8.01	flat	1	4.6
115-5	Pit 115	14	10%	9.18	flat	2	56.49
133-2	Pit 133	18	5%	9.47	flat	1	10
219-1	Pit 219	14	7%	7.86	flat	3	15.1
277-2	Pit 277	10	10%	8.28	flat	1	22.2
289-1	Pit 289	16	5%	8.87	flat	2	19.9
294-5	Pit 294	14	3%	7.91	flat	1	25.8
367-3	Pit 367	16	10%	8.21	flat	1	27.9
H13-1	67.5N 97.5W H13/ 14/15/16/17 Floor	10	30%	14.2	flat	4	58.2

Table B.24. Visual Attributes For Mini-Vessels From Olin

Vessel #	Feature	Vessel Type	Temper	Temper Size	Ext surf	Ext slip	Decoration	Int Slip	Rim attach	# sherds	Wt (g)
43-10	Pit 43	mini-bowl	shell		pl	n/a		n/a		1	3.7
74-3	Pit 74	mini-jar	shell	Fine	sl	drkbrn	burnished	dkbrn	top	4	9.9
223-1	Pit 223	mini-jar	none		sl	red		red		1	3.19
232-4	Pit 232	mini-jar	shell		sl	red		red	rolled lip	1	0.8
304-2	Pit 304	mini-bottle	shell	Fine	sl	black		n/a		1	2.1
318-3	Pit 318	mini-bowl	shell	Fine	sl	red				1	1
321-3	Pit 321	mini-jar	grog		pl	n/a		n/a		1	3
321-5	Pit 321	mini-jar	shell/ grog		pl	n/a		n/a		1	4
321-6	Pit 321	mini-jar	shell	Fine-Med	pl	n/a		n/a		1	1.9
327-3	Pit 327	mini-jar	shell	Fine	sl	drkbrn/ black	burnished	n/a	continuous from neck	1	5.3
356-4	Pit 356	mini-bowl	grog		sl	brown	burnished	n/a		1	4.9
H29-2	House 29	mini-jar	shell	very fine-fine	sl	red	burnished			1	32.6

Table B.25. 0Metric Attributes For Mini-vessels From Olin

Vessel #	Vessel Type	Orifice Dia (cm)	% of Orifice	RA (deg)	LB (deg)	LL (mm)	WT (mm)	RC	LT (mm)	LP	LS	RT	WTD
43-10	mini-bowl	5	5%						5.91				
74-3	mini-jar	8	15%		38	6.68	3.4		3.4	0.506	1.964	0.395	1.095
223-1	mini-jar	8	10%			12	5.2		5.07	0.434	2.359		
232-4	mini-jar	8	5%						5.3				
304-2	mini-bottle	6	8%					-0.086	2.73				
318-3	mini-bowl	5	5%						4.46				
321-3	mini-jar	10	5%						7.6				
321-5	mini-jar	8	5%						6.9				
321-6	mini-jar	8	7%						5.18				
327-3	mini-jar	6	14%		32	8.61	4.6	-0.018	5	0.545	1.722	0.782	0.772
356-4	mini-bowl	6	10%						6.44				
H29-2	mini-jar	6	50%	109		5.79	2.6	-0.026	3.43	0.442	1.688	0.407	0.975

Table B.26. . Pinch Pots Recovered From Olin (* denotes Late Woodland feature;** denotes mixed LW/Miss context)

Vessel #	Features	Temper	Ext Surf	CM Orient	CM Twist	Orifice Dia (cm)	% of Orifice	LT (mm)	Lip Form	# sherds	Wt (g)
45-3	Pit 45	none	pl			10	3%	3.84		1	1.95
68-8	Pit 68	none	pl			10	5%			1	3.01
68-9	Pit 68	none	pl			3	15%			1	4.94
92-2	Pit 92*	none	pl			5	15%	6.34		1	3.13
110-1	Pit 110*	none	pl			7	10%	3.5	rounded	1	5.42
110-2	Pit 110*	none	pl			6	5%	2.28	rounded	1	2.75
110-3	Pit 110*	none	pl			7	5%	4.19	rounded	1	1.13
110-8	Pit 110*	none	pl			6	10%	3.35	rounded	1	10.07
111-2	Pit 111*	none	pl			5	10%	2.41	rounded	1	1.13
118-1	Pit 118*	none	pl			10	5%	4.93	rounded	1	13.83
127-8	Pit 127	none	pl			12	8%	3.71	rounded	1	12.2
127-9	Pit 127	none	pl			12	5%	2.79	ext. bevel	1	3.4
132-1	Pit 132*	none	pl			4	10%	2.41		1	3.8
132-3	Pit 132*	none	pl			4	10%	4.56		1	6.6
133-1	Pit 133	none				4	15%	4.23		1	6.4
135-1	Pit 135*	none	cm	diagonal	S	11	6%	3.77	rounded	5	11.3
137-1	Pit 137*	none	pl			4	15%	2.69	rounded	1	2.2
145-2	Pit 145*	none	pl			6	15%	8.03	rounded	1	17.61
179-1	Pit 179*	none	pl			11	10%	5.01	flat	1	31.9
198-2	Pit 198*	none	pl			7	12%	3.3	rounded	1	10.6
198-3	Pit 198*	none	sm/cm			8	10%	4.46	rounded	1	7.7
198-4	Pit 198*	none	pl			6	15%	3.08	peaked	1	4.5
204-1	Pit 204*	none	pl			10	7%	3.43	rounded	1	9.2
223-2	Pit 223	none	pl			8	15%	5.19	rounded	1	26.53
249-2	Pit 249**	none	pl			10	5%	3.82	rounded	1	5.7
250-1	Pit 250*	none	sm/cm			5	25%	2.23	rounded	1	36.7
256-4	Pit 256	none	pl			7	10%	8.2	flat	1	6

Table B.26. Pinch Pots Recovered From Olin (Continued)

Vessel #	Features	Temper	Ext Surf	CM Orient	CM Twist	Orifice Dia (cm)	% of Orifice	LT (mm)	Lip Form	# sherds	Wt (g)
258-1	Pit 258*	none	pl			4	15%	5.2	flat	1	4.4
267-28	Pit 267	none	pl			8	10%	2.63	rounded	1	3.3
268-2	Pit 268*	none	pl			5	16%	4.99	rounded	1	11
275-7	Pit 275	none	pl			6	7%	4.18	rounded	1	2.9
275-8	Pit 275	none	pl			9	5%	4.31	rounded	1	3
283-1	Pit 283	none	pl			10	5%	7	int. bevel	1	14.2
295-3	Pit 295	none	pl			5	15%	4.2	rounded	1	6.7
299-2	Pit 299	none	pl			6	10%	7.49		1	3.4
311-3	Pit 311*	none	pl			6	20%	9	flat	1	23.7
311-4	Pit 311*	none	pl			4	20%	1.56	peaked	4	17.14
319-4	Pit 319	none	pl					8.46	flat	1	19.1
321-10	Pit 321	none	pl			8	15%	5.43	rounded	1	15.4
350-2	Pit 350	none	pl			4	13%	6.14	ext. bevel	1	3.1
355-3	Pit 355	none	pl			2.5	85%	3.71	flat	1	18.8
365-2	Pit 365	sand	pl			8	5%	4.59	rounded	1	1.8
H31-1	House 31 Wall Trench 1	none	pl			5	10%	3.61	rounded	2	4.04
H40-8	House 40/42/43/44 Floor	none	cm	vertical	S	7	16%	5.52	rounded	1	9
H27-4	House 27 posts	Shell	Pl			13	3%	8.06	Flat	1	4.84

COPPER SITE CERAMIC DATA

Table B.27. Body Sherds Recovered From Copper, Summarized By Temper And Surface Treatment

	Plain		Dark Slipped		Red Slipped		Tan Slipped		Cordmarked		Total	
Temper	**Ct**	**Wt (g)**	**Ct**	**Wt (g)**	**Ct**	**Wt (g)**	**Ct**	**Wt (g)**	**Ct**	**Wt (g)**	**Ct**	**Wt (g)**
Lime-stone	1	0.7	0	0	0	0	0	0	0	0	1	0.7
Grit-Grog	2	3.2	0	0	0	0	0	0	1	0.5	3	3.7
Sand	1	1.7	0	0	0	0	0	0	1	18.4	2	20.1
Shell-Grog	13	56.5	4	5.7	1	4.9	0	0	0	0	18	67.1
Pinch Pot	21	72.4	0	0	0	0	0	0	0	0	21	72.4
Grog	80	103.9	4	8.4	1	0.9	0	0	27	84.3	112	197.5
Grit	326	357.8	0	0	0	0	0	0	293	744.5	619	1102.3
Shell	784	1621.9	75	163.9	24	141.6	4	12.7	230	876.8	1117	2816.9
TOTAL	1228	2218.1	83	178	26	147.4	4	12.7	552	1724.5	1893	4280.7

Table B.28. Decorated Body Sherds Recovered From Copper

Feature #	Bag #	Temper	Surface	Decoration	Ct	Wt (g)	Tool
Feature 3	F3-6	SH	PL	Trailed	2	2.6	blunt medium
Feature 3	F3-6	SH	CM	Trailed	1	2.3	blunt wide
Feature 3	F3-4	SH	DS	Trailed	1	5.9	blunt narrow
Feature 3	F3-6	SH	PL	Trailed	1	4.1	finger very wide
Feature 4	F4-18	GG	PL	Rocker Stamped	1	1.6	
Feature 4	F4-18	Sand	PL	Dentate Rocker Stamped	1	7.1	
Feature 4	F4-18	SH	RS	Effigy protrusion (hooded bottle or shell vessel?)	1	2.9	effigy node (blunt, finger)
Feature 4	F4-7	SH	PL	Trailed	2	2.2	
Feature 4	F4-24	GT	PL	Rocker Stamped	1	0.3	
Feature 4	F4-36	SH	PL	Trailed	1	0.4	blunt medium
Feature 5	F5-2	GT	PL	Rocker Stamped	1	3.3	
Feature 8	F8-1	GT	PL	Reed Brushed	1	8.8	
Feature 13	F13-1	GG	PL	Incised	1	1	sharp narrow
Feature 13	F13-2	Sand	PL	Reed Brushed	2	28.6	
Mound 3	M3-22	Sand	PL	Trailed	1	0.6	
Mound 4	M4-7	GT	PL	Rocker Stamped	1	12.3	
Unit 68	U68-1	SH/GG	PL	Trailed	1	6.6	
Unit 135	U135-1	GT	PL	Rocker Stamped	1	3.7	
Unit 167	U167-1	GT	PL	Trailed	1	5.6	blunt narrow

Table B.29. Appendages Recovered From Copper

Feature #	Vessel Form	Vessel Part	Temper	Ext surf	Int surf	Wt (g)	Comments
F4	ind	appendage	shell	pl	pl	2.4	lip tab, 9.6 mm thick, 27.42 mm long, made separately and attached to exterior
F3	jar	appendage	shell	pl	pl	21.2	bifurcated narrow strap handle: 14.2 thick, 22.02 wide, height greater than 44.46
F4	jar	appendage	shell	pl	pl	2.1	loop handle fragment
Unit 129	jar	appendage	shell	pl	pl	8.3	bifurcated narrow strap handle; 10.5 mm thick, >41.27 mm high, 17.05 mm wide
Mound 3	ind	effigy	shell	ds	ds	12.6	hollow head, burnished dk brown/black slip
Unit 159	ind	effigy	shell	ds	er	7.4	

Table B.30. Non-vessels Recovered From Copper

Feature #	Vessel Form	Vessel Part	Temper	Ext surf	Int surf	Wt (g)	Comments
F3	bottle	neck	shell	rs	pl	10	4-6 cm orifice diameter
F3	bottle	neck	grog	pl	pl	6.2	
F3	bowl	lip	shell	pl	pl	2.4	
F4	bowl	lip	shell	pl	pl	1	
Unit 5	bowl	lip	shell	er	er	0.7	
Mound 3	Woodland bowl	rim	grit	pl	pl	2.4	woodland bowl
F13	ind	body	shell/ grog	pl/ inc	pl	4.4	chevron/inverted chevron pattern, 0.6 mm wide, blunt tool
Unit 168	ind	body	shell	pl	pl	1.1	
F4	ind	ind	sand	pl	pl	1.7	
F3	ind	lip	shell	er	er	1.4	
F3	ind	lip	shell	pl	er	0.3	
F4	ind	lip	shell	er	er	1	fine shell
F4	ind	lip	shell	pl	pl	0.5	
F4	ind	lip	shell	er	er	0.9	n=2
F4	ind	lip	shell	er	er	1.2	
F4	ind	lip	shell	pl	pl	3.3	
F8 l	ind	lip	grog	pl	pl	2.6	
Mound 3	ind	lip	shell	pl	pl	0.3	
Mound 3	ind	lip	shell	pl	pl	0.7	n=2
Mound 3	ind	lip	shell	pl	pl	0.3	
Mound 3	ind	lip	shell	pl	pl	0.5	
Mound 3	ind	lip	grit	pl	er	1.4	woodland vessel, exterior lip notch
F4	ind	rim	shell	pl	er	1.2	
F4	ind	rim	grog	pl	pl	0.9	
F4	ind	rim	shell	pl	pl	1.3	
Mound 3	ind	rim	shell	rs	pl	0.8	
F23	jar	neck	shell/ grog	pl	pl	12.7	reduced paste
F3	jar	neck	shell	pl	pl	19.3	
F3	jar	neck	shell	pl	pl	3.2	
F3	jar	neck	shell	er	er	16	
F3	jar	neck	shell	pl	pl	12.9	
F3	jar	neck	shell	pl	pl	10.8	
Mound 3	jar	neck	shell	ds	pl	14.8	brown slip
F13	jar	rim	shell	cm	rs	8.8	rim added to exterior
F19	jar	rim	shell	pl	pl	3.3	
F3	jar	rim	shell	pl	rs	7	

Table B.30. Non-vessels Recovered From Copper

Feature #	Vessel Form	Vessel Part	Temper	Ext surf	Int surf	Wt (g)	Comments
F3	jar	rim	shell	er	er	22.3	rim attached over top of neck with bolster of clay at neck exterior
F4	jar	rim	shell	er	er	3.4	
Unit 145	jar	rim	shell	er	er	3	lip rolled under
Unit 168	jar	rim	shell	pl	pl	3.8	rim/lip added as folded coil attached to front of vessel
F3	jar	shoulder	shell	pl	er	25.1	possible jar shoulder, broken at neck and sand-ed down? Or sherd was shovel skimmed
F12	jar/bottle	neck	shell	ds	pl	6.4	sparse temper, dense paste
F4	pan	lip	shell	pl	pl	2	
F3	pinch pot	rim	none	pl	pl	0.4	
F4	pinch pot	rim	grit	sm/cm	pl	9.5	exterior lip notching, blunt tool
F4	pinch pot	rim	none	pl	pl	1.3	
F4	pinch pot	rim	none	pl	pl	12.4	exterior indents from smoothing
F4	pinch pot	rim	none	pl	pl	2.9	bowl?
F3	plate	rim	shell	er	er	5.7	was likely dark slipped, probably trailed
F3	plate	rim	shell	ds	ds	2.8	maybe trailed
F3	plate	rim	shell	pl	pl	1.9	incised
F3	Woodland jar	rim	grit	er	pl	0.7	
F4	Woodland jar	rim	grit	pl	pl	0.4	woodland jar
F4	Woodland jar	lip	grit	pl	pl	0.5	Woodland vessel
F4	Woodland jar	lip	sand	sm/ cm	pl	2.5	Woodland vessel boss
F4	Woodland jar	rim	grit	sm/ cm	pl	1.4	LW Jar
F4	Woodland jar	rim	grit	cm	pl	0.5	LW vessel, interior lip notch
F13	Woodland Jar	rim	grit	TRL	pl	5.7	5 diagonal parallel lines, 1.44 mm wide, 3.23 mm apart, blunt tool
Mound 3	Woodland jar	rim	grit	pl	pl	2.4	woodland vessel
Mound 3	Woodland jar	rim	grit	er	pl	2.2	woodland vessel
Surface	Woodland jar	rim	grit	rkr stmp	pl	6.5	Middle Woodland vessel, mendhole
Unit 11	Woodland jar	rim	sand	pl	pl	5.7	

Table B.31. Decoration On Jars Recovered From Copper.

Vessel #	Feature	Exterior surface	Exterior decoration	Exterior Decoration Width	Exterior Decoration Tool	Handle Type	Handle Width (mm)	Handle Thickness (mm)	Handle Height (mm)
non-vessel	Feature 3	pl	handle			Narrow Strap	22.2	14.2	44.46
3-5	Feature 3	pl	handle			Narrow Strap	26.04	16.16	76.42
3-13	Feature 3	pl	lip tab						
U-6	Plow zone	cm	lip tab						
3-19	Feature 3	pl	trailed, lip notching, handle	Medium	Blunt	Narrow Strap	21.7	14.1	21.7

Table B.32. Visual Attributes Of Cordmarked Jars From Copper

Vessel #	Feature	Temper Size	Ext surf	Ext decoration	cm orient	cm twist	cm thickness (mm)	cm space (mm)	Ext Soot	Int Slip	Int smooth	# sherds	Wt (g)
3-9	F3	Med-coarse	cm		vert	S			Y	n/a		1	8.2
3-22	F3	Fine-Med	cm		vert	S	1.95	1.3		red		1	109.1
4-15	F4	Fine-Med	cm		vert/diag	ind.	2.2	1.5		red		2	41.5
6-2	F6	Fine	cm		vert	ind.	1.35	1.42		red		1	18.7
12-3	F12	Fine-Med	cm		vert	ind.				n/a	Y	1	22.5
20-1	F20	Med-coarse	cm		vert	S	2.2	1.4	Y	n/a	Y	1	23.7
23-1	F23	Fine-Med	sm/cm		vert	ind.			Y	red		1	112.7
23-2	F23	Med	Grooved Paddled		vert/diag				Y	red		1	160
U-3	PZ		cm		vert	ind.				n/a		1	7.8
U-6	PZ		cm	lip tab	vert	S	1.25	1.55		red	Y	1	116.6
B-1	Backdirt		cm		vert	S				red	Y	1	20.9
B-3	Backdirt	Fine-Med	cm		vert	S			Y	n/a		1	18.3

Table B.33. Metric Attributes Of Cordmarked Jars From Copper

Vessel #	Rim attachment	Orifice Dia (cm)	% of Orifice	LB (deg)	LL (mm)	WT (mm)	RC	LT (mm)	LP	LS	RT (mm)	WTD
3-9	front/ext	10	10%	30	18.7	6.22		5.49	0.333	3.41	0.65	
3-22	continuous from body, exterior bolster	28	15%	34	27.22	6.48	-0.078	10.07	0.238	2.7	0.22	0.77
4-15	front/ext with ext bolster	40	5%	23	27.6	6.38	-0.054	10.35	0.231	2.67	0.165	0.84
6-2	front/ext	38	5%	26	31.57	7.73		10.5	0.245	3.01		
12-3	front/ext	36	5%	43	29.47	5.86		7.97	0.199	5.03		
20-1	top	14	15%	42	18.39	5.87	-0.06	6.79	0.32	3.13	0.4	0.71
23-1	top with ext bolster	30	12%	20	27.82	8.82	-0.07	10.4	0.317	2.675	0.266	0.74
23-2	top with ext bolster	28	30%	45	27.11	7.57		17	0.28	1.59	0.255	
B-1	top with ext bolster	24	5%			6.96						
B-3	front/ext	26	5%	31	24.3	7.13		8.03	0.293	3.03		
U-3	top with ext bolster	19	5%	33	22.41	5.46		6.04	0.244	3.71		
U-6	top with ext bolster	32	10%	18	28.43	6.96	-0.04	16.25	0.245	1.75	0.19	

Table B.34. Visual Attributes Of Plain and Eroded Fars From Copper

Vessel #	Feature	Temper Size	Ext surf	Ext decoration	Ext Decoration Width	Ext Decoration Tool	Ext Soot	Int Slip	Int Smooth	# sherds	Wt (g)
3-2	F3	Med-coarse	er					n/a		1	14.7
3-5	F3	Fine-Med	pl	handle				n/a		1	125.8
3-6	F3		pl					n/a		2	1.1
3-7	F3		pl					n/a	Y	2	87.8
3-8	F3	Fine	pl				Y	n/a		1	39.3
3-12	F3	Fine-Med	pl					n/a	Y	1	11.8
3-13	F3	Fine-Med	pl	lip tab				red		1	15.9
3-14	F3	Fine-Med	pl					n/a	Y	1	43.6
3-16	F3	Med	er					n/a		1	8.1
3-18	F3		er				Y	n/a	Y	1	10.5
3-19	F3	Fine-Med	pl	trl, lip notch, handle	Med	Blunt		red	Y	5	201.7
3-26	F3	Fine-Med	pl					n/a	Y	2	34.2
4-1	F4	Fine-Med	pl					n/a		1	5.5
4-3	F4	Fine	pl					n/a	Y	1	4.6
4-10	F4	Med-coarse	er					n/a	Y	1	18.4
12-2	F12	Fine	pl					n/a	Y	1	6.2
18-1	F18	Fine-Med	pl					n/a	Y	1	1.4
M3-3	Mound 3	Med-coarse	pl					n/a	Y	1	17.8
U-8	PZ		er					red		1	10.3
U-9	PZ	Fine	pl					n/a		1	7.2

Table B.35. Metric Attributes Of Plain and Eroded Jars From Copper

Vessel #	Feature	Rim attach	Orifice Dia (cm)	% of Orifice	RA (deg)	LB (deg)	LL (mm)	WT (mm)	LT (mm)	LP	LS	RT (mm)
3-2	F3	top	28	6%		54	25.31	5.66	9.98	0.224	2.54	
3-16	F3	top	28	5%		18	24.52		9.42		2.6	
3-18	F3		28	5%	143				6.49			
4-10	F4	continuous from body, with extra clay added below rim	30	8%		39	30.08	6.23	8.45	0.207	3.56	
U-8	PZ	top with ext bolster	30	5%		20	29.03	6.31	10.21	0.217	2.84	
3-5	F3	continuous from body	24	25%	101	79	35.6	5.77	5.18			
3-6	F3		11	5%								
3-7	F3	continuous from body	24	25%	126	54	40	6.04	6.05			
3-8	F3	top	24	10%	127	53	38.16	5.94	7.22			
3-12	F3	top	18	6%		17	27.05	5.38	11.46	0.199	2.36	0.298
3-13	F3	top	18	5%		14	31.19	5.19	13.71	0.166	2.27	0.288
3-14	F3	continuous from body	26	10%	116		27.6	5.87	5.94			
3-19	F3	front/ext	19	10%	97		36.19	7.65	6.17			
3-26	F3	interior of neck	24	12%	110		34.96	6.72	6.2			
4-1	F4	front/ext with ext bolster	24	5%		4	21.65		16.65		1.3	
4-3	F4		16	5%								
12-2	F12		30	5%								
18-1	F18		10	5%								
M3-3	Mound 3		24	5%	112		46.1	8.46	8.14			
U-9	PZ	continuous from body	14	5%		38	24.08	6.5	7.97	0.27	3.02	0.5

Table B.36. Bottles Recovered From Copper

Vessel #	Bag #	Feature	Temper	Temper Size	Lip Shape	Ext surf	Ext slip	Orifice Dia (cm)	% of Orifice	LT (mm)	# sherds	Wt (g)
non-vessel	F3-31 & 999-2	F3 and PZ	shell	Fine		sl	red	5	15%		2	10
V3-3	F3-4	F3	shell	Fine-Med	Round	sl	drkbrn	10	16%	5.14	1	7.5
non-vessel	F4-18	F4	shell/ grog			sl	drkbrn	11	10%		1	9.8
V4-12	F4-19	F3	shell	Fine-Med	Round	er	n/a	6	10%	4.87	1	2.1

Table B.37. Bowls Recovered From Copper

Vessel #	Feature	Temper	Temper Size	Bowl shape	Lip shape	Ext surf	Ext slip	Ext dec	Int Slip	# sherds	Wt (g)
Incurving Bowls											
V4-2	F4	Shell	Fine-Med	incurving	Flat	pl	n/a		n/a	1	4.1
V4-4	F4	Shell	Fine-Med	incurving	Round	pl	n/a		n/a	1	13.2
VU-2	PZ	Shell	Fine	incurving	Round	pl	n/a		n/a	1	16.4
V3-15	F3	Shell	Fine-Med	incurving	Round	pl	n/a	Effigy? handle	n/a	1	29.5
V6-1	F6	Shell	Fine	incurving	Flat	sl	brown	lip tab	n/a	1	91.4
V3-28	F3	Shell	Fine	incurving	Flat	pl	n/a	lip tab	n/a	1	25.3
V3-20	F3	Shell		incurving	Flat	pl	n/a		n/a	1	44
Inslanting Bowls											
V4-5	F4	Shell		inslanting	Flat	pl	n/a		n/a	1	12.9
Straight Bowls											
V3-23	F3	Shell	very fine	straight	Flat	pl	n/a		n/a	1	23.6
V3-24	F3	Shell	Fine	straight	Round	pl	n/a		n/a	1	20.3
M3-6	M3	Shell	very fine	straight	round	sl	drkbrn	burnish	dkbrn	1	5.6
Outcurving Bowls											
V10-1	F10	Shell	Fine-Med	outcurving	Round	pl	n/a	Effigy?	n/a	1	8.7
V12-1	F12	Grog		outcurving	Round	sl	drkbrn	burnish	dkbrn	1	15.7
V3-10	F3	Grog		outcurving	Outward bevel-flat	smudge	n/a	burnish, lip tab	n/a	1	77.2
V23-5	F23	Shell	Fine-Med	outcurving or cambered	Outward bevel-flat	sl	drkbrn	burnish	dkbrn	1	16.7
Indeterminate Bowls											
V4-11	F4	Shell	Fine	indeterminate	Round	sl	drkbrn	burnish	dkbrn	1	7.9

Table B.38. Metric Attributes Of Bowls From Coppe\r

Vessel #	Feature	Orifice Diameter (cm)	% Orifice	LT (mm)	# sherds	Weight (g)
Incurving Bowls						
V4-2	Feature 4	16	5%	6.36	1	4.1
V4-4	Feature 4	14	10%	5.53	1	13.2
VU-2	Plowzone	16	5%	9.35	1	16.4
V3-15	Feature 3	12	10%	6.98	1	29.5
V6-1	Feature 6	24	15%	11.1	1	91.4
V3-28	Feature 3	26	10%	6.55	1	25.3
V3-20	Feature 3	26	7%		1	44
Inslanting Bowls						
V4-5	Feature 4	14	8%	5.88	1	12.9
Straight Bowls						
V3-23	Feature 3	18	8%	6.11	1	23.6
V3-24	Feature 3	30	5%	7.35	1	20.3
M3-6	Mound 3	16	6%	4.16	1	5.6
Outcurving Bowls						
V10-1	Feature 10	9	10%	4.93	1	8.7
V12-1	Feature 12	18	9%	6.99	1	15.7
V3-10	Feature 3	20	15%	7.67	1	77.2
V23-5	Feature 23	14	13%	4.79	1	16.7
Indeterminate Bowls						
V4-11	Feature 4	24	5%	6.83	1	7.9

Table B.39. Effigy Adornos From Copper

Vessel #	Feature	Vessel Type	Ext. surface	Ext. slip	Ext. decoration	# sherds	Wt (g)	Comments
non-vessel	F4	effigy bowl	sl	red		4	9.3	Wood Duck/ Hooded Merganser effigy
non-vessel	F4	effigy bowl	sl	drkbrn	burnished	1	14.2	Spoonbill effigy

Table B.40. Visual Attributes Of Pates From Copper

Vessel #	Feature	Temper	Lip Shape	Ext surf	Ext slip	Ext dec	Int Slip	Int Dec	Int Dec Width	Int Dec Tool	Int Dec Motif	# sherds	Wt (g)
V3-1	F3	shell	Round	sl	drkbrn		dkbrn					1	34
V3-21	F3	shell	Flat	pl	n/a		n/a					1	34.9
V3-25	F3	shell	Flat	sl	drkbrn	burnish	dkbrn					1	17.8
V3-27	F3	shell/ grog	Flat	sl	red		red	Incised	Nar	Sharp	Chevrons w/ vertical lines between	1	15.9
V3-29	F3	shell	Flat	sl	drkbrn	burnish	dkbrn	Burnish				1	14.3
V3-30	F3	shell	Round	pl	n/a		n/a					1	10.7
V4-6	F4	shell	Flat	pl	n/a		n/a					1	9
V4-9	F4	shell	Round	sl	red		red	Trailed	Nar	Blunt	diagonal lines	1	26.5
V20-2	F20	shell	Out bevel	sl	drkbrn		dkbrn	Trailed	Med	Blunt	chev/ oppositional diag	1	26.5
V20-3	F20	shell/ grog	Round	sl	drkbrn	burnish	dkbrn	Trailed	Med	Blunt	chev/ oppositional diag	1	44
VU-4	PZ	shell	flat	sl	drkbrn		dkbrn					1	22.2
VU-7	PZ	shell	Round	sl	drkbrn		dkbrn					1	22.1

Table B.41. Metric Atributes Of Plates From Copper

Vessel #	Feature	Orifice Diameter (cm)	Rim Diameter (cm)	% of Orifice	LL (mm)	LT (mm)
V3-1	Feature 3	36		5%	69	6.5
V3-21	Feature 3	34		8%	75.25	7.21
V3-25	Feature 3	32		6%	40.6	5.34
V3-27	Feature 3	34		6%	39.6	4.66
V3-29	Feature 3	28		5%	47.6	4.7
V3-30	Feature 3	24		7%	49.9	9.8
V4-6	Feature 4	(41)	42	5%	38	8.31
V4-9	Feature 4	(31)	32	7%	58.43	9.04
V20-2	Feature 20	36		6%	46.64	6.98
V20-3	Feature 20	28		15%	43.94	8.65
VU-4	Plowzone	(53)	54	5%	56.86	7.14
VU-7	Plowzone	35		6%	57	9.8

Table B.42. Pans Recovered From Copper

Vessel #	Feature	Temper Size	Lip Shape	Ext surf	Cm orient	Cm twist	Ext Soot	Int Slip	Orifice Dia (cm)	% of Orifice	LT (mm)	# sherds	Wt (g)
V3-11	F3	Fine-Med	Flat	pl	n/a		Y		36	5%	11.03	1	13.7
V23-3	F23	Fine-Med	Interior bevel	pl	n/a		Y	Y	43	5%	13.48	1	31
V23-4	F23	Fine	Flat	cm	diag	S		Y	48	5%	15.15	1	62.5
M3-4	Mound 3		Flat	pl	n/a				28	5%	12.01	1	9.7
M3-5	Mound 3	Fine-Med	Outward-bevel- flat	cm	diag	S	Y		50	5%	13	1	62.4
M3-7	Mound 3	Med-coarse	round	pl	n/a		Y		50	5%	10.36	1	119.5

Table B.43. Special Vessels Recovered From Copper

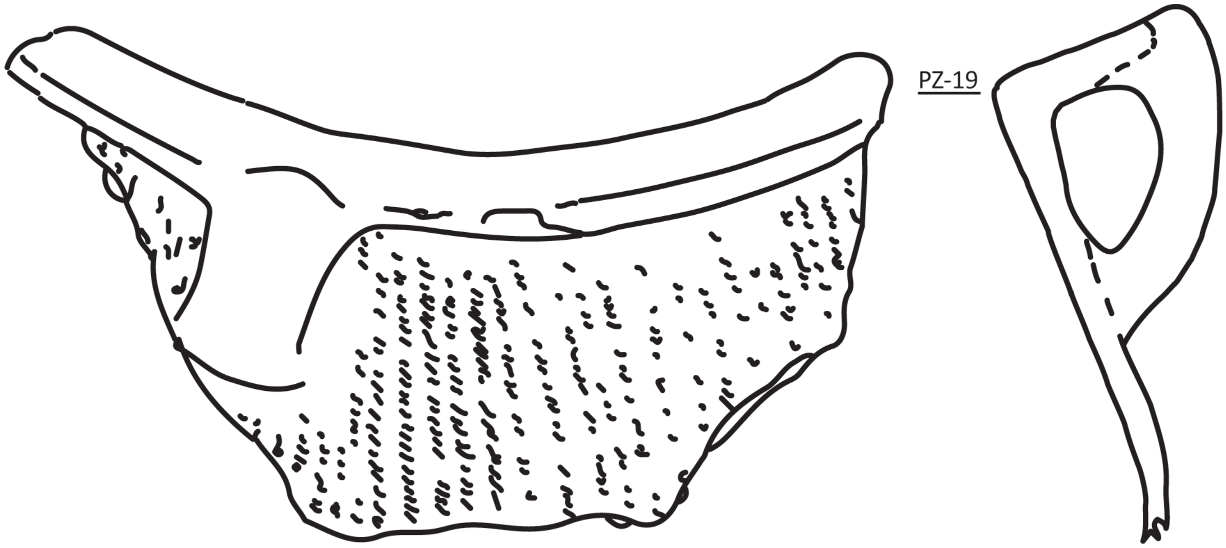
Vessel #	Feature	Vessel Type	Temper	Ext surface	Int Soot/ Residue	Orifice Dia (cm)	% of Orifice	# sherds	Wt (g)
V4-7	Feature 4	mini-vessel	shell	pl	Y	6	10%	1	6.3

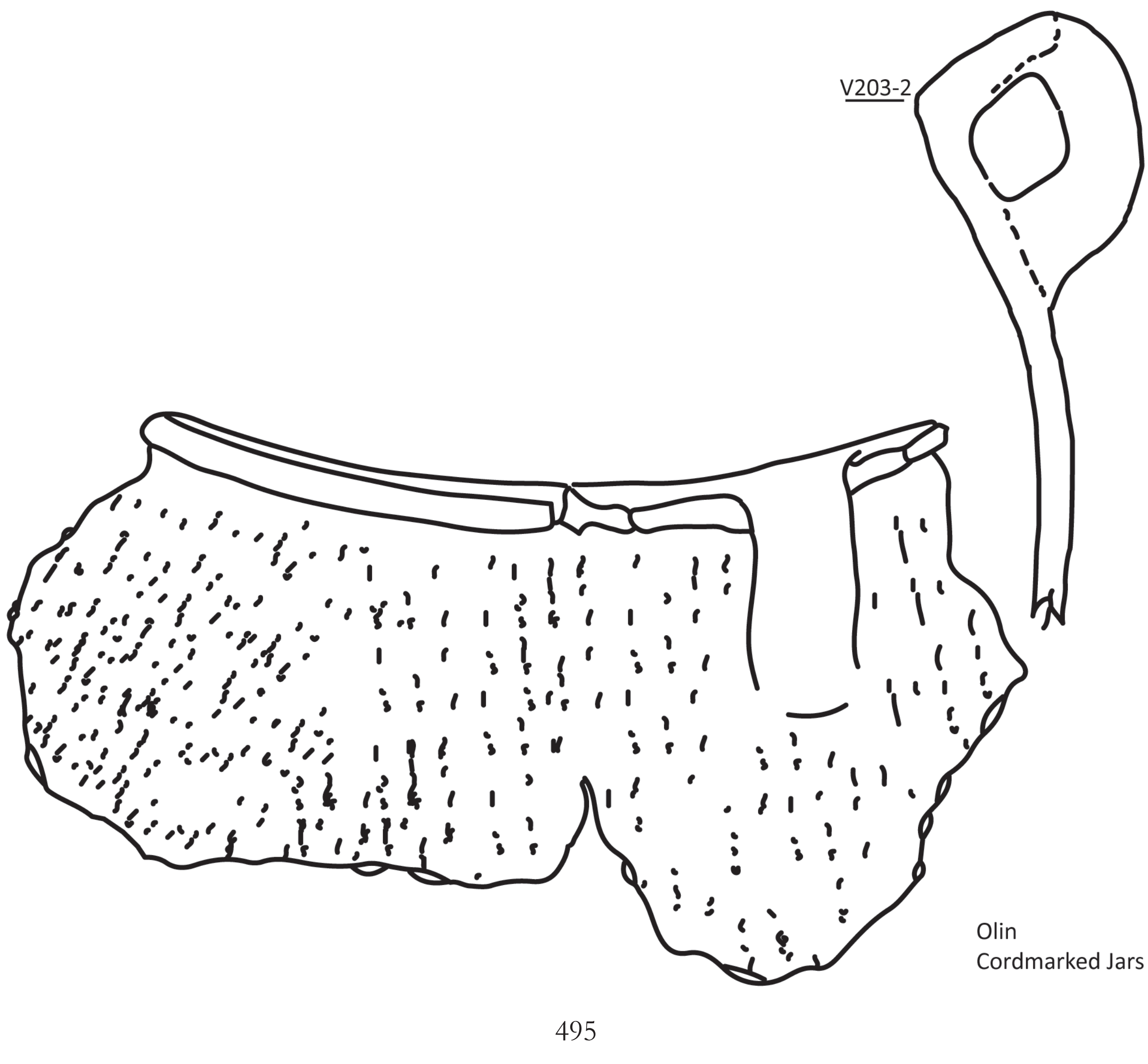
Vessel #	Feature	Vessel Type	Temper	Ext surface	Ext Soot	Orifice Dia (cm)	% of Orifice	# sherds	Wt (g)
V3-4	Feature 3	beaker (base)	shell	er	base, body	14	30%	1	53.3

Vessel #	Feature	Vessel Type	Temper	Ext surface	RC	LT (mm)	Orifice Dia (cm)	% of Orifice	# sherds	Wt (g)
VB-2	Backdirt F4 area	seed jar	shell	pl	-0.04		4	15%	1	8.6

Table B.44. Utensils/Crude Wares From Copper

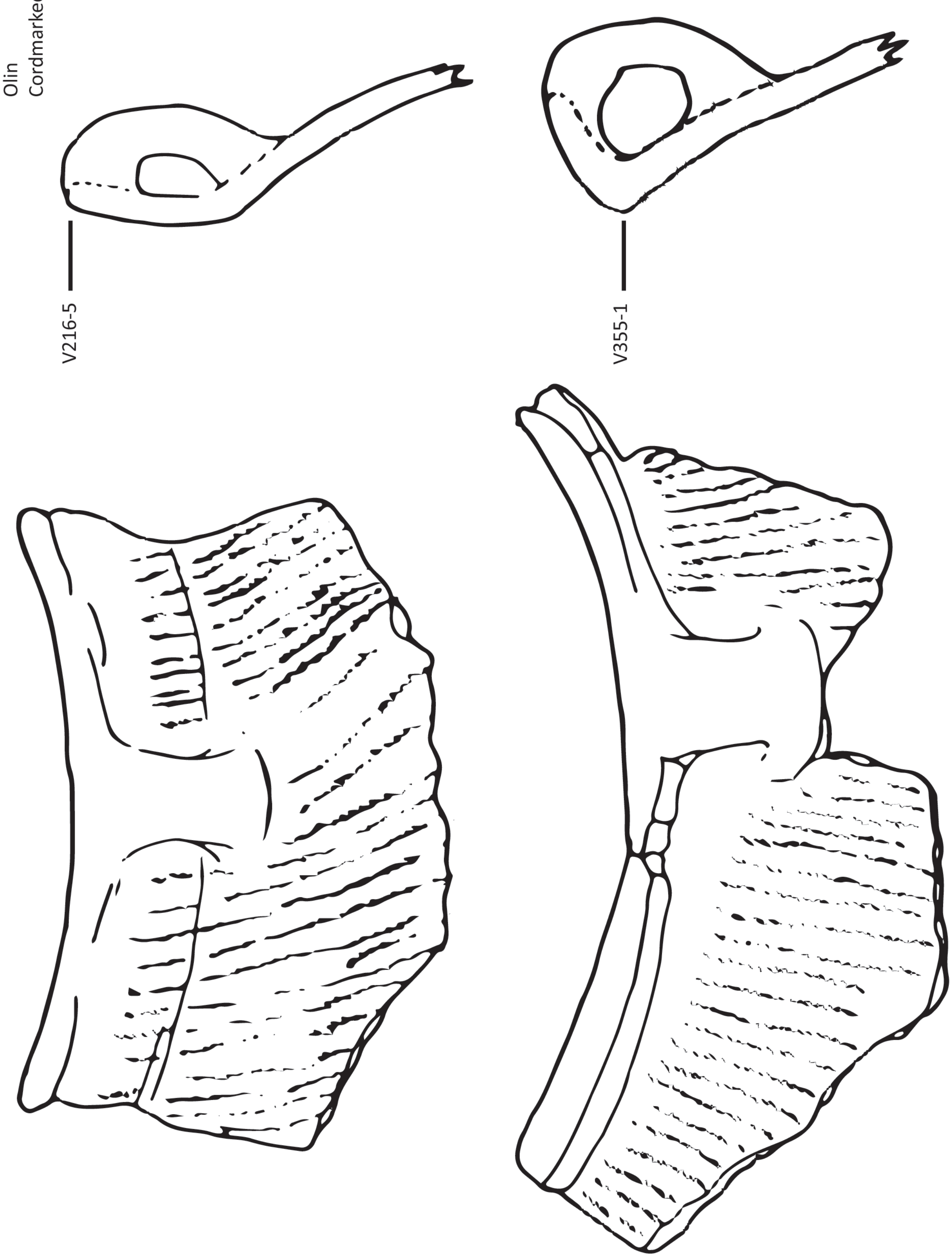
Vessel #	Feature	Vessel Type	Temper	Lip Shape	Ext surf	Ext slip	Int Slip	Orifice Dia (cm)	% of Orifice	WT (mm)	LT (mm)	# sherds	Wt (g)
V3-17	F3	crude beaker	grog/ shell	Flat	pl	n/a	n/a	8	12%	11.03	9.66	1	38.9
M3-2	Mound 3	crude bowl	shell	Flat	sl	red	red	31	5%		7.55	1	5.6
VU-1	PZ	crude bowl	grog		pl	n/a	n/a	12	8%	8.26	15.29	1	10.4





Olin
Cordmarked Jars

Olin Cordmarked Jars



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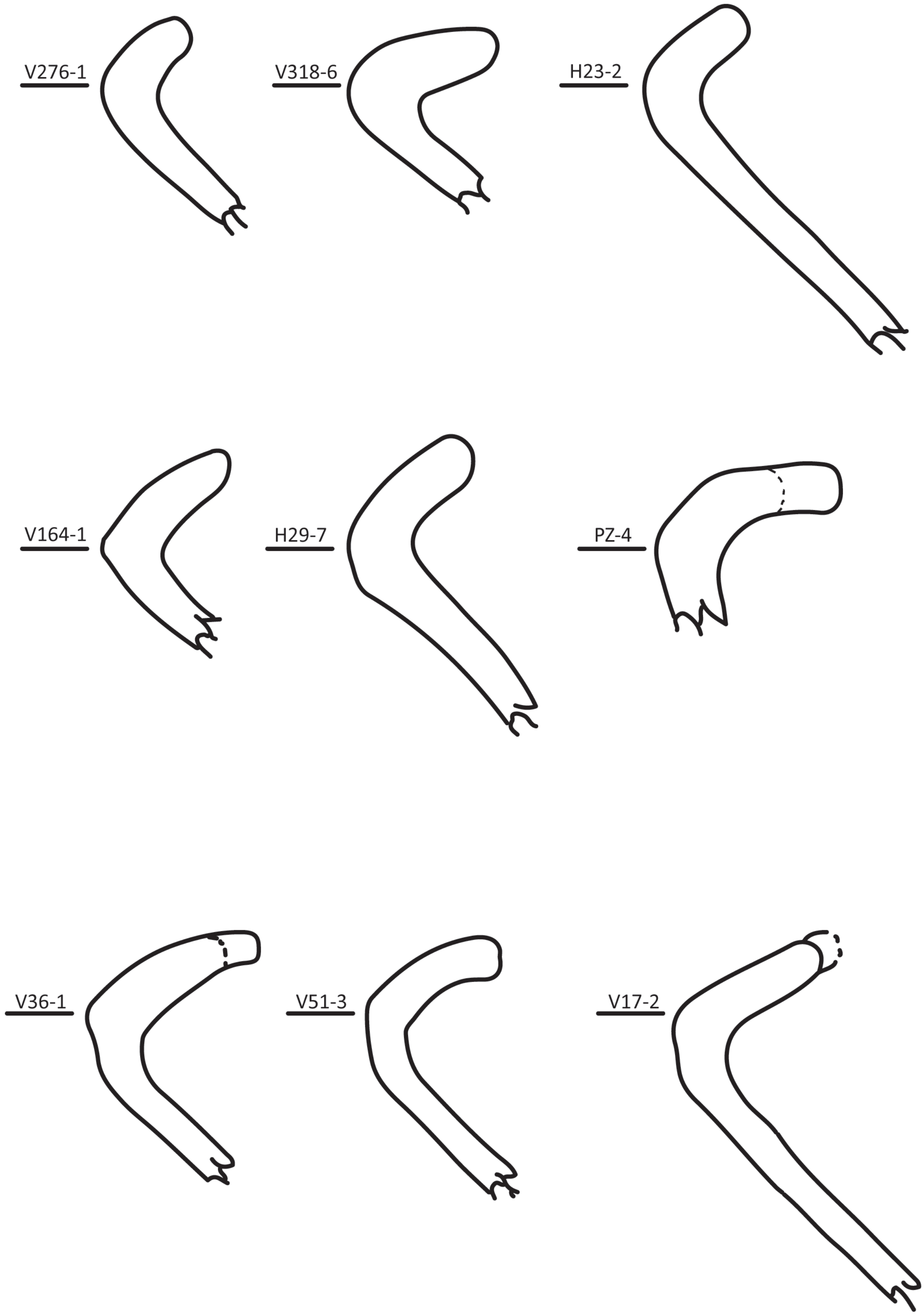
Cordmarked Jars



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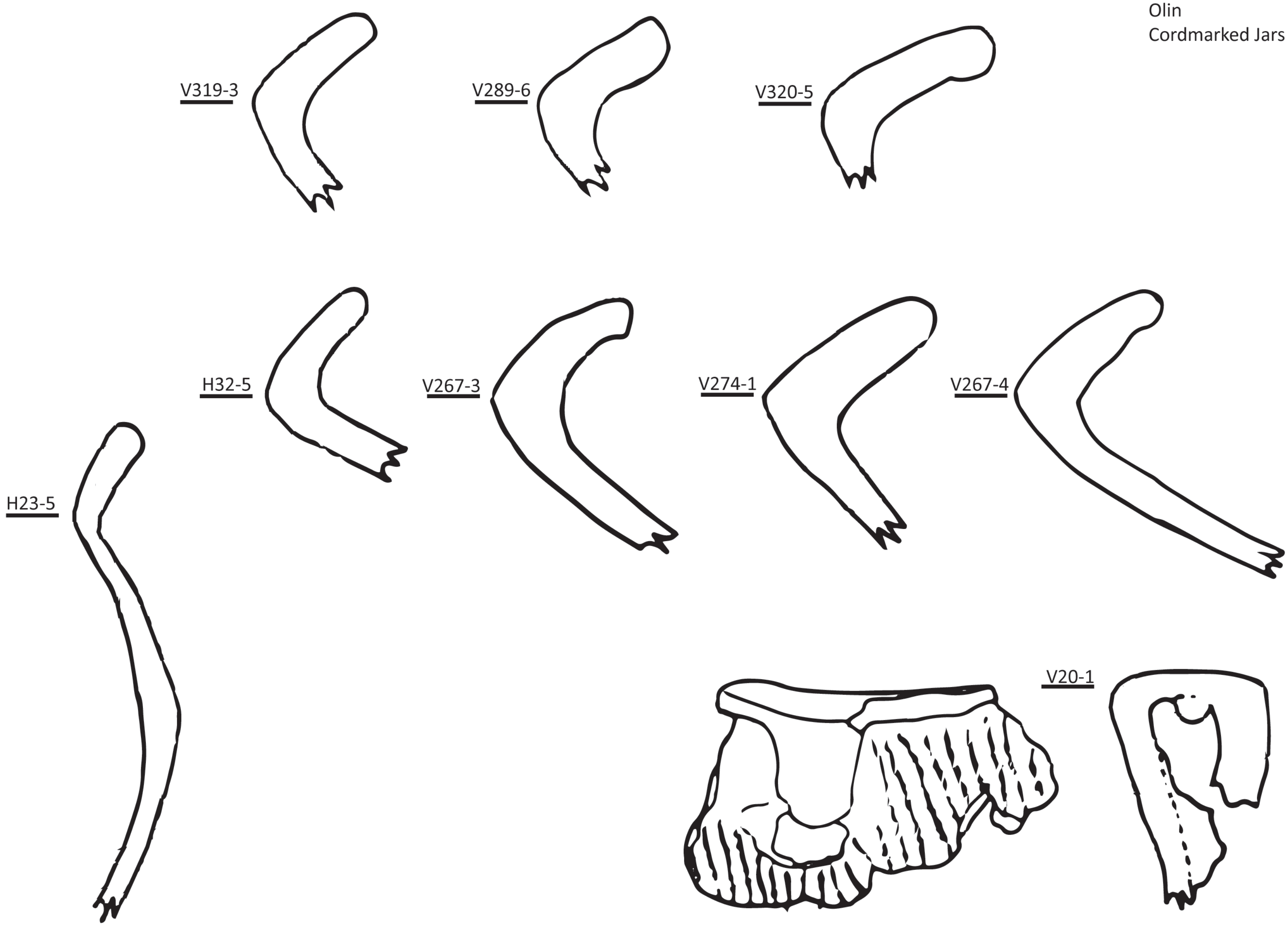

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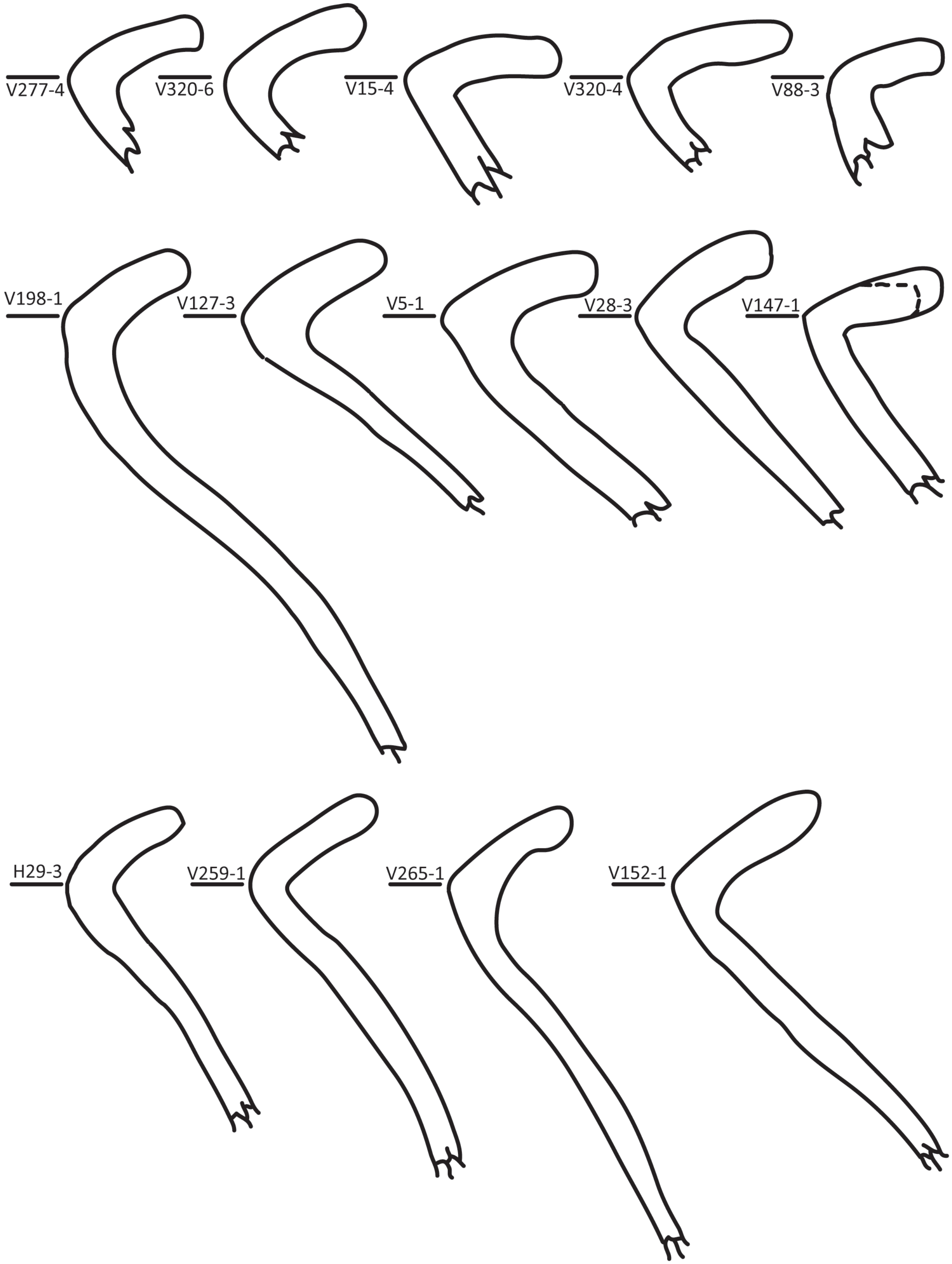

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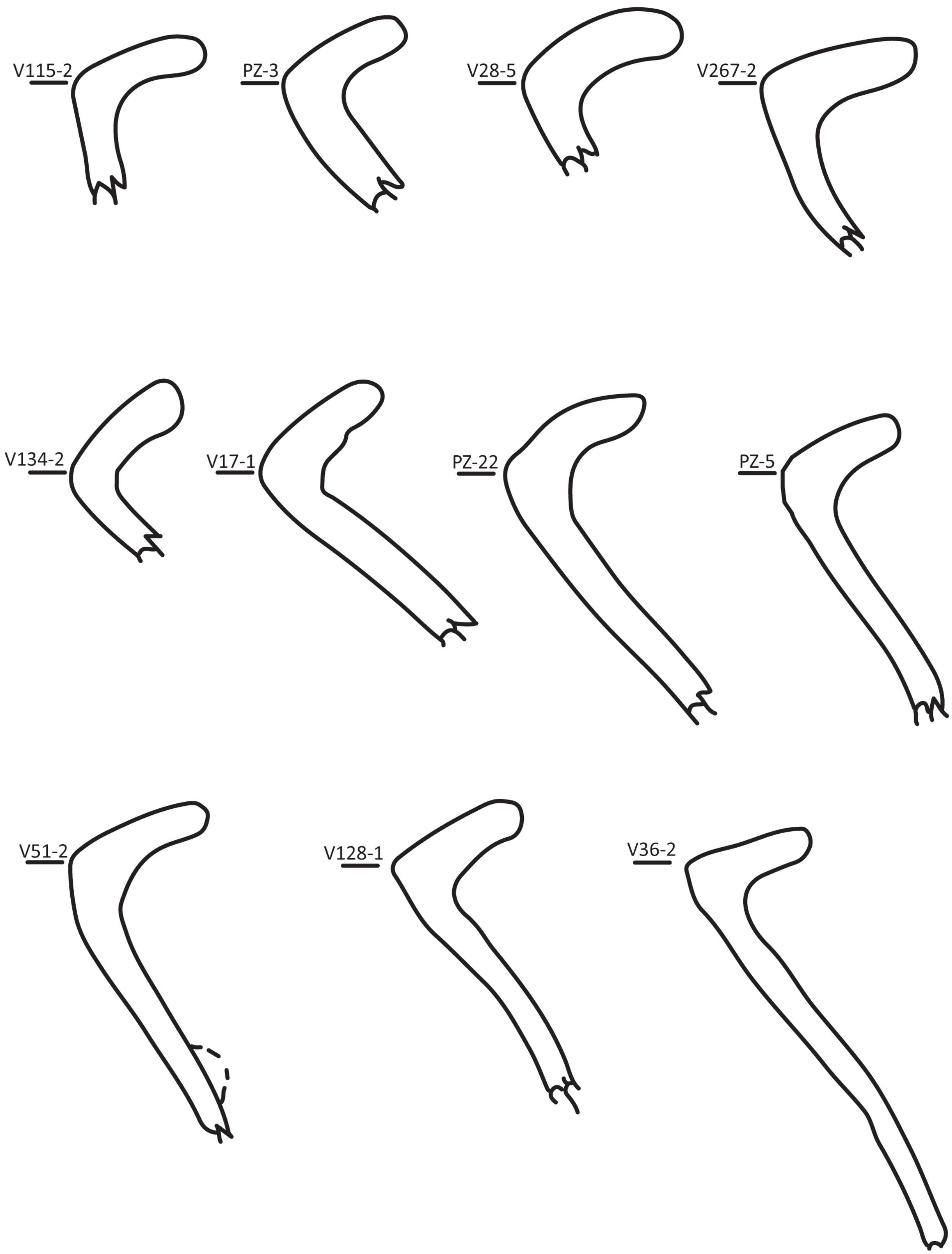

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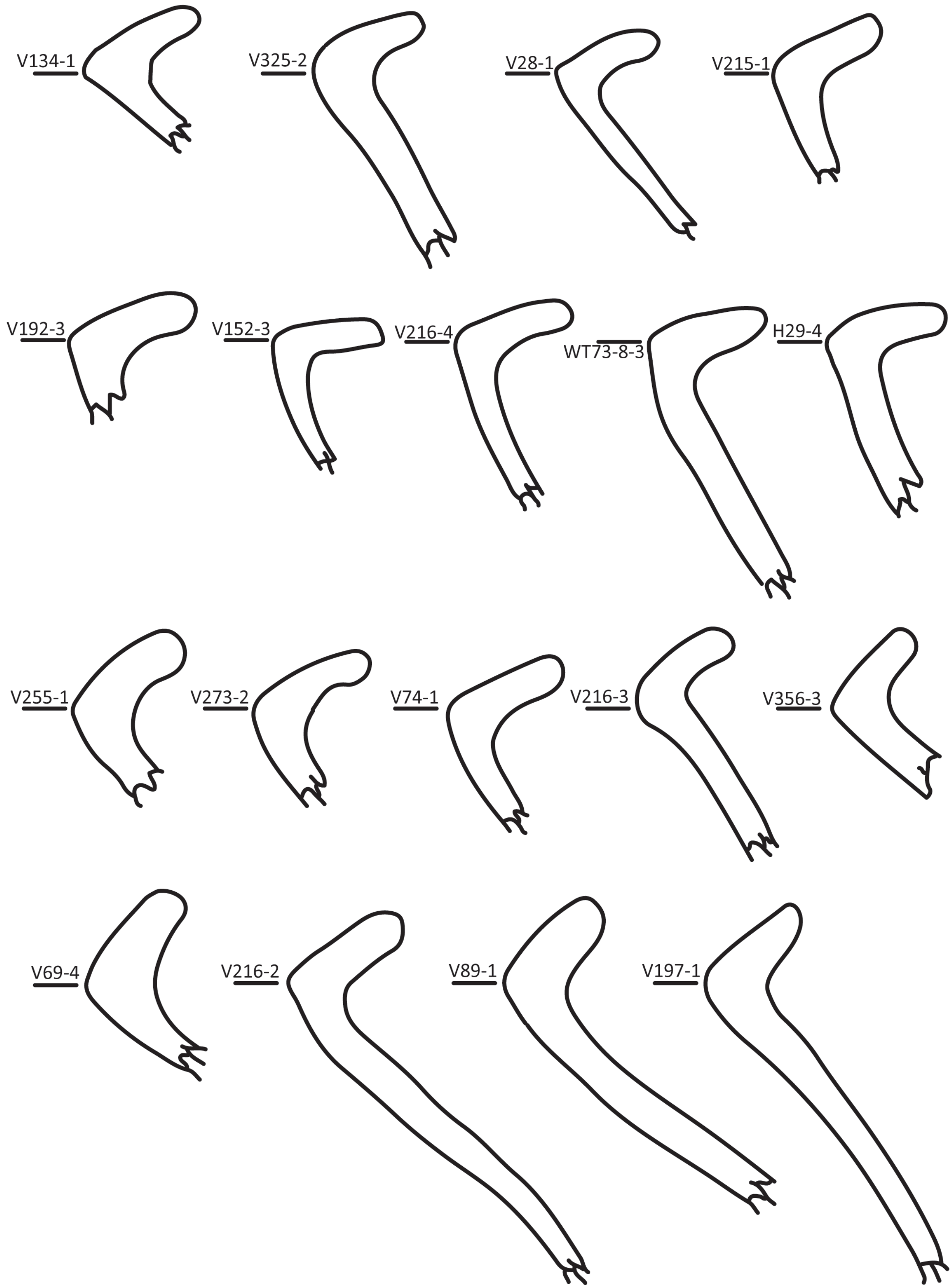

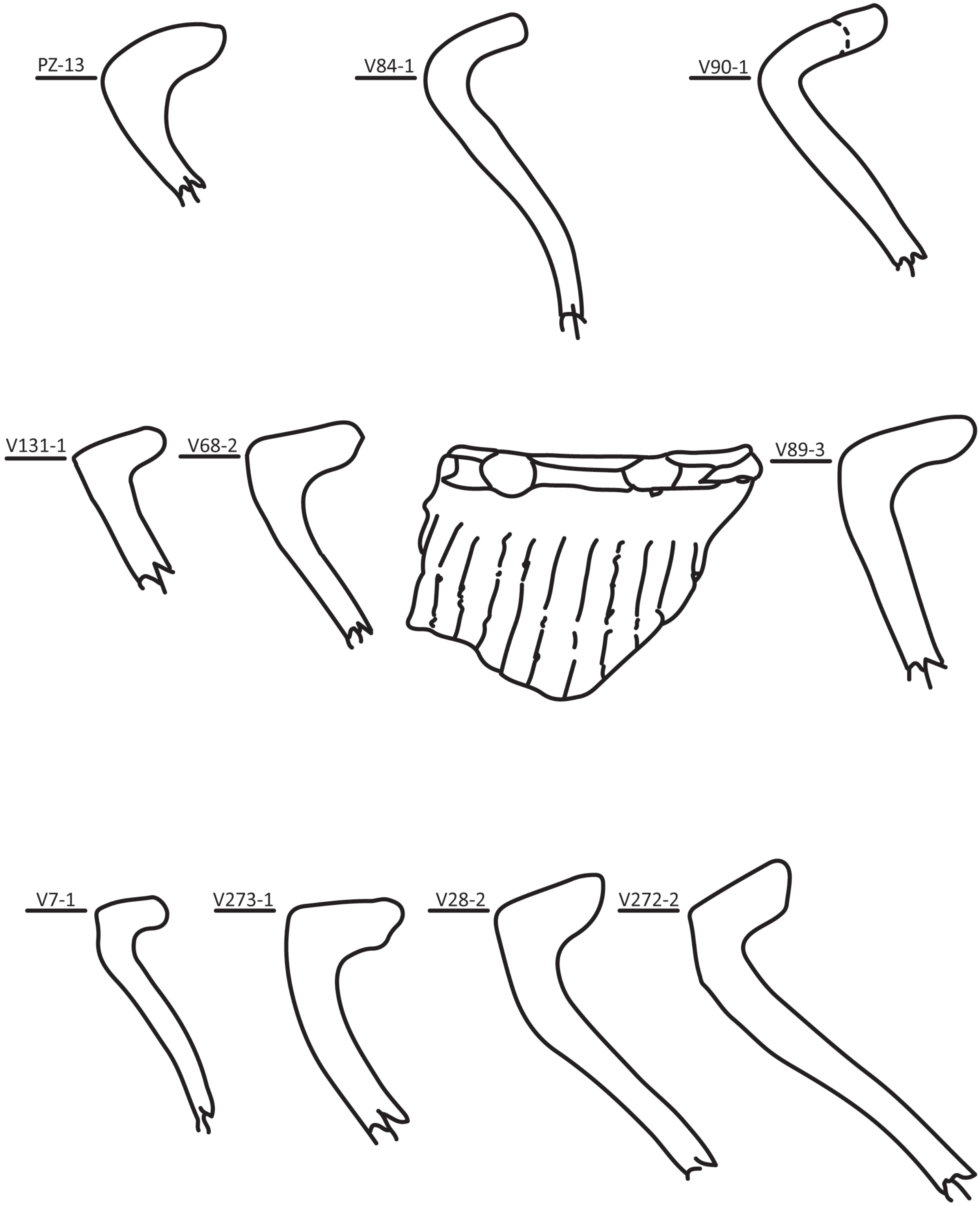
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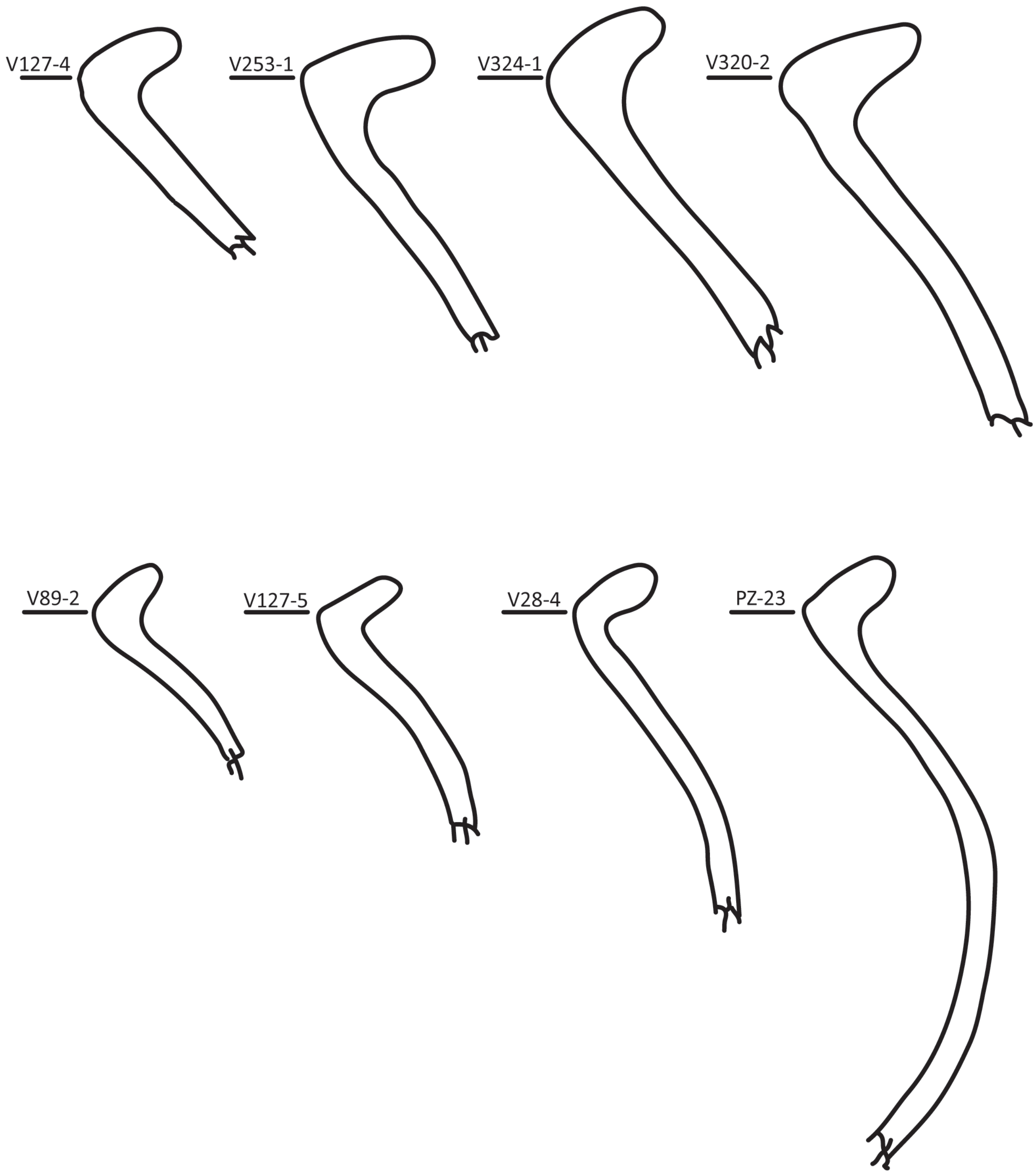
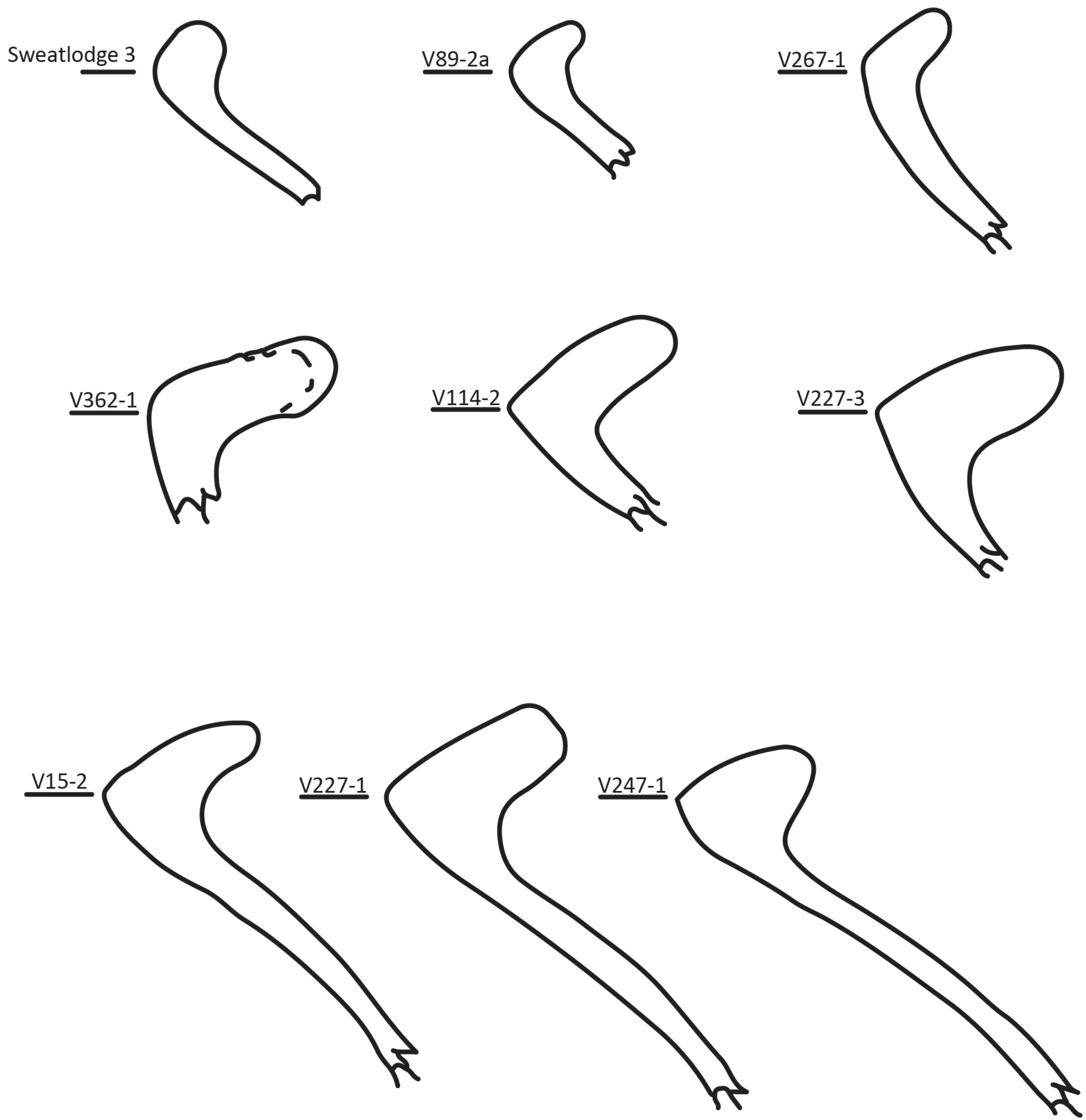
V90-1
V131-1
V68-2
V89-3
V7-1
V273-1
V28-2
V272-2


V127-4
V253-1
V324-1
V320-2
V89-2
V127-5
V28-4
PZ-23

Olin Cordmarked Jars



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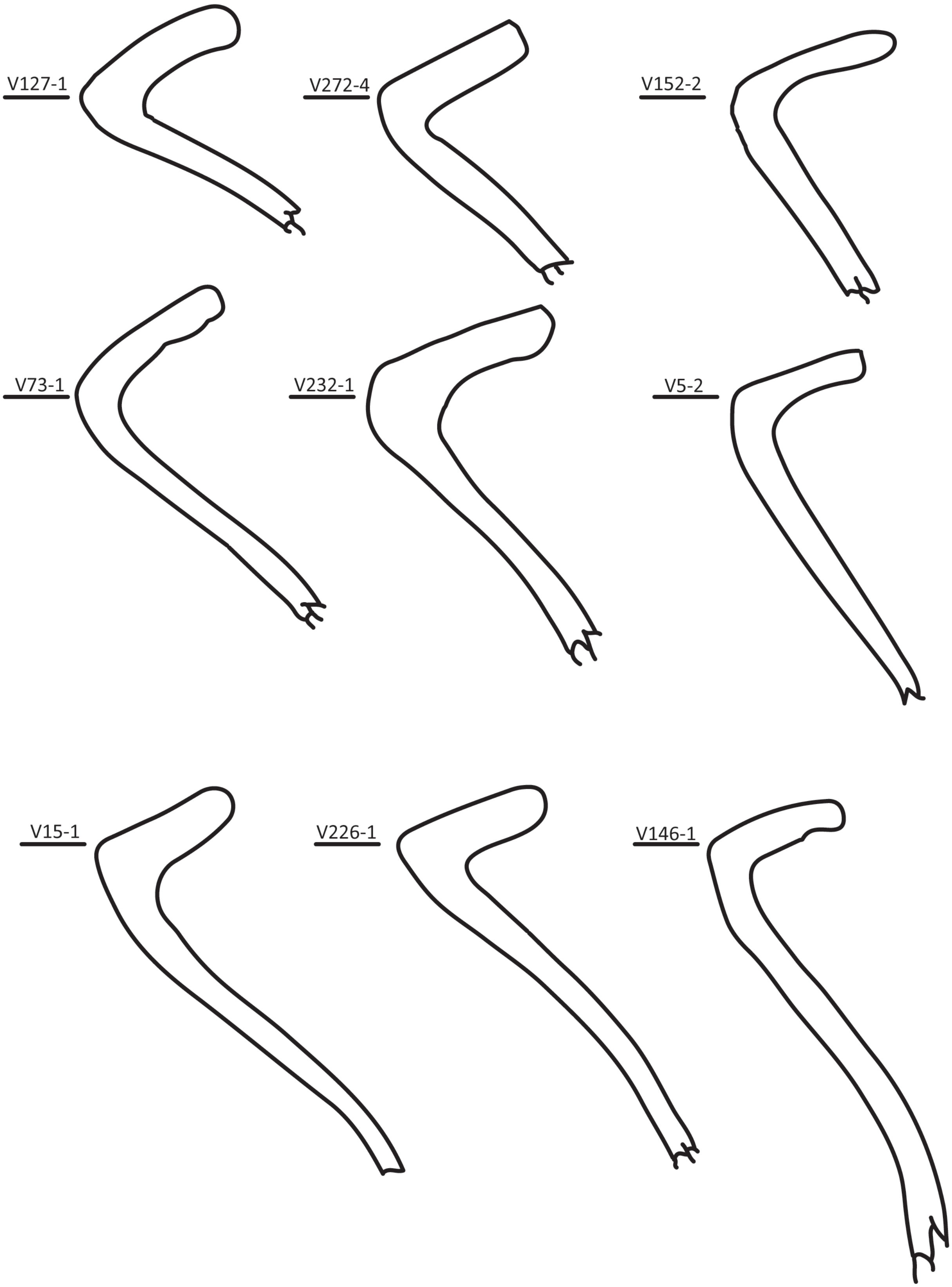
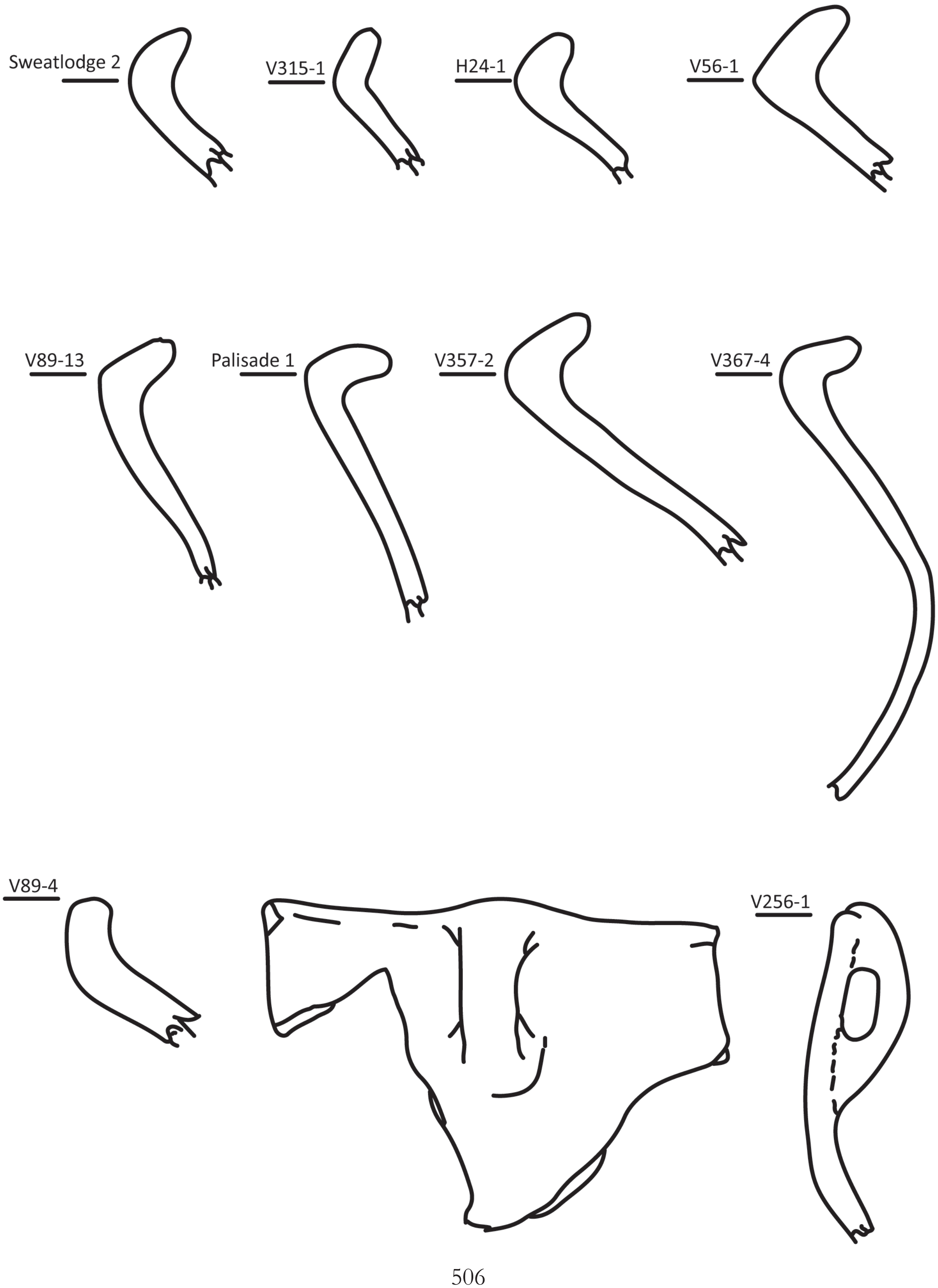
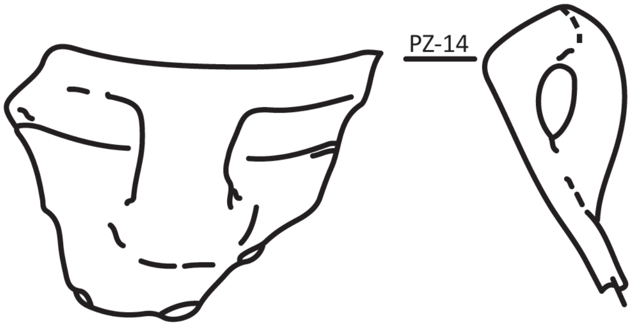
Cordmarked Jars



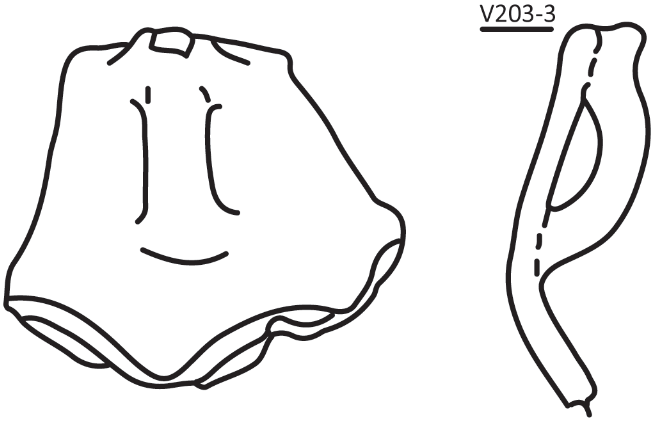
Olin
Slipped Jars



PZ-14

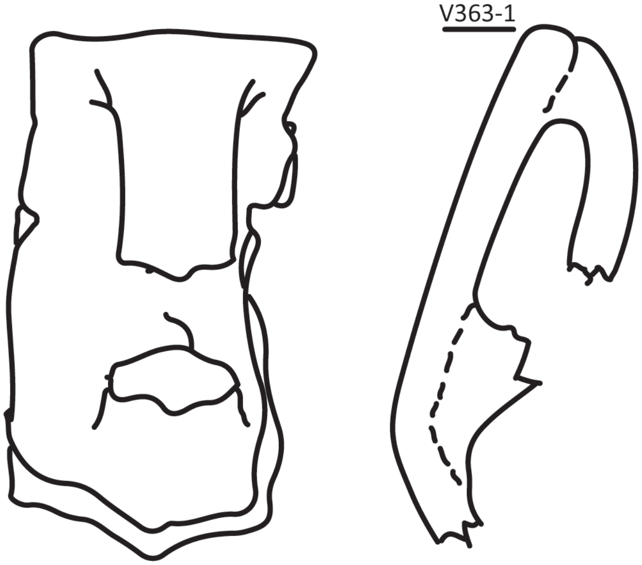


V203-3

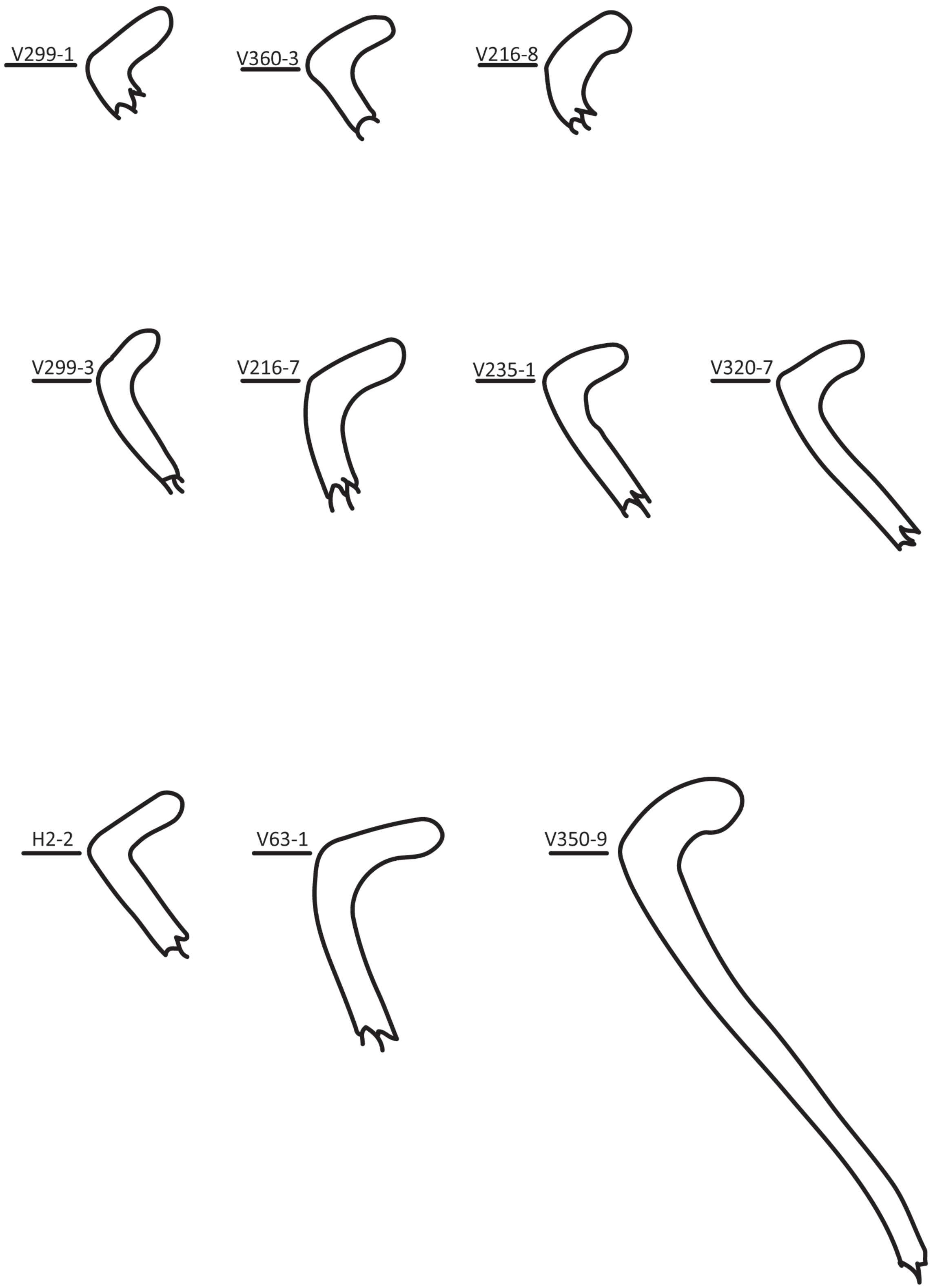


V146-2

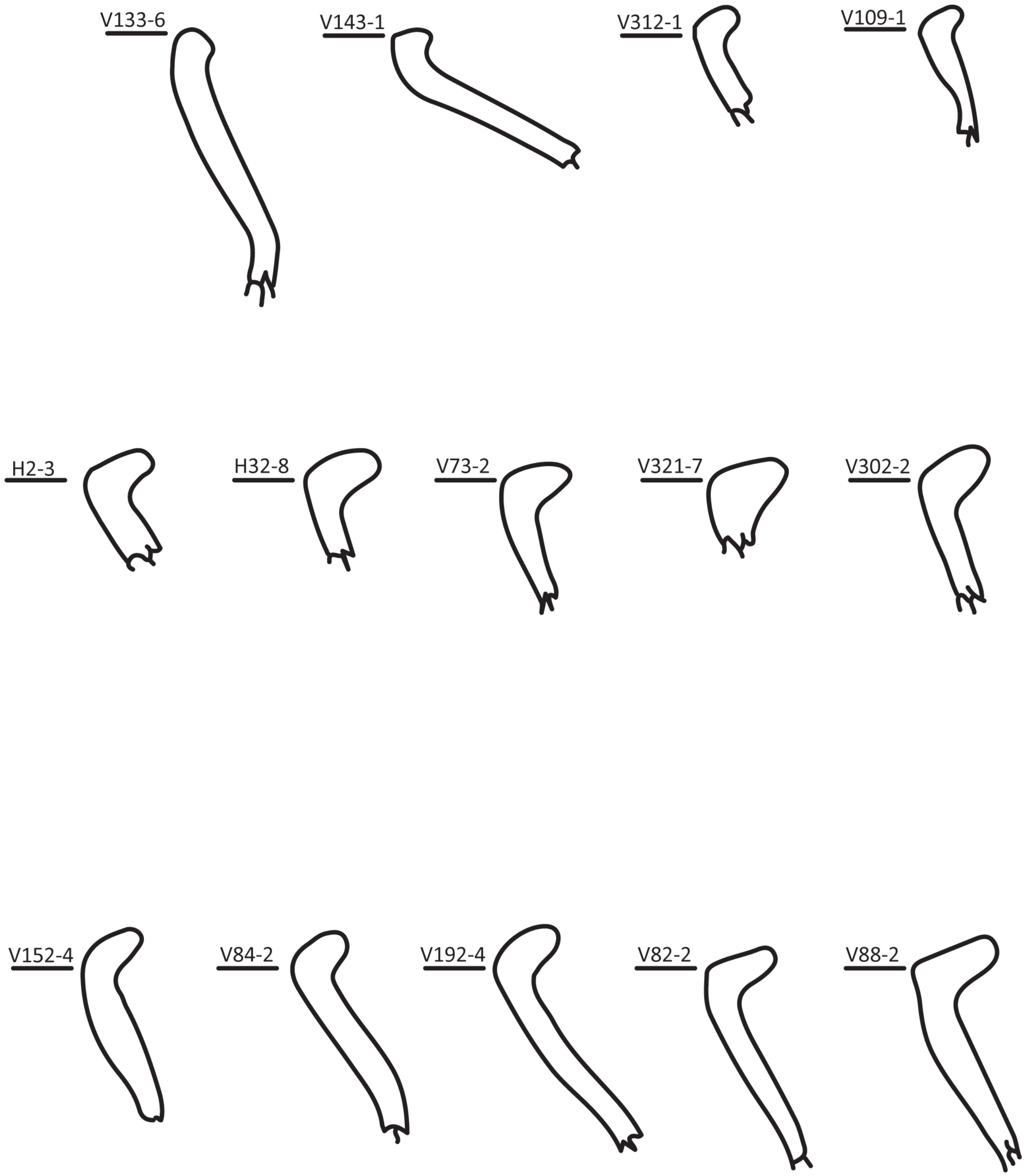
V363-1



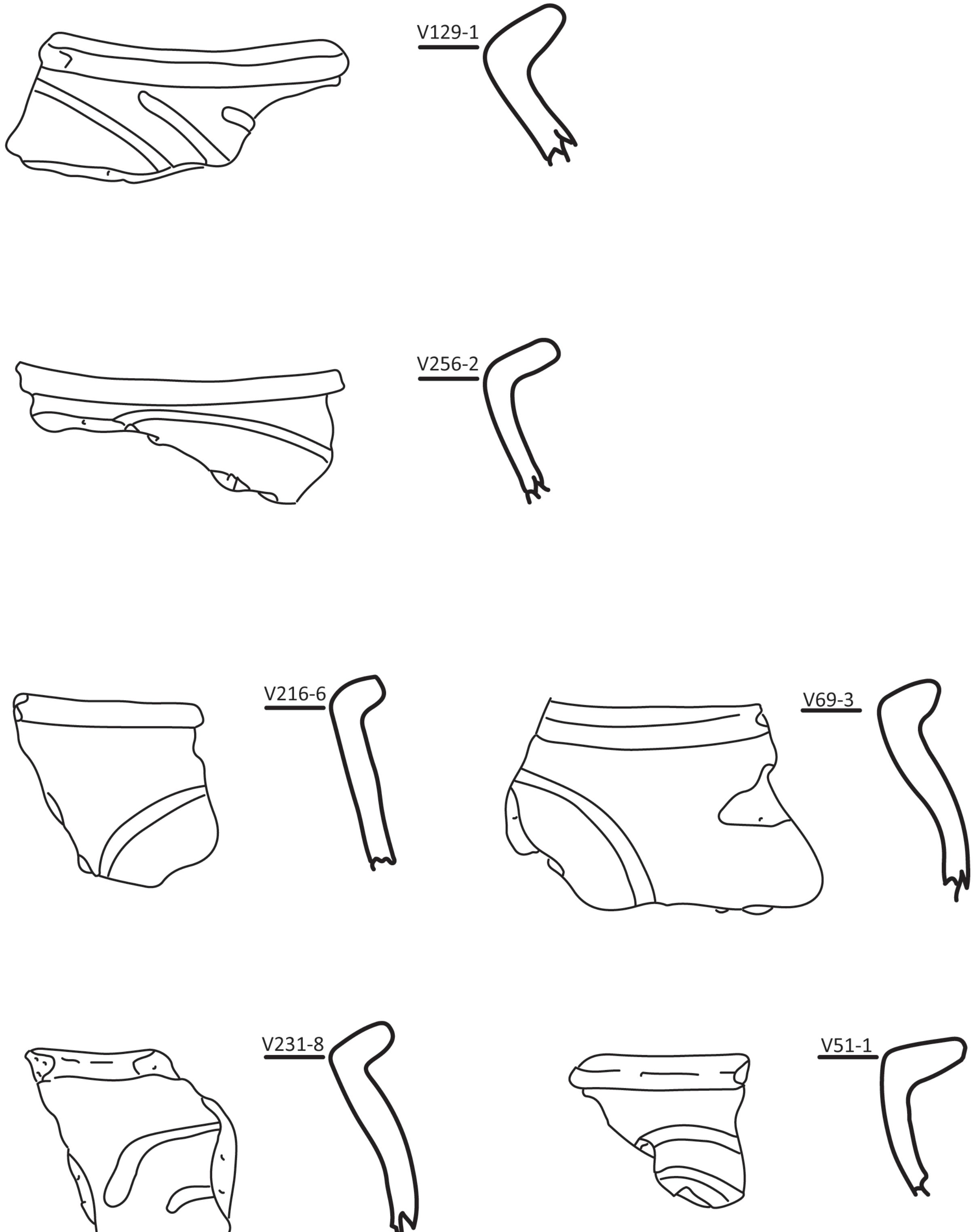
Olin
Slipped Jars



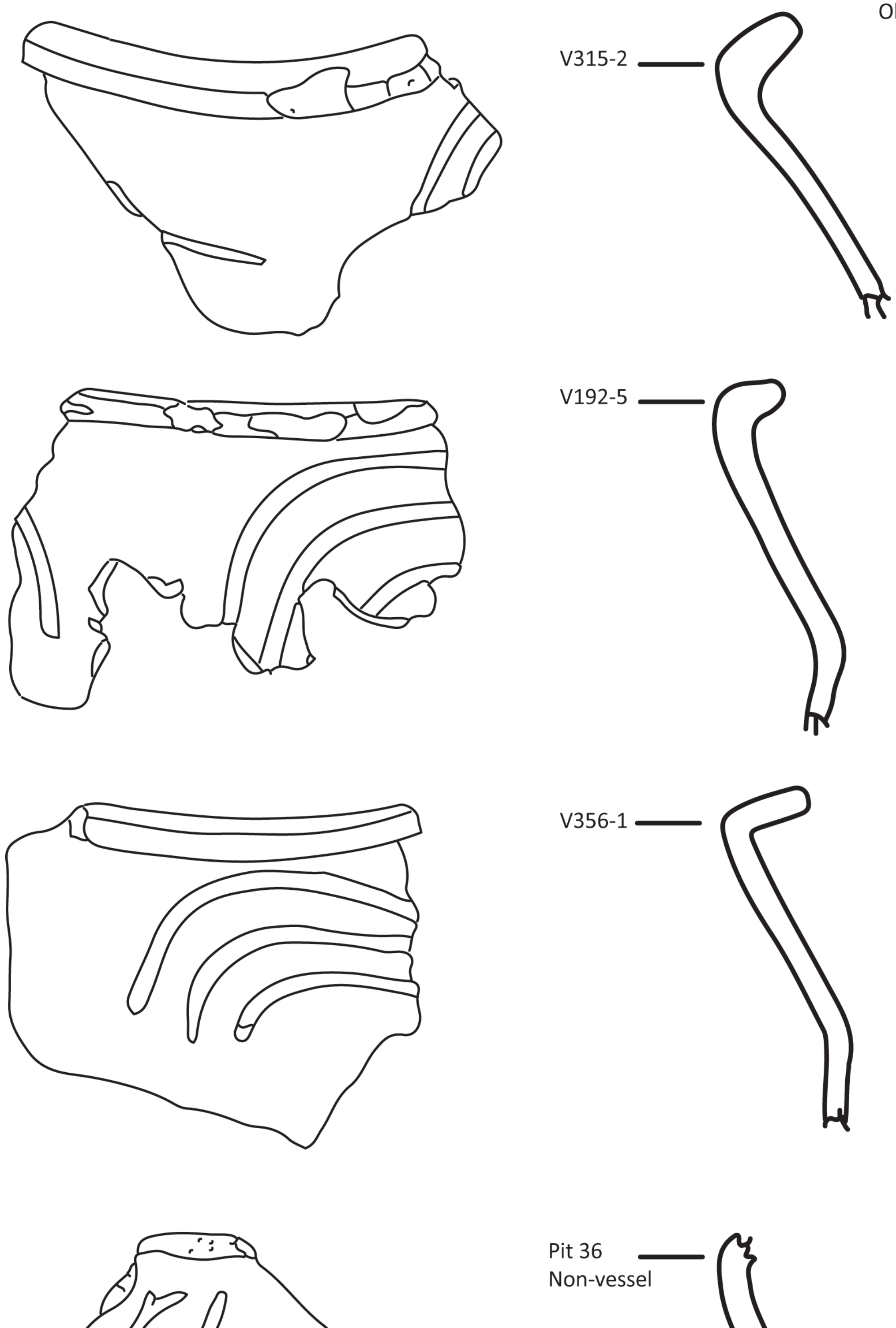
Olin
Slipped Jars



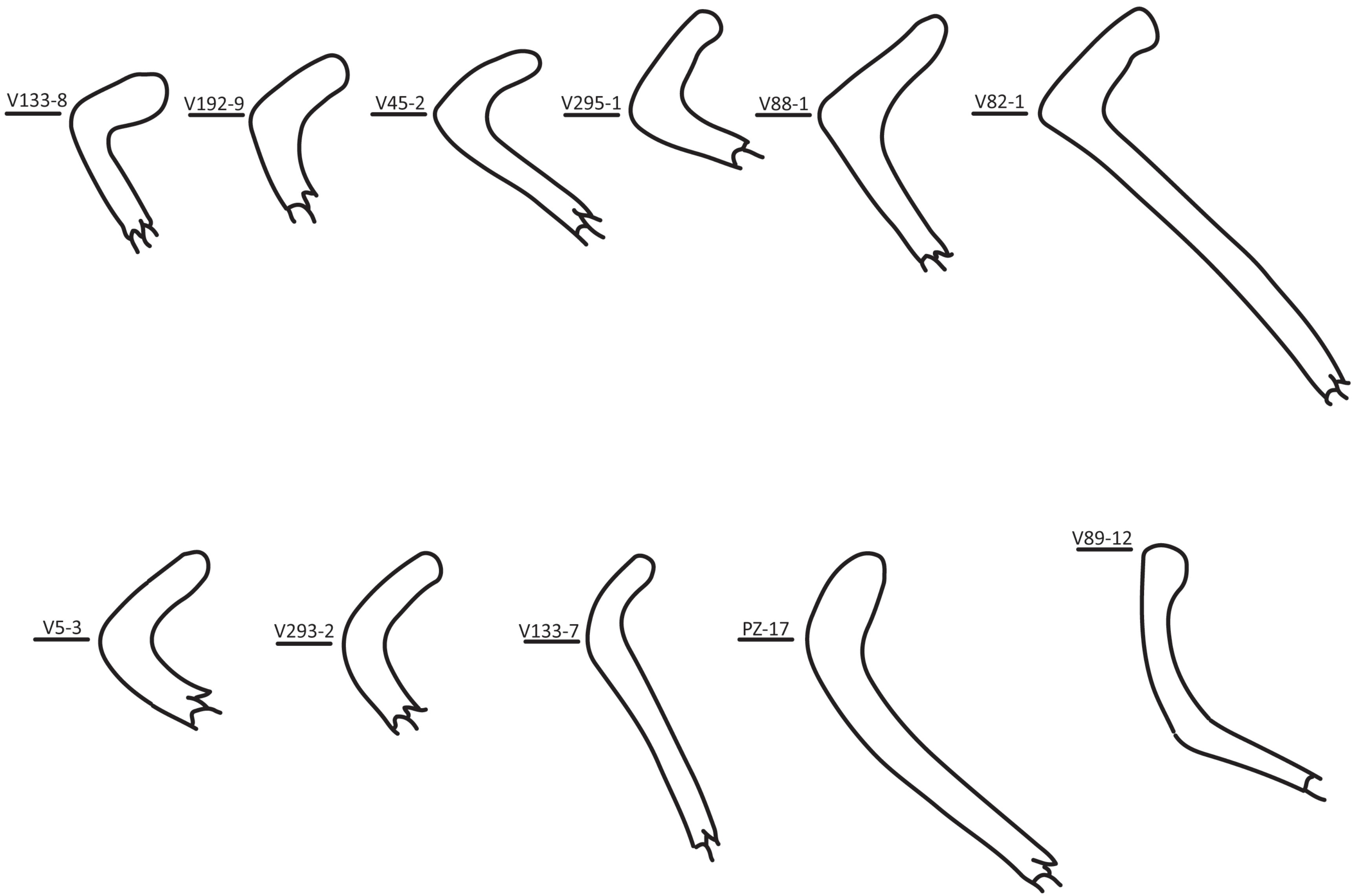
Olin Ramey Jars

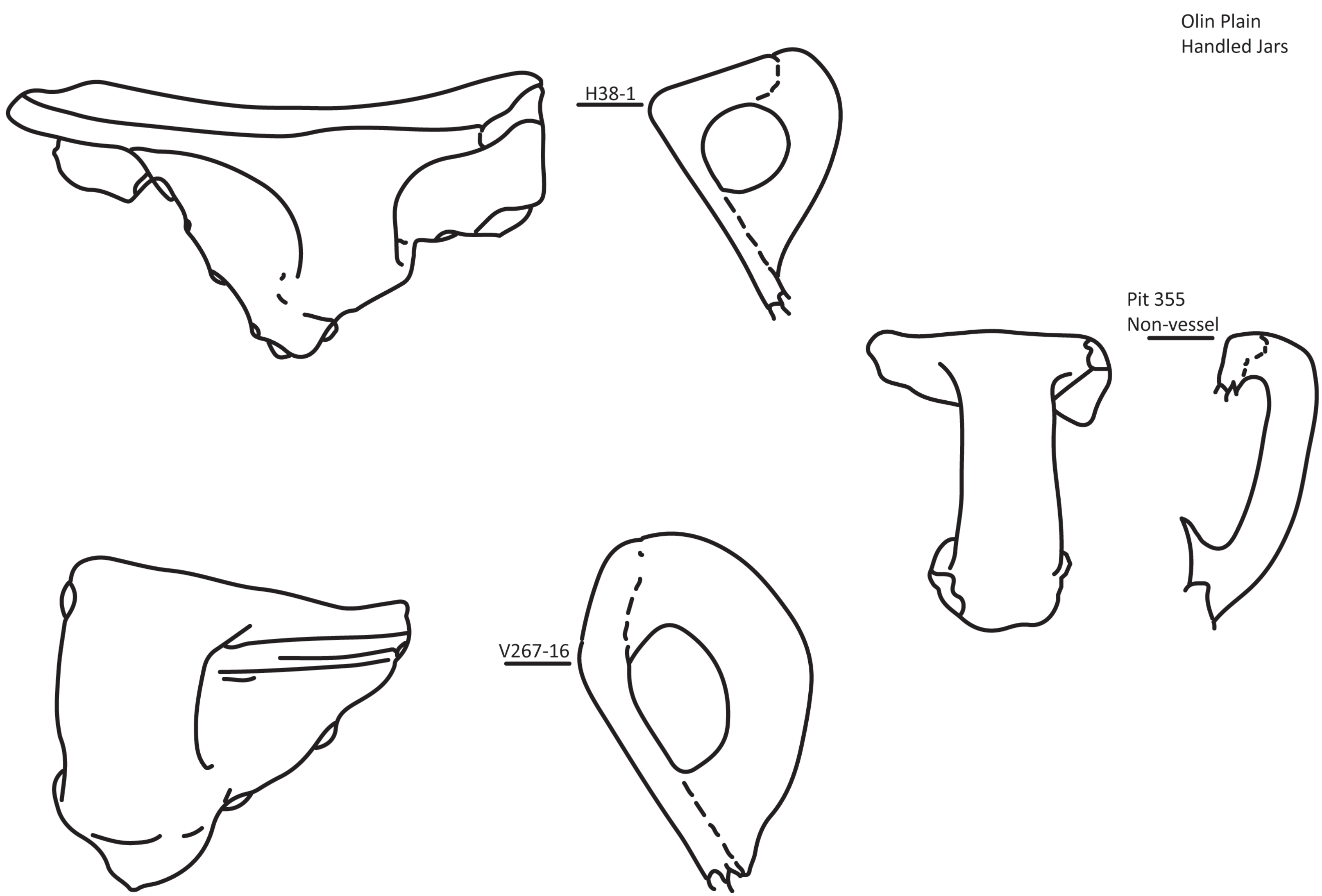


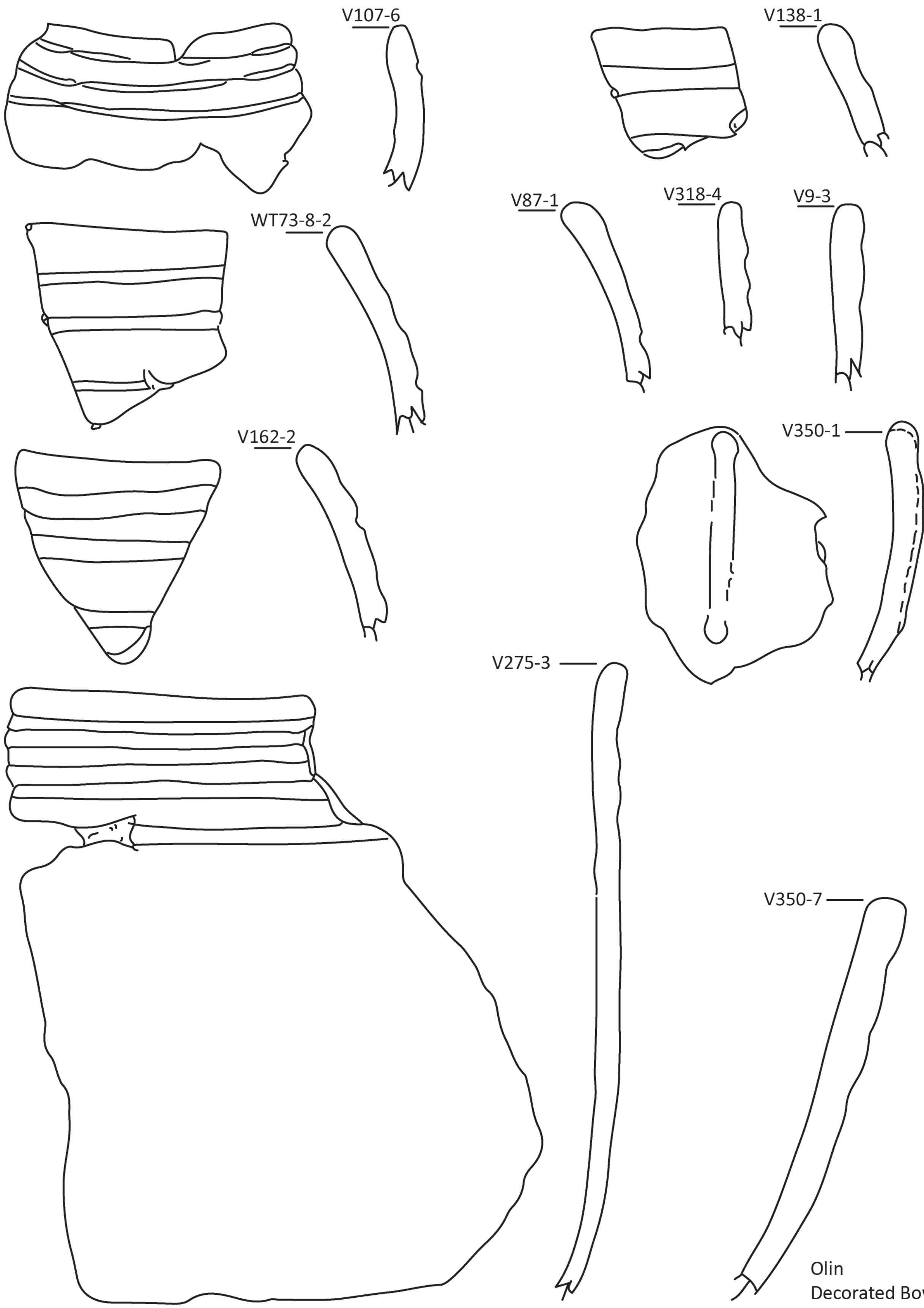
Olin Ramey Jars



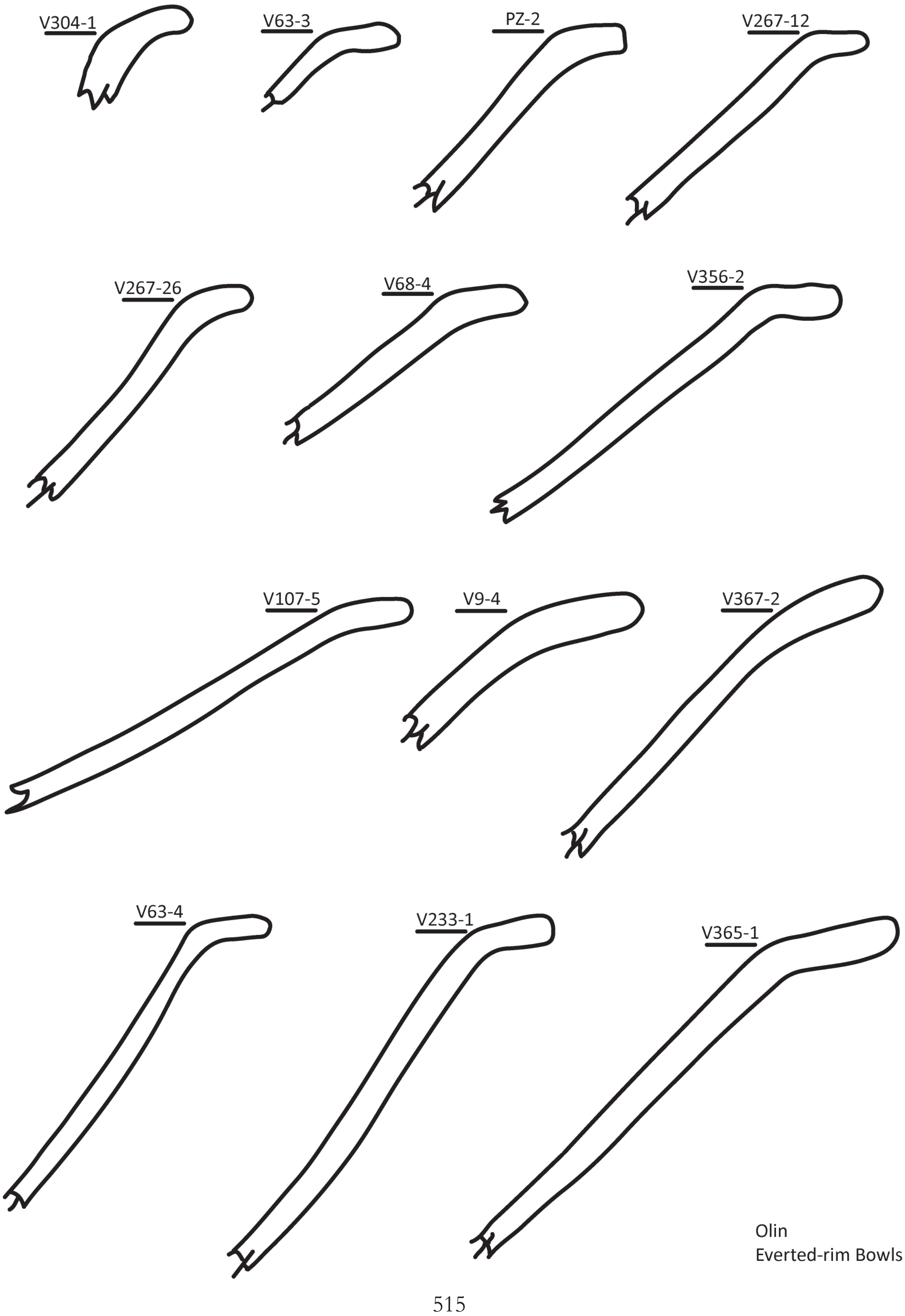
Olin Plain Jars



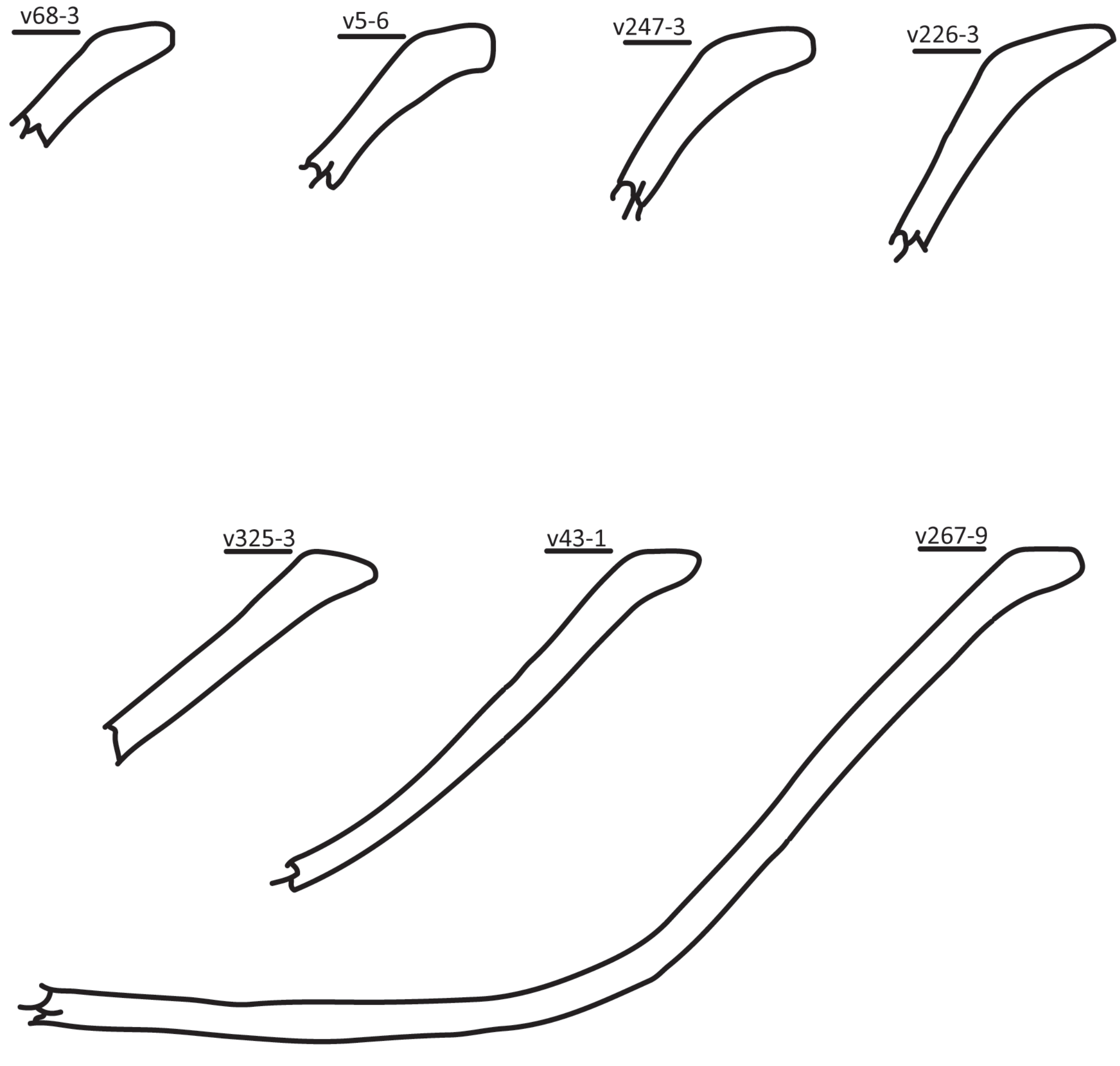

Olin Plain
Handled Jars
H38-1
Pit 355
Non-vessel
V267-16



Olin
Decorated Bowls



Olin
Everted-rim Bowls



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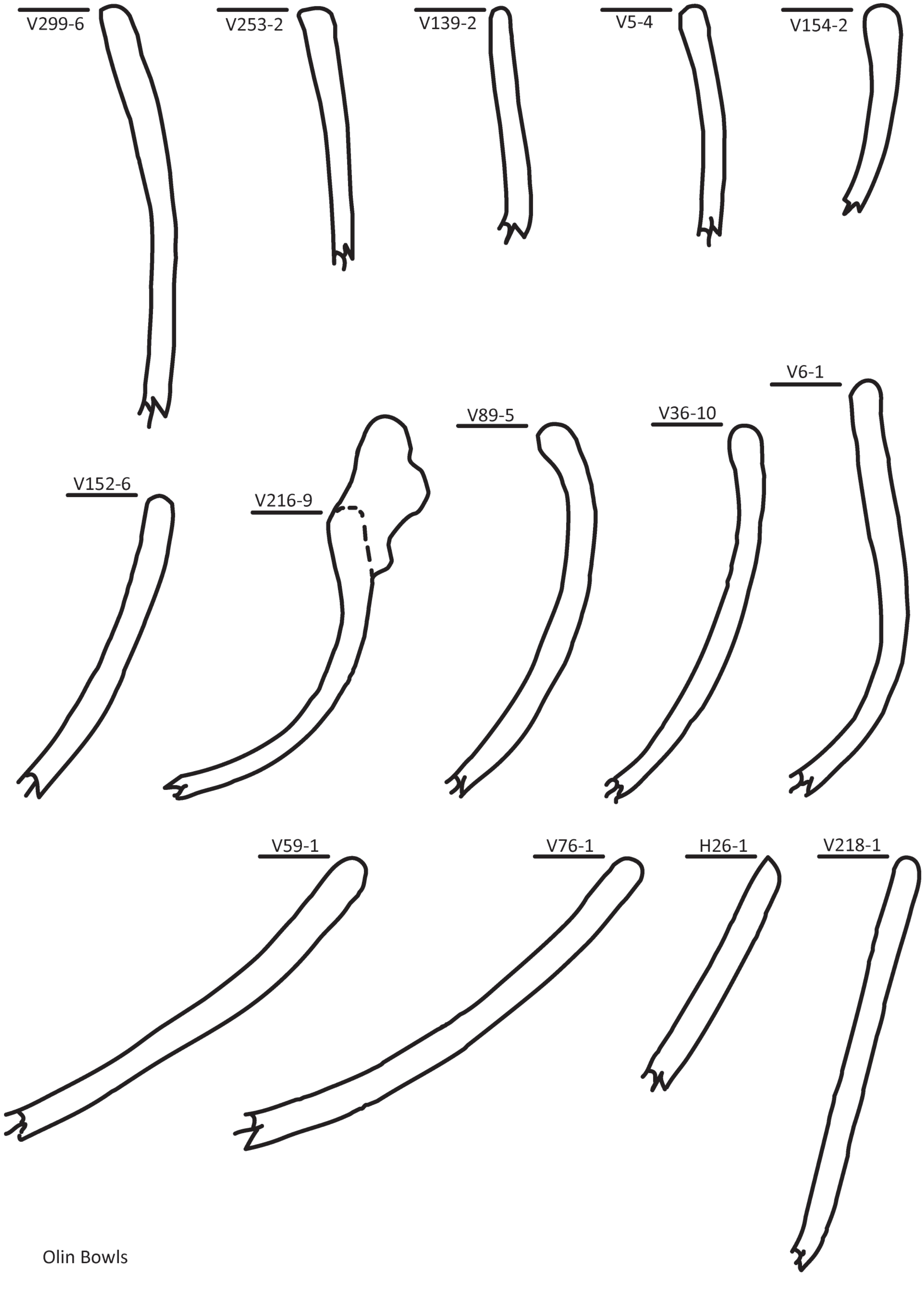
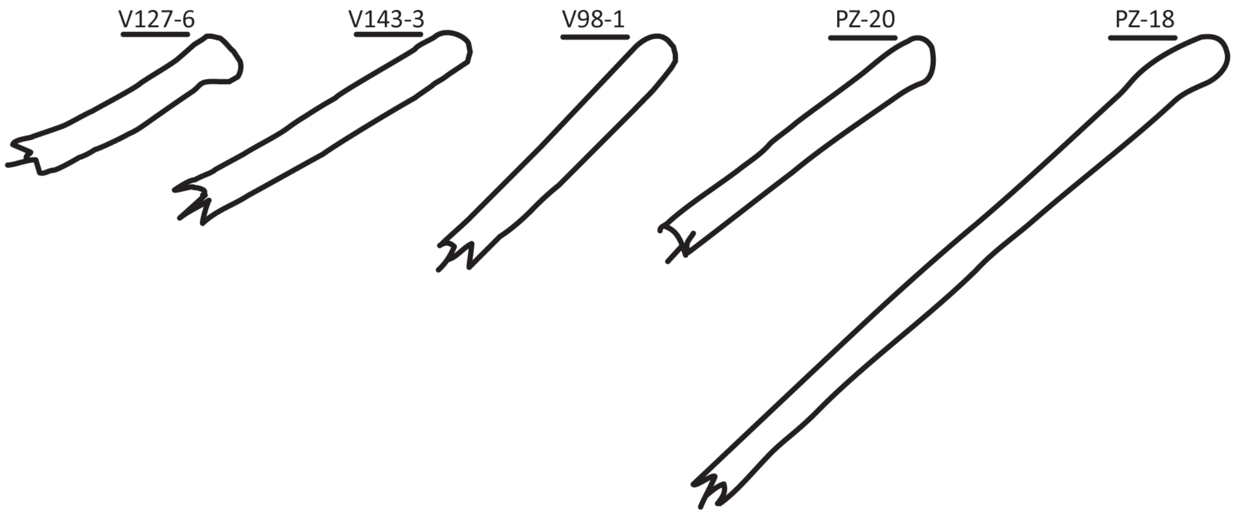
Everted-rim Bowls

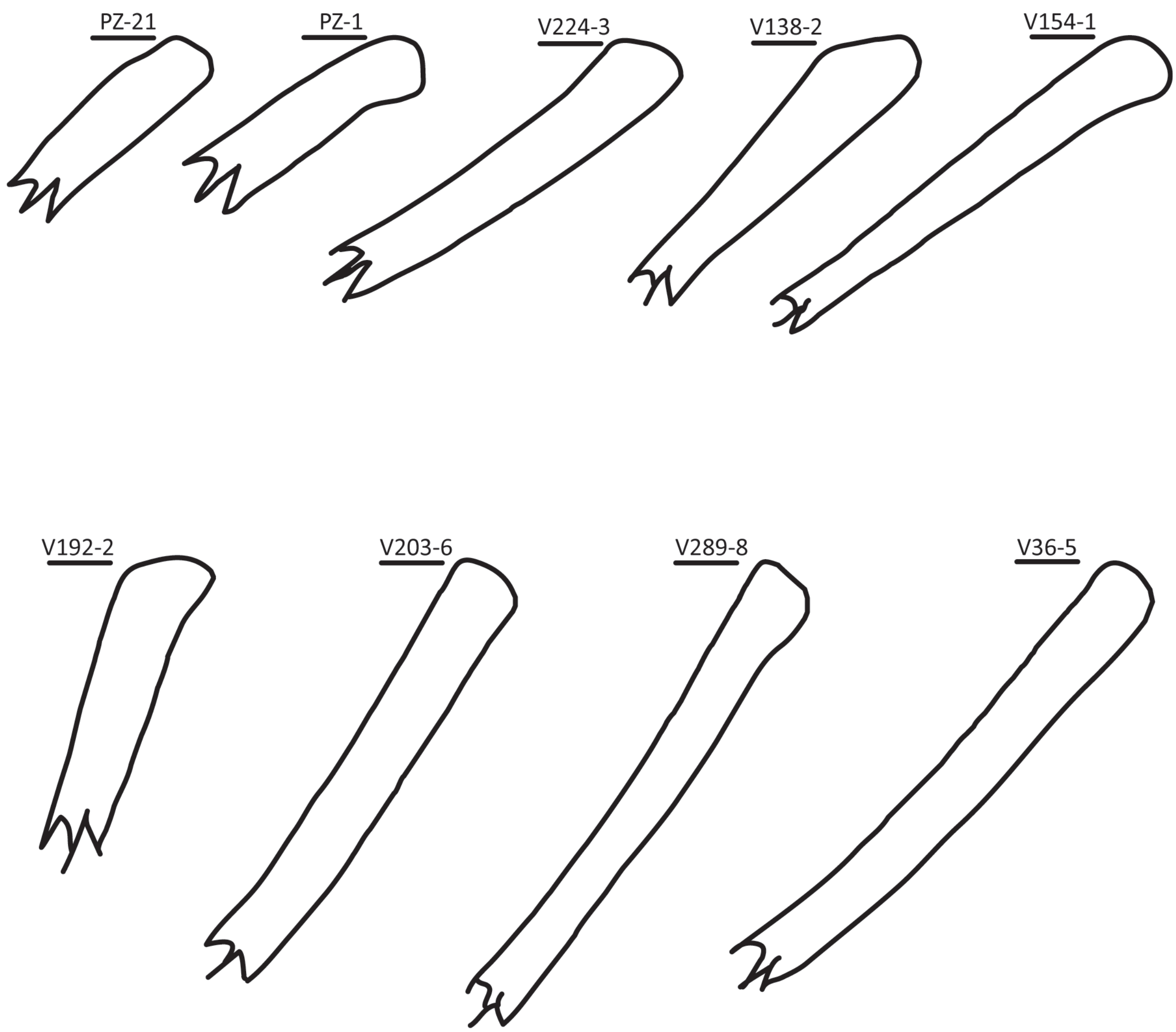

V299-6
V253-2
V139-2
V5-4
V154-2
V6-1
V89-5
V36-10
V152-6
V216-9
V59-1
V76-1
H26-1
V218-1

Olin Bowls

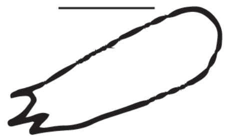
Olin Shallow Bowls/Plates

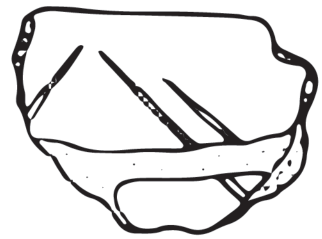


Olin Pans

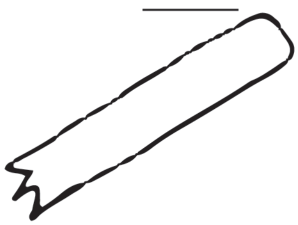


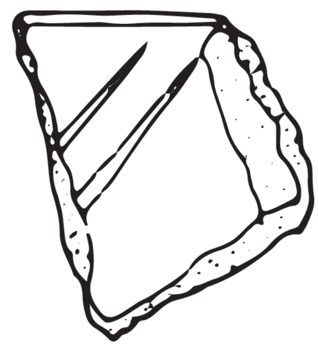
V321-1



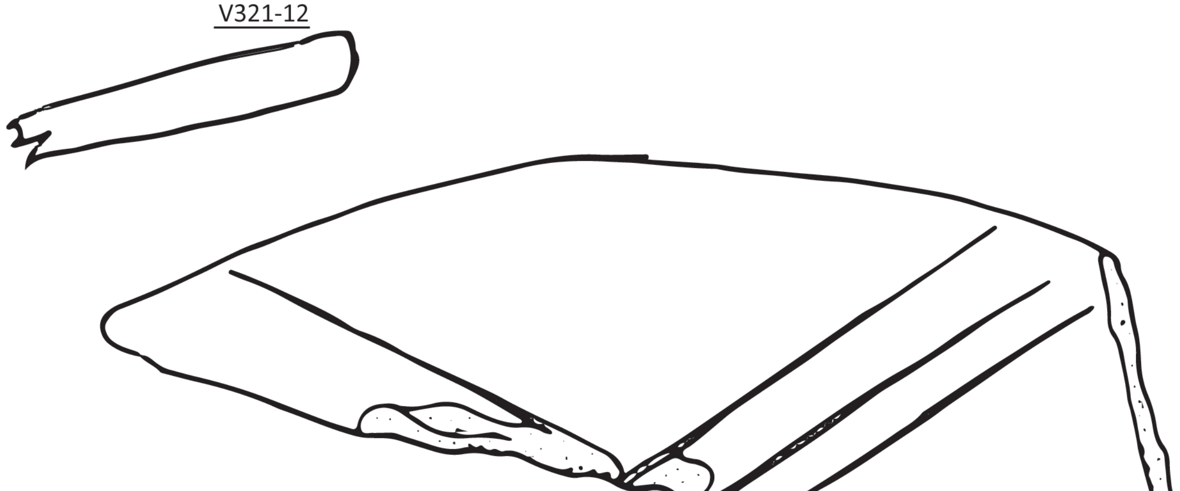


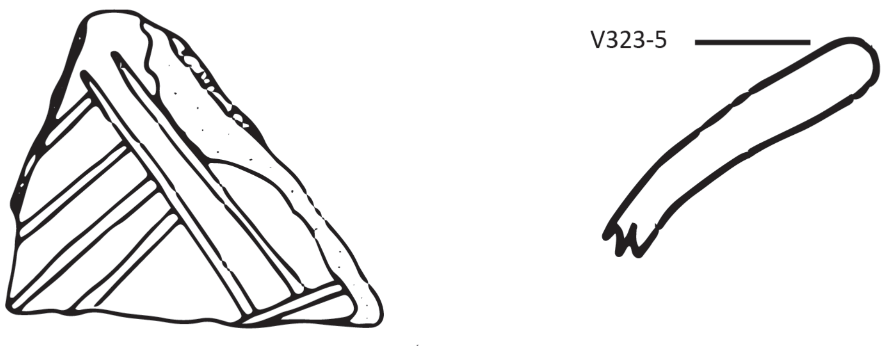
V321-11





V321-12

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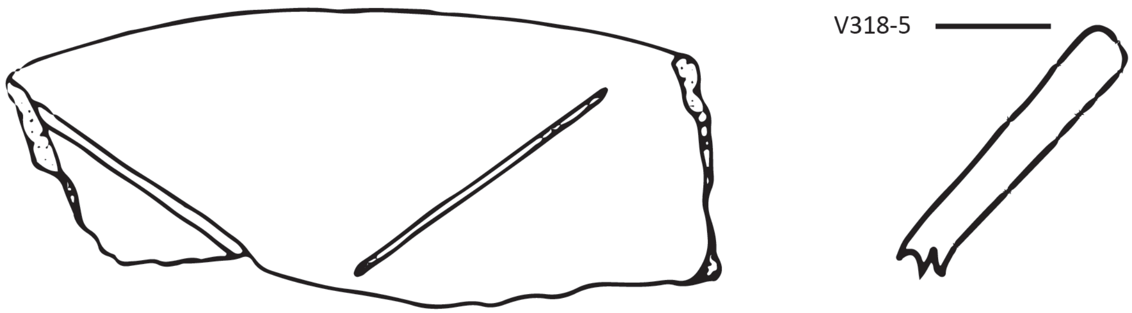
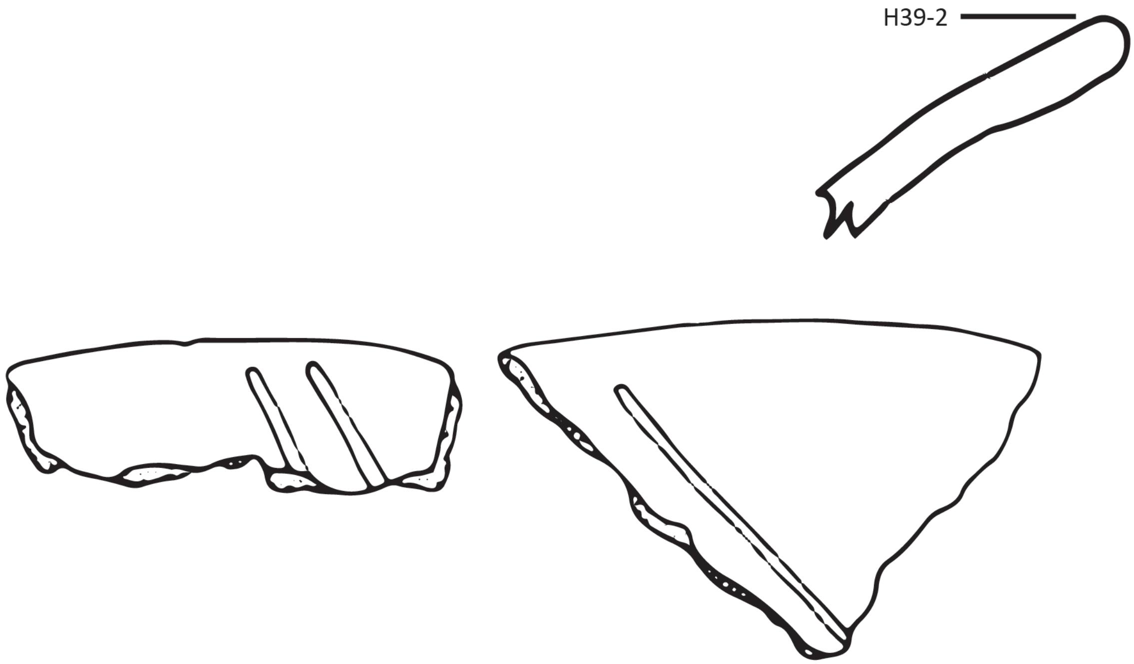
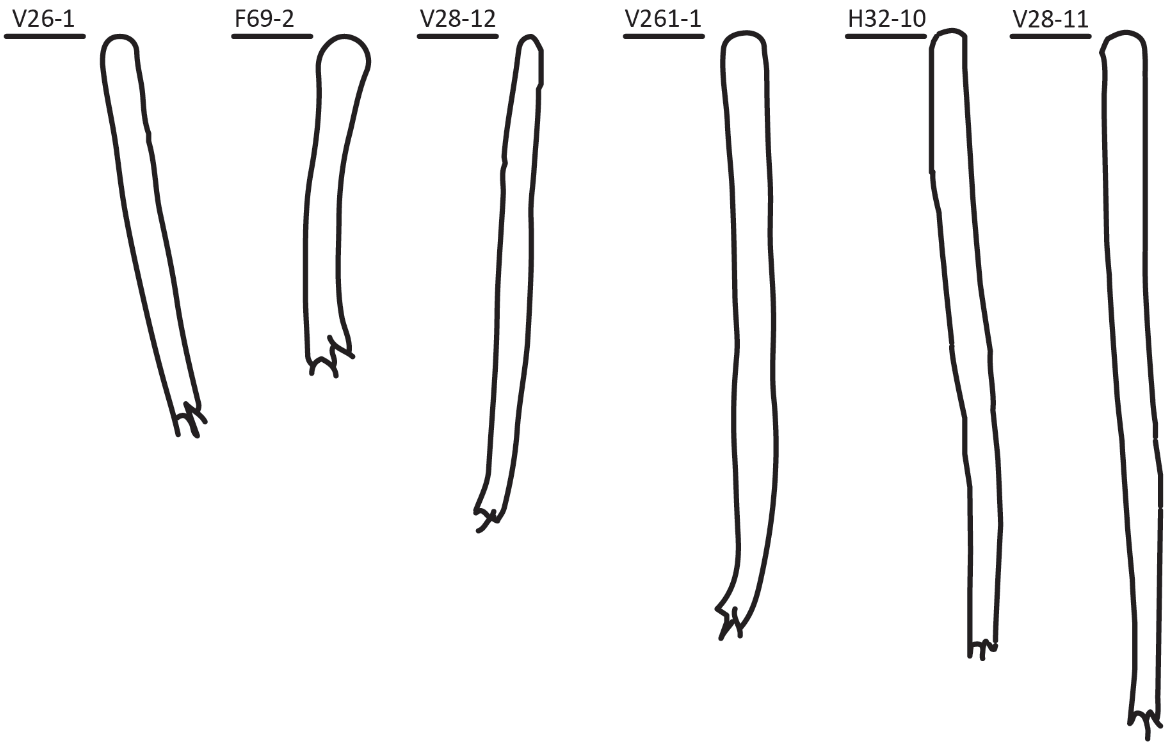
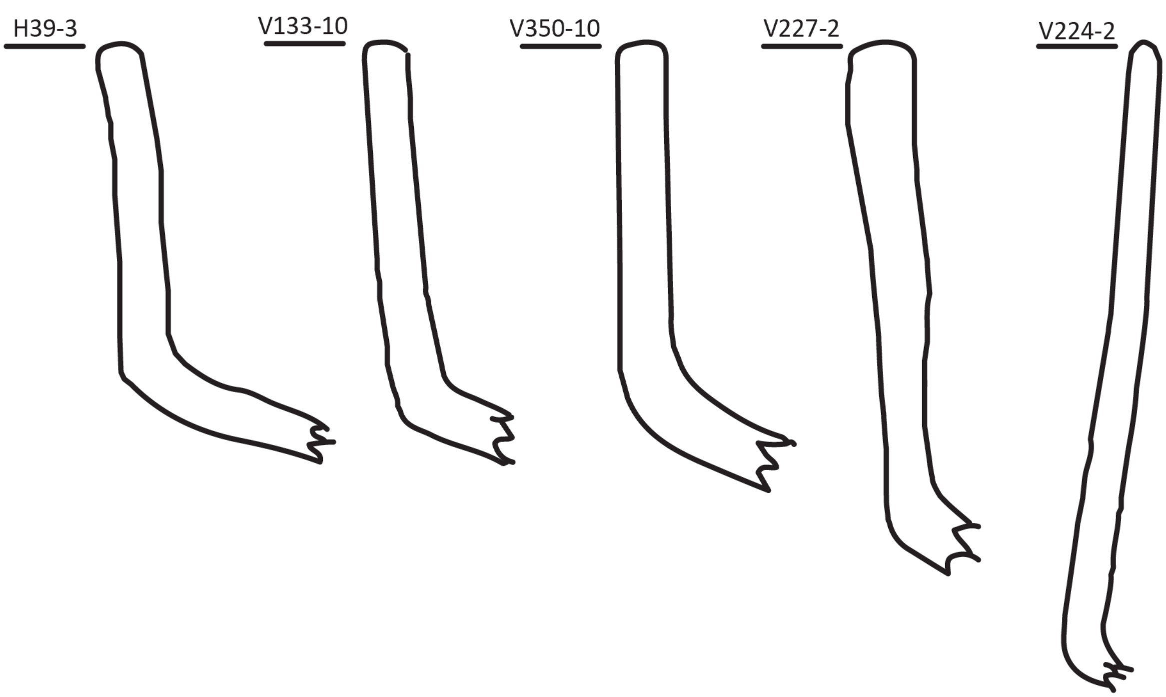

V318-5

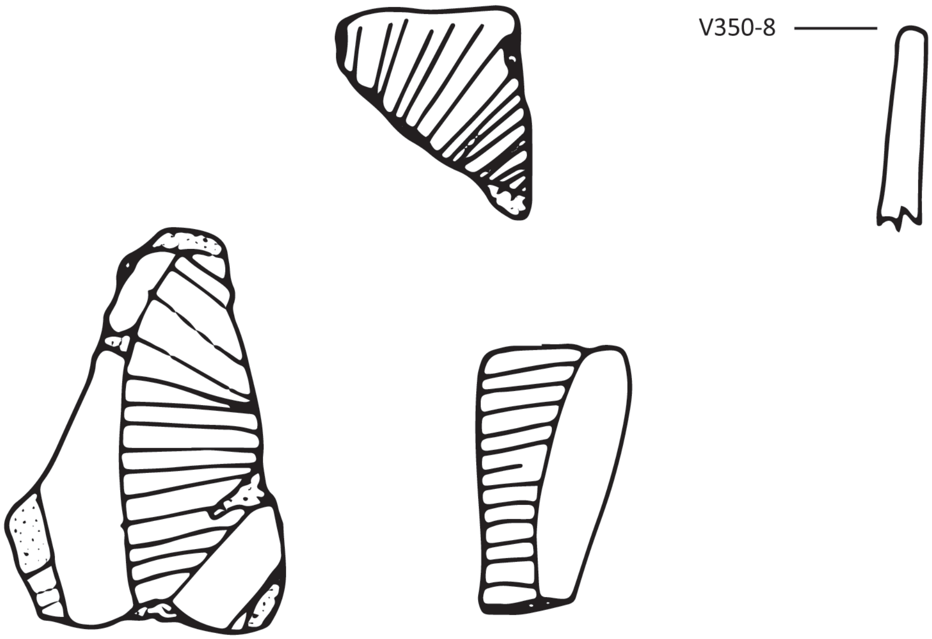

H39-2

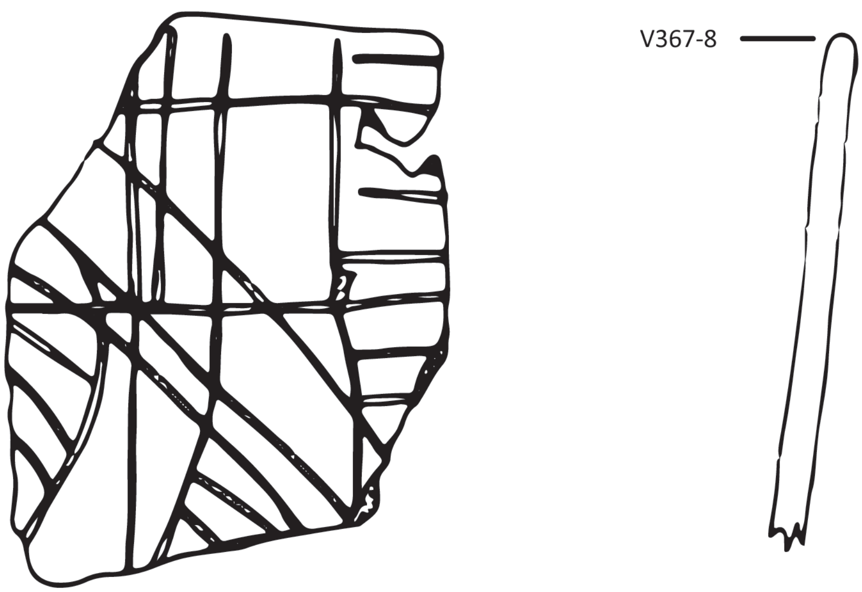
Olin Beakers



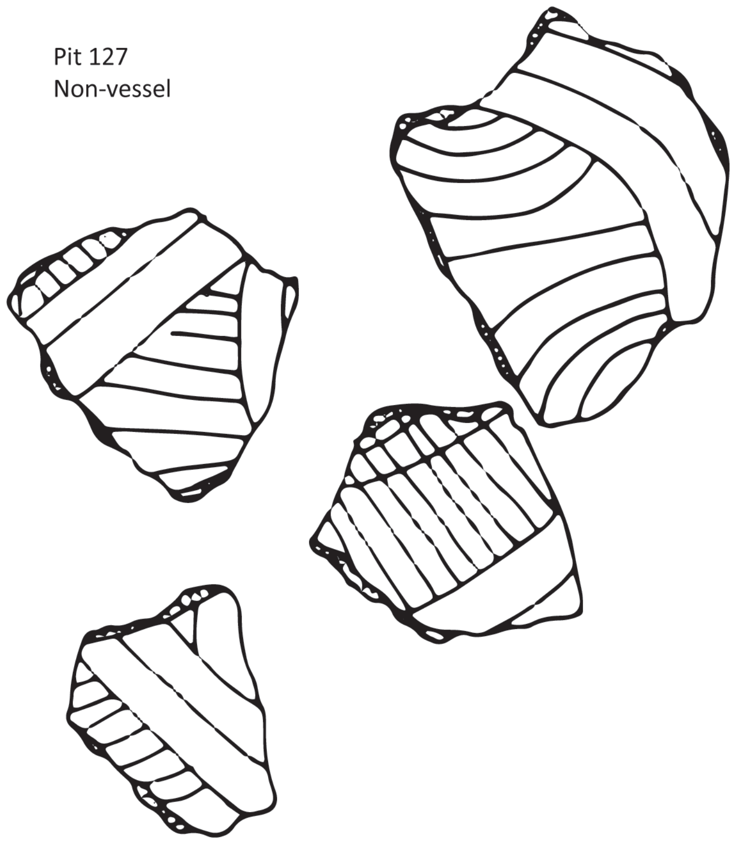
Olin Bottles



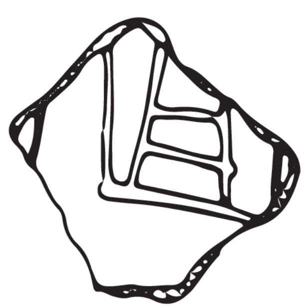

V350-8

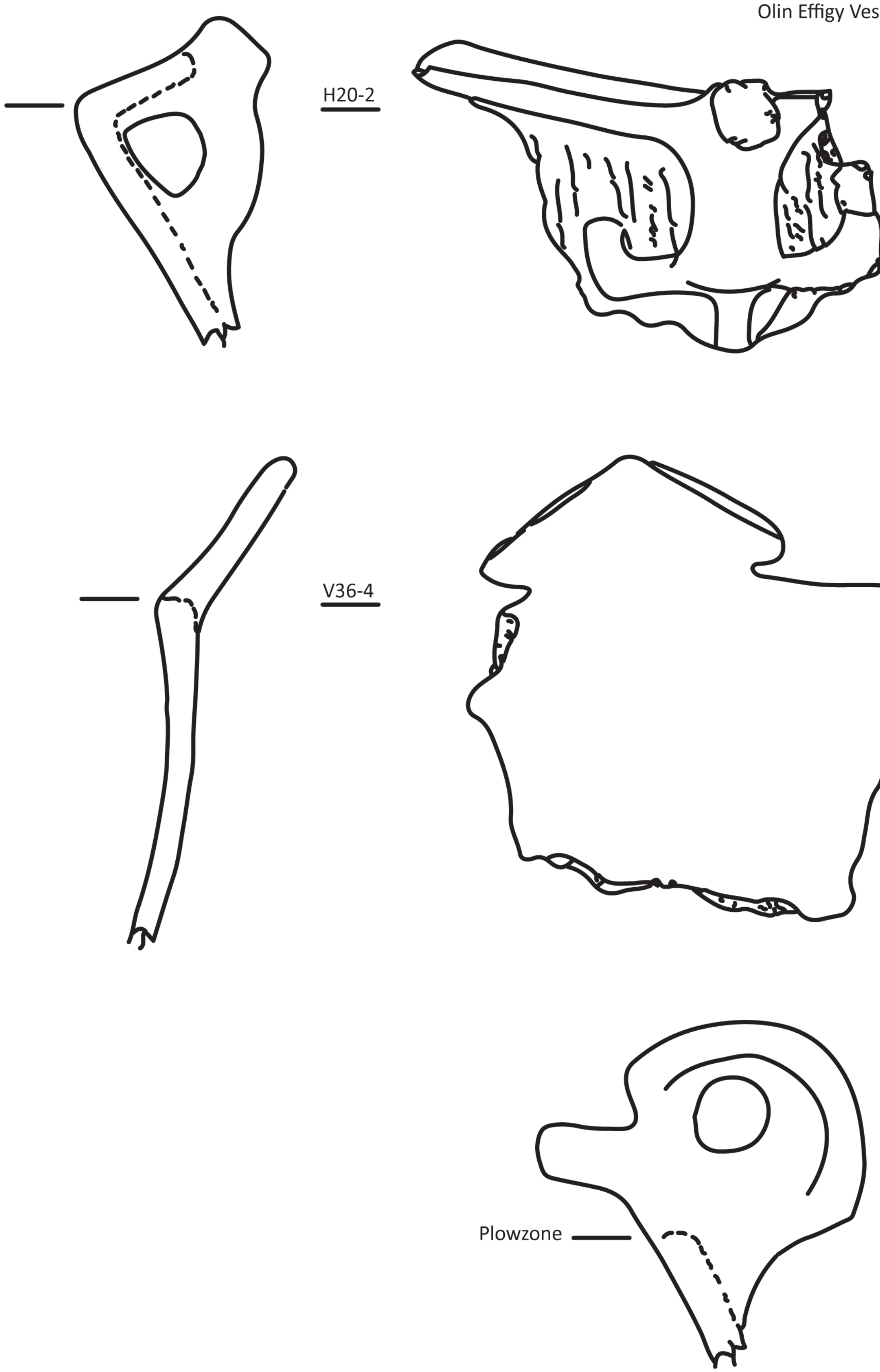

V367-8

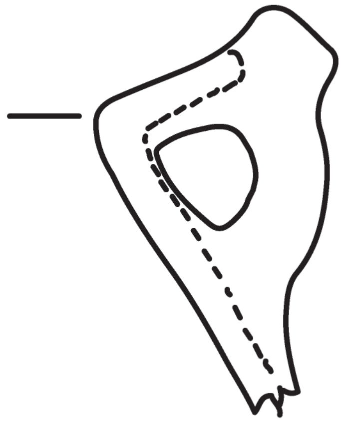
Pit 127
Non-vessel



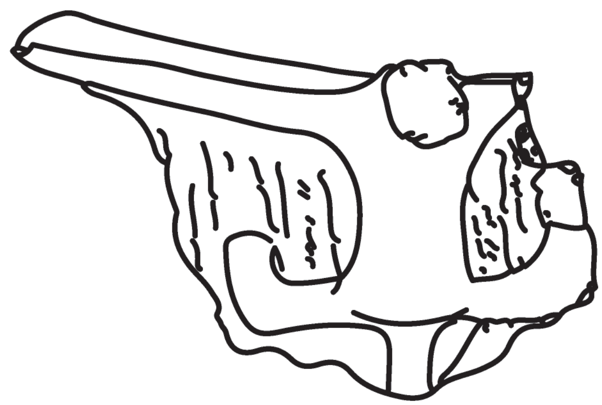
Pit 320
Non-vessel

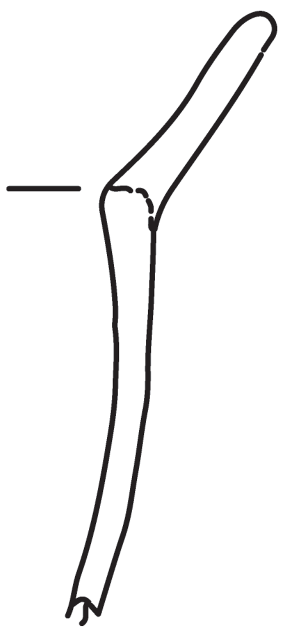



H20-2
V36-4
Plowzone



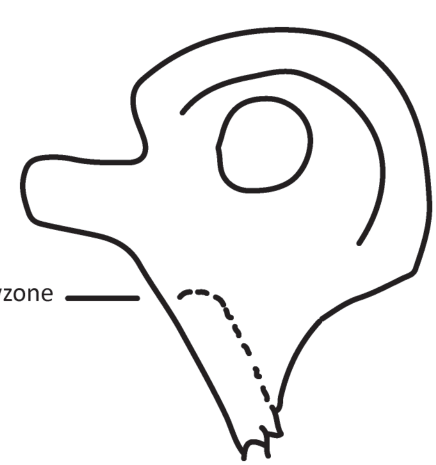
H20-2



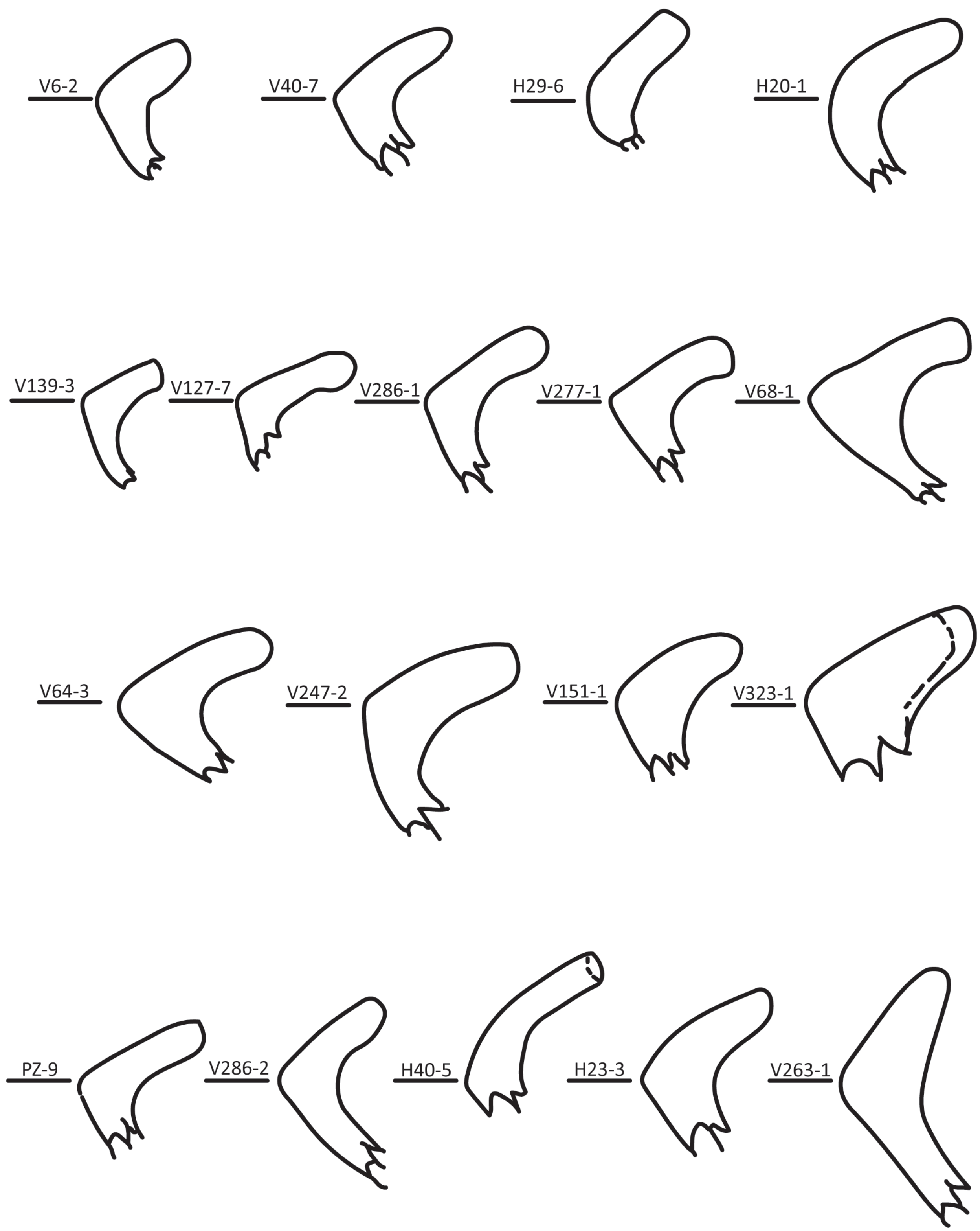


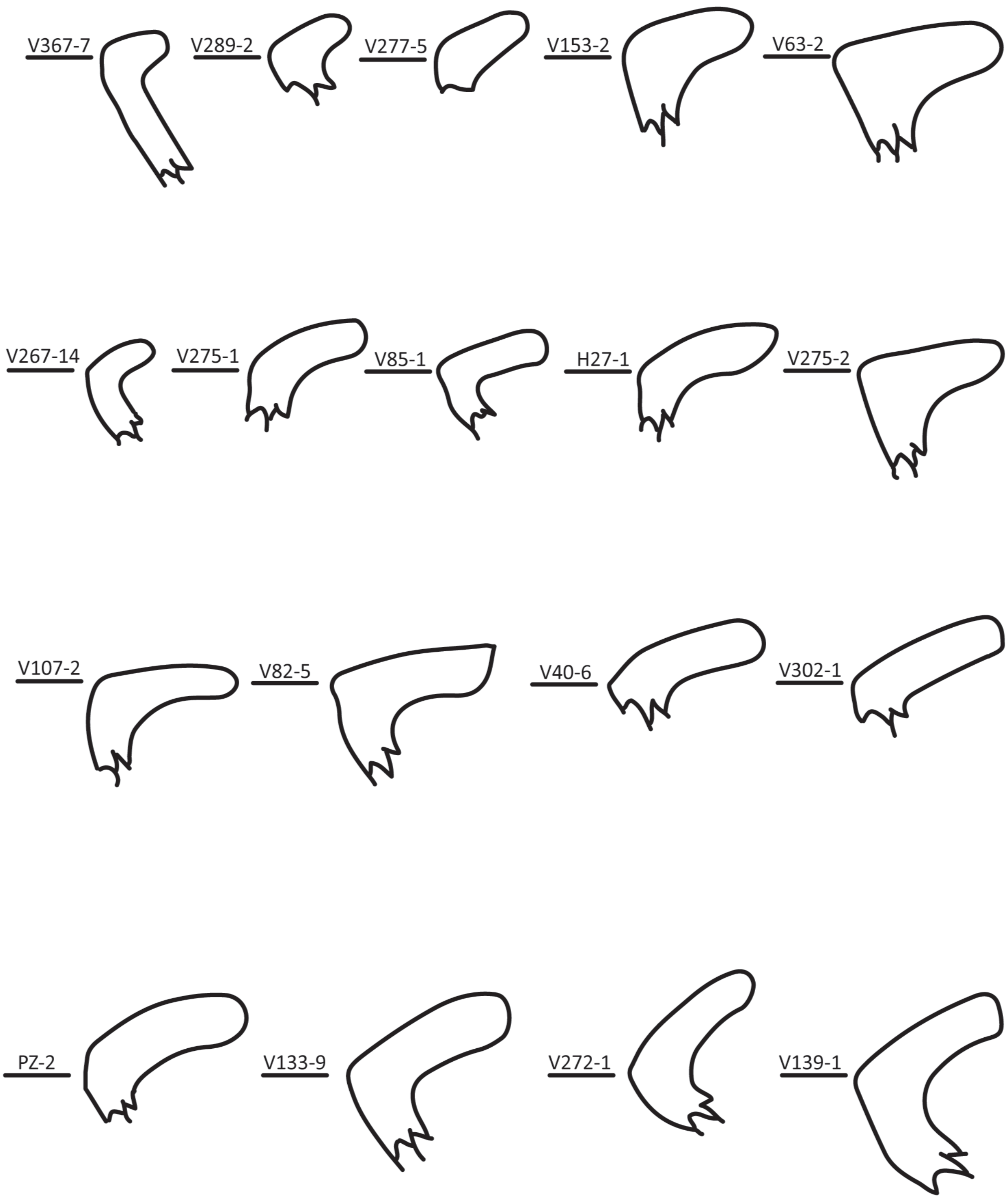
V36-4

Plowzone



Olin Eroded Jars

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V289-2
V277-5
V153-2
V63-2
V267-14
V275-1
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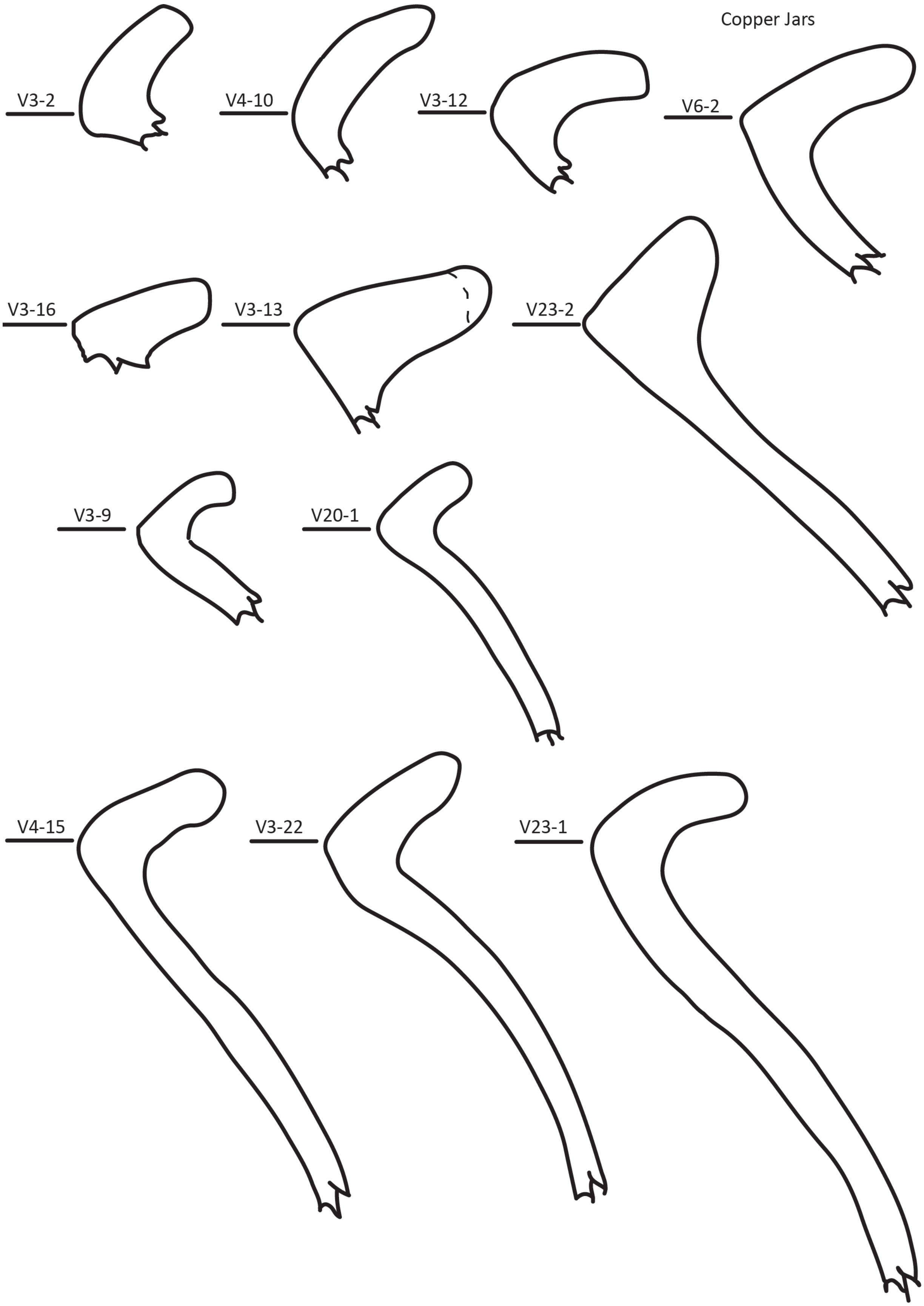
V40-6
V302-1
PZ-2
V133-9
V272-1
V139-1


Copper Jars
V3-2
V4-10
V3-12
V6-2
V3-16
V3-13
V23-2
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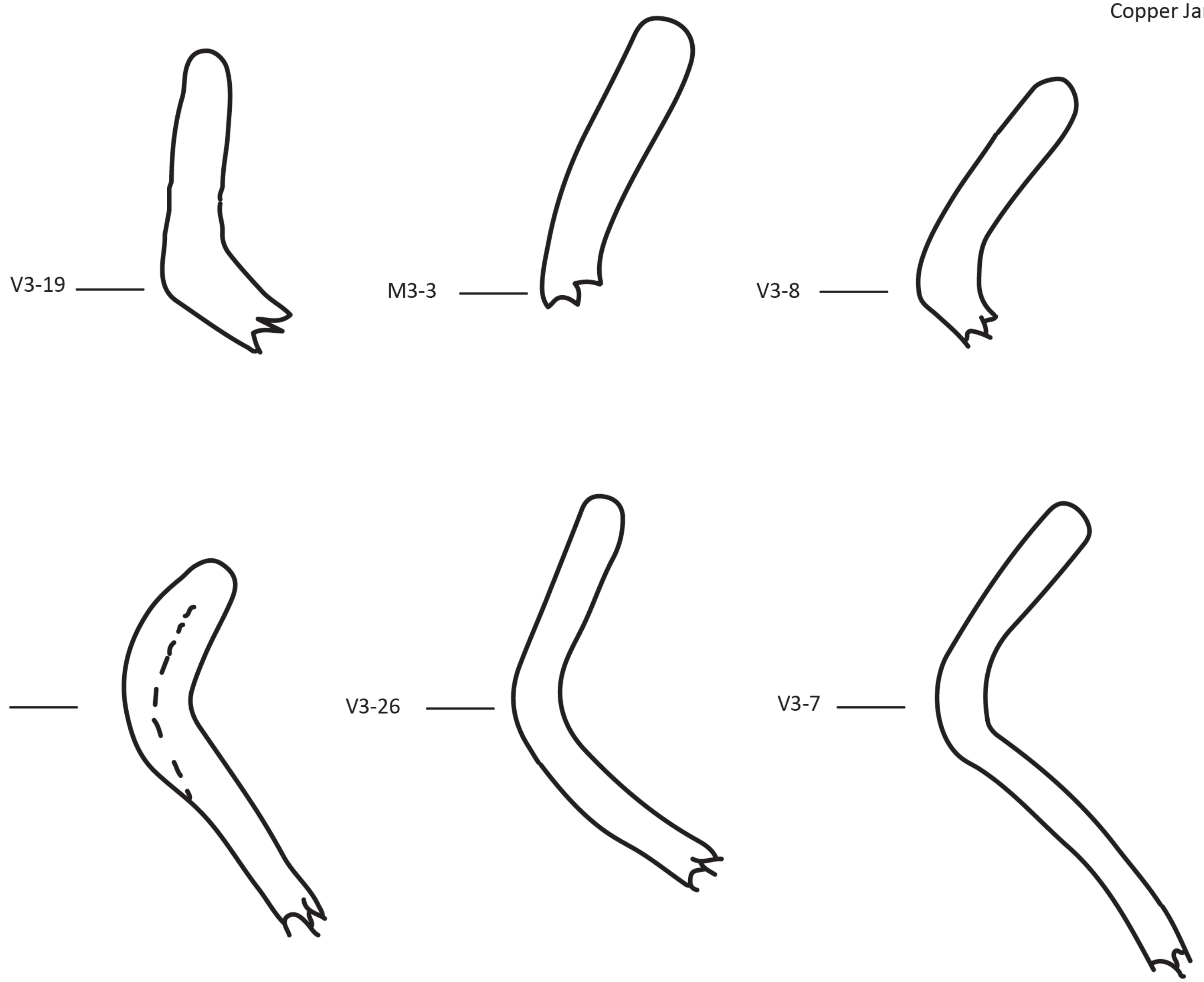
V4-15
V3-22
V23-1

Copper Jars



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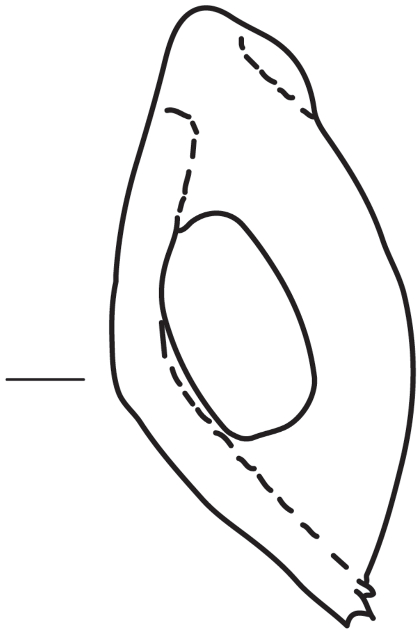

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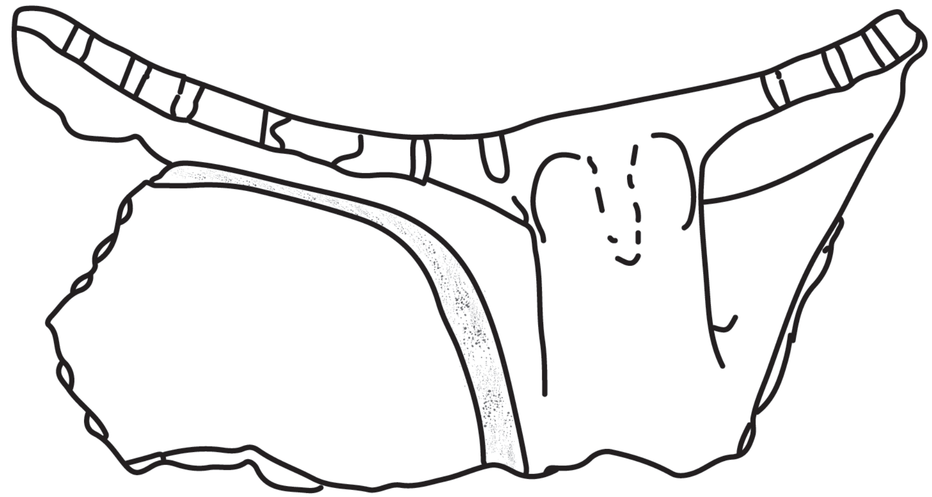
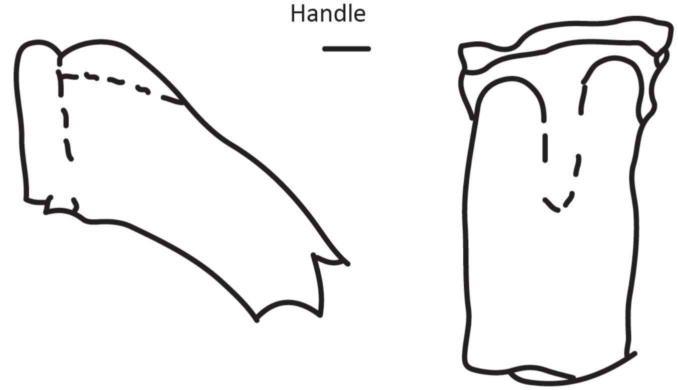
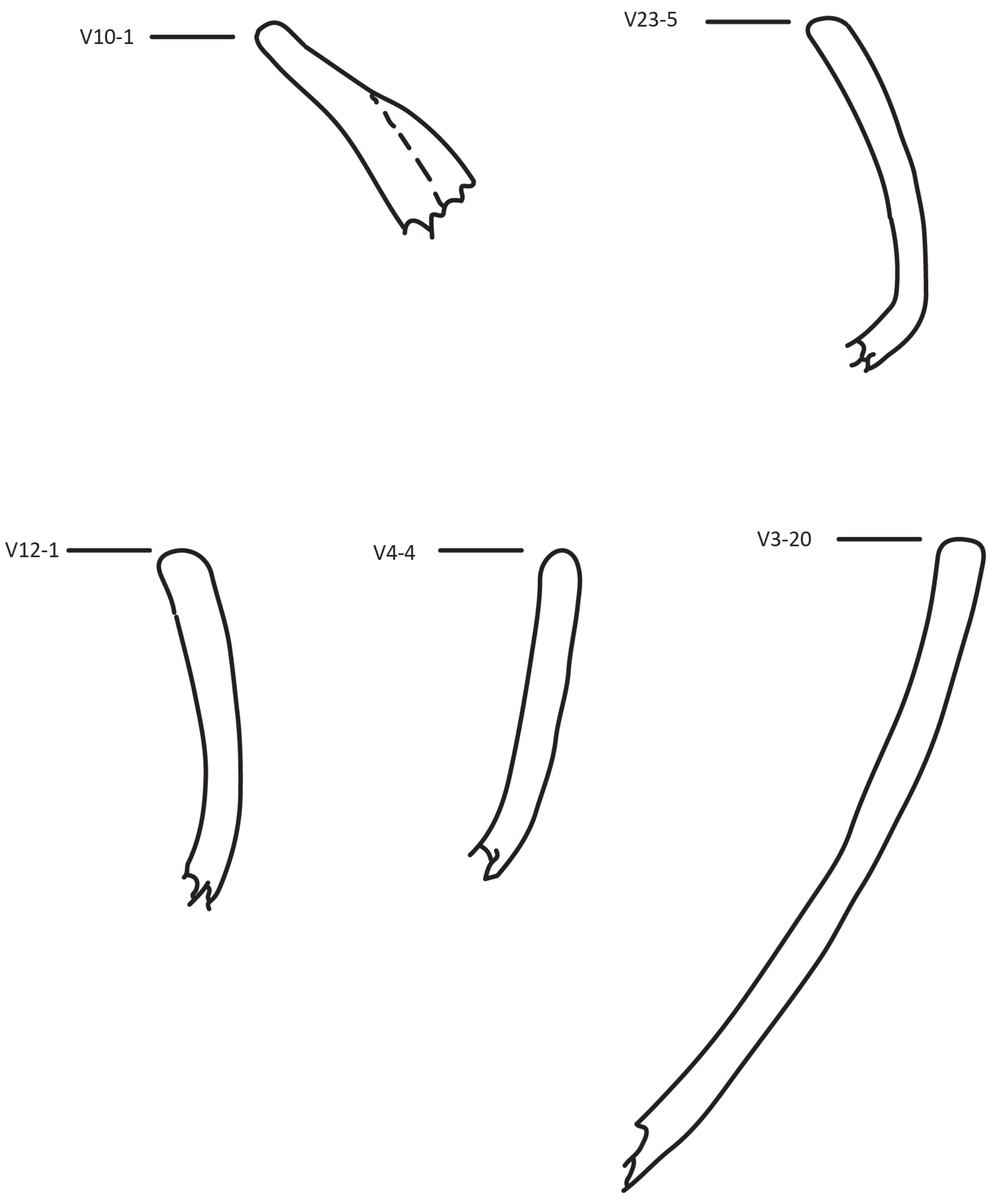


Feature 3
Non-Vessel
Handle

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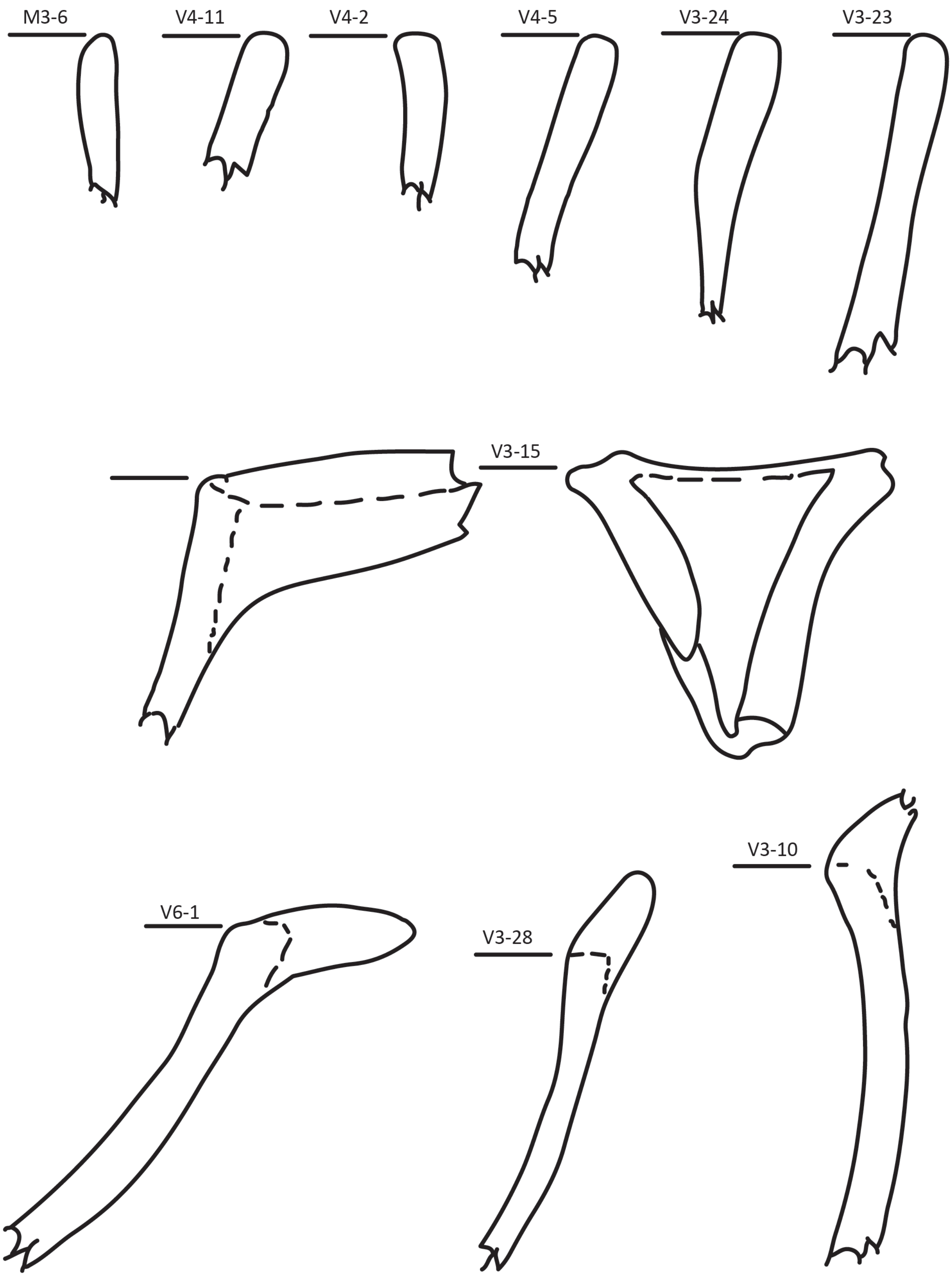
V23-5
V12-1
V4-4
V3-20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V3-24
V3-23
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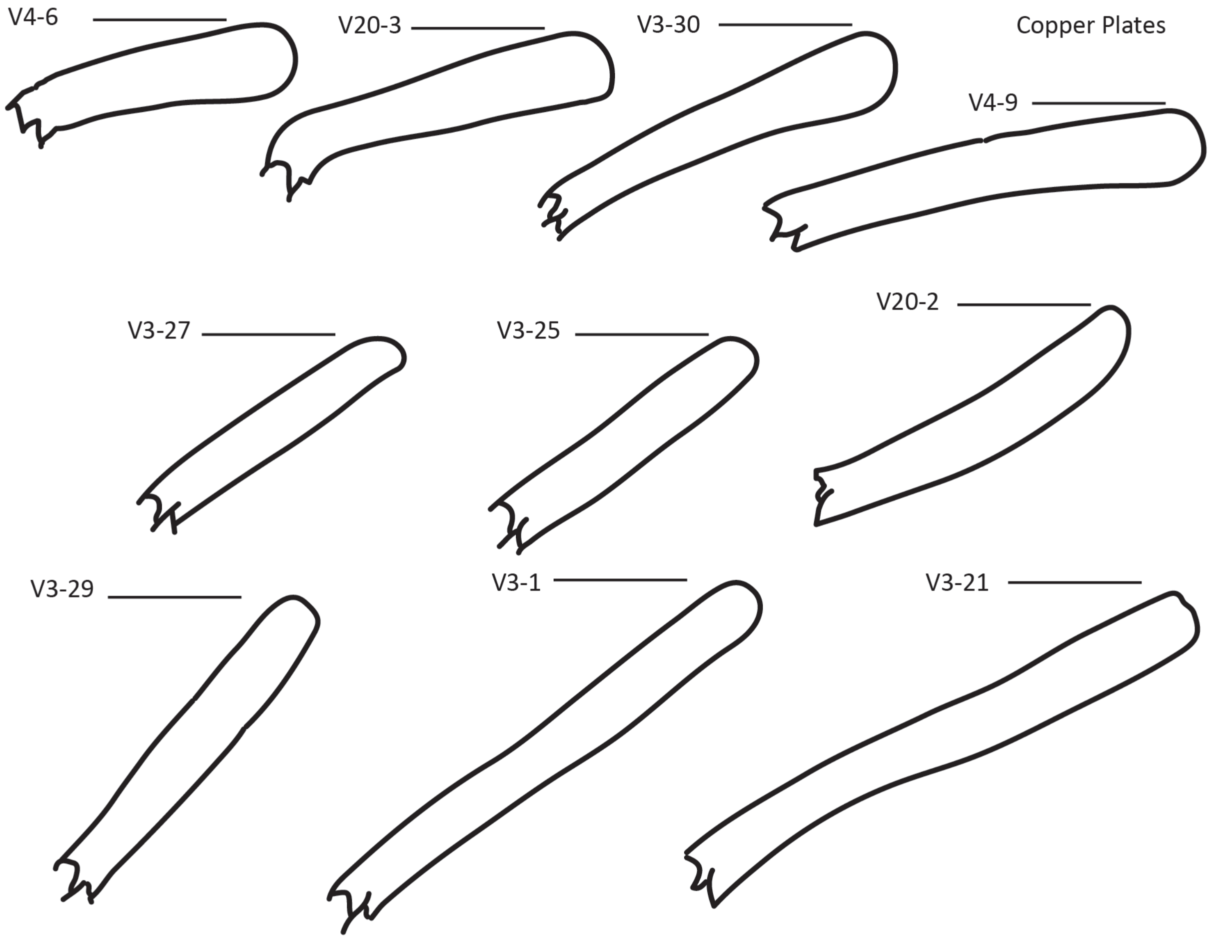
V6-1
V3-28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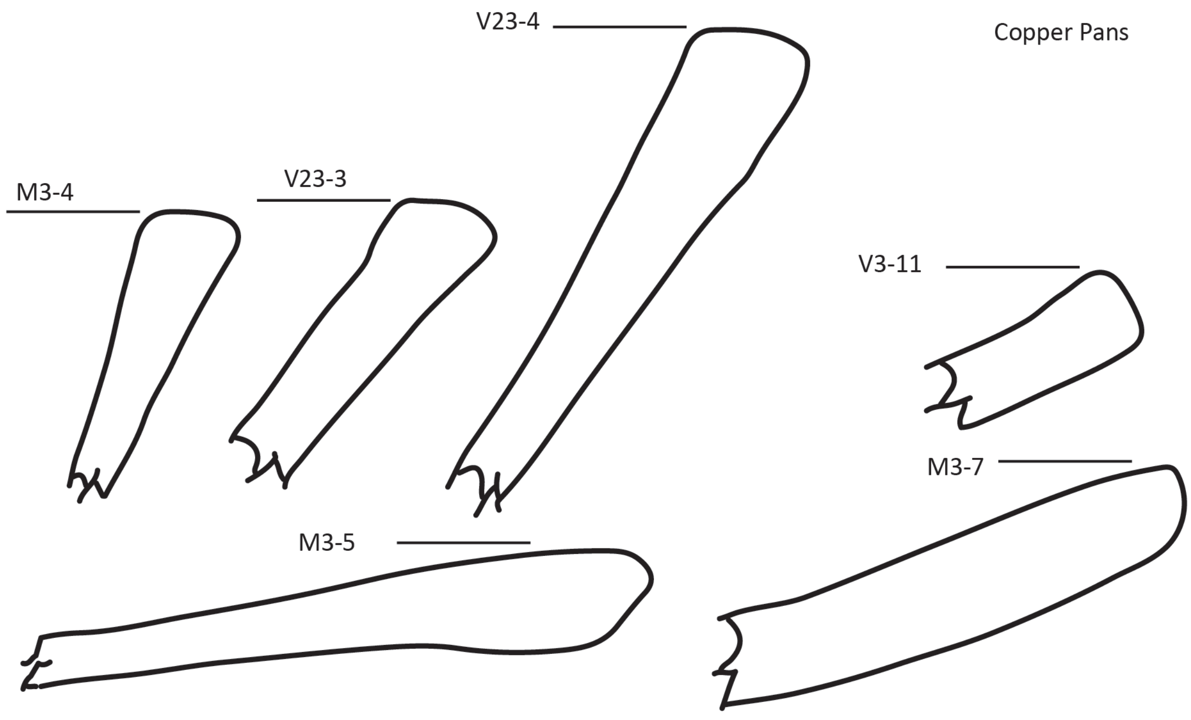
V3-21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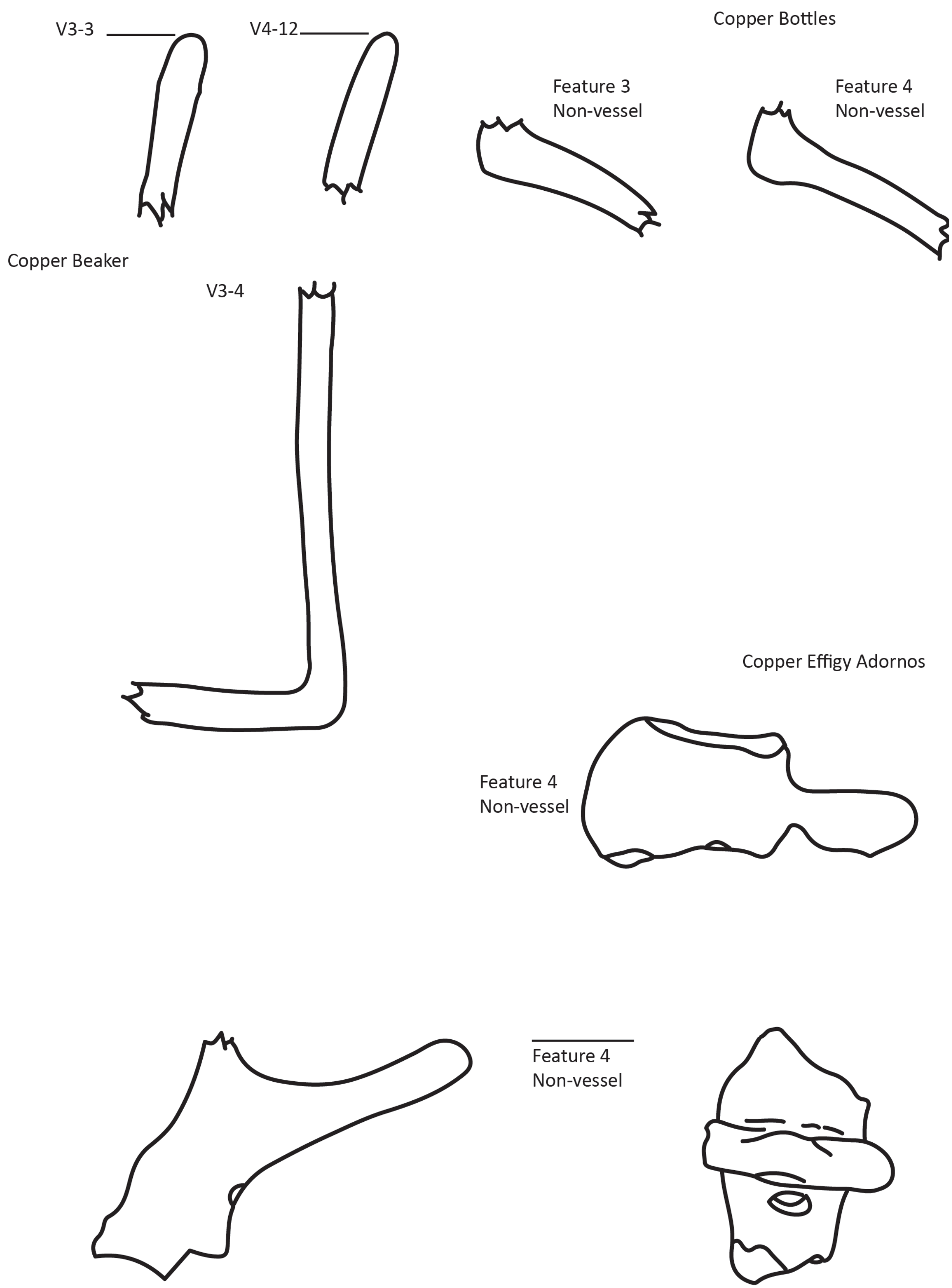
M3-4
V23-3
V3-11
M3-7
M3-5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V3-3
V4-12
Feature 3
Non-vessel
Feature 4
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V3-4
Copper Effigy Adornos
Feature 4
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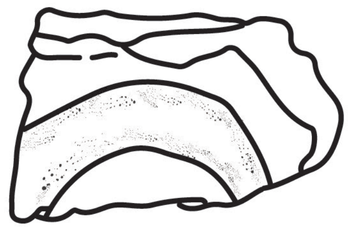
Feature 4
Non-vessel

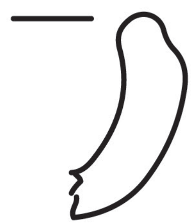
Feature 3
Non-vessel



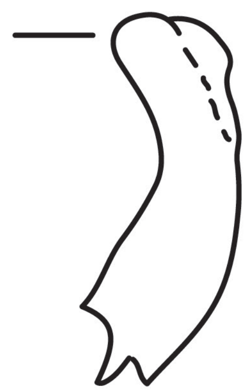
Copper Pinch Pots

M3-1

V4-13



V6-3



Appendix C: Faunal Data

Prepared by Steven R. Kuehn, Illinois State Archaeological Survey, University of Illinois at Urbana-Champaign

Introduction

The Olin (11MS133) faunal assemblage contains 49,621 pieces of bone, mussel shell, and fish scale. The remains were recovered during the 1971 through 1975 Southern Illinois University-Edwardsville field school excavations, under the direction of Dr. Sidney Denny. The Olin site represents the only extensively excavated upland village in the uplands immediately north of the American Bottom (Baltus 2009). In addition, it is one of the few upland sites in the greater American Bottom to produce a large, well-preserved faunal assemblage. The majority of remains are affiliated with either a Late Woodland (NISP=19,007) or a Mississippian Moorehead phase (NISP=21,345) component. The remaining specimens (NISP=9,269) are from mixed or disturbed components, lack specific provenience data, or cannot otherwise be clearly assigned to either recognized occupation. The bulk of the faunal assemblage was obtained from pit features and structures.

A portion of the Olin assemblage was partially analyzed (see Baltus 2009:34-35, 67) prior to examination by the author. For this report, the entire assemblage was analyzed anew by the author, and is presented here for the first time. The earlier preliminary analyses provided some insight on the composition of the Olin faunal assemblage and raised a number of hypotheses requiring further inquiry, including possible evidence for feasting and differential exploitation of deer. Several of these hypotheses have been incorporated into the research questions guiding this analysis. The primary goal of this analysis is to describe Late Woodland and Mississippian faunal exploitation at Olin, in terms of primary and secondary dietary resource use, habitat exploitation, season of use, deer exploitation strategies, fish habitat procurement patterns, and evidence for feasting and/or ritual use of fauna. Bone modification and tool use is included within the primary analysis. Late Woodland and Mississippian faunal exploitation patterns at Olin are then compared and contrasted. Finally, Late Woodland and Mississippian faunal exploitation at Olin (upland) is compared to dietary evidence from select contemporaneous upland and floodplain sites in the northern (primarily) American Bottom.

The secondary goal of this analysis is to address, as much as possible, research questions raised during earlier investigations. For example, prior analyses note the presence of animal remains potentially associated with ritual or ceremonial activities, so the distribution of faunal remains by feature is examined for evidence of ritual or feasting activity. Olin was a fortified settlement during the Moorehead phase, with evidence for increased privatization resulting from conflict-related stress (Baltus 2009). In consideration of this, the Mississippian assemblage is examined for evidence of dietary stress, in the form of greater use of secondary resources, increased consumption of secondary or low-value meat cuts, and greater focus on local habitats (i.e., constricted procurement strategies). During the field investigations, it was thought that a fully articulated deer was recovered from a pit feature on the east side of the site. As such, deer remains in each feature are examined to determine if a fully articulated animal was present, and if so, what it represents. Finally, deer hunting was considered to be a focal activity at the Olin site, and preliminary analyses suggested that deer cranial and distal limb elements were disproportionately represented, indicating that deer were being processed for consumption at another location. To test this theory, deer element representation for each component is examined and compared with contemporaneous sites, to determine if evidence exists for feasting or supplying other settlements with venison or other foodstuffs.

Method of Analysis

Faunal material from the Olin site was obtained through hand collection and 1/4" inch dry screening in the field. After separation by provenience, each specimen larger than 2 mm was examined individually and the following information recorded: element, side of the body (when applicable), section or portion of the element, and taxonomic classification. Relative age (e.g., adult or juvenile) or approximate chronological age was recorded when it could be reliably determined. Determination of age was based on the degree of epiphyseal fusion, tooth eruption, and occlusal wear. Refitting of bone fragments was restricted to specimens recovered from within the same feature.

Each specimen was examined for exposure to heat, in the form of burned or calcined bone. Evidence of butchering (e.g., cut and chop marks, fractures) was recorded when observed. Worked bone and shell are described in detail separately. Due to specimen fragmentation, otherwise unidentifiable pieces of mammal and bird bone are categorized as large-sized, medium-sized, or small-sized based on the relative size and thickness of each specimen. The approximate live weight of large-sized mammals is considered to be greater than 50 lbs (23 kg), 11 to 50 lbs (5 to 23 kg) for medium-sized mammals, and less than 10 lbs for small-sized mammals. Indeterminate bird remains were treated in a similar fashion, divided into large-sized (e.g., turkey, Canada goose, or larger), medium-sized (e.g., large duck, cormorant), and small-sized (e.g., teal-sized duck or smaller). When it was not possible to reliably categorize a specimen based on size, it is listed simply as mammal or bird of indeterminate size.

The quantitative measure of the number of identified specimens per taxon (NISP) is used throughout this report unless otherwise noted. Minimum number of individuals per taxon (MNI) determinations are based on comparison of repeating or multiple elements, relative age, and overall size, and calculated separately for the Late Woodland and Mississippian assemblages. In general, MNI estimates are made only for specimens minimally identifiable to the genus or species level. However, MNI calculations are offered for certain taxa identified to the family level provided no more specifically identifiable specimen from that family is present (following Reitz and Wing 1999:198-199). Accessory MNI estimates were made for select specimens identified to the genus level, even if more specifically identifiable remains are present, in order to document the relative abundance of certain taxa. For example, a MNI value was recorded for Ameriurus sp. even though elements of Ameriurus melas, Ameiurus natalis, and Ameiurus nebulosus were identified and assigned MNI counts. This approach risks over-inflating the relative abundance of certain taxa, but for the select taxa to which it is applied, the resultant MNI values likely are much more accurate than the MNI estimates provided through a more conservative approach. Habitat information for the various taxa recovered was taken from Jackson (1961) for mammals, Kaufman (1996) for birds, Phillips et al. (1999) for reptiles and amphibians, Smith (1979) for fish, Cummings and Mayer (1992) for freshwater mussels, and Clarke (1981) for gastropods. A detailed inventory of the Olin faunal assemblage is presented in Appendix I.

Late Woodland Faunal Assemblage

The Late Woodland assemblage contains 19,007 faunal remains (Table C.1). Mammal remains are most abundant among identifiable taxa with 5,883 specimens. Fish and birds are the next most common with 2,008 and 1,375 specimens, respectively. Reptile bones account for 382 specimens, with a small number of mollusk (NISP=128) and amphibian (NISP=7) elements

Table C.1. Olin Late Woodland Faunal Remains

Taxon	NISP	MNI	Burned
White-tailed deer (*Odocoileus virginianus*)	551	17	72
Elk (*Cervus elaphus*)	2	1	0
Deer/elk, indet. (Cervidae)	1	--	0
Domestic dog (*Canis familiaris*)	3	1	0
Dog/wolf/coyote, indet. (*Canis* sp.)	3	--	1
Red fox (*Vulpes vulpes*)	1	1	0
Raccoon (*Procyon lotor*)	8	2	0
Beaver (*Castor canadensis*)	5	3	0
Muskrat (*Ondatra zibethicus*)	10	1	1
Mink (*Mustela vison*)	1	1	0
Cottontail rabbit (*Sylvilagus floridanus*)	37	3	8
Plains pocket gopher (*Geomys bursarius*)	36	4	1
Fox squirrel (*Sciurus niger*)	45	7	8
Tree squirrel, indet. (*Sciurus* sp.)	14	--	2
Mouse/vole, indet. (*Microtus* sp.)	1	1	0
Mouse/rat, indet. (Sigmodontinae)	2	--	0
Vole, indet. (Arvicolinae)	1	1	0
Rodent, indet. (Rodentia)	19	--	0
Large-sized mammal	1241	--	619
Medium-sized mammal	7	--	2
Medium-large mammal	5	--	2
Small-medium mammal	9	--	1
Small-sized mammal	80	--	18
Mammal, indet.	3801	--	2869
Turkey (*Meleagris gallopavo*)	127	8	2
Northern bobwhite (*Colinus virginianus*)	2	1	0
Greater prairie chicken (*Tympanuchus cupido*)	1	1	0
Mallard (*Anas platyrhynchos*)	2	1	0
Wood duck (*Aix sponsa*)	3	1	0
Teal (*Anas crecca/discors*)	1	1	1
Bay duck, indet. (*Aythya* sp.)	1	1	0
Small duck (small Anatinae)	3	--	2
Duck, indet. (Anatinae)	4	--	2
King rail (*Rallus elegans*)	1	1	1
Bald eagle (*Haliaeetus leucocephalus*)	1	1	0
Perching bird, indet. (Passeriformes)	2	2	0
Large-sized bird	185	--	10
Medium-sized bird	10	--	1
Small-sized bird	24	--	12
Bird, indet.	1008	--	273
Snapping turtle (*Chelydra serpentina*)	2	1	0
Softshell turtle, indet. (*Apalone* sp.)	1	1	0

Table C.1. Olin Late Woodland Faunal Remains (Continued)

Taxon	NISP	MNI	Burned
Box turtle, indet. (*Terrapene* sp.)	100	4	4
Painted turtle (*Chrysemys picta*)	3	1	0
Blanding's turtle (*Emydoidea blandingii*)	2	1	0
River cooter (*Pseudemys concinna*)	1	1	0
Pond/box turtle, indet. (Emydidae)	46	--	5
Turtle, indet.	186	--	88
Fox snake (*Elaphe vulpina*)	5	1	0
Garter snake, indet. (*Thamnophis* sp.)	2	1	0
Milk/kingsnake, indet (*Lampropeltis* sp.)	3	1	0
Non-venomous snake, indet. (Colubridae)	31	--	27
Frog, indet. (*Rana* sp.)	1	1	0
Toad, indet. (*Bufo* sp.)	1	1	0
Frog/toad, indet.	5	--	0
Gar, indet. (*Lepisosteus* sp.)	6	1	1
Bowfin (*Amia calva*)	20	2	2
Northern pike (*Esox lucius*)	1	1	0
Pike/pickerel, indet. (*Esox* sp.)	1	--	0
Creek chub (*Semotilus atromaculatus*)	1	1	0
Smallmouth buffalo (*Ictiobus bubalus*)	1	1	0
Buffalo, indet. (*Ictiobus* sp.)	23	2	0
Golden redhorse (*Moxostoma erythrurum*)	4	2	0
Redhorse, indet. (*Moxostoma* sp.)	33	5	0
Sucker, indet. (Catostomidae)	10	--	0
Black bullhead (*Ameiurus melas*)	16	3	0
Yellow bullhead (*Ameiurus natalis*)	11	2	0
Brown bullhead (*Ameiurus nebulosus*)	4	1	0
Bullhead, indet. (*Ameiurus* sp.)	115	23	7
Blue catfish (*Ictalurus furcatus*)	9	1	0
River catfish, indet. (*Ictalurus* sp.)	6	2	1
Catfish/bullhead, indet. (Ictaluridae)	25	--	1
Bass, indet. (*Micropterus* sp.)	4	1	0
Bluegill (*Lepomis macrochirus*)	13	2	0
Bluegill/sunfish, indet. (*Lepomis* sp.)	1	--	0
Crappie, indet. (*Pomoxis* sp.)	3	1	0
Small sunfish, indet. (small Centrarchidae)	2	--	0
Sunfish, indet. (Centrarchidae)	26	--	0
Freshwater drum (*Aplodinotus grunniens*)	17	2	0
Fish, indet.	1656	--	47
Lightning whelk (*Busycon contrarium*)	1	1	0
Whelk, indet. (*Busycon* sp.)	3	--	0
Threeridge (*Amblema plicata*)	4	1	0
Washboard/threeridge (*Megalonaias/Amblema*)	2	--	0

Table C.1. Olin Late Woodland Faunal Remains (Continued)

Taxon	NISP	MNI	Burned
Mussel, indet.	117	--	0
Snail, indet. (Gastropoda)	1	--	0
Taxon indet. (Vertebrata)	9224	--	4775
Total	**19007**	**130**	**8866**

also present. A total of 9,224 pieces of bone cannot be identified to element or class, and are listed as taxon indeterminate (Vertebrata). Of these, 4,775 are burned or calcined. None of the Vertebrata remains display butchery marks or evidence of modification.

Mammals

White-tailed deer (*Odocoileus virginianus*) are the most commonly identified mammal in the Late Woodland assemblage, with 551 pieces of bone, teeth, and antler. Seventy-two specimens are burned or calcined. A minimum of 17 individuals is represented, ranging in age from juvenile to mature adult. Pit 132 produced a left mandible fragment from an adult deer aged 4 to 5 years at the time of death (Severinghaus 1949). Deer element representation is skewed towards phalanges, teeth, and antler fragments, but all body portions are proportionately represented (Table C.2). The quantity of antler pieces likely reflects curation of tools and tool stock. The relative abundance of low-value cranial and distal limb elements translates to a low food utility index (FUI) of 54.3 percent, slightly less than that of a standard deer (59.5 percent) (Kelly 1997; Styles and Purdue 1996). The occurrence of high and mid utility elements is 15.9 and 29.8 percent, respectively, consistent with that of a standard deer (11.5 percent and 29.0 percent, respectively). This pattern demonstrates that entire field-dressed deer were regularly brought back to the site for processing. At a broad scale, it does not appear that high-value cuts of venison were selectively returned to the site during the Late Woodland occupation. Thirty pieces of deer bone, primarily antler, have been worked, modified, or represent tool stock. Six

Table C.2. Olin Late Woodland Deer Food Utility Indices And Body Part Representation

Food Utility Index	Element	NISP	%FUI
High	sternum	0	
	femur	8	
	tibia	12	
	patella	0	
	astragalus	24	
	calcaneus	17	
	tarsal	23	
		84	*15.9*
Mid	vertebra	28	
	pelvis	3	
	sacrum	2	
	scapula	16	
	humerus	10	
	radius	7	
	ulna	9	
	metatarsal	57	
	rib	26	
		158	*29.8*
Low	antler	45	
	crania	16	
	maxilla	4	
	mandible	18	
	teeth	117	
	atlas/axis	3	
	carpal	11	
	metacarpal	6	
	phalanx	57	
	sesmoid	11	
		288	*54.3*
Mid/Low*	metapodial	21	n/a
	Total Deer NISP	**551**	

*Mid/Low elements not included in FUI calculations; FUI for standard deer is 11.5% High, 29.0% Mid, and 59.5% Low.

Body Portion	Representative Elements	NISP	%NISP
Head	crania, teeth, antler	200	36.3
Trunk	vertebrae, ribs, pelvis	62	11.3
Upper Forelimb	humerus, radius, carpals	53	9.6
Upper Hindlimb	femur, tibia, tarsals	84	15.2
Distal Limb	metapodials, phalanges	152	27.6
	Total	**551**	**100.0**

deer elements exhibit butchery marks. The deer remains provide some evidence for season of occupation (Table C.3). Three antler base pieces have been dropped, suggesting a late fall/winter time of death. Three frontals with attached antlers likely reflect animals killed in the fall. One frontal from Pit 144 has exposed pedicles with no evidence of new growth, indicating death in the late winter or early spring.

Table C.3. Olin Late Woodland Deer Remains With Seasonality Evidence

Pit	Element	Season
132	frontal with attached antler	fall-early winter
144	frontal, shed antler, no new growth	late winter-early spring
235	frontal with attached antler	fall-early winter
250	antler, base (dropped)	fall-winter
268	antler, base (dropped)	fall-winter
268	frontal with attached antler	fall-early winter
373A	antler, base (dropped)	fall-winter

Two elk (*Cervus elaphus*) remains were identified, a left mandibular incisor and the base fragment of an antler. The antler has been score cut and represents partially modified tool stock. A single adult elk is indicated. One other antler tine fragment is categorized as indeterminate deer/elk (*Cervidae*). The deer/elk antler shows no evidence of modification.

Portions of a left mandible, left tibia, and right radius are classified as domestic dog (*Canis familiaris*). A single adult animal is indicated. None of the dog remains exhibit butchering marks or evidence of modification. Three specimens are listed as indeterminate dog/coyote/wolf (*Canis* sp.). One of these, an atlas fragment, has cut marks. The other two specimens are a burned left maxilla and a right tibia shaft piece. One right maxilla from an adult red fox (*Vulpes vulpes*) is also present in the assemblage.

Muskrat (*Ondatra zibethicus*), raccoon (*Procyon lotor*), and beaver (*Castor canadensis*) remains are moderately well represented in the Late Woodland assemblage. Ten muskrat bones were recovered, consisting primarily of cranial elements, vertebrae, and girdle elements. Eight raccoon elements, primarily teeth and jaw pieces, are present and reflect a minimum of two adult individuals. At least one male is represent, based on the recovery of a worked baculum fragment from Pit 129. Cut marks were observed on one raccoon ulna. One radius fragment and four incisors are identified as beaver, and represent at least three individuals. Both adult and juvenile beaver are present. One left mandibular incisor from Pit 268 has been modified for use as a scraping or engraving implement. One left humerus fragment is identifiable as mink (*Mustela vison*). No butchering marks or evidence of modification was observed on the mink element.

Forty-five fox squirrel (*Sciurus niger*) remains were identified, with a MNI of seven adult and juvenile individuals represented. Nearly all body parts are present, with limb bones and mandibles the most common. Fourteen elements are categorized as indeterminate tree squirrel (*Sciurus sp.*). Thirty-six remains are identifiable as plains pocket gopher (*Geomys bursarius*), with at least four adult and juvenile individuals represented. Limb elements are most common, with essentially all major body portions present. None of the fox squirrel, plains pocket gopher, or indeterminate tree squirrel remains exhibit butchering marks or evidence of modification.

Thirty-seven cottontail rabbit (*Sylvilagus floridanus*) remains were identified in the Late Woodland assemblage. Limb elements predominate with vertebrae, girdle bones, and cranial pieces also present. None of the rabbit bones display butchering marks or modification evidence.

Twenty-three specimens are listed as smaller rodent remains. Indeterminate mouse/vole (*Microtus sp.*) and indeterminate vole (*Arvicolinae*) are represented by one bone each. Two specimens are listed as indeterminate mouse/rat (*Sigmodontinae*). The other 19 elements are classified as indeterminate rodent (*Rodentia*). The majority of specimens in this group are non-diagnostic tooth and limb fragments. None exhibit butchery marks or evidence of cultural modification.

Indeterminate mammal remains account for 3,801 bone fragments, of which 2,869 are burned or calcined. None show butchering marks or modification evidence. The rest of the mammal bones can only be categorized in terms of relative size. Large-sized mammal bones are most common with 1,242 specimens, of which 619 are burned. One large-sized mammal bone shows cut marks, and one specimen is interpreted as an awl tip fragment. Five pieces of bone are listed as medium-large mammal, seven as medium-sized mammal, nine as small-medium mammal, and 80 as small-sized mammal.

White-tailed deer occupy a variety of habitats but prefer forest-edge settings. Elk inhabit both forest-edge and prairie settings. Aquatic and semi-aquatic mammals present include beaver, muskrat, and mink. Forest-edge and forest dwelling mammals consist of raccoon, red fox, fox squirrel, and cottontail rabbit. Plains pocket gophers are typically found in grassland and prairie areas.

Birds

A total of 1,374 bird remains are present in the Late Woodland assemblage, but relatively few are identifiable beyond the class level. Large-sized bird remains account for 185 specimens, of which 10 are burned. Two large-sized bird elements have been fashioned into tubes or beads.

Ten specimens are listed as medium-sized bird, and 24 are classified as small-sized bird. None of the large-sized, medium-sized, or small-sized bird remains exhibit butchery marks. A total of 1,008 specimens are categorized as indeterminate bird; 273 remains are burned or calcined. Three indeterminate bird bones have been modified into perforating implements.

Turkey (*Meleagris gallopavo*) remains account for 127 pieces of bone, with a minimum of eight individuals present. Adult remains predominate, but several juvenile bones were observed. One turkey humerus has been cut and polished, and two elements display butchery marks. Two specimens are classified as northern bobwhite (*Colinus virginianus*) and one is identifiable as greater prairie chicken (*Tympanuchus cupido*). No cut marks or evidence of modification was observed on any of the bobwhite or prairie chicken remains.

Relatively few waterfowl remains were identified in the Late Woodland assemblage. Ducks present include mallard (*Anas platyrhynchos*), wood duck (*Aix sponsa*), teal (*Anas crecca/discors*), and indeterminate bay duck (*Aythya* sp.). Three specimens are listed as small duck (small *Anatinae*) and four are categorized as indeterminate duck (*Anatinae*). None of the duck remains show cut marks or evidence of modification. One left tarsometatarsus fragment is identifiable as king rail (*Rallus elegans*). Two right carpometacarpi are classified as indeterminate perching bird (*Passeriformes*), with two individuals represented. None of the perching bird or rail elements display butchery marks or modification evidence.

Turkeys are found primarily in forest-edge and forest settings. Greater prairie chickens inhabit tallgrass prairies and prairie-forest edge areas, while northern bobwhites are most common in brushy meadows, grasslands, and woodland edge zones. Ducks and rails are seasonally abundant in aquatic settings, wetlands, and marsh habitats. Perching birds occur in forest, forest-edge, prairie, and riparian settings.

Reptiles

Reptile remains in the Late Woodland assemblage consist of 341 turtle elements and 41 snake bones, for a total of 382 specimens. One hundred specimens, primarily shell fragments, are classified as indeterminate box turtle (*Terrapene* sp.). At least four individuals are represented, although the quantity of shell pieces suggests that a larger number of box turtles are present. The remains of painted turtle (*Chrysemys picta*), Blanding's turtle (*Emydoidea blandingii*), and river cooter (*Pseudemys concinna*) were also identified in the assemblage. Cut marks and interior polish were noted on both Blanding's turtle elements (a nuchal and a carapace fragment). The river cooter bone, a fused nuchal and peripheral fragment, also has modification marks on the interior. Forty-six carapace and plastron pieces are classified as indeterminate box/pond turtle (*Emydidae*). Two carapace fragments exhibit interior polish and striations associated with modification for bowl or scoop manufacture.

One right femur and a left scapula fragment are identifiable as snapping turtle (*Chelydra serpentina*). Cut marks were observed on the femur. One shell fragment is categorized as indeterminate softshell turtle (*Apalone* sp.). The remaining 186 turtle elements are listed as indeterminate turtle. Eighty-eight indeterminate turtle bones are burned. None of the indeterminate turtle remains show butchery marks or evidence of modification.

Snake remains consist entirely of trunk vertebrae and vertebra fragments. Five trunk vertebrae are identifiable as fox snake (*Elaphe vulpina*), three are listed as indeterminate milk/kingsnake (*Lampropeltis* sp.), and two as indeterminate garter snake (*Thamnophis* sp.). One individual of each taxon is represented. Thirty-one trunk vertebrae are listed as indeterminate non-venomous snake (*Colubridae*). Twenty-seven indeterminate snake vertebrae are burned. None of the snake remains display butchery marks or modification evidence.

Box turtles inhabit forest, forest-edge, and prairie settings. Snapping and painted turtles occur in a variety of aquatic habitats, while Blanding's turtles are most common in marshes, wetlands, and shallow lakes. River cooters prefer backwater lakes and large river oxbows, while softshell turtles are found in large rivers and streams, and some in backwaters, lakes, and ponds. Fox snakes occupy prairie habitats, while the various milk, king, and garter snakes occur in prairie, meadow, forest, and edge settings.

Amphibians

Seven amphibian remains are present in the assemblage. One tibiofibula shaft fragment is classified as indeterminate frog (*Rana* sp.), and one left femur fragment is categorized as indeterminate toad (*Bufo* sp.). Three vertebrae, a maxilla fragment, and a long bone shaft piece are listed as indeterminate frog/toad. None of the amphibian remains display butchery marks or evidence of modification. Frogs and toads occur in a variety of aquatic and terrestrial habitats.

Fish

The Olin Late Woodland assemblage contains 2,008 fish remains. A total of 1,656 specimens are non-diagnostic vertebrae, cranial fragments, scale fragments, and spine/rib shaft pieces that cannot be specifically identified. Forty-seven pieces of bone are burned or calcined. None of the indeterminate fish remains exhibit butchery marks or evidence of modification.

Of the 352 specimens minimally identifiable to the class level, over fifty percent are from members of the catfish/bullhead family (*Ictaluridae*). Sixteen elements are classified as black bullhead (*Ameiurus melas*), 11 as yellow bullhead (*Ameiurus natalis*), and four as brown bullhead (*Ameiurus nebulosus*). Another 115 remains are categorized as indeterminate bullhead (*Ameiurus* sp.). In total, at least 29 individual bullheads are represented. Nine cranial elements are identifiable as blue catfish (Ictalurus furcatus), and all appear to be from a single adult individual recovered from Pit 303. Six specimens are listed as indeterminate river catfish (*Ictalurus* sp.), and 25 bone fragments are categorized as indeterminate catfish/bullhead (*Ictaluridae*).

Seventy-one specimens are from members of the sucker family (*Catostomidae*). Four pharyngeals are identifiable as golden redhorse (*Moxostoma erythrurum*), with a MNI of two. Thirty-three elements, representing another five individuals, are classified as indeterminate redhorse (*Moxostoma* sp.). One right postcleithrum is from a smallmouth buffalo (*Ictiobus bubalus*) and 23 remains are identifiable as indeterminate buffalo (*Ictiobus* sp.). In total, a minimum of three buffalo is represented. Ten bone fragments are categorized as indeterminate sucker (*Catostomidae*). None of the sucker remains display butchery marks or modification evidence.

Forty-nine sunfish (*Centrarchidae*) bones are present in the assemblage. Thirteen cranial elements are identifiable as bluegill (*Lepomis macrochirus*), with a MNI of two. One premaxilla fragment is classified as an indeterminate bluegill/sunfish (*Lepomis* sp.). Four specimens are listed as indeterminate crappie (*Pomoxis* sp.) and three as indeterminate bass (*Micropterus* sp.). Two bone fragments are classified as indeterminate small sunfish (small *Centrarchidae*) and 26 are listed as indeterminate sunfish (*Centrarchidae*). None of the sunfish remains exhibit butchery marks or evidence of modification.

Twenty pieces of bone, primarily cranial elements, are identifiable as bowfin (*Amia calva*). A minimum of two individuals is present. Seventeen specimens are classified as freshwater drum (*Aplodinotus grunniens*), with a MNI of two. One drum had a live weight of approximately 7.3 lbs (3.3 kg) based on an otolith length of 25.1 mm (Morey et al. 1991). No butchery marks or modification evidence was observed on any of the bowfin or drum remains.

Two cranial elements, a vertebra, and three scales are classified as indeterminate gar (*Lepisosteus* sp.). One left quadrate is identifiable as northern pike (*Esox lucius*) and one left palatine fragment is listed as indeterminate pike/pickerel (*Esox* sp.). One left pharyngeal fragment is identifiable as creek chub (*Semotilus atromaculatus*). No butchery marks or modification evidence was observed on any of the gar, pike, or creek chub remains.

Blue catfish occur in rivers and stream channels, while brown bullheads are typically found in clear, well-vegetated lakes. Yellow bullheads prefer creeks and streams and black bullheads are more often found in pond and lake settings, although the two species are often found together. Golden redhorse occur in a variety of aquatic habitats, showing some preference for creek and small river pools; they are seldom found in large rivers. Redhorse suckers are most common in medium-sized rivers, streams, and creeks. Smallmouth buffalo are usually found in large rivers but on occasion occur in lakes and medium-sized rivers. Most buffalofish inhabit larger rivers, some larger streams, and backwater lakes. Bowfins are typically found in oxbows and backwater pools of rivers, floodplain lakes, and swamps. Freshwater drums are primarily a large river fish. Bluegills inhabit clear, well-vegetated lakes, as well as swamps, ponds, and stream and river pools. Crappies and other sunfish can be found in well-vegetated lakes but also quiet river pools and backwater lake settings. Bass occur in floodplain lakes, weedy oxbows, swamps, ponds, rivers, and creeks, depending on the species. Gars inhabit various aquatic settings including lakes, streams, and rivers. Pike occur in lakes, marshes, large rivers, and creek pools, while creek chubs inhabit creeks and low-gradient streams.

Mollusks

Two valve fragments and two pieces of shell are identifiable as threeridge (*Amblema plicata*). A MNI of one is indicated. Two additional pieces of shell are listed as threeridge or washboard (*Megalonaias nervosa*). A total of 117 valve and shell fragments are categorized as indeterminate mussel. None of the freshwater mussel remains in the Late Woodland assemblage exhibit butchery marks or evidence of modification. Threeridges inhabit medium-sized to large-sized rivers.

One shell fragment from Pit 303 is identifiable as lightning whelk (*Busycon contrarium*). Three other shell fragments, from Pit 27, are classified as indeterminate whelk (*Busycon* sp.). Lightning whelks are found in shallow coastal waters from South Carolina to Florida (Morris 1975). No modification evidence was observed on any of the whelk remains, but the limited preservation may hinder identification of tool marks. As such, the four specimens recovered are designated as tool stock.

One piece of snail shell is categorized as indeterminate snail (*Gastropoda*). It has no butchery marks or evidence of modification, and may be intrusive or naturally occurring.

Modified Bone and Shell

Fifty-eight pieces of bone in the Late Woodland assemblage show butchery marks or evidence of modification. Twelve pieces of bone have single or multiple cut marks attributable to butchering and filleting activity (Table C.4). Most of the cuts are on deer remains, with butchery marks also noted on raccoon, canid, snapping turtle, and large-sized mammal elements.

Table C.4. Olin Late Woodland Faunal Remains With Butchery Marks

Taxon	NISP	Element	Description
Deer (*Odocoileus virginianus*)	2	scapula	cut marks
	4	navicularcuboid	cut marks
Dog/coyote/wolf, indet. (*Canis* sp.)	1	atlas	cut marks
Raccoon (*Procyon lotor*)	1	ulna	cut marks
Large-sized mammal	1	long bone	cut marks
Turkey (*Meleagris gallopavo*)	1	tibiotarsus	cut marks
	1	coracoid	cut marks
Snapping turtle (*Chelydra serpentina*)	1	femur	cut marks
Total	**12**		

Forty-six pieces of bone exhibit modification relating to tool or artifact manufacture, or represent tool stock (Table C.5). Fifteen deer and elk antler fragments are categorized as partially worked tools, tool stock, or manufacturing debris. Ten specimens are classified as awls or pins, and three bird bones are listed as tube or bead fragments. One deer 1st phalanx has been fashioned into a cup and pin gaming piece, and one beaver incisor has been modified for use as a graving or incising tool. One deer antler has been worked into a spear or harpoon point. One raccoon baculum shows cut marks and polish, although the function cannot be determined. Five pieces of turtle shell display cuts, striations, or use-wear polish on the interior surfaces, consistent with the manufacture and use of bowls, vessels, or scoops. Ten bone fragments show small areas of polish, striations, or similar modification, but specific type and function cannot be determined.

Table C.5. Olin Late Woodland Modified Faunal Remains

Taxon	NISP	Element	Tool Type/Modification
Deer (*Odocoileus virginianus*)	15	antler	worked/tool stock
	3	metatarsus	awl
	3	frontal & antler	cuts, some wear; tool stock
	2	antler	awl, tip fragment
	2	antler	striations, cut
	1	1st phalanx	cup & pin game
	1	antler	honed point, interior hollowed
	1	antler	incised
	1	metatarsus	polished
	1	antler	rounded, smoothed tip
Elk (*Cervus elaphus*)	1	antler	score cut, tool stock
Raccoon (*Procyon lotor*)	1	baculum	worked, cut
Beaver (*Castor canadensis*)	1	incisor	graver
Large-sized mammal	1	indet.	awl, tip fragment
Medium-large mammal	1	indet.	polished
Turkey (*Meleagris gallopavo*)	1	humerus	bead/tube
Large-sized bird	1	radius	bead/tube
	1	long bone	bead/tube
Bird, indet.	3	long bone	awl/pin, tip
Blanding's turtle (*Emydoidea blandingii*)	1	nuchal	bowl/vessel, fragment
	1	carapace	bowl/vessel, fragment
River cooter (*Pseudemys concinna*)	1	nuchal, peripheral	bowl/vessel, fragment
Pond/box turtle, indet. (Emydidae)	2	carapace	bowl/vessel, fragment
Total	**46**		

Distribution and Seasonality

Late Woodland faunal remains were recovered from 112 pit features (Table C.6). The largest amount of material was recovered from Pit 303, which contained 4,023 remains. The ten pits with the most bone and shell contain a total of 9,539 specimens, or 50.2 percent of the Late Woodland assemblage. A cursory examination of the faunal remains within each pit reveal no significant patterns relating to consumption or disposal practices. The majority of pits, especially those containing large amounts of bone, contain a mix of various animal remains. Deer and fish are present most often, along with bird, turtle, and other mammal remains. No distinct evidence of feasting or ritual activity was noted. Similarly, pit function (other than secondarily for refuse disposal) cannot be determined based on the faunal material recovered.

Table C.6. Olin Late Woodland Summary Faunal Distribution

Pit	NISP
303	4023
201	1074
129	1049
179	885
156	484
116	446
141	428
44	422
35	366
143	362
all other pits	9468
Total	**19007**

Pit 144 contained a deer frontal with exposed pedicles, with no evidence of new growth, indicating a late winter or early spring season of use. No open-water taxa were identified from this feature, which supports this interpretation. Five other pits (Pits 132, 235, 250, 268, 373A) produced deer cranial/antler fragments demonstrating fall/winter use. The composition of most pits indicates long-term use throughout the year, with a mix of taxa represented. Overall, the composition of the Late Woodland faunal assemblage indicates a year-round occupation of the Olin site.

Mississippian Faunal Assemblage

The Mississippian (Moorehead phase) assemblage contains 21,345 faunal remains (Table C.7). In addition, one mud dauber nest fragment was found in Pit 107. A total of 8,223 bone fragments cannot be identified to element or class, and are listed as taxon indeterminate (Vertebrata). None of the Vertebrata remains display butchery marks or evidence of modification; 3,725 specimens are burned or calcined. Among specimens minimally identifiable to class, mammals are the most abundant with 8,594 pieces of bone. Fish remains are the next most common with 2,788 bone and scale fragments. Bird and mollusk remains account for 718 and 643 specimens, respectively, with a small number of turtle, snake, and amphibian bones also present.

Mammals

A total of 1,232 white-tailed deer elements were identified in the Mississippian assemblage. One hundred-eight elements are burned or calcined. A MNI of 23 deer is indicated, based on multiple left astragali, with individuals ranging in age from fawn to mature adult. Twenty-five elements, primarily mandibles, provide specific information on approximate age at death (Table C.8). Several specimens are classified as fawn or fawn/juvenile, and 13 show occlusal wear from deer ranging from 6-12 months to 5.5-6.5 years (Severinghaus 1949). All deer body portions are represented, with vertebra, teeth, rib, and phalanges the most common (Table C.9). Sixty-four pieces of antler were recovered; most are tools, tool fragments, or probable tool stock. In contrast to the Late Woodland deer assemblage, the food utility indices for the Mississippian deer are not consistent with the proportions observed for a standard deer (see Table C.2). Mid utility

Table C.7. Olin Mississippian Faunal Remains

Taxon	NISP	MNI	Burned
White-tailed deer (*Odocoileus virginianus*)	1232	23	108
Elk (*Cervus elaphus*)	2	1	0
Deer/elk, indet. (Cervidae)	1	--	0
Black bear (*Ursus americanus*)	1	1	0
Domestic dog (*Canis familiaris*)	8	2	0
Dog/wolf/coyote, indet. (*Canis* sp.)	2	--	0
Raccoon (*Procyon lotor*)	18	3	1
Beaver (*Castor canadensis*)	10	2	0
Muskrat (*Ondatra zibethicus*)	11	2	3
River otter (*Lontra canadensis*)	1	1	0
Cottontail rabbit (*Sylvilagus floridanus*)	17	2	6
Plains pocket gopher (*Geomys bursarius*)	65	6	4
Fox squirrel (*Sciurus niger*)	28	4	1
Gray squirrel (*Sciurus carolinensis*)	1	--	0
Tree squirrel, indet. (*Sciurus* sp.)	10	--	2
Squirrel, indet. (Sciuridae)	4	2	1
Common mole (*Scalopus aquaticus*)	4	1	0
Mouse/vole, indet. (*Microtus* sp.)	3	3	0
Vole, indet. (Arvicolinae)	4	2	0
Mouse/rat, indet. (Sigmodontinae)	6	--	0
Rodent, indet. (Rodentia)	41	--	2
Large-sized mammal	2112	--	580
Medium-large mammal	11	--	0
Medium-sized mammal	18	--	3
Small-medium mammal	4	--	0
Small-sized mammal	75	--	7
Mammal, indet.	4905	--	1896
Turkey (*Meleagris gallopavo*)	62	6	4
Greater prairie chicken (*Tympanuchus cupido*)	1	1	1
Swan, indet. (*Cygnus* sp.)	10	2	0
Canada goose (*Branta canadensis*)	2	1	1
Mallard (*Anas platyrhynchos*)	6	1	0
Wood duck (*Aix sponsa*)	3	1	0
Teal (*Anas crecca/discors*)	1	1	0
Redhead (*Aythya americana*)	1	1	0
Greater scaup (*Aythya marila*)	5	1	5
Medium duck (medium Anatinae)	1	--	0
Small duck (small Anatinae)	4	--	2
Duck, indet. (Anatinae)	3	--	0
Pied-billed grebe (*Podilymbus podiceps*)	2	1	0
American coot (*Fulica americana*)	1	1	0
Robin (*Turdus migratorius*)	1	1	0

Table C.7. Olin Mississippian Faunal Remains (Continued)

Taxon	NISP	MNI	Burned
Woodpecker/flicker, indet. (Picidae)	1	1	0
Perching bird, indet. (Passeriformes)	10	3	3
Large-sized bird	92	--	12
Medium-sized bird	24	--	4
Small-medium bird	1	--	0
Small-sized bird	24	--	4
Bird, indet.	463	--	137
Snapping turtle (*Chelydra serpentina*)	16	2	0
Softshell turtle, indet. (*Apalone* sp.)	1	1	0
Box turtle, indet. (*Terrapene* sp.)	26	4	0
Painted turtle (*Chrysemys picta*)	6	1	1
Map turtle, indet. (*Graptemys* sp.)	1	1	0
Pond/box turtle, indet. (Emydidae)	96	--	9
Mud/musk turtle, indet. (Kinosternidae)	4	1	0
Turtle, indet.	209	--	67
Garter snake, indet. (*Thamnophis* sp.)	1	1	0
Non-venomous snake, indet. (Colubridae)	9	--	1
Frog, indet. (*Rana* sp.)	3	1	0
Frog/toad, indet.	6	--	0
Frog/toad/salamander, indet. (Amphibia)	1	--	0
Gar, indet. (*Lepisosteus* sp.)	18	2	1
Bowfin (*Amia calva*)	28	2	0
Northern pike (*Esox lucius*)	6	3	0
Creek chub (*Semotilus atromaculatus*)	18	10	2
Minnow, indet. (Cyprinidae)	1	--	0
Bigmouth buffalo (*Ictiobus cyprinellus*)	3	1	0
Buffalo, indet. (*Ictiobus* sp.)	22	2	0
River redhorse (*Moxostoma carinatum*)	1	1	0
Golden redhorse (*Moxostoma erythrurum*)	1	1	0
Redhorse, indet. (*Moxostoma* sp.)	48	5	4
Sucker, indet. (Catostomidae)	18	--	1
Black bullhead (*Ameiurus melas*)	26	5	1
Brown bullhead (*Ameiurus nebulosus*)	9	2	0
Yellow bullhead (*Ameiurus natalis*)	6	1	0
Bullhead, indet. (*Ameiurus* sp.)	220	26	14
Blue catfish (*Ictalurus furcatus*)	2	1	0
Channel catfish (*Ictalurus punctatus*)	1	1	0
River catfish, indet. (*Ictalurus* sp.)	14	3	1
Catfish/bullhead, indet. (Ictaluridae)	19	--	3
Bass, indet. (*Micropterus* sp.)	10	2	0
Bluegill (*Lepomis macrochirus*)	18	3	0
Rock bass (*Ambloplites rupestris*)	1	1	0

Table C.7. Olin Mississippian Faunal Remains (Continued)

Taxon	NISP	MNI	Burned
Crappie, indet. (*Pomoxis* sp.)	1	1	0
Small sunfish, indet. (small Centrarchidae)	13	--	0
Sunfish, indet. (Centrarchidae)	14	--	1
Freshwater drum (*Aplodinotus grunniens*)	45	3	1
Fish, indet.	2225	--	134
Lightning whelk (*Busycon contrarium*)	2	2	0
Whelk, indet. (*Busycon* sp.)	12	7	1
Threeridge (*Amblema plicata*)	3	3	0
Ebonyshell (*Fusconaia ebena*)	1	1	0
Washboard/threeridge (*Megalonaias/Amblema*)	2	--	0
Pocketbook/fatmucket, indet. (*Lampsilis* sp.)	1	1	1
Mussel, indet.	620	--	224
Discus snail, indet. (*Discus* sp.)	1	1	0
Snail, indet. (Gastropoda)	1	--	0
Taxon indet. (Vertebrata)	8223	--	3725
Total	**21345**	**180**	**6979**
Mud dauber nest	1	--	0

Table C.8. Olin Mississippian Deer Remains With Age Information

Pit/Provenience	Element	Age
13	left mandible	A: 3.5-4.5y
73	left mandible	A: 3.5-4.5y
97	right mandible	A: 4.5-5.5y
127	right mandible	A: 2-3y
127	right mandible	fawn/juvenile
133	left deciduous premolar (mandibular)	fawn/juvenile
133	left mandible	fawn/juvenile
133	left 3rd molar, mandibular	A: 1.5-2.5y
227	cranium	fawn
227	left maxilla	fawn
227	metapodial	fawn
227	right mandible	fawn
227	right rib	fawn
227	right scapula	fawn
227	right ulna	fawn
232	right mandible	A: 5.5-6.5y
312	left mandible	A: 3.5-4.5y
312	left mandible	A: 4.5-5.5y
312	right mandible	A: 3.5-4.5y
355	left mandible	A: 2.5-3.5y
360	right mandible	fawn/juvenile
367	left mandible	fawn/juvenile
House 1 area	left ilium	fawn
House 4 floor	right maxilla	juvenile <1.5y
Sweat lodge	right mandible	A: 2.5-3.5y

Table C.9. Olin Mississippian Deer Food Utility Indices And Body Part Representation

Food Utility Index	Element	NISP	%FUI
High	sternum	5	
	femur	25	
	tibia	35	
	patella	5	
	astragalus	48	
	calcaneus	36	
	tarsal	26	
		180	*15.2*
Mid	vertebra	130	
	pelvis	38	
	sacrum	12	
	scapula	47	
	humerus	48	
	radius	52	
	ulna	36	
	metatarsal	46	
	rib	118	
		527	*44.4*
Low	antler	64	
	crania	40	
	maxilla	6	
	mandible	48	
	teeth	119	
	atlas/axis	12	
	carpal	27	
	metacarpal	25	
	phalanx	110	
	sesmoid	28	
		479	*40.4*
Mid/Low*	metapodial	38	n/a
	Total Deer NISP	**1224**	

*Mid/Low elements not included in FUI calculations; FUI for standard deer is 11.5% High, 29.0% Mid, and 59.5% Low.

Body Portion	Representative Elements	NISP	%NISP
Head	crania, teeth, antler	277	22.6
Trunk	vertebrae, ribs, pelvis	315	25.7
Upper Forelimb	humerus, radius, carpals	210	17.2
Upper Hindlimb	femur, tibia, tarsals	175	14.3
Distal Limb	metapodials, phalanges	247	20.2
	Total	**1224**	**100.0**

elements account for 44.4 percent (versus 29.0 percent for a standard deer), while low utility elements are slightly less at 40.4 percent (versus 59.5 percent for a standard deer). High utility elements comprise 15.2 percent, slightly higher than that of a standard deer, but nearly identical to the high FUI for the Woodland assemblage. It would appear that in some instances entire field-dressed deer were brought back to the site for processing, but often the low value portions (e.g., crania, distal limb) were discarded at the kill location, likely to offset transportation costs. As in the Late Woodland assemblage, it does not appear that high value cuts of venison were selectively returned to the village. Trunk elements, specifically vertebrae and ribs, are abundant which suggests some preference for these mid value portions. Thirty-three pieces of deer bone, primarily antler, have been modified or represent tool stock. Twenty deer elements exhibit butchery marks. Nine frontal/antler pieces provide insight into season of use (Table C.10). Three dropped antler base fragments were identified, reflecting acquisition during the fall or winter. Five frontal bones have attached antlers, indicative of death in the late fall or early winter. One frontal fragment from Pit 226 had an exposed pedicle with no new growth, suggesting a late winter or early spring association.

Table C.10. Olin Mississippian Deer Remains With Seasonality Evidence

Pit	Element	Season
97	antler, base (dropped)	fall-winter
151	frontal with attached antler	fall-early winter
192	frontal with attached antler	fall-early winter
192	frontal with attached antler	fall-early winter
197	frontal with attached antler	fall-early winter
226	antler, base (dropped)	fall-winter
226	frontal, shed antler, no new growth	late winter-early spring
304	frontal with attached antler	fall-early winter
355	antler, base (dropped)	fall-winter

One right fibula and a first phalanx fragment are identifiable as elk. A single adult animal is represented. One antler fragment is listed as indeterminate deer/elk. The specimen is unmodified but may represent tool stock or waste.

Eight domestic dog bones were recovered, with at least two individuals represented. Pit 139 produced a left mandible fragment, two premolars, and two molars, all of which appear to be from a single adult individual. A right scapholunar was found in Pit 350 and the distal epiphysis of a right femur was recovered in Pit 347. A right mandible from a very young dog, less than 6 months of age, was found in the House 1 area. None of the dog remains show butchery marks, modification evidence, or signs of pathology or trauma. The mandible fragments in Pit 139 and House 1 may be ritual or ceremonial in origin, but it is not thought likely due to their association with other food refuse. Two additional specimens, portions of a right femur and left radius, are classified as indeterminate dog/coyote/wolf.

One black bear (*Ursus americanus*) element, a distal metapodial fragment, was recovered from Pit 347. A single adult individual is indicated. No butchery marks or modification evidence was observed on the bear bone. Thirty-nine raccoon, muskrat, and beaver bones were identified, with multiple individuals of each taxon represented. One right humerus fragment was identifiable as river otter (*Lontra canadensis*). No butchery marks or modification evidence was observed on any of the raccoon, muskrat, beaver, or otter remains.

Smaller mammals identified in the Mississippian assemblage consist of plains pocket gopher, fox squirrel, gray squirrel (*Sciurus carolinensis*), indeterminate tree squirrel, and cottontail rabbit. One small left tibia fragment is listed as indeterminate squirrel family (*Sciuridae*). Four pieces of bone are classified as common mole (*Scalopus aquaticus*). Small rodents found in the assemblage include mouse/rat, vole, mouse/vole, and indeterminate rodent. None of the smaller mammal remains exhibit butchery marks or evidence of modification.

A total of 4,905 specimens are categorized as indeterminate mammal. One awl tip was recognized, and one bone fragment is a worked bone cylinder. Over 2,100 large-sized mammal remains are present; one specimen has cut marks and four exhibit signs of modification. A total of 108 pieces of bone are categorized as medium-large, medium-sized, small-medium, and small-sized mammal. Butchery marks were observed on one medium-large mammal bone.

White-tailed deer are common in various habitats, but prefer forest-edge settings. Other forest-edge and forest mammals in the assemblage include black bear, raccoon, fox squirrel, gray squirrel, and cottontail rabbit. Elk inhabit both forest-edge and prairie habitats. Aquatic mammals observed include beaver, muskrat, and river otter. Plains pocket gophers are most common in grassland and prairie settings.

Birds

The Mississippian assemblage contains 718 bird remains, of which 463 are categorized as indeterminate bird. Two indeterminate bird long bone shaft pieces have been worked. Ninety-two specimens are classified as large-sized bird, 24 as medium-sized bird, one as small-medium bird, and 24 as small-sized bird. Two large-sized bird bones have been worked, and one medium-sized bird bone has butchery marks.

Sixty-two turkey elements were recovered. A minimum of six individuals is represented, with both adult and juvenile elements recognized. Cut marks were observed on one turkey metatarsus fragment. One right scapula from a greater prairie chicken is present in the assemblage.

A variety of migratory waterfowl was identified, including swan (*Cygnus* sp.), Canada goose (*Branta canadensis*), mallard, wood duck, teal, redhead (*Aythya americana*), greater scaup (*Aythya marila*), and indeterminate duck. One mallard tibiotarsus has butchery marks and one swan humerus has been cut and partially modified. Wetland birds recognized in the assemblage consist of American coot (*Fulica americana*) and pied-billed grebe (*Podilymbus podiceps*). None of the coot or grebe bones display butchery marks or evidence of modification.

One complete left coracoid is classified as indeterminate woodpecker/flicker (*Picidae*). One left carpometacarpus is identifiable as robin (*Turdus migratorius*). Ten pieces of bone, representing at least three individuals, are listed as indeterminate perching bird. None of the smaller bird remains exhibit butchery marks or modification evidence.

Turkeys inhabit forest-edge and forest settings while greater prairie chickens occur in tallgrass prairies and prairie-forest edge zones. Swans, ducks, and geese are seasonally abundant residents of lakes, ponds, rivers, wetlands, and marshes. Coots and grebes are similarly attracted to ponds, marshes, and lake habitats. Woodpeckers inhabit wooded areas, while robins and other perching birds occur in a wide array of habitats.

Reptiles

Reptile remains consist of 359 turtle bones and 10 snake elements. Twenty-six specimens are identifiable as indeterminate box turtle, with a MNI of 4 indicated. Sixteen snapping turtle elements were recovered, with at least two individuals represented. Other turtles identified in the Mississippian assemblage include painted turtle, map turtle (*Graptemys* sp.), softshell turtle, and indeterminate musk/mud turtle (*Kinosternidae*). The map turtle bone, a costal fragment, has a high degree of polish on the interior surface and likely represents part of a bowl or scoop.

Ninety-six specimens, primarily shell fragments, are listed as indeterminate box/pond turtle. One indeterminate box/pond turtle peripheral displays butchery marks. The remaining 209 turtle bones are categorized as indeterminate turtle.

One trunk vertebra is identifiable as indeterminate garter snake, and ten fragmentary trunk vertebrae are listed as indeterminate non-venomous snake. None of the snake remains exhibit butchery marks or evidence of modification.

Box turtles inhabit forest, forest-edge, and prairie settings. Snapping, painted, and mud/musk turtles occur in a variety of aquatic habitats. Softshell and map turtles are generally found in large rivers and streams. Garter snakes occur in prairie, meadow, forest, and edge settings.

Amphibians

Ten amphibian elements were recovered. Three limb elements are identifiable as indeterminate frog, with a single individual represented. Six pieces of bone are listed as indeterminate frog/toad, and one vertebra fragment is categorized as indeterminate amphibian. None of the amphibian bones show butchery marks or evidence of modification. Frogs and toads inhabit a variety of aquatic and terrestrial settings.

Fish

The Mississippian fish assemblage contains 2,788 fish remains. Non-diagnostic vertebrae, cranial fragments, scale fragments, and spine/rib shaft pieces, listed as indeterminate fish, account for 2,225 specimens. None of the Mississippian fish remains display butchery marks or evidence of modification.

Catfish and bullhead remains account for 297 pieces of bone. Twenty-six bones are identifiable as black bullhead, nine as brown bullhead, and six as yellow bullhead. A total of 220 remains, representing at least 26 individuals, are classified as indeterminate bullhead. One channel catfish (*Ictalurus punctatus*) and two blue catfish bones are present, along with 14 specimens categorized as indeterminate river catfish. Nineteen pieces of bone are listed as indeterminate catfish/bullhead.

Ninety-three buffalo and redhorse sucker bones are present in the assemblage. One specimen each is identifiable as golden redhorse and river redhorse (*Moxostoma carinatum*). Another 48 pieces of bone, primarily cranial elements, are classified as indeterminate redhorse, with at least five individuals present. One palatine and two maxillae are categorized as bigmouth buffalo (*Ictiobus cyprinellus*). Twenty-two specimens are listed as indeterminate buffalo, with two individuals represented. Eighteen bone fragments are classified as indeterminate sucker.

Forty-seven sunfish elements were recovered, with bluegill, bass, crappie, and rock bass (*Ambloplites rupestris*) specifically identified. At least seven individuals are represented. Thirteen pieces of bone are classified as small sunfish and 14 are listed as indeterminate sunfish.

Freshwater drum, bowfin, and gar remains are moderately well represented, with 91 specimens in total and a minimum of eight individuals present. Six elements, primarily jaw bones, are identifiable as northern pike. Eighteen pharyngeal bones are identifiable as creek chub, and one ceratohyal fragment is classified as indeterminate minnow (*Cyprinidae*).

Channel and blue catfish are found in rivers and stream channels. Yellow bullheads occur in creeks and streams while black bullheads are found in pond and lake settings, although the two species are often found together. Brown bullheads occupy clear, well-vegetated lakes. Golden redhorses occupy a variety of aquatic habitats but prefer creek and small river pools, while river redhorses are most common in small and medium-sized rivers. The bigmouth buffalo is typically found in large and medium-sized rivers, oxbows, and bottomland lakes adjacent to large rivers. In general, redhorse suckers occupy medium-sized rivers, streams, and creeks, while buffalo inhabit larger rivers and nearby floodplain lakes. Freshwater drums prefer large rivers. Gars inhabit lakes, streams, and rivers, while pike are most common in lakes, marshes, large rivers, and creek pools. Bowfin prefer oxbows and backwater pools in rivers, floodplain lakes, and swamps. Bass are found in floodplain lakes, weedy oxbows, swamps, ponds, rivers, and creeks. Bluegills inhabit clear, well-vegetated lakes as well as swamps, ponds, and stream and river pools. Crappies and other sunfish prefer lakes but are also found in river pools and backwater lake settings. Rock bass occur in gravelly rivers, and creek chubs are most commonly found in creeks and low-gradient streams.

Mollusks

The majority of freshwater mussel shell in the Mississippian assemblage cannot be identified to a specific taxon. Of the 620 shell fragments classified as indeterminate mussel, 224 are burned. The remains of threeridge, washboard/threeridge, ebonyshell (*Fusconaia ebena*), and indeterminate pocketbook/fatmucket (*Lampsilis* sp.) were observed. One indeterminate mussel shell fragment has a drill hole. Washboards, threeridges, and ebonyshells inhabit medium to large-sized rivers.

Two shell fragments, one from Pit 43 and one from Pit 355, are identifiable as lightning whelk. Both specimens are cut and are interpreted as tool stock or wastage. Seven whelk columella fragments, three of which show evidence of modification, were recovered from Pits 5, 97, 272, and 340. Five whelk shell fragments are also present. Two pieces from Pit 82 are disk shaped with single drill holes and likely represent disk bead blanks. One shell fragment from Pit 97 has a distinctly smoothed interior surface. The remaining pieces of shell were recovered from Pit 340 and House 1, respectively. Lightning whelks occur in shallow coastal waters from South Carolina to Florida (Morris 1975).

One discus snail (*Discus* sp.) shell and one indeterminate snail shell are also present in the assemblage. No butchery marks or evidence of modification was noted on either specimen, and they may be intrusive or naturally occurring.

Modified Bone and Shell

Twenty-six pieces of bone in the Mississippian assemblage exhibit butchery marks (Table C.11). Most of the cut marks occur on deer remains, with butchery marks also noted on mallard, turkey, turtle, and indeterminate mammal and bird elements. All are consistent with cuts associated with carcass processing and filleting activity.

Table C.11. Olin Mississippian Faunal Remains With Butchery Marks

Taxon	NISP	Element	Description
Deer (*Odocoileus virginianus*)	4	femur	cut marks
	4	humerus	cut marks
	4	scapula	cut marks
	2	radius	cut marks
	2	lumbar vertebra	cut marks
	1	cervical vertebra	cut marks
	1	calcaneus	cut marks
	1	ilium	cut marks
	1	tibia	cut marks
Large-sized mammal	1	indet.	cut marks
Medium-large mammal	1	long bone	cut marks
Turkey (*Meleagris gallopavo*)	1	tarsometatarsus	cut marks
Mallard (*Anas platyrhynchos*)	1	tibiotarsus	cut marks
Medium-sized bird	1	humerus	cut marks
Pond/box turtle, indet. (Emydidae)	1	peripheral	cut marks
Total	**26**		

Fifty-six pieces of bone and shell show modification relating to tool or artifact manufacture, or are categorized as tool stock (Table C.12). Four deer metapodials and 22 antler pieces are listed as tool stock, partially worked tools, or manufacturing debris. Five limb bones are classified as tube or bead fragments, and four specimens represent awls or pins. One map turtle plastron has extensive polish on the interior surface, and likely represents a vessel or bowl fragment. Four deer phalanges have been fashioned into cup and pin gaming pieces, and one mandible displays sickle polish. One freshwater mussel shell fragment has one drill hole present. Two whelk shell fragments are listed as bead blanks; they are circular in shape with a hole drilled in the center. Six other whelk shell and columella fragments are partially worked or represent tool stock.

Table C.12. Olin Mississippian Modified Faunal Remains

Taxon	NISP	Element	Tool Type/Modification
Deer (*Odocoileus virginianus*)	13	antler	cut, tool stock
	9	antler	rounded, modified
	4	metapodial	cut, tool stock
	4	1st phalanx	cup & pin game
	1	ulna	awl
	1	mandible	sickle polish
	1	scapula	score cut, worked
Large-sized mammal	3	long bone	polished
	1	indet.	polished
	1	long bone	awl, tip fragment
Mammal, indet.	1	indet.	worked bone cylinder
	1	indet.	awl, tip fragment
Swan, indet. (*Cygnus* sp.)	1	humerus	polished, cut
Large-sized bird	1	long bone	awl/pin
	1	long bone	bead/tube
Bird, indet.	3	long bone	polished, cut
Map turtle, indet. (*Graptemys* sp.)	1	costal	bowl/vessel, fragment
Lightning whelk (*Busycon contrarium*)	2	shell	cut, tool stock
Whelk, indet. (*Busycon* sp.)	3	columella	cut, tool stock
	2	shell	bead blanks, drilled center
	1	shell	smoothed interior
Mussel, indet.	1	shell	drill hole
Total	**56**		

Distribution and Seasonality

Mississippian faunal material was recovered from 142 pit features, one probable firepit feature, one post pit, one sweat lodge, a palisade wall, and numerous house areas, house floors, and wall trenches (Table C.13). In addition to the sweat lodge, five numbered houses produced faunal remains. Bone and shell was also obtained from three undefined or undetermined house areas, described as the house floor annex off Trench 2, the double wall house, and the house floor at grid 67.5N 97.5W. The majority of bone from structural features was found in association with House 29 and House 4. Some pit features are located in or near house structures, but these remains are considered separately in this discussion.

Table C.13. Olin Mississippian Summary Faunal Distribution

Pit	NISP
321	2014
89	1327
127	1322
133	1195
367	1019
227	799
312	772
360	766
82	550
347	528
FirePit 82	66
alll other pits	9669
Houses	1226
Sweat lodge	45
Wall trenches	30
Post pit	5
Palisade wall	1
all other structural context	11
Total	**21345**

The 143 pit features (probable Firepit 82 is included here) contained 20,027 faunal remains, or 93.8 percent of the Mississippian assemblage. The ten Mississippian pits with the most bone and shell contain a total of 10,292 specimens, or 51.4 percent of the pit assemblage (and 48.2 percent of the total assemblage). Examination of faunal material by pit feature reveals no specific patterns relating to consumption or disposal practices. The majority of pits, especially those with numerous faunal remains, contain a diverse array of animal taxa. As in the Late Woodland pits, fish and deer are most common, with a variety of bird, other mammal, and turtle remains also present. No evidence of feasting or ritual activity was noted for any of the pit features or house structures.

Overall, the composition of the faunal assemblage indicates a year-round habitation of the Olin site during the Mississippian component. Deer cranial and antler evidence, discussed above, clearly demonstrates occupation during the fall and winter. One frontal fragment from Pit 226 with no new growth on the pedicles indicates a late winter to early spring deposition. The widespread distribution of fish, turtle, and aquatic bird and mammal remains demonstrates occupation of the site during the open-water months.

Indeterminate Faunal Assemblage

A total of 9,269 faunal remains cannot be securely assigned to either recognized component, and are combined within an Indeterminate assemblage (Table C.14).

Due to the lack of provenience information, only cursory discussion of these remains is provided. Overall, the composition of the Indeterminate assemblage mirrors that of the Woodland and Mississippian assemblages, as expected. A total of 3,906 specimens are classified as Vertebrata, with 1,566 specimens burned or calcined.

Table C.14. Olin Indeterminate Component Faunal Remains

Taxon	NISP	MNI	Burned
White-tailed deer (*Odocoileus virginianus*)	734	29	69
Muskrat (*Ondatra zibethicus*)	4	2	0
Elk (*Cervus elaphus*)	5	1	0
Domestic dog (*Canis familiaris*)	4	1	1
Dog/wolf/coyote, indet. (*Canis* sp.)	3	--	0
Beaver (*Castor canadensis*)	11	1	1
Plains pocket gopher (*Geomys bursarius*)	10	3	0
Raccoon (*Procyon lotor*)	8	2	1
Striped skunk (*Mephitis mephitis*)	2	1	1
River otter (*Lontra canadensis*)	1	1	0
Cottontail rabbit (*Sylvilagus floridanus*)	1	1	0
Fox squirrel (*Sciurus niger*)	6	2	2
Tree squirrel, indet. (*Sciurus* sp.)	4	--	0
Squirrel, indet. (Sciuridae)	1	--	0
Common mole (*Scalopus aquaticus*)	1	1	0
Rodent, indet. (Rodentia)	5	--	0
Carnivore, indet. (Carnivora)	1	--	0
Large-sized mammal	1179	--	305
Medium-large mammal	2	--	0
Medium-sized mammal	12	--	1
Small-medium mammal	2	--	0
Small-sized mammal	15	--	2
Mammal, indet.	2008	--	852
Turkey (*Meleagris gallopavo*)	16	3	0
Mallard (*Anas platyrhynchos*)	4	2	1
Wood duck (*Aix sponsa*)	3	1	0
Bay duck, indet. (*Aythya* sp.)	1	1	0
Barred owl (*Strix varia*)	1	1	0
Perching bird, indet. (Passeriformes)	4	1	0
Large-sized bird	41	--	3
Medium-sized bird	2	--	0
Small-sized bird	7	--	1
Bird, indet.	91	--	23
Snapping turtle (*Chelydra serpentina*)	10	1	0
Softshell turtle, indet. (*Apalone* sp.)	2	1	0
Painted turtle (*Chrysemys picta*)	2	1	0
Blanding's turtle (*Emydoidea blandingii*)	2	1	0
Ornate box turtle (*Terrapene ornata*)	1	1	0
Box turtle, indet. (*Terrapene* sp.)	23	4	1
Slider/map turtle, indet. (*Trachemys/Graptemys*)	2	1	1
Pond/box turtle, indet. (Emydidae)	26	--	3
Turtle, indet.	65	--	15

Table C.14. Olin Indeterminate Component Faunal Remains (Continued)

Taxon	NISP	MNI	Burned
Rat snake (*Elaphe obsoleta*)	71	1	0
Corn/rat snake, indet. (*Elaphe* sp.)	1	--	0
Non-venomous snake, indet. (Colubridae)	4	--	3
Frog/toad, indet.	6	--	0
Gar, indet. (*Lepisosteus* sp.)	4	1	0
Bowfin (*Amia calva*)	11	1	1
Northern pike (*Esox lucius*)	1	1	0
Creek chub (*Semotilus atromaculatus*)	1	1	0
Bigmouth buffalo (*Ictiobus cyprinellus*)	5	1	0
Buffalo, indet. (*Ictiobus* sp.)	4	1	0
Redhorse, indet. (*Moxostoma* sp.)	5	2	0
Sucker, indet. (Catostomidae)	8	--	0
Black bullhead (*Ameiurus melas*)	6	2	0
Brown bullhead (*Ameiurus nebulosus*)	1	1	0
Bullhead, indet. (*Ameiurus* sp.)	63	14	1
River catfish, indet. (*Ictalurus* sp.)	3	1	0
Catfish/bullhead, indet. (Ictaluridae)	4	--	0
Bass, indet. (*Micropterus* sp.)	2	1	0
Crappie, indet. (*Pomoxis* sp.)	1	1	0
Small sunfish, indet. (small Centrarchidae)	3	--	0
Sunfish, indet. (Centrarchidae)	2	--	0
Freshwater drum (*Aplodinotus grunniens*)	4	1	0
Fish, indet.	485	--	33
Whelk, indet. (*Busycon* sp.)	15	2	10
Threeridge (*Amblema plicata*)	1	1	1
Washboard/threeridge (*Megalonaias/Amblema*)	3	--	0
Mussel, indet.	324	--	14
Campeloma snail (*Campeloma* sp.)	1	1	0
Snail, indet. (Gastropoda)	1	--	0
Crayfish, indet. (Cambaridae)	1	1	0
Taxon indet. (Vertebrata)	3906	--	1566
Total	**9269**	**99**	**2912**

Mammals

Over 700 white-tailed deer remains are present, with a minimum of 29 individuals represented. Deer ranging in age from fawn/juvenile to mature adult are indicated, with five mandibles providing specific age information (Table C.15). Essentially all body portions are represented, with teeth, phalanges, astragali, and vertebrae the most abundant. FUI values for the Indeterminate assemblage are similar to those of the Mississippian assemblage, and vary somewhat from the values attributed to a standard deer (Table C.16). While entire field-dressed deer were returned to the site for processing, the inhabitants had some preference for high and mid utility cuts of venison. Two deer frontals with attached antlers reflect a late fall season of use, while the fawn elements indicate summer or early fall occupation. In addition to deer, five elk bones were identified, representing a single adult animal.

Table C.15. Olin Indeterminate Component Deer Remains With Age Information

Pit/Provenience	Element	Age
294	left mandible	fawn/juvenile
294	right mandible	A: 2.5-3.5y
318	left mandible	fawn/juvenile
318	right mandible	fawn/juvenile
319	right mandible	J: 0.5-1.5y
345	deciduous mandibular premolar	fawn/juvenile
Smudge pit	left humerus	young adult
Trench 2	left mandible	A: 3.5-4.5y
unknown	left mandible	A: 4-5y
unknown	left mandible	A: 2.5-3.5y

Four domestic dog and three dog/coyote/wolf bones are present, with one adult dog represented. One terminal phalanx fragment is identifiable as indeterminate carnivore (*Carnivora*). One river otter and two striped skunk (*Mephitis mephitis*) bones were recovered.

Table C.16. Olin Indeterminate Component Deer Food Utility Indices And Body Part Representation

Food Utility Index	Element	NISP	%FUI
High	sternum	1	
	femur	17	
	tibia	22	
	patella	4	
	astragalus	55	
	calcaneus	30	
	tarsal	19	
		148	*21.0*
Mid	vertebra	47	
	pelvis	25	
	sacrum	2	
	scapula	24	
	humerus	41	
	radius	36	
	ulna	14	
	metatarsal	32	
	rib	43	
		264	*37.4*
Low	antler	40	
	crania	19	
	maxilla	6	
	mandible	25	
	teeth	87	
	atlas/axis	2	
	carpal	14	
	metacarpal	21	
	phalanx	73	
	sesmoid	7	
	(Total, %FUI)	*294*	*41.6*
Mid/Low*	metapodial	24	n/a
	long bone, indet.	4	n/a
	Total Deer NISP	**734**	

*Mid/Low elements not included in FUI calculations; FUI for standard deer is 11.5% High, 29.0% Mid, and 59.5% Low.

Body Portion	Representative Elements	NISP	%NISP
Head	crania, teeth, antler	177	24.1
Trunk	vertebrae, ribs, pelvis	120	16.3
Upper Forelimb	humerus, radius, carpals	129	17.6
Upper Hindlimb	femur, tibia, tarsals	147	20.0
Distal Limb	metapodials, phalanges	161	21.9
	Total	**734**	**99.9**

Twenty-three pieces of bone are identifiable as beaver, raccoon, and muskrat, with a total of five individuals represented. Smaller mammals present include fox squirrel, plains pocket gopher, cottontail rabbit, and common mole. Five small pieces of bone are classified as indeterminate rodent.

Approximately 2,000 bone fragments are classified as indeterminate mammal. The remaining mammal bones are categorized according to relative size, with 1,179 listed as large-sized mammal. Thirty-one specimens range in size from small-sized to medium-large mammal.

Birds

Sixteen turkey bones were recovered, with three individuals represented. Several different waterfowl remains are present, including wood duck, mallard, and indeterminate bay duck. One left tarsometatarsus is identifiable as barred owl (*Strix varia*). One sternum and three limb bones are classified as perching bird, with a MNI of one indicated.

Ninety-one specimens are categorized as indeterminate bird. Forty-one remains, primarily long bone shaft pieces, are listed as large-sized bird. Two specimens are classified as medium-sized bird and seven as small-sized bird.

Reptiles and Amphibians

The Indeterminate assemblage contains an array of turtle species, with snapping, painted, softshell, Blanding's, ornate box (*Terrapene ornata*), and indeterminate box turtle remains identified. Two humeri are categorized as indeterminate slider/map turtle. Twenty-six specimens, primarily carapace and plastron fragments, are listed as indeterminate box/pond turtle. Sixty-five specimens are categorized as indeterminate turtle.

Seventy-one rat snake (*Elaphe obsoleta*) bones are present, consisting of 16 ribs, 54 trunk vertebrae, and 1 dentary fragment. All of the specimens were recovered from Pit 18, and appear to represent a snake that died naturally. One trunk vertebra from Pit 319 is classified as indeterminate corn/rat snake (*Elaphe* sp.). Four trunk vertebrae are categorized as indeterminate non-venomous snake. Six frog/toad bones were identified in the Indeterminate assemblage.

Fish

Fish remains account for 613 specimens, of which 485 are listed as indeterminate fish. Catfish and bullhead remains predominate among specifically identifiable specimens, with black bullhead, brown bullhead, indeterminate bullhead, and indeterminate river catfish bones recognized. Other taxa present include bigmouth buffalo, indeterminate buffalo, redhorse sucker, bowfin, freshwater drum, crappie, bass, northern pike, gar, small sunfish, and creek chub.

Mollusks and Crayfish

One threeridge and three washboard/threeridge shell fragments were identified in the Indeterminate assemblage. A total of 324 pieces of shell are listed as indeterminate mussel.

One columella and 14 shell pieces are classified as indeterminate whelk. The columella and one shell fragment display cut or processing marks, but all 15 specimens are thought to represent tool stock or wastage.

One campeloma (*Campeloma* sp.) shell is present. The specimen has a possible perforation in the shell, perhaps to facilitate its use as a bead or ornament. One other indeterminate snail shell was found, but shows no evidence of modification and may be intrusive.

One right 1st chela (or claw) fragment is categorized as indeterminate crayfish (*Cambaridae*). The specimen is unburned, and no butchery or processing marks were observed.

Modified Bone and Shell

Butchery marks were observed on 10 deer elements and three large-sized mammal bones (Table C.17). Both singular and multiple cuts were noted, all consistent with butchering and filleting activity.

Table C.17. Olin Indeterminate Component Faunal Remains With Butchery Marks

Taxon	NISP	Element	Description
Deer (*Odocoileus virginianus*)	4	humerus	cut marks
	2	femur	cut marks
	2	rib	cut marks
	1	radius	cut marks
	1	navicularcuboid	cut marks
Large-sized mammal	3	long bone	cut marks
Total	**13**		

Thirty-six specimens in the Indeterminate assemblage exhibit modification marks relating to tool or artifact manufacture, or represent tool stock (Table C.18). Fourteen pieces of deer antler show score cuts or polish, and are classified as tool stock, manufacturing debris, or tool fragments. Several antler tines have rounded or squared tips and likely represent knapping tools or awls. One antler tine has been honed to a conical shape and may be an awl or point fragment. One other awl fragment, fashioned from a bird long bone shaft piece, is present. One bird bone tube was identified, and one campeloma shell has a possible perforation or drill hole present. Seven deer phalanges have been worked into cup and pin gaming pieces, and one metapodial shaft fragment is identifiable as a beamer. Score cuts were observed on one large-sized mammal long bone fragment. Five whelk columella and shell pieces show evidence of modification and are listed as tool stock or manufacturing debris.

Table C.18. Olin Indeterminate Component Modified Faunal Remains

Taxon	NISP	Element	Tool Type/Modification
Deer (*Odocoileus virginianus*)	6	1st phalanx	cup & pin game
	4	antler	score cut, tool stock
	4	antler	probable tool stock
	2	antler	worked
	1	antler	rounded tip
	1	antler	squared tip
	1	antler	conical awl/point
	1	antler	polished tip
	1	metapodial	beamer
	1	phalanx	cut, hollowed
	1	frontal & antler	cut, tool stock
Large-sized mammal	1	long bone	score cuts
Bird, indet.	1	long bone	exterior polish, striations
	1	long bone	awl, honed
Blanding's turtle (*Emydoidea blandingii*)	1	costal	polished
	1	peripheral	bowl/vessel, fragment
Ornate box turtle (*Terrapene ornata*)	1	carapace	bowl/vessel, fragment
Turtle, indet.	1	plastron	worked interior
Whelk, indet. (*Busycon* sp.)	4	shell	cut, tool stock
	1	columella	cut, tool stock
Campeloma snail (*Campeloma* sp.)	1	shell	possible perforation
Total	**36**		

Distribution and Seasonality

Only minimal consideration is giving to the distribution and seasonality evidence provided by the Indeterminate faunal remains, due to the lack of contextual data. Fifty-one pits contained 5,216 faunal specimens. The remaining 4,053 pieces of bone and shell in the Indeterminate assemblage are from mixed deposits, non-feature contexts, or otherwise like specific provenience information. The Indeterminate assemblage is consistent in overall composition to the Late Woodland and Mississippian faunal assemblages. Likewise, seasonality evidence is comparable with a year-round occupation indicated. Deer crania and antler pieces in the Indeterminate assemblage indicate fall, winter, and late winter-early spring occupations (e.g., dropped antlers, frontals with attached antlers, and frontals with exposed pedicles showing no new growth), and numerous open-water taxa are represented.

Discussion

Olin Faunal Exploitation

The composition of the Olin Late Woodland assemblage reflects a broad-based subsistence strategy utilizing faunal resources from a variety of local habitats. White-tailed deer were of singular importance, and represent the most economically important large game animal in the assemblage. Deer, along with elk, provided large amounts of meat per animal along with valuable hides, sinew, bone, and antler. The Olin inhabitants procured a diverse range of aquatic resources, particularly fish. The fish remains identified demonstrate exploitation of a variety of aquatic settings including backwater lakes, sloughs, large rivers, and tributary streams. In addition to fish, the remains of waterfowl, marsh birds, semiaquatic mammals, turtles, and mollusks demonstrate the importance of aquatic resources in the diet. The Late Woodland inhabitants also made use of an array of mammals and birds from forest, forest-edge, and prairie habitats.

Box turtle remains are relatively abundant, likely owing to the upland location of the site. The role of domestic dogs is not clear; the context in which the remains were found (in association with food refuse) suggests dogs were consumed, but no butchery marks were observed and the sample size (NISP=3) is too limited to fully address this issue. No dog burials were recognized in association with the Late Woodland occupation. If dogs were consumed, it was likely during ritual or ceremonial events or feasts (e.g., Hudson 1976; Kerber 1997; Swanton 1946). With the limited information available, the role of domestic dogs at Olin cannot be addressed at this time. The procurement of bald eagle, mink, and red fox may have been oriented towards the acquisition of pelts, feathers, claws, or other items for non-dietary purposes (Swanton 1946). The overall composition of the Late Woodland faunal assemblage suggests a year-round occupation of the site.

The Mississippian or Moorehead phase faunal assemblage at Olin is similar in composition to the Late Woodland assemblage. Deer were of singular importance, providing large quantities of meat per animal as well as hides, sinew, bone, and antler. Other large mammals procured include elk and black bear. Fish remains are abundant, with a diverse array of species from backwater lake, large river, stream, and slough habitats represented. In addition to fish, a range of waterfowl, semiaquatic mammals, wetland birds, turtles, and shellfish are present, indicating extensive exploitation of aquatic resources. The Mississippian inhabitants also procured an array of forest-edge, forest, and prairie mammals, but relatively few terrestrial birds (e.g., turkey) or reptiles (e.g., box turtle) are present in the assemblage. Several passerine and woodpecker remains were recovered, and may have been acquired for their feathers rather than their food value. As in the Late Woodland assemblage, the role of domestic dogs during the Mississippian occupation in not clear. Relatively few dog elements were recovered, and they were obtained in association with dietary refuse. None of the dog bones display butchery marks or evidence of pathology/trauma, and none were found in burial context. The overall composition of the Mississippian assemblage indicates a broad-based subsistence strategy in which a variety of resources were procured from local aquatic, forest, forest-edge, and prairie habitats.

The Late Woodland and Mississippian faunal assemblages at Olin are similar in many respects. Nearly identical taxa are present in each assemblage, with comparable proportions of deer, fish, other mammals, birds, and turtles. The Late Woodland and Mississippian fish assemblages are essentially indistinguishable. Similar taxa (e.g., bullhead, bowfin, buffalo, redhorse, catfish, drum, sunfish, and gar) are abundant in both, indicating comparable fish procurement strategies. Freshwater mollusk remains are sparse in both assemblages, suggesting limited use of this resource. It is possible, however, that shellfish were collected, processed, and the shells discarded at another location. A focus on aquatic and riparian resources is evident, with an array of taxa also procured from forest-edge, forest, and prairie settings. Dog remains are slightly more abundant in the Mississippian assemblage, but the context in which they were found (i.e., in association with dietary refuse) suggests similar treatment during both occupations.

Upon closer inspection, some distinctions were noted which may provide insight on differences in faunal exploitation between the two components. As the two assemblages are similar in size, it is unlikely that differences in sample size are wholly responsible for the variation observed. The Mississippian assemblage is characterized by a larger number of identified mammal, bird, and fish species, which may reflect more intensive exploitation of locally available faunal resources. Somewhat greater exploitation of fish, especially backwater lake and slough species, occurred during the Moorehead phase occupation, suggesting aquatic resource productivity had recovered from the environmental degradation experienced during the Stirling phase (e.g., Benson et al. 2009).

Turkey and box turtle remains are somewhat less abundant in the Mississippian assemblage, suggesting these resources were of greater importance during the Late Woodland occupation. It is also possible that some upland fauna were less intensely harvested during the Mississippian occupation due to potential conflict within inter-group buffer areas, or other factors. The relative increase in cottontail rabbit and plains pocket gopher remains during the Moorehead phase occupation could have resulted from increased garden hunting (e.g., Holt 2007). The Mississippian assemblage is characterized by greater quantity and variety of waterfowl and marsh birds, which suggests avifauna procurement during the Moorehead phase focused on floodplain resources. Whelk remains occur in greater frequency in the Mississippian assemblage, which is not surprising given the relatively wide distribution of marine shell during this period (e.g., J. Kelly 1991).

A number of differences were observed between the Late Woodland and Mississippian deer assemblages. White-tailed deer were the single most important prey species in the Olin diet, and examination of element and body part representation provides insight on important shifts in deer exploitation between the Late Woodland and Moorehead phase occupations. Overall, deer remains are twice as plentiful in the Mississippian assemblage, accounting for 5.8 percent of the total assemblage, as opposed to 2.9 percent of the Late Woodland assemblage. Deer bones represent 14.3 percent of the Mississippian mammal assemblage and only 9.4 percent of the Late Woodland mammal assemblage.

Deer element representation varies between the two components (Table C.19). Trunk and upper forelimb bones together account for 42.9 percent of the Mississippian deer remains, in contrast to 20.9 percent of the Late Woodland deer. Bones associated with the head and distal limb portions are slightly less abundant in the Mississippian deer assemblage, comprising 42.8 percent, while in the Late Woodland deer assemblage these elements account for 63.9 percent of the deer remains. Upper hind limb bones occur in roughly equal proportions in the two assemblages.

Table C.19. Olin Late Woodland And Mississippian Deer Body Part Representation

		Late Woodland		Mississippian	
Body Portion	**Representative Elements**	**NISP**	**%NISP**	**NISP**	**%NISP**
Head	crania, teeth, antler	200	36.3	277	22.6
Trunk	vertebrae, ribs, pelvis	62	11.3	315	25.7
Upper Forelimb	humerus, radius, carpals	53	9.6	210	17.2
Upper Hindlimb	femur, tibia, tarsals	84	15.2	175	14.3
Distal Limb	metapodials, phalanges	152	27.6	247	20.2
	Total	**551**	**100.0**	**1224**	**100**

Body part representation, in terms of the meat, nutrients, and marrow provided, can be examined through comparison of food utility indices (FUI) (Kelly 1997; Metcalfe and Jones 1988; Purdue et al. 1989; Styles and Purdue 1996). As mentioned earlier, deer FUI values for the Late Woodland (see Table C.2) and Mississippian (see Table C.9) components at Olin are markedly different. The FUI values for the Late Woodland deer assemblage are consistent with those expected for a standard deer, with slightly greater high and mid value elements present. This suggests that entire field-dressed deer were brought back to the site for processing and disbursement during the Late Woodland occupation. Some minor preference for high and mid value portions may have occurred. In contrast, the FUI values for Mississippian deer indicate a strong preference for mid-value portions (Mid FUI 44.4 percent) and a slight preference for high-value cuts (High FUI 15.2 percent). Low FUI bones comprise only 40.4 percent, or roughly two-thirds the value expected if all low-value elements were returned to the site. During the Mississippian occupation, therefore, it can be argued that select mid and high value portions were preferentially transported to the Olin site for further processing and consumption. There is no evidence to suggest that deer were procured and processed at Olin and subsequently transported and consumed at another location.

There is no simple explanation to account for this difference. Variations in sample size or differential preservation are unlikely candidates, as comparable levels of preservation were observed in both assemblages, and relatively robust faunal samples were recovered. A shift in deer hunting strategies is a possibility, but complex questions regarding preservation, seasonality, and aging obfuscates the issue, making it difficult to address hunting strategies based on the limited data available in the zooarchaeological record (e.g., Emerson 2007; Munson 1991). Further, it is unlikely that a single type of hunting (e.g., single or ambush, in contrast to mass drives and large-scales kills) was responsible for all the deer remains deposited at the site.

A probable explanation may relate to local deer availability and transportation cost. The effects of increasing demographic and environmental pressue on floral and faunal resources, particularly deer, in the American Bottom have been established through various lines of study (e.g., Benson et al. 2009; Kelly 1997; Lopinot 1997; Lopinot and Woods 1993; Wilson and Kuehn 2011). It should be cautioned, however, that deer population decreases were not continuous across a given landscape; deer population density was actually greater in hinterland areas and in buffer zones between culture groups (Garniewicz 2005; see also Hickerson 1965; Theler and Boszhardt 2006). Given the absence of a significant Terminal Late Woodland or early Mississippian occupation at Olin, it is conceivable that deer population density may have recovered in this vicinity prior to the Moorehead occupation. The Olin site was a fortified settlement situated at the northern end of the American Bottom, and it follows that as such it was in proximity to potentially resource-rich buffer zones surrounding the greater American Bottom. The composition of the Moorehead phase deer assemblage at Olin may reflect both relatively high local deer population density as well as a need to acquire preferred, higher value cuts in a timely manner from potential hostile buffer areas (e.g., Garniewicz 2005). This interpretation would explain both the relative abundance of deer remains at Olin during the Moorehead occupation, as well as the prevalence of mid and high value portions observed.

Although detailed examination of this pattern is necessary, a cursory inspection of Moorehead and Late Mississippian deer exploitation lends support to this interpretation (Table C.20). Deer FUI percentages for Late Woodland assemblages demonstrate considerable variation, although most upland and interior upland assemblages display deer FUI values close to that attributed to a standard deer. One Late Woodland floodplain assemblage (Fish Lake-North Ridge) mirrors that of a standard deer, but the other floodplain deer assemblages have FUI values that appear to account for the elimination of low-value cuts, likely in order to reduce transportation costs. In contrast, deer FUI values for the Moorehead/Late Mississippian assemblages are fairly consistent, regardless of location. A preference for mid and high value cuts is evident for sites in all three locations. Again, the reduction of low value elements can likely be associated with a desire to reduce transportation costs, with these portions discarded at the kill site. However, it should be noted that relatively large amounts of deer remains were found in many of the Moorehead assemblages, with NISP values generally greater than those seen for Late Woodland assemblages. This would suggest that deer population density during the Moorehead/Late

Table C.20. Deer FUI Values For Select Late Woodland And Mississippian Sites In The American Bottom

Site (Component)	Location	Deer FUI (%NISP) Low	Mid	High	Total NISP*
Olin (Late Woodland)	upland	54.3	29.8	15.9	530
Reilley (Sponemann)	upland	53.6	27.4	19.1	614
John Faust #1 (Sponemann)	interior upland	67.1	24.7	8.2	329
John Faust #2 (Sponemann)	interior upland	34.5	45.5	20.0	840
Fish Lake-South Ridge (Patrick)	floodplain	39.9	38.7	21.5	424
Fish Lake-North Ridge (Patrick)	floodplain	61.2	22.3	16.5	103
Range-Cluster 4, Area P3 (Patrick)	floodplain	35.7	43.9	20.4	387
Souffle de Caverne (Patrick)	floodplain	31.2	45.2	23.7	93
Olin (Moorehead)	upland	40.4	44.4	15.2	1186
Russell (Moorehead)	upland	41.9	43.0	15.1	86
John Faust #1 (Mississippian)	interior upland	45.9	40.3	13.8	207
Lembke #2 (Moorehead)**	interior upland	38.4	37.5	24.1	617
Tract 15B (Late Mississippian)	floodplain	35.6	55.2	9.2	663
Fingers South (Moorehead)***	floodplain	28.7	62.9	8.4	1167
Cahokia ICT-II (Moorehead)	floodplain	26.8	33.8	39.4	71
Standard Deer		**59.5**	**29.0**	**11.5**	

*Deer NISP refers to NISP used to calculate FUI values, may not reflect overall total deer NISP
**all remains are from a single feature; ***all Moorehead sub-components combined

Averaged Mississippian/Moorehead FUI Values, by Location

Site	Location	Low	Mid	High	Total NISP
Olin, Russell	Upland	41.2	43.7	15.2	1272
John Faust #1, Lembke #2	Interior Upland	42.2	38.9	19.0	824
Tract 15B, Fingers South, ICT-II	Floodplain	30.4	50.6	19.0	1901

Mississippian period had recovered from the dramatic ecological impacts suffered during the Early Mississippian period, although the greatest recovery may have occurred in buffer zones surrounding the greater American Bottom, resulting in a need to reduce transportation costs by procuring primarily mid and high value portions. No distinct evidence for the increase of secondary faunal resources was observed, but the pattern of deer exploitation does suggest use of potentially hostile buffer zone resources.

Feasting and Articulated Deer Remains

As noted above, no discrete evidence for feasting was recognized for either component at the Olin site. Evidence for large-scale or communal feasting typically incorporates multiple lines of evidence, including the context of the deposit, and does not rely solely on the composition of the faunal assemblage (e.g., Blitz 1993; Hayden 1996, 2001; Holley 2006:318-319; Jackson and Scott 1995; Kelly 2001; Parker and Scott 2007; Pauketat et al. 2002; Scott and Jackson 1996; VanDerwarker 1999). In regards to the zooarchaeological record, evidence for feasting may include low species diversity, body portions with high meat yield, bulk meat cuts, special or unique food items, and little butchering debris (e.g., Hayden 1996; Jackson and Scott 1995). VanDerwarker (1999:26), however, argues that since large amounts of meat would be required, entire animals might be utilized and animal part representation may be less skewed than anticipated. Further, if guests contributed supplies to the feasts, unusual or exotic foodstuffs may be present, thereby increasing species diversity (VanDerwarker 1999:26). Recognition of small-scale or household level feasting is even more difficult, as the remains of such activities are often obscured by everyday food processing, consumption, and disposal activities (e.g., Pluckhahn et al. 2006). As such, it is not possible within the confines of the faunal analysis to definitively address the issue of feasting activity at the Olin site. Additional research is necessary to determine if feasting or similar ceremonial activity is represented.

During the field investigations, it was thought that a fully articulated deer was recovered from a pit feature on the east side of the site. No fully articulated deer remains were identified during the analysis. Several pits contained a few articulating elements, but likely represent joint portions processed and discarded together. Deer remains are abundant in several pits, which may account for the initial observation made in the field.

Mississippian Faunal Exploitation in the Lower and Central Illinois River Valleys

In her examination of the Olin and Russell ceramic assemblages, Baltus (2009; personal communication) recognizes a fairly close connection between these northern American Bottom sites and Mississippian settlements in the lower and central Illinois River valley. Unfortunately, little Mississippian subsistence data has been recovered from the lower Illinois River valley. Few Mississippian sites in the lower Illinois River valley have been subject to subsurface excavation, and faunal remains are poorly known (e.g., Delaney-Rivera 2000; 2004). The one significant exception is the Hill Creek site, with nearly 4,800 faunal remains recovered from two Mississippian house structures and associated features (Colburn 1985). Fish elements are abundant, with bowfin, bullhead, catfish, gar, bass, northern pike, buffalo, chubsucker, sunfish, and drum identified. Other taxa present consist of white-tailed deer, elk, muskrat, beaver, turkey, teal, duck, large canid, fox squirrel, cottontail rabbit, marsh rice rat, painted turtle, and probable box turtle. The composition of the Hill Creek assemblage reflects a broad-based subsistence strategy, with a strong focus on backwater fauna, particularly fish (Colburn 1985). A range of taxa was incorporated into the diet, but seasonally abundant aquatic resources were heavily utilized. Some exploitation of terrestrial species from local forest, forest-edge, and prairie habitats is suggested.

Moving northward, slightly more faunal data are available from Mississippian sites in the central Illinois River valley. Faunal remains from the Eveland phase Baker-Preston and Tree Row sites demonstrate a broad-based subsistence strategy in which fish and deer were the primary prey items (Kuehn and Blewitt 2013). Other fauna consumed include large and small mammals, wetland and terrestrial birds, waterfowl, aquatic and terrestrial turtles, and freshwater mussels. Although intensive exploitation of aquatic and floodplain resources is indicated, forest-edge and forest fauna were also procured; only limited use of prairie resources is evident. Other Mississippian faunal assemblages in the central Illinois River valley run the gamut from small and poorly preserved to abundant with favorably preservation. In some instances, however, the remains are mixed with earlier deposits or have not been fully reported. Sites in the central Illinois River valley with noteworthy Mississippian faunal assemblages include Dickson Mounds (Conrad 1972), Norris Farms #26 (Harn 1991), Norris Farms #36 (Styles 1990), Rench (Martin 1993), Larson (Conrad 1991; Harn 1994), and Orendorf (Emerson 1981; Kuehn 2010; Paloumpis 1981; Speth 1981; see also Conrad 1991). With some variation resulting from local resource abundance and seasonal availability, Mississippian faunal exploitation in the central Illinois River valley can be characterized as a broad-based strategy in which deer and aquatic resources, particularly fish, were of primary importance. A variety of other taxa from aquatic, riparian, forest, and forest-edge habitats also were incorporated into the diet. Similar taxa occur in late Late Woodland and Mississippian assemblages in the region, suggesting overall consistency in faunal exploitation over time.

The composition of the Olin Late Woodland faunal assemblage is consistent with that seen at most other Late Woodland sites in the American Bottom. Some variation is evident, likely attributable to differences in local resource availability and abundance, seasonality, and other factors. Floodplain sites in the American Bottom have contributed considerable data regarding late Late Woodland (Patrick and Sponemann phases) faunal exploitation (e.g., Kelly 1984, 1987; Kuehn 2009a, 2009b, n.d.a; Styles 2000). Far fewer sites with sizeable, well-preserved assemblages are known from upland/upland interior sites, hindering our understanding of faunal exploitation in these areas. Late Woodland faunal exploitation on the American Bottom floodplain is characterized by localized procurement strategies (Styles 2000). There is an emphasis on fish and deer exploitation, with a strong secondary focus on aquatic floodplain resources. The variability in fish remains between sites can be attributed to differences in proximity to specific aquatic settings. Resource rich locations were preferentially utilized and reoccupied on a regular basis. As a result, there areas were subject to relatively intensive harvesting pressure during certain periods. Shifts in resource availability or abundance, whether brought on by environmental changes or over-harvesting, would have resulted in the targeting of other, more abundant resources (Kuehn 2009a).

Several upland sites produced assemblages of sufficient size from which to examine faunal exploitation. The Reilley site contained over 13,000 pieces of bone, shell, and fish scale (Kuehn n.d.b). Mammal remains predominate, with white-tailed deer the most common among specifically identifiable specimens. Other mammals recognized in the assemblage include elk, black bear, domestic dog, coyote, gray fox, raccoon, beaver, muskrat, cottontail rabbit, fox squirrel, Franklin's ground squirrel, and plains pocket gopher. Fish are well represented with buffalo, redhorse, gar, bowfin, northern pike, channel catfish, black bullhead, yellow bullhead, brown bullhead, bass, bluegill, and freshwater drum remains recovered. Bird remains identified include swan, Canada goose, mallard, wood duck, teal, great blue heron, double-crested cormorant, pied-billed grebe, American coot, king rail, and turkey. Other taxa identified at Reilley include box turtle, snapping turtle, slider, painted turtle, map turtle, cooter, softshell turtle, mud turtle, threeridge, mucket, yellow sandshell, and spike. A broad-based subsistence strategy is evident, with some reliance on deer and aquatic resources, particularly fish. The composition of the assemblage demonstrates procurement of resources from aquatic, forest-edge, forest, and prairie habitats in both upland and floodplain locales.

Late Woodland assemblages were obtained from the John Faust #1 and John Faust #2 sites, both upland habitations located in the Silver Creek valley (Parker and Scott 2007). Deer, elk, and deer/elk remains are abundant at both sites, suggesting considerably reliance on large game animals. Other mammals identified at these sites include dog, raccoon, beaver, mink, badger, bobcat, striped skunk, ground squirrel, plains pocket gopher, tree squirrel, and cottontail rabbit. Bird remains are scarce at John Faust #1, but pied-billed grebe, hooded merganser, turkey, greater prairie chicken, northern bobwhite, American coot, owl, duck, and swan/goose elements were recognized in the John Faust #2 assemblage. Turtles identified include snapping, painted, slider, map, box, musk, and softshell. The John Faust #2 fish assemblage contains bowfin, gar, northern pike, buffalo, shorthead redhorse, black bullhead, flathead catfish, bullhead/catfish, smallmouth bass, rock bass, sunfish, white crappie, and freshwater drum, with similar albeit fewer taxa noted in the John Faust #1 assemblage. Similarly, the John Faust #2 mussel assemblage is fairly diverse, with threeridge, pink heelsplitter, pimpleback, Wabash pigtoe, plain pocketbook, fatmucket, mucket, and many other species recognized. A broad-based exploitation strategy is indicated, with a reliance on white-tailed deer but intensive procurement of a variety of other locally available resources. The composition of the fish assemblage suggests some exploitation of resources from larger rivers such as the Kaskaskia or Mississippi (Parker and Scott 2007).

Two interior upland sites in Monroe County, Illinois, produced relatively large assemblages. The Dugan Airfield assemblage contained over 4,600 remains (Scott 2006a). Specifically identified taxa include deer, dog/coyote, raccoon, beaver, plains pocket gopher, tree squirrel, duck, turkey, greater prairie chicken, snapping turtle, slider, musk turtle, box turtle, bowfin, probable white sucker, yellow bullhead, flathead catfish, sunfish, largemouth bass, threeridge, spike, mucket, pink heelsplitter, yellow sandshell, and fatmucket. The Sprague assemblage was smaller, with around 1,900 specimens recovered (Scott 2006b). Animals identified at Sprague include deer, raccoon, plains pocket gopher, cottontail rabbit, turkey, goose, duck, greater prairie chicken, box turtle, musk turtle, bowfin, pike/pickerel, brown bullhead, yellow bullhead, catfish/bullhead, sunfish, freshwater drum, threeridge, and plain pocketbook. Deer were of considerable dietary importance at both sites, although a broad-based subsistence strategy is evident. There was a focus on local resources, from an array of habitat settings, but some use of fish from larger rivers is indicated (Scott 2006a, 2006b).

Faunal assemblages from interior and bluff-edge upland sites share many similarities with late Late Woodland settlements on the floodplain. A reliance on fish and white-tailed deer is indicated, with deer and elk somewhat more common at upland interior sites. The evidence also suggests that a more dispersed procurement strategy was employed in the uplands, with some use of resources in the larger river valleys. Local resources, however, were most heavily exploited in the uplands. The smaller size and limited preservation of the interior upland assemblages hinders direct comparison with those of the floodplain. At a general level, faunal exploitation is consistent but again reflect differences in the locally available resources. Seasonality may also be a key factor, with the interior upland sites representing winter settlements created as a result of population fissioning in order to alleviate resource stress (Koldehoff and Galloy 2006; Koldehoff et al. 2006).

Moorehead Faunal Exploitation in the American Bottom

Only a handful of Moorehead phase faunal assemblages are known from upland settings. Preservation is limited, typically, with few specifically identifiable specimens recovered. Moorehead assemblages are more common at floodplain sites, but again the assemblages tend to be of limited size and/or poorly preserved. Examination of a selection of upland and floodplain assemblages provides some insight on Moorehead phase faunal exploitation. The exploitation patterns seen at these sites are generally consistent with that of Olin, with some variation. Further study is necessary to fully explore the factors underlying these differences, but likely include variable preservation, sample size, site location, seasonality, local resource availability and abundance, to name just a few.

The Russell site is a small bluff top settlement on the uplands overlooking Indian Creek in the northern American Bottom (Zych and Koldehoff 2007). The Moorehead phase faunal assemblage contains 3,588 remains (Kuehn 2009c). Mammal bone, particularly deer and deer/elk, predominates among specifically identifiable taxa. Other mammals identified include beaver, muskrat, raccoon, striped skunk, tree squirrel, and probable dog. Fish are moderately well represented with bowfin, gar, pike, drum, catfish/bullhead, and bluegill/sunfish identified. Other taxa recognized include crane, map turtle, slider, box turtle, softshell turtle, and indeterminate mussel. Deer FUI values (15.1% high, 43.0% mid, 41.9% low) vary slightly from those of a standard deer, but the sample size is relatively small (NISP=86) which may account for the discrepancy. The composition of the Russell assemblage suggests a year-round occupation, during which deer, smaller mammals, and a variety of fish were procured from adjacent floodplain, forest-edge, forest, and prairie settings. The types of fish recovered demonstrate exploitation of floodplain lake and pond settings, as well as larger rivers.

A Mississippian faunal assemblage containing 10,098 specimens is reported from the John Faust #1 site (Parker and Scott 2007). Identified mammals include deer, dog/coyote, raccoon, beaver, plains pocket gopher, gray squirrel, fox squirrel, muskrat, and cottontail rabbit. Birds recovered consist of trumpeter swan, Canada goose, common merganser, pied-billed grebe, turkey, and northern bobwhite. A large number of box turtle elements are present, along with the remains of musk turtle, painted turtle, slider, map turtle, and softshell turtle. Fish identified in the Mississippian assemblage consist of bowfin, gar, minnow, buffalo, redhorse, black bullhead, bass, crappie, and walleye/sauger. Mollusks present include threeridge, white heelsplitter, pimpleback, and mucket; one whelk shell was also observed. The composition of the Mississippian assemblage demonstrates that the inhabitants of John Faust #1 depended primarily on locally obtained resources, although a small portion of dietary meat came from large river fish, likely procured from the Kaskaskia or Mississippi rivers (Parker and Scott 2007). In examining dietary patterns during the Late Woodland through Mississippian occupation of the site, the authors recognized a broad-based subsistence strategy during the Late Woodland occupation, a narrowed procurement strategy during the Emergent Mississippian/Terminal Late Woodland occupation, and an intensified broad-based dietary strategy during the Mississippian occupation (Parker and Scott 2007:72-73). In fact, Mississippian faunal exploitation was considerably more intense and diverse in comparison to the Late Woodland occupation. The Mississippian inhabitants utilized all available terrestrial and aquatic habitats, and incorporated a larger, more diverse array of species from those habitats into their diet (Parker and Scott 2007:73).

A small faunal assemblage was recovered from the Quicksilver site, a Mississippian homestead located along the East Fork of Silver Creek in Madison County, Illinois. Approximately 1,600 faunal remains were collected, although relatively few could be identified to the genus/species level. Identified taxa include deer, beaver, raccoon, fox squirrel, plains pocket gopher, green-winged teal, yellow bullhead, white crappie, slider, box turtle, painted turtle, musk turtle, threeridge, and probable giant floater (Vanderford 2008). The composition of the assemblage indicates exploitation of a diverse array of taxa from various local habitat settings.

The Old Edwardsville Road site is situated at the bluff base, above the eastern bank of Smith Lake, and is characterized by several rectangular structures, a circular sweatlodge, pit features, and midden deposits (Jackson and Millhouse 2003). Faunal material was recovered from 23 pit features and three house structures, with the majority obtained through flotation. The assemblage contains 3,282 specimens, of which 2,619 are not identifiable to the class level (Berres 2003). Specifically identified taxa include white-tailed deer, muskrat, plains pocket gopher, mallard, blue-winged teal, American coot, river catfish, largemouth bass, freshwater drum, and box turtle. Fish remains are abundant, accounting for approximately two-thirds of the specifically identifiable remains. Indeterminate bird, turtle, and mammal remains comprise the bulk of the remainder. A small amount of freshwater mussel shell is also present. Exploitation of an array of aquatic and terrestrial fauna is indicated, although deer and fish likely would have supplied the greatest amount of dietary meat. Deer element representation suggests that entire animals were butchered, consumed, and discarded at the site (Berres 2003), but it should be cautioned that only ten deer or probable deer bones are present in the assemblage. Berres (2003) interprets the presence of small, fingerling-sized fish as evidence for netting in shallow floodplain settings.

Moorehead phase faunal material was recovered from ten structures and pit features at the Julien site, a small Mississippian household situated on the Goose Lake point bar complex. Of the 4,874 pieces of bone recovered, only 926 specimens are minimally identifiable to the class level (Cross 1984). Aquatic and wetland animals predominate, with fish remains accounting for 407 specimens. Fish taxa identified include bowfin, gar, brown bullhead, catfish/bullhead, pike, bass, sunfish, sucker, and freshwater drum, and demonstrate seasonal exploitation of floodplain lake and pond habitats (e.g., Styles 1981). The presence of mallard, teal, pintail, indeterminate duck, snapping turtle, and indeterminate turtle remains likewise reflects the use of aquatic resources. Other birds recognized in the assemblage include crane and northern bobwhite, suggesting some use of wetland, prairie, and forest-edge resources. Few mammal bones are present, with only two deer cranial bones and a gray squirrel mandible specifically identified.

A relatively large Late Mississippian assemblage was recovered from the GCS#1 site, a farmstead located near Horseshoe Lake in Madison County. Analyzed by Elizabeth Scott, the assemblage contains 5,729 well preserved pieces of bone and shell (Craig and Galloy 1994). Fish remains are abundant with gar, bowfin, gizzard shad, northern pike, bigmouth buffalo, buffalo, redhorse, black bullhead, brown bullhead, channel catfish, yellow bass, rock bass, largemouth bass, black crappie, sunfish, and drum recognized. White-tailed deer are moderately well represented, with 169 specimens and a minimum of five individuals present. Other mammals identified include elk, raccoon, gray wolf, beaver, and muskrat. Indeterminate duck remains are common, with hawk, northern bobwhite, and American coot bones also present. Snapping, softshell, and map turtles were recovered. None of the mollusk remains were specifically identifiable. Extensive utilization of aquatic resources is indicated, along with deer. Faunal resources from other forest-edge, forest, and prairie settings were procured to a limited extent.

The Late Mississippian (Moorehead and Sand Prairie phase components) faunal assemblage from Tract 15B at Cahokia contained 11,759 pieces of bone and shell recovered from 17 houses, 69 pit features, and two burials (Kuehn 2013). Deer remains are abundant and along with fish represent the most heavily exploited taxa, but a diverse array of fauna were consumed. In addition to deer, mammals identified include probable elk, beaver, raccoon, muskrat, dog, river otter, cottontail rabbit, tree squirrel, and rice rat. Waterfowl and marsh birds are well represented with trumpeter swan, Canada goose, mallard, teal, wigeon, wood duck, canvasback, bufflehead, ruddy duck, merganser, double-crested cormorant, pied-billed grebe, American coot, greater yellowlegs, lesser yellowlegs, and sora among the species identified. Other bird remains observed include turkey, sandhill crane, greater prairie chicken, northern bobwhite, bald eagle, hawk, and perching bird. Fish elements recovered include lake sturgeon, longnose gar, bowfin, northern pike, buffalo, redhorse, blue/channel catfish, bullhead, bass, crappie, sunfish, and freshwater drum. A moderate number of turtle, amphibian, and mollusk remains are also present in the assemblage, as well as a relatively large amount of whelk shell. The composition of the Tract 15B Late Mississippian assemblage demonstrates intensive exploitation of floodplain resources, particularly fish and waterfowl, but also shellfish, turtles, and semi-aquatic mammals. The abundance of bullhead, bowfin, and gar remains suggests considerable emphasis on floodplain lake settings, likely during periods of seasonal abundance. The variety of fish identified indicates utilization of large river, tributary stream, and slough resources as well. Deer and smaller game were regularly procured, and some consumption of dogs is also indicated.

The Moorehead phase assemblage of ICT-II at Cahokia contained 835 pieces of bone and mussel shell (Kelly 1991, 1997). Deer remains account for nearly half of the mammal bone recovered. In terms of body part representation, 63 percent of the deer bones are from the main body and 37 percent are from the extremities (Kelly 1991). Other mammals identified include raccoon, plains pocket gopher, and small rodents. Fish remains comprise about one-quarter of the assemblage, with catfish, bullhead, gar, bowfin, pike, buffalo, chubsucker, sunfish, and drum remains recovered. The array of fish taxa recovered indicates exploitation of floodplain lake and backwater slough settings, with some utilization of large river species. Birds identified include swan, mallard, teal, pintail, indeterminate duck and goose, turkey, and northern bobwhite, demonstrating procurement of avian resources from riparian, wetland, prairie, and forest settings.

Faunal material from Feature 1828 at the Cahokia-East Palisade location is assignable to the Moorehead phase (Kelly 1990). Fifty-three specimens were recovered, with the remains of deer, dog/coyote, tree squirrel, mallard, bowfin, black bullhead, and buffalo identified. Although limited in size, the composition of the assemblage is similar to that of the larger Moorehead assemblages obtained from floodplain sites.

Based on reexamination of Parmalee's (1957, 1975) original identification sheets, Lucretia Kelly (Kelly and Kelly 2007) separated out the Moorehead phase fauna from Mound 34 (Brown and Kelly 2000:487-491) at Cahokia. Parmalee (1975) noted the abundance of deer and waterfowl in the Mound 34 assemblage, which was confirmed through Kelly's analysis. Of the 6,659 mammal bones recovered, white-tailed deer remains account for 90.2 percent. Ducks, geese, and swans constitute 75.4 percent of the 2,944 bird elements recovered. Only 236 fish remains are present, but catfish, bullhead, buffalo, sucker, drum, and gar remains were identified. The prevalence of deer and waterfowl remains likely represents feasting refuse, as the Mound 34 area was a center for ceremonies, ritual events, and other activites (Brown and Kelly 2000; Kelly and Kelly 2007).

Summary

The Olin faunal assemblage provides significant information regarding Late Woodland and Moorehead phase faunal exploitation in the American Bottom. It stands as one of the few upland sites with a sizeable, well-preserved faunal assemblage, allowing for both a temporal (Late Woodland versus Mississippian) and geographic (upland versus floodplain) comparison of dietary patterns. Although similar in many respects, detailed examination highlights several significant differences that provide important insight on variation in faunal exploitation over time. The Olin faunal data, used in conjunction with Late Woodland and Mississippian zooarchaeological data, will facilitate greater understanding of faunal exploitaiton in the American Bottom.

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Appendix D: Floral Data

Analysis conducted by Kathryn E. Parker, Independant Researcher

Archaeobotanical analysis of the Olin material was performed by Kathryn E. Parker, independent researcher. As all excavated soils at Olin were waterscreened, an extensive floral assemblage is present for the site, therefore, only a sample of features was analyzed. The majority of these samples were gained from pit features, though two samples were analyzed from structure contexts. Wood charcoal (n=74,741, 893.42 g) and burned nutshell (n=62,199, 951.78 g) comprise the majority of floral material recovered from these sample features. Identified wood is dominated by oak (43%) and hickory species (31%) while identified nut species were predominately hickory (98%), with smaller amounts of walnut (1.2%), acorn (0.4%), hazelnut (0.1%), and pecan (>0.01%).

Approximately 517 seeds are present in the sample assemblage. The majority of seeds consist of chenopodium (65%, n=337), and erect knotweed (6%, n=32). Few examples are present of wild bean, little barley, sunflower, sumpweed, pokeweed, smartweed, bedstraw, sumac, dock, St. John's wort, plum, raspberry/blackberry, elderberry, and grape. These proportions suggest chenopodium and knotweed may have been cultigens, while the remaining seeds represent foods gathered from local wild sources.

As is expected for Mississippian sites, maize was present at Olin in high numbers (n=9144, 75.39 g). All parts of the ears were present, though most maize samples consisted of cupules (n=8660), followed by kernels (n=328), and glumes (n=143).

Additional plant material (n=199) recovered from the site consists of wild leek corm/bulb, tuber/rootstock, dicot stem, squash rind, fungus, grass/cane stem, and various fiber knots, fruit/vegetative tissue, husk/hull, and pedicel.

Table D.1. Olin Site Wood Remains

Feature Provenience	Smudge Pit, Level 3	F. 15	F. 15	F. 36	F. 57	F. 57 Level 2	F. 75	F. 77
Feature type	Smudge Pit	pit		pit	sweatlodge	sweatlodge	Pit	Pit
Sample number			72-109	72-64	75-79 (bag 1)	75-79 (bag 2)		72-206
Total Wood (N)	41	250	390	1250	1000	168	327	23
Total Wood Wt. (g)	1	13.12	17.02	15.15	8.88	2	10.71	2.5
Breakdown by taxon (N)								
Acer sp (Maple)	1		1	1				
Carya sp. (hickory)	10			2	2	10	17	4
C. Illinoensis (pecan)								
Celtis sp. (hackberry/sugarberry)								2
Fraxinus sp. (ash)					2			1
Gleditsia triacanthos (honey locust)					4	1		
Ilex sp., cf. *decidua* (swamp holly)				1				
Juglans sp. (walnut/butternut)								2
Platanus occidentalis (sycamore)								
Prunus sp. (cherry)			1			3		
Quercus sp. (oak)		4	3	3	4	2	3	6
Q. Sp., subgenus *Erythrobalanus* (red oak subgroup)		9	8			2		2
Q. Sp., subgenus *Lepidobalanus* (white oak subgroup)		3	7	8				
Salix/Populus sp. (willow or poplar)				1	1			
Sassafras albidum (sassafras)					2			
Ulmaceae (elm family)								
Ulmus americana (American elm)								
Vitis sp. (grape)								
Bark		1			1			1
Diffuse porous	2							
Ring porous	2	1		2	4	1		3
Unidentifiable	5					1		

Table D.1. Olin Site Wood Remains (Continued)

Feature Provenience	F. 78	F. 87	F. 88	F. 89	F. 90	F. 117A	F. 117B	F. 141	F. 152
Feature type	SWEATLODGE	PIT	PIT	PIT	PIT	PIT	PIT	PIT	PIT
Sample number	75-78	72-223		73-748	73-749	73-796	73-797	73-812	73-824
Total Wood (N)	21	31	1800	6000	690	102	1250	3000	290
Total Wood Wt. (g)	0.53	1.24	19.93	70.53	9.75	0.94	13.34	28.72	3.48
Breakdown by taxon (N)									
Acer sp (Maple)					1				
Carya sp. (hickory)	5	5	7	4	4	1	1	4	1
C. Illinoensis (pecan)								6	
Celtis sp. (hackberry/sugarberry)								2	4
Fraxinus sp. (ash)									
Gleditsia triacanthos (honey locust)			1						1
Ilex sp., cf. *decidua* (swamp holly)									
Juglans sp. (walnut/butternut)									
Platanus occidentalis (sycamore)		4			1				
Prunus sp. (cherry)									
Quercus sp. (oak)	5	4	5	5	9	5	7	3	6
Q. Sp., subgenus *Erythrobalanus* (red oak subgroup)	2			1	2		8	5	1
Q. Sp., subgenus *Lepidobalanus* (white oak subgroup)	1		4	6	1	2	1		
Salix/Populus sp. (willow or poplar)	1								
Sassafras albidum (sassafras)									
Ulmaceae (elm family)	2					1			2
Ulmus americana (American elm)	1	1							
Vitis sp. (grape)									
Bark			1	3		1	1		1
Diffuse porous	1			1	1		1		1
Ring porous		4	1		1	5	1		1
Unidentifiable	2	2				5			2

Table D.1. Olin Site Wood Remains (Continued)

Feature Provenience	F. 220	F. 245	F. 253	F. 267	F. 296	F. 297	F. 312	F. 327	F. 345	F. 350
Feature type	**PIT**	**PIT**	**PIT**	**PIT**	**PIT**	**PIT**		**PIT**	**PIT**	**PIT**
Sample number		74-164	74-182	74-214	74-252		74-259	75-57	75-80	
Total Wood (N)	155	495	405	7000	582	1090	3000	2900	25,000	190
Total Wood Wt. (g)	1.48	5.66	4.94	67.93	6.17	20.41	25.49	28.12	272.64	10.45
Breakdown by taxon (N)										
Acer sp (Maple)				2					1	
Carya sp. (hickory)	2	7	2	9	11	13	4	3	6	10
C. Illinoensis (pecan)										
Celtis sp. (hackberry/sugarberry)							1			
Fraxinus sp. (ash)										2
Gleditsia triacanthos (honey locust)		2					2			
Ilex sp., cf. *decidua* (swamp holly)										
Juglans sp. (walnut/butternut)										
Platanus occidentalis (sycamore)										
Prunus sp. (cherry)	4									
Quercus sp. (oak)	2	2	5	4	4	1	3	7		1
Q. Sp., subgenus *Erythrobalanus* (red oak subgroup)	6	6	6		4		2	4	4	5
Q. Sp., subgenus *Lepidobalanus* (white oak subgroup)		1		2			6	4	4	
Salix/Populus sp. (willow or poplar)								2		
Sassafras albidum (sassafras)							1		1	
Ulmaceae (elm family)										
Ulmus americana (American elm)				2					2	
Vitis sp. (grape)										
Bark		1	5	1	1	1				
Diffuse porous	4					1				1
Ring porous	2	1				2	1			
Unidentifiable			2			2				1

Table D.1. Olin Site Wood Remains (Continued)

Feature Provenience	F. 353	F. 368	F. 370	F. 373B	House 1 WT	House WT2	Palisade Post	Totals
Feature type	pit	pit	pit		structure	structure	postmold	
Sample number	75-84		75-137	*			73-875	
Total Wood (N)	525	350	1200		15,000	190	26	74,741
Total Wood Wt. (g)	6.47	3.61	13.06		190.8	15.69	1.66	893.42
Breakdown by taxon (N)								
Acer sp (Maple)		5						11
Carya sp. (hickory)	7		1	4	15	17	13	202
C. Illinoensis (pecan)								6
Celtis sp. (hackberry/sugarberry)		1						10
Fraxinus sp. (ash)		2						7
Gleditsia triacanthos (honey locust)								11
Ilex sp., cf. *decidua* (swamp holly)								1
Juglans sp. (walnut/butternut)								2
Platanus occidentalis (sycamore)								5
Prunus sp. (cherry)	1							9
Quercus sp. (oak)	5	1	3				1	113
Q. Sp., subgenus *Erythrobalanus* (red oak subgroup)	3	2	5	15				102
Q. Sp., subgenus *Lepidobalanus* (white oak subgroup)	1	6	7					64
Salix/Populus sp. (willow or poplar)				1		3		9
Sassafras albidum (sassafras)								4
Ulmaceae (elm family)			1				1	7
Ulmus americana (American elm)			2		3			11
Vitis sp. (grape)					1			1
Bark	1				1			21
Diffuse porous		1	1				1	16
Ring porous	1	1	1					35
Unidentifiable	1						4	27

*Feature 373B Sample: a wood and nutshell mass = 139.11 g. Only non-wood and non-hickory nutshell items were extracted and counted.

Table D.2. Olin Site Identified Nutshell and Seeds

Feature Provenience	Smudge Pit, Lv 3	F. 15	F. 15	F. 36	F. 57	F. 57 Level 2
Feature type	Smudge Pit	pit		pit	sweatlodge	sweatlodge
Total Nutshell (N)	3	0	2	186	165	5016
Total Nutshell Wt. (g)	0.09		0.29	6.54	6.07	163.45
Breakdown by taxon (N and Wt.)						
Carya Sp.				182	165	5000
(hickory)				6.35	6.07	162.43
C. Illinoiensis						
(pecan)						
Corylus americana						
(hazelnut)						
Juglandaceae	3		1			
(hickory/walnut family)	0.09		0.01			
Juglans nigra				3		3
(black walnut)				0.18		0.46
Quercus sp.			1	1		
(acorn)			0.28	0.01		
Total Seeds (N)	0	0	0	0	320	0
Breakdown by taxon (N)						
Aristida sp. (three awn)						
Chenopodium berlandieri (chenopod)					310	
Fabaceae (bean family)						
Galium sp. (bedstraw)						
Gleditsia triacanthos (honey locust)						
Helianthus sp. (sunflower)						
Helianthus/Iva (sunflower or sump-weed)						
Hordeum pusillum (little barley)						
Hypericum sp. (St. John's wort)						
Iva annua (sumpweed)						
Phytolacca americana (pokeweed)					1	
Poaceae (grass family)						
Polygonum sp. (smartweed)						
P. erectum (erect knotweed)						
Prunus americana (plum)						
Rhus sp. (sumac)						
Rubus sp. (raspberry/blackberry)						
Rumex sp. (dock)					2	
Sambucus canadensis (elderberry)						
Strphostyles helvola (wild bean)						
Triticum sp., cf. *aestivum* (wheat)						
Vitis sp. (grape)						
Unidentifiable					7	

Table D.2. Olin Site Identified Nutshell And Seeds (Continued)

Feature Provenience	F. 75	F. 77	F. 78	F. 87	F. 88	F. 89	F. 90	F. 117A
Feature type	Pit	Pit	sweatlodge	pit	pit	pit	pit	pit
Total Nutshell (N)	1227	16	98	223	957	10,062	1528	47
Total Nutshell Wt. (g)	45.57	0.74	4.92	8.48	16.47	123.54	30.03	0.6
Breakdown by taxon (N and Wt.)								
Carya Sp.	1224	16	98	218	850	10,000	1500	
(hickory)	45.11	0.74	4.92	7.98	15.94	48.68	28.17	
C. Illinoiensis								
(pecan)								
Corylus americana					2	4	3	
(hazelnut)					0.02	0.12	0.03	
Juglandaceae								43
(hickory/walnut family)								0.58
Juglans nigra	3			5	5	42	11	
(black walnut)	0.46			0.5	0.51	3.21	0.55	
Quercus sp.						16	14	4
(acorn)						1.53	1.28	0.02
Total Seeds (N)	6	0	0	0	2	15		
Breakdown by taxon (N)							2	5
Aristida sp. (three awn)								
Chenopodium berlandieri (chenopod)								
Fabaceae (bean family)								
Galium sp. (bedstraw)								
Gleditsia triacanthos (honey locust)					1			
Helianthus sp. (sunflower)								
Helianthus/Iva (sunflower or sump-weed)								
Hordeum pusillum (little barley)								
Hypericum sp. (St. John's wort)								
Iva annua (sumpweed)						2		
Phytolacca americana (pokeweed)								
Poaceae (grass family)								
Polygonum sp. (smartweed)								
P. erectum (erect knotweed)	4					3		
Prunus americana (plum)						1		5
Rhus sp. (sumac)						1	1	
Rubus sp. (raspberry/blackberry)								
Rumex sp. (dock)								
Sambucus canadensis (elderberry)								
Strphostyles helvola (wild bean)								
Triticum sp., cf. *aestivum* (wheat)						2		
Vitis sp. (grape)					1	2		
Unidentifiable	2					4		

Table D.2. Olin Site Identified Nutshell And Seeds (Continued)

Feature Provenience	**F. 117B**	**F. 141**	**F. 152**	**F. 220**	**F. 245**	**F. 253**	**F. 267**	**F. 296**
Feature type	**PIT**	**PIT**	**PIT**	**PIT**	**PIT**	**PIT**	**PIT**	**PIT**
Total Nutshell (N)	41	2550	4030	162	1163	1300	15,357	203
Total Nutshell Wt. (g)	0.46	28.21	49.48	1.41	15.1	27.88	184.48	6.42
Breakdown by taxon (N and Wt.)								
Carya Sp.	40	2500	4000		1155	1300	15,000	203
(hickory)	0.45	27.62	49.27		14.93	27.88	175.9	6.42
C. Illinoiensis								
(pecan)								
Corylus americana	1	25	9				29	
(hazelnut)	0.01	0.17	0.07				0.35	
Juglandaceae				136				
(hickory/walnut family)				1.31				
Juglans nigra		16	2		7		165	
(black walnut)		0.36	0.06		0.16		7.21	
Quercus sp.		9	19	26	1		163	
(acorn)		0.06	0.08	0.1	0.01		0.9	
Total Seeds (N)	9	11	0	1	8	6	62	1
Breakdown by taxon (N)								
Aristida sp. (three awn)								
Chenopodium berlandieri (chenopod)		3					21	
Fabaceae (bean family)		1					3	
Galium sp. (bedstraw)				1				
Gleditsia triacanthos (honey locust)								
Helianthus sp. (sunflower)							4	
Helianthus/Iva (sunflower or sump-weed)						1		
Hordeum pusillum (little barley)		1						
Hypericum sp. (St. John's wort)	1							
Iva annua (sumpweed)	1							
Phytolacca americana (pokeweed)								
Poaceae (grass family)							1	
Polygonum sp. (smartweed)							2	
P. erectum (erect knotweed)	2	1					11	1
Prunus americana (plum)								
Rhus sp. (sumac)		1						
Rubus sp. (raspberry/blackberry)							1	
Rumex sp. (dock)								
Sambucus canadensis (elderberry)					1			
Strphostyles helvola (wild bean)								
Triticum sp., cf. *aestivum* (wheat)					1			
Vitis sp. (grape)		2						
Unidentifiable	5	2			6	5	19	

Table D.2. Olin Site Identified Nutshell And Seeds (Continued)

Feature Provenience	F. 297	F. 312	F. 327	F. 345	F. 350	F. 353	F. 368	F. 370
Feature type	pit		pit	pit	pit	pit	pit	pit
Total Nutshell (N)	62	153	9	2203	6009	8512	556	137
Total Nutshell Wt. (g)	0.9	2.06	0.27	37.31	67.78	105.57	8.47	4.09
Breakdown by taxon (N and Wt.)								
Carya Sp.	60	145	9	1990	6000	8500	550	45
(hickory)	0.83	2.03	0.27	29.31	67.49	105.51	8.42	0.79
C. Illinoiensis				4				
(pecan)				0.05				
Corylus americana				8	4	3	2	1
(hazelnut)				0.12	0.04	0.03	0.02	0.01
Juglandaceae								
(hickory/walnut family)								
Juglans nigra	1			205	4			90
(black walnut)	0.06			7.82	0.24			3.28
Quercus sp.	1	8		1	1	9	4	1
(acorn)	0.01	0.03		0.01	0.01	0.03	0.03	0.01
Total Seeds (N)	0	9	0	39	3	9	2	5
Breakdown by taxon (N)								
Aristida sp. (three awn)						1		
Chenopodium berlandieri (chenopod)				2		1		
Fabaceae (bean family)								1
Galium sp. (bedstraw)				1				
Gleditsia triacanthos (honey locust)								
Helianthus sp. (sunflower)								
Helianthus/Iva (sunflower or sump-weed)								
Hordeum pusillum (little barley)				6				
Hypericum sp. (St. John's wort)								
Iva annua (sumpweed)		1					2	
Phytolacca americana (pokeweed)								
Poaceae (grass family)						1		
Polygonum sp. (smartweed)		2		1				
P. erectum (erect knotweed)		1		1		1		1
Prunus americana (plum)								
Rhus sp. (sumac)								
Rubus sp. (raspberry/blackberry)								
Rumex sp. (dock)								
Sambucus canadensis (elderberry)								
Strphostyles helvola (wild bean)				1				
Triticum sp., cf. *aestivum* (wheat)				22	3	5		
Vitis sp. (grape)		1						
Unidentifiable		4		5				3

Table D.2. Olin Site Identified Nutshell And Seeds (Continued)

Feature Provenience	F. 373B	House 1 WT	House WT2	Palisade Post	Totals
Feature type		structure	structure	postmold	
Total Nutshell (N)	see Table D.1	206	0	16	62,199
Total Nutshell Wt. (g)		4.53		0.57	951.78
Breakdown by taxon (N and Wt.)					
Carya Sp.		205		16	61,071
(hickory)		4.52		0.57	848.6
C. Illinoiensis					4
(pecan)					0.05
Corylus americana	1				92
(hazelnut)	0.01				1
Juglandaceae					183
(hickory/walnut family)					1.99
Juglans nigra	2				577
(black walnut)	0.07				25.69
Quercus sp.	12	1			292
(acorn)	0.04	0.01			4.45
Total Seeds (N)	2	0	0	0	517
Breakdown by taxon (N)					
Aristida sp. (three awn)					1
Chenopodium berlandieri (chenopod)					337
Fabaceae (bean family)					5
Galium sp. (bedstraw)					2
Gleditsia triacanthos (honey locust)					1
Helianthus sp. (sunflower)					4
Helianthus/Iva (sunflower or sump-weed)					1
Hordeum pusillum (little barley)					7
Hypericum sp. (St. John's wort)					1
Iva annua (sumpweed)					6
Phytolacca americana (pokeweed)					1
Poaceae (grass family)					2
Polygonum sp. (smartweed)					5
P. erectum (erect knotweed)	1				32
Prunus americana (plum)					2
Rhus sp. (sumac)	1				3
Rubus sp. (raspberry/blackberry)					1
Rumex sp. (dock)					2
Sambucus canadensis (elderberry)					1
Strphostyles helvola (wild bean)					1
Triticum sp., cf. *aestivum* (wheat)					33
Vitis sp. (grape)					6
Unidentifiable					63

Table D.3. Olin Site Maize And Misc. Floral Remains

Feature Provenience	Smudge Pit, Level 3	F. 15	F. 15	F. 36	F. 57	F. 57 Level 2	F. 75	F. 77	F. 78	F. 87
Feature type	**Smudge Pit**	**pit**		**pit**	**sweatlodge**	**sweatlodge**	**Pit**	**Pit**	**sweatlodge**	**pit**
Total Maize (*Zea mays*) (N)	994	11	0	10	1	12	5	0	1	0
Total Maize Weight (g)	12.62	0.14		0.13	0.01	0.11	0.05		0.03	
kernel	9	1		6		9			1	
embryo										
cupule	900	9		3	1	3	5			
glume	85	1		1						
cob segment										
Miscellaneous Materials (Total N)	0		0	1	17	22	1	0	1	0
Allium (wild leek) corm/bulb										
Tuber/rootstock										
Dicot stem						2				
Cucurbita pepo (squash) rind										
Fiber knot										
Fruit/vegetative tissue						20			1	
Fungus										
Grass/cane stem				1	17					
Husk/hull						1	1			
Pedicel										

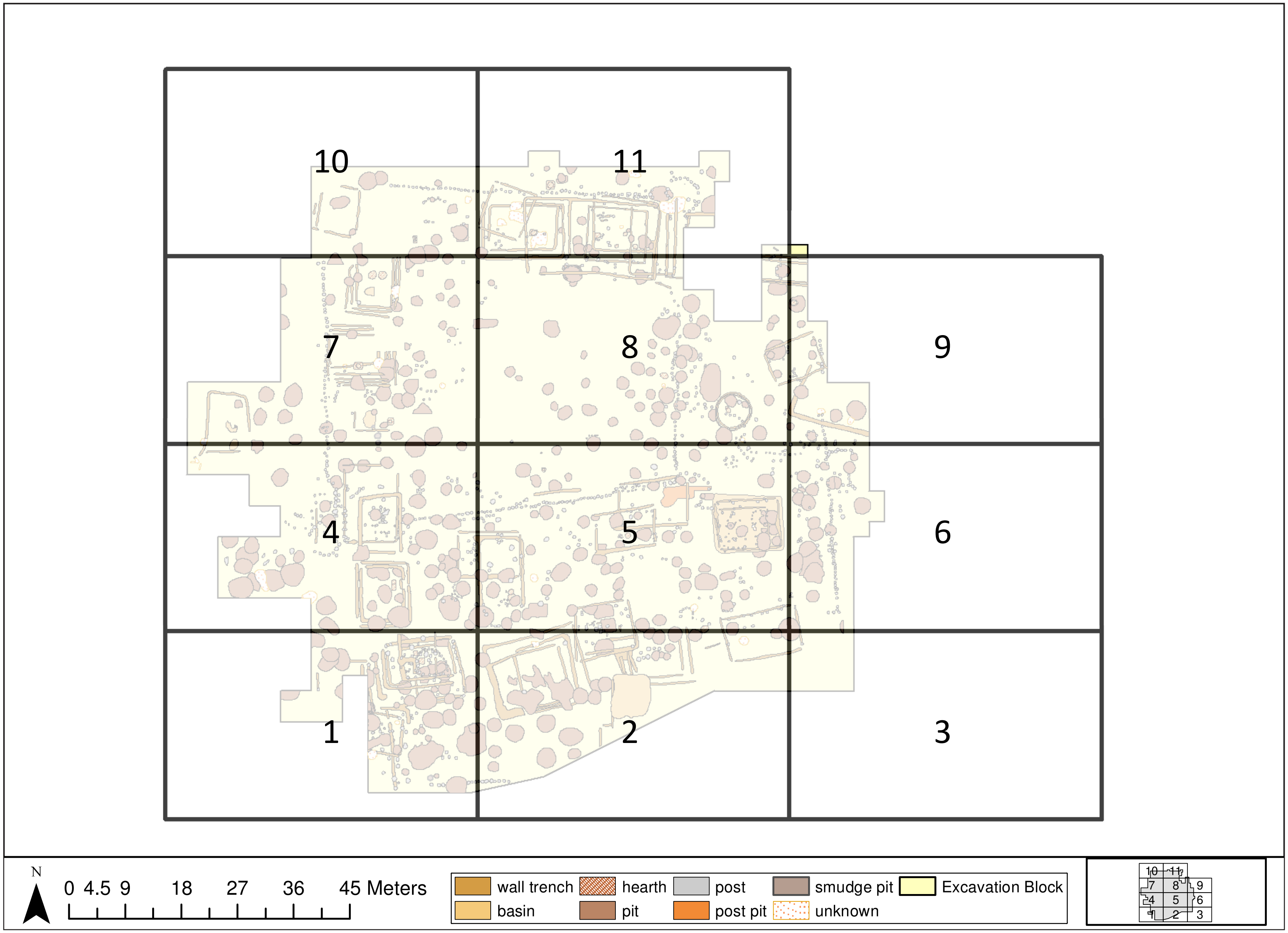
Table D.3. Olin Site Maize And Misc. Floral Remains (Continued)

Feature Provenience	F. 88	F. 89	F. 90	F. 117A	F. 117B	F. 141	F. 152	F. 220	F. 245	F. 253	F. 267	F. 296	F. 297	F. 312
Feature type	PIT	PIT	PIT	PIT	PIT	PIT	PIT	PIT	PIT	PIT	PIT	PIT	PIT	
Total Maize (*Zea mays*) (N)	51	5500	151	6	11	2	14	3	41	63	163	1100	530	57
Total Maize Weight (g)	0.45	36.82	2.74	0.02	0.11	0.01	0.05	0.01	0.21	0.65	1.4	8.97	6.18	0.47
kernel	11	25	41	6	3		5		8	12	58		29	13
embryo										1	2			1
cupule	40	5469	105		8	2	8	3	29	48	85	1100	500	32
glume			5				1		4	2	18			11
cob segment		6											1	
Miscellaneous Materials (Total N)	5	35	4	1	0	13		4	7	11	16	0	2	3
Allium (wild leek) corm/bulb														
Tuber/rootstock		1									1			
Dicot stem								1		3				
Cucurbita pepo (squash) rind		3				1		1	1					
Fiber knot														
Fruit/vegetative tissue		4				7			2	1				
Fungus		1	1			1					1			
Grass/cane stem	5	26	3	1		3		2	3	5	7		2	3
Husk/hull						1								
Pedicel									1	2	7			

Table D.3. Olin Site Maize And Misc. Floral Remains (Continued)

Feature Provenience	F. 327	F. 345	F. 350	F. 353	F. 368	F. 370	F. 373B	House 1 WT	House WT2	Palisade Post	Totals
Feature type	**PIT**	**PIT**	**PIT**	**PIT**	**PIT**	**PIT**		**STRUCTURE**	**STRUCTURE**	**POSTMOLD**	
Total Maize (*Zea mays*) (N)	1	134	173	92	15	0	0	3	0	0	9144
Total Maize Weight (g)	0.01	1.79	1.46	0.85	0.07			0.03			75.39
kernel		38	17	26	9			1			328
embryo			6	2							3
cupule	1	91	150	61	5			2			8660
glume		5	6	3	1						143
cob segment											7
Miscellaneous Materials (Total N)	0	17	14	3	1	3	9	8	0	0	199
Allium (wild leek) corm/bulb											1
Tuber/rootstock											2
Dicot stem		3		1							10
Cucurbita pepo (squash) rind			1	1	1	1					10
Fiber knot		1									1
Fruit/vegetative tissue		4	7			2	8				56
Fungus							1				5
Grass/cane stem		8	5	1				8			100
Husk/hull			1								3
Pedicel		1									11

Appendix E: Olin Site Plan Maps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11
7
8
9
4
5
6
1
2
3
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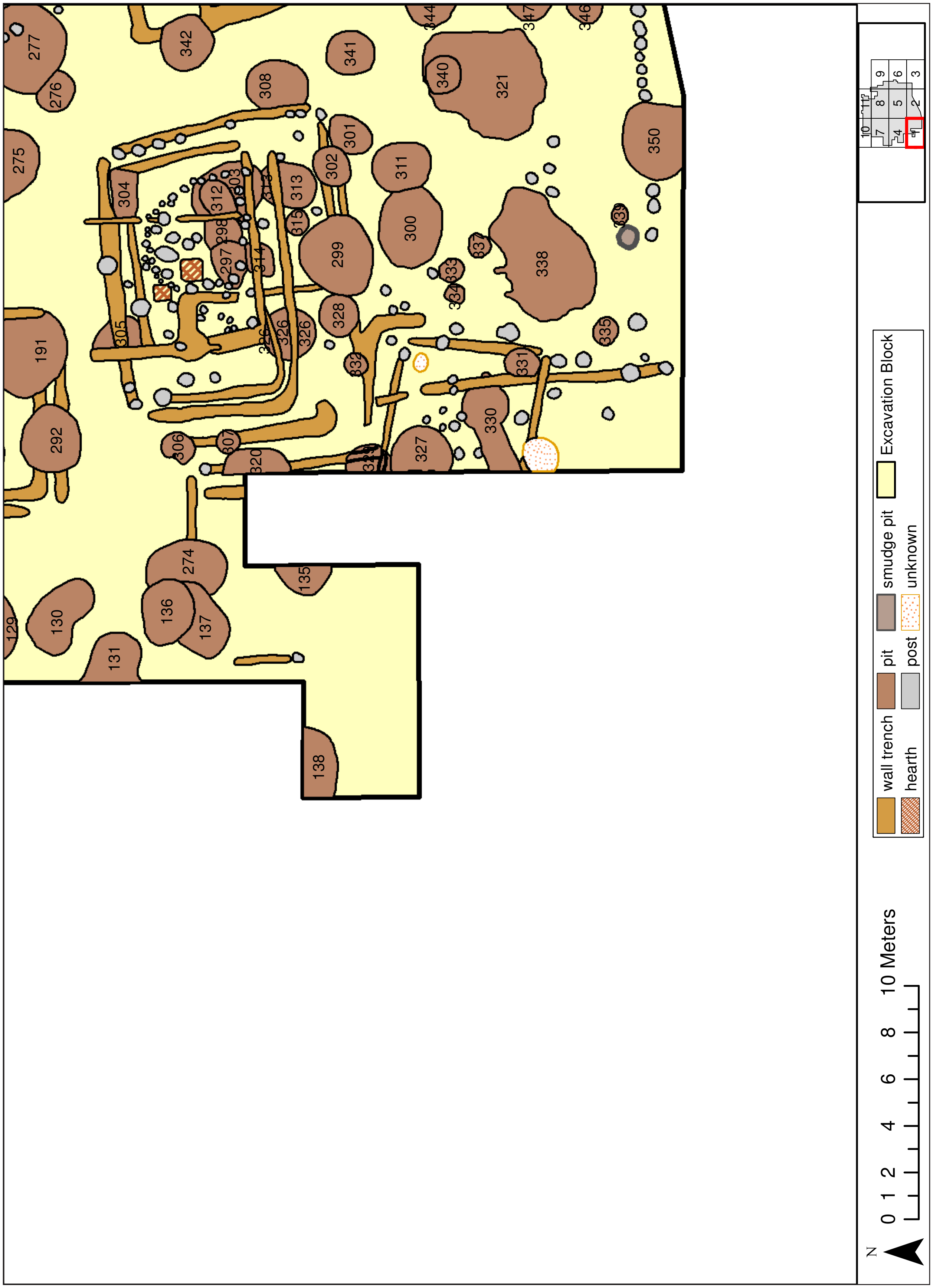
hearth
post
smudge pit
Excavation Block
basin
pit
post pit
unknown



wall trench
pit
smudge pit
Excavation Block
hearth
post
unknown
0 1 2 4 6 8 10 Meters
N
277
276
275
342
341
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302
311
321
340
350
304
312
313
300
299
338
328
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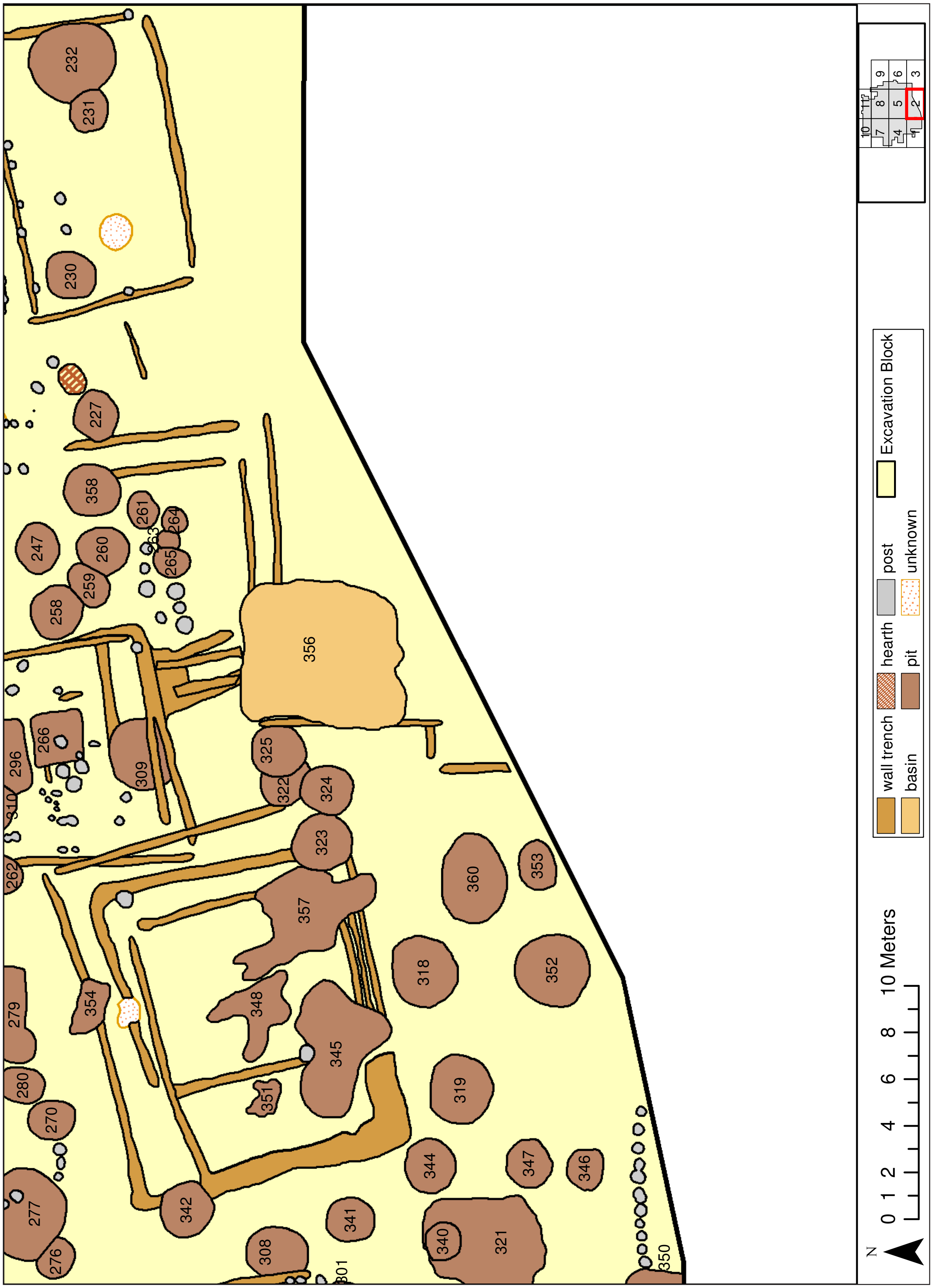
131
129
138


wall trench
basin
hearth
pit
post
unknown
Excavation Block
0 1 2 4 6 8 10 Meters
N
232
231
230
227
358
261
264
263
265
260
247
259
258
356
266
296
309
325
322
324
310
323
262
360
353
357
318
352
279
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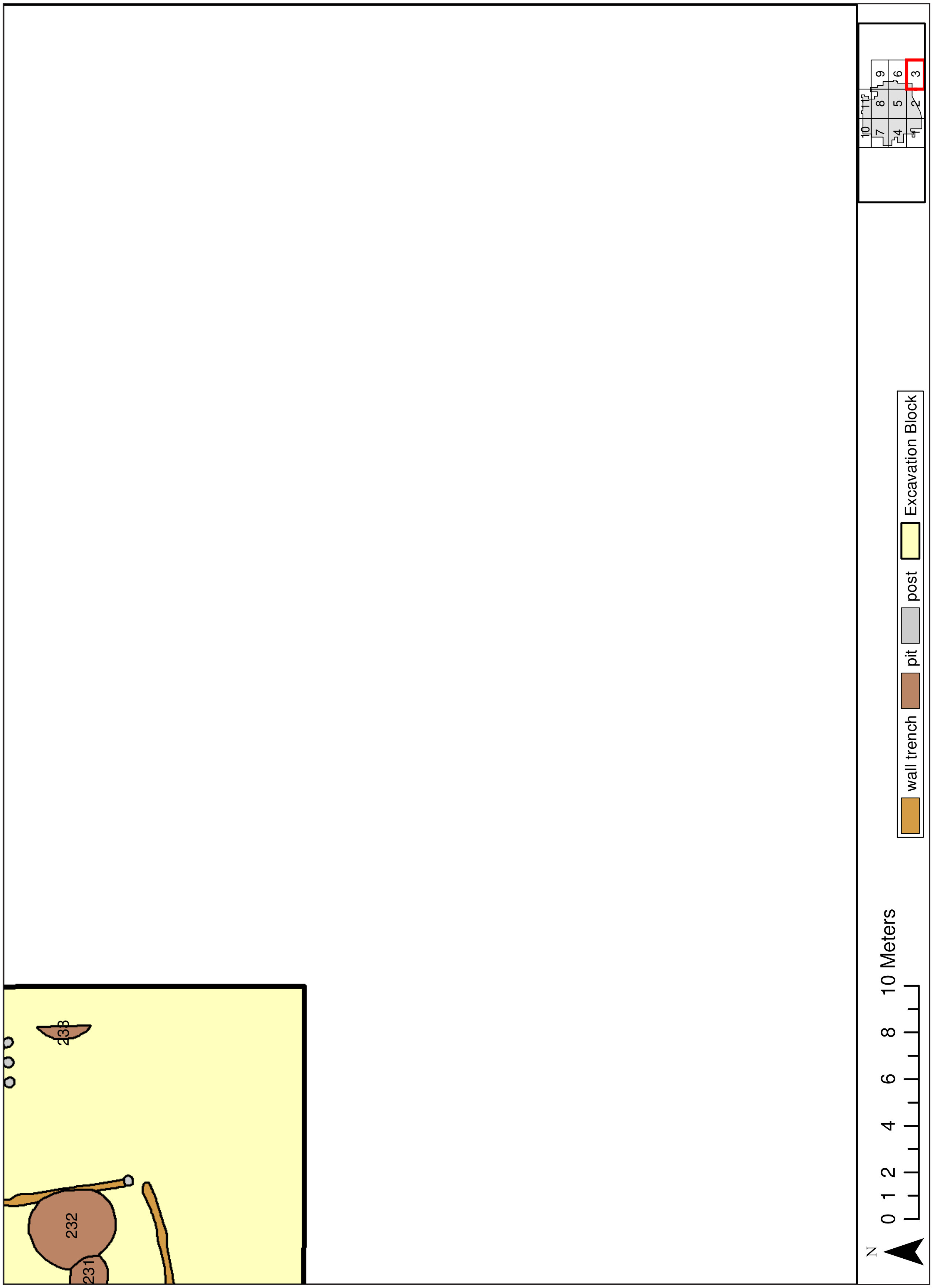
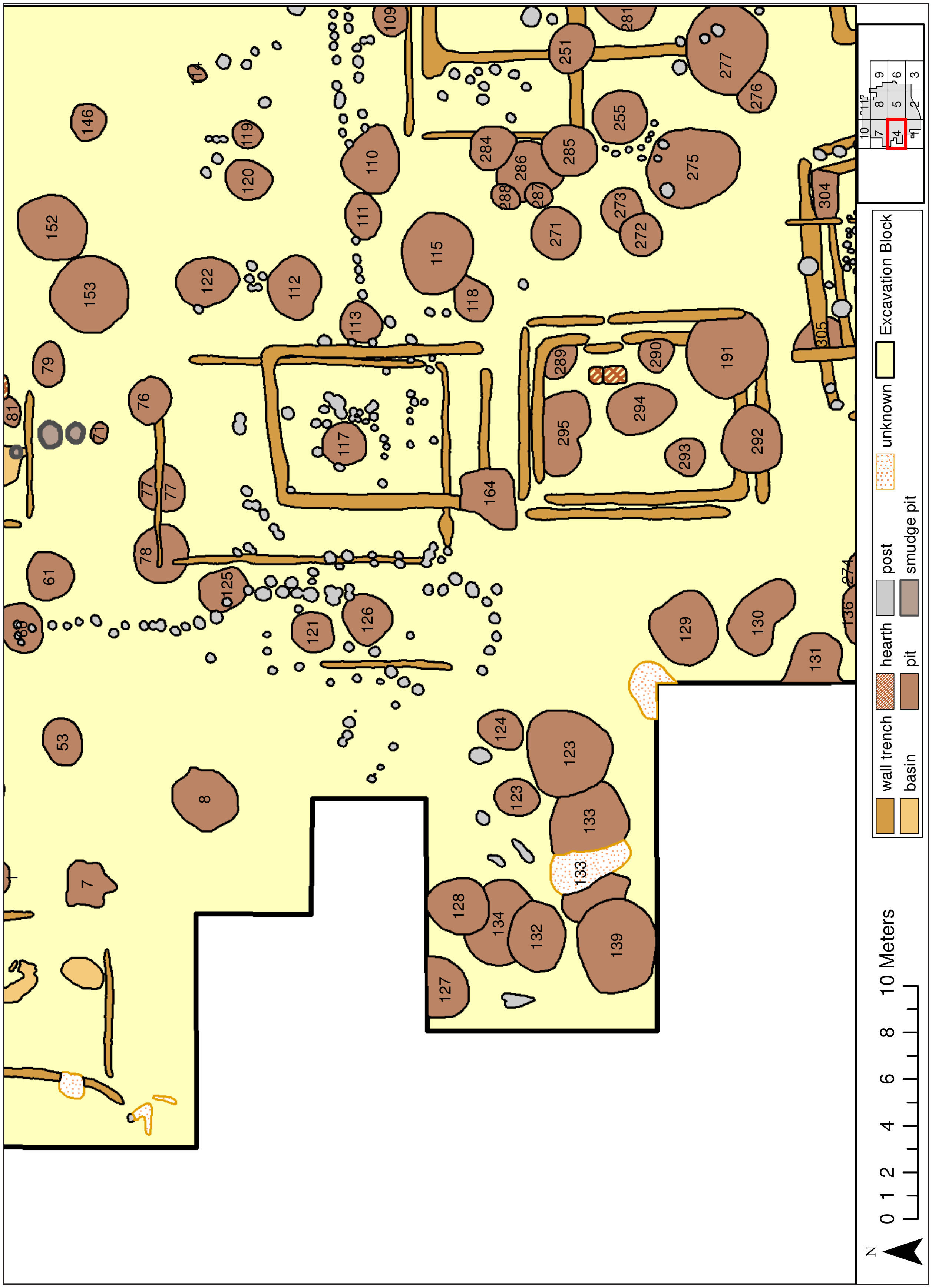
301
350


231
232
233
N
0 1 2 4 6 8 10 Meters
wall trench
pit
post
Excavation Block
1
2
3
4
5
6
7
8
9
10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hearth
post
unknown
Excavation Block
basin
pit
smudge pit
0 1 2 4 6 8 10 Meters
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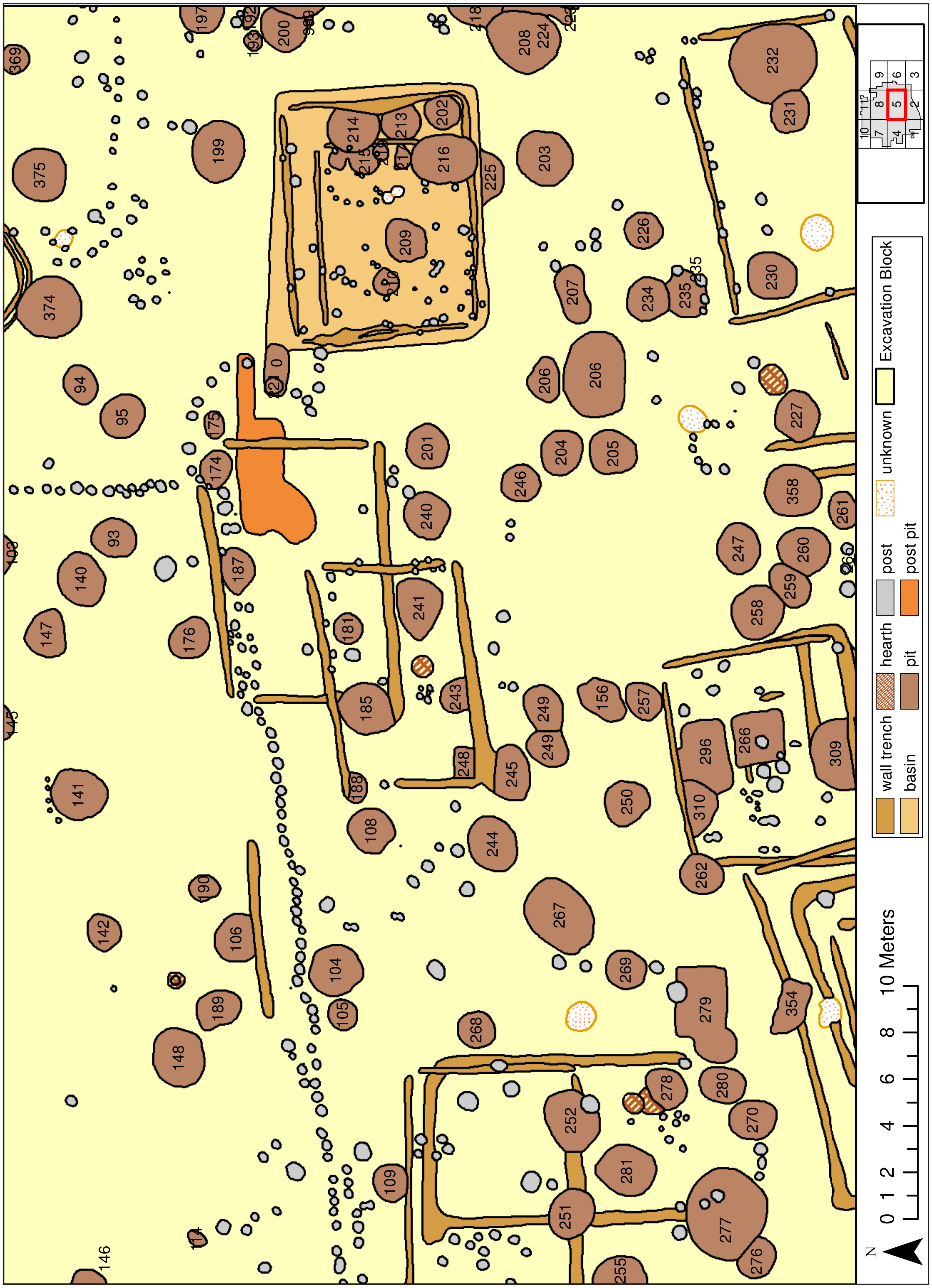
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post pit
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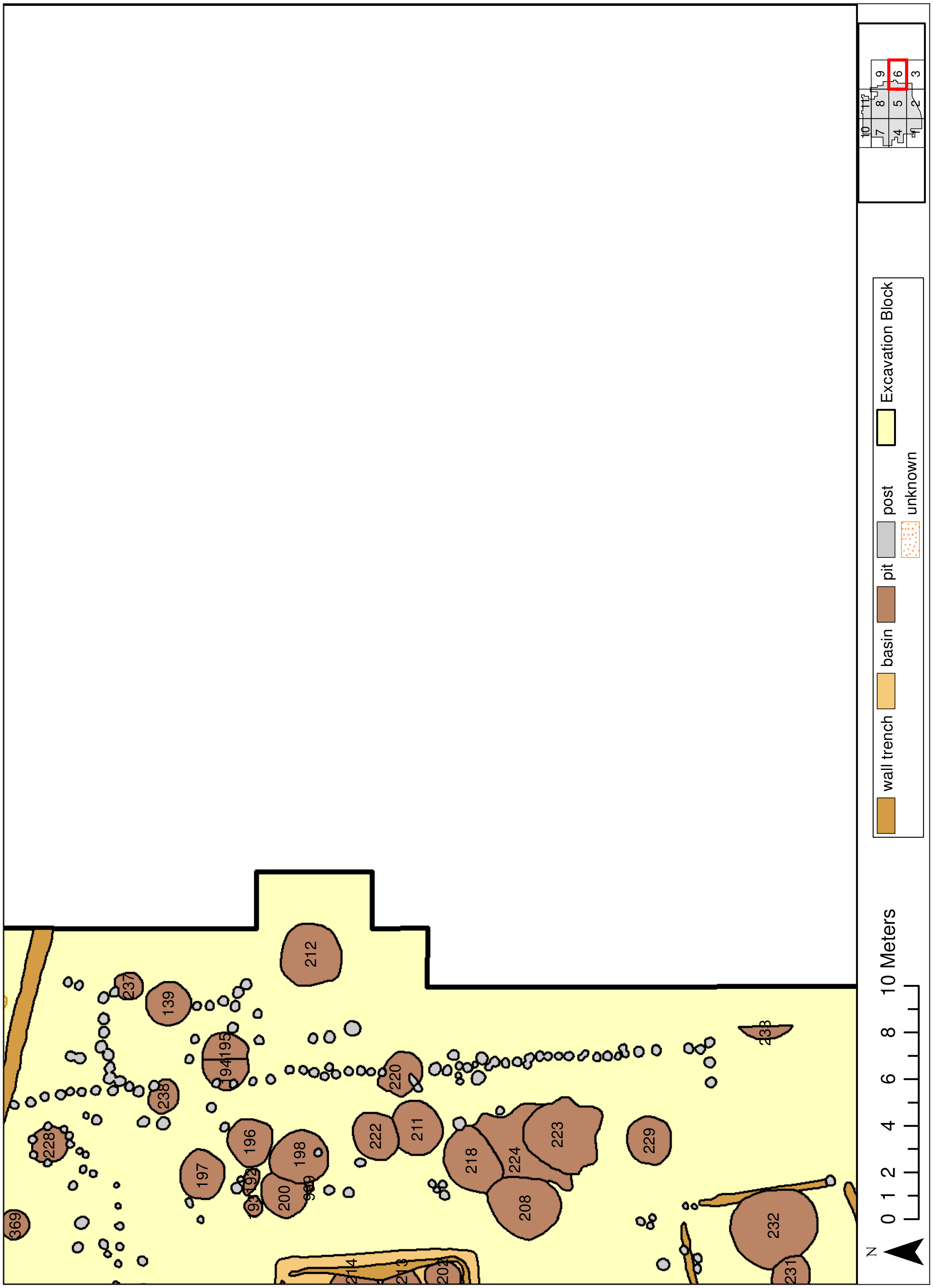
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basin
pit
post
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Excavation Block
0 1 2 4 6 8 10 Meters
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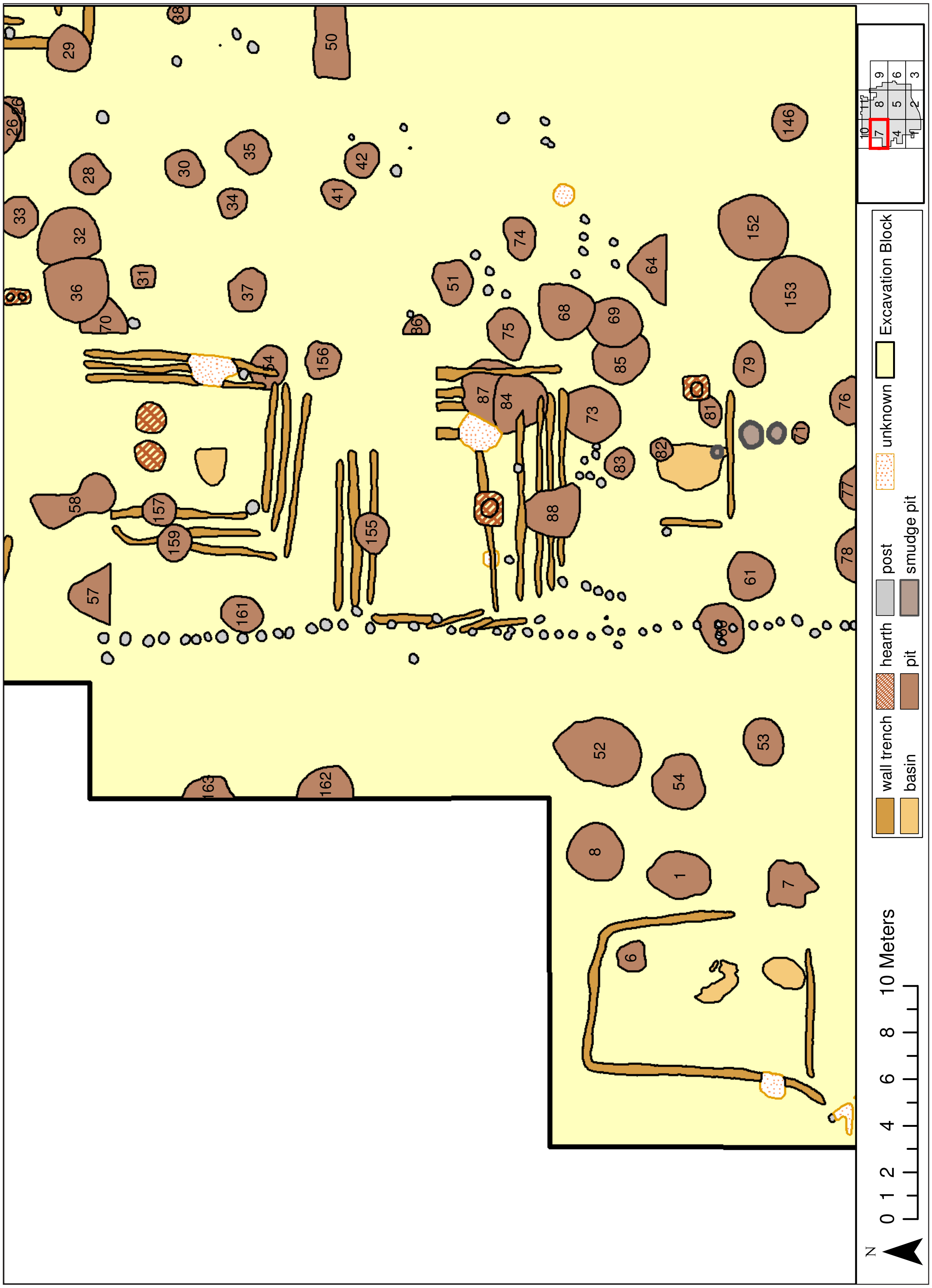
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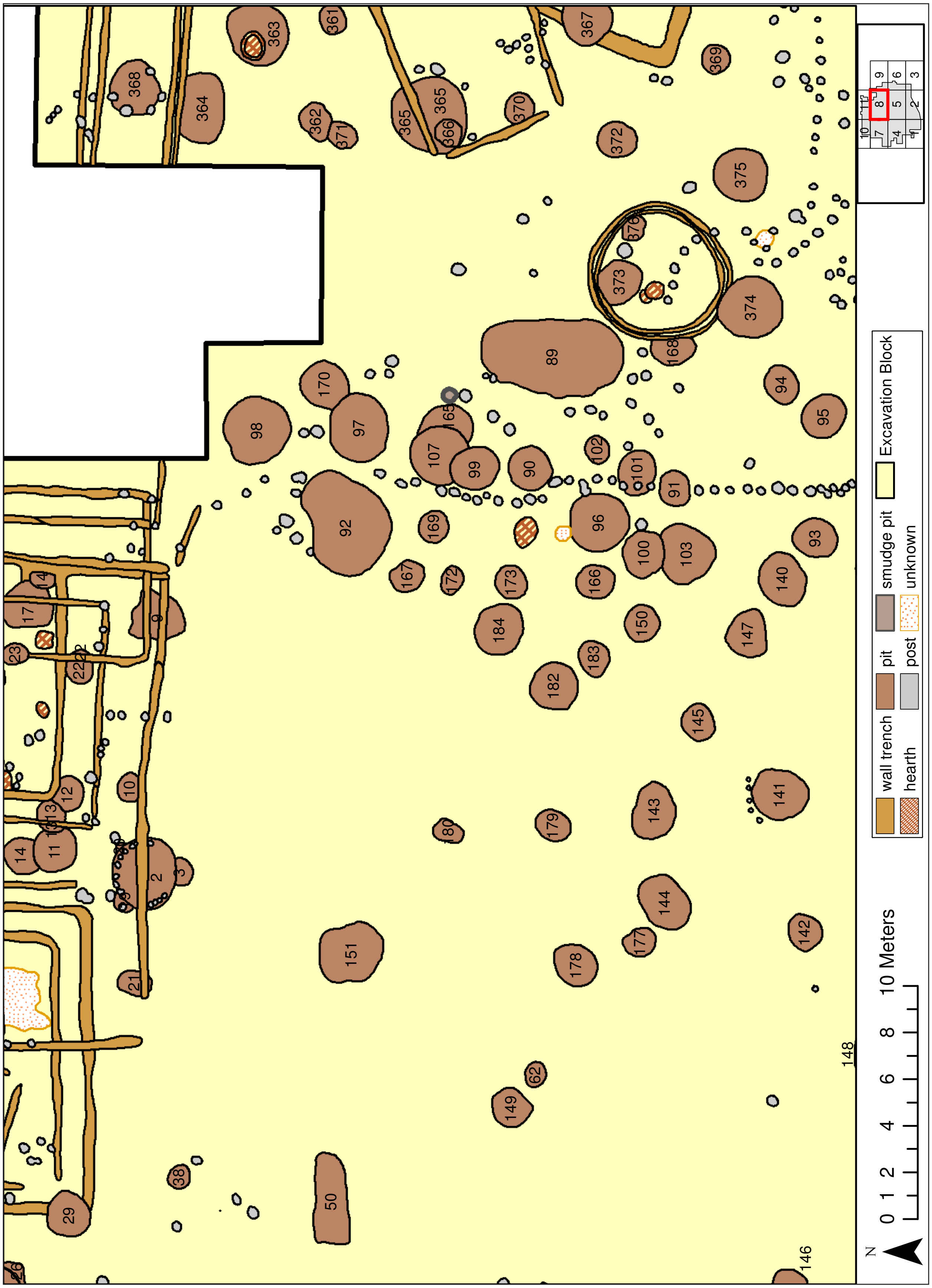
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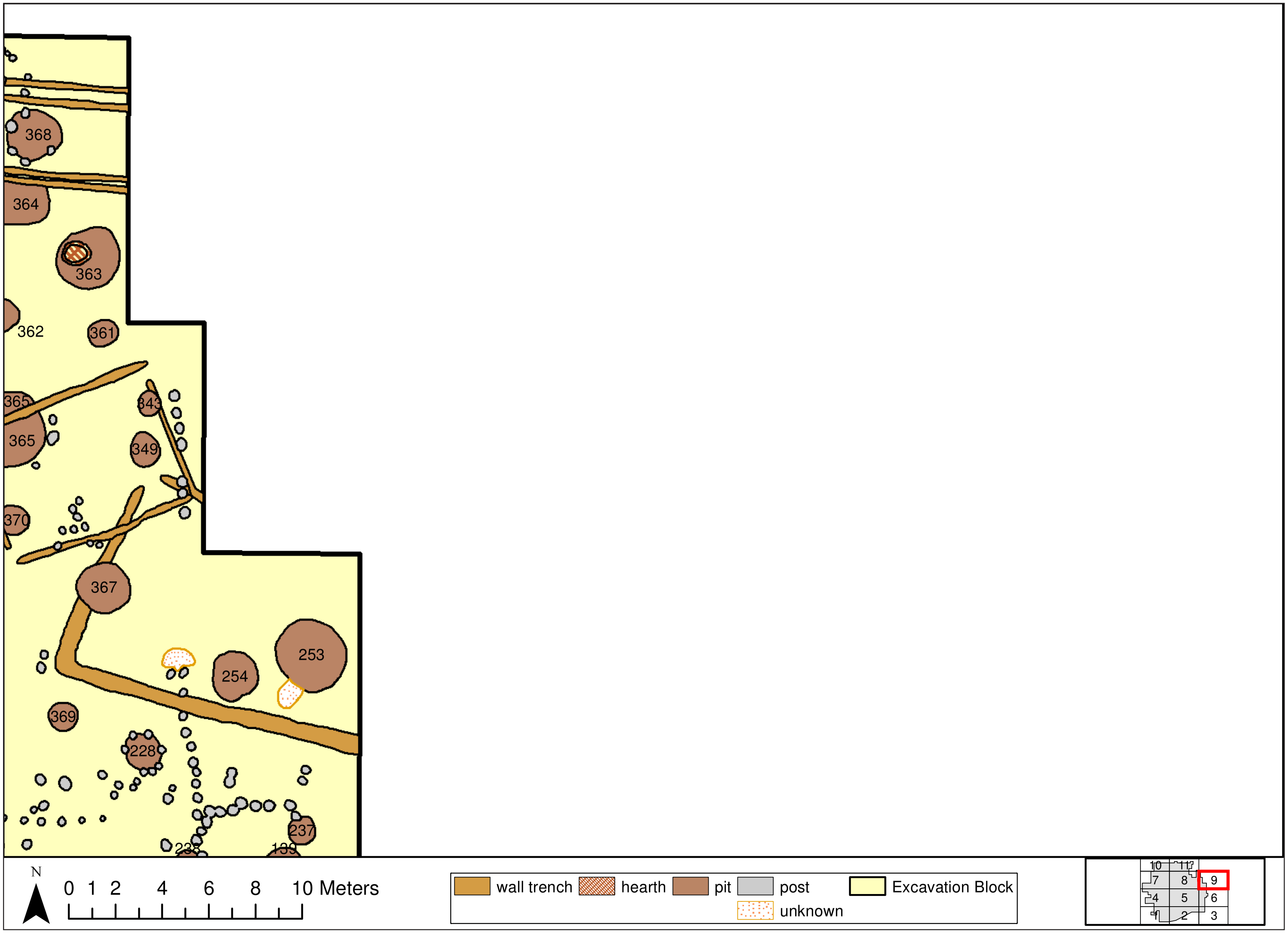
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0 1 2 4 6 8 10 Meters
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hearth
pit
post
Excavation Block
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11
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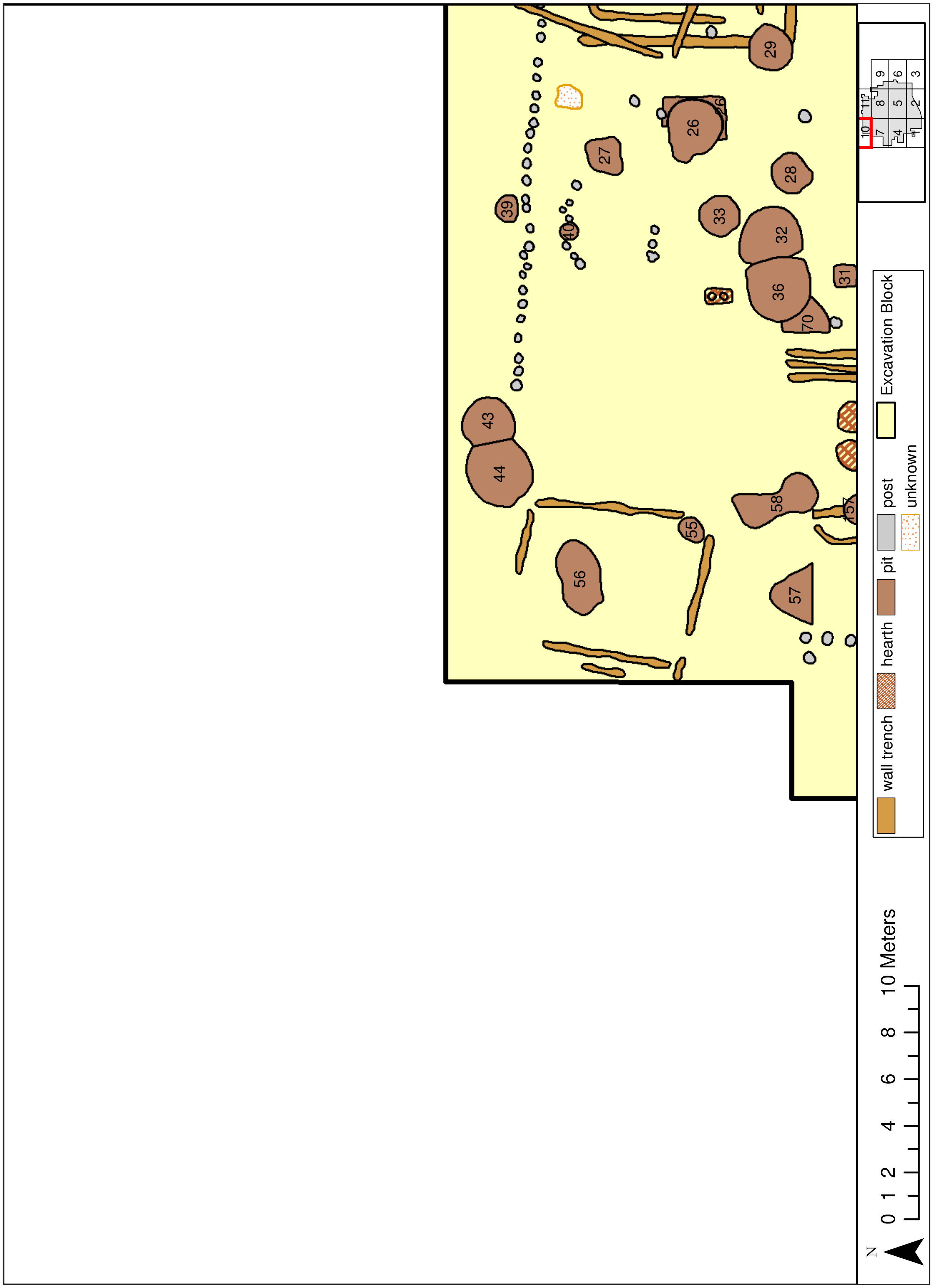
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hearth
pit
post
unknown
Excavation Block
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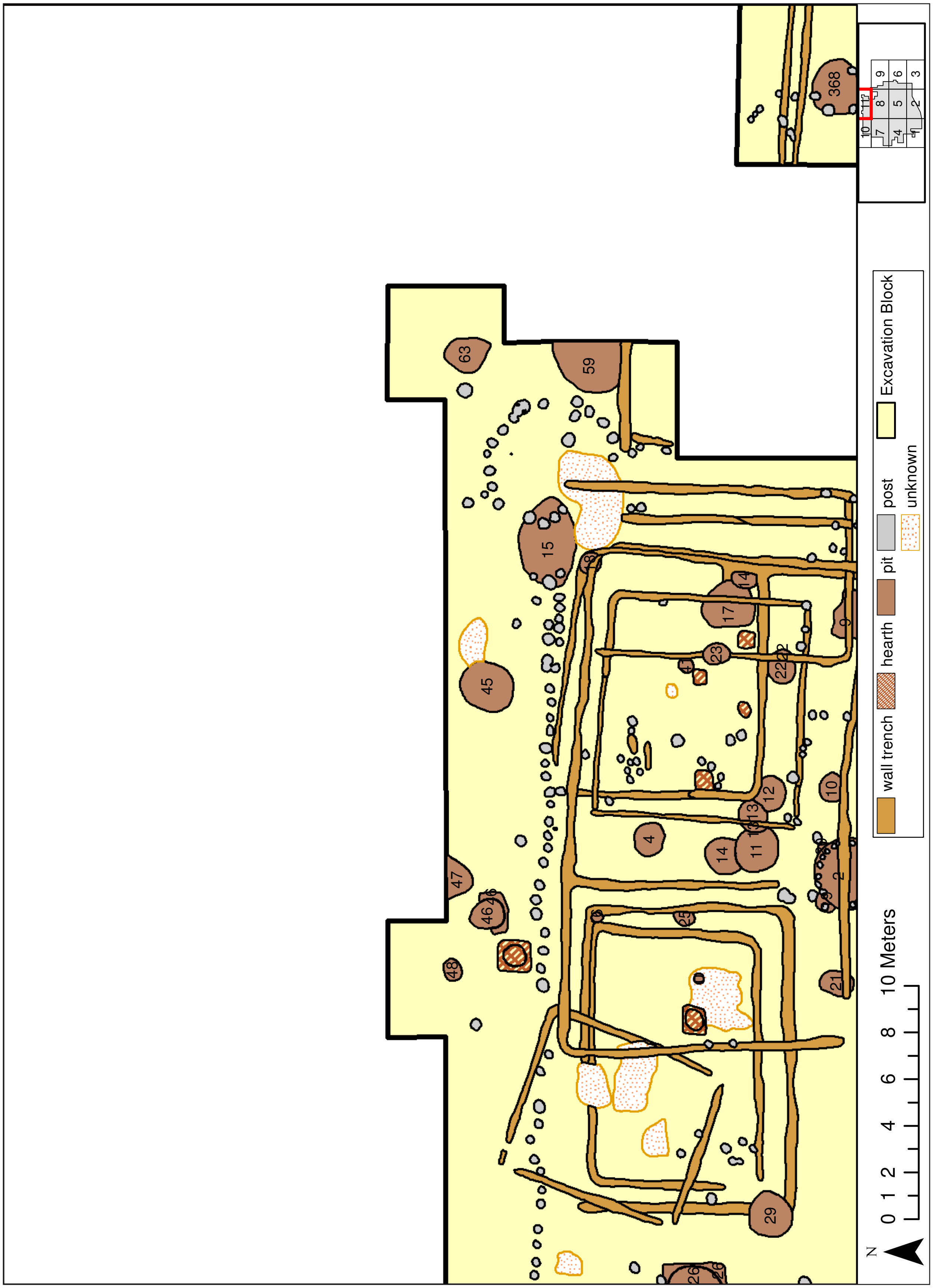
wall trench
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Excavation Block
0 1 2 4 6 8 10 Meters
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