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PILGRIMAGE AND THE CONSTRUCTION OF CAHOKIA: A VIEW FROM THE EMERALD SITE

BY

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DISSERTATION

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ABSTRACT

This dissertation investigates the role of pilgrimage and pilgrimage centers in the development of the pre-Columbian city of Cahokia (A.D. 1050-1350) by examining archaeological data from the Emerald site, a large multi-mound center 24 km east of Cahokia. The goals of this project are to determine whether the Emerald site was a pilgrimage center coeval with Cahokia and, if so, how these journeys contributed to Cahokia's beginnings. Using mound construction data from four of Emerald's earthen mounds, data from magnetic surveys and targeted excavations on a pre-Columbian roadway called the Emerald Avenue linking Emerald to Cahokia, and analyses of features and artifacts excavated from the Emerald site by the Illinois State Archaeological Survey in 1998 and 2011, I argue that Cahokia's development hinged in part on pilgrimages to the Emerald site during lunar standstill events every 18.6 years.

To determine whether Emerald was a pilgrimage center, I used ethnohistories, ethnographies, and contemporary accounts of Native American pilgrimage to construct material correlates of what we might expect to find archaeologically at a Native American pilgrimage center. These correlates include multiple short-term occupations, formal roads or paths converging there, evidence of non-local populations, few domestic structures, religious structures, plazas or open areas, evidence of feasting and other communal activities, and acts of remembrance. Overall, the archaeological data closely corresponds with these correlates. Ceramic and architectural data revealed that there were at least five distinct, short-term occupations at Emerald from about A.D. 1020 to 1200. Importantly, during one of these occupations, the Emerald site was completely reconstructed and enlarged in conjunction with Cahokia's A.D. 1050 founding. Investigations on the Emerald Avenue provide indirect evidence that there was indeed a processional avenue that linked Cahokia and Emerald. Ceramic data

demonstrates that pilgrims traveled to Emerald primarily from Cahokia and the lower Illinois Valley and not local villages near the Emerald site. Short-term domiciles, special shrine structures, a large plaza, the continued enlargement and renewal of Emerald's central earthen monument, and abundant feasting remains also point to Emerald's unique nature. Overall, this evidence shows that Emerald was a pilgrimage center temporally and spatially associated with Cahokia's founding.

Pilgrimages to the Emerald site were key to Cahokia's emergence. More specifically, the alignment of Emerald's natural landscape, mounds, and features to the lunar standstill event, the presence of a spring adjacent to the site, the continued renewal of the primary mound, large-scale feasts, and the special structures at the site show that these journeys linked pilgrims to the moon, Earth Mother deity, Under World, mythical narratives, and notions of renewal, abundance, and fertility. The relationships that were forged during these pilgrimages ensured world renewal, sufficient rainfall, and successful harvests; they also instigated important social and political alliances and a collective identity. In sum, pilgrimages to Emerald assured the overall wellbeing and prosperity of the Cahokian world. It is likely that without these journeys, the city of Cahokia and its impact on the rest of pre-Columbian North America, would have been profoundly different.

For Terra and Adam

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CHAPTER 1
INTRODUCTION

Pilgrimage, or the physical journey of an individual or group to a historically or religiously significant place, has become a central topic in archaeology. A number of scholars have argued that pilgrims, pilgrimage centers, or the practice of pilgrimage were integral to the development and maintenance of cities, ceremonial centers, states, and empires throughout the world (Bauer and Stanish 2001; Boone 2002; Coleman and Elsner 1995; Dubey et al. 2000; Mack 2002, 2004; McCorriston 2011, 2013; Ristvet 2011, 2015; Singh 2000). Elizabeth Boone (2002), for example, has shown that residents from the 16th century Aztec capital-city of Tenochtitlan made pilgrimages to the ancient city of Teotihuacan, which thrived a millennium earlier. The Aztecs recognized Teotihuacan as a place of myth and power – it was the birthplace of the sun and moon, the birth and resting place of mythical rulers, the place where the Aztec system of government was founded, and the site of the ancient city of Tollan, a mythical Toltec city described in Nahuatl legends as a place of abundance, intellectual achievement, and Aztec origin. Tenochtitlan's rulers in particular attributed special importance to Teotihuacan. Sixteenth century historical documents record that the Aztec Emperor Moctezuma and his priests "came to offer sacrifices every twenty days" on the top of Teotihuacan's Pyramid of the Moon (Boone 2002:386-387). For Tenochtitlan elite, pilgrimages to Teotihuacan were a way to draw on a mythical past to maintain their power and ensure the continuity of the Aztec world. Without pilgrimages to Teotihuacan, the city of Tenochtitlan may never have been constructed; at the very least, its history would have been profoundly different.

Surprisingly few Mississippian scholars have seriously considered the role of pilgrimage and pilgrimage centers in the emergence of Mississippian towns and mound centers (see

Pauketat 2013a for an exception). Instead, Mississippian culture and settlements are generally interpreted as the result of neo-evolutionary trajectories, environmental adaptation, powerful leaders, political economies, or fission-fusion processes (Anderson 1994; Beck 2003; Blitz 1993, 1999; Brown et al. 1990; Kelly 1990a; Knight 1990; Milner 1998; Muller 1997; Pauketat 1994; Peebles and Kus 1977; Peregrine 1992; Rees 1997; Smith 1990; Trubitt 2000; Welsh 1991; compare with Alt 2010; Blitz 2009; Cobb 2003; Pauketat 2007). However, pilgrimage seems like a worthwhile avenue of inquiry as it might explain, at least in part, the multiethnic nature of Mississippian towns, the spread of Mississippian practices and objects throughout eastern North America, evidence for communal ceremonies and practices at mound centers, the fusion of autonomous groups under larger political units, and the periodic returning to vacant Mississippian centers (see Alt 2006, 2008; Blitz 1993, 1999, 2009; King 2003; Knight and Steponaitis 1998; Pauketat and Alt 2003; Pauketat et al. 2002; Wilson 2008, 2010).

In addition, there is ample evidence that pilgrimages or other analogous special or sacred journeys were performed by past and present native groups throughout the eastern Woodlands. The extensive geometric earthworks, linear passageways, and dearth of associated domestic features and refuse suggests that at least some Ohio Hopewell mound groups were pilgrimage centers (Carr 2006; Lepper 1995, 2004, 2006; Pacheco 2010; Romain 2015a). Scholars have argued that Hopewellian pilgrims journeyed to these mound centers for short periods of time to make offerings of rare materials, participate in mound construction events, bury their dead, and experience rare celestial events (Carr 2006; Lepper 2006; Romain 2015a). Alfred Cave (2006) has argued that the establishment of the sacred settlement of Prophetstown by the Shawnee prophet Tenskwatawa in 1808 attracted Native Americans from the Midwest, Southeast, and Great Plains. While most of the settlement's population was recruited by Tenskwatawa's brother, Tecumseh, to permanently settle there and join a Pan-Indian alliance against Euro-American settlement and ways of life, some briefly visited Prophetstown to hear Tenskwatawa's message and be healed by his powers. The comings and goings of these so-called pilgrims were integral to Prophetstown's existence and history (Cave 2006:101, 105).

Why do archaeologists overlook or eschew pilgrimage as a factor in the formation of Mississippian centers? I suggest that there are two reasons for this, and that they are largely theoretical. First, as Timothy Pauketat (2013a) and others have argued, most Mississippian archaeologists view religion as a series of beliefs and orthodoxies (see also Baires 2014a; Emerson and Pauketat 2007; Emerson et al. 2008; Pauketat and Emerson 2008). Mississippian archaeologists adopt structural approaches to religion, meaning they view Mississippian religion as a series of beliefs located in the head or at best embedded within cult institutions and symbols that can be decoded via analogies with historic native groups (Pauketat 2013a:23; see Brown 1997, 2004; Knight 1986; Lankford et al. 2011; Reilly 2004; Reilly and Garber 2007). As indicated by numerous scholars, these views of religion are problematic because they homogenize diverse beliefs and practices, reflect the views and dichotomies of western archaeologists, and fail to account for the entanglement of religious experience with the material world and everyday practice (see Baires 2014a; Emerson et al. 2008; Emerson and Pauketat 2007; Pauketat 2013a). Moreover, pilgrimage – as a religious practice based in physical movements, special places, and sacred encounters with various phenomena – has no place in a structural view of religion.

The second reason for disregarding pilgrimage in the formation of Mississippian centers is the prevailing view among archaeologists that cities, towns, and ceremonial centers are constituted by "traits." Mississippian mound centers, for example, are often classified and studied by their spatial dimensions, boundaries, population size, labor organization, ritual practices, and level of complexity (Cobb 2003). As mentioned earlier, the appearance of Mississippian centers and culture is attributed to prime movers such as economic specialization or elite strategies, just to name a few, that either singly or together instigated the amassing of large numbers of people, the construction of monuments, a hierarchical political-religious system controlled by elite-priests or rulers, and so on (Alt 2010; Pauketat 2007; see also Adams 1966; Childe 1950; Cowgill 2004; Creekmore and Fisher 2014; Marcus and Sabloff 2008; A. Smith 2003; M. Smith 2003; Trigger 2003:120-141; Weber 1966 [1921]; Wheatley 1971). From this perspective the movement of human bodies through and to special places, even if they took place, is seen as irrelevant compared to these other factors.

To better understand the role and importance of pilgrimage in the formation of Mississippian centers, we must rethink not only our views of Mississippian religion as Pauketat (2013a; see also Baires 2014a; Emerson et al. 2008) suggests but also how we approach and study Mississippian centers themselves. We must consider them relational – they were assemblages of persons (human and otherwise), things, ideas, practices, materials, memories, and so on that extended beyond the center itself. Importantly, such a perspective – recently elaborated by Ash Amin and Nigel Thrift (2002) and others (Barley 2000; Farias and Bender 2010; Janusek 2006, 2008, 2015a, 2015b) – also sees movements and the relationships they engender as key in a city's formation. Drawing from these perspectives, I likewise view Mississippian centers, towns, and ceremonial centers as constituted by the movement and convergence of various phenomena that created complicated webs of relationships (cf. Janusek 2015b; Pauketat 2013a). Moreover, these fields or webs were continually in flux – they were altered through ongoing movements, shiftings, and alignments of all kinds of entities. From this perspective, understanding the construction of any Mississippian center requires an investigation of the movements (such as pilgrimage) that underlie these phenomena as well as the kinds of relationships and effects they afforded.

In the mid-11th century A.D., a complex nexus of relationships coalesced along the Mississippi River in what is now called the American Bottom, opposite of modern-day St. Louis, Missouri (Figure 1.1). Here, at a place we call Cahokia, a large Native American village was dismantled and North America's first and only pre-Columbian city was built in its place. The new city of Cahokia was unprecedented, complex, and continually changing. It exhibited over 100 earthen monuments, conforming to an overarching city plan, that were continually being enlarged, renewed, and maintained. Thousands of domiciles were built, rebuilt, and dismantled there throughout its history. At its peak, at least 10,000 residents lived at Cahokia, though this number constantly waxed and waned (Pauketat and Lopinot 1997). Moreover, many of these residents were immigrants from outlying regions (Alt 2001, 2002a, 2006; Pauketat 2003); Philip Slater and colleagues (2014) claim that at least a third of American Bottom residents at this time were non-local to the region. Cahokians established colonies and shrines throughout the Midwest (Emerson and Lewis 1991; Stoltman 1991; Pauketat et al. 2015). Importantly, the construction of the city appears to have been part of a new religion that consisted of a milieu of other-worldly powers, superhuman ancestor-heroes, new burial practices, world renewal ceremonies, and cosmic principles (Baires 2014a; Baltus 2014, 2015; Emerson 1989, 1997a, 1997b; Hall 1989, 2006; Pauketat 2013a; Pauketat and Alt 2015). In short, Cahokia was more than a thing or place in the landscape – it was a dynamic web of people, other-than-human persons, places, things, practices, ideas, and more (cf. Alt 2012; Baires 2014a; Baltus 2014, 2015; Pauketat 2013a; Skousen 2015a).

From this perspective, investigating whether pilgrimages occurred in the greater Cahokia region as well as their potential effects suddenly becomes vital in understanding Cahokia's beginnings. Thus, in this book, I evaluate whether pilgrimages took place in the American Bottom in the mid-11th century and if so, investigate their role in Cahokia's formation. I focus specifically on the Emerald site, a large mound center located 24 km east of Cahokia, defined by Timothy Pauketat (2013a) as a possible pilgrimage center (Figure 1.2). Specifically, I ask whether Emerald was a pilgrimage center, when it was visited and/or inhabited, by whom, and in what ways pilgrimages to Emerald were part of the movements and relationships that constituted Cahokia.

To address these issues, I analyze over 50 features and their associated refuse excavated from the Emerald site, construction data from Emerald's central mound, and a roadway that converged at the site. I use architectural and ceramic data to reconstruct the occupational and construction history at the site, ceramic data to infer the geographical origin of the inhabitants, and ceramic, lithic, architectural, botanical, and mound construction data to determine the activities that took place at the site. I compare these data to examples of Native American pilgrimage practices and pilgrimage centers recorded in ethnohistories, ethnographies, and contemporary native accounts as well as to archaeological data recovered from contemporaneous sites in the greater Cahokia region. Based on these analyses and comparisons, I argue that Emerald was indeed a pilgrimage center by at least A.D. 1050, and probably several decades earlier, and that pilgrimages to Emerald were a vital part of Cahokia's construction. More specifically, several decades before Cahokia's construction diverse groups of people traveled to Emerald to feast, perform world renewal ceremonies, and harness the animate powers of Emerald's natural landscape. Then, around A.D. 1050, the entire Emerald landscape was co-opted and reconstructed by Cahokians, some of whom repeatedly traveled to Emerald from Cahokia along a processional avenue during rare lunar events. While at Emerald, visitors feasted, built mounds, and engaged in ceremonies to simultaneously remember the past and renew the world. These journeys and activities not only legitimated elite rule, reinforced Cahokia's dominance, and created social alliances between the visitors, but they also formulated relationships with other-worldly beings and realms. Continually creating and renegotiating these relationships during Emerald pilgrimages was part of a new Cahokian religion and underlay Cahokia's construction and ongoing success (cf. Janusek 2006, 2008, 2015b; Pauketat 2001, 2013a; Pauketat and Alt 2003; Skousen 2015a; Van Dyke 2004; Wilson 2010).

ORGANIZATION OF THE BOOK

I begin Chapter 2 by outlining theories of movement and explaining how movements create, alter, and transform relationships that underlie life and experience. Two kinds of movement are discussed in depth – wayfaring and what I call linear movements. Wayfaring is the improvisatory, undirected forms of movement that make up the majority of everyday life and experience (see Ingold 2000, 2007, 2011). Linear movements, on the other hand, are direct, ordered, intentional, and repeated; moreover, they are capable of referencing and reconfiguring particular relationships in new ways. In the second part of the chapter, I discuss the concept of pilgrimage and suggest that despite its historical baggage, the concept is in some ways similar to Native American sacred journeys and can be used to broadly describe these practices. I also contend that pilgrimage is a form of linear movement that links humans with other humans, deities, spirits, places, and phenomena. Importantly, Native American pilgrimages are acts of remembering that deliberately reference and renegotiate specific social memories for present and future purposes (see Jones 2007; Joyce 2003; Mills and Walker 2008a; Pauketat 2014). Next I describe four examples of Native American pilgrimage to demonstrate the relational link between pilgrimage, remembering, and other phenomena. I conclude the chapter by describing potential material traces of a Native American pilgrimage center, thus providing a series of correlates to evaluate archaeological data recovered from the Emerald site.

In Chapter 3, I first discuss models of Cahokia's development, followed by an account of the history of Cahokia and the greater American Bottom region. Overall, archaeological evidence shows that Cahokia's beginnings were tied to the movements and connections between distant places and groups, other-worldly realms and beings, multiple temporalities, and new practices, objects, and materials. Though few scholars have formally investigated pilgrimage as one of these movements, it was undoubtedly a movement that contributed to Cahokia's entanglements (see Pauketat 2013a; Pauketat and Alt 2015).

I begin Chapter 4 by describing the natural landscape of the Emerald site. This is followed by a description of the overall layout of the site based on previous work there, which until recently consisted of descriptions, surface collections, and limited salvage excavations. I then provide a history of mound construction at the site as well as estimate the rapidity of mound construction and the number of people these construction events required. The construction history is primarily based on excavations into the pre-mound construction fills underneath Mounds 7 and 9 performed by the Illinois State Archaeological Survey (ISAS) in 2011 (which has not been analyzed or reported), 2012 excavations on Mound 12 as part of a joint Indiana University and University of Illinois project funded by the Boston Historical Society's Religion and Innovation in Human Affairs (RIHA), my own 2014 excavations on Mound 12 funded by the National Science Foundation, and previous excavations on Mound 2. I continue to discuss of

Emerald's landscape in Chapter 5 by turning to the Emerald Avenue, a hypothesized pre-Columbian road or processional avenue connecting Emerald to Cahokia. I recount historical descriptions of the Emerald Avenue and my own efforts to identify this feature through magnetic survey and targeted excavations. While these investigations did not provide definitive evidence of the Emerald Avenue, they uncovered remnants of an early 19th century wagon road that probably followed or traced over the Emerald Avenue. In Chapter 6, I present results from ISAS's 1998 and 2011 excavations from the center of the site, which uncovered structures, pits, ceramic and lithic artifacts, and botanical and faunal remains. These data provide a more detailed chronology of the site and shed light on who visited the site, how long they stayed, and the activities they performed there. In Chapter 7 I summarize the evidence and patterns presented in Chapters 4 through 6. Cumulatively, this evidence shows that Emerald was a pilgrimage center – it has a uniquely aligned landscape, a path that connected it to Cahokia, a large central plaza, multiple discrete occupations, special shrine structures, a few short-term domestic structures, evidence of multiple large-scale feasts and mound construction events, and evidence of visitors from Cahokia and more distant locales. I also elaborate on the specific relationships these journeys engendered between pilgrims and the underworld, an Earth Mother deity, and notions of fertility, renewal, and abundance.

In the final chapter I discuss why pilgrimages to Emerald mattered in Cahokia's formation. I suggest that it was during these pilgrimages and their associated activities that visitors made connections between each other and, just as importantly, animate beings, spirits, and other-worldly places during regular world renewal ceremonies at the site. These ceremonies were a key part of Cahokia's new religion, and the relationships they created were necessary for the construction of Cahokia itself. Renewing relationships with kin and other pilgrims during these ceremonies reinforced social and political bonds, constructed a common Cahokian identity, and made connections with powerful beings that ensured adequate rainfall, abundant harvests, amiable social relations, and overall favorable conditions through which Cahokia was constructed and flourished through time. Thus, these pilgrimages to Emerald were a vital part of the movements and relational milieu that underlay Cahokia's development and ongoing construction well into the 13^{th} century.

FIGURES

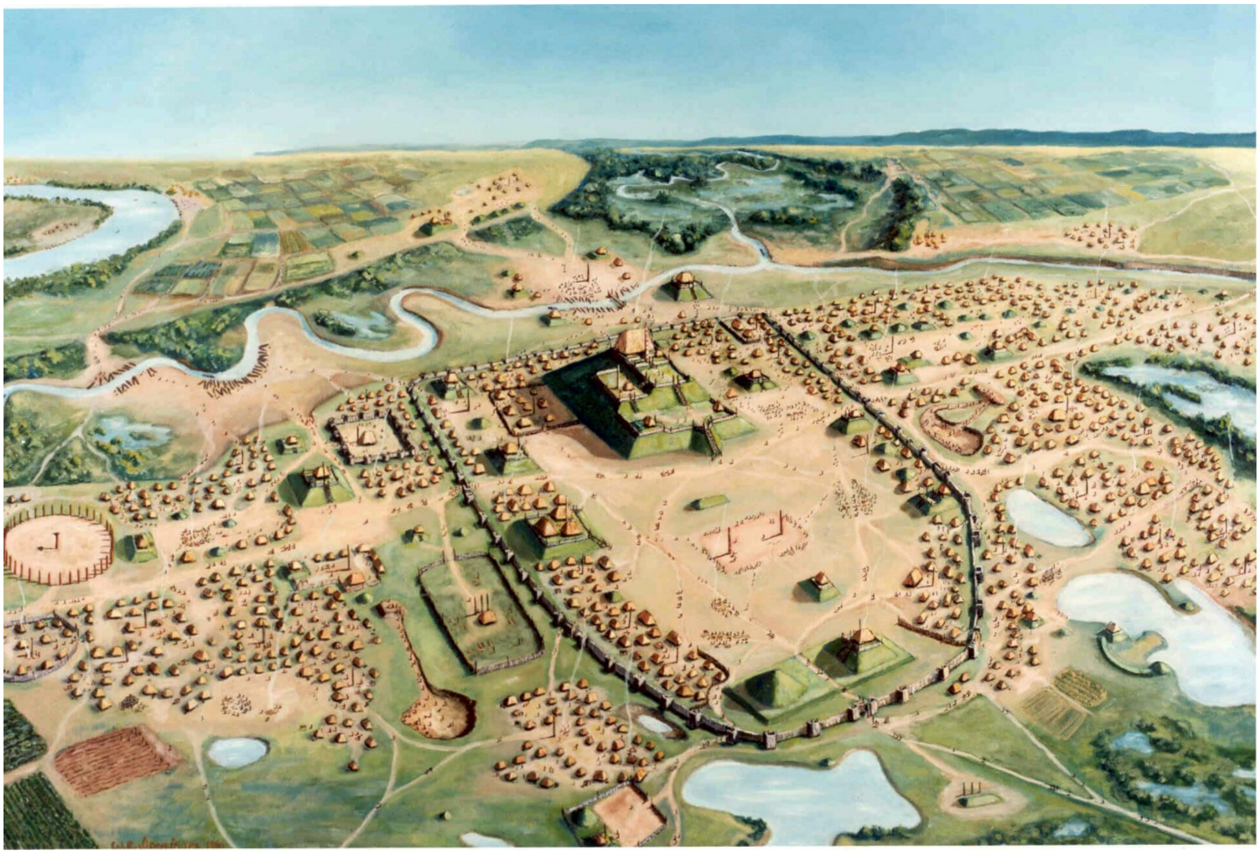

Figure 1.1. Downtown Cahokia, late 12th century. Painting by William R. Iseminger, courtesy of Cahokia Mounds State Historic Site.

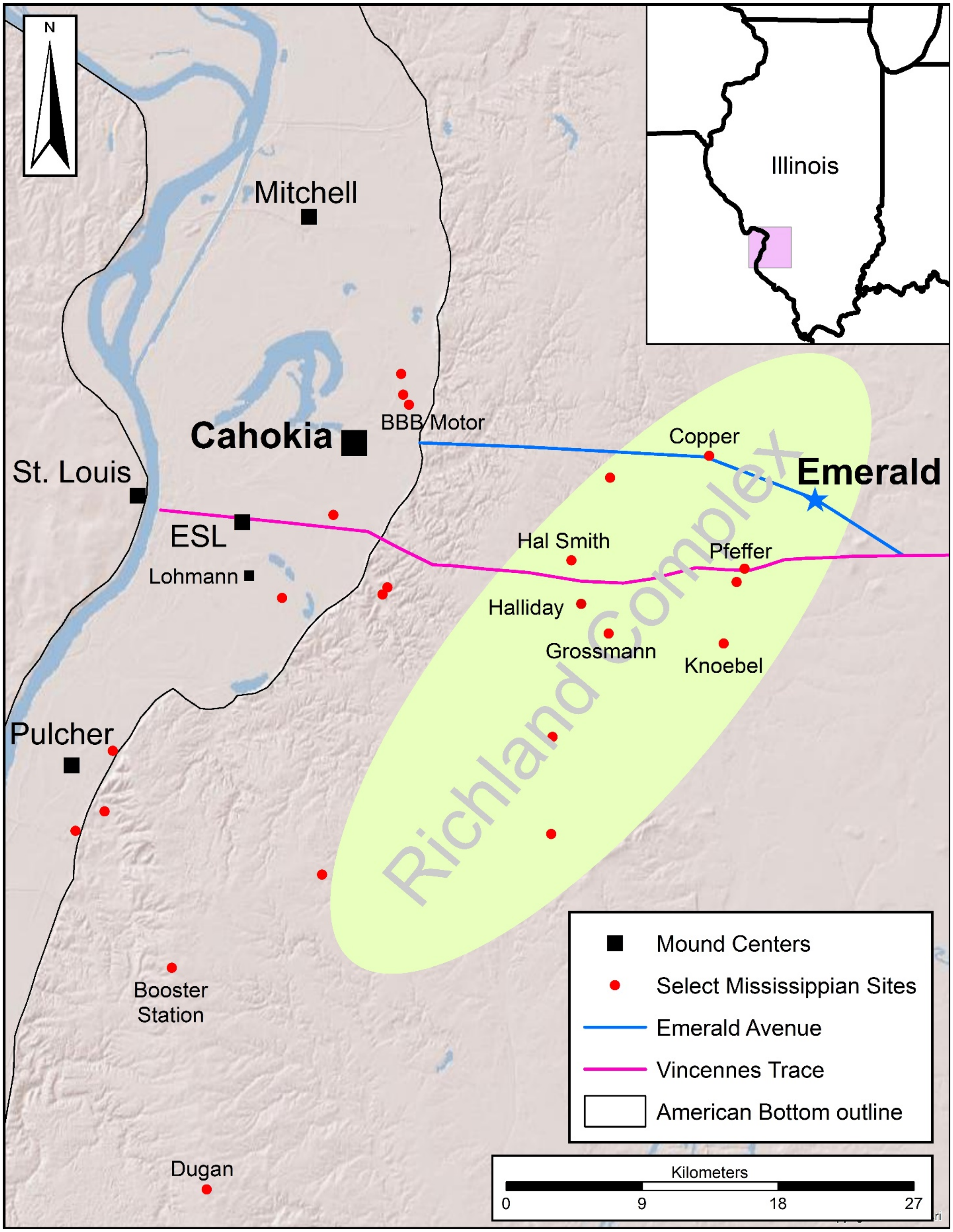

Figure 1.2. Overview of the greater Cahokia Region with the location of the Emerald site (11S1), Emerald Avenue, Vincennes Trace, and other select sites in the region.

CHAPTER 2
THEORIZING MOVEMENT, RELATIONSHIPS, AND PILGRIMAGE

If Mississippian centers like Cahokia were relational as argued in Chapter 1, then understanding their development necessitates an examination of the relationships that constitute them and, more importantly, the movements that brought them about. In this chapter I discuss movement and how certain kinds of movements instigate certain kinds of relationships. I argue that Native American pilgrimages are a particular form of movement that brings about particular relationships with people, special places, sacred objects, memories, and other-worldly entities. In this case, pilgrimages to Emerald mediated relationships between people as well as these other phenomena that were a necessary part of Cahokia's construction and overall wellbeing.

I begin by discussing movement and the role of movement in recent theories of relationality. I focus particularly on theories developed by Tim Ingold (2000, 2007, 2011), Timothy Pauketat (2013a), Sarah Baires and colleagues (2013), and myself and Meghan Buchanan (2015). I then describe three forms of movement: transport, wayfaring, and what I call linear movement, and argue that pilgrimage is a kind of linear movement that affords unique relationships that do not occur in everyday situations. Next, I use ethnohistories, ethnographies, and contemporary native accounts to show that Native American pilgrimages always involve returning to particular places, remembering past figures and histories, and re-incorporating these things into the present. I then provide several specific examples of these sacred journeys. I end with a discussion on how to identify Native American pilgrimage centers archaeologically, which will help me evaluate whether Emerald was a pilgrimage center in Chapters 4 through 7.

THEORIZING MOVEMENT

Human movement as the physical journey of humans through landscapes has been a major topic of inquiry in the social sciences, and more recently in archaeology. Early twentieth-century anthropologists believed that the large scale movements of people explained culture change. These scholars drew from the works of Boas (1896) and his students, who argued that cultural traits diffused or spread through the intermittent movement and contact of different populations (see also Bender 2001:76-77; Trigger 2006:217-223). The archaeologist V. Gordon Childe (1969 [1950]), for example, argued that only migration could account for the complete replacement of an entire culture (i.e., set of artifacts types) by another. While these normative, overly-simplistic diffusionist models were eventually rejected, human movement has been pushed to the forefront of recent archaeological scholarship, thanks in part to the development of new sourcing methods (see Scarre 2015). Migration, trade, pilgrimage, resettlement, seasonal movements, and other long-distance journeys are popular topics (see Bauer and Stanish 2001; Beaudry and Parno 2013; Beekman and Christensen 2003; Bender 2001; Close 2000; Cummings and Johnston 2007; Gibson 2007; Knott and McLoughlin 2010; Leary 2014; Mills 2005; Pauketat 2003; Peregrine et al. 2009; Ristvet 2015; Seymour 2012; Snead et al. 2009).

Prior to the mid-20th century, however, theoretical attention to the body itself, and especially the moving body, was absent in the social sciences. The body was viewed as a "deterministic object" – in short, it was a mechanical system whose movements were determined by society or biology, not the agency of an embodied person (Farnell and Varela 2008:234). Any treatment of human actions or movements were simply objective observations of these actions and how they fit within larger social or psychological structures (see Farnell and Varela 2008:218). There were a few exceptions. In the early 1900s Franz Boas and his students were the first scholars to recognize that certain bodily movements such as gestures and dances were important, albeit only as environmental, social, or psychological adaptations (see Farnell 1999:349-350). Moreover, Marcel Mauss (1979 [1935]) considered human movement itself as a topic worthy of study. He specifically recognized that everyday movements (e.g., walking, running, digging) were cultural constructions, varied widely through time and space, and had meanings and effects. Aside from these exceptions, as a whole the body was ignored as being an important part of human agency and experience (Farnell and Varela 2008).

Beginning in the 1970s there was a conscious attempt to bring the body back into social theory. In anthropology, this move came with recently developed theories of practice and embodiment (Farnell and Varela 2008:216). Farnell and Varela (2008) call this development the "first somatic revolution." The goal was to focus on the subjective nature of the moving body (how it is perceived, felt, and experienced by humans) and not just the mechanical nature of the body (as a thing that responds to external stimuli, commands from the brain, or social or psychological structures) (Farnell and Varela 2008). In a word, this perspective focused on the sense or "feeling of doing" but not the ability of the moving body to signify or create meaningful representations (Farnell and Varela 2008:216). While these newer theories of embodiment considered the importance of bodily movement, they retained the dichotomy between body and brain – though the movements of the body were clearly felt and experienced by individuals, the meanings of these movements and experiences were constructed by the brain.

Interestingly, several years before the first somatic revolution, a number of scholars began to formulate a theory of "dynamic embodiment" (see Williams 1975). According to Farnell and Varela (2008), the development of dynamic embodiment theory (which began with Williams 1975), represents "the second somatic revolution." This perspective claims that bodily movement itself is meaningful, even if a particular movement is unintentional. Brenda Farnell

(1994, 1996, 1999), for example, contends that humans participate in a variety of complex bodily activities full of meaning. These movements, along with thoughts and speech, are the source of intelligence, knowledge, and communication (Farnell 2003). Adopting this perspective overturns the mind-body dualism still cemented in Western academic traditions as well as a view of the body as "a static, more or less passive cultural object of disciplines and representations" (Farnell 1999:348). Indeed, she argues that bodily movements constitute the ways in which a person purposefully and meaningfully engages with the world and effects a person's identity and knowledge of society.

Bodily movement was a fundamental starting point for most theories of human perception. In the 16th century, Descartes argued that "the basis of perception is an awareness of states of the brain that are the remote effects of physical causes" (Harre 1986:155, cited in Farnell 2003:133). Thus, the body and brain were dichotomized – the body perceived external stimuli through movement, and this information was then transferred to and processed by the brain to construct representations and perceptions of the world. Descartes's dichotomy of body and brain contributed to the idea of the biological, mechanical basis of the body and movement that characterized the social sciences until the first somatic revolution (see above). Beginning in the late 20th century (about the same time as the first somatic revolution), other scholars likewise viewed bodily movement as the crux of perception but rejected Descartes mind-body dichotomy. Maurice Merleau-Ponty (1962) argued that fully understanding any object or place could only occur from multiple angles and perspectives, which meant that a person must move around the object or place to fully discern it. For Merleau-Ponty, then, perception was a complete bodily experience of exploration, engagement, and movement – it did not consist of the brain constructing mental images of what was sensed by the body. Similarly, James Gibson (1986) argued that the environment could only be observed as one moved through it. For Gibson, these movements are exploratory but intentional, and they involve the entire body, which for him also included the mind.

Human movement, particularly the journeys and experiences of humans through landscapes, was key in studies of landscape phenomenology (see Richards 1993, 1996; Thomas 1990, 1993; Tilley 1994, 2004, 2010). Like theories of human perception, these studies considered the body, and specifically the moving body, as the primary medium through which individuals experience and perceive the world. Thus, the location, orientation, and way in which the body moves through and otherwise sensually engages with the landscape dictates the experience of it. One of the problems of these studies is the extent to which an individual's experience of the landscape is represented or experienced by another. Landscapes are socially constructed, meaning they have different meanings for different people in different contexts; furthermore, ontological perspectives of the body are complex and diverse, which complicates the notion of experiential uniformity (see Harris and Robb 2012). Thus, human movement in and around any particular landscape can produce a range of responses and emotions as numerous as the individuals who experience it. The major strength of these studies is the role of landscapes in controlling, dictating, or otherwise affecting human movement, perception, and experience. Tilley (2010:29) argues that landscapes affect how we move, feel, and act; specifically, they "offer a series of affordances for living and acting in the world, and a series of constraints." These affordances may come in the form of natural features like mountains, cliffs, or oceans as well as manmade constructions such as paths, roads, buildings, or monuments (see Barrett 1999; Snead et al. 2009; Thomas 1990; Tilley 1994, 2010). This is not to say that the landscape is merely a backdrop or "structure" that humans simply learn, reproduce, and conform to as they move about (Thomas 1993); moreover, the meanings and experiences of landscapes do not come solely from the brain. Instead, landscapes are a part of the webs or fields of relationships that make up the world and are thus constantly negotiated through the movements and entanglements of all kinds of phenomena (Ingold 2000, 2011).

Building on these previous studies, I see movement as underlying all human perception, life, experience, and history (Farnell 1999; Ingold 2000, 2007, 2011, 2013; Pauketat 2013a; Sheets-Johnstone 2011). I define movement as the shifting, positioning, or alignment of any entity, quality, or phenomenon in relation to others. That is to say movement brings about encounters with other aspects of the world, and it is the elementary factor in the formation and ongoing negotiation of relationships of all kinds (see Baires et al. 2013; Deleuze and Guttarri 2004; Ingold 2000, 2007, 2011, 2013; Latour 2005; Pauketat 2013a; Sheets-Johnstone 2011; Skousen and Buchanan 2015).

Movement is an inherent part of relational theories. Bruno Latour, the pioneer of Actor Network Theory, argues that actors are not the source of action "but the *moving* target of a vast array of entities swarming toward it" (Latour 2005:46, emphasis mine). For him, moving entities initiate relationships between various phenomena, and it is these relationships that ultimately cause or drive action (Latour 2005:60). Furthermore, these networks are constantly being reformulated; Latour describes a reworking of a group or network as "a movement," or something that involves an "older association mutating into a slightly newer or different one" (Latour 2005:36). Thus, movement lies at the heart of the social, which is itself a "type of momentary association which is characterized by the way it gathers together into new shapes" (Latour 2005:65). Networks are the traces of actants that are continually on the move (Latour 2005:132).

Tim Ingold (2000, 2007, 2011, 2013) has argued that life is a web of relationships that is continually in a process of becoming. This perspective overturns what he calls the "logic of inversion," which is a way of seeing entities as isolated from the rest of the world. In this view, people, organisms, and entities are occupants of a completed, static world instead of co-contributors in the world's ongoing formation and flow. Ingold instead views beings of all kinds as a "trail of movement or growth" that have no beginning or end (Ingold 2011:69). As lines of movement, all entities weave their qualities and histories into the world as they move through it, thus becoming inseparable from the surrounding environment. Importantly, people, things, and other phenomena – as well as the other webs of relations in which they are entangled – are also continually reshaped by these movements. Together, the ongoing movement of all these entities form what Ingold (2011) calls the meshwork of life or the texture of the lifeworld. The meshwork and the entities that constitute it are never complete or static; they are always on the move and transforming in unpredictable ways.

Following Ingold, Pauketat (2013a, 2013b) sees movement as the source of relationships because they continually position different phenomena (persons, places, and things as well as their biographies, genealogies, and qualities) in various ways. Pauketat calls the entanglements and effects that result from movement *bundles*. Importantly, bundling involves *translation*, a process in which "all practices, places, and cultural objects not only cite precedents, they relate to others in such a way as to redefine themselves and their associations to fit the local web of experience" (Pauketat 2013a:39; see also Latour 2005). Bundling, therefore, is a historical process. It involves numerous biographies, memories, and the citation of previous movements and associations, and the process of bundling continually translates relationships that always have different effects.

Similarly, Baires and colleagues (2013) see movement as the primary phenomena that defines people, cultures, and agents, and they argue that the ways in which movements occur and mediate relationships is vital to understanding the world. They consider movements as "entanglements of experiences tied to past, present, and future" that connect "different phenomenal realms" and thus alter the fields of relations in which they are embedded (Baires et al. 2013:198). They specifically use Native American pilgrimage, mound construction, and pipe smoking as examples of how this occurs: pilgrimages mimicked origin stories and past journeys, mound construction connected the upperworld, lived-in world, and underworld; and smoking sacred pipes "centered" the smoker in relation to the cosmos and other forms of life (see Baires et al. 2013).

Recently Skousen and Buchanan (2015) emphasized that while the physical movement of humans (e.g., everyday gestures, practices, and activities as well as long-distance journeys, migrations, and relocations) is crucial to the constitution of these relational milieus, movement is not solely a human quality (see also Baires et al. 2013; Ingold 2000, 2007, 2011; Pauketat 2013a). Instead, "all sorts of persons, bodies, entities, ideas, forces, and powers can and do move alongside humans, and these movements matter in the ongoing formation of life and experience" (Skousen and Buchanan 2015:6). Animals forage, hunt, wander, and migrate, often along regular routes (Whitridge 2013). Birds soar through the air. Celestial bodies progress through the sky (Ingold 2011:72; Pauketat 2013a). Natural elements, substances, and weather related phenomena (e.g., wind, lightening, rain) move and are often described as actions or movement itself (see Ingold 2011:72, 115-125).

Moreover, Skousen and Buchanan (2015) argue that movement is not limited to the actions of physical bodies. They can be intangible and ephemeral (see Skousen 2015a).

Memories, for instance, are a form of movement that transports an individual through time, space, and circumstance (Skousen and Buchanan 2015:6; see also Van Dyke and Alcock 2003; Mills and Walker 2008a; Baires et al. 2013; Pauketat 2013a). Many indigenous cultures throughout the New World believe that souls or spirit bodies literally move through space and time during dreams, sleep, or illness (see Freidel et al. 1993; Hall 1997; Hultkrantz 1987; Irwin 1994). Emotions, which are often linked to sensory experiences, are movements – a person can be “moved” to tears or anger, for example (see Skousen and Buchanan 2015). Non-physical movements also include religious, social, and political “movements,” though these too are often accompanied by the physical movements of people and things (Baltus 2014, 2015). The point is that movement includes more than the tangible locomotion of physical bodies through space.

In sum, recent relational theories claim that movements are extremely diverse – humans, bodies, substances, elements, memories, and other “ephemeral” phenomena move through space and time. However, no one movement is necessarily more important than another (though some may have more influence at certain times than others); each movement is part of the relational web of the world and has the potential to affect other phenomena in some way. There are also many different kinds, forms, and styles of movement. This book focuses on the ways that certain forms of human movement, specifically pilgrimage, alter the relational fields in which they are enmeshed. In this case, I argue that pilgrimages to the Emerald site involved both physical movement of humans through space as well as memory work, and that these movements transformed relationships between humans and other-worldly beings and places.

CONCEPTUALIZING MOVEMENTS

In this section I describe three ways of conceptualizing movement. The first, called transport, is the movement of a person or thing from one place to another (Ingold 2007:77). The second is the undirected, improvisatory form of movement that Ingold (2007:75-76) calls wayfaring. The final form is the more ordered, direct forms of movement I call linear movement. In a way, linear movements bridge the gap between transport and wayfaring in that they are intentional movements to particular places but are still affected by convergences and entanglements along the way. Though I focus specifically on linear movements, I argue that all of these forms of movement (as well as many other conceptualizations of movement not discussed here) are part of the meshwork of life and must be considered when investigating the ways movements affect these meshworks.

Transport and Wayfaring

Ingold (2000, 2007, 2011) describes two forms of movement: transport and wayfaring. Transport, according to him, "is destination-oriented. It is not so much a development along a way of life as a carrying across, from location to location, of people and goods in such a way as to leave their basic natures unaffected" (Ingold 2007:77). During transport, in other words, the movements between destinations, places, or locations have little effect on the moving entity: "the sights, sounds and feelings that accost him during the passage have absolutely no bearing on the motion that carries him forth" (Ingold 2007:78). Transport also emphasizes places as static points in two-dimensional space and downplays the movements that occur between them and the interactions and convergences that inevitably occur. According to Ingold (2007), transport is a product of the modern world of commerce, exchange, and capitalism.

In contrast, wayfaring is a form of movement that Ingold argues is a fundamental part of being in the world. The wayfarer is "instantiated in the world as a line of travel," or "an ongoing process of growth and development, or of self-renewal" (Ingold 2007:75-76). Wayfarers unintentionally encounter other phenomena along their paths of travel that are likewise meandering and flowing in various directions. These encounters inevitably shift, redirect, or in some way affect the course and movements of the wayfarer; thus, travel for the wayfarer is a process of moving in relation to the movements that create the meshwork of life (Ingold 2011, 2013). Such wayfaring movements are never repeated but are re-created through repetition, invention, and improvisation and are the primary way humans gain knowledge and understanding (Ingold 2012). Ingold visualizes such wayfaring entities as lines that are "winding," "irregular," and "perambulatory," and have "no ultimate destination, no final point with which they are seeking to link up" (Ingold 2007:81, 2011:148). In sum, wayfaring is an undirected, free-flowing form of movement; it is a "line that goes out for a walk" (Ingold 2007:76). Ingold believes wayfaring is the primary kind of movement that underlies the world (Ingold 2007:81). This fits with his conceptualization of meshwork, which he contrasts with the so-called static network analogy of Latour (2005; see Ingold 2011:89-94). Sheets-Johnstone (2012) and Thrift (2008) also argue that the everyday movements of humans are largely improvisatory and creative. Although Ingold specifically refers to wayfaring as a movement of humans, wayfaring also applies to other phenomena – for instance, the wandering of thoughts, songlines, texts, animals, substances, and so on (see Ingold 2000, 2007, 2011).

Linear Movements

In addition to transport and wayfaring, I suggest that there are other ways to think about movement. In the rest of this book I focus on a third kind of movement I call “linear movement.” Linear movements are more direct, ordered, or focused, similar to the notion of transport; unlike transport, however, linear movements still effect and are affected by other movements and relationships. Linear movements are best illustrated through Latour’s metaphor of networks, which he likens to “star-shaped” bundles or “centers of calculation” (Pauketat 2013a:39 calls them “asterisks”) that connect to others via “conduits” of connection (Latour 2005:178). These conduits are numerous and complex – they run in different directions, accumulate, link time and space, and inform and feed off the others (Latour 2005:173-177). But they are akin to the more direct, linear movements I am referring to because, at least in the way Latour describes them, they are straight and thus dictate the kinds of resulting associations that occur. Importantly, they are different from transport because they are still interconnected with other movements and entities in the world (see Pauketat 2013a:184-187). Put another way, linear movements “entail a myriad of simultaneous movements, as entire fields of citations, attachments, associations, and connections are reconfigured” (Pauketat 2013a:186). Overall, Latour’s conduit metaphor provides a useful contrast to Ingold’s metaphor of twisting lines and helps us visualize the variety of movements that occur in fields of relationships.

I contend that at least three kinds of linear movements are a vital part of human experience. The first is the “more direct and linear movements of sensory organs” involved in perception, as discussed by Sarah Baires and colleagues (2013:211; see also Pauketat 2013a:184). For example, a flash of light or an unexpected movement in the sky draws one’s eye, a person may intentionally focus his or her gaze on certain destinations on the horizon during a journey, animals catch and follow a smell or sound in the air, all the senses of an animal or human can focus on a predator or some other impending danger. These kinds of sensory movements are instantaneous, direct, and purposeful, and they contrast with more casual, sweeping, unfocused perceptions of landscapes, places, or things.

The second kind of linear movement is memory work, as mentioned by Pauketat (2013a) and Baires et al. (2013:211; see also Connerton 1989; Butler 1993; Mills and Walker 2008a; Van Dyke and Alcock 2003). Memory work is the "social practices that create memories, including recalling, reshaping, forgetting, inventing, coordinating, and transmitting" (Mills and Walker 2008b:4). Many forms of memory work are bodily movements performed as a habitual part of everyday life – Connerton (1989:72-73) calls these incorporated practices. Indeed, in most situations humans unconsciously recall and use past experiences or memories to make sense of the present context (see Connerton 1989; Pauketat and Alt 2005). Rosemary Joyce (2003, 2008), for instance, shows that repeated practices always involve memory work. She sees these acts as the accumulation of actions performed through time. Each individual event or act is a "layer" that references previous acts but is modified in the present. In other words, these repetitive events are "historicized chains of practices" that are improvised within "bounds of strategies" (Joyce 2008:26, 30). These chains of practices are akin to John Chapman's (2000) notion of enchainment, or the idea that fragments of the same object exchanged between different people represent a link or chain of personal relation (see also Gell 1998).

Similar conceptions of memory work are embodied in the ideas of citation and index (Butler 1993; Jones 2001, 2007; Joyce 2008; Pauketat 2008; Pollard 2008). Citation is the idea that humans only make sense of their current predicament through references to other persons, places, things, and situations previously encountered or experienced; at the same time, however, citation is never a perfect replication of the past (Butler 1993; see also Gell 1998; Jones 2001). Regarding index, Andrew Jones (2007:23) claims that

> "the notion of index is especially useful in the context of discussions of memory because it captures a sense of the way in which material traces or natural phenomena are perceived as signs of past events. By focusing on causation, the directive force of events, it also implies a sense of conjunction. Smoke equals fire because it is a product of fire. Hoofprints refer to the horse because they resemble the shape of its hooves. When dealing with material culture, this seems more useful than an approach to signification which treats meaning as arbitrary to the signifier. However, while there is contiguity, the sign is not identical to that to which it refers."

As Jones suggests, indexing, or linking signs to certain meanings or events, is a form of memory work during which one connects the sign with previous experiences.

Many forms of memory work, however, are more intentional or linear in that they deliberately reference particular events or actions in the past as well as their socially-accepted meanings (see Connerton 1989; Joyce 2003; Meskell 2003; Pauketat and Alt 2003; Wilson 2010). Some acts of memory work, for example, are akin to the inscribed practices discussed by Connerton (1989:72-73). These kinds of practices are usually recorded and stored, retrieved specifically during acts of remembrance. These acts are meant to portray a particular action, event, or version of the past for specific purposes or goals (see also Joyce 2003; Wilson 2010). Commemorative ceremonies, for example, are formal, public events that involve writ, repetitive speech, gestures, actions, and other performances that directly mark, link to, or reference the past. The goal of these performances is to recreate a particular version of the past in the present (Connerton 1989).

Of course, the specific memory or memories recalled are always reconstructed and transformed in some way. While the construction of Mississippian mounds undoubtedly mimicked or referenced an ancient creation myth (see Hall 1997; Knight 1989), these acts were still performed and interpreted differently by the participants. As Pauketat and Alt (2003:161) rightly claim, such practices were "co-opted and promoted in ways that selectively draw from the past." Some linear movements are imaginaries, or actions motivated by a future goal or purpose (Bradley 1997:151-155; 2002; Pauketat 2014; Sassaman 2012; Scarre 2002; Whitridge 2004). Bruce Bradley (2002), for instance, suggests that stone monuments in ancient Europe evoked certain responses and interpretations and thus shaped future actions and movements, an argument iterated by Pauketat for Mississippian mounds (2014). Similarly, Kenneth Sassaman (2012) posits that major acts or "events," such as the founding of the Archaic-period mound center of Poverty Point, was the result of "purposeful actions to change things from the way they are to what one imagines they should be" (Sassaman 2012:253). Though imaginaries seem to contrast with commemorative events, the two often coincide and thus are not mutually exclusive (see Joyce 2003; Pauketat 2014; Sassaman 2012; Wilson 2010). Overall, the ideas of memory work and imaginaries capture what I am calling linear movement in that they directly connect a person, thing, place, or event with a past memory and/or imagined future.

The third kind of linear movement is the ordered procession of phenomena through space. These movements are often performed by non-human bodies or entities. Birds fly directly from one branch to another, or an arrow streaks toward an unsuspecting target. Perhaps the best example is Pauketat's (2013a:186) conception of celestial bodies traversing the sky in linear, predictable paths (see also Farnell 1994:959). Linear movements also include some movements of human beings. In some cases, this kind of human movement is not only direct and linear but highly structured and systematic. Advocates of the "anthropology of human movement," for instance, study more formal systems of movement such as rituals, dances, and exercise techniques (see Farnell 1995, 1999; Kaeppler 1971; Williams 1975, 1997). These activities are performed by agents who move in symbolic and meaningful ways and, though they involve some creativity, are far more focused, structured, and intentional than wayfaring.

Other linear human movements are less structured but still intentional and strategic. Yi-Fu Tuan (1977:180) argues that some human movements are "oriented to a feature and compelling goal." The goal is a point in space one aspires to reach by following a more direct path of movement. These paths, according to Tuan, are different from other forms of everyday movement, which are repeated and consist of "pauses" (Tuan 1977:180-182). In a similar vein, De Certeau (1984:36-42) describes the "tactics" of everyday life as including movements that "must play on and with a terrain imposed on it and organized by the law of a foreign power." Such movements or actions, in other words, are conscious and calculated but also dictated by external rules or orders. For Jack Katz (1999:36), tactics best describe the knowledgeable movements of drivers in modern cities. While drivers know the limits of traffic laws and the city's infrastructure, they choose specific routes to avoid traffic jams, stoplights, and other obstacles to get to their destination more quickly or directly.

Similarly, human movements through a landscape are often linear or directed because of paths, roads, monuments, and natural features (Thomas 1990, 1993; Tilley 1994, 2004, 2010). Paths, trails, and roads in particular represent histories of movements, dictate (at least to some degree) the experiences that occur along them, and "become obvious templates for future movements" (Tilley 1994:31; see also Snead et al. 2009; Tilley 2004, 2010). Using Ingold's concept of the meshwork, the linear movements of humans through a landscape can be visualized as individual threads that follow, run alongside, intertwine with, or tightly coil around previous ones and dictate future movements. Together these threads form a thickly-twisted cord or a thick, linear trace that is inherently historical because each thread is tethered to, traces over, or mimics past movements while also paving the way for future movements (cf. Ingold 2011). Such movements along paths and roads include the regular journeys of large numbers of people that travel to a certain place for a certain purpose (e.g., processions and pilgrimages).

This is not to say that the linear movements of human bodies through space, even if they are repeated and/or commemorative, duplicate earlier ones. Linear movements are always improvised to some degree. They are always slightly different due to the sensual and physical experience of moving through landscapes, the current condition of the moving body(s), and the ongoing engagement with people, things, and other phenomena along the way (see Ingold 2012; Jones 2007; Mills and Walker 2008a; Thrift 2008). Sheets-Johnstone (2012:126), for example, argues that while we can perceive the paths or traces of our past movements, we can never perfectly reconstruct them – we can only "dynamically recreate the lines along which we traveled and those which our lives once followed." Ingold's (2000:220) notion of wayfinding (not to be confused with wayfaring) also embodies this idea – that such movements through the landscape are improvisatory but also rely on previous movements. The linear movements of humans, then, are best viewed as citations of an original movement but not replications of it; they simply have an essence or quality that is similar to previous ones, though the degree to which a person is aware of the past during these movements varies (Butler 1993; Jones 2007). As I will argue below, memory work is clearly a major part of journeys such as Native American pilgrimages.

While all forms of movement create, alter, or transform relationships between phenomena, linear movements transform relationships in particular ways. For example, when humans move along a regular path or route of travel, they encounter specific features, monuments, objects, people, and more (Thrift 2008; Tilley 1994, 2010; Snead et al. 2009). When encountered they are processed and interpreted anew – they are incorporated or translated into the meshwork of the world and dictate future actions (Ingold 2011; Pauketat 2013a). However, because linear movements have a history or chain of referents, they also instigate and create predictable encounters, experiences, associations, and memories; they are bundled with things, places, qualities, and properties that ultimately dictate how experiences and meanings are interpreted in the present and future (Jones 2001, 2007; Joyce 2008; Keane 2005; Pauketat 2013a; 2013b). Due to the histories of linear movements, then, certain relationships are more likely to occur, and these relationships dictate, at least to some degree, how one experiences and corresponds to the world, albeit in new and unique ways (see Ingold 2013; Thrift 2008).

In sum, the wayfaring, improvisatory movements described by Ingold are only part of human experience. Many forms of movement, including sensory perceptions, memory work and imaginaries, and some movements of physical bodies through space (including some human movements) are linear, directed, and ordered. Linear movements are vital aspects of life and need to be coupled with transport and wayfaring as described by Ingold. Of course, these different kinds of linear movement are not mutually exclusive. The direct movements of humans through space, for instance, occur simultaneously with and depend on memory work, intentions, and focused perception (see Barrett 1994, 1999; Bradley 2000; Tilley 2004). As I will discuss below, Native American pilgrimages are a linear form of human movement through space that involve intention, planning, and expectation. Traversing the same routes, visiting well-known places, and performing ceremonies during these pilgrimages also mediates the past, present, and future.

PILGRIMAGE

Pilgrimage is a widespread practice that occurs in many past and present cultures throughout the world. Generally, pilgrimages involve the intentional travel of a person or group of people to a sacred or meaningful place (see Coleman and Elsner 1995; Collins-Kreiner 2010; Dyas 2001; Eade and Sallnow 1991; Gitlitz and Davidson 2006; Kantner and Vaughn 2012; Lucero and Kinkella 2015; Morinis 1984; Silverman 1994; Stoddard 1997; Turner and Turner 1978; Van der Veer 1988). These journeys are undertaken for a variety of reasons, such as receiving divine aid, asking for favors, showing devotion, paying penance, leaving offerings, having fun, relaxing, exploring, experiencing history, and many others (see Cohen 1988, 1992; Coleman 2013; Coleman and Elsner 1995; Collins-Kreiner 2010; Dyas 2001; Eade 1992; Gitlitz and Davidson 2006; Singh 2003; Wagner 1997).

Pilgrimage has long been a subject of inquiry in anthropology. Most anthropological studies of pilgrimage can be divided into three general camps or perspectives: a functionalist perspective, a "Turnerian" perspective, or a "contestation" perspective (for reviews, see Bowie 2006:238-244; Coleman 2002; Coleman and Elsner 1995:196-213; Kantner and Vaughn 2012). The functionalist perspective – based in classic British functionalism – sees pilgrimage as a social institution or practice that functioned to integrate society and maintain social equilibrium (Cohn and Marriott 1958; Durkheim 2008; Spiro 1970; Wolf 1958). The second perspective was championed by Victor Turner, who argued that pilgrimage was a liminal practice during which individuals were moved from the everyday social structure into a sacred condition where structural constraints and statuses were eliminated (Turner 1974; Turner and Turner 1978). Similar to functional perspectives, Turner argued that pilgrimage created a sense of "communitas," or a sense of harmony and shared identity among pilgrims (Turner and Turner 1978). The third perspective represents a backlash to Turner's work – some scholars found that many pilgrimage events were actually fraught with discord and conflict, not communitas (Morinis 1984; Sallnow 1981, 1987, 1991). Thus, they saw pilgrimage and pilgrimage centers as arenas for different and often competing perspectives between individuals and organizations (Eade and Sallnow 1991; Morinis 1984; Sallnow 1981, 1987, 1991; Van der Veer 1988). Today, pilgrimage scholars are moving beyond these three paradigms and viewing pilgrimage and its effects as heterogeneous, diverse, and complex (see Coleman 2002, 2013). Pilgrimage is never solely integrative or divisive, nor is it marked only by communitas or contestation. Pilgrimages are enacted in numerous ways – the degree of pilgrims' devotion varies, each journey is experienced and interpreted differently, and their meanings and effects are unpredictable and historically contingent (Coleman 2013).

Despite the positive direction of these recent studies of pilgrimage, I take a different tack here. I see pilgrimage as a special kind of linear movement that causes unique convergences between various people, places, entities, and phenomena (cf. Baires et al. 2013; Oetelaar 2012, 2015; Pauketat 2013a; Romain 2015a; Skousen 2015a). The resulting entanglements between pilgrims, supernatural powers and beings, special places, sacred objects or icons, practices, memories, and more have outcomes that do not generally occur in normal situations yet permeate and affect everyday life in various ways (see Coleman and Elsner 1995).

Importantly, the movement of pilgrims are more directed and ordered than other forms of human movement because pilgrimages, by and large, are planned, structured journeys in which people travel to specific places for specific reasons (though, as stated above, these reasons vary widely) and return home afterwards. Moreover, pilgrimage routes, centers, shrines, images, and landscapes are built to accommodate and direct the movements and experiences of pilgrims. For example, Christian pilgrims travel on specific trails, encounter particular features and images in certain ways, perform pre-determined gestures, actions, and ceremonies, and travel home with special wisdom and/or objects to use or remind them of the journey (Coleman and Elsner 1994, 1995; Dyas 2001). The point is that the ways pilgrims move is akin to the linear movements discussed earlier, and these forms of movement create specific kinds of encounters, experiences, and relationships.

Native American Pilgrimage

The term pilgrimage is being increasingly used by both western and Native American scholars to refer to a specific kind of sacred journey that was and still is practiced by many indigenous groups throughout the Americas (see Astor-Aguilera and Jarvenpa 2008; Baires et al. 2013; Blaeser 2003; Catlin 1839; Deloria 2003; Echo-Hawk 2000; Ferguson et al. 2009; Fowler 2009; Fox 1997; Gill 2005; Gulliford 2000:73-81; Hall 1997; Howey 2012; Hultkrantz 1987; Koyiyumptewa and Colwell-Chanthaphonh 2011; Medicine 1981; Momaday 1968, 1969, 1975; Nabokov 2006; Naranjo 1995; Oetelaar 2012, 2015; Oetelaar and Oetelaar 2006; Pauketat 2013a; Schachner 2011; Silko 1977; Skousen 2015a; Underhill 1975; Zedeno and Stoffle 2003). This is an interesting development, as the word pilgrimage is rooted in Christian tradition and practice. The word pilgrimage itself originated from the Latin word *peregrinus*, which means a foreigner on a journey; other definitions, which clearly have a Christian flavor, include wayfarer, exile, and "one whose home or destination is heaven" (Dyas 2001:2). The point is that due to its Christian origins, this view of pilgrimage has no direct equivalent in the pre-Columbian world (see Kubler 1985; Morinis and Crumrine 1991; Nolan 1991).

Soon after their arrival in the Americas, however, Europeans witnessed native groups participating in long-distance, planned, and religiously-motivated journeys that colonists believed mimicked the pilgrimages of medieval Europe, and thus began to call these sacred journeys pilgrimages (see Kubler 1985; Palka 2014). In reality, of course, there were many differences between these journeys (see Kubler 1985; Nolan 1991; Palka 2014; Urbano 1991). The question is whether it is still appropriate to use a Christian term to describe a pre-Columbian practice, especially since assigning European words and definitions to control, co-opt, or dissolve native practices was part of Euro-American attempts to colonize and Christianize native peoples in the Americas (see Deloria 2003; Fowles 2013; Nolan 1991). Although I am aware of and sympathetic to these issues, I still use the term pilgrimage to refer to a particular kind of Native American sacred journey in past and present North America. There are several reasons for this. First, as implied earlier, native scholars are beginning to refer to these sacred journeys as pilgrimages (Astor-Aguilera and Jarvenpa 2008; Blaeser 2003; Koyiyumptewa and Colwell-Chanthaphonh 2011; Medicine 1981; Momaday 1975; see also Gill 2005; Oetelaar 2012; Oetelaar and Oetelaar 2006). This may be in part because the mixing of the European pilgrimages and Native American sacred journeys in the Americas created a variety of hybrid pilgrimage-like journeys (Morinis and Crumrine 1991; Nolan 1991). The second reason is that I believe that there are some general similarities between native sacred journeys and European pilgrimages – both were a form of religious practice, are often viewed as "sacred" acts (though notions of what is sacred clearly differ), involved traveling to specific places, and had vital social, religious, and economic effects on individuals and groups. Finally, I believe it is worth highlighting the similarities between these journeys to reach a wider audience and to encourage future research on how these journeys are and are not alike. So, while I am certainly not saying that the Christian notion of pilgrimage equates with the Native American journeys I am referring to here, there are still some broad similarities that I believe are worth retaining.

Ethnohistories, ethnographies, and contemporary accounts show that Native American pilgrimages are vital, planned, repeated regularly, and simultaneously commemorative and forward-looking. These journeys afford unique encounters, entanglements, and relationships between pilgrims, places, spirits, ancestors, other-worldly dimensions, and temporalities (see Blaeser 2003; Baires et al. 2013; Momaday 1969; Nabokov 2006; Oetelaar 2012, 2015; Pauketat 2013a; Silko 1977; Skousen 2015a). Like other pilgrimage traditions, Native American pilgrimages are not meandering movements through the landscape – they are linear, ordered, intentional movements to specific places along specific routes of travel, and they create entanglements between particular phenomena.

The vast majority of Native American pilgrimages fall into two basic forms. The first involves returning to an importance place to gather resources, make offerings, and remember and commune with deities, powers, and ancestors. The second involves a larger gathering of numerous tribes at a particular place to celebrate, feast, and perform world renewal or purification ceremonies. This is not to say that a pilgrimage event (regardless of the form) is a replica of another or experienced in the same way by all participants. There are many individual motivations for undertaking a pilgrimage, and in practice these motivations are often complicated (cf. Coleman 2013). The outcomes of pilgrimages also vary widely. Results include, for example, obtaining important resources, rebalancing the cosmos, renewing the world order, becoming purified, renewing or reinforcing tribal identity, gaining knowledge and/or power, burying the dead, remembering past individuals, places, and events, or any combination of these (Blaeser 2003; Catlin 1839; Hall 1997; Gulliford 2000; Momaday 1969; Nabokov 2006; Oetelaar 2012; Underhill 1975).

Still, Native American pilgrimages, regardless of their motivations, form, or results, involve special or sacred places, specific routes of travel, and returning and remembering. According to Vine Deloria Jr. (2003:275-285), sacred places used as places of pilgrimage are chosen for their special qualities. Some places are sites where something of great importance took place, either in the mythical past or more recently (see Basso 1996; Christie 2009; Gulliford 2000; Momaday 1969; Oetelaar 2012; Oetelaar and Oetelaar 2006). Additionally, some sacred places are where higher powers revealed themselves to human beings in an otherwise secular situation or context. Finally, some places are inherently sacred because higher powers have always revealed themselves to humans there. Native Americans have long visited these places to commune with these powers and "to perform ceremonies…so that the earth and all its forms of life might survive and prosper" (Deloria 2003:279; see also Nabokov 2006).

Additionally, Native American pilgrimages occur along specific routes of travel. These routes are usually well-known paths or trails that were blazed by ancestors, supernatural beings, and culture heroes and regularly trod by past pilgrims. The O'odham Indians of California perform salt pilgrimages to the Pacific coast that follow trails that have been used for generations (Underhill 1975). These pilgrims move and act in certain ways along these trails, such as traveling in single file and in a specific order (with the leader-priest at the front), not straying from the trail, speaking softly, reciting specific prayers and speeches, and performing ceremonies in a prescribed order. Hopi and Zuni pilgrims travel to their sacred shrines along well-known trails where they perform ceremonies for the benefit of their respective tribes (Ferguson et al. 2009; Gill 2005; Gulliford 2000). Ancient trail systems established by mythical figures are regularly used by modern Plains tribes to reach their sacred places scattered throughout their homelands (Oetelaar 2012, 2015).

Perhaps the most important component of Native American pilgrimages – and an important difference between Native American pilgrimages and pilgrimages in many contemporary world religions – is returning, remembering, and recalling (Blaeser 2003). Kimberly Blaeser (2003:83) contends that Native American pilgrimages are "the physical and symbolic reconnection or return to a place of ancestral memory." This is because, for Native Americans, histories are woven into places, and only by visiting and moving through such places can they remember, relive, and experience these histories (see Basso 1996; Blaeser 2003; Deloria 2003; Irwin 1994; Momaday 1968, 1969; Naranjo 1995; Neihardt 2014; Oetelaar 2012). However, these journeys are still undertaken for a reason – they are performed to attain a future goal or expectation. These sacred journeys, then, are movements through time.

N. Scott Momaday, the Kiowa author, describes his own pilgrimage to his grandmother's grave at Rainy Mountain, a well-known landmark for the Kiowas in the southern Plains (Momaday 1969). The motivation for this journey was to "see in reality what she had seen more perfectly in my mind's eye" (Momaday 1969:7). This pilgrimage was a process of remembering. As he made his way to Rainy Mountain, Momaday remembered stories of his ancestors, more recent histories of Kiowa removal and resettlement, his own past experiences with his grandmother and other family members, and his own observations of the landscape and people. These past experiences intertwined with and informed his understanding of the present. For

Momaday, then, pilgrimages are not only physical but "made with the whole memory" (Momaday 1969:4).

Another example is the Cherokee Nation's "Remember the Removal" bike pilgrimage. This 3-week long pilgrimage has occurred annually for over 30 years. It begins in Georgia and retraces the northern-most route of the Trail of Tears, which crosses through Georgia, Tennessee, Kentucky, Illinois, Missouri, Arkansas, and Oklahoma. Riders travel over 1,000 miles and visit historical sites along the way to learn the history of the removal, remember and commemorate the suffering of their ancestors, and visit the places where they settled, lived, and were buried (https://youtu.be/tcAb-WfQGd0; https://youtu.be/uT-8aWxCDHA; https://youtu.be/mQ8AKpyVYQs). Cherokee Nation Chief Bill John Baker claims that the pilgrimage "ensures our tribe's future leaders never forget our past or the sacrifices our ancestors made" (www.cherokee.org/News/Stories/20150603_2015RemembertheRemovalBikeRidetoretraceTrailofTears.aspx). This pilgrimage is not just about remembering past people and events – it also molds leaders for the future.

Thus, Native American pilgrimages are processes of remembering that thereby manipulate present and future conditions. Pilgrims travel to specific places to recall ancestors, deities, and culture heroes and the events, deeds, and ceremonies performed at these places. In a sense, the physical movement of pilgrims is a tangible form of remembering, which itself is a form of movement. Importantly, these intertwined acts of physical movement and remembering during pilgrimage affects the present and future – they help pilgrims interpret and understand their current situation, construct or renew senses of identity, and create or modify possibilities for their futures. As I will show later in this book, pilgrimages to Emerald commemorated past relationships with people and otherworldly beings to integrate them into their present and future relational spheres. These relationships ensured the fertility of crops, the abundance of rain and resources, amiable social relationships, and more that were crucial to Cahokia's construction.

Examples of Native American Pilgrimages

In this section I provide four more detailed accounts of Native American pilgrimages. Two examples recount pilgrimages to sacred or historically significant places and two describe world renewal pilgrimages. Each example shows that Native American pilgrimages were linear journeys that involve visiting specific places, traveling along well-defined routes, and remembering the past for a specific purpose. They also show the ways in which these acts of remembering were often commemorative and reworked in the present to re-create social identities and memories and renewed the world. These examples also provide a number of material signatures and traces of pilgrimage activities and centers that I use to create archaeological correlates of pilgrimage discussed later in this chapter.

Pilgrimage to a Significant Place: Nanih Waiya

An important place of pilgrimage for modern day Choctaw Indians is *Nanih Waiya*, the Choctaw place of origin (see Brescia 1985; Carleton 1996; Nabokov 2006:47-51; Swanton 1931). This place plays a central part in several Choctaw origin stories. One tells of the Choctaw leaving their home in the west and traveling eastward to find a new homeland. They traveled for many days, led by a medicine man with a sacred pole that pointed out the path they were to follow. After many days of travel, the sacred pole directed them to settle at the junction of three rivers, which they named Nanih Waiya (see Swanton 1931). To thank the sacred pole for leading them safely to their new home, the Choctaw constructed a mound that served as the pole's final resting place. Another legend describes the Choctaw emerging from Nanih Waiya or a hole in the ground that led to the belly of the earth. According to this legend, several groups of people emerged from this hole, and each eventually dispersed to other parts of the land and established their own tribes. The final group to surface from the hole was the Choctaw, and they decided to make Nanih Waiya and the surrounding landscape their permanent home (Swanton 1931).

Modern Choctaws believe Nanih Waiya is an ancient mound center located in the modern-day state of Mississippi. Today, Nanih Waiya consists of two mounds (see Swanton 1931). One is a rectangular platform mound with an associated earthen rampart and the other is a conical mound, the top of which is penetrated by a moderate-sized hole (Brescia 1985; Swanton 1931). Nanih Waiya is a place of upmost importance and sacredness and has long been a place of pilgrimage for contemporary Choctaw who have returned here for centuries via special trails or paths. One early description mentions the "traces of two broad, deeply worn roads or highways," one coming from the southeast and the other from the north, converging at the mound (Halbert 1899:223-224). Once there, pilgrims left offerings in, on, and near the conical mound. Horatio Cushman, who wrote extensively about Nanih Waiya in 1899, claimed that "the Choctaws…would ascend it and drop into the hole at its top various trinkets, and sometimes a venison ham, or dressed turkey, as a kind of sacrificial offering to the memory of its ancient builders…and as the highest evidence of their veneration for this relic of their past history, it was sometimes spoken of by the more enthusiastic as their Iholitopa Ishki (Beloved mother)" (cited in Swanton 1931:30). Today Choctaws continue to travel to Nanih Waiya to remember and revere its role as their "Mother" and recall the events that took place there (Carleton 1996; Nabokov 2006:47). Clearly, Nanih Waiya is a key part of Choctaw identity and social stability.

Pilgrimages to this sacred place re-associate the Choctaw with their “mother” and help them remember the events that led to their present place in the world (Carleton 1996; Nabokov 2006:47-51; Swanton 1931).

Pilgrimage to a Significant Place: Bears’ Lodge

Many places of pilgrimage exist throughout the Black Hills in southwestern South Dakota (Hanson and Moore 1999; Jenkins 2013; LaPointe 1976; Momaday 1969; Ostler 2010; Sundstrom 1996, 1997, 2012). Bears’ Lodge (also known as Devils Tower), a 1,000-foot high monolith of igneous rock, is one of these places due to its prominence in tribal myths (Hanson and Moore 1999; LaPoine 1976:65-71; Sundstrom 1996, 1997). The best-known tale of Bears’ Lodge describes the encounter of several young girls with a number of hungry bears, who began chasing them. Just as the bears were about to overtake them, a mysterious voice distracted the bears and instructed the girls to climb a small knoll. They did, and the knoll quickly grew upward and out of the bears’ reach. The bears could not climb the steep sides of the knoll and, in their frustration, clawed the knoll’s sides, leaving deep linear gouges in the rock. The mysterious voice caused boulders from the knoll to fall and kill the bears, after which large birds carried the stranded girls back to their parents. In other versions of the story, the girls instead rose to the sky and became the stars of the Big Dipper or Pleiades (Momaday 1969:8; Sundstrom 1996). The mysterious voice, it is believed, belonged to Fallen Star, one of the Lakota’s culture heroes (see Sundstrom 1997:192).

Bears’ Lodge has long been a place of pilgrimage, particularly in the last hundred years, for the Lakota, Cheyenne, Kiowa, Arapaho, Crow, and Arikara (Hanson and Moore 1999; Sundstrom 1996, 1997). At least one early description mentions trails and paths leading to and from the Black Hills, and it is likely that Bears' Lodge was connected to one of these paths (see Sundstrom 1997:186). Offerings left immediately around Bears' Lodge (small pieces of cloth or packets of dried tobacco tied to trees) and the frames of old sweat lodges are indicative of recent pilgrimages by individuals or small groups to pray and perform special ceremonies (see Hanson and Moore 1999; Jenkins 2013). Sun Dances, ceremonies associated with large annual pilgrimage events, also take place around Bears' Lodge (LaPointe 1976:68-70; Ostler 2010:17; Sundstrom 1996, 1997:187; see below). Today Native American youths return to Bears' Lodge regularly to participate in the Sacred Hoop Run (see Jenkins 2013). This pilgrimage and ceremonial race, initiated in 1983, consists of a 500-mile relay race in the vicinity of Bears' Lodge over a five-day period. It references a sacred myth about the hunting activities of the first human inhabitants of the northern Plains (see Jenkins 2013). Retracing this ancient route encourages Native Americans to discover their history and identity. These pilgrimage-races foster a stronger sense of identity that helps Native American youths cope with poverty, food shortage, and alcoholism as well as to reverse high teen suicide and high school dropout rates (Jenkins 2013). These pilgrimages, in short, involve returning to a special place to remember and reenact certain myths, which construct and revitalize senses of history, identity, belonging, and self-worth in the contemporary world.

World Renewal Pilgrimage: The Sun Dance

The Sun Dance is a generalized designation given to an elaborate pilgrimage and world renewal ceremony practiced by native tribes from the Plains, upper Midwest, and Great Basin (see Amiotte 1989; Archambault 1999; Brown 1953; Hall 1997). While each tribe performs the Sun Dance in their own unique way, this event generally consists of activities such as visiting sacred places, ceremonies, singing, dancing, praying, planning, gossiping, arranging marriages, trading, and gift-giving.

The two basic parts of the Sun Dance are the pilgrimage to the Sun Dance grounds and the actual ceremonies and other activities held at the grounds. Gerald Oetelaar (2012, 2015; Oetelaar and Oetelaar 2006) describes the pilgrimage to the Sun Dance Grounds for Blackfoot Indians. The pilgrimage involves a long journey (up to 800 km round trip) that takes pilgrims along well-known paths and by a series of named places and landmarks. According to myths and oral traditions, these places were created by Napi, an ancestral being who left behind sacred songs, objects, and ceremonies to mark his creative acts at these places. It is at these places where tribes renew their alliances with spirits and other powerful beings who control the availability of game and other resources. Furthermore, repeated visits to these places help recall sacred stories and events, thus serving as "anchors" for the oral traditions and history of the tribe (Oetelaar 2012:339).

Black Elk, an Oglala Sioux, provided one of the most detailed descriptions of the Sun Dance ceremony and its origins (Brown 1953:67-100; see also Neihardt 2014:59-61). According to him, the Sun Dance were first revealed in a vision to a tribal elder named Kablaya, who claimed that the Sun Dance would increase the tribe's strength and security. In preparation for the ceremony, Kablaya told a number of men to gather certain sacred items (e.g., sacred pipe, tobacco, eagle plumes, blue paint, eagle tail feathers); he also taught them sacred songs and how the items and songs should be used in the ceremony. He also showed them how to construct the sacred lodge. The lodge included a large central cottonwood pole surrounded by a series of upright posts, a door facing the east, a cross-shaped path inside the post circle, and an altar at the base of the central pole. This structure, according to Kablaya, was a representation of the universe and considered the most sacred place in the grounds. The ceremony was held inside the lodge the following day. It began with a number of dancers singing songs and dancing for long periods of time, stopping only to smoke the sacred pipe and take sweat baths in nearby lodges. Flesh was offered to Wakan-Tanka, the sun, the moon, the Morning Star, and other sacred entities by inserting hooks into dancers' skin that was then ripped from their bodies during the dances. These offerings ensured the health of the tribes. The ceremony ended with the sacred objects being piled in the center of the Sun Dance lodge, smoking the sacred pipe, sweat baths, songs, a large feast, and finally the return journey home (see also Amiotte 1989; Archambault 1999; Brown 1953).

Overall, the Sun Dance pilgrimage includes a journey along well-established trails and past known places that mimics the journeys and actions of ancestral beings. The subsequent ceremony celebrates fertility, abundance, and the Sun. It also strengthens group cohesion, renews social ties, and ensures the health, safety, and general wellbeing of the entire group. Perhaps most importantly, it re-establishes the tribes' connection with and reliance on other-worldly powers and beings.

World Renewal Pilgrimage: The Green Corn Ceremony

Another well-known world renewal ceremony and associated pilgrimage, called the Green Corn Ceremony or Busk, is one of the most important annual festivals that was and still is practiced by many southeastern tribes (for a summary see Hudson 1976:365-375, 473-477, 1989; also see Adair 1968; Swanton 1911; Witthoft 1949). Although the particular details, meanings, and functions of the ceremony vary from tribe to tribe, it is generally an expression of gratitude for a successful corn harvest. It also plays a key role in a tribe's quest for purity, the sanctification of the social order, and in ensuring the overall wellbeing of the tribe for the upcoming year. The description given below is a summation provided by Hudson (1976, 1989), based mainly on his studies of Adair (1968) and other accounts of the Green Corn Ceremony.

The Green Corn Ceremony took place sometime during the summer. After the specific dates (usually from a few days to a week) and site (it could be an established village or an entirely new site) for the ceremony were determined by the tribal chief, a messenger was sent to neighboring towns and villages to invite the rest of the tribe to the ceremony. When the day for the ceremony drew near, men, women, and children departed the outlying settlements and journeyed to the place of the event, some from long distances. The meeting place, which exhibited both domestic and community structures, was additionally furnished with large granaries, elite domiciles, and temporary structures to house the incoming pilgrims. The most important area was the central plaza or courtyard, often called the "square ground," where most of the ceremonial activities took place.

The ceremony began with a feast in the square ground, after which all the food debris were removed. Public buildings were rebuilt and refurbished, hearths were extinguished and cleaned, the plaza was swept, and domiciles and cooking pots were emptied and washed. This was followed by a multi-day fast, during which time fasters frequently took emetics, displayed special objects, opened medicine bundles, and settled or forgave most disputes and crimes. Several days later, the fast was broken with a moderate feast, after which the new fire ceremony, the central rite of the Green Corn Ceremony, took place in the square grounds. During this important ceremony, the head priest kindled a new fire and placed it in a special structure. The fire was fueled with certain types of wood and given offerings, particularly newly ripened corn obtained from the harvest. The priest would then address the onlookers, urging them to stay pure throughout the year, as doing so would ensure their own health, plenty of rain, and safety from enemies. After the speech, embers from the sacred fire were distributed to the surrounding houses to kindle new fires, and this symbolized the purification of the entire tribe. The final day of the Green Corn ceremony included a large feast of newly harvested corn and many other kinds of food. Participants sang, danced, performed mock battles, told stories, and participated in additional purification ceremonies. At the end of the day, the ceremony ended and everyone returned to their home villages.

In sum, the Green Corn ceremony is an annual pilgrimage and communal ceremony that involves people traveling long distances to an agreed-upon meeting place and performing rituals that reestablish tribal harmony and purity. Moreover, it is a ceremony of thanks during which pilgrims are reminded of and acknowledge their good fortune. Together, the pilgrimage and ceremony balances, purifies, and perpetuates the world and life as a whole.

IDENTIFYING PILGRIMAGE CENTERS IN THE ARCHAEOLOGICAL RECORD

I have shown that Native American pilgrimages are linear, intentional movements to specific places that renegotiated relationships between pilgrims, other-worldly beings and powers, and past, present, and future. I have also provided several examples of Native American pilgrimages from ethnohistoric, ethnographic, and contemporary native accounts. However, is it possible to recognize the traces of pilgrims and pilgrimage centers archaeologically? It is critical to develop ways to identify ancient pilgrimage centers and practices before we can investigate the effects of pilgrimages on Cahokia’s formation.

Many of the earliest archaeological studies of pilgrimage were models that focused on ways to identify pilgrimage via material remains. A number of these scholars, in fact, constructed archaeological “correlates” of pilgrimage centers. For example, Helaine Silverman (1994) claimed that the Andean site of Cahuachi was a pilgrimage center due to the presence of shrines or sacred/ritual objects and symbols; monumental architecture built in stages; short term, ephemerally-constructed houses; sporadic occupation; foreign occupants or visitors; evidence of large-scale gatherings, feasts, ceremonies, or rituals; and roadways, trails, or paths that converged at the center. Similarly, Himanshu Ray (1994) showed that Buddhist places of pilgrimage were identifiable by the presence of stupas situated in caves and votive offerings or relics left at their bases. Numerous scholars have proffered that the presence of over-built and under-utilized roadways that converge at great houses, large-scale deposits of feasting debris, and exotic goods is evidence for pilgrimage at Chaco Canyon (Judge 1989; Kantner and Vaughn 2012; Malville and Malville 2001; Mills 2002; Plog and Watson 2012; Renfrew 2001; Toll 1985; Van Dyke 2007). Other scholars, while not explicitly dealing with identifying pilgrimage centers archaeologically, still rely on similar expectations or material signatures when dealing with pilgrimage in the past (e.g., Bauer and Stanish 2001; Bradley 1999; Candy 2009; Harbison 1994; Lepper 1995, 2004, 2006; Lucero and Kinkella 2015; Mack 2002; McCorriston 2011, 2013; Palka 2014; Petersen 1994; Renfrew 2001; Schachner 2011; Stopford 1994; Wells and Nelson 2007).

To determine whether Emerald was a pilgrimage center, we must first define the potential material traces of a Native American pilgrimage center. The four examples just described reveal that Native American pilgrims leave distinct material traces, particularly at unique, special places in the landscape, and I believe that looking for similar traces at such places can help evaluate whether Emerald was a pilgrimage center. Based on the examples of Native American pilgrimage practices, I expect Native American pilgrimage centers to be located at, on, or near special places in the landscape, or in other words at unique natural places or landforms such as springs, caves, hills, or mountains. Such places are viewed as locations of inherent importance. They are often places where higher powers have revealed themselves to humans (see Deloria 2003). They are also where spirits, ancestors, and other-worldly beings dwell and are thus accessible (Gulliford 2000; Nabokov 2006). Bears' Lodge is a good example of such a place (see above).

Pilgrimage centers should also exhibit roads, trails, or paths converging there and evidence of non-local populations. As the previous examples revealed, places of pilgrimage were visited regularly using well-worn paths and trails, and such pathways are detectable in the archaeological record (see Shaw 2008; Snead et al. 2009; Trombold 1991 for examples). The examples given above also suggest that there would be some sort of mix of local and non-local populations at a pilgrimage center. Some Sun Dance pilgrimages included people who traveled hundreds of miles to a special place chosen by a host community, meaning that both local and non-local populations were present during these events. Green Corn Ceremonies, on the other hand, generally involve individuals from more local settlements and villages who gathered at a central place for celebrations and rituals. Attendees, in other words, are not foreigners but from the same tribe or group – they simply live in outlying settlements and neighboring communities. In this case, we would see no evidence of distant populations but more evidence of intra-regional populations. Of course, the proportion of local and non-local pilgrims at any given pilgrimage center would vary. The point is that while there could be evidence of distant populations at a pilgrimage center, there may be evidence of local and intra-regional populations and people at the site as well.

There would also be evidence of multiple visits or occupations (possibly at regular intervals) and therefore temporarily occupied domestic structures (if any are present at all). In each example given above, if there was some kind of occupation at a pilgrimage center, it was short. Sun Dances and Green Corn ceremonies lasted several days to a week at the most, which means that we would also expect to see some short-term residential structures at pilgrimage centers. We would also find the accumulation of domestic garbage, though these accumulations would not be as significant as what we might see at a site occupied for many years. Moreover, whatever refuse was present would be deposited in single dumping or disposal events. There is no mention that pilgrims stayed beyond the time it took them to perform a ceremony or deposit an offering at special places on their way to the Sun Dance Grounds. At certain pilgrimages centers, then, there may be little or no evidence of short-term residential structures or refuse accumulation.

We might also find evidence of large open spaces, special religious architecture, and feasting and/or other communal practices (similar to Emerson 1997a; Hall 1997). This would be more likely if a place was used for world renewal pilgrimages and ceremonies like the Sun Dance or Green Corn Ceremony. These pilgrimages involved large numbers of people who performed communal rituals and dances in formal, open spaces; in the Green Corn Ceremony, this special area was called the "square ground" (see above). Moreover, large-scale communal feasts were also a major activity that took place in these formal spaces. In both cases, special ceremonial structures were constructed specifically for these events, sometimes near these open spaces (e.g., the Sun Dance lodge, new fire structure). Although the structures varied in form, they were clearly different from the residential structures built for the occasion and were a key part in the ceremonies, dances, and rituals performed there.

Perhaps most importantly, Native American pilgrimage centers should exhibit evidence of acts of remembering. These acts can also be identified archaeologically, as social memories are created and manipulated through practice, movements, landscapes, places, objects, and deposits (Basso 1996; Connerton 1989; Hodder and Cessford 2004; Jones 2007; Joyce 2003, 2008; Meskell 2003, 2004, 2008; Pollard 2008; Tilley 2004; Wilson 2010). Rosemary Joyce (2003, 2008) found that acts of commemoration involve certain kinds of repetitive practices. One example is the recurrent use and curation of heirlooms, which is apparent archaeologically through extensive use wear as well as the repairing, manipulation, treatment, storage, and disposal of rare or unique objects (Joyce 2003; Wilson 2010:6). Repetitive practices are also evident through the travel to and through places and the ongoing construction and manipulation of landscapes, monuments, and other features. These include regular visits to a particular place for special purposes like celebrations, ceremonies, or feasts; monuments that are continually added to and manipulated; and the burial, excavation, and reburial of special objects (Gillespie 2008; Hodder and Cessford 2004; Jones 2007; Pauketat 2008; Pauketat and Alt 2003; Pollard 2008; Wilson 2010). As will be shown in Chapters 5 and 6, there is abundant evidence of repetitive, commemorative practices at Emerald, including the continual renewal of the central mound, the alignment of special structures and mounds to a certain orientation, and frequent feasting events. While many of these acts were intentional while others were more habitual, both acts were performed simultaneously, thus blurring the lines between inscribed and incorporated practices (see Joyce 2003). Moreover, many of these practices, while clearly drawing from the past, were performed in the present and projected towards the future (see Bradley 2002; Pauketat 2014; Sassaman 2014).

It is important to understand that even though there are broad similarities between Native American pilgrimage traditions through time, the pilgrimage events described earlier are not replicas of more ancient prototypes or practiced in that exact form today. We cannot expect any pilgrimage event to be the same, meaning that a potential pilgrimage center may not have all the correlates outlined above or that the archaeological evidence will perfectly match these correlates. For example, Mississippian architecture (domestic and religious) looks different from the architecture of the more recent American Indian groups discussed in the examples, and world renewal ceremonies would have been performed in unique ways depending on the group performing them and the specific history of the practice. In short, we should expect to see several of these characteristics archaeologically if Emerald was a pilgrimage center (cf. Lucero and Kinkella 2015), but their specific forms and manifestations would be historically contingent.

It is also important to understand that a Native American pilgrimage center cannot be described, summed up, or understood solely by these traits or correlates. Indeed, pilgrimage centers are constituted by the movements and experiences of pilgrims, how these movements facilitated convergences between pilgrims and other-worldly phenomena, and how these convergences affected everyday life. These correlates are simply the best way to identify pilgrimage in the archaeological record. And while evaluating whether Emerald was a pilgrimage center is a major goal of this book (see Chapter 7), I am more interested in understanding the relationships these journeys fostered and their role in Cahokia’s development (see Chapter 8).

CONCLUSION

In the first part of this chapter I showed that movement is what brings about convergences between all kinds of phenomena and that movement shifts, alters, and transforms these relationships. Furthermore, linear forms of movement are a vital part of experience and must be considered alongside the improvisatory, undirected movements of everyday life. Native American pilgrimages are a linear form of human movement crucial to Native American life, wellbeing, and continuity. These movements bring about convergences between humans, places, deities, ancestors, and other-worldly realms that do not regularly occur but clearly matter in everyday life. According to most contemporary native accounts, pilgrimages are powerful and sacred because they renegotiate relationships between people, places, beings, and more.

In the second part of the chapter I claimed that Native American pilgrimage centers can be identified through archaeological remains. This is critical, as evaluating whether the Emerald site was a pilgrimage center is one of the primary goals of this book. If Emerald was a pilgrimage center, then we would expect it to be situated in a unique natural landscape as well as exhibit evidence of formal roads, trails, or paths, multiple short-term visits or occupations, temporary domestic structures (if any were present at all), and non-local participants. If something akin to world renewal pilgrimages took place at Emerald, we would also expect to find large open spaces, religious structures, and evidence of communal ceremonies or events. Most importantly, we would expect to find evidence of remembering, particularly through repetitive routes of travel and ongoing landscape modification and ceremonial practices.

In the rest of this book, I use historical descriptions of the site and archaeological data to determine whether Emerald was a pilgrimage center, when it was inhabited/visited, and if it was a pilgrimage center, the ways these pilgrimages helped construct Cahokia. As I will show, the evidence suggests that Emerald was first inhabited several decades before Cahokia's construction specifically to cite and draw upon the inherent powers and relationships of Emerald's natural landscape. Around A.D. 1050, this inherently powerful place was co-opted and reconstructed by Cahokians and used as a pilgrimage center throughout Cahokia's history (see Chapters 4 through 6). Journeying to Emerald and participating in major world-renewal ceremonies and feasts was a way for Cahokians to reconnect with people from more distant lands, memories of a mythical past, and other-worldly beings and places. These pilgrimages created amiable social relationships among participants and observers, fostered a new Cahokian identity, and petitioned powers and beings for successful harvests, an abundance of resources, and more, all of which were necessary for Cahokia's construction and wellbeing. In short, pilgrimages to Emerald helped form, alter, and realign the webs of relationships that constituted Cahokia.

CHAPTER 3
HISTORICAL CONTEXT

In this chapter I review the history and regional context of Cahokia. I focus specifically on the many forms of human movement that occurred in the greater Cahokia region, including migrations, abandonments, relocations, trade networks, the establishment of colonies or outposts, and more. The frequency and effects of these movements show that Cahokia was an ever-changing amalgamation of entanglements (Alt 2012; Alt and Pauketat 2015; Baires 2014a; Baltus 2014, 2015; Baltus and Baires 2012; Emerson and Lewis 1991; Pauketat 2008, 2013a; Skousen 2015a; Slater et al. 2014; Stoltman 1991). Interestingly, pilgrimage is largely ignored in these discussions. This is problematic, as pilgrimage was likely a part of a revitalized religion at Cahokia and may account in part for the heterogeneous nature of Cahokia, the spread of Cahokian religious practices and objects, and the population fluctuations at villages and mound centers in the region (see Alt 2001, 2002a, 2006, 2012; Baires 2014a; Baltus 2014; Emerson and Lewis 1991; Emerson et al. 2003; Pauketat 2002, 2003, 2013a; Pauketat and Alt 2003, 2015; Pauketat and Lopinot 1997; Stoltman 1991). And, as I will argue later, pilgrimage explains the special nature of the Emerald site.

I begin this chapter by discussing past models of Cahokia's development, including more recent ones that claim Cahokia's rise was instigated by religion, broadly conceived as a series of relationships between human and non-human persons, places, things, practices, myths, celestial beings, and other-worldly realms (Alt and Pauketat 2015; Baires 2014a; Baltus 2014, 2015; Pauketat 2008, 2010, 2013a; Pauketat and Alt 2015; Pauketat and Emerson 2008). I next present the culture history of the greater Cahokia region from A.D. 900 to 1350. Migrations, relocations, trade networks, distant contacts, and other forms of physical movement took place during this time, and these movements had direct impacts on Cahokia's development and history. I then review the work of scholars who have mentioned or discussed pilgrimage at Cahokia. Although these studies do not delve into the nature or role of pilgrimage as a practice, they do suggest pilgrimage took place and hint at its potential effects throughout Cahokia's history.

CAHOKIA'S EMERGENCE

Many of the earliest models of Cahokia's rise focused on the influx of external influences and cultural traits. Based on exotic pottery recovered from Cahokia's Powell Tract, Patricia O'Brien (1972) suggested that Late Woodland peoples were replaced by populations that migrated from the Caddo region practicing a fully developed Mississippian way of life. Glenn Friemuth (1974) similarly argued for a Caddoan migration into the region. Gregory Vogel (1975) was vaguer; he claimed that the appearance of Mississippian traits in Merrell phase ceramics suggests that some Late Woodland cultures in the American Bottom were in contact with or influenced by outside groups. John Kelly (1980) asserted that Cahokia was the result of a mix of in-situ evolutionary processes and distant contacts. These models contrasted with scholars who contended that Cahokia developed from local Late Woodland groups due to social evolution, population growth, sedentism, and/or the development of maize agriculture with little or no outside influence (cf. Bareis and Porter 1984; Benchley 1974; Fowler 1974, 1978; Gregg 1975; Hall 1966; Milner 1998; Muller 1997; Smith 1978).

Other scholars looked even further afield to explain Cahokia's origins. Donald Lathrap, for instance, argued that Cahokia's construction was instigated by the intrusion of peoples from Mexico with a fully-developed Mississippian way of life (see Hall 1991). James Porter (1969, 1974) claimed that economic practices from Mexico stimulated Cahokia's development (e.g., redistribution and market systems of exchange); more specifically, he suggested that traders (similar to the Aztec "potchteca") from the south were vital in Cahokia's construction. Robert Hall (2006) believed that Cahokia was influenced by an influx of new ritual practices that originated in Mexico (see also Hall 1989, 1991, 1997). Similarly, Alice Kehoe (1998:150-172; see also Kehoe 2005; Kehoe and Rilley 2003) claimed that Cahokia's formation was instigated by interaction and trade with the post-Classic Toltec state in Mexico.

Despite the prevalence of these models, however, archaeological evidence has shown that viewing Cahokia as solely a result of foreigners or distant influences is too simplistic (see Hall 1991; Pauketat 1998a; Pauketat and Emerson 1997a). Indeed, many of these so-called foreign characteristics and practices that became prevalent after Cahokia's inception (e.g., shell-tempered pottery, maize agriculture, and pyramidal mounds) actually had precedents in other parts of the Midwest (Kelly et al. 1984b; Alt 2010; Pauketat 1994, 2004; Pauketat and Alt 2003; Pauketat and Emerson 1997a). However, neither was Cahokia the result of internal, inevitable evolutionary trajectories. Migrations, population relocations, and other long-distance journeys clearly occurred throughout Cahokia's history and, while not sufficient in and of themselves to explain its development, still shaped Cahokia (see Pauketat 2004).

A number of other models became popular in the 1970s through 90s. These followed the then-popular trend of identifying "prime movers" responsible for the development of chiefdoms, states, and cities. Kelly (1991a, 1991b), for example, argued that trade was Cahokia's prime mover. According to him, Cahokia was a center or gateway for long-distance trade throughout the Midwest, and this spurred Cahokia's construction (Kelly 1991a, 1991b). Similarly, others argued that Cahokia was a hub for the production and distribution of prestige goods controlled by elites (Jeske 1999; Peregrine 1992; Yerkes 1983, 1991; compare with Pauketat 1998a). Some argued that Cahokia's growth was due to its domineering relationship over other sites in the region and its ability to collect and redistribute all natural resources in the American Bottom to surrounding settlements (Fowler 1978).

A number of more recent scholars argue that a new religion was the primary catalyst for Cahokia's construction. They specifically see Cahokia's religion as a series of relationships between people, places, things, celestial beings, spirits, powers, and other-worldly dimensions (see Alt 2010; Baires 2014a; Baltus 2014, 2015; Pauketat 2008, 2010, 2013a). For Pauketat (2008, 2010, 2013a), Cahokia was the result of the continual citation and convergence of various phenomena. Specifically, he has argued that celestial bodies and their animate powers were woven into early Cahokia through the alignment of landscapes, mounds, domiciles, and medicine lodges (Pauketat 2013a). Melissa Baltus (2014, 2015) similarly argues that Cahokia's florescence in the mid-11th century was coeval with a sudden social-political-religious movement that "transpired within and along the meshwork of existing personal relationships and everyday experiences," that created "new relationships among people, places, and material objects" (Baltus 2015:147). Moreover, she argues that the changes that occurred at Cahokia in the 12th to 13th centuries were associated with another revitalization-like movement, which made conscious disentanglements of these relationships. Sarah Baires (2014a) argues that the burial ceremonies and processions associated with Cahokia's ridge-top mounds and ceremonial avenues connected the underworld to the present world and allowed humans and spirits to travel between these realms. In sum, these newer models of Cahokia's development rely on relational, practice-based theories and contrast with theories that emphasize social evolution, environmental adaptations, or prime movers.

I too see Cahokia's beginnings as a unique entanglement of interrelated practices and phenomena that rapidly coalesced in the American Bottom. These convergences not only resulted in the construction of Cahokia, but also had major reverberations throughout North America (see Baltus 2014; Pauketat 2004, 2005a, 2013a). These newer perspectives are more akin to my view of Mississippian centers presented in Chapter 1, and both urge us to investigate the movements that instigated Cahokia's web of relations. I contend that pilgrimage was one of these movements. In the rest of the chapter I recount the history of Cahokia and the greater Cahokia region. Archaeological evidence shows that the movements of humans, ideas, and things were closely associated with its development and major changes throughout its history.

THE TERMINAL LATE WOODLAND PERIOD (A.D. 900-1050)

I begin this history around A.D. 900, during a time known to most archaeologists as the Terminal Late Woodland period (TLW hereafter) (Figure 3.1). Prior to A.D. 900 (the Late Woodland period), the American Bottom and surrounding region was inhabited by a number of mobile family groups who lived in hamlets and small villages for short periods of time (Kelly et al. 1984a). However, around 900 these settlements were abandoned and fully sedentary villages, farmsteads, and hamlets of various sizes were constructed in new locations (see Fortier and Jackson 2000; Fortier et al. 2006). The largest TLW villages, which housed between one and two thousand individuals, were situated at the Cahokia and Lunsford-Pulcher sites (see Pauketat 1998b, 2003; Pauketat and Lopinot 1997; see also Pauketat 2013c). Smaller villages existed at the Range, Janey B. Goode, and Knoebel sites, and a series of multi-family floodplain settlements were established at BBB motor, Horseshoe Lake, Robinson's Lake, George Reeves, and other sites throughout the region (Alt 2002b; Emerson and Jackson 1984; Galloy 2011; Kelly 1990b; Kelly et al. 1984b; McElrath and Finney 1987; Milner 1985; Pauketat et al. 1998).

Except for perhaps Lunsford-Pulcher and Cahokia, mound construction did not take place at these TLW villages (Porter 1974; Kelly 1990a). Instead, the villages consisted of clusters of rectangular, semi-subterranean, single post wall domiciles. In larger villages, structures were arranged around courtyards and probably inhabited by families and other social groups (Alt 2002b; Bareis 1976; Holley et al. 2001a; Kelly 1990a, 1990b; Kelly et al. 1984b; Pauketat 1998b, 2013c). Courtyards, with their four-sided boundaries and central pit and upright post features, divided horizontal space into four directions and vertical space into layered dimensions (see Kelly 1990a, 1990b). Living in, moving through, and experiencing these spaces and performing everyday tasks within them produced a specific view of a multilayered cosmos (see Emerson and Pauketat 2008). Smaller villages consisted of linear clusters of features situated along ridges while hamlets consisted of a few houses and associated storage pits (Emerson and Jackson 1984; McElrath and Finney 1987).

Perhaps the most dramatic change during the TLW period was the increased movement of people between villages throughout the American Bottom. This change is particularly evident later in the TLW period, during the Edelhardt and Lindeman ceramic phases (generally, A.D. 1000-1050) (see Figure 3.1). Archaeological evidence for these movements include a drastic increase in ceramic diversity throughout the region. The classic "Late Bluff" ceramic vessels that dominated the American Bottom in the Late Woodland phase (grog and sometimes grit temper, cordmarked exteriors, and notched or impressed lips) are replaced by vessels with a variety of pastes, tempers, surface finishes, and vessel forms (Fortier and Jackson 2000; Fortier and McElrath 2002; Fortier et al. 2006; Kelly et al. 1984a; Kelly et al. 1984b). Temper types include various combinations of grit, grog, limestone, and occasionally shell. Surfaces are plain, smoothed, cordmarked, and red-slipped, and decoration includes impressed or notched lips, nodes, and lugs. Jar forms are very diverse, and include straight, thickened, and everted rim shapes (Kelly 1980; Kelly et al. 1984b). Importantly, some ceramic traits are loosely associated with certain regions in the American Bottom. For instance, vessels exhibiting crushed limestone temper (the "Pulcher" ceramic tradition) are more common in the southern American Bottom region (Kelly 2002). Grog and shell tempered vessels are common at Cahokia, and grit temper was used more regularly in the northern American Bottom and Illinois River Valley (Farnsworth et al. 1991; Pauketat 2004:59; Studenmund 2000). Pauketat (1998a, 2004:60) has argued that this diversity is evidence of increased exchange among American Bottom villages or of a greater number of intra-village feasts, ceremonies, and gatherings in which vessels of food were brought, cooked, and shared (see also Fortier and McElrath 2002; Fortier et al. 2006).

In addition to these intraregional movements, intermittent contact with or journeys to more distant regions are evident through non-local vessel types such as Varney Red-Filmed, Coles Creek Incised, Yankeetown appliqued, and Kersey Incised (Emerson and Jackson 1984; Kelly 1980; Kelly et al. 1984b). Some of these exotic ceramic vessels were imported from distant regions, while some styles and decorations were simply copied by local TLW potters (Pauketat 2004:58). For example, the use of red slip as a surface decoration is similar to the "Varney Red Film" pottery tradition from southeastern Missouri and northeastern Arkansas. The increase of red-slipped pots in the TLW indicates contact, influence, and perhaps even the migration of small groups of people from sites in this region (e.g., Toltec and Zebree) into the American Bottom (Morse and Morse 1990; Pauketat 2004; Rolingson 1990).

In sum, between A.D. 900 and 1050, people, things, ideas, and practices moved or were moved around the American Bottom and more distant regions to the south. The frequency and distance of these movements and encounters increased from the preceding Late Woodland period (see Fortier et al. 2006). These local and distant movements and connections undoubtedly paved the way for the localized movements, larger-scale migrations, and distant journeys into and out of the American Bottom region that began around A.D. 1050.

THE LOHMANN PHASE (A.D. 1050-1100)

At or around A.D. 1050, during what archaeologists call the Lohmann phase, Cahokia and the surrounding landscape (hereafter called the greater Cahokia region) underwent a major transformation that Pauketat (1994) has called the Big Bang (see Figure 3.1). The large TLW village at Cahokia was replaced by an entirely new city (Pauketat 1994). The layout of this new city was based on an overarching plan that hinged on two organizational axes aligned to the moon (Romain 2015b). Approximately 120 pyramidal, ridgetop, and conical mounds, all aligned to this overall plan, were rapidly constructed in numerous stages of alternating light and dark layers of fill (Pauketat 1993; Pauketat et al. 2010; Sullivan and Pauketat 2007; Reed et al. 1968; Smith 1969). Mound construction referenced earlier mound building traditions and ancient creation myths and was associated with world renewal ceremonies (Hall 1989, 1997; Knight 1989; Pauketat and Alt 2003). Additionally, the Grand Plaza, a 19-24 ha space just south of Cahokia's central pyramid (Monks Mound), was built over portions of the TLW village that previously dominated the area (Alt et al. 2010; Dalan 1997; Dalan et al. 2003; Holley et al. 1993). At least three smaller plazas and their associated mounds were also built in conjunction with the Grand Plaza (Fowler 1997). These projects involved a massive amount of planning, time, labor, and materials. Large numbers of people (directed by leaders and planners) were continually digging, sorting, transporting, dumping, packing, and layering earth in particular ways (Dalan 1997; Dalan et al. 2003; Friemuth 1974; Pauketat and Alt 2003; Porter 1974). Furthermore, the four-sided plazas and earthen pyramids, alternating light and dark fills used during construction, and the frequent pairing of flat-topped and conical mounds represented the cosmic dualism (e.g., upper and lower world, life and death, day and night) that pervaded social life (Emerson 1997a; Emerson and Pauketat 2008; Pauketat 1993). These cosmic principles had referents in the TLW courtyards but were reconfigured in new ways during the Lohmann phase.

Cahokia's population burgeoned from a few thousand to between 10 and 16 thousand inhabitants (Pauketat and Lopinot 1997). This five- to ten-fold increase cannot be explained by natural birthrate projections, meaning that people from the greater Cahokia region and beyond migrated to, resettled at, or were brought to Cahokia (Alt 2001, 2002a, 2006, 2008, 2012; Pauketat 2003; Pauketat and Lopinot 1997; Slater et al. 2014). Recent strontium isotope studies reveal that a third of Cahokia's inhabitants were not local to the region (Slater et al. 2014). The rapid surge in population and the construction of this new city transformed Cahokia's landscape. TLW courtyard groups were abandoned and replaced with settlements surrounding mounds and/or plazas aligned to Cahokia's overall plan (Collins 1990; Dalan 1997; Dalan et al. 2003; Kelly 1990a; Pauketat 1998b). Wall trench style structures virtually replaced the earlier single-post structures, and the type, size, and function of structures were more diverse (Alt 2006; Alt and Pauketat 2011; Pauketat 1994, 2004). Large upright posts, transported to Cahokia from stands of red cedar or bald cypress trees throughout the region, were regularly planted and removed in plazas, on top of mounds, and near religious structures. These wooden monuments linked the upper, middle, and lower worlds and transformed senses of self and identity (Pauketat and Alt 2005; Alt et al. 2010; Hall 1997; Kelly 2003; Skousen 2012).

Massive gatherings, celebrations, and feasts were held in the Grand Plaza (Pauketat et al. 2002). A borrow pit underneath Mound 51 contained the refuse from at least six of these gatherings; these remains included masses of deer bones, maize, seed crops, tobacco seeds, pottery vessels, projectile points made from exotic cherts, celt-making debris, pigments, quartz crystal, coniferous wood chips, and roof thatch (Pauketat et al. 2002). In short, thousands of people, including Cahokians, residents of outlying sites, and perhaps even people from more distant regions attended these gatherings to share news, arrange marriages, create alliances, feast, build and renew mounds, participate in world renewal ceremonies, make special items out of exotic materials, and play chunkey (DeBoer 1993; Pauketat 2004:86; Pauketat et al. 2002). Participating in and experiencing these events helped Cahokians and visitors alike become acquainted with and better comprehend Cahokia's new political-religious order (Pauketat 2004:78; Pauketat et al. 2002).

Community-wide burial processions and performances occurred early in Cahokia's history, perhaps in association with these large public gatherings (Baires 2014a). These events occurred at ridge top mounds at Cahokia and other nearby centers (East St. Louis, St. Louis, Mitchell, Lunsford-Pulcher) and brought together the living and dead, exotic objects, earth, substances, practices, beliefs, and other-worldly dimensions (Alt and Pauketat 2007; Baires 2014a; Fowler et al. 1999; Milner 1984). The activities that occurred at Mound 72, an extensively excavated mortuary mound at Cahokia, included the placement and removal of large upright posts, the construction and dismantling of a charnel structure, the burial of numerous human bodies (bundle burials, extended burials, burials on stretchers, two mass burial pits containing dozens of human sacrificial victims, a male and female laid together on top of a shell bead cape or blanket, and more), and the interment of arrowheads, sheet copper rolls, shell beads, chunky stones, and mica sheets in caches (Fowler et al. 1999). Undoubtedly these and other similar events performed at the nearby Mound 66 involved burial processions along an elevated central causeway that connected Monks Mound to Mound 66 (Baires 2014a, 2014b). It is clear that these events involved local and distant movements and interactions of people, spirits, objects, substances, and more (Alt and Pauketat 2007; Baires 2014a; Brown 2003; Fowler et al. 1999; Hall 1997; Pauketat 2005a).

The activities at Cahokia, however, were not isolated. The nearby East St. Louis (hereafter ESL) and St. Louis mound centers were constructed at this time. At this time ESL was home to at least 3,000 residents and construction on ESL's "Cemetery Mound" likely began (Galloy 2011; Kelly 1994; Pauketat et al. 2013). Together, Cahokia and the ESL and St. Louis mound centers made up what Pauketat (1994) calls the "Central Administrative Complex," and the close vicinity of these sites makes them difficult to distinguish from each other archaeologically (Emerson 2002). Like Cahokia, these settlements housed large year-round populations and hosted large feasts and mound construction events; furthermore, people, objects, goods, information, and more moved or were moved between them (Pauketat 2005a; Pauketat and Lopinot 1997:117). Other smaller mound centers (e.g., Lunsford-Pulcher, Mitchell, Washausen, and Lohmann) and their associated villages/towns were also constructed or expanded at this time (Betzenhauser 2011; Esarey and Pauketat 1992; Friemuth 1974; Kelly 2004; Porter 1974).

With Cahokia's reorganization and the abandonment of TLW villages, many displaced families settled at or were relocated to other mound centers while others established farmsteads throughout the floodplain, the eastern uplands (known as the Richland Complex), and in the region's hinterlands (Alt 2001, 2002a, 2006; Binford et al. 1970; Emerson 1997a; McConaughy 1991; Milner et al. 1984; Pauketat 2003; Tiffany 1991a). Some Richland Complex villages were built and inhabited by second generation immigrants from southeast Missouri or northeast Arkansas (Alt 2001, 2002a, 2006; Pauketat 2003). Inhabitants of these farmsteads produced surplus food to feed Cahokia's thriving population or special goods like cloth or shell beads (Alt 1999, 2001, 2002a; Benson et al. 2009; Pauketat 2003; Yerkes 1983, 1991). Residents of these farmsteads and villages regularly traveled to and from their residences, fields, and Cahokia, carrying the food, materials, and objects that they grew, crafted, and obtained. Not surprisingly, some of these settlements are situated along overland trails, which undoubtedly facilitated these movements as well as those of visitors, traders, messengers, and pilgrims (see Binford et al. 1970; Claflin 1991; Koldehoff 1996; Koldehoff et al. 1993; Kruchten 2012; Skousen 2015b).

Some floodplain and Richland Complex settlements were established and/or inhabited by Cahokians, presumably to manage or exert control over outlying settlements (Emerson 1997a, 1997b, 1997c; Emerson et al. 2008). Inhabitants of these so-called "nodal" sites were leaders that directed the communal, religious, and political affairs of these upland farmers, immigrants, and specialists (Emerson 1997a). These nodal sites exhibited special buildings such as sweat lodges, temples, community structures, and cemeteries; they also contained special materials like quartz crystals, red cedar wood, medicinal plants, and flint-clay figurines, all of which were used during ceremonies. Farmers, villagers, and elites periodically traveled to these sites for information, feasts, renewal ceremonies, councils, and to bury special or high-status individuals (Emerson 1997a, 1997b).

Intra-regional trade, distribution, and interaction occurred regularly throughout the greater Cahokia region at this time. This is evident in diverse pottery types and styles as well as the procurement of lithic materials from outside the greater Cahokia region. While new pottery-making techniques and vessel types became dominant throughout the region during the Lohmann phase (e.g., jars exhibiting angled shoulders and extruded or angled rims, vessels with slipped surfaces, and a preference for shell temper), not all settlements adopted these new ceramic styles at the same time or even at all (see Alt 2001, 2002a; Pauketat 2003). The "Pulcher" ceramic tradition, for instance, persisted well into the Lohmann period, and limestone tempered, red-slipped pottery was distributed throughout the floodplain and uplands (Kelly et al. 1984b; Kelly 1990a, 2002; Pauketat 1994). Vessels made from Madison County Shale paste, the clays of which were derived north of modern-day St. Louis, were also distributed or traded throughout the region (Porter 1963). Grit-tempered vessels with forms more similar to Late Woodland and TLW vessels were still periodically made in villages north of Cahokia and the lower Illinois River Valley and appear at sites throughout the American Bottom region (Farnsworth et al. 1991; Pauketat 2004; Studenmund 2000). Raw materials for lithic tools, pigments and paints, and special wood for structures and monumental posts were obtained from the St. Francois Mountains, immediately southeast of Cahokia (Butler 2014; Emerson et al. 2003; Kelly 1980; Kelly and Brown 2012; Koldehoff and Brennen 2010; Koldehoff and Wilson 2010; Pauketat 1998a; Pauketat and Alt 2004; Walthall 1981). Mill Creek, Kaolin, and Cobden chert, used to make agricultural tools and formal bifaces, were obtained from more distant quarries in southern Illinois (Koldehoff 1991). Based on the abundance of these materials (particularly Burlington chert) throughout the greater Cahokia region, trips to and from these specific areas occurred regularly; it is possible that the extraction and distribution of some of these resources were controlled by Cahokian elites (Brown et al. 1990; Fowler and Hall 1978; Koldehoff 1987; Koldehoff and Brennen 2010; Winters 1981; but see also Butler and Cobb 2001; Cobb 1989, 2000).

More long-distance contacts and movements also occurred during this time. Many of these connections had been established in the TLW period (see above). Pottery vessels and styles were traded or brought to Cahokia from the lower Mississippi River Valley (Coles Creek cultures in Mississippi, Varney culture in northeastern Arkansas), southern plains (Caddo region), and southern Indiana (Yankeetown culture) (Alt 2002a, 2006; Fowler and Hall 1975; Holley 1989; Pauketat 1998a, 2003). While people may have periodically journeyed between these regions and brought or exchanged these exotic vessels, many similar-looking vessels were copies made in the American Bottom (Wilson 1999). As mentioned earlier, this suggests that potters from these distant places migrated to the greater Cahokia region (Alt 2002a). Other materials and objects were also obtained and/or traded from different regions, including marine shell and shark teeth from the Gulf Coast and copper and silicified sandstone from the Great Lakes region and northern Midwest (Kozuch 1998; Pauketat 2004). Mound 72 contained a number of exotic materials, including mica from the Appalachian Mountains, copper from the Great Lakes, and arrow points from northeastern Oklahoma, Wisconsin, and southern Illinois, which indicates contact, trade, or journeys to and from these areas (Fowler 1991; Fowler et al. 1999).

Cahokians also traveled to, settled, or established connections with a number of sites in the north. For instance, in the early to mid-11th century, Cahokians settled at Aztalan, Collins, and several sites in the Apple River Valley (Butler 2015; Douglas 1976; Emerson 1991a; Richards 2003). Although their numbers were apparently few, these Cahokian colonists clearly influenced their local Late Woodland hosts, who began to mimic Cahokian ceramic styles and artifacts (Butler 2015; Douglas 1976; Emerson 1991b; Richards 2003). Furthermore, a small contingent of Cahokians traveled into the upper Mississippi River valley to establish farmsteads, villages, and shrine complexes. A series of short-term farmsteads were established at the Fisher Mound Complex in present-day Stoddard, Wisconsin (Benden 2004; Pauketat et al. 2015). At about the same time, a bluff-top shrine and a series of scattered residences were constructed about 45 km to the north at Trempealeau (Green and Rodell 1994; Pauketat et al. 2015). The presence of a symmetrical platform mound complex and associated religious architecture, replete with materials and objects from Cahokia, suggests that the Mississippian occupation at Trempealeau was a short-term religious mission established by Cahokians to tap into the animate powers of the Upper Mississippi River Valley (see Pauketat et al. 2015).

Overall, the Lohmann phase saw major shifts in how and where people, things, ideas, and practices moved or were moved. Farmsteads, villages, and mound centers were constructed and abandoned. Food, objects, earth, building and other raw materials, information, and other resources were continually obtained and carried throughout the region. Mythical stories and narratives were remembered, negotiated, and reenacted during mound construction events. The living and dead traveled to the otherworld during burial processions and ceremonies. Mounds and monumental posts connected individuals to the upper, lower, and middle worlds. Religious specialists journeyed to distant regions to acquire knowledge and exotic materials and/or objects (cf. Helms 1988), while some people established colonies, missions, or shrines. These movements, while in part begun or instigated in the preceding TLW, increased in number, frequency, and distance and were clearly tied to Cahokia’s emergence.

THE STIRLING PHASE (A.D. 1100-1200)

Other significant changes took place around A.D. 1100 during what is known as the Stirling phase (see Figure 3.1). The population of Cahokia shrunk from 10 to 16 thousand to between 5 and 7 thousand individuals (Pauketat and Lopinot 1997). This de-centralization may have been associated with an increase in elite and/or ritual use of large tracts of central Cahokia that were previously used for habitation. In one area west of Monks Mound (Tract 15A), for example, a series of "woodhenges" were constructed (Pauketat 1998b; Wittry 1969, 1996). In the west plaza (Tract 15B), rotundas (large circular buildings reminiscent of historic era Plains Indian Sun Dance circles), large compounds, and a palisade were built (Pauketat 2013c). These features re-structured human movement and forced Cahokians to settle in other locations throughout the city (Fowler and Hall 1975:5; Pauketat and Lopinot 1997). This drop in population was likely the beginnings of a massive out-migration (Pauketat and Lopinot 1997). Mound construction continued at Cahokia and surrounding mound centers (Sullivan and Pauketat 2007; Pauketat 1993, 2005a).

Shifts in domestic spaces also occurred and altered how people experienced their everyday world. While wall trench architecture continued to be the dominant architectural style, Stirling phase domiciles were larger. There was also a wider range of structure sizes, suggestive of increased differences in social status (Collins 1990; Fowler and Hall 1975; Milner et al. 1984; Vogel 1975). Furthermore, nearly half of Stirling phase structures contained one or more internal storage pits, which indicates a shift in preference from communal to private storage space (Milner et al. 1984). At Cahokia, Stirling phase buildings were arranged in tighter clusters and conformed less to Cahokia's master plan (Collins 1997).

Overall, there were few changes in lithic technologies and sources – people still traveled to obtain or traded with people from the Ozarks and southern Illinois. However, there were some clear shifts in pottery forms, styles, and technologies. For instance, the use of shell temper became more widespread, meaning that potters were adopting or being forced to adopt Cahokian pottery-making traditions and techniques (Holley 1989; Milner et al. 1984; Pauketat 1998b). Plain, inslanted jars with rolled rims, known as the type Powell Plain, became the dominant jar form. Ramey Incised jars exhibiting glossy black slip and incised scroll motifs with cosmological referents were also prevalent (Fowler and Hall 1975; Pauketat and Emerson 1991; Vogel 1975). Finely decorated beakers were obtained via trade and through long-distance journeys to the Caddo region and lower Mississippi Valley, while others were local copies of these exotic styles (Holley 1989; Milner et al. 1984; Wilson 1999). Some of these elaborate beakers held Black Drink, which was likely a major part of purification ceremonies (Crown et al. 2012). Additionally, the plants used to make Black Drink (*I. vomitoria* and *I. cassine*) were transported or obtained from the lower Mississippi Valley (Crown et al. 2012).

Major changes occurred in the greater Cahokia region as well. At the densely occupied ESL site, a walled ritual-residential zone or elite compound replete with community structures, temples, rotundas, and small storage huts was constructed (see Fortier 2007; Galloy 2011; Pauketat 2005b; Pauketat et al. 2013). Monumental posts were repeatedly set and removed in association with mound construction events and other communal ceremonies (Fortier 2007; Pauketat 2005b; Skousen 2012). Elaborate burial ceremonies took place at ESL's Cemetery Mound. These ceremonies included interring important or elite individuals in log tombs with pottery vessels, shell beads, arrowheads, earspools, and stone tools (Kelly 1994). New families and groups settled at other mound centers like Mitchell and possibly Lunsford-Pulcher, where they constructed or enlarged mounds (Friemuth 1974; Porter 1969, 1974). Farmsteads and nodal sites were present throughout the region, though most of these (particularly those in the Richland Complex) were abandoned by A.D. 1150 (Alt 2006; Emerson 1997a; Emerson and Jackson 1984; Koldehoff et al. 1993; Milner et al. 1984). Communal ceremonies at mound centers occurred regularly, during which participants were given Ramey Incised jars and flint-clay figurines that they took back to their home villages (Emerson et al. 2002; Pauketat and Emerson 1991).

In contrast to the apparently peaceful Lohmann phase, violence and the threat of violence marked the middle and end of the Stirling phase (Emerson 2007; Milner 1999). The threat of violence is evident through the construction of a massive palisade around Cahokia's central precinct in the mid-12th century (Anderson 1969; Holley et al. 1990; Iseminger et al. 1990). Palisades were also constructed at ESL, Mitchell, and other villages in the region at about the same time (Baltus 2014; Pauketat et al. 2013; Porter 1974). Building these palisades not only required time and planning, but also required resources and people from the surrounding area (Anderson 1969; Holley et al. 1990; Iseminger et al. 1990). Violence is also implied through the widespread burning of structures and storage huts at Cahokia, ESL, and other sites in the late 12th-century (Jackson and Millhouse 2003; Pauketat 1987; Pauketat et al. 2013), though as Pauketat and colleagues (2013) state, these burning events probably represent ritual incinerations, not violent encounters. Still, the threat of violence, even if actual violent encounters never or only rarely occurred, would have changed the way people moved through and experienced the world (see Buchanan 2014; Emerson 2007; Pauketat 2009; VanDerwarker and Wilson 2015).

Importantly, the Stirling phase marks the unprecedented spread of Cahokian religious objects, paraphernalia, ideas, and practices to distant regions (Emerson 1991b; Hall 1991; Kelly 1991a; Pauketat 1998a). Many of these movements and interactions occurred to the north and west of Cahokia (see Emerson 1991b, Hall 1991; Kelly 1991a). Kelly (1991a, 1991b) has argued that these contacts were due to Cahokia's role as a center of trade. Hall (1991, 1997) proposes a more likely scenario – he argues that these intrusions were not economically-based but fictive adoption rituals that established peaceful relationships between distant groups. These adoption rituals involved the exchange of specific sacred objects and items – in most cases, Ramey Incised pots, flint-clay figurines, and/or long-nosed god masks (Emerson 1989, 1997c; Hall 1991, 1997; Pauketat and Emerson 1991). Other scholars have recently argued that these interactions were deliberate attempts by Cahokians to missionize or spread Cahokian religion (i.e., ideas, practices, objects, myths, hero-gods) (Butler 2015; Pauketat 2004, 2005b; Wells 2008).

Even more colonies were established throughout the upper Midwest at this time. Groups of Cahokians traveled to the Central Illinois Valley (CIV) and Spoon River area and established mound centers, temple sites, villages, farmsteads, and colonies alongside local Late Woodland groups (Conrad 1991; Harn 1991a, 1991b). These colonists brought marine shells, copper-covered earspools, and other ceremonial-religious paraphernalia as well as elaborate burial practices and ceremonies (see Conrad 1991; Harn 1991a, 1991b). The initial influx of Cahokians was a peaceful process, though the presence of four headless burials in the Dickson Mound Cemetery reveals that some violent acts were sanctioned (see Conrad 1991; Harn 1991b). However, the peace was short-lived – several decades after these colonies were established, palisades were erected around some of them, and some villages were raided and burned (see Conrad 1991; VanDerwarker and Wilson 2015).

Cahokians continued to travel to and settle at the palisaded outpost or colony of Aztalan, where they lived with local Late Woodland groups and instigated the construction of pyramidal mounds and religious structures (Barrett 1933; Goldstein 1991; Goldstein and Richards 1991; Richards 2003; Zych 2013). Cahokians also traveled to the Apple River area of northern Illinois and established mound centers, villages, and farmsteads such as the Mills, John Chapman, and Lundy sites (Emerson 1991a; Millhouse 2012). Residents of the palisaded Fred Edwards site – a village in southwestern Wisconsin that was presumably founded by Late Woodland groups from northwestern Illinois or northeastern Iowa – traded galena and hides for Cahokian pots and lithic materials (Finney and Stoltman 1991). Even further to the north in southeastern Minnesota, Ramey Incised and Powell Plain pottery vessels, notched triangular projectile points, copper pendants, marine-shell columella, and one flat-topped pyramidal mound were noted at the Bryan and Silvernale sites, suggesting some sort of trade, movement, or contact with these places (Gibbon 1974; Gibbon and Dobbs 1991).

Contact with Mill Creek culture villages and peoples from the Little and Big Sioux river valleys (in present-day northwest Iowa) is marked by the presence of triangular projectile points, long-nosed god masks, stone hoes, shell beads, discoidals, and Ramey Incised jars (Tiffany 1991a, 1991b). Some of the pottery vessels were clearly made at Cahokia, while others were local imitations (Tiffany 1991a, 1991b). Joe Tiffany (1991a, 1991b) suggests that visits between Mill Creek villages and Cahokia occurred intermittently and Mill Creek groups may have traded meat and hides from the Plains for Cahokian marine shell, pottery, and religious items and paraphernalia (Tiffany 1991a). Other sites in northeastern (Hartley Fort) and southwestern Iowa (Glenwood culture sites) were also connected to Cahokia (Tiffany 1991b). Cahokian goods, ideas, religious practices, and probably people moved or were transported regularly between these areas (see Tiffany 1991b).

Cahokian contacts to the south are evident, though not to the same extent as to the north. For example, Cahokian elites or priests traveled to select Coles Creek sites situated along major waterways in the Yazoo Basin in present day Mississippi (Brain 1991). Although these visits or contacts were likely short-lived, they stimulated major changes in and additions to earlier Coles Creek mound centers such as the Winterville and Lake George sites (Brain 1991). Cahokian objects and influence is evident but relatively minimal at Kincaid and Wickliffe, multiple mound centers in southern Illinois and western Kentucky established at this time (Butler et al. 2011; Pauketat 2004:134-138; Wesler 2001).

The Stirling phase, in sum, represented a significant change in the way people, things, and ideas moved or were moved to and from Cahokia and beyond. As before, people, objects, goods, and information continued to move between Cahokia and surrounding centers, villages, and farmsteads, but journeys, migrations, and contacts to more distant locales north and west of Cahokia were more frequent. Cahokians established colonies, outposts, and religious centers in these locations and shared their knowledge, practices, and things with local Late Woodland groups, many of whom incorporated these objects and practices into their everyday lives and religious practices. The evidence suggests that many of these journeys had to do with spreading Cahokia's religion through special objects, paraphernalia, ideas, and practices (see Butler 2015; Emerson 1991b; Hall 1991; Kelly 1991a; Pauketat 1998a, 2004).

THE MOOREHEAD PHASE AND BEYOND (A.D. 1200-1350)

The Moorehead Phase, the following Mississippian ceramic phase that covers the time from A.D. 1200-1275, marks another major disjuncture in Cahokia's history (see Figure 3.1). This was likely due to the waning influence of Cahokian elites and religious transformations throughout the countryside (Baltus 2014; Buchanan 2014). At Cahokia, out-migration continued as the population dropped from 5 to 7 thousand to 3 to 5 thousand (Pauketat and Lopinot 1997). The remaining residents constructed their houses in tight clusters oriented toward central pyramids and not the city plan (Collins 1990; Pauketat 1998b, 2013c). Furthermore, domestic structures were larger on average than Stirling phase structures and nearly square in shape; storage pits were still located inside houses, suggesting individual or family-based storage practices (see Collins 1990, 1997; Milner et al. 1984; Pauketat 1998b, 2013c). The palisade around Cahokia's central precinct was rebuilt several times, suggesting an ongoing concern with violence (Anderson 1969; Holley et al. 1990; Iseminger et al. 1990). For the most part, mound construction ceased, though a few select mounds were constructed and others were ceremonially "capped" (Reed 1969, 2009; Reed et al. 1968; Sullivan and Pauketat 2007). The Ramey Plaza, just east of Monks Mound, was constructed and became Cahokia's primary ceremonial space (Kelly 1997; Kelly et al. 2007; Kelly et al. 2008). In short, the domestic and ceremonial spaces within Cahokia were reshaped yet again and thus modified the remaining residents' movement and everyday experience.

Pottery styles and techniques changed significantly. The specialized jars of the Stirling phase (Ramey Incised and Powell Plain) were replaced by "Cahokia Cordmarked" jars, differentiated by their rounded shoulders and cordmarked exteriors (see Pauketat 1998a). Large plates with sun-related motifs became the primary ceremonial ware used during mound-top ceremonies and feasting events (Pauketat 2004:150). A small number of vessels from the lower

Mississippi River valley suggest infrequent contact with and/or journeys to the south (Milner et al. 1984). The procurement of stone tool materials was similar to the Stirling phase, though fewer microdrills and notched projectile points were made and used (Milner et al. 1984). A more restricted array of exotic materials and objects were obtained from distant sources, such as galena, marine shell, fluorite, copper, Mill Creek and Kaolin cherts, and basalt (Milner et al. 1984; Pauketat 2004:149). Deer meat was consumed less during this time, suggesting changes in hunting and/or food distribution patterns (L. Kelly 1997).

Equally drastic shifts occurred in the greater Cahokia region as well. At the very end of the Stirling phase, many structures (including most of the small storage structures) were burned at ESL (Pauketat et al. 2013). Soon thereafter ESL was virtually abandoned, though some people traveled there periodically, as one mound was constructed and an elite individual or family lived on its summit (Pauketat et al. 2013). Only a few people remained at Lunsford-Pulcher, though the number of residents is unknown (Friemuth 1974). Mitchell became one of the largest villages in the region (see Porter 1974). The majority of the floodplain farmers abandoned the region (Baltus 2014; Milner et al. 1984). Several new villages and mound centers (e.g., Olin, Copper, and Kuhn Station) were constructed in the uplands and Richland Complex, some likely connected by overland trails (Baltus 2014; Koldehoff et al. 1993; Pauketat 2013a:110, 136-137). Elaborate burial ceremonies ceased at Cahokia and surrounding centers; the bodies of minor elites were instead transported to and interred in cemeteries outside major mound centers (Brown and Kelly 2000; Emerson 2003; Emerson and Hargrave 2000).

The Cahokian political-religious ties with northern settlements weakened or were severed altogether (see Kelly 1991a). Cahokian immigrants and settlers left villages where their presence and influence was once strong, such as Aztalan. However, ties were maintained with some settlements in the Apple River region, such as the Mills site, and a few entirely new settlements were founded (e.g., the Savannah Proving Grounds site, Emerson 1991a). Several stockaded villages in the CIV (e.g., the Orendorf and Larson sites), which were constructed and inhabited by descendants of the original Cahokian CIV colonists, were still occupied (Conrad 1991). Even at these places, however, the level of contact and influence from Cahokia waned, evident in the local flavor in ceramic styles (Emerson 1991a).

Apparently, direct Cahokian contacts and movements with populations between the upper and central Kaskaskia Valley and the Wabash River Valley were relatively rare. For the most part, Mississippian period vessels from this area do not closely mimic Cahokian vessel forms, and there is only minimal evidence of Cahokian trade objects in these areas (see Barth 1991; Hall 1991; Moffat 1991; Wells 2008; Winters 1967). The relative lack of Cahokian influence in these areas is unexpected because they were connected by a major overland trail that spanned from the American Bottom to the modern-day Vincennes, Indiana (Kruchten 2012). One clear exception is the Bridges site, located in the central Kaskaskia Valley. During the Moorehead phase, Bridges appears to have been a Cahokian or Cahokian-inspired nodal site, complete with sweat lodges and large council houses (Hargrave et al. 1983). Future research in these regions is necessary to better understand the nature of Cahokian contact and influence in these areas.

Like the Lohmann and Stirling phases, the Moorehead phase is characterized by major changes in how and where people, objects, ideas, and practices moved. Changes in Cahokia's immediate landscape would have altered everyday movements and experiences. At a larger scale, the drop in population at Cahokia, the abandonment of nearby mound centers and farmsteads, and the dearth of extra-regional contacts or colonies suggests that Cahokia's political and religious influence had waned and that Cahokians had abandoned major portions of the greater

Cahokia region (see Buchanan 2014; Pauketat 2004). This massive out-migration left the landscape virtually empty – by the subsequent Sand Prairie phase (A.D. 1275-1400), few Mississippians lived in the American Bottom region, which suggests that the out-migration was comprehensive and complete by about A.D. 1350 (Emerson 2002; Pauketat 2004). Exactly where Cahokians migrated to is unclear, though evidence suggests that they dispersed throughout the Midwest, Plains, and greater Southeast (Pauketat 2004:153; Pauketat and Emerson 1997b).

PILGRIMAGE IN THE GREATER CAHOKIA REGION

The movement of humans, objects, practices, and ideas instigated the entanglements that spurred Cahokia's development in the mid-11th century and the major shifts that occurred throughout its 300-year history. These movements were more than just procuring and transporting resources, food, or other necessities – some journeys, for example, involved visiting special places or distant peoples and regions to obtain knowledge and special objects and/or materials. A number of Cahokian scholars have suggested that pilgrimage was one of these more specialized movements. Most of these scholars argue that pilgrims from elsewhere were attracted to Cahokia itself because of Cahokia's power, influence, and grandeur and/or to participate in world-renewal ceremonies or other communal events (Alt 2012; Anderson 1997:258; Byers 2006; Kelly and Brown 2012:116; Pauketat 1998a:49; Pauketat and Alt 2003:169; Pauketat and Emerson 1997a:20; Pauketat et al. 2002; Wesler 2001). Pilgrimage has also been used to explain the distribution of particular kinds of artifacts and materials throughout the Midwest and Southeast. For example, Emerson and colleagues (2002:326) suggest that Cahokian-made flint clay figurines were "mementos" obtained by upper Mississippi Valley residents during pilgrimages to Cahokia (see also Pauketat 2004:124-125). Kelly and Brown (2012) claim that

Cahokians undertook pilgrimages to the St. Francois Mountains and brought back basalt and cedar wood as evidence of these journeys. Finally, several scholars have argued that pilgrimages consisted of Cahokians traveling to more distant places to obtain prestige, knowledge, and/or power (Pauketat and Emerson 1997a:20; cf. Helms 1988).

Despite these mentions of pilgrimage, no one has seriously considered the effects of pilgrimage on Cahokia's emergence, development, and history (see Pauketat 2013a for exception). Nor has anyone examined the details of a Cahokian pilgrimage journey (e.g., timing, frequency, number of people, routes of travel, motivations, effects, etc.) or how to identify places of pilgrimage archaeologically. Furthermore, few have considered the possibility that outlying sites in the American Bottom region were pilgrimage centers or stopping points along ceremonial circuits that crossed the region (see Pauketat 2013a:160). One exception is Porter (1974:165, 173, 183), who argued that the Mitchell site was a place where individuals from surrounding settlements gathered annually for ceremonies and mound construction events. Another exception is Pauketat (2013a), who recently argued that pilgrimage circuits may have taken place east of Cahokia in the Richland Complex along well-known trails and pilgrimage centers or shrines situated throughout the landscape. The Emerald and Pfeffer sites, according to him, may have been two of these pilgrimage centers or shrines due to their specially aligned landscape, non-local pottery, and position next to well-worn roads that span the region (Pauketat 2013a:160). In general, however, pilgrimage is an understudied practice in Cahokian archaeology, despite its potential to explain certain archaeological patterns and the likely implications these movements had on Cahokia's history.

CONCLUSION

In this chapter I described models regarding Cahokia's construction and reviewed the culture history of the greater Cahokia region from A.D. 900 to 1350. Cahokia was a place that was always in the process of becoming – it was an ever-changing web of movements and convergences of people, places, things, ideas, practices, and other phenomena. Cahokia's emergence and the major historical shifts throughout its history were the result of changes in these movements and the relationships they instigated. While migrations, trade networks, and so on have been well documented by previous researchers (see Alt 2001, 2002a, 2006, 2008, 2012; Hall 1991; Kelly 1991a; Pauketat 2003, 2004; Slater et al. 2014), pilgrimage has not been explored in detail; no one has attempted to identify pilgrimage centers archaeologically, investigate what pilgrimages consisted of or how they were performed, or evaluate their potential role in instigating Cahokia's construction.

I attempt to remedy this situation here. The primary goals of the next four chapters are to determine whether the Emerald site was a pilgrimage center and when it was visited and/or inhabited. To address these issues, I examine construction data from Mounds 2 and 12 and submound platforms that supported Mounds 7 and 9; data from my own excavations on a hypothesized roadway called Emerald Avenue; and features and refuse excavated from the site. I also investigate the geographical origins of those who traveled to or visited Emerald, how long they stayed, how many came, and what they did during their visits. Overall, the evidence shows that Emerald was a pilgrimage center by at least A.D. 1050, and that traveling there was crucial to renegotiating relationships between people and other-worldly powers and beings that controlled the cosmos.

FIGURES

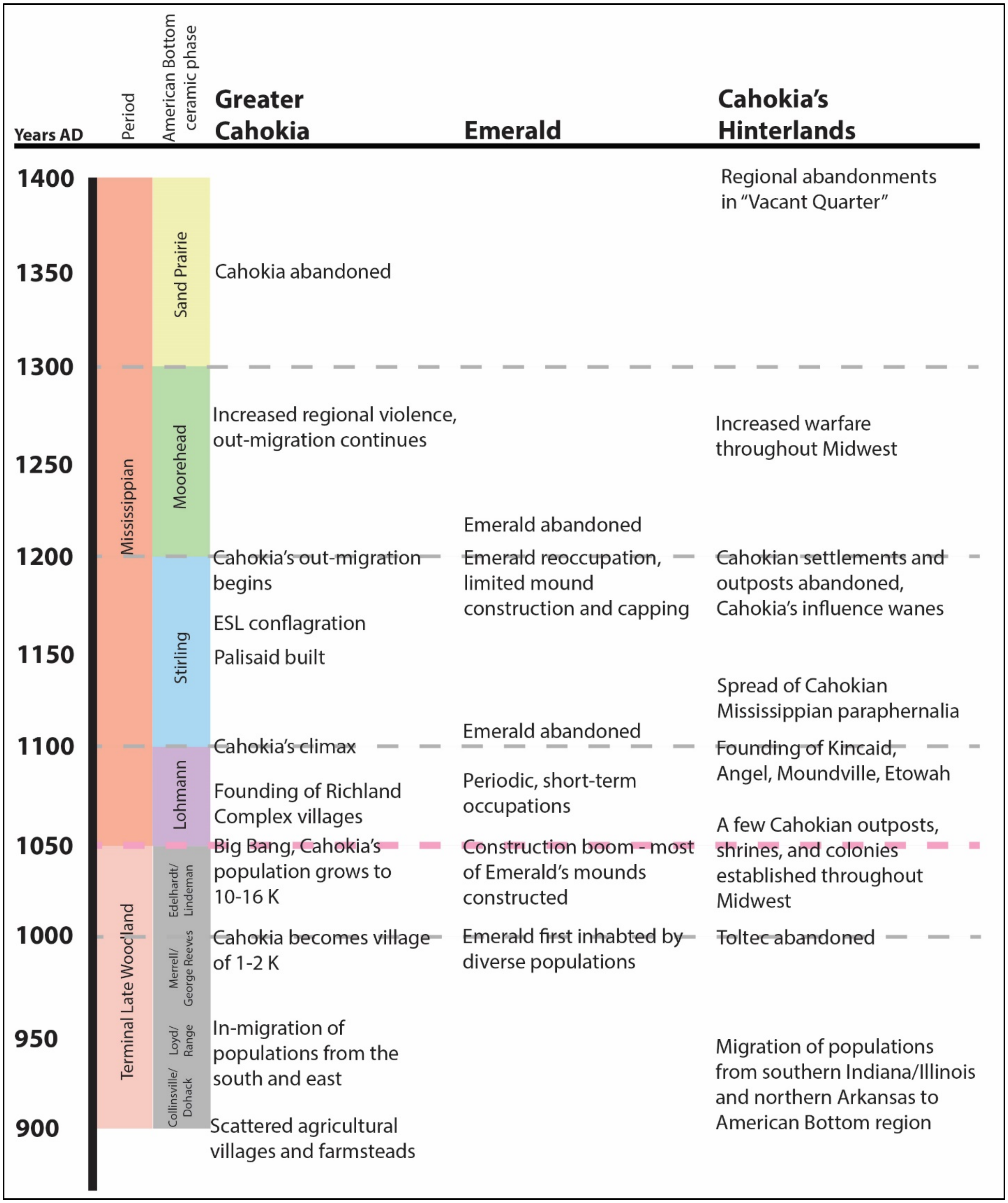

Figure 3.1. Chronology of the greater Cahokia region.

CHAPTER 4
CONSTRUCTING AND EXPERIENCING EMERALD'S LANDSCAPE

In this chapter I describe the layout of the Emerald site as well as the construction of several of its mounds and a large plaza. A thorough understanding of the layout of the site and the surrounding landscape, when and how the mounds and plaza were constructed, and the rapidity of their construction is vital to this project for several reasons. First, the overall landscape can provide evidence that Emerald was a pilgrimage center. As stated in Chapter 2, unique natural landscapes and features are often destinations for pilgrims. Second, understanding the timing of the construction is crucial to determine whether the site was coeval with Cahokia, and the speed of mound construction will help determine how many people were present to construct them. Finally, the landscape, layout, and orientation of the site dictated pilgrims' movement through and experience of the site. This is important because these movements and experiences shaped the kinds of relationships that occurred at the site. These kinds of movements and their resulting entanglements mattered in Cahokia's formation.

I begin by describing the landscape of the uplands east of Cahokia and key natural features associated with the Emerald site. Next I review past descriptions of the site and how it has been modified and disturbed in more recent times, followed by a description of the overall layout of Emerald's mounds and a large plaza in the center of the site (other key parts of the Emerald site – the Emerald Avenue, structures, pits, hearths, etc. – are discussed in Chapters 5 and 6). This description builds on past descriptions of the site – particularly Pauketat's (2013a) more recent investigations – and ISAS's 2011 LiDAR images of the site. I then present the results of my own excavations into Mound 12, previous excavations into Mound 2, and ISAS's 2011 excavations into the submound platforms supporting Mounds 7 and 9. Using these data as well as early descriptions of the site, I estimate the timing of construction as well as the amount of labor (in person work-days) and number of people it took to construct the mounds. This will not only portray the size and amount of planning and work these monuments required, but it will also shed light on the number of people that were present at Emerald during these construction events. Finally, I provide evidence for the presence of a formal plaza at the site. Overall, these data show that Emerald was a pilgrimage center and that Emerald's landscape had profound effects on the movements, experiences, and entanglements that occurred there.

THE EASTERN UPLANDS

The Emerald site is located in northeastern St. Clair County, Illinois, and is part of the Richland Complex. This area of the eastern uplands is situated on the western edge of a flat expanse of treeless prairie that was formed during the Illinoian glacial period between 300,000 and 125,000 years ago (see Wood and Holley 1991; Schwegman 1973). Despite the glaciation that bulldozed this area, the landscape surrounding Emerald is variable due to the presence of glacial drift ridges and hills formed by wind-deposited silts. While not overly large, these ridges and knolls are prominent landforms that are visually distinct from the surrounding landscape. Furthermore, this area is crosscut by streams of all sizes that drain into Silver Creek and eventually the Kaskaskia River (Woods and Holley 1991). Before Euro-American settlement, strips and clusters of oak-hickory forests dominated the area, especially along the creek and stream edges, while immediately to the east were more extensive, treeless prairies and savannas (Benchley 1974:236; Woods and Holley 1991; Snyder 1877:434). Overall, the upland region where Emerald lies is a transitional zone between the diverse local environments of the American Bottom and the more continuous prairies to the east (see Benchley 1974:236; Fowler

1978; Kelly 1990a; Schwegman 1973; Snyder 1877:434; Walton 1962:261; White et al. 1984; Woods and Holley 1991).

The Emerald site was constructed on one of these prominent glacial drift ridges (Figure 4.1). Emerald's location on this high ridge and away from a floodplain or permanent stream has long perplexed archaeologists. Some have argued that Emerald was constructed in this location because of the ridge's strategic position, dominating view of the landscape, good drainage and soils, and availability of salt resources in the area (see Benchley 1974:237; Koldehoff et al. 1993:333; Winters and Struever 1962:86). However, these explanations alone are problematic. There are many other nearby ridges that are higher and would have provided a more strategic position and better view of the landscape (see Figure 4.1). Moreover, good soils and salt resources would have been equally accessible at any site in the area and does not explain why Emerald was built in this particular location.

Pauketat (2013a) has argued that Emerald was built on this ridge because the ridge is naturally aligned to approximately 53 degrees of azimuth[1]. This 53-degree alignment references major lunar standstill events. What is a lunar standstill event? Like all celestial bodies, the moon rises and sets at certain points along the horizon. These rising and setting points gradually shift over the period of a single month. In other words, every month the moon appears to rise and set at extreme northerly and southerly positions along the horizon. In addition to this monthly cycle, the position of the moonrise and moonset along the horizon shifts slightly over a period of 18.6 years, meaning that every 18.6 years the moon appears to rise and set at a northernmost and a southernmost extreme on the horizon. The year in which these extremes occur is a major lunar standstill. And, 9.3 years after a major lunar standstill, the moon appears to rise and set at points

[1] All azimuth measurements – of mounds, structures, landscape features, etc. – mentioned in the text are based on true north.

along the horizon that are the closest together during this cycle. This is the year of a minor lunar standstill (see Pauketat 2013a). In short, every 9.3 years there is a major or minor lunar standstill event. At the Emerald site, major lunar standstill events would appear on the horizon at 53 degree of azimuth, which again is the natural orientation of the ridge. The rarity of this alignment in the Mississippian southeast suggests that witnessing these events at Emerald were crucial to Cahokians (Pauketat 2013a). Thus, the ridge was a place of natural convergence between the earth and sky, and it undoubtedly made Emerald's location special and meaningful (Pauketat 2013a; Skousen 2015a; see Chapter 7).

Additionally, a now-defunct spring or seep was situated just north of the Emerald ridge. The spring was first described by John Francis Snyder in 1909: "Near the bank of that rivulet, beneath the spreading branches of stately old elms and oaks, there gushed from the earth…a bold spring of clear, cold water in the days before the era of well-digging and corn-raising" (Walton 1962:260). Snyder went on to infer that the spring "furnished the water supply of the colony of mound builders" that inhabited the site (Walton 1962:260). Although the spring has now disappeared, it likely existed when Emerald was constructed (Figure 4.2). While this spring may have provided a water source for Emerald's inhabitants as Snyder suggested, it almost certainly embodied a symbolic connection to the underworld as well. Many Native American groups in the Midwest and Southeast viewed springs as portals to the underworld, a place to attain knowledge and spiritual power, and a link to underworld beings and monsters (Hudson 1976:128-130; Lankford 2004, 2007a, 2007b; Reilly 2004; Wagner et al. 2000). Thus, this spring was a node of convergence to the underworld and other-worldly beings (Skousen 2015a).

This brief description of the natural landscape provides several reasons for Emerald's location. First, Emerald is located in a "liminal" or transitional zone between the diverse environments of the floodplain and the more open plains to the east (cf. Scarre 2002). Second, Emerald was constructed on a glacial ridge that not only provided a commanding view of the surrounding landscape and eastern sky but was naturally aligned to 53 degrees of azimuth, which marked lunar standstill events (see Pauketat 2013a). Finally, the ridge on which Emerald was constructed was situated next to a major spring, which probably served as a portal to the underworld. Together, the presence of these unique characteristics suggest that the area, and particularly the ridge on which Emerald was built, was special. It was a place of convergence between the earth, sky, and underworld that facilitated various kind of movements and relationships and allowed people to experience, commune with, and draw on animate beings and places (see Deloria 2003; Gulliford 2000; Hall 1997; Kruchten 2012; Nabokov 2006; Pauketat 2013a; Skousen 2015a; Zedeno and Bowser 2009; see Chapter 7). This evidence also supports my argument that Emerald was a pilgrimage center, as Native American places of pilgrimage are often established at such places of convergence (see Chapter 2).

LAYOUT AND CONSTRUCTION OF THE EMERALD SITE

In this section I discuss the layout and construction of the Emerald site, specifically Emerald's 12 mounds and a large plaza situated in the center of the site. I begin by reviewing past descriptions of the Emerald site and the more recent impacts that have altered the site. I also provide a more comprehensive description of the layout, plan, and orientation of the site's mounds. I then discuss previous excavations spanning from the early 20th century to the present that have taken place at Emerald. This is followed by a summary of the results of recent excavations into four of the mounds (12, 2, 7, and 9) as well as labor estimates for their construction. I then present evidence for a plaza in the center of the site and describe the plaza's dimensions, size, and potential uses. Finally, I discuss the implications of these data, especially how the landscape dictated the movement and experiences of Emerald's pilgrims and how they facilitated particular relationships.

Early Descriptions and Depictions

The Emerald site is located 24 km east of Cahokia, just north of the present-day town of Lebanon, Illinois (Figure 4.3). In numbers of mounds, the site is the largest Mississippian mound center in the Richland Complex (see Finney 2000; Koldehoff et al. 1993; Pauketat 2013a). The site's prominent location and the size of its primary mound attracted the attention of early explorers, amateur archaeologists and historians, and professional archaeologists, many of whom provided descriptions of the site and its mounds.

The first description of the Emerald site was provided in 1877 by John Francis Snyder, a local physician and amateur archaeologist. His description focused on the "Emerald Mound" (see Walton 1962:259), now labeled Mound 12 (Figure 4.4). He claimed that the mound was "the finest Indian mound in the State of Illinois" (Snyder 1877:434), and described it as

> a truncated pyramid, or rather a parallelogram, measuring at its base 400 feet in length and 250 feet in width, and rises in perfect proportions to the height of 50 feet. The angles are still sharp and well defined, and the top level, comprising (approximately) an area of 80 by 150 feet, which doubtless served as the base of some elaborate wooden structure (Snyder 1877:434).

An artist's rendition of Henry Seiter's "Mound Farm," published in an 1881 atlas of St. Clair County, is the next known depiction of the site (Brink, McDonough & Co. 1881:343). The artist drew Mound 2 as a flat-topped circular mound located southeast from Mound 12 and Seiter's large farmhouse (Figure 4.5). Unfortunately, the size and location of these two mounds in relation to each other is unclear from this rendition. However, this depiction of Mound 2 as a flat-topped circular mound is important, as it is a rare mound form in the greater Cahokia region and confirms later descriptions of the site.

The most comprehensive description of the Emerald site in terms of the number of mounds was made by Theodore Lewis in 1891 (Finney 2000). In his description he recorded the dimensions of Mound 12 and the general location and shape of the other 11 mounds:

> The mounds are located on a high ridge which extends NE and SW. On the northeast end there is a platform mound about 150 x 150 feet on top and 30 or 35 feet in height. On the NW side there is a low terrace about 100 x 100 feet square. On the SW end of the ridge there is another small platform mound now partly plowed down. Along the edge of the ridge there are 10 round mound[s] 3 of which are flat topped (Finney 2000:264).

It is notable that Lewis described the lower terrace of Mound 12, something Snyder did not do. He also mentioned the presence of not just one but two flat-topped circular mounds, one of which is depicted in the sketch just mentioned.

Snyder described the site again in 1909, once more lauding Mound 12 as "the most perfect and best preserved mound of its class in the State" (Walton 1962:259). He also provided more details on the dimensions of Mound 12, which he described as

> a truncated pyramid in form, approximately true mathematical proportions, each line of its quadrilateral base measuring almost exactly 300 feet, and its level top 150 feet square. Its height is within a few inches of 50 feet, rising from the ground surface on each side with the even grade of a modern railroad embankment…it is computed to comprise 56,787 cubic yards;…Its corners directed to the four cardinal points of the compass indicate that it was projected with regard to correct orientation, vaguely suggested worship of the sun by its builders (Walton 1962:259-260).

Snyder also included information about the first terrace as well as a stairway or ramp leading from the first to the second terrace: "Extending a hundred feet from the base of the mound, on its northwestern side, there was originally an artificial terrace 280 feet wide and two or three feet high…upon which an inclined way 20 feet wide ascended to the top" (Walton 1962:260). The discrepancy between Snyder's two descriptions of the mound base dimensions is because the 1877 length included the measurements of the first and second terraces together, while the 1909 description treated the lengths of each terrace separately (see Koldehoff et al. 1993:333). The reason for the discrepancy of the summit dimensions is unclear.

In this same description Snyder also described four other mounds: two flat-topped circular mounds to the east of Mound 12 and two conical mounds to the west (Walton 1962:259) (see Figure 4.2). He labeled the eastern earthworks, undoubtedly the flat-topped circular mounds mentioned by Lewis (see above), Mounds 1 and 2, and the ones to the west Mounds 3 and 4:

> Directly in front of the northeastern side of the square mound, and 350 feet from its base, there stood a circular mound, 75 feet in diameter at the ground, 12 feet in height, with a level top 30 feet across. East of the east corner of the large square mound, and 300 feet from it, was conical mound No. 2, the exact counterpart of No. 1. Both were carefully constructed of hard, tenacious clay, and described true circles, both at their bases and flat summits. On the broad undulation to the west of these works, and 600 feet distant from the western corner of the truncated pyramid, is mound No. 3, presumably artificial and perhaps sepulchral. It is of the ordinary rounded form, ten feet in height, 150 feet in length and 100 feet wide at the base. West of it a hundred feet is another similar but smaller mound, No. 4, in length 75 feet, by 50 feet in width, and 6 feet high (Walton 1962:260).

Snyder's original labels of Mounds 1 through 4 have been retained in this study for clarity; the other mounds have been labeled by Pauketat and colleagues (2016), and these designations are also used here (compare Figures 4.2 and 4.4). The dimensions recorded by Snyder in his two descriptions (as well as all other descriptions of the any mound at the site) are summarized in Table 4.1.

Snyder also described artifact scatters and features surrounding the mounds. He claimed that "ancient lodge rings, with their central fire beds, and the camp refuse and the many fragments of pottery and flint, scattered far and wide around these mounds," and that these artifacts were similar to those found at Cahokia (Walton 1962:259). Importantly, Snyder mentioned "a well-worn trail, or road, leading from the mound village on the banks of Cahokia creek to the eastern bluffs, and up that ravine between the two lofty signal stations, and on through the timbered hills and across Silver creek, to another square mound in the western edge of Looking Glass prairie, a distance of fifteen miles" (Walton 1962:259). This presumably pre-Columbian trail or road has been dubbed the "Emerald Avenue" by Pauketat (2013a:110) and is the subject of Chapter 5.

The next description of the site was made in 1962. Howard Winters and Stuart Struever, both professional archaeologists, briefly described Mound 12, which they called "the great Emerald Mound" (Winters and Struever 1962:86). According to them, the mound "stands some 40 feet high and is basically a truncated, earthen pyramid, with an apron, or ceremonial approach, some six feet high on its northwestern side" (Winters and Struever 1962:86). Aside from the slight difference in the height of the first and second terraces, this description did not add any new information to previous ones. Winters and Struever also described Mound 2 as "between six and nine feet high, and perhaps 150 feet long and 100 feet wide" (Winters and Struever 1962:86). The discrepancy between Winters and Struever's estimations of these mounds and those of Snyder's is likely due to erosion and modern agricultural practices. While a map recording the position of Mound 2 was apparently drafted during the excavations (Stuart Struever, personal communication, 2013), this map has since been lost. Aside from an aerial photo reported by Brad Koldehoff and colleagues (1993) that purportedly showed the basal remnants of Mound 2, its precise location was unclear until recent test excavations uncovered remnants of the mound in 2013 (Barzilai 2015).

Archaeologist Robert Hall briefly described Mound 12 in 1964. He claimed that the "Emerald Mound is the second largest existing platform mound of the Cahokia area" and that it was oriented to the northwest and southeast (Hall 1965:535). Hall also created a topographic map of the second terrace summit (Figure 4.6). This map showed that a low conical mound, or "a slightly elevated part of the summit," was situated in the western corner (Hall 1965:535; see also Benchley 1974:243). Based on Hall's map, this summit mound was approximately 24 meters in diameter and between 50 and 60 cm high. He did not describe any of the other mounds at the site.

Modern Erosion and Destruction

The Emerald site has been severely impacted by historic activity and erosion before and after the site was first described by Snyder in 1877 (see Pauketat 2013a:138-140). According to Snyder, the southeastern edge of Mound 12 was dug away in 1840 when "Mr. Baldwin, then proprietor of the premises, built a dwelling house that encroached several feet upon the large square mound near its eastern corner" (Walton 1962:260). Snyder specifically made mention of this because a cache of 16 hoe blades was uncovered at the base of the mound at this location (Walton 1962:260).

The sketch of Henry Seiter's "Mound Farm" also shows historic period impacts (Brink, McDonough & Co. 1881:343) (see Figure 4.5). A treebox is depicted on the summit of Mound 2. Furthermore, a large farmhouse encroaches into the southern side of Mound 12, which is the same house built by Baldwin in the 1840s and mentioned by Snyder (see Arjona 2015). Additionally, the sketch shows a stairway on the southeastern face of the mound leading up the second terrace and a fence lining the edges of its summit. A few post molds from this fence may have been uncovered in the southwest unit of his 1964 excavations (Skousen 2011).

Another major alteration to Mound 12 occurred about forty years after the house was constructed, when, according to Snyder, "a narrow trench, two or more feet deep, was cut into the northeastern side of that mound in which to embed an iron pipe for supplying water to a distributing reservoir placed on its top" (Walton 1962:261). The supposed foundation of this distribution reservoir was uncovered in Hall's T-trench during the 1964 excavations (Skousen 2011) (Figure 4.7).

Sometime before 1940, a driveway was constructed just west of Mound 12 to provide access to a farmhouse located northwest of the mound. Based on a 1940 aerial photograph, the driveway clearly clipped the northwest corner of the first terrace, though the extent of the damage is unclear (Figure 4.8). My own observations of the current driveway suggest that over time it shifted a few feet in either direction, meaning that the mound may have been further impacted whenever its position was altered. My 2014 excavations into the first terrace at this point shows that the corner of the mound had been graded away, likely by a bulldozer, to make way for the driveway (see below).

Mound 2 was largely destroyed in 1961. Additionally, small portions of Mound 12 had been dug away sometime before 1965, and perhaps as early as 1961, as Hall stated that Mound 12 "has already been partly removed by a local land-fill contractor" in 1964 (Hall 1965:535; see also Pauketat 2013a:140). Although he did not indicate which portion of the mound had been removed, Hall was likely referring to a large backhoe gouge made in the eastern side of the second terrace and the removal of the low conical mound on the second terrace summit (see Pauketat 2000, 2013a:140) (Figure. 4.9, see also Figure 4.6).

Today the entire site is still being adversely impacted by erosion, modern farming, and other activities. As implied earlier, many of the conical mounds have been and continue to erode during rainstorms and plowing, and several may have been destroyed by modern terracing activities. Mound 12 is being impacted by the growth and decay of trees and rodent burrows. Several large trees growing on the eastern edge of the second terrace have fallen and in the process have torn away large chunks of the mound (Figure 4.10). Rodents and small mammal burrows are also visible all over the mound. Some burrows are reused and enlarged, and new ones are made regularly.

The Emerald Axis

Despite the overall erosion and destruction of the site, recent investigations by Pauketat (2013a) based on LiDAR images have shown that remnants of many of the mounds are still discernable. According to him, these remnants show that the entire site was constructed according to an overarching site plan that highlighted the natural alignment of Emerald's ridge (see Pauketat 2013a). In this section I describe the site's layout and orientation. Again, this description is based on the work of Pauketat (2013a) and ISAS's 2011 LiDAR images of the site, though I also rely on some earlier work to describe other portions of the site that have since been destroyed or altered.

As previously mentioned, there are 12 mounds at the Emerald site, all of which are located on a high ridge that is naturally oriented to 53 degrees of azimuth (Pauketat 2013a). Recent LiDAR imaging shows that Mounds 1 and 2 have been largely destroyed by modern plowing, though basal remnants of these mounds indicate that they are situated east of Mound 12 on a north-south line (see Pauketat et al. 2016). LiDAR images also show that all but two of the other nine circular mounds (Mounds 3 and 4) have been leveled by modern plowing and erosion (see Figure 4.4). The only indications of these mounds' location are semi-circular "lobes" extending perpendicularly at even intervals along the ridge's sides. The nearly equivalent elevation of these lobes and the adjacent ridgetop and coring evidence provided by Mike Kolb (2011) shows that these lobes were purposefully constructed bases or platforms of prepared fill to support the conical mounds. Unfortunately, little if any of these circular mounds remain today. As stated before, only the lower portions of Mounds 3 and 4 are extant, evident by clear differences in their elevation compared to the adjacent ridgetop (see Figure 4.4).

If these lobes represent the location of these conical mounds, it is clear that nine of the 11 mounds (Mounds 3-11) were built in three rows arranged in straight lines. Mounds 3, 4, and 8 line the south edge of the ridge. Mounds 5, 6, and 7 line the north edge of the ridge, while Mounds 9, 10, and 11 also line the north edge but are offset from Mounds 5 through 7 (see Figure 4.4). These mounds are "carefully spaced along the ridge, each one around 70 meters from the next in three rows, two of which are also spaced 70 m apart" (Pauketat 2013a:143) (see Figure 4.4). In short, these mounds outline the ridge and thereby emphasize the ridge's natural 53-degree alignment (Pauketat 2013a:143-144). Together, the natural ridge and mounds make up what Pauketat (2013a:137-147) calls the Emerald Axis. This axis was the organizing principle of the entire site (Pauketat et al. 2016; see also Chapter 6).

Mound 12, the central feature of the Emerald site, further confirms the Emerald Axis and overall structure of the site (see Figure 4.4). The dimensions of the mound are generally discernable and can be described using the 2011 LiDAR images of the site provided by ISAS. The base of the main body of Mound 12, which I call the second terrace, measures 75 meters square. However, it may actually measure up to 90 meters square (which incidentally is more similar to Snyder's measurement), though this is difficult to tell due to mound erosion. Its flat-topped summit measures about 43 meters square and is six meters in height. Based on Hall's 1964 topo map, a low conical mound, approximately 24 meters in diameter and about a half meter in height, once stood on the west corner of the second terrace (see Figure 4.6). It has since been mostly destroyed, almost certainly as a result of the 1960s borrowing activities (see above).

The first terrace of Mound 12 extends from the northwest side of the second terrace. The first terrace, smaller than the second, measures approximately 37 meters square at its base and is between one and two meters high. Given the difficulty in differentiating between the intact mound and eroded mound fill, the base may actually measure up to 46 meters square. Here I use the former measurement, as it more closely matches Snyder's measurement. It is also hard to procure accurate dimensions for the surface of the first terrace summit because of erosion, though I estimate that it was about 30 meters square. Together, the base of both terraces measures 112 meters in length. Importantly, the angle of Mound 12 measures 323 degrees of azimuth, which is perpendicular to the rows of conical mounds. This orientation is crucial because it "locks down" or confirms the Emerald Axis (Pauketat 2013a:144). Furthermore, Mound 12's long axis aligns with another conical mound on a high ridge about 1.5 km to the northwest (Figure 4.11) (Pauketat 2013a:147). This conical mound, called the Brown Mound, is assumed to be a burial mound and was likely constructed during the Late Woodland or early Mississippian period (see Hall 1965:535; Jenne 1971; Kruchten 2012).

Additional evidence of the organizational importance of the Emerald Axis is provided by Jeffery Kruchten (2012). He found that by extending the Emerald Axis southeast beyond Brown Mound and Emerald's Mound 12 (both of which are perpendicular to the Emerald Axis) points toward several prominent ridges in the modern town of Summerfield, located southeast of Emerald. According to Kruchten (2012:4), "the axis runs between two of these, Berger Hill and another just to that ridge's southwest, before hitting a third." A mound may be present on this third ridge. Kruchten also argues that the Emerald Axis itself points to another high ridge about seven km northeast of Emerald. Though this ridge has not been systematically surveyed, contour maps suggest that a low conical mound (likely Middle Woodland or Mississippian in origin) is present on the ridge (Kruchten 2012:6). Clearly, then, Emerald's mounds as well as other mounds and natural knolls scattered throughout the surrounding landscape mimicked or accentuated the natural ridge on which Emerald was built, the lunar event it referenced, and the relationships it created (see Kruchten 2012; Pauketat 2013a; Skousen 2015a).

Previous Excavations

Portions of the Emerald site have been excavated by archaeologists and non-archaeologists alike and have provided a general framework for the site's history. In 1840 or 1843, the owner of the site, a Mr. Baldwin, unearthed a cache of hoe blades and a plethora of human bones while digging into the primary mound to build a cellar or well, presumably for the homestead depicted in Figure 4.5 (Grimm 1944; Koldehoff et al. 1993:335; Snyder 1877:434; Walton 1962:260-261). Several decades later (the exact year is unclear), a bed of ashes and charcoal was uncovered on the top of Mound 12 when the trench for the distribution tank water pipe was dug (Walton 1962:261). For Snyder, this indicated that a "fire had been maintained there for an indefinite period of time" (Walton 1962:261). Warren K. Moorehead performed the first systematic excavations at Emerald in 1923. Unfortunately, his report is vague. He never mentioned which mounds were excavated; he only claimed that "very little" was found in the mounds and surmised that "they were elevations probably on which Indian cabins had been placed" (Moorehead 2000[1929]:65). Robert Grimm (1944:41), a local amateur archaeologist, later claimed that Moorehead "found several pottery vessels" in one of the smaller mounds and "a few small arrowheads" in another. Koldehoff et al. (1993:336) reported that Moorehead's collection included "twenty-one sherds, three chert flakes, and one broken diorite celt." Among the sherds were several rims, some of which dated to the early Mississippian period and others that dated to the Moorehead or Sand Prairie phase (Koldehoff et al. 1993:336). Profiles of these rims, drawn by John Kelly, are reproduced in Figure 4.12. Again, the exact provenience of these rims is unknown, but most of them clearly date to the Moorehead phase. Given their late Mississippian date, they may have been excavated from Mound 2 or 12 (see below).

The next known excavations at Emerald occurred in 1961. In response to the impending destruction of Mound 2 and potentially Mound 12, the Illinois State Museum sent archaeologists Howard Winters and Stuart Struever to salvage whatever information they could. Winters and Struever (1962) excavated five test units on or around the "apron" of Mound 12 (the first terrace). However, no map showing the location of these test pits was ever published, and the original field map has since been lost (see Benchley 1974:242; Skousen 2011). Winters and Struever (1962:86) claimed that pottery recovered from these units was "typical of very early Mississippian, with plain buff or red wares predominant." My own analysis of this pottery revealed that they date to the early Lohmann phase, which meshes with Winters and Struever's early Mississippian designation (Skousen 2011; see also Woods and Holley 1991:55). They also performed a surface collection from what they called the "village area," assumed to be situated along the edges of the flat area situated west of Mound 12 (Winters and Struever 1962:86). Based on the ceramics from these surface collections, they argued that the site was inhabited in the early Mississippian period (Winters and Struever 1962:86; see also Benchley 1974; Koldehoff et al. 1993; Skousen 2011; Woods and Holley 1991). Finally, they performed salvage excavations on Mound 2, the results of which I discuss in more detail below.

In 1964, another round of excavations at Emerald were sponsored by the Illinois State Museum, led by Robert Hall. Mound 12 was again under threat of destruction, and Hall's job was to salvage whatever information he could before that happened (Skousen 2011; see also

Benchley 1974:243; Hall 1965:535; Koldehoff et al. 1993; Woods and Holley 1991:55). Hall excavated three test units into the summit of Mound 12 (Figure 4.13). One of these units, excavated into the low conical mound in the northwest corner, uncovered “an aboriginal postmold pattern and hearth area” (Hall 1965:535). His unpublished plan map of these excavations, reproduced in Figure 4.14, shows three post molds and a square hearth (the hearth itself is oriented within a few degrees of the Emerald Axis) that burned the surrounding soil, all of which superimposed a circular pit two meters in diameter and about 30 cm deep (see Skousen 2011). Although the post molds hint at the presence of a structure, Hall either did not recognize it or the unit did not uncover other architectural components of the structure. Hall’s largest excavation unit, a 30-meter-long T-trench, uncovered a single burial of an adult of unknown sex (Figure 4.15). The body was in a flexed position, suggesting that it was buried in a shallow pit (though no pit feature was identified during the excavations). A bone awl and a black-slipped, shell-tempered bowl rim sherd was situated next to the burial, presumably inside the burial pit. Unfortunately, the burial was partially disturbed by the late 19th century construction of the water-distribution reservoir (see above) (Skousen 2011). The T-trench also revealed that several distinct layers or mantles capped the second terrace summit (Figure 4.16). Several jar rim sherds recovered from the cap fill date to the Moorehead phase (see Skousen 2011). Hall’s third excavation unit, excavated in the southwest corner of the mound, did not uncover any pre-Columbian features. However, it did reveal several historic post molds, possibly from the fence that lined Mound 12’s summit (see Figure 4.5). In sum, the excavations by Moorehead, Winters, Struever, and Hall were key in establishing both the early and late occupations discussed by later scholars (see Alt and Pauketat 2015; Benchley 1974:238-239; Koldehoff 1980; Koldehoff et al. 1993:336-337; Pauketat 1998a:58, 2013a:146; Pauketat and Alt 2015; Pauketat et al. 2016;

Skousen 2011, 2015a; Woods and Holley 1991:55). Fortunately, Mound 12 was never leveled, and the majority of the mound remains intact today. In fact, the mound was purchased by the Illinois Archaeological Survey in the 1970s and is currently under the ownership of the state of Illinois (Benchley 1974:242).

Several additional excavation projects at Emerald have taken place since the 1990s. The University of Oklahoma's Early Cahokia Project, led by Timothy Pauketat, visited Emerald in 1993 and 1996 to determine the integrity and construction history of the primary mound (Pauketat 2000, 2013a). Two profiles were made on extant mound faces. The 1993 profile was made on the eastern corner of the mound on an escarpment presumably made during the 1960s borrowing activities (see above). The second profile, made in 1996, was made on a separate escarpment that also resulted from the 1960s borrowing activities. Additionally, the 1993 profile was extended to the base of the mound during the 1996 investigations (Pauketat 2000). These profiles revealed the construction methods of the entire vertical extent of the eastern side of the mound (see Pauketat 2000, 2008, 2013a). Based on this information, the mound was constructed in at least three, and possibly five, distinct construction events (Pauketat 2013a:140). During the first event, the topsoil was stripped and "four thin mantles of alternating yellow and dark clayey silt" were spread. Sod blocks were laid on top of these mantles, which were then capped by a series of thin blanket mantles that likely served as stable mound surfaces that supported buildings and other activities (Pauketat 2013a:140). According to Pauketat (2000:9), each event was a "burst of human energy" that significantly raised the height of the mound; he also estimates that the stable surfaces would only have been open for about a year before the mound was enlarged. Overall, Pauketat (2000) suggests that the mound could have been built in a few decades.

Unfortunately, no diagnostic artifacts were recovered from these excavations, meaning the date of the earliest construction episodes is uncertain (see Pauketat 2000).

In 1998, ISAS (then ITARP) opened several test trenches on the ridge west of Mound 12 before drainage tiles were emplaced to reduce erosion (Figure 4.17). These excavations uncovered numerous features dating from the Edelhardt to Early Stirling phases (see Chapter 6). In 2003, Jeffery Kruchten performed pedestrian survey about 1 square mile around the site as part of a UIUC field school. In 2011, ISAS flew LiDAR over the Emerald site and placed 20 excavation blocks west of Mound 12 before the entire ridge was terraced to prevent erosion (see Figure 4.17). The LiDAR images allowed more detailed measurements to be taken on Mound 12 and were reported earlier (see also Pauketat 2013a). Extensive excavations were conducted between 2012 and 2015 by Indiana University and the University of Illinois, led by Susan Alt and Pauketat as part of the RIHA project. These excavations opened several large blocks around Mound 12. These blocks uncovered numerous houses, shrines, pits, and construction fills that dated primarily to the Lohmann phase (see Alt and Pauketat 2015; Kruchten 2014; Pauketat and Alt 2015). As part of this project, two units were opened on Mound 12 and a resistivity survey on the Emerald Avenue was performed, both in 2012 (Larson et al. 2013; Skousen 2013).

In sum, these previous excavations revealed that Emerald was inhabited beginning in the Edelhardt phase and into the early Stirling phase. Construction on Mound 12 began in the early Mississippian period and continued in bursts of building activity that culminated in the Moorehead phase, when several features were constructed on the summit of the second terrace and the entire second terrace was capped. The mound excavations reported below confirm this timeline and provide additional evidence of the construction and history of several other mounds.

Mound 12 Excavations

Summit Excavations

In 2012, a series of units were excavated into the second terrace summit by myself, field school students, and graduate student volunteers as part of Alt and Pauketat's "Revealing Cahokia's Religion" project. A 2 x 2 meter unit and adjoining 2 x 1 meter unit were excavated on the summit of the second terrace (Figure 4.18). The goals of these excavations were to reopen Hall's 1964 unit, identify any structures that had been overlooked, and document their size, construction style, orientation, and function. The 2012 units uncovered a number of features and the remnants of the low conical mound, both of which were dated through diagnostic ceramic artifacts and contextual information. Although I was not able to identify the edges of Hall's old unit (they were almost certainly destroyed during the hauling away of the conical mound in the 1960s, see above), I suspect that the 2012 units overlay portions of the 1964 unit, meaning that the features identified may have been associated with those documented by Hall.

Four superimposed features were identified in the 2012 summit unit. Based on the profiles of the summit units, these excavations only uncovered the lower portion of the features. All of the features were apparently constructed on or near the summit of the low conical mound – the profiles show that the upper portions of these features were truncated by the mound's destruction in the 1960s (see above) (see Figures 4.6 and 4.9). These features include a post pit and its associated insertion and extraction ramps, two wall trench structures, and a pit (Figure 4.19). The post pit and its two insertion/extraction ramps, collectively labeled Feature 175, is the earliest feature constructed in this area. Although it was only partially uncovered due to the placement and orientation of the unit, the post pit measures approximately 60 cm in diameter, meaning that the diameter of the post it held was comparable in size. Given the length of the insertion/extraction ramps to facilitate the insertion and extraction of the post, the post was likely very tall as well.

The next feature in the construction sequence is Feature 176, a wall trench structure that was rebuilt twice (see Figure 4.19). It clearly superimposes the north-trending ramp of the post pit (Feature 175). However, since the upper portions of this feature were destroyed, it is impossible to know its exact relationship to Feature 175 except that it superimposed it. The dimensions of Feature 176 are unclear due to the limits of the excavation unit, though it is oriented approximately north-south. No basin was observed. Based on four body sherds recovered from one of its wall trenches, this structure clearly dates to the early Moorehead phase. (Table 4.2). Each sherd is shell tempered and cordmarked, and one exhibits a red slipped interior (Figure 4.20). These sherds are fragments of Cahokia Cordmarked vessels, diagnostic of the early Moorehead phase (Fowler and Hall 1975; Holley 1989; Pauketat 1998b).

Another wall trench structure, Feature 177, superimposes both Features 175 and 176 (see Figure 4.19). This structure is not rebuilt. Silted-in post molds are visible in the wall trenches, suggesting that the walls were shifted or pulled sometime before a rainstorm filled the post molds with rain-washed silt (Figure 4.21). This structure is oriented to 53 degrees of azimuth (relative to true north), which aligns perfectly to Mound 12 and the Emerald axis (see Figure 4.19) (see Pauketat 2013a). Like Feature 176, the full dimensions of Feature 177 cannot be determined, and no basin was observed. Finally, a pit, labeled Feature 186, superimposes the wall trenches of Feature 176 and may have been an internal pit of Feature 177 (see Figure 4.19). The full size of Feature 186 is unclear, but it is at least 85 by 60 cm in diameter. These features also date to the Moorehead phase – a single shell-tempered, cordmarked body sherd was recovered from Feature 186 (see Figure 4.20) (see Table 4.2) and Feature 177 clearly superimposes Feature 176, which means that Feature 177 dates to the Moorehead phase.

As implied earlier, this summit unit was excavated into the remnants of the low conical mound on the second terrace summit. Thus, these excavations shed light on the methods used for the low mound's construction and its chronology. The mound was constructed using what appears to be "loaded fills" (Sherwood and Kidder 2011) (Figure 4.22). Individual loads are outlined by very thin (less than 1 cm thick) bands of dark brown fill, though these do not appear to be remnants of topsoil (Figure 4.23). A slight but distinct change in soil color is observable at the base of the profiles all around the units, which I interpret as the base of the conical mound (see Figures 4.22 and 4.23). The remnants of the conical mound are about 70 cm high (see Figure 4.22), meaning that, based on these excavations, the conical mound was slightly taller than Hall's plan map suggests (see above).

Like the ceramic remains from the features, the ceramic artifacts from the fill of the conical mound date to Moorehead phase. Six jars, two bowls, and three plates were recovered, though some of these artifacts may have been associated with the mound top features (Table 4.3). Five of the jars are shell-tempered and all of these have plain or burnished exteriors and interiors. One jar is tempered with grog, unslipped, and undecorated (Figure 4.24). Both bowls are shell-tempered; one exhibits exterior dark slip and the other has a plain exterior. One plate is tempered with grog and plain, and another is shell-tempered and red-slipped on the interior and exterior. The final plate, however, is the most temporally diagnostic of these vessels. It is shell-tempered, has a broad rim, and exhibits dark slip on the exterior and red to dark slip on the interior. Two broad, diagonal incisions are also visible on the interior (upper) rim surface (Figure 4.25). This plate fits the type Wells Broad-Trailed Incised, which dates to the early Moorehead phase (Holley 1989:209-210; Pauketat 1998b:217, 2013c:215; Vogel 1975:104-106). Additionally, 22 percent of the body sherd assemblage by count are cordmarked and six sherds exhibit exterior cordmarks and interior red slip, which is diagnostic of the type Cahokia Cordmarked and verifies the Moorehead phase affiliation (see Table 4.2).

Interface Excavations

In addition to the summit units, a 3 x 1 meter trench was excavated into the junction of the first and second terraces in 2012 (see Figure 4.18). The purposes of this trench were to determine how the first and second terraces conjoined, the number of construction episodes it took to build each terrace, the methods used to construct each episode, and the chronology of both terraces.

The summit of the first terrace was identified by the presence of a shallow trench and the cessation of alternating light-dark zoned layers of fill that are clearly part of the first terrace (Figure 4.26). The function of the shallow trench is unclear, though I suspect it caught and funneled water from the second terrace. The second terrace was clearly constructed on top of the first terrace – thin, alternating light and dark zoned layers of fill clearly belonging to the first terrace ran into all sides of the profile wall and under second terrace fills (Figure 4.27). When the height of the second terrace reached the first terrace summit, several zoned layers from the second terrace were extended beyond the second terrace and spread onto the summit of the first terrace. In profile, these extended zoned layers are visible overlaying the zoned layers of fill that capped the first terrace summit (see Figure 4.27). These extended zoned layers smoothly joined the second terrace to the first as construction on the second terrace continued above the height of the first terrace. The profile in Figure 4.27 also shows several places where low buttresses were interspersed among these extended zoned layers, presumably to stabilize the fills of the second terrace as it was being constructed upward. Not long after the first and second terraces were joined by these extended layers and buttresses, a series of rainstorms occurred, leaving several bands of laminated layers on top of these fills (see Figure 4.27). After these rain events, construction on the second terrace continued. A series of more substantial buttresses (made from well-packed basketloads of fill) and more zoned layers were laid directly on the laminated fill, as indicated in Figure 4.28, again to shore up and stabilize the fills of the next construction event. Aside from the buttresses, relatively little of the fill of this next construction episode was captured in the southeast face of the interface profile (see Figure 4.27).

In mounds, individual construction episodes are generally differentiated from others by the presence of a thick cap layer, several thin layers of fill, or the presence of features (see Pauketat 1993, 2000, 2008, 2013a; Pauketat et al. 2010; Reed 2009; Reed et al. 1968; Sherwood and Kidder 2011; Smith 1969; Sullivan and Pauketat 2007). From this interface profile, at least two distinct construction episodes make up the first terrace. The first episode consists of a series of thin zoned fills capped by thick bands of laminated fill. The second, which represents the final construction episode of the first terrace, also consists of thin zoned fills (see Figure 4.27). This profile also reveals two construction events in the second terrace. The first consists of the thicker zoned layers of fill, a few of which were extended across to the summit of the first terrace to smoothly join the two terraces. Some low buttresses were interspersed with these zoned layers to support the increasing height of the second terrace as it was built higher. This construction episode, which consisted of about 50 cm of fill, ended when a series of rainstorms washed numerous bands of laminated fill over these fills. The second construction stage of the second terrace consists largely of buttresses and perhaps some zoned or basketloaded fills (see Figure

4.27). The composition of the upper portions of this second episode, and any additional ones above it, are unclear (see Figure 4.27).

Based on these and Pauketat's excavations, zoned fills are the primary method used to construct the mound. The zoned fills are generally between 3 and 5 cm in thickness and were laid down in alternating dark and light colored layers (Figure 4.29) (Sherwood and Kidder 2011:78). Although Sherwood and Kidder (2011:78) claim that these alternating fills create a series of permeable and less permeable layers of soil to "improve moisture balance" and "increase slope strength and reduce sheer stress" on sloped mounds, the virtually identical textures of Mound 12's zone fills suggest that the colors were selected more to symbolize the dualism between the upper and lower worlds (see Knight 1989; Pauketat 2008; Purcell 2004). Similar color patterns in zoned fills have been observed in other mounds in the region (see Pauketat 1993, 2008; Pauketat et al. 2010; Pauketat et al. 1998; Sherwood and Kidder 2011).

Importantly, the zoned fills in this profile are interspersed by two major laminated fill layers, one on the first terrace and another on the second (see Figure 4.27). I interpret these laminated layers as evidence of construction hiatuses. In each case these thick layers consist of a series of much thinner micro-laminations. These fills likely developed during rainstorms when water-washed silt from other parts of the mound collected in horizontal bands on extant mound surfaces. Given that each of the thicker laminated layers consists of a series of smaller laminated layers, it is likely that these thick layers developed from a series of rainstorms rather than from a single major storm.

In addition to the zoned fills, a series of small buttresses made of well-packed basketloaded fills are visible on the second terrace surfaces (see Figure 4.28). As mentioned earlier, these loads presumably stabilize the horizontal zoned fills used to construct the second terrace as its height increased. The buttresses are more distinct in the southwest-facing profile and less so in the northeast-facing profile (see Figure 4.27). The reason for this may be because the excavation trench was not quite squarely aligned to the mound, though it is also possible that the buttresses were not built as a continuous feature but were built only in places on the mound where stabilization was needed (see Bareis 1975:13). Similar buttress features have been noted at Cahokia and in other Mississippian mounds (see Bareis 1975; Sherwood and Kidder 2011). A paired light brown and dark gray zone overlaying the second terrace fills is visible in the profile (see Figures 4.27 and 4.28). These layers could represent a veneer; it is also possible that the upper dark zone represents slope wash from the second terrace. Finally, a thick band of topsoil and probably material eroded from the second terrace makes up the uppermost fill of this trench.

The chronology of these terraces can be inferred based on a handful of diagnostic ceramic artifacts. The three jars recovered from the interface trench are clearly Mississippian, as all are shell-tempered and exhibit plain exteriors (Table 4.4). One exhibits remnants of red slip on the interior rim (see Figure 4.24), which suggests a Stirling or Moorehead phase affiliation (Holley 1989; Pauketat 1998b). Additionally, about half of the body sherds recovered are shell-tempered and plain, and 11 percent by count are shell-tempered and cordmarked, indicative of the type Cahokia Cordmarked (Table 4.5). Grit and grog-tempered sherds are less common, together making up about 20 percent of the assemblage. Notably, most sherds were recovered from fills between 50 and 90 cm under the mound surface (see Table 4.5). Thus, these sherds likely came from the slope wash or potential veneer, and some may have come from the buttresses visible in the profile (see below). The presence of shell-tempered pottery with cordmarks in the veneer or slope wash suggests a Moorehead phase affiliation for the upper portions of the second terrace. The second construction episode of the second terrace and the overlying slope wash/veneer, in other words, likely took place in the Moorehead phase. It is unclear whether these layers or construction episodes correspond with the final activities that took place on the second terrace summit (see above). Unfortunately, very few sherds were recovered from the layered fills of the lowest levels of the trench, particularly those that penetrated the lower fills of the first and second terraces (see Table 4.5). Thus, there is no evidence to warrant anything other than a general Mississippian period designation for the layers of the first terrace and the lower construction episode of the second terrace.

First Terrace Excavations

A 1 x 4 meter trench was excavated into the first terrace in 2014 (see Figure 4.18). The purpose of the trench was to determine the number of construction events, the methods of construction, and chronology of the first terrace as well as evaluate the extent of the damage inflicted by the driveway of the corner of the first terrace (see above).

The first terrace was constructed in at least three, and more likely four, distinct events (Figure 4.30). Prior to the first construction event, a pit or post pit was dug and presumably used. The slight "dip" of the mound fill into the feature suggests that the pit was backfilled right before the initial mound construction event began – the weight of the mound fill apparently compressed the unsettled feature fill, creating the dip. In other words, backfilling open features was likely part of the first construction event of the first terrace. This initial event also involved stripping the prairie sod from the existing surface and spreading two thin layers of zoned fill. Both the second and third construction episodes consisted of piling 30 cm of basket-loaded fills and then covering them by two or three pairs of very thin alternating light and dark zoned layers (each layer between less than one and five cm in thickness) (see Figure 4.30). The final construction event consisted of up to 50 cm of basket-loaded fills. It is possible that this final event was capped with thin zoned fills like the others, but the top 20 cm of fill was obscured by rodent runs, roots, and topsoil development. While this profile reveals similar thin basal layers noted in Pauketat's (2013a:140, Figure 7.6) profile, this profile did not uncover any evidence of sod block construction and revealed that in this area the first terrace was constructed in three or four episodes instead of one.

The general chronology of the first terrace was determined by ceramic artifacts. While no rim sherds were recovered in these excavations, the vast majority of the 54 body sherds recovered from these units are shell tempered and plain; the other sherds are either grit or grog-tempered (Table 4.6). The abundance of shell-tempered sherds, relative lack of other temper types, and lack of black slip or cordmarked surfaces (indicative of late Mississippian pottery) suggests an early Mississippian (particularly Lohmann) period date. As mentioned before, I assume that the thin, paired zoned fills represent not only an end of a construction episode but also a stable mound surface on which mound-top activities took place. While it is unclear exactly how long these each construction episode took to construct and how long each stable surface was used or remained open to the elements, I assume it was a relatively short amount of time because no soil development or erosion was observed on these zoned surfaces (cf. Kidder 2004; Kidder et al. 2004; Sherwood and Kidder 2011:82).

These excavations also revealed that the historic period driveway destroyed the corner of the first terrace (see Figure 4.8). More specifically, the corner was likely scraped away by heavy machines (e.g., a bulldozer) in several passes or swipes (see Figure 4.30). Furthermore, a layer of limestone gravel was encountered about 10 cm below the surface in the lowest unit in the first terrace trench. This lens represents an earlier version of the driveway situated slightly closer to the mound than the current driveway (see Skousen and Pauketat 2014). It is unclear exactly when this destruction occurred, though the presence of the driveway in the 1940 aerial photograph suggests that it happened sometime before then.

Mound 12 Summary

Collectively, the excavations on Mound 12 shed light on the mound's complex history and the history of the Emerald site more generally. The first terrace of Mound 12 was constructed first, beginning around A.D. 1050. This is based on the relative abundance of shell-tempered sherds that are not dark-slipped or cordmarked recovered from the first terrace, the relative lack of grit and grog-tempered sherds from the same units, and the presence of early Lohmann phase pottery from Winters and Struever's 1961 test excavations into the first terrace (Skousen 2011; Winters and Struever 1962). Moreover, the first terrace was built in four major events, the latter three of which consisted of major stage enlargements capped with thin mantles of alternating light and dark fill. From the chronological data available, these four stages were all constructed during the Lohmann phase. The initial and concluding construction events on the first terrace uncovered in the 2012 and 2014 excavations also correspond with the stages identified by Pauketat (2000, 2013a). Pauketat argued that the before mound construction began on the first terrace, the topsoil was stripped and thin blanket mantles were spread. These initial blanket mantles are apparent in the first terrace excavations. Furthermore, the blanket mantles that top Pauketat's (2000; 2013a:Figure 7.6) "lower stage" match the elevation of the first terrace summit as identified in my 2012 and 2014 excavations.

The chronology of the lower levels of the second terrace is difficult to determine, as very few sherds were recovered from these lower levels. However, ceramics from the upper levels of the second terrace suggest that these layers were constructed later. A few shell-tempered cordmarked sherds (probably from a Cahokia Cordmarked vessel) were likely recovered from the buttress features, which would mean the buttresses was constructed during the Moorehead phase and that the earlier stages of the second terrace were built sometime before then. Moreover, the second terrace was built in at least two major events. These stages are visible in the 2012 interface profile, each separated by a series of laminated fill layers. The elevation of these layers match a series of "possible blanket mantles" with water laminations in Pauketat's (2013a:Figure 7.6) profile. The 2012 interface profile also shows that the earlier stage of the second terrace consists of zoned fill layers, much like Pauketat's depiction of zoned fills between blanket mantles (compare Figure 4.27 with Pauketat 2013a:Figure 7.6).

The final construction activities took place on Mound 12's summit sometime during the early Moorehead phase. A low conical mound was constructed on the summit. On top of this mound, a monumental post was planted and removed and two wall trench structures (likely elite structures or temples) were constructed and dismantled, one after the other. The presence of several highly everted rim jars, a Wells Incised plate fragment, and shell-tempered sherds with external cordmarks and internal red slip clearly shows that all of these activities took place during the early Moorehead phase. Interestingly, the first mound top structure was oriented cardinally while the other was oriented to the Emerald Axis. This is significant given the length of time that passed between the last occupation at the site that referenced the Emerald Axis (the early Stirling phase, see Chapter 6) and the early Moorehead phase. In addition to these activities, the entire second terrace was capped with several veneers or thick layers of fill (see Skousen 2011). The recovery of shell-tempered pottery with external cordmarks and internal red slip from the veneer fills suggests that these veneers were also added during the Moorehead phase, a point that has been articulated by several scholars (Benchley 1974; Koldehoff et al. 1993; Pauketat 2013a; Skousen 2011, 2013; Woods and Holley 1991).

Mound 2 Excavations

In this section I review the results of the salvage excavations performed by Howard Winters and Stuart Struever (1962) on Mound 2 and more recent test excavations by Alt and Pauketat (see Barzilai 2015). Based on the exposed fills observed during Mound 2's destruction in 1961, Winters and Struever claimed that the mound "had been enlarged two or three times" (Winters and Struever 1962:87). The earliest version of Mound 2 was a "truncated pyramid…constructed of very dark soil"; the latter enlargements were constructed using "a sharply contrasting yellow clay" (Winters and Struever 1962:87). Furthermore, after the mound was graded away, Winters and Struever noticed a cylindrical pit (probably a hearth) at the base of the mound measuring "three feet in diameter and a foot deep" with walls "lined at least twice with carefully smoothed clay" (Winters and Struever 1962:86). The hearth contained ash, the shells of several young turtles, burned fawn bones, and pottery. Winters and Struever (1962:87) suggested that, based on the uncommon assemblage of faunal remains and the young nature of the specimens, "the bones were left from ceremonial activities rather than food preparation." They also observed that the pottery recovered from the hearth was the type Cahokia Cordmarked, distinctive of the Moorehead phase (Fowler and Hall 1975; Holley 1989; Pauketat 1998b). My own reanalysis of the pottery from Winters and Struever's excavations confirmed the presence of Cahokia Cordmarked pottery as well as a shell-tempered jar with a highly everted rim, which does indeed suggest that this hearth and Mound 2 were constructed sometime during the Moorehead phase (Skousen 2011, 2013) (Figure 4.31).

In 2013, however, test excavations performed by Alt and Pauketat during their RIHA project suggest that construction on Mound 2 began in the Lohmann phase (see Barzilai 2015). A series of test units excavated into the area where Mound 2 was supposedly located revealed a prepared mound surface of dark brown and yellow prepared fills. A wall trench structure was constructed on the surface of these prepared fills. Although datable artifacts from these fills were scarce, the presence of a single red-slipped seed jar implies a Lohmann phase affiliation. The initial construction of Mound 2 in the Lohmann phase corresponds with the initial construction of Mound 12 and several other mounds at Emerald, as I will discuss below (see Barzilai 2015).

Mound 7 Excavations

In 2011, ISAS dug 20 test excavation blocks (EBs) via backhoe into the north side of the Emerald ridge in lieu of terracing activities (see Figure 4.17). A few of these EBs were dug into areas later estimated by Pauketat (2013a:143) to have once been the locations of several of Emerald's circular mounds. EB 4, for instance, was excavated in the location of Mound 7 (see Figure 4.17). The south-facing profile of the block revealed what appeared to be the basal remnants of Mound 7 or, more likely, remnants of the "lobes" or sub-mound platforms that once supported Mound 7 (see above). These fills superimpose a structure designated Feature 64 (Figure 4.32). Based on this profile, these fills are approximately 1.2 meters in height (including the plow zone; 0.9 m high without the plow zone). The lateral dimensions of the fill could not be determined from this EB.

These fills were laid during the Lohmann phase. This was determined based on the fill's association with Feature 64 (see Figure 4.32). Though the architectural style, size, and orientation of Feature 64 is unclear, the basin fill contained fragments of a single shell-tempered, dark-slipped jar that clearly dates to the Lohmann phase (see Chapter 6). This vessel and the lack of soil development between the structure and fills suggests that these fills were laid down immediately after the structure was abandoned and dismantled. The presence of a single thin band of laminated fill about three cm thick, however, shows that Feature 64's basin was open just long enough for a single rainstorm to wash some laminated fills into the upper basin.

The EB 4 profile sheds light on the methods used to construct this apparent platform. These were zoned and/or loaded fills (see Figure 4.32). The color difference between each layer or load of fill is slight (all generally brown), often distinguishable only by greater or lesser concentrations of slightly lighter or darker mottles. Any further additions to the fills (e.g., Mound 7) were either not uncovered by the EB or, more likely, destroyed by modern agricultural practices. The length of time it took to construct these fills was likely short, as no laminations or soil development was apparent between fill layers. It is possible that some of the fill used to create this lobe or platform was obtained from the summit of Emerald's ridge, as the ridgetop appears to have been flattened to create a plaza (see below). Overall, the evidence suggests that these fills (and possibly Mound 7) was built in a single episode during the Lohmann phase.

Mound 9 Excavations

EBs 1 and 2, also excavated by ISAS in 2011, uncovered the basal remnants of Mound 9 or likely the fills used to construct the platform supporting Mound 9 (see Figure 4.17). The profiles of these EBs show that these fills are at least 1.5 meters in height (1.2 meters high not counting the plow zone) (Figures 4.33 and 4.34). Again, the lateral extent of the fills could not be determined based on these excavations. The profiles also reveal that these fills, probably obtained from the flattening of the ridgetop, were laid on top of a buried A horizon (Figures 4.33

and 34). Before the laying down of these fills, however, a discontinuous, 1-3 cm layer of laminated fill, presumably formed during a rainstorm, collected on the A horizon. The platform fills were constructed directly above this laminated fill using loaded fills and perhaps some zoned fills of a gray to brown color. The zoned fills ranged from 2 to 25 cm in thickness. The upper-most layers of the construction fill and any remnants of Mound 9 were destroyed by modern erosion and agricultural practices. There was no indication of distinct construction stages, which suggests that, at least based on these profiles, these fills were emplaced in a single episode. Unfortunately, no artifacts were recovered from these fills in either EB, so when it was deposited is unclear. However, I suspect that it was constructed during the Lohmann phase, probably in conjunction with the platform or fills that supported Mound 6 (given the laminated bands at its base), the earliest stages of Mounds 2 and 12, and probably the rest of the conical mounds at the site.

Labor Estimates

It is possible to estimate the number of people that constructed a mound in terms of person work days. This estimate is especially important for this project. Mound construction events were undoubtedly a part of pilgrimages and large gatherings in the greater Cahokia region (see Pauketat and Alt 2003; Pauketat et al. 2002; Pauketat 2013a), and estimating the number of people who constructed Emerald's mound during a particular event sheds light on the number of pilgrims present at Emerald. Additionally, the experience of the event would be dictated in part by the number of people present.

This estimate requires 1) calculating the volume of fill in each mound, 2) determining the number of distinct construction events in each mound, 3) determining the amount of time it took to construct each episode, and 4) estimating the amount of fill a single person could move in a work day. Calculating a mound's volume requires knowing the shape and dimensions of each mound. Descriptions of the shape and dimensions (lengths and widths of mound bases and summits as well as heights) of any mound from the Emerald site are included in Table 4.1. Specifically, the dimensions of Mounds 1, 2, 3, 4, and 12 were measured by Snyder, Lewis, and Winters and Struever. I assume earlier measurements are desirable for these calculations because they better capture the original dimensions of the mounds before the mounds were impacted by modern erosion and farming practices. At the same time, however, the accuracy of some earlier measurements is questionable. It seems, for instance, that Snyder simply estimated the dimensions of the mounds as well as the distance between features when making his map of the site (see Walton 1962:Plate 36, see Figure 4.2). Furthermore, the dimensions recorded by different scholars rarely coincide, which may be due to the effects of erosion through time. Table 4.1 includes all available measurements on each mound as well as the corresponding volume estimates. The height of the fills beneath Mounds 7 and 9 are also included based on data recovered during ISAS's excavations, though the volume estimates were not calculated because the lateral dimensions of these fills could not be determined. Although each scholar's measurements and the corresponding volumes vary for each mound, I suggest that they still represent a worthwhile range of potential measurements and volumes for these mounds. As stated earlier, the only mound that is still mostly intact and can be accurately measured today is Mound 12, which is also recorded in Table 4.1.

The volumes for Mounds 1 and 2 (both flat-topped circular mounds) were calculated using the formula of a circular truncated cone, or $V = \pi h/3(r_1^2+r_1r_2+r_2^2)$, where r_1 = the radius of the base of the mound, r_2 = the radius of the top of the mound, and h = the height of the mound.

The volumes for Mounds 3 and 4 (both ovoid conical mounds, probably circular conical mounds originally) were calculated based on the formula of a truncated ellipsoid, or $V = \pi ab(h/4)$, where *a* = the major axis of the mound base, *b* = the minor axis of the mound base, and *h* = the height of the mound. Finally, the volume of Mound 12 (a truncated pyramid) was calculated based on the formula for a truncated pyramid, or $V = h/3(a^2+ab+b^2)$, where *a* = one side of the base of the mound, *b* = one side of the summit of the mound, and *h* = the height of the mound. The volumes of the first and second terrace were calculated separately and then combined to obtain the total volume of Mound 12 (see Table 4.1).

As mentioned earlier, the amount of time it took to construct each distinct stage is difficult to determine. Knowing the number of stages it took to construct a mound requires excavation, and in this case only four of Emerald's mounds (or the constructed platforms that supported mounds) have been excavated or tested. The number of major construction stages for these four mounds or their sub-mound platforms (Mounds 2, 7, 9, and 12), along with the phase the stage was constructed in, is summarized in Table 4.7. While both the current Cahokian ceramic chronology and radiocarbon dating are not refined enough to reflect the potentially short amount of time it took to build an individual stage (see Sherwood and Kidder 2011), diagnostic artifacts and radiocarbon dates can narrow down how often major construction events occurred (see Pauketat 1993). As stated earlier, for example, Mound 12's first terrace was built exclusively during the Lohmann phase. Since the Lohmann phase covers a 50-year period, we can assume that the three to four stages that make up the first terrace took place within a 50-year time span. Thus, each construction event took place, at the very least, every 12 to 16 years. This is not to say that each stage was constructed over a 12- to 16-year period; again, most mound stages likely took less than a month to complete, and perhaps even a few days (see Pauketat

1993; Pauketat and Alt 2003; Sherwood and Kidder 2011; contra Milner 1998; Muller 1997). Therefore, it is more likely that each of the first terrace's stages were built in a few days to a few weeks and that these short construction episodes took place once every 12 to 16 years. On the other hand, far less time may have passed between each construction event, especially given the lack of soil formation on each capped episode (see Kidder 2004; Kidder et al. 2004; Sherwood and Kidder 2011:82).

To account for possible time variation in individual construction events, I used three arbitrary lengths of time in which a stage could have been constructed (1 day, 7 days, and 30 days) to calculate labor estimates (Table 4.8). Importantly, these windows of time generally correspond with the duration of most Native American pilgrimage events recorded in ethnographies and contemporary accounts as well as with current interpretations of the length of time it took to construct individual stages (Pauketat 1993; Pauketat and Alt 2003; Sherwood and Kidder 2011). I believe these three estimates are reasonable and provide a range of how long it may have taken to build each mound stage.

The final piece of information needed to calculate labor estimates is the amount of fill a single person could move in a single work day. I use Muller's (1997:273) estimate that a single person could excavate, move, and deposit 1.25 m^3 of soil per day. It is worth mentioning, however, that there are many factors not accounted for in this estimate. For example, constructing a Mississippian mound would have involved planning the mound's layout, orientation, and dimensions; preparing the natural surface; finding the correct color and texture of soils; excavating the soils; processing and/or mixing the soils; carrying the fill to the site of construction; depositing or spreading the fill in specific ways; packing, compressing, or pounding the soil to ensure stability; maintaining the angle of repose on mound sides; and so on.

Furthermore, additional labor would have been needed to fashion and maintain construction tools, support the directors and builders, perform necessary ceremonies, maintain the mound's shape and appearance after each stage was built, and undoubtedly much more. In other words, Muller's estimate *only* takes into account digging and piling fill. It also assumes a constant rate of mound construction, though Muller (1997:274) admits that there were probably periods of more rapid and/or intensive labor. The point is that labor estimates of mound construction (including those reported here) probably underestimate the actual amount of labor that went in to constructing a mound, particularly if mounds were constructed as quickly as scholars have suggested (Pauketat 1993; Pauketat and Alt 2003; Sherwood and Kidder 2011).

The number of individuals needed to build each stage was calculated using the formula I = (V/X)/(LT), with *V* = the total volume of each mound in m^3, *X* = the number of stages in each mound, *L* = the amount of fill a single individual could move a day (see Muller 1997:273), and *T* = the length of time in days it took to construct each stage. Whenever it was unclear how many stages made up a mound (e.g., Mounds 1, 3, and 4), I assumed that they were built in a single stage. Again, labor estimates for the prepared surfaces that supported Mounds 7 and 9 could not be determined because their lateral dimensions were never recorded and cannot be accurately determined today due to erosion.

The labor estimates for each mound stage are recorded in Table 4.8. Based on these estimates, the construction of the initial stages in Mound 12 would have required anywhere from a few dozen to about six hundred people. Again, the accuracy of these estimates depends on how much labor a single person provided and the length of time it took to construct a stage. The number of individuals required obviously increases with the shorter amount of time allowed for each construction event. Similarly, the number of individuals required for these events increases if we assume that multiple mounds or stages were constructed during a single event. For instance, one of the stage enlargements of Mound 12's first terrace, which occurred during the Lohmann phase, may have coincided with the construction of the fills that supported Mound 7, which also occurred in the Lohmann phase (see Table 4.7). Furthermore, given their strict spacing and alignment, I suspect the other circular mounds west of Mound 12 were constructed at the same time as the fill supporting Mound 7 and the early stages of Mounds 2 and 12. If correct, there was an explosion of construction activity that took place during the early Lohmann phase, probably right around A.D. 1050. At the very least, this early Lohmann phase construction event would have required several hundred people to be present at Emerald at one time; upper estimates suggest nearly two thousand individuals. These data also suggest that significant construction events took place throughout Emerald's history. For example, the final stages of Mound 12's second terrace and Mound 2, both of which were added during the Moorehead phase, may have occurred simultaneously. These later construction events, while perhaps not as large as the initial construction boom that took place in the early Lohmann phase, would still have required over 500 people (see Table 4.8).

The Plaza

In addition to the mounds, a large plaza located just west of Mound 12 is also a major component of the Emerald site (see Figure 4.4). The potential presence of this plaza has been noted by several scholars (Benchley 1974:240; Koldehoff et al. 1993:337; Pauketat 2013a:146). There are several lines of evidence that suggest a plaza exists. The first is the unusually flat nature of the area. This was noticed by amateurs and professional archaeologists alike. In his description of Mound 12, Snyder claimed that "in all directions from the mound, *excepting the* *west*, the ground slopes down as gradually and evenly as a shelving beach of the ocean; on the west it continues with but slight depression to the timber" (Walton 1962:260; emphasis mine). Winters and Struever called this area the "village area" (Winters and Struever 1962:86), presumably due to its higher elevation, levelness, and association with the conical mounds. Similarly, Benchley (1974:239-240) claimed that this area was the major part of the Emerald site, again presumably because of its flatness. Even today this area is unusually flat and rectilinear despite continued plowing and in contrast to the haystack-like shape of other nearby drift ridges (see Figure 4.1).

As implied earlier, there is evidence that at least some portions of the plaza area were constructed with prepared fills. A series of soil cores from the northern edge of the plaza area, conducted by Mike Kolb (2011), show that construction fills were added to this side of the ridge. Some of this fill was apparently used to construct lobes or platforms to support some (if not all) of the small conical mounds that lined the north edge of the ridge and plaza. Again, it is possible that soil from the peak of the ridge (if it was originally peaked) was dug or carved away, particularly in the area closer to Mound 12, thereby flattening the ridge and accentuating its edges (see Kolb 2011; Pauketat 2013a:144-146). Moreover, the ridge and plaza were further highlighted because mound construction fill may have been borrowed from the northwestern corner of the site (Kolb 2011; Winters and Struever 1962:86; see also Pauketat 2013a:144-146). Recent excavations by Pauketat and colleagues (2016) show that artificial construction fills exist just south of Mound 12, presumably emplaced to accentuate this side of the ridge and the height of Mound 12.

Another line of evidence is that this area is bordered by three lines of regularly-spaced and intentionally aligned conical mounds. As stated earlier, these lines of mounds align to 53 degrees of azimuth, and each mound was constructed about 70 meters from the other. These mounds and their regular placement not only accentuated the ridge but also bounded this space and set it apart from the rest of the site. A plaza delineated by mounds is evident at other Mississippian centers including Cahokia, Moundville, and Etowah (Alt et al. 2010; King 2003; Knight and Steponaitis 1998). In this case, the western half of the Emerald plaza is narrower than the eastern half due to the offset placement of the northern-most row of mounds (see Figure 4.4). Overall, the plaza measures approximately 26,725 m^2, which is roughly the area of five football fields, a space that could have easily accommodated hundreds if not thousands of people at once. Furthermore, moving through Emerald's plaza and among structured rows of mounds would have drawn pilgrims' attention to these lunar standstill events and in so doing would have reconnected them with the moon and its powers (see Chapter 7).

The third line of evidence that this area was a formal plaza was that it is largely devoid of features and artifacts (Pauketat 2013a:146). Artifact collectors have long recognized the lack of surface artifacts on the summit of the Emerald ridge (Koldehoff 1980), though artifacts and features north of Mound 12 (Walton 1962:260-261) and on the slopes of this ridge are abundant (see Grimm 1944:41) and are the likely reason this area was called the village area by Winters and Struever (1962). No features were identified in three of ISAS's 1998 excavation trenches that cut across the summit of the ridge in the proposed plaza area (see Figure 4.17 and Chapter 6). However, a circular structure and possibly several more special structures exist on the southeastern edges of the plaza near Mound 12 (see Pauketat et al. 2016). The final line of evidence for the presence of this plaza is that the Emerald Avenue seems to terminate at the widest part of the plaza in a gap between Mounds 12 and 8 (see Chapter 5 for a more in-depth discussion of the Emerald Avenue). The fact that the Avenue brought pilgrims and visitors to the plaza strongly suggests that this was an important space.

In sum, the Emerald plaza was set apart from other spaces at the Emerald site. It was delineated and emphasized by lines of conical mounds and fewer features and debris within its bounds. Furthermore, it was probably one of the first formal spaces experienced by visitors and pilgrims. This space was probably reserved specifically not only for receiving pilgrims but also for ceremonial performances such as processions between mounds, dances, songs, speeches, and observing and commemorating lunar standstill events. Furthermore, the recovery of abundant amounts of maygrass and other seed crops from features adjacent to the plaza suggest that it was a place for massive feasting events (see Chapter 6). Overall, the alignment and organization of this area as well as its large size, lack of artifacts and features, and the potential activities that took place there shows, as Pauketat (2013a:146) has suggested, that this area was intentionally constructed into "a sacred space or public plaza."

SUMMARY

Several and probably most of Emerald's mounds were built during the Lohmann phase in an explosion of construction activity that corresponded with Cahokia's Big Bang. The prepared surface that supported Mound 7 and the early stages of Mounds 2 and 12 were constructed around A.D. 1050. Based on the strict spacing and alignment of mounds 3 through 11 and their association with the Mound 7 platform, I assume that the other circular mounds were also built or at least started during the same construction event. This would also mean that the plaza was conceived and constructed at this same time. There is no evidence that any of these mounds were constructed before the Lohmann phase, as very few grit or grog tempered sherds were recovered from any of the mound or pre-mound fill. Likewise, there is little or no evidence that any of these mounds were constructed during the Stirling phase (though it is possible that earlier construction stages of Mound 12's second terrace were constructed at this time). This apparent lack of Stirling phase mound building activities corresponds with other evidence that suggests the Emerald site was abandoned after the first few decades of the Stirling phase (see Chapter 6). And, while portions of Mounds 2 and 12 were clearly enlarged and/or capped during the Moorehead phase, the spacing of these mounds was clearly conceived and laid out during the Lohmann phase.

Given the layout, number, and size of mounds at the site, this initial Lohmann construction boom would have been a massive undertaking that required planning, coordination, and a large number of people. If we assume that all the circular mounds for which we have measurements (minus the later stages of Mound 2) were constructed in a single episode within a seven-day period, this alone would have required at least five hundred people; when adding the earliest stages of Mound 12, this event would have required far more people. An even larger number is estimated for the potentially later construction events that made up the second terrace of Mound 12. This would mean that at designated times throughout Emerald's history (not just the Lohmann phase), over five hundred people traveled to Emerald to construct mounds. Again, this is likely a low estimate of the number of people actually present during these construction events, as it fails to take into consideration the people who did not directly participate in mound construction but supported these events in other ways.

While there is little evidence that Emerald's landscape was modified significantly after the early Stirling phase, the site was clearly revisited and modified several times during the Moorehead phase. These visits involved constructing a low conical mound on Mound 12's second terrace summit, a number of special-use structures and features on the summit of this conical mound, and finally adding a cap or veneer to the entire second terrace. One of the structures was generally aligned to the Emerald Axis, meaning that these later pilgrims remembered and intentionally linked themselves to this rare lunar event and Emerald's strictly-aligned landscape. These later visitors also dug a special pit into the prepared surface of Mound 2 and capped it by constructing the upper portions of Mound 2. These later mound construction events, while perhaps not as large overall as the earlier event, were still major affairs that became entangled with other pilgrims through their cooperative construction efforts as well as the moon and memories of past events that occurred at the Emerald site.

Emerald's layout also accentuated the special alignment of Emerald's natural ridge. As shown by Pauketat (2013a), there was a clear pattern underlying the layout of Emerald's mounds – they, along with the plaza, were built specifically to align to 53 degrees of azimuth. Clearly, Emerald's visitors were concerned with reconstructing and aligning the entire site to lunar standstill events. Though it is uncertain from these data, it is very possible that the Lohmann phase construction boom and some of the other construction events may have occurred during these lunar standstill events – certainly the similarity between the 18.6 year lunar events and my estimate of at least one construction episode every 15 or so years for the first terrace suggests so (Figure 4.35) (see also Chapter 6). Furthermore, the act of constructing mounds referencing these rare occasions took place in conjunction with dances, processions, and other ceremonies that celebrated this event as well as formulated relationships between the builders, the powers of the moon, and the sensuous experiences of digging, handling, manipulating, and depositing earth. Even if these construction events did not take place during standstills, the experience would still have recalled these powerful relationships that were only inherent at Emerald.

CONCLUSION

The Emerald site was constructed in a unique and inherently powerful landscape. This area is situated between two very different environmental zones, meaning its location may have been a transitional or liminal space between the swampy, forested, and otherwise variable environments of the American Bottom and the well-drained upland prairies with commanding views of the eastern sky. Furthermore, Emerald is also situated on a high glacial drift ridge that not only afforded a panoramic view of the landscape but is aligned to 53 degrees of azimuth, which points to rare lunar standstill events that take place every 18.6 years (see Pauketat 2013a). Finally, a spring was located at the base of the ridge, which many pilgrims likely saw as a portal or opening to the underworld. Thus, the Emerald site was built in an inherently special place; as several scholars have argued, Emerald was where worlds, powers, and human and other-than-human beings converged (Alt and Pauketat 2015; Pauketat 2013a; Pauketat and Alt 2015; Skousen 2015a).

The major features of the Emerald site – specifically, its mounds and plaza – referenced and enhanced these natural convergences. These links to the sky and underworld were clearly recognized in the early 1000s when the site was first established (see Chapter 6), but these relationships were radically emphasized and reconfigured around A.D. 1050 by an explosion of construction activity. Most of Emerald's mounds and a large plaza were built in a single event; in fact, most of the mounds (aside from Mounds 2 and 12) were likely completed during this initial construction boom. The ridge, mounds, and plaza either aligned or linked to the 53-degree orientation, and together constituted the Emerald Axis (see Pauketat 2013a). This initial surge of construction was a major event that required the participation of hundreds and possibly thousands of people from surrounding settlements to congregate at the site. Moreover, these events actively recreated or renewed the world and highlighted the other-worldly connections inherent there (see Hall 1997; Knight 1989). Moreover, the mounds and plaza changed the way people moved through and experienced Emerald's landscape. The lines of mounds structured dances, processions, and other formal ceremonies and experiences in the plaza area. They also emphasized the ridge's natural alignment and referenced the previous activities that took place there (see Chapter 6), which encouraged people to remember the past and realign their own bodies and perceptions to the landscape and sky. These events and the relationships they formed were not easily ignored or forgotten by pilgrims, overseers, and bystanders.

Other major mound construction events occurred throughout Emerald's history. Many of these, if not all, likely occurred in conjunction with lunar standstill events every 18.6 years. Based on labor estimates alone, some of these later building events may have rivaled Emerald's initial Lohmann phase construction boom. By the first few decades of the Stirling phase, however, mound construction ceased. But, over 50 years later, Emerald was again revisited by pilgrims who focused solely on constructing mound top features and adding to or capping mounds. A few individuals, possibly elites or priestly care takers, may have lived in special buildings on the summit of Mound 12. Importantly, one of these mound top buildings was aligned to the Emerald Axis, which relinked these later pilgrims to the animate powers that converged there in the past and present. While some people were likely present at or visited Emerald between these major building pulses, the mound construction data suggests that the bulk of pilgrims visited during these large gatherings.

Overall, Emerald's construction in this special place, the site's overall layout, and the repeated, large-scale gatherings that took place there clearly shows that visiting with other distant pilgrims and experiencing lunar standstill events were of paramount importance. I suggest that these acts created, renewed, or reconfigured pilgrims' relationships with each other, the moon, other-worldly dimensions, memories of past events, and mythical narratives. The Emerald Avenue, which connected Emerald to Cahokia, further suggests that these large-scale events were attended by Cahokians and perhaps even controlled, funded, and led by Cahokian priests and leaders (see Chapters 5 and 6). Thus, regular pilgrimages to Emerald by Cahokians (as well as other populations, see Chapter 6) to renew mounds, observe lunar standstill events, participate in mound top ceremonies or processions through the plaza fostered a sense of Cahokian identity, increased Cahokian rulers' prestige and influence, and provided these leaders with special knowledge or power. Furthermore, moving through and around the plaza, mounds, spring, and the surrounding landscape reconfigured one's relationship and experience with the earth, sky, underworld, and larger cosmos. Perhaps most importantly, these movements rebalanced or reconfigured the cosmos in ways that made Cahokia's construction and ongoing maintenance possible. Collectively, these pilgrimages not only shaped understandings of identity, purpose, and belonging in the wider Cahokian world, but also reconfigured relationships with powerful beings who, in turn, provided sufficient rain, successful harvests, and other forms of supernatural aid. In a word, Emerald was a place where the linear movements of humans, other-worldly beings and dimensions, and memories converged, entangled, and thus ensured Cahokia's wellbeing and success.

FIGURES AND TABLES

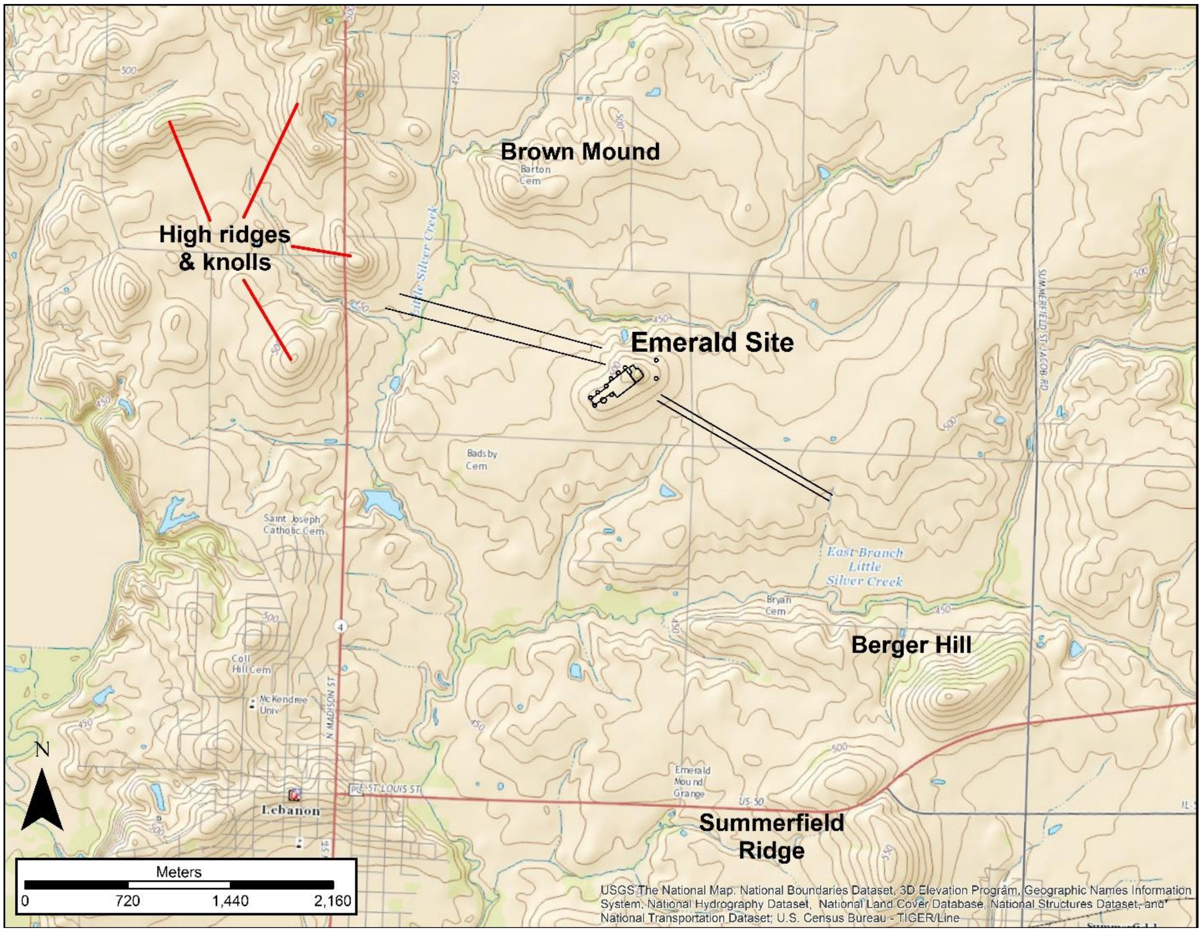

Figure 4.1. Topographic map of the landscape surrounding the Emerald site. The ridge on which the Emerald site sits as well as other high ridges and knolls are labeled.

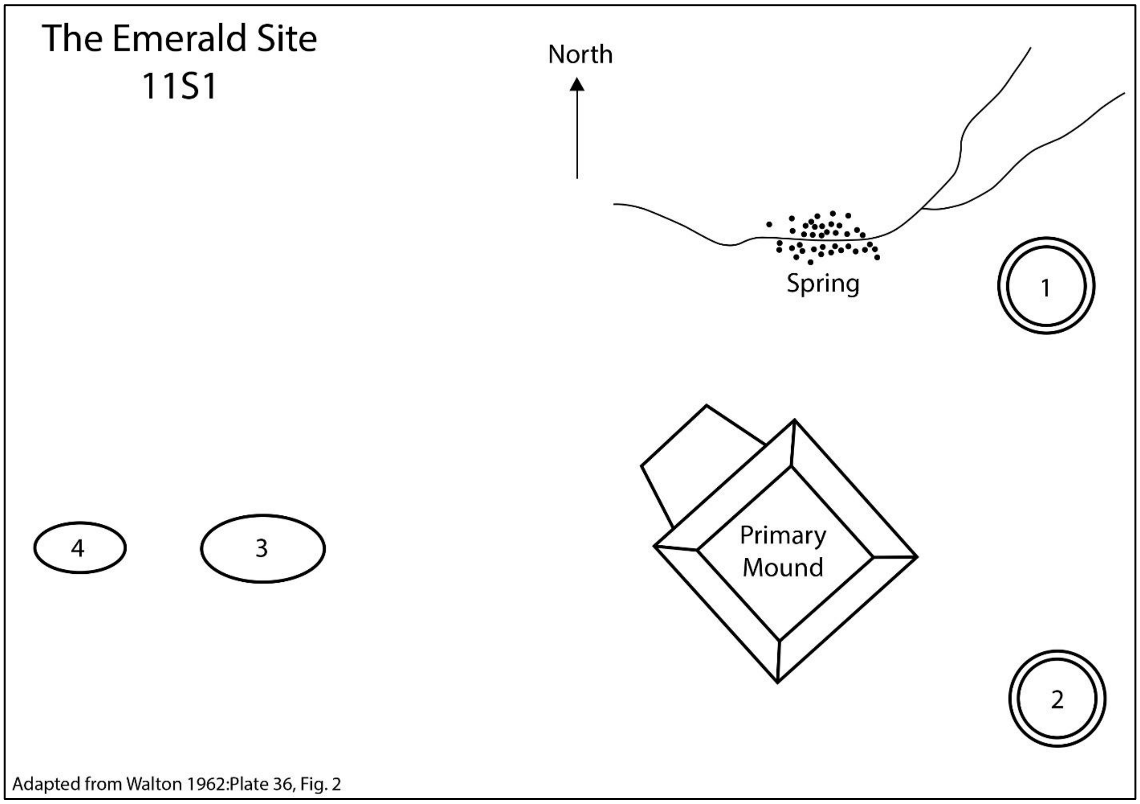

Figure 4.2. Reconstruction of John Francis Snyder's 1909 map of the Emerald site, complete with the now-defunct spring north of the primary mound (now Mound 12). Recreated from Walton 1962:Plate 36, Fig. 2.

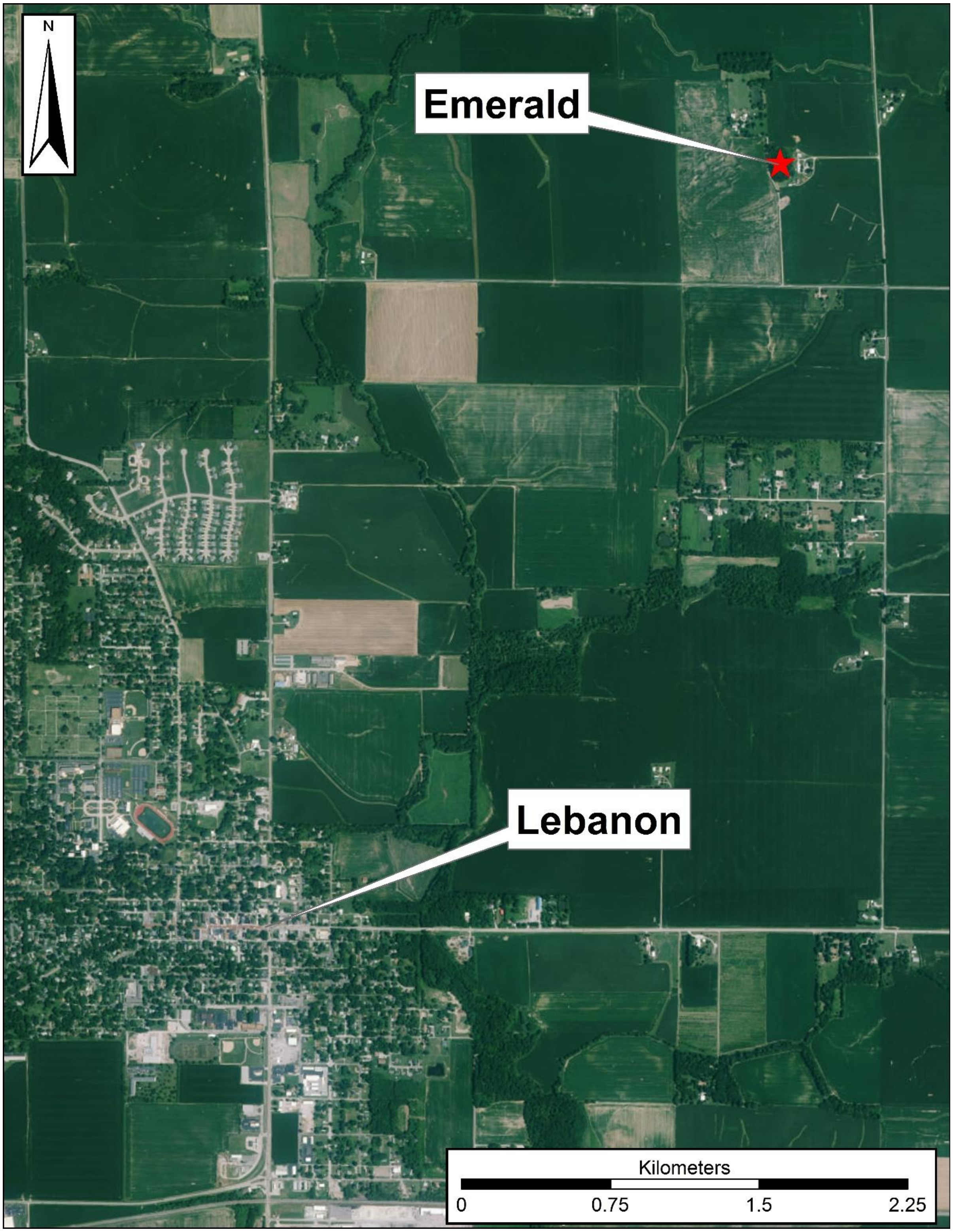

Figure 4.3. Location of the Emerald site in relation to the modern town of Lebanon, Illinois.

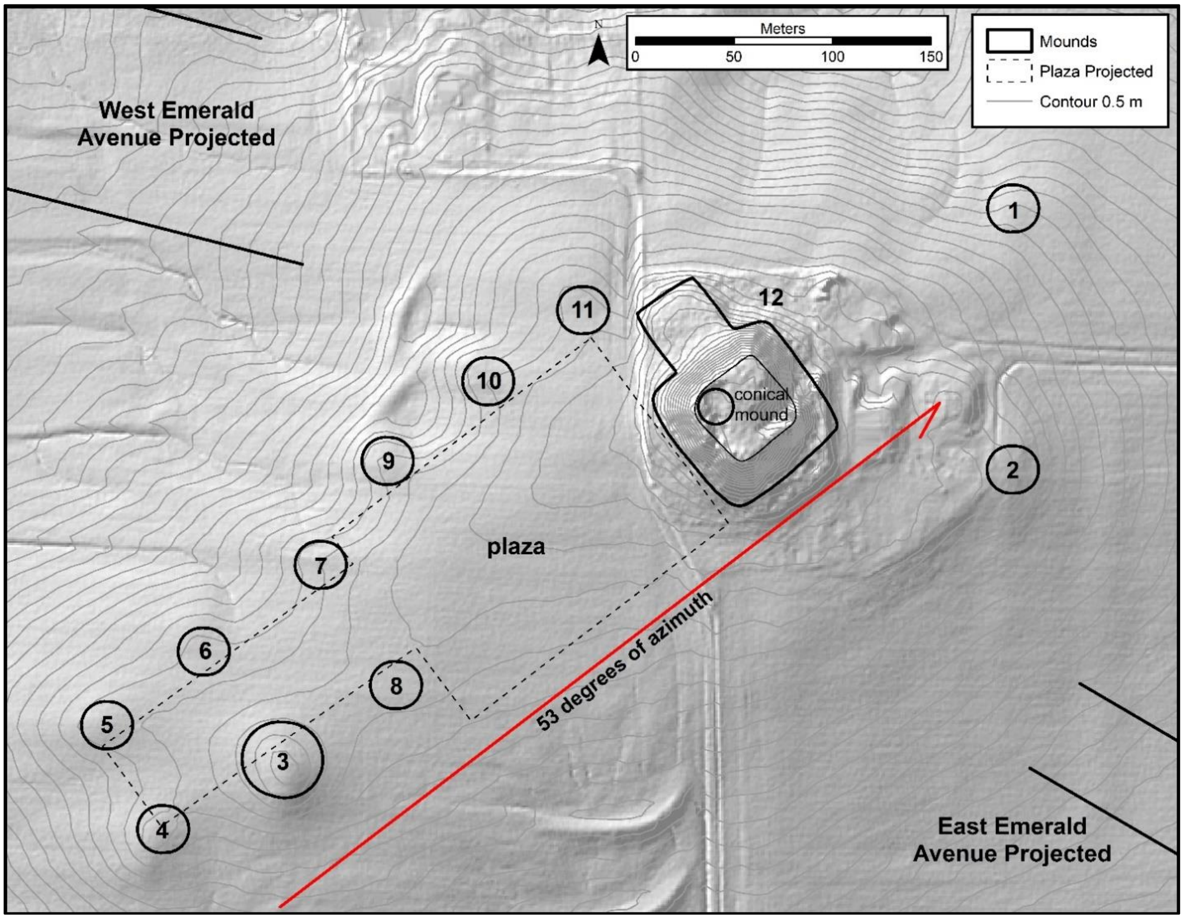

Figure 4.4. Overview of the Emerald site, with mounds, plaza, Emerald Avenue, and Emerald Axis noted. The Emerald Axis 53-degree azimuth is calculated relative to true north.

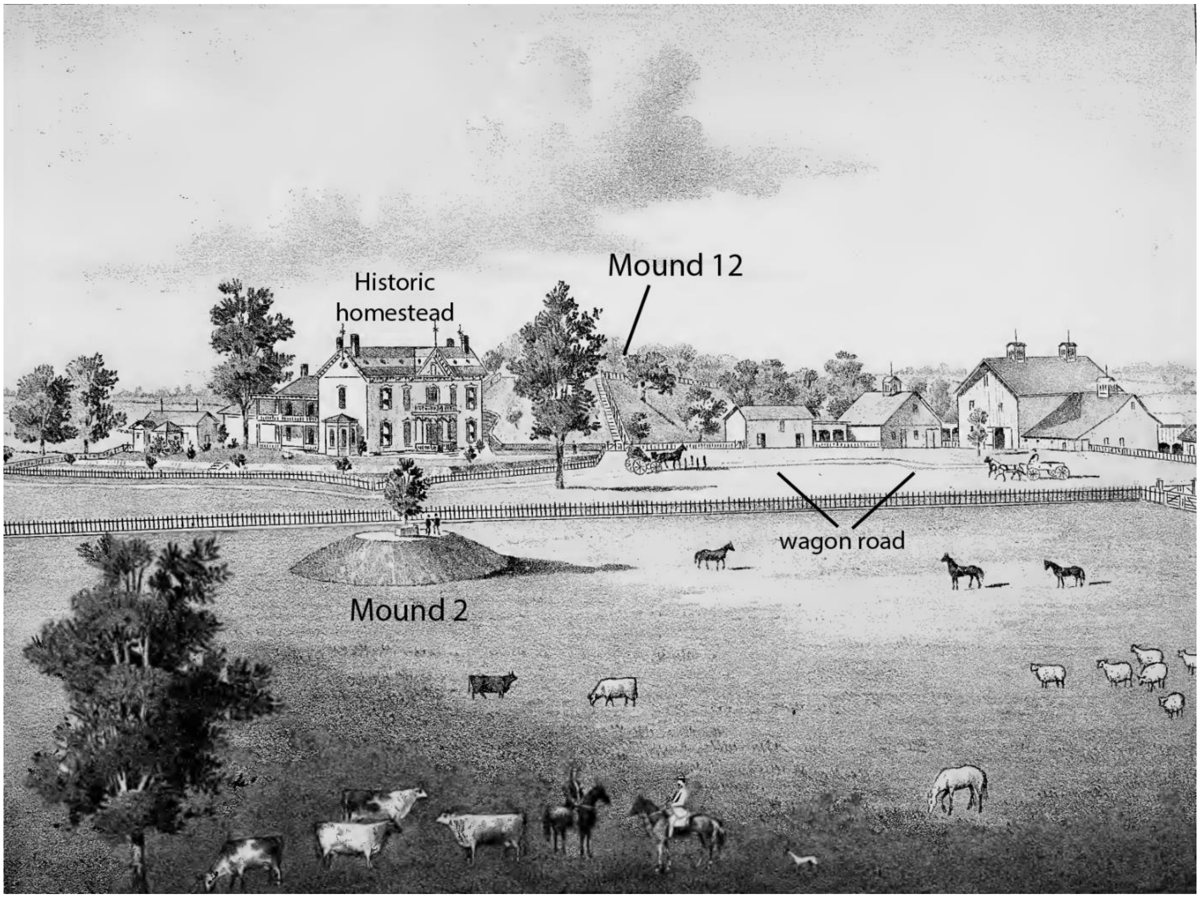

Figure 4.5. Sketch of the Henry Seiter's mid-19th century homestead built just south of Mound 12. Mound 2 is in the foreground, and a wagon road is also indicated. Artist unknown. Modified from Brink, McDonough & Co. 1881:343.

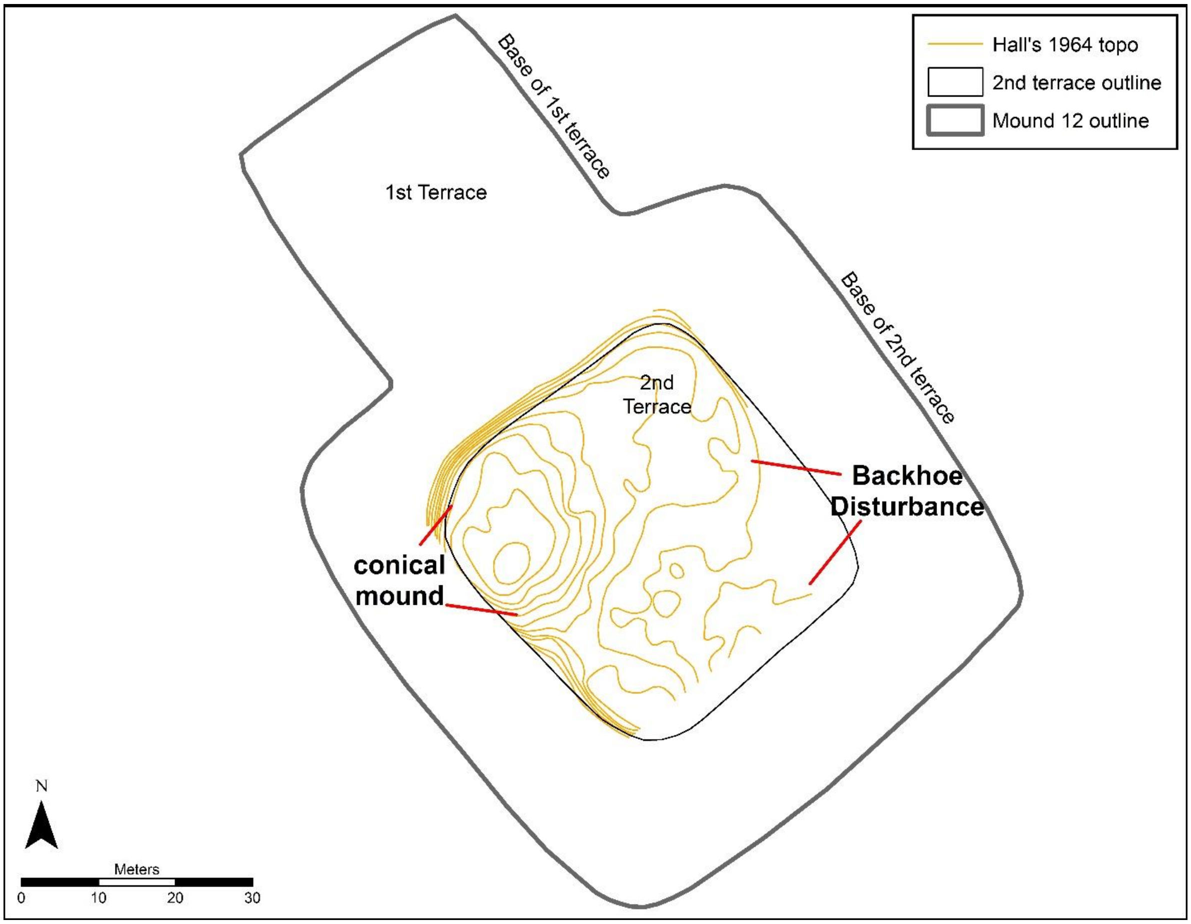

Figure 4.6. Robert Hall’s 1964 topographic map of the second terrace summit of Mound 12. A small conical mound is evident on the northwest corner, and a backhoe disturbance is evident in the southeast corner. Topo lines are in 0.1 meter intervals. Topo lines digitized by author and georeferenced to 2011 ISAS LiDAR image, which is oriented to UTM grid north.

Figure 4.7. Photo of Robert Hall’s 1964 excavations of historic foundation of distribution reservoir on Mound 12 summit.

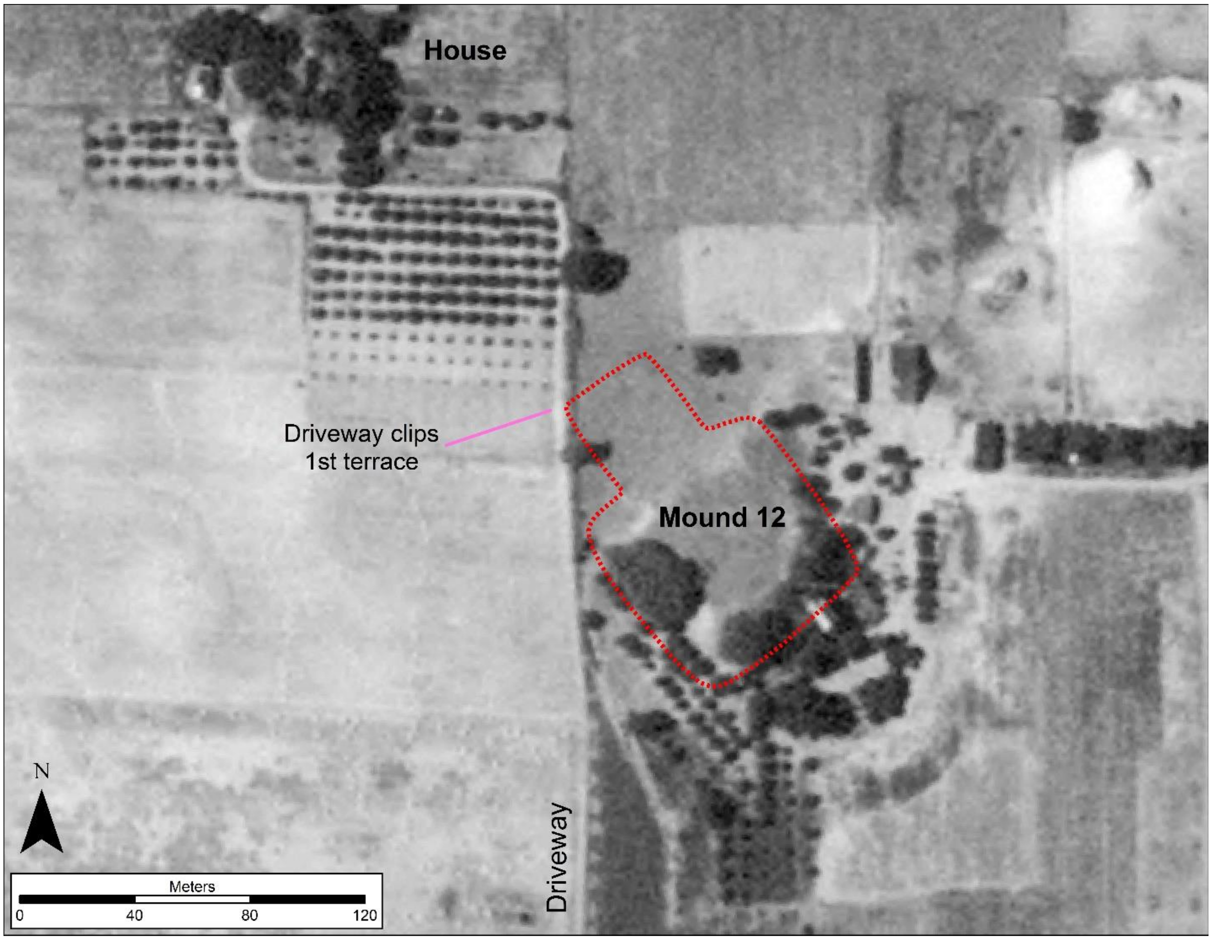

Figure 4.8. A 1940 aerial photograph showing a driveway cutting into the corner of Mound 12's first terrace.

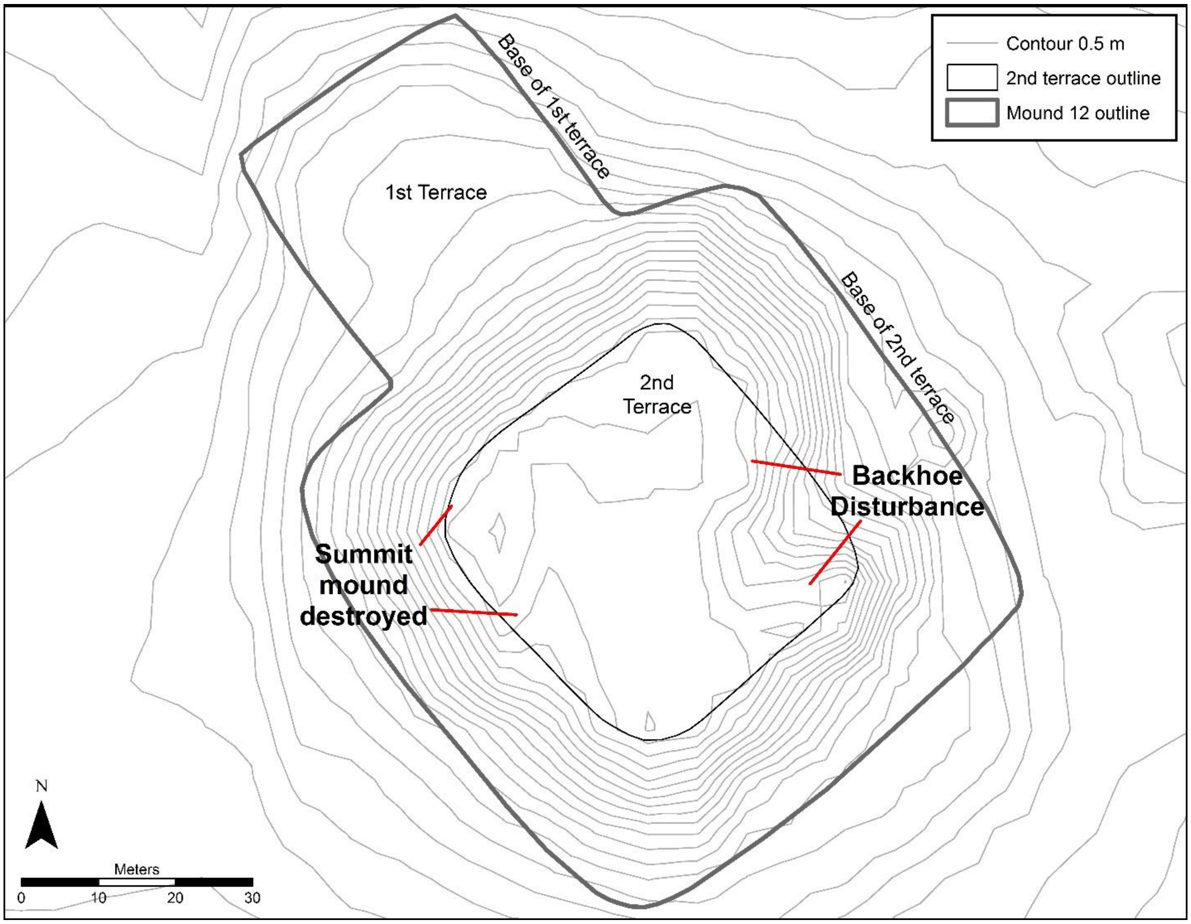

Figure 4.9. 2011 topographic image of Mound 12, showing the 1960s soil barrowing activities. The contour lines are in 0.5 meter intervals.

Figure 4.10. The southeastern face of Mound 12, with Tim Pauketat in the foreground. Photo taken by the author in 2011.

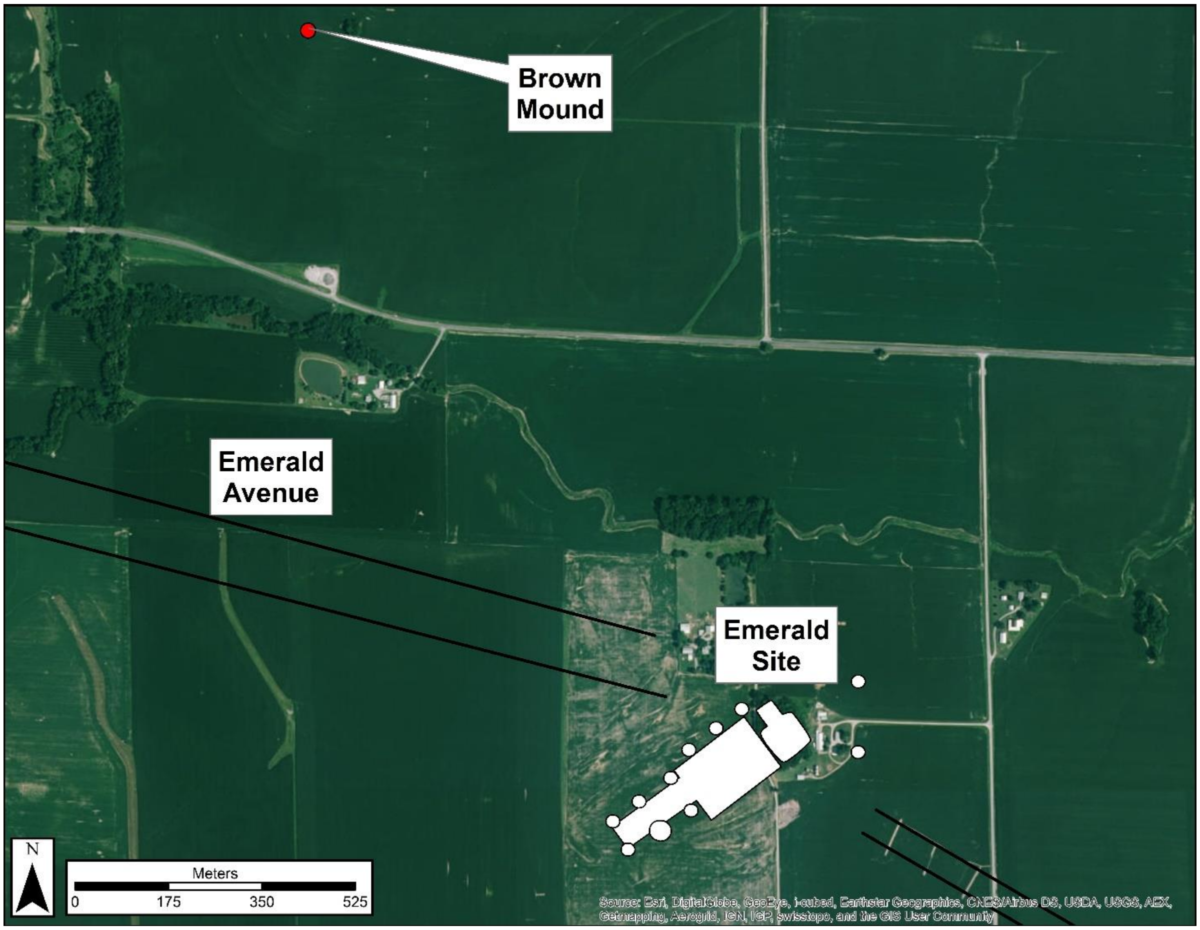

Figure 4.11. The location of Brown Mound, situated to the northwest of Mound 12 and situated adjacent to the Emerald Axis.

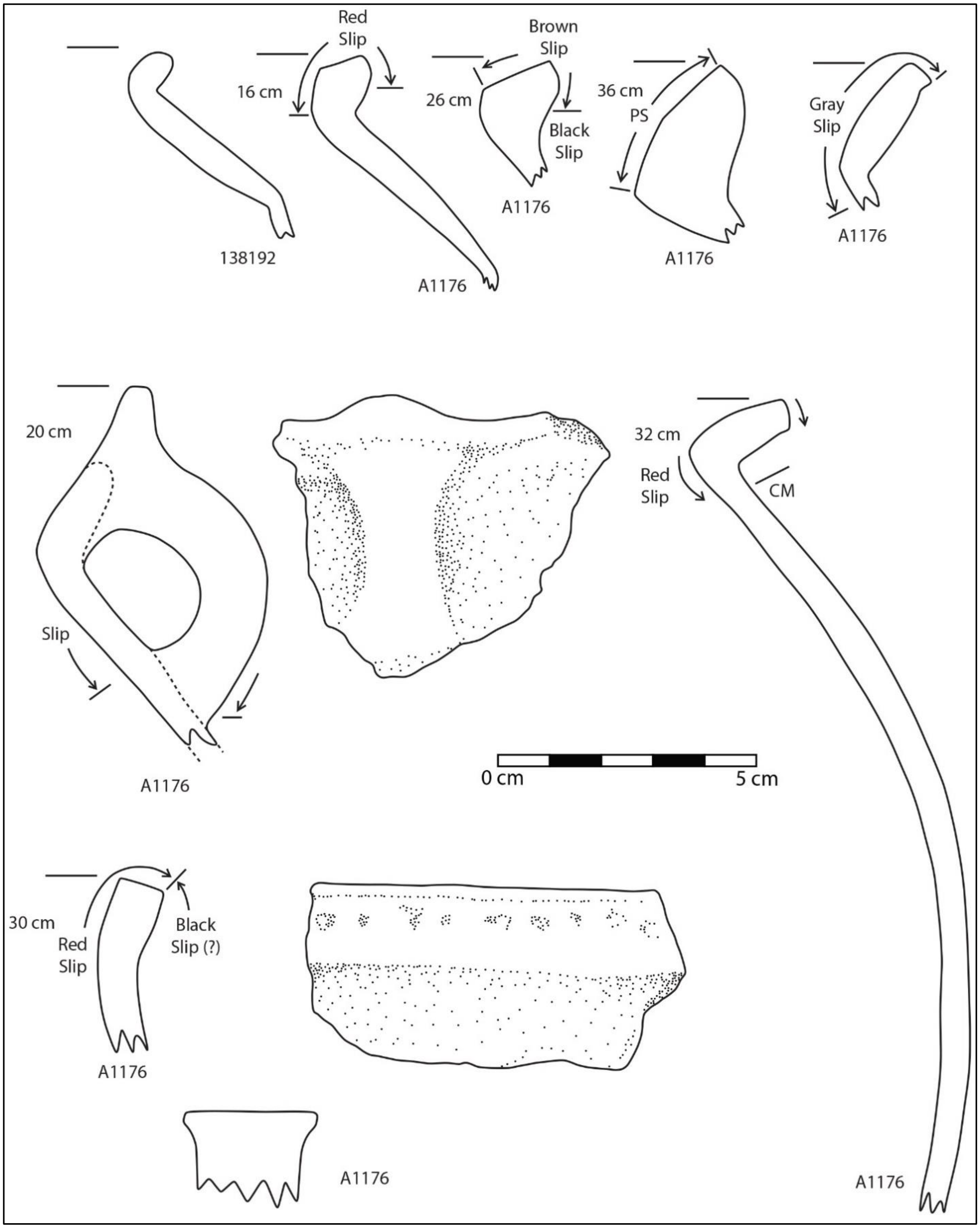

Figure 4.12. Rim profiles from Warren K. Moorehead's 1923 excavations at the Emerald site. Profiles originally drawn by John Kelly, reproduced by the author.

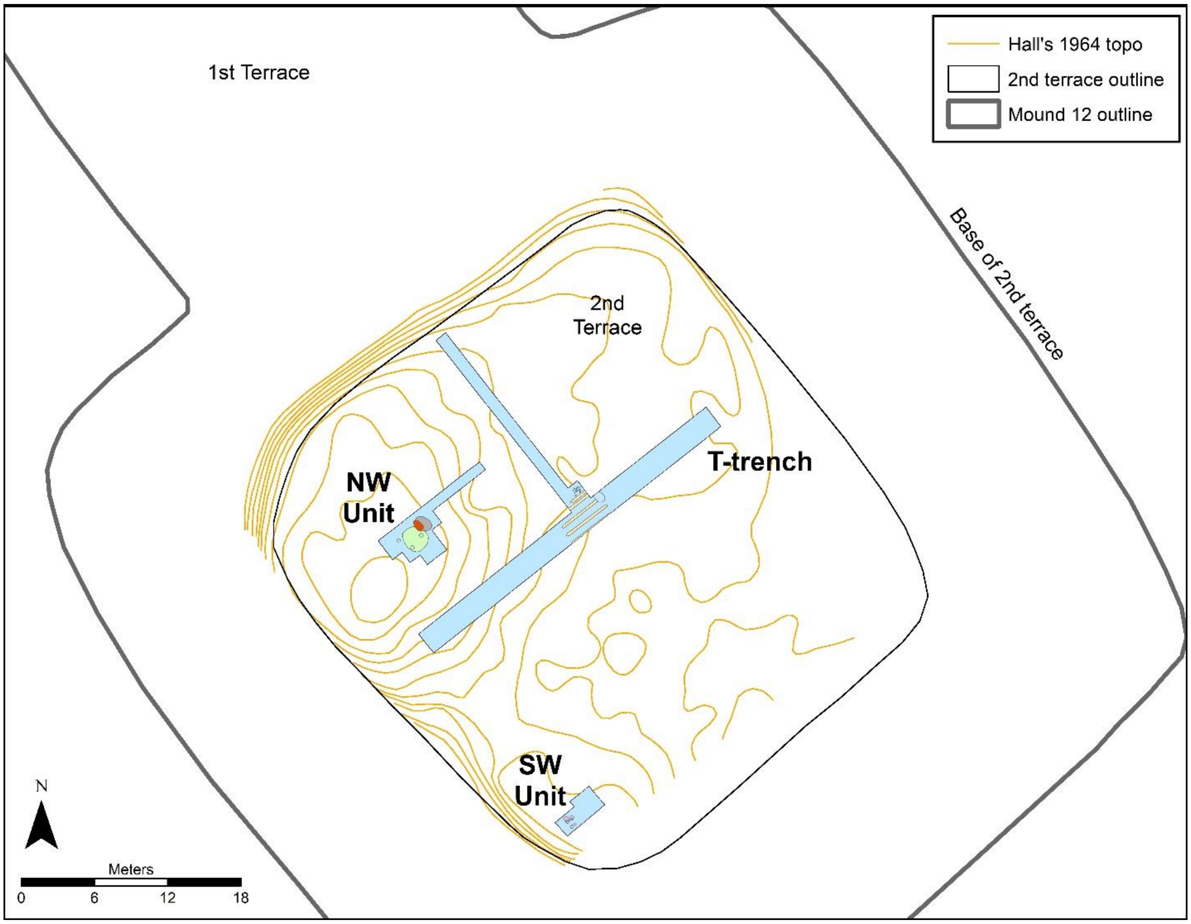

Figure 4.13. Plan map of Hall's 1964 excavation units on the second terrace of Mound 12. Digitized by author and georeferenced to 2011 ISAS LiDAR image, which is oriented to UTM grid north.

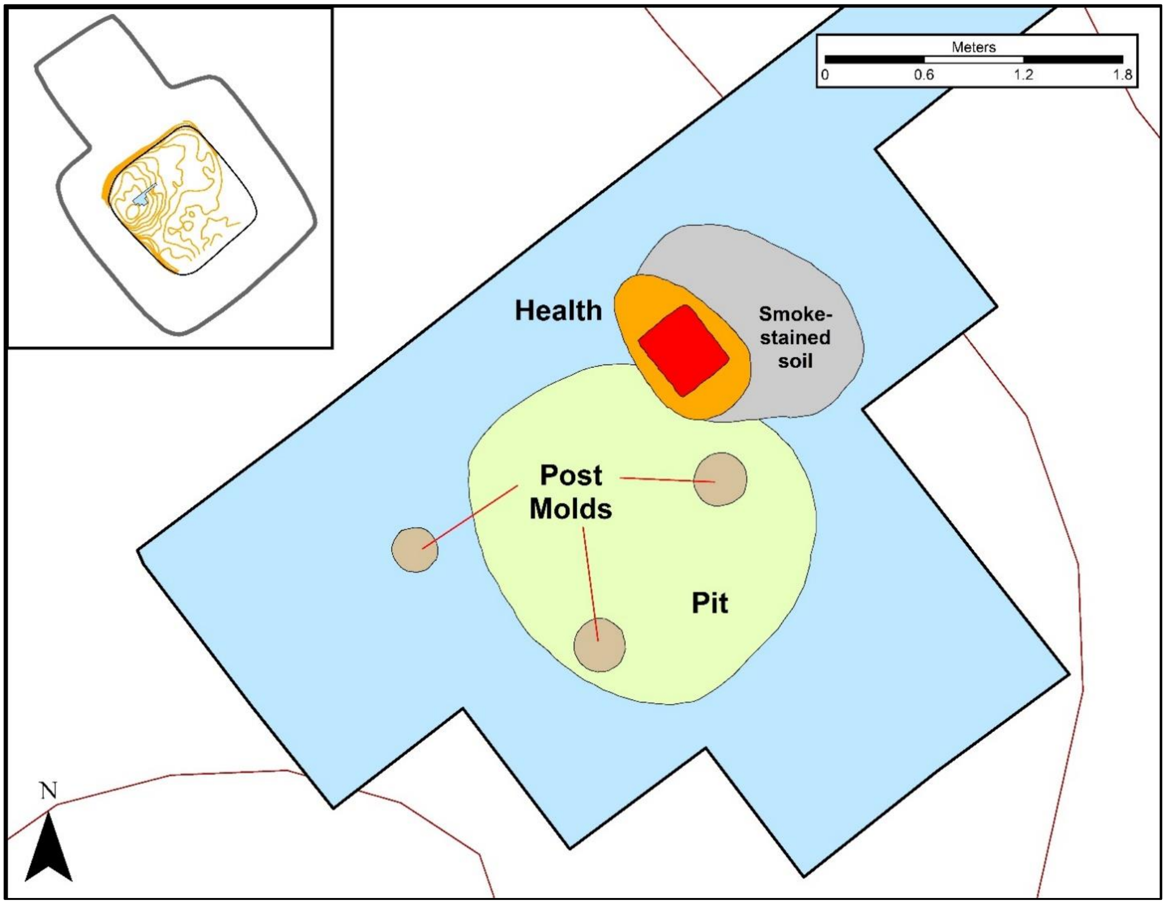

Figure 4.14. Plan map of features uncovered in Hall's 1964 northwest excavation unit on the second terrace of Mound 12. This unit was situated on top of a small conical mound. Digitized by author and georeferenced to 2011 ISAS LiDAR image, which is oriented to UTM grid north.

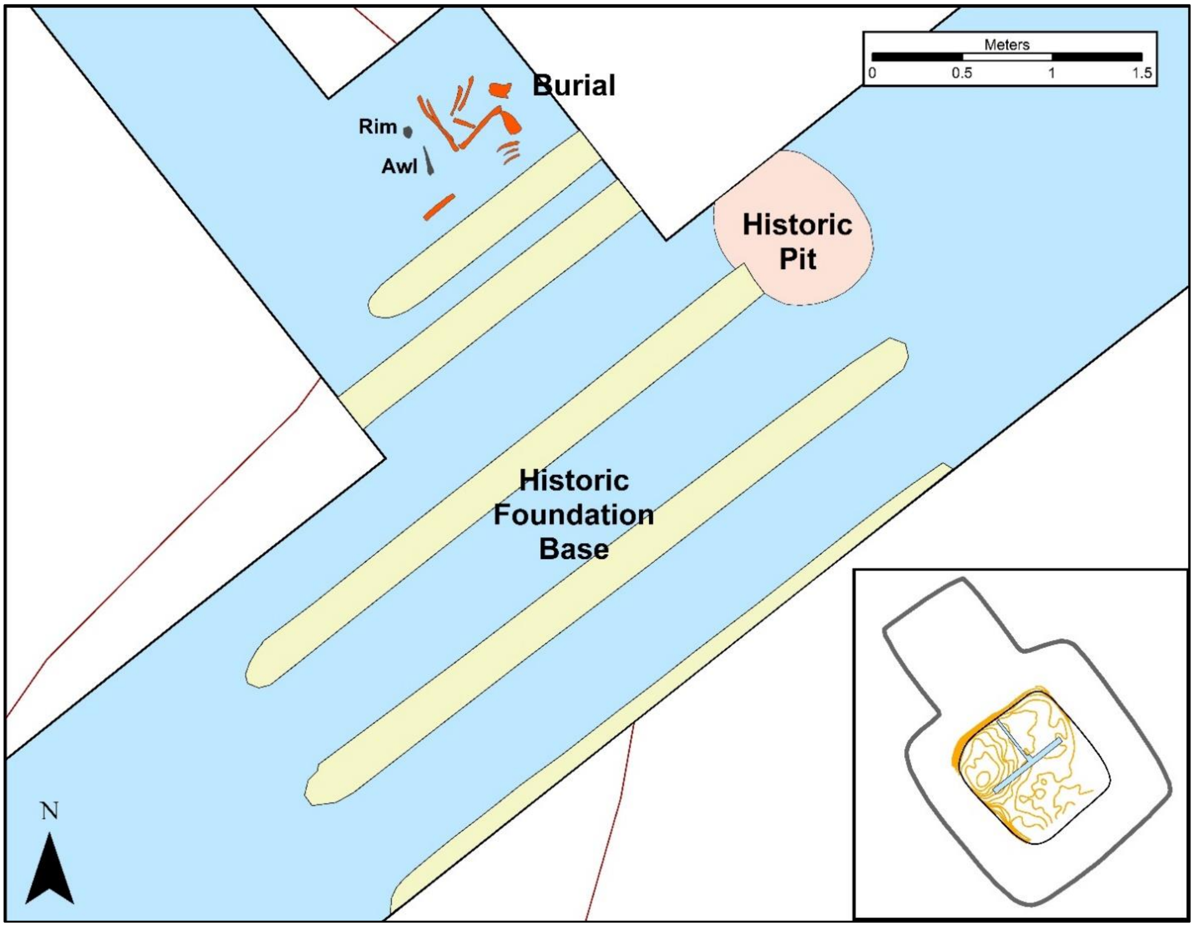

Figure 4.15. Plan map of human burial and historic foundation uncovered in Hall's 1964 T-trench on the second terrace of Mound 12. Digitized by author and georeferenced to 2011 ISAS LiDAR image, which is oriented to UTM grid north.

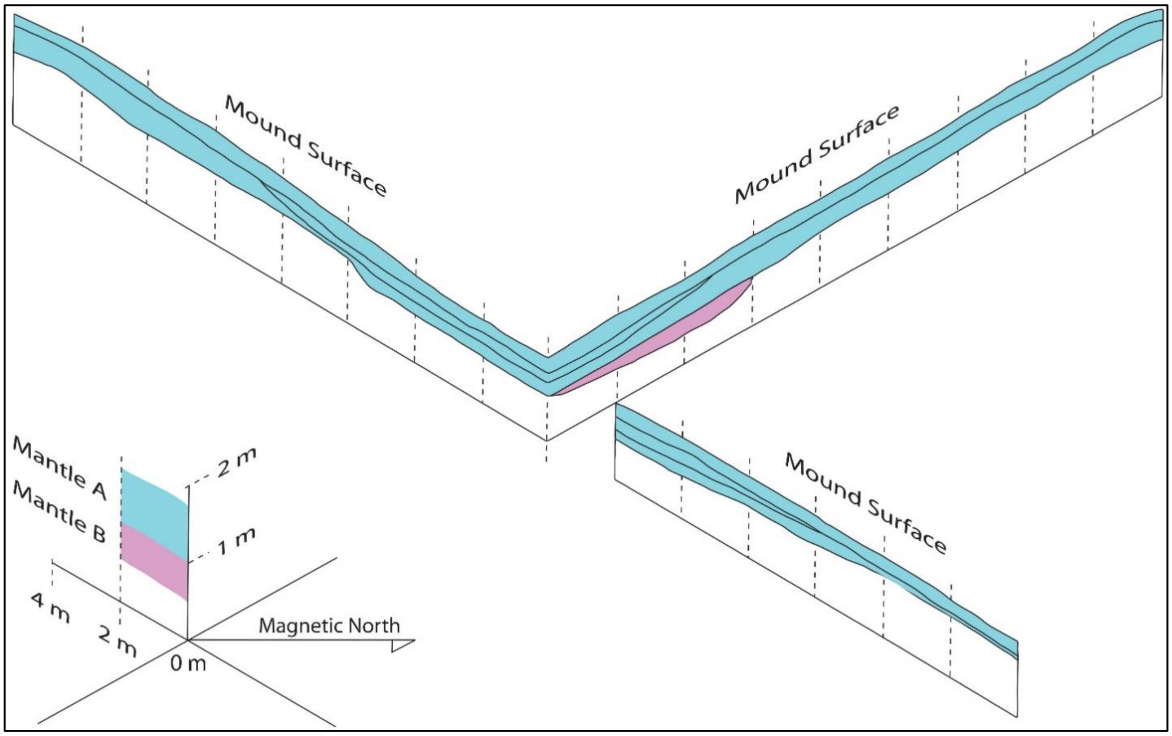

Figure 4.16. Robert Hall’s 1964 profile of his T-trench excavation unit, reproduced by the author.

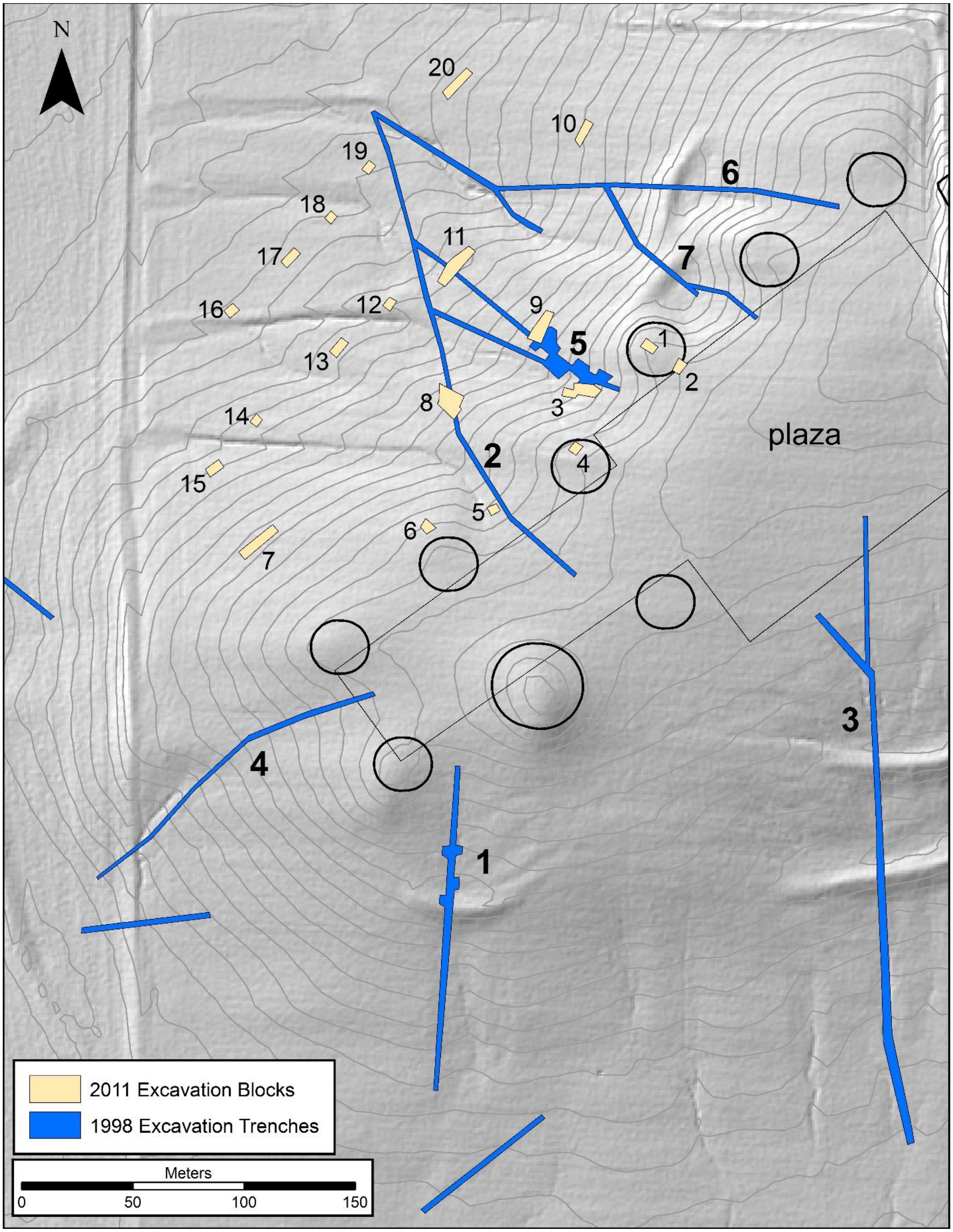

Figure 4.17. Location of ISAS's 1998 and 2011 excavations. Excavation trenches and blocks oriented to UTM grid north.

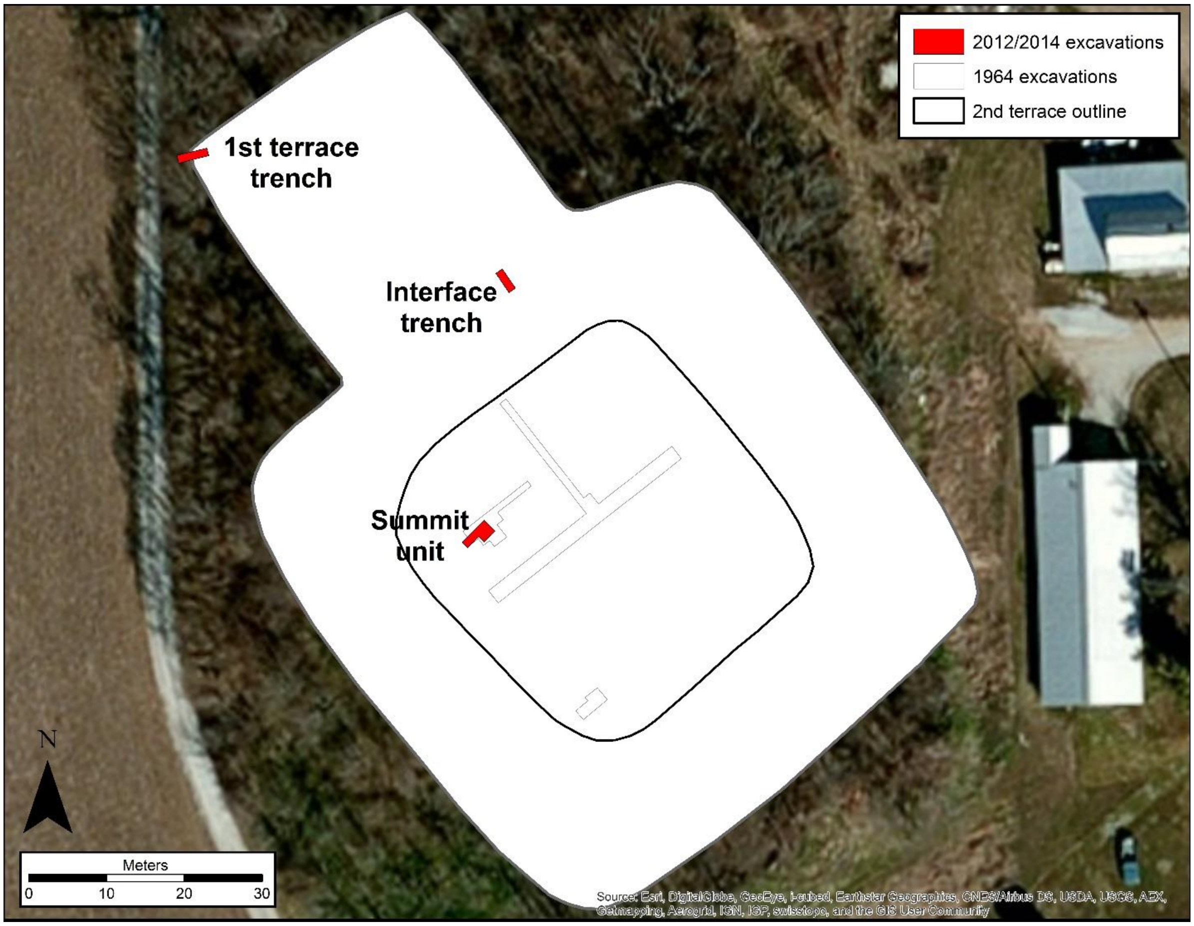

Figure 4.18. Location of the 2012 and 2014 excavation units into Mound 12. The 2012 and 2014 units are oriented to Emerald Acropolis Project (EAP) grid north.

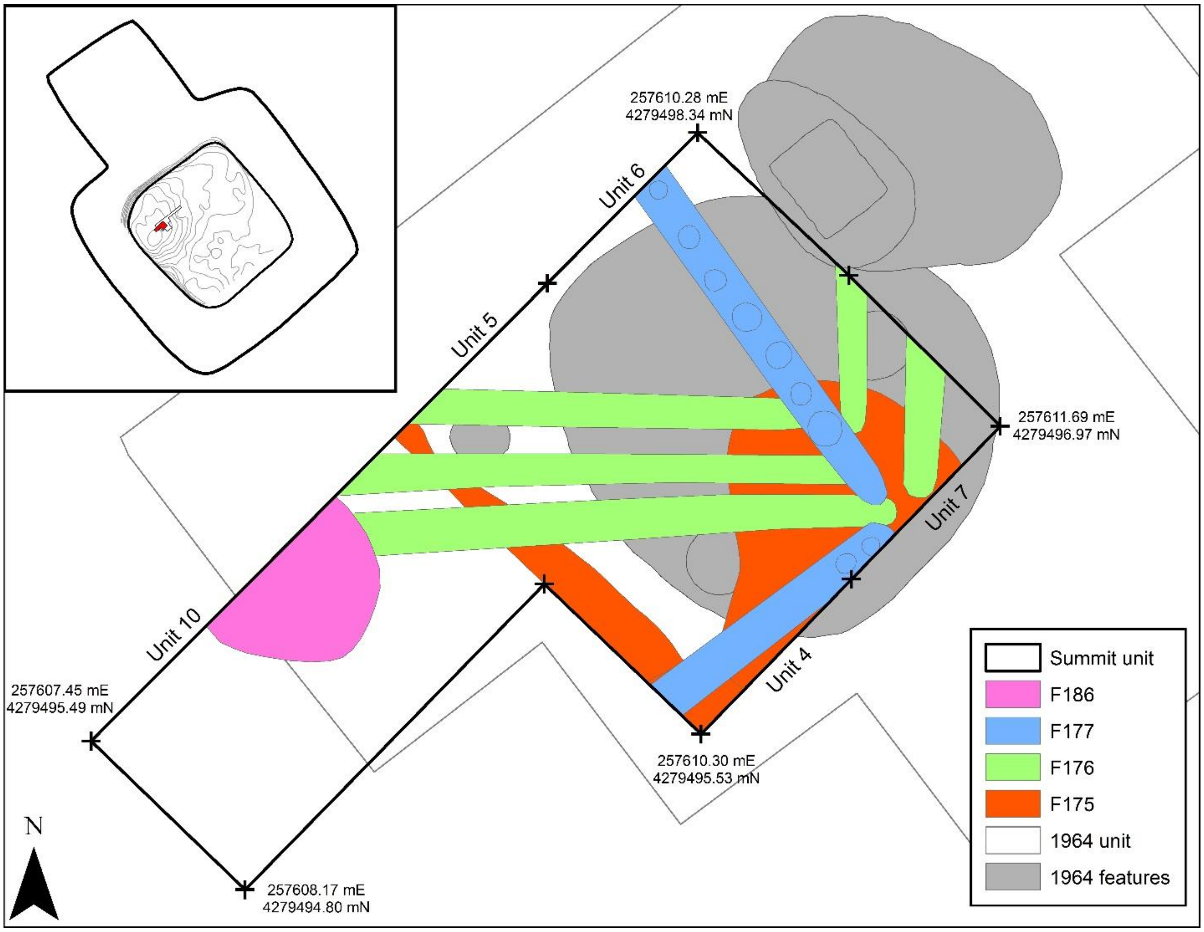

Figure 4.19. Plan map of Features 175, 176, 177, and 186, all uncovered in the 2012 summit unit. The 2012 unit and features are oriented to EAP grid north.

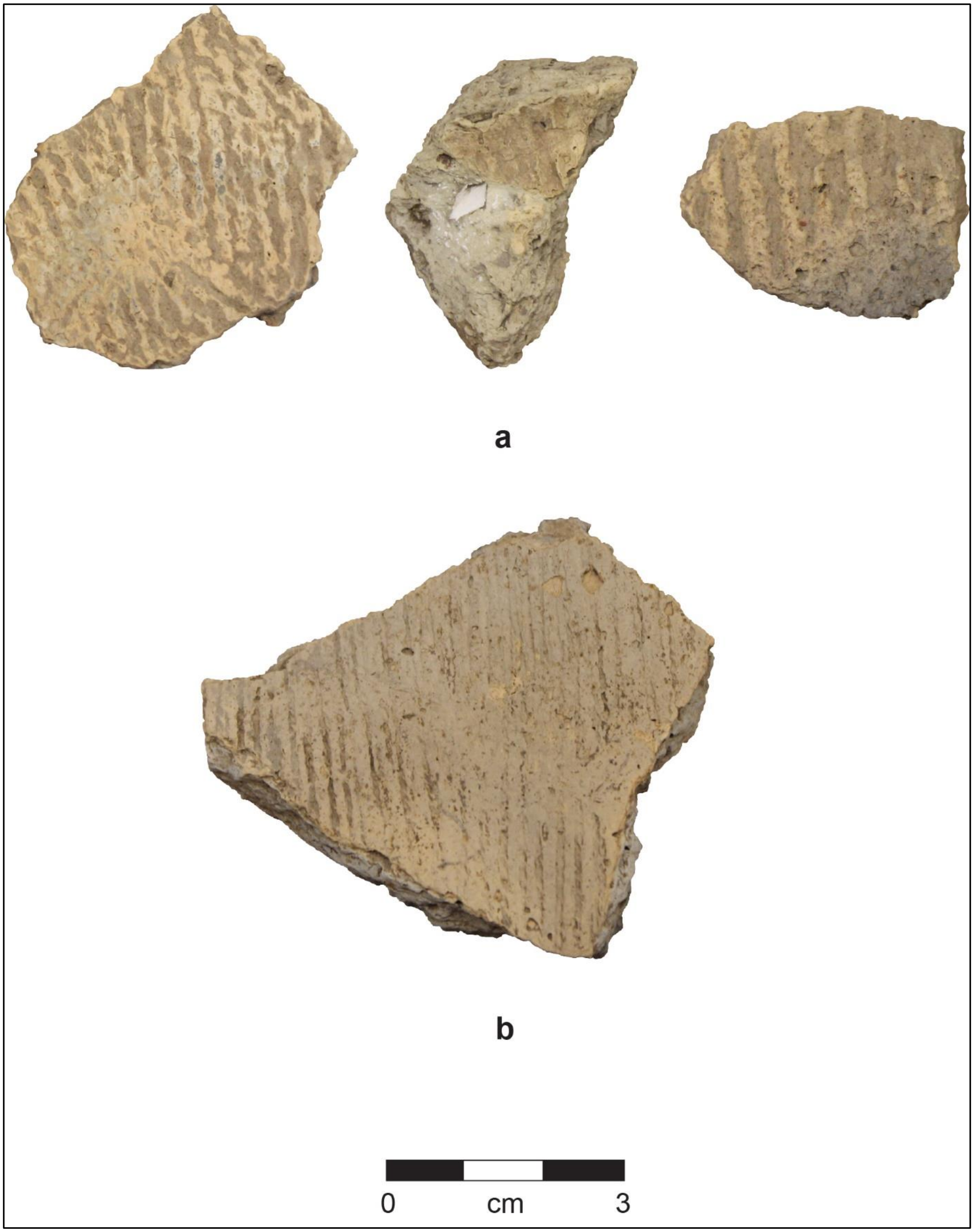

Figure 4.20. Cahokia Cordmarked sherds from the 2012 summit excavations: a) sherds recovered from Feature 176; b) sherd recovered from Feature 186.

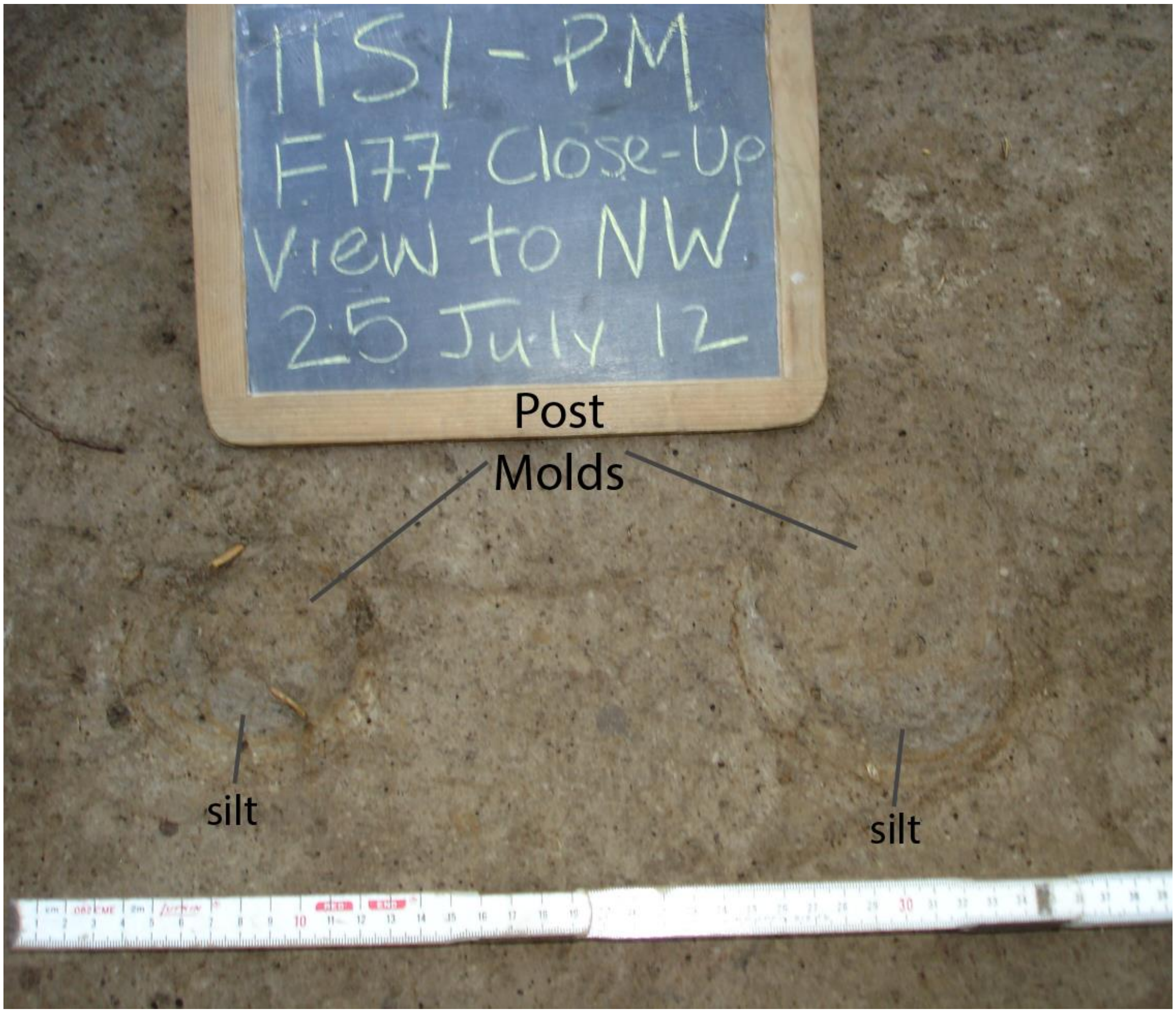

Figure 4.21. Close-up of silted-in post molds from the wall trenches of Feature 177, uncovered in the 2012 summit excavations.

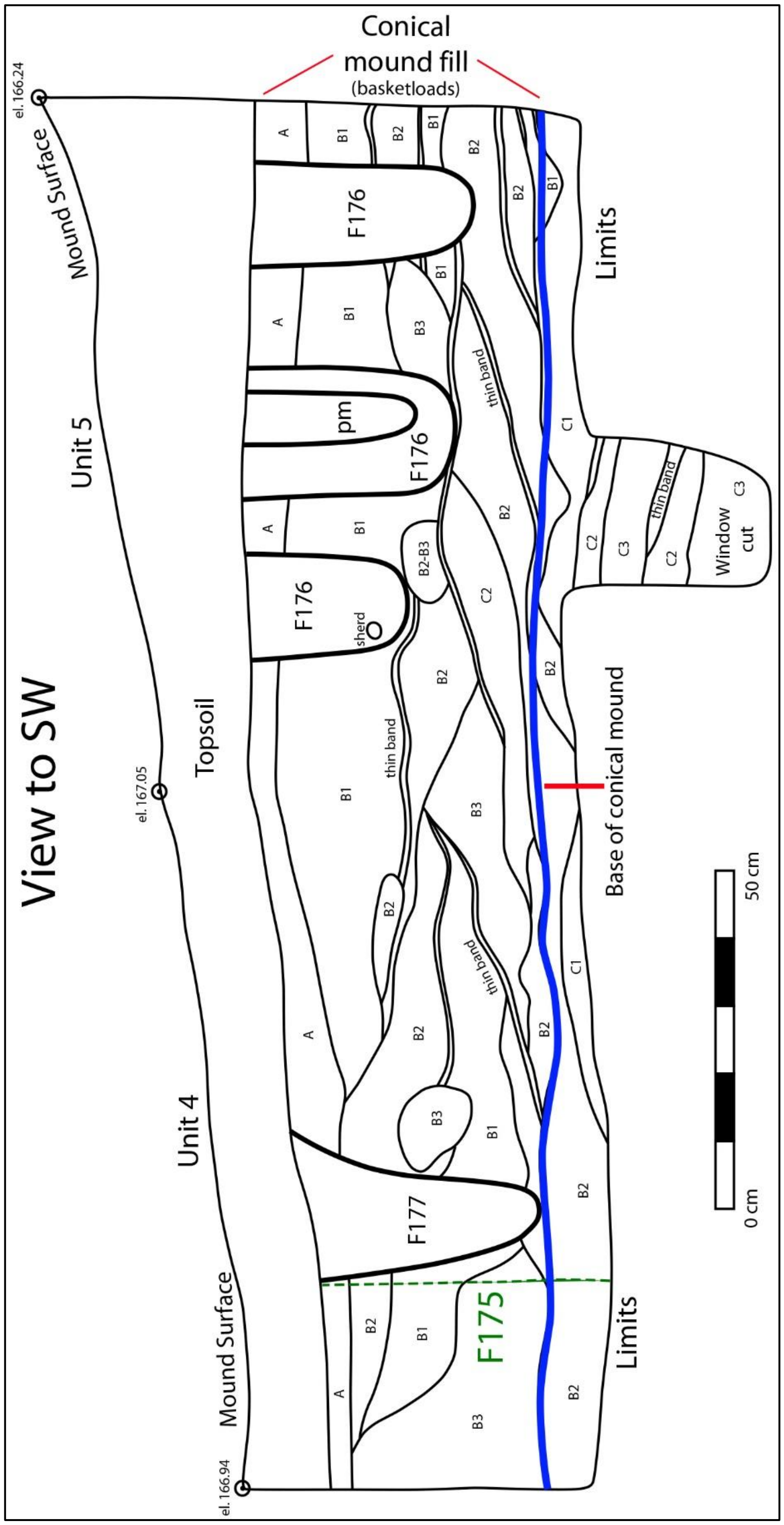

Figure 4.22. Profile map of a summit unit wall, view to the southwest. Features and mound construction details are noted.

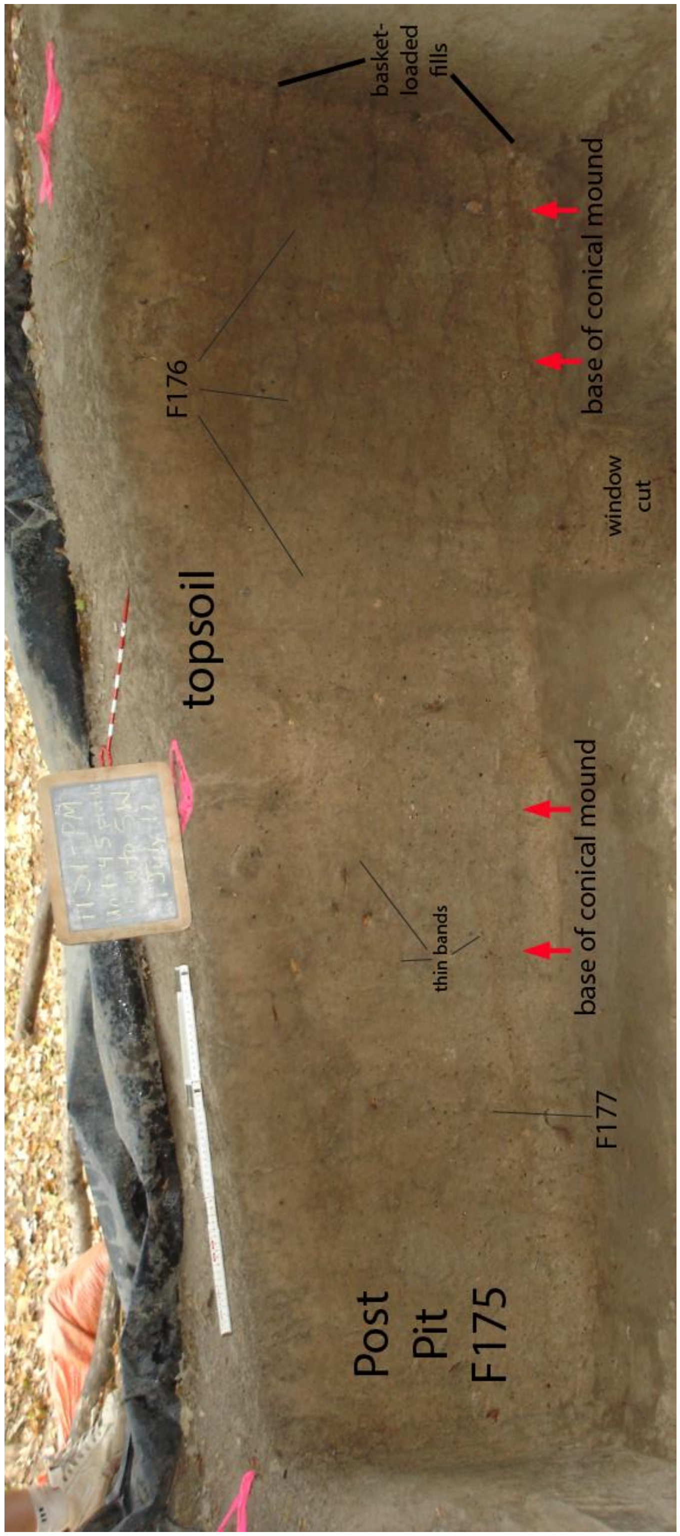

Figure 4.23. Photo of a summit unit profile, view to the southwest. The location of Features 175, 176, and 177 are noted, as is the base of the conical mound.

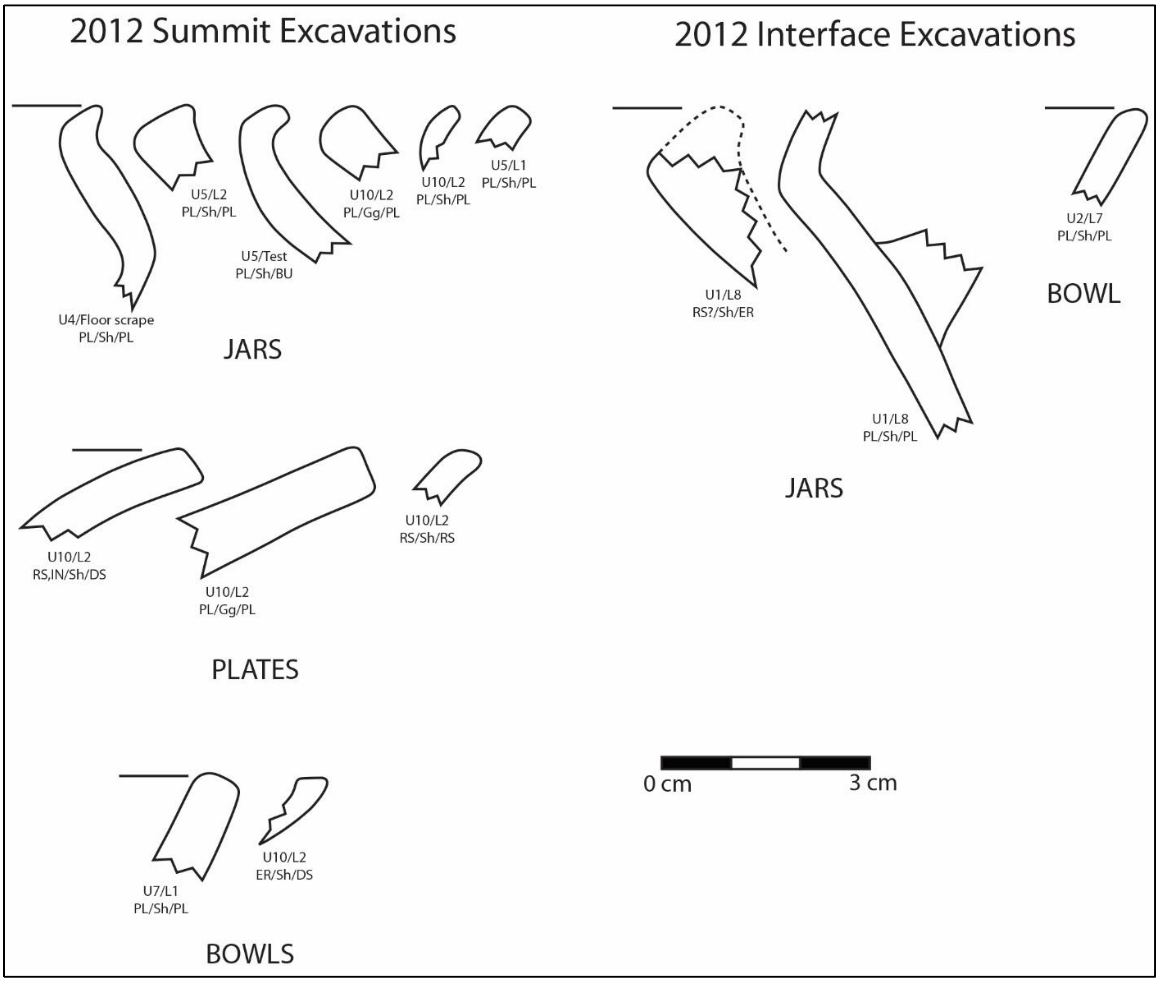

Figure 4.24. Rim profiles of vessels recovered from the 2012 summit and interface unit excavations.

Figure 4.25. Wells Incised plate fragment recovered from the 2012 summit excavations.

Figure 4.26. Photo of 2012 interface profile, view to the northeast. The first terrace summit, laminated zones, and veneer/slopewash are indicated.

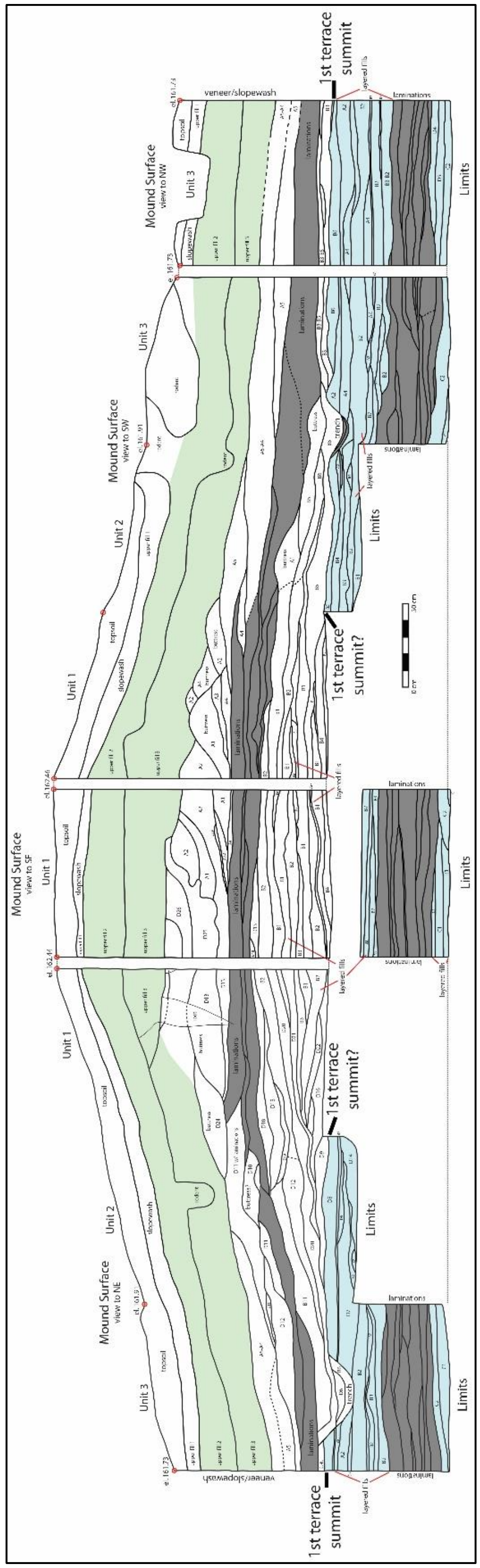

Figure 4.27. Composite profile of the 2012 Mound 12 interface units. Note the first terrace summit, shallow trench, layered fills, and laminated layers.

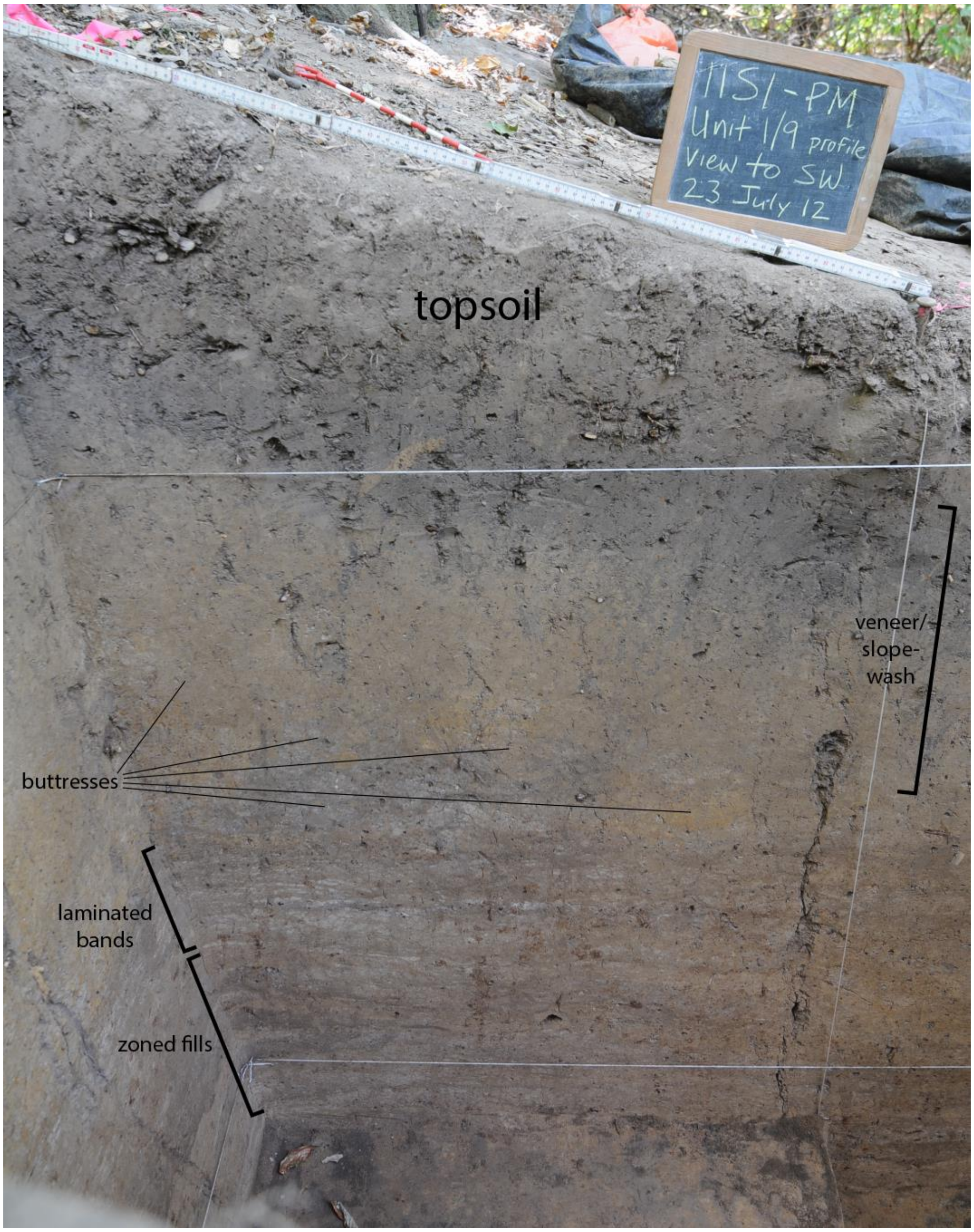

Figure 4.28. Photo of veneer overlaying buttresses in the 2012 interface profile, view to the southwest.

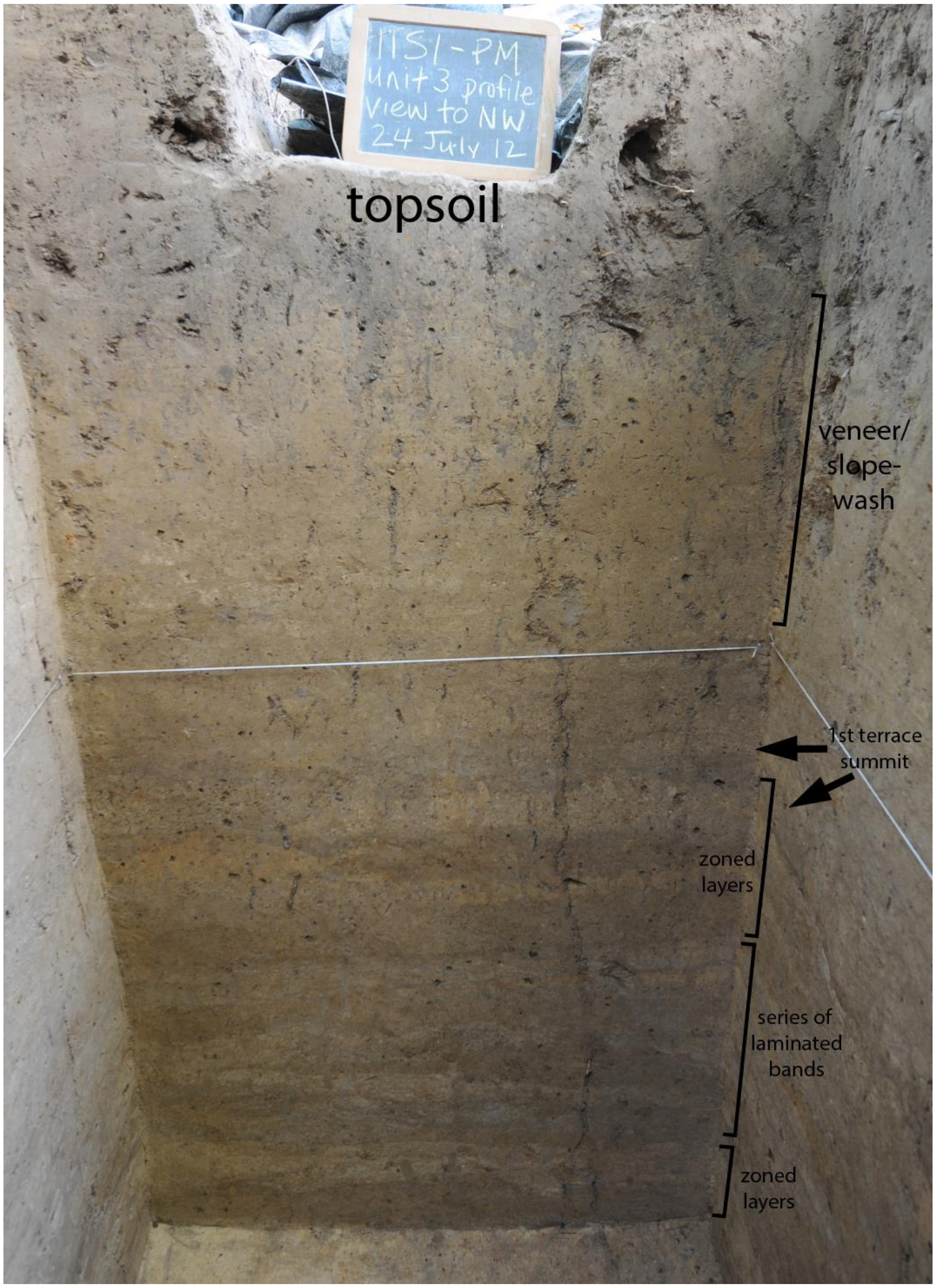

Figure 4.29. Photo of alternating light and dark zoned fills in 2012 interface unit, view to the northwest. The first terrace summit, laminated layers, and zoned fills are noted.

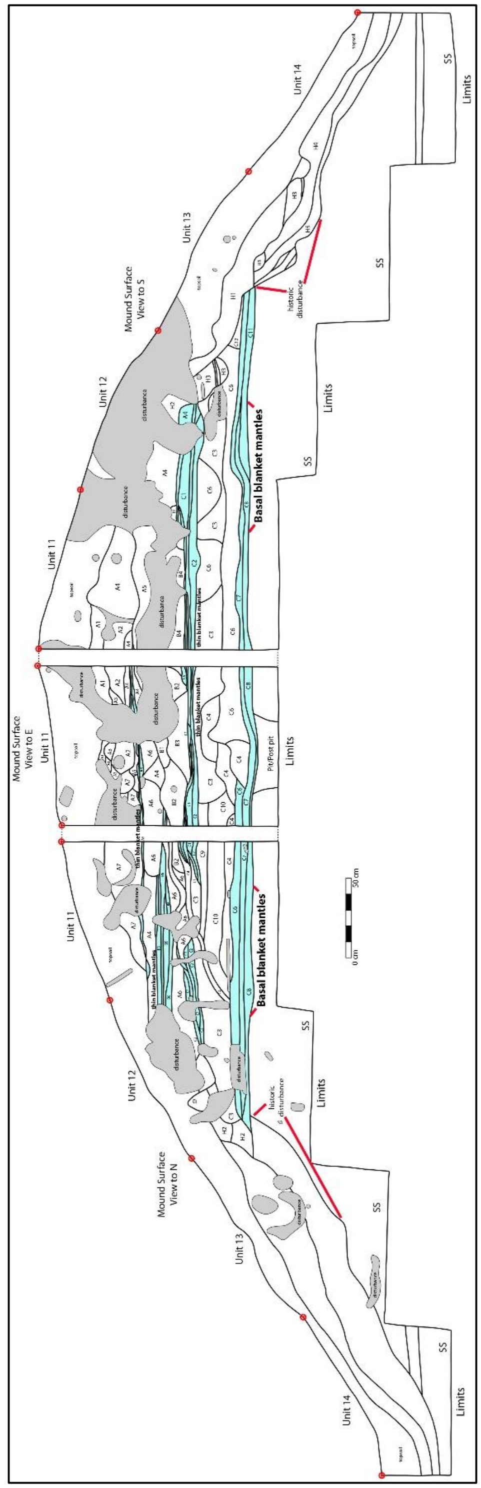

Figure 4.30. Composite profile of the 2014 first terrace trench. The thin series of zoned layers, colored in blue, mark individual construction episodes.

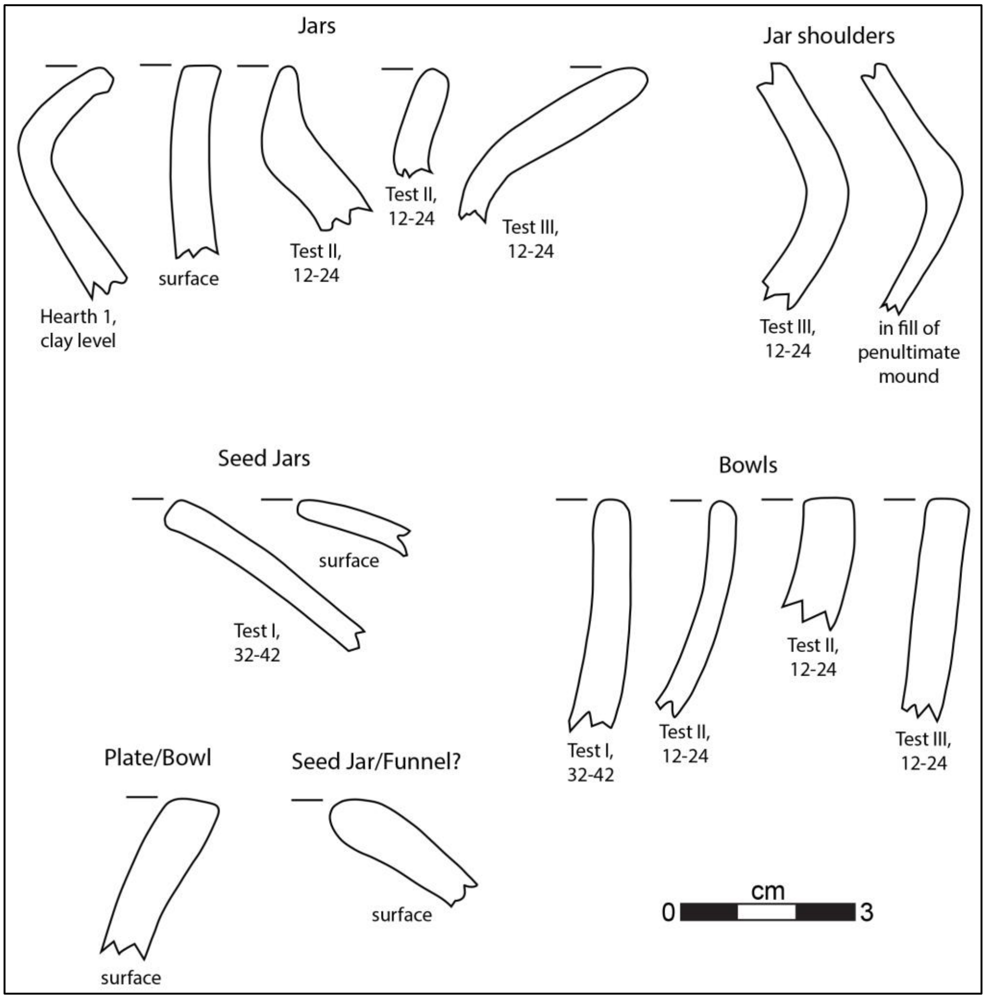

Figure 4.31. Rim profiles of the vessels recovered during Winters and Struever's 1961 salvage excavations on Mound 2.

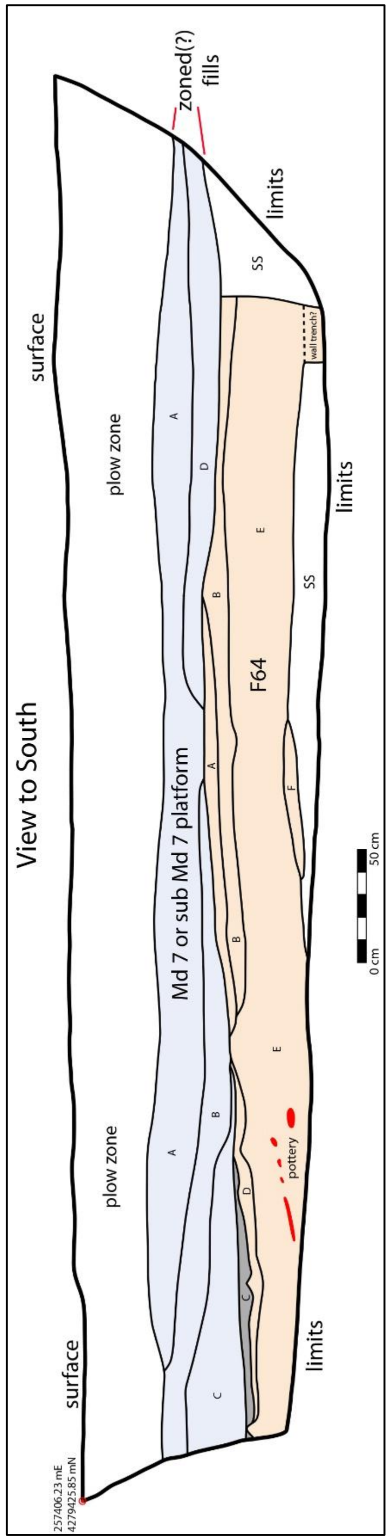

Figure 4.32. Profile of EB 4, showing the basal remnants of sub-Mound 7 construction fill and Feature 64. View to the south.

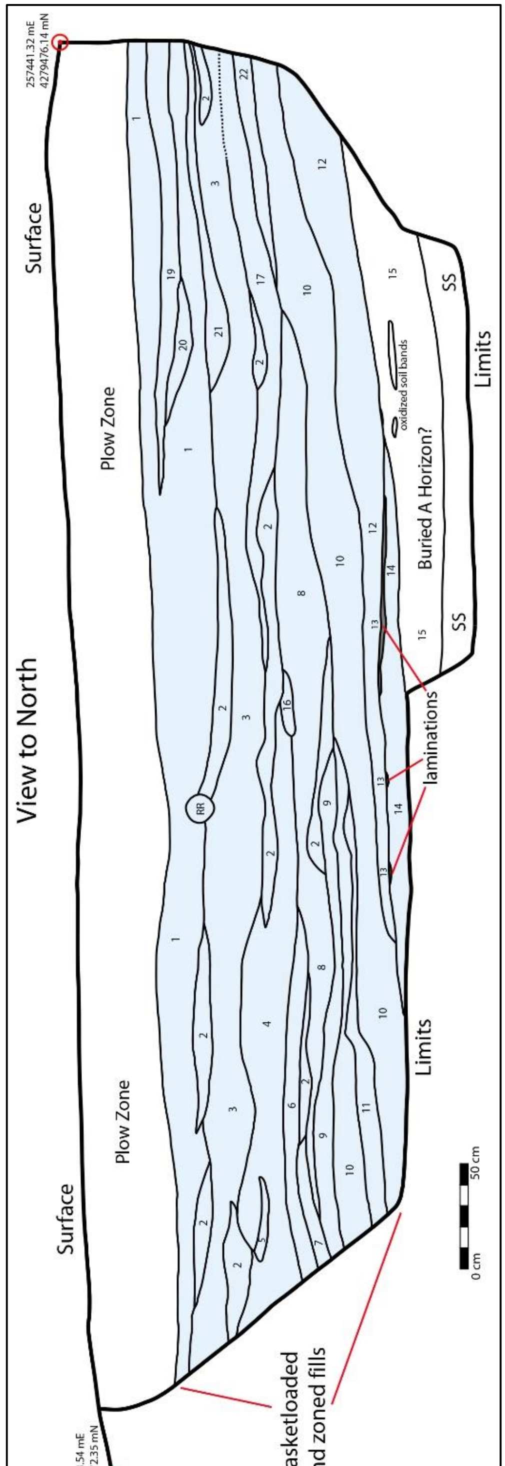

Figure 4.33. Profile of EB 1, showing the remnants of sub-Mound 9 construction fill overlaying a possible buried A horizon. View to the north.

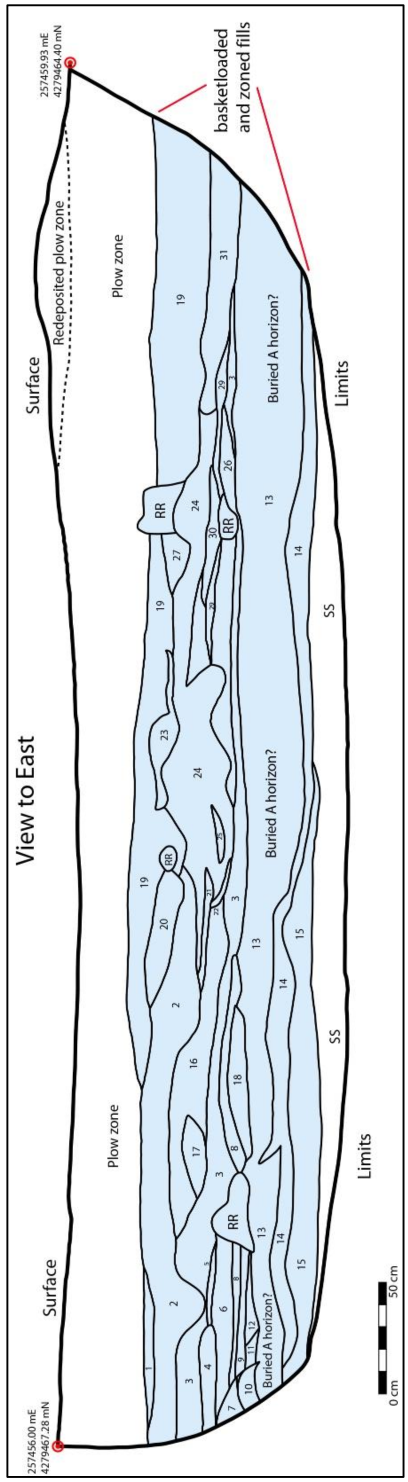

Figure 4.34. Profile of EB 2, showing the remnants of sub-Mound 9 construction fill with a possible buried A horizon. View to east.

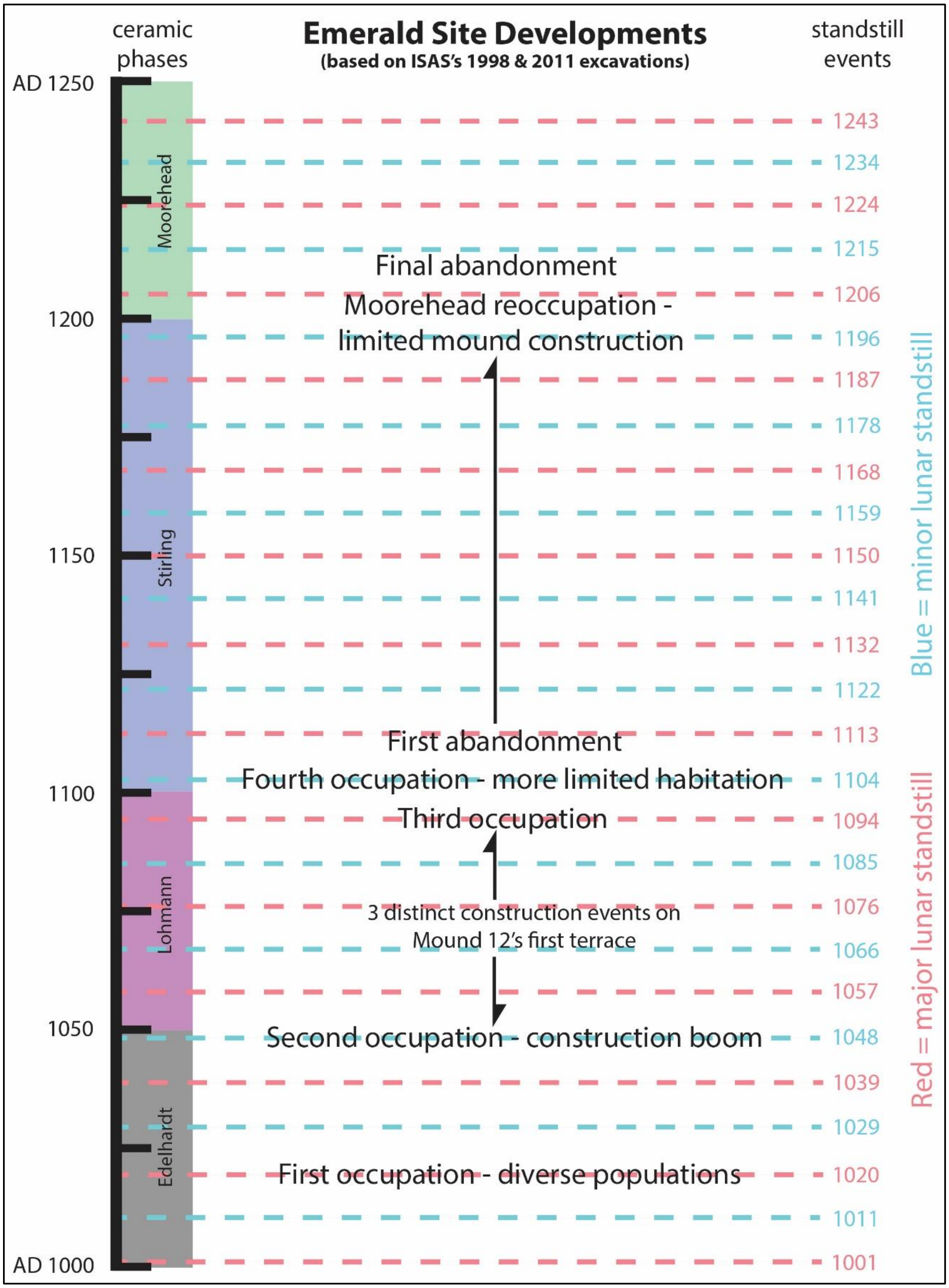

Figure 4.35. Schematic of the major events that occurred at the Emerald site.

Table 4.1. All Recorded Dimensions of Mounds at the Emerald Site.

Mound	Type	Terrace	Measurements, converted to meters							Source
			Length (m)		Width (m)		Height (m)	Volume (m3)	Formula Used	
			base	top	base	top				
1	flat-topped conical	-	22.86	9.14	22.86	9.14	3.66	780.98	$V = \pi h/3(r_1^2+r_1r_2+r_2^2)$	Walton 1962:260
2	flat-topped conical	-	22.86	9.14	22.86	9.14	3.66	780.98	$V = \pi h/3(r_1^2+r_1r_2+r_2^2)$	Walton 1962:260
	conical	-	45.72	-	30.24	-	2	2171.74	$V = \pi ab(h/4)$	Winters and Struever 1962:86
3	conical	-	45.72	-	30.48	-	3.05	3338.19	$V = \pi ab(h/4)$	Walton 1962:260
4	conical	-	22.86	-	15.24	-	1.83	500.73	$V = \pi ab(h/4)$	Walton 1962:260
7	conical	-	-	-	-	-	1.2	-	-	personal measurements
9	conical	-	-	-	-	-	1.5	-	-	personal measurements
12	two-terrace truncated pyramid	both terraces	-	-	-	-	-	-	-	Snyder 1877:434
		second terrace	-	-	-	-	-	-	-	Snyder 1877:434
		first terrace	-	-	-	-	-	-	-	Finney 2000:264
		second terrace	-	-	-	-	-	-	-	Finney 2000:264
		first terrace	-	-	-	-	-	-	-	Walton 1962:260
		second terrace	91.44	45.72	91.44	45.72	15.24	74331.72	$V = h/3(a^2+ab+b^2)$	Walton 1962:259-260
		second terrace	-	-	-	-	-	-	-	Winters and Struever 1962:86
		first terrace	-	-	-	-	-	-	-	Winters and Struever 1962:86
		first terrace	37	30	37	30	2	2252.67	$V = h/3(a^2+ab+b^2)$	personal measurements
		second terrace	75	43	75	43	6	21398.00	$V = h/3(a^2+ab+b^2)$	personal measurements

Table 4.2. Body Sherds from the 2012 Mound 12 Summit Excavations.

Unit	Level	Feature	SH-RS		SH-DS		SH-PL		SH-CM		SH-CM, RS int		LS-RS		LS-PL	
			No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)
4	1	-	-	-	-	-	-	-	1	2.7	-	-	-	-	-	-
4	2	-	1	0.3	-	-	2	0.7	-	-	-	-	-	-	-	-
4	3	-	2	3.8	1	0.3	16	5.7	1	0.5	3	2.0	-	-	-	-
4	4	-	-	-	10	25.4	2	0.5	-	-	-	-	-	-	-	-
4	Wall scrape	-	2	2.7	-	-	-	-	-	-	-	-	-	-	-	-
4	Floor scrape	-	-	-	-	-	8	17.9	-	-	-	-	-	-	-	-
5	1	-	-	-	-	-	2	1.2	-	-	-	-	-	-	-	-
5	2	-	-	-	-	-	3	2.0	-	-	-	-	-	-	-	-
5	3	-	1	0.2	-	-	11	11.5	6	7.1	-	-	-	-	-	-
5	4	-	-	-	-	-	1	0.6	-	-	-	-	-	-	-	-
5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	Wall scrape	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.3
6	1	-	1	0.2	-	-	19	10.2	2	0.8	-	-	-	-	-	-
7	1	-	-	-	-	-	1	0.3	-	-	-	-	-	-	-	-
8	1	-	-	-	-	-	1	0.7	-	-	-	-	-	-	1	0.5
8	Wall scrape	-	-	-	-	-	1	0.3	-	-	-	-	-	-	-	-
10	1	-	-	-	1	0.9	21	6.9	13	18.7	1	0.4	1	0.3	1	0.3
10	2	-	6	5.0	2	3.9	25	38.1	10	8.0	1	2.1	1	0.3	-	-
10	2	176	1	0.1	-	-	-	-	2	13.6	1	3.5	-	-	-	-
10	2	186	-	-	-	-	-	-	1	25.7	-	-	-	-	-	-
Totals			14	12.3	14	30.5	113	96.6	36	77.1	6	8.0	2	0.6	3	1.0
Total %			6.3	4.4	6.3	11.0	50.7	34.8	16.1	27.8	2.7	2.9	0.9	0.2	1.3	0.4

Unit	Level	Feature	GG-PL		GT-DS		GT-PL		GT-CM		GT-CM, MCS		Totals			
			No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	No. %	Wt. (g)	Wt. %
4	1	-	-	-	-	-	1	0.3	-	-	-	-	2	0.9	3.0	1.1
4	2	-	-	-	-	-	-	-	-	-	-	-	3	1.3	1.0	0.4
4	3	-	-	-	-	-	-	-	-	-	-	-	23	10.3	12.3	4.4
4	4	-	-	-	-	-	-	-	-	-	-	-	12	5.4	25.9	9.3
4	Wall scrape	-	-	-	-	-	-	-	1	1.2	-	-	3	1.3	3.9	1.4
4	Floor scrape	-	-	-	-	-	-	-	-	-	-	-	8	3.6	17.9	6.5
5	1	-	-	-	-	-	-	-	-	-	-	-	2	0.9	1.2	0.4
5	2	-	1	0.3	-	-	-	-	-	-	-	-	4	1.8	2.3	0.8
5	3	-	1	0.2	1	0.2	1	0.6	-	-	-	-	21	9.4	19.8	7.1
5	4	-	-	-	-	-	-	-	1	1.6	-	-	2	0.9	2.2	0.8
5	5	-	1	0.7	-	-	-	-	-	-	-	-	1	0.4	0.7	0.3
5	Wall scrape	-	-	-	-	-	-	-	-	-	-	-	1	0.4	0.3	0.1
6	1	-	2	1.3	-	-	1	13.7	4	4.8	-	-	29	13.0	31.0	11.2
7	1	-	-	-	-	-	-	-	-	-	-	-	1	0.4	0.3	0.1
8	1	-	-	-	-	-	-	-	-	-	1	0.9	3	1.3	2.1	0.8
8	Wall scrape	-	-	-	-	-	-	-	-	-	-	-	1	0.4	0.3	0.1
10	1	-	6	10.8	-	-	4	2.7	3	7.0	-	-	51	22.9	48.0	17.3
10	2	-	2	0.4	-	-	2	0.5	2	4.0	-	-	51	22.9	62.3	22.4
10	2	176	-	-	-	-	-	-	-	-	-	-	4	1.8	17.2	6.2
10	2	186	-	-	-	-	-	-	-	-	-	-	1	0.4	25.7	9.3
Totals			13	13.7	1	0.2	9	17.8	11	18.6	1	0.9	223	100.0	277.3	100.0
Total %			5.8	4.9	0.4	0.1	4.0	6.4	4.9	6.7	0.4	0.3				

Table 4.3. Vessel Data from the 2012 Mound 12 Summit Excavations.

Unit	Level	Type	Temper	Exterior	Interior	Decoration	Oriface (cm)	%	No.	Wt. (g)	RA	LB	LL	WT	RC	LT	LP	LS	Usewear	Comments
4	4	jar	SH	pl	pl	-	6	10	3	8.8	62	31	6.75	6.12	-0.06	3.39	0.91	0.50	Exterior blackened	2 sherds from level 6, 1 sherd from level 10
5	1	jar	SH	pl	pl	-	-	-	1	0.4	-	-	-	-	-	4.71	-	-	-	-
5	2	jar	SH	pl	pl	Rim notches?	-	-	1	1.2	-	-	10.38	7.68	-	2.32	0.74	0.22	-	-
5	test	jar	SH	bu	pl	-	< 20	5-7	4	5.2	51	34	8.60	5.17	-	4.48	0.60	0.52	Interior slightly darkened	Sherds not mendable but FSV
10	2	jar	GG	pl	pl	-	-	-	1	6.7	-	-	-	-	-	7.96	-	-	-	Faint groove on lip; possible plate
10	2	jar	SH	rs	rs	-	-	-	1	0.6	-	-	-	-	-	4.82	-	-	-	-
10	2	jar	GG	pl	pl	-	-	-	1	1.4	-	-	-	-	-	8.30	-	-	-	Possible pan
10	2	jar	SH	pl	pl	-	-	-	1	0.3	-	-	-	-	-	3.32	-	-	-	-
7	1	bowl	SH	ds	er	-	-	-	1	4.7	-	-	-	-	-	4.69	-	-	-	-
10	2	bowl	SH	pl	pl	-	-	-	1	1.8	-	-	-	-	-	7.32	-	-	-	-
10	2	plate	SH	ds	rs/ds	Incised	36	5	1	8.4	-	-	-	-	-	-	-	-	-	Wells Incised
Totals	11								16	39.4										
Ave.											56.5	32.5	8.58	6.32		5.13	0.75	0.41		

Table 4.4. Vessel Data from the 2012 Mound 12 Interface Excavations.

Unit	Level	Type	Temper	Exterior	Interior	Decoration	Oriface (cm)	%	No.	Wt. (g)	RA	LB	LL	WT	RC	LT	LP	LS	Usewear	Comments
1	8	jar	SH	er	pl	-	-	-	1	3.5	-	-	-	-	-	-	-	-	-	Possible red slip on interior lip
1	8	jar	SH	pl	pl	-	-	-	1	16.8	-	-	-	6.4	-	5	-	-	-	Broken handle
2	7	jar	SH	pl	pl	-	-	-	1	0.9	-	-	-	-	-	4.9	-	-	-	-
Totals	**3**								**3**	**21.2**										

Table 4.5. Body Sherds from the 2012 Mound 12 Interface Excavations.

Unit	Level	Elevation (masl)	SH-RS		SH-DS		SH-PL		SH-CM		SH-CM, RS int		GG-PL	
			No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)
1	2	162.35-162.21	-	-	-	-	-	-	-	-	-	-	2	0.6
	4	162.12-162.04	-	-	-	-	1	0.8	-	-	-	-	-	-
	5	162.04-161.99	-	-	-	-	3	1.7	-	-	-	-	-	-
	6	161.99-161.89	-	-	-	-	1	0.4	-	-	-	-	-	-
	7	161.89-161.79	-	-	-	-	11	10.3	-	-	-	-	-	-
	8	161.79-161.62	4	0.5	1	2.0	11	10.9	3	4.6	5	3.6	-	-
	9	161.62-161.52	-	-	1	0.3	13	4.0	-	-	-	-	-	-
	10	161.52-161.42	-	-	-	-	-	-	3	1.0	-	-	-	-
	-	Wall scrape	-	-	-	-	1	1.9	-	-	-	-	-	-
2	4	161.86-161.76	-	-	-	-	5	1.7	-	-	-	-	-	-
	5	161.76-161.66	-	-	-	-	5	3.1	-	-	-	-	-	-
	6	161.66-161.46	1	1.4	2	1.1	20	13.4	2	1.9	1	6.9	-	-
	7	161.46-161.36	-	-	-	-	4	0.4	8	5.1	-	-	7	3.0
	-	Wall scrape	-	-	-	-	1	1.4	1	0.8	-	-	1	1.0
3	2	161.87-161.77	-	-	-	-	2	0.6	-	-	-	-	-	-
	3	161.77-161.67	-	-	-	-	-	-	-	-	-	-	1	2.4
	4	161.67-161.57	-	-	-	-	1	2.1	-	-	-	-	-	-
	5	161.57-161.47	-	-	-	-	2	0.3	2	2.0	-	-	-	-
	6	161.47-161.37	-	-	-	-	3	0.9	-	-	-	-	-	-
	7	161.37-161.17	-	-	1	0.5	14	14.7	-	-	-	-	1	0.8
	8	161.17-161.07	-	-	-	-	-	-	-	-	-	-	-	-
	11	160.86-160.76	-	-	-	-	-	-	-	-	-	-	-	-
	-	Wall scrape	-	-	-	-	1	0.2	-	-	-	-	-	-
9	1	161.32-161.22	-	-	-	-	4	2.8	-	-	-	-	4	3.1
Totals			5	1.9	5	3.9	103	71.6	19	15.4	6	10.5	16	10.9
Total %			2.9	1.3	2.9	2.6	58.9	47.4	10.9	10.2	3.4	6.9	9.1	7.2

Unit	Level	Elevation (masl)	GT-RS		GT-PL		GT-CM		GT-CM, MCS		GT some GG-CM, MCS		Totals			
			No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	No. %	Wt. (g)	Wt. %
1	2	162.35-162.21	-	-	-	-	-	-	-	-	-	-	2	1.1	0.6	0.4
	4	162.12-162.04	-	-	-	-	-	-	-	-	-	-	1	0.6	0.8	0.5
	5	162.04-161.99	-	-	-	-	-	-	-	-	-	-	3	1.7	1.7	1.1
	6	161.99-161.89	-	-	-	-	-	-	-	-	-	-	1	0.6	0.4	0.3
	7	161.89-161.79	1	0.5	2	2.4	-	-	-	-	-	-	14	8.0	13.2	8.7
	8	161.79-161.62	-	-	-	-	-	-	-	-	-	-	24	13.7	21.6	14.3
	9	161.62-161.52	-	-	1	0.9	-	-	-	-	-	-	15	8.6	5.2	3.4
	10	161.52-161.42	-	-	-	-	-	-	-	-	-	-	3	1.7	1.0	0.7
	-	Wall scrape	-	-	-	-	-	-	-	-	-	-	1	0.6	1.9	1.3
2	4	161.86-161.76	-	-	-	-	-	-	-	-	-	-	5	2.9	1.7	1.1
	5	161.76-161.66	-	-	-	-	1	1.9	-	-	-	-	6	3.4	5.0	3.3
	6	161.66-161.46	-	-	3	6.7	3	5.9	-	-	2	5.2	34	19.4	42.5	28.1
	7	161.46-161.36	-	-	-	-	-	-	1	1.5	-	-	20	11.4	10.0	6.6
	-	Wall scrape	-	-	-	-	-	-	-	-	-	-	3	1.7	3.2	2.1
3	2	161.87-161.77	-	-	-	-	-	-	-	-	-	-	2	1.1	0.6	0.4
	3	161.77-161.67	-	-	-	-	-	-	-	-	-	-	1	0.6	2.4	1.6
	4	161.67-161.57	-	-	-	-	2	1.2	-	-	-	-	3	1.7	3.3	2.2
	5	161.57-161.47	-	-	-	-	-	-	-	-	-	-	4	2.3	2.3	1.5
	6	161.47-161.37	-	-	1	0.7	-	-	-	-	-	-	4	2.3	1.6	1.1
	7	161.37-161.17	-	-	2	8.0	-	-	-	-	-	-	18	10.3	24.0	15.9
	8	161.17-161.07	-	-	-	-	1	1.9	-	-	-	-	1	0.6	1.9	1.3
	11	160.86-160.76	-	-	-	-	-	-	1	0.2	-	-	1	0.6	0.2	0.1
	-	Wall scrape	-	-	-	-	-	-	-	-	-	-	1	0.6	0.2	0.1
9	1	161.32-161.22	-	-	-	-	-	-	-	-	-	-	8	4.6	5.9	3.9
Totals			1	0.5	9	18.7	7	10.9	2	1.7	2	5.2	175	100.0	151.2	100.0
Total %			0.6	0.3	5.1	12.4	4.0	7.2	1.1	1.1	1.1	3.4				

Table 4.6. Body Sherds from the 2014 First Terrace Excavations.

Unit	Level	Elevation (cmbd)	Shell		Grog		Grit						BC		Totals			
			Plain/eroded		Plain/eroded		Plain/eroded		CM		MCS CM							
			No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	No. %	Wt. (g)	Wt. %
11	3	29-39	3	3.3	-	-	-	-	-	-	-	-	-	-	3	3.8	3.3	5.1
	6	59-69	5	6.3	-	-	-	-	1	0.4	-	-	1	0.1	7	8.8	6.8	10.6
	8	79-89	-	-	-	-	-	-	-	-	-	-	4	1.4	4	5.0	1.4	2.2
12	1	26-59	25	26.0	-	-	-	-	-	-	-	-	-	-	25	31.3	26	40.4
	2	59-79	1	1.9	-	-	-	-	-	-	1	1.5	2	0.9	4	5.0	4.3	6.7
	3	79-89	1	0.2	-	-	1	1.2	-	-	-	-	3	1.9	5	6.3	3.3	5.1
	4	89-99	7	1.9	-	-	-	-	-	-	-	-	-	-	7	8.8	1.9	3.0
	5	99-109	-	-	-	-	-	-	-	-	-	-	2	0.5	2	2.5	0.5	0.8
	7	119-129	1	0.4	-	-	-	-	-	-	-	-	-	-	1	1.3	0.4	0.6
13	1	2-42	-	-	1	1.1	-	-	-	-	-	-	-	-	1	1.3	1.1	1.7
	2	42-62	1	0.2	-	-	-	-	-	-	-	-	-	-	1	1.3	0.2	0.3
	3	62-72	2	5.1	-	-	-	-	-	-	-	-	-	-	2	2.5	5.1	7.9
	4	72-82	1	0.2	-	-	-	-	-	-	-	-	3	2.5	4	5.0	2.7	4.2
	8	wall scrape	1	0.9	-	-	-	-	-	-	-	-	-	-	1	1.3	0.9	1.4
14	1	5-55	-	-	-	-	-	-	-	-	-	-	4	3.7	4	5.0	3.7	5.8
	2	55-65	-	-	-	-	-	-	-	-	-	-	1	0.2	1	1.3	0.2	0.3
	3	65-75	-	-	-	-	-	-	-	-	-	-	3	0.8	3	3.8	0.8	1.2
	6	97-107	1	0.5	-	-	-	-	-	-	-	-	3	0.7	4	5.0	1.2	1.9
	10	wall scrape	-	-	1	0.5	-	-	-	-	-	-	-	-	1	1.3	0.5	0.8
Totals			49	46.9	2	1.6	1	1.2	1	0.4	1	1.5	26	12.7	80	100.0	64.3	100.0
Total %			61.3	72.9	2.5	2.5	1.3	1.9	1.3	0.6	1.3	2.3	32.5	19.8				

Table 4.7. Chronology of the Construction Stages for Select Mounds at the Emerald Site.

Mound	Type	Terrace	Volume (m3)	# of Stages (low estimate)	# of Stages (high estimate)	Ceramic Phase	Ceramic Phase Length (yrs)	High estimate per stage (yrs)	Low estimate per stage (yrs)
1	flat-topped conical	-	780.98	unknown	unknown	unknown	-	-	-
2	flat-topped conical	-	780.98	2	3	Moorehead	75	37.5	25
3	conical	-	3338.19	unknown	unknown	Lohmann?	-	-	-
4	conical	-	500.73	unknown	unknown	Lohmann?	-	-	-
7	conical	-	-	1	1	Lohmann	50	50	50
9	conical	-	-	1	1	Lohmann?	-	-	-
12	truncated pyramid	first terrace	2252.67	3	4	Lohmann	50	16	12
		second terrace	21398.00	2	3	Moorehead?	75	37.5	25

Table 4.8. Labor Estimates for Select Mounds at the Emerald Site.

Mound	Type	Terrace	Volume, m3 (V)	# of Stages, low estimate (X)	# of Stages, high estimate (X)	Labor estimate, m3 (L)	Length of time (T)					
							1 day		7 days		30 days	
							low	high	low	high	low	high
1	flat-topped conical	-	780.98	unknown*	unknown*	1.25	625	625	89	89	21	21
2	flat-topped conical	-	780.98	2	3	1.25	312	208	45	30	10	7
3	conical	-	3338.19	unknown*	unknown*	1.25	2671	2671	382	382	89	89
4	conical	-	500.73	unknown*	unknown*	1.25	401	401	57	57	13	13
7	conical	-	-	1	1	1.25	-	-	-	-	-	-
9	conical	-	-	1	1	1.25	-	-	-	-	-	-
12	truncated pyramid	first terrace	2252.67	3	4	1.25	601	451	86	64	20	15
		second terrace	21398.00	2	3	1.25	8559	5706	1223	815	285	190

I = number of person-days of labor required to build stage, or (V/X)/LT
*for unknown, I assumed 1 stage

CHAPTER 5
TRACING THE EMERALD AVENUE

This chapter focuses on the "Emerald Avenue," a hypothesized pre-Columbian road that connected Emerald to Cahokia's central precinct. This is a key part of this project because establishing the presence of such a road or path is crucial in determining whether Emerald was a pilgrimage center; indeed, formal paths, trails, and roads are closely associated with pilgrimage centers throughout the world, including those in native North America (e.g., Bauer and Stanish 2001; Claassen 2011; Ferguson et al. 2009; Hitchner 2012; Lepper 1995; Mack 2002; Marshall 1997; Palka 2014; Patel 2005; Ristvet 2011, 2015; Shaw 2008; Silverman 1994; Tozzer 1941:109, 146). Perhaps more importantly, verifying the presence of a road or trail spanning between Emerald and Cahokia would suggest that people were moving regularly between these sites, and more generally that journeys to and from particular places in the region were part of the movements that created Cahokia.

I begin this chapter by reviewing descriptions of the Emerald Avenue. I then discuss previous work on ground-truthing the Emerald Avenue, which consists of a targeted resistivity survey performed in 2012 as part of Alt and Pauketat's RIHA project. In the rest of the chapter I describe my own research on the Avenue. This includes a targeted magnetic survey and series of excavations, completed in 2014, to confirm the presence of the Avenue and to determine when and how it was constructed.

PREVIOUS DESCRIPTIONS AND INVESTIGATIONS

The Emerald Avenue was first described by John Francis Snyder in 1894. Snyder's description of the Avenue is based on the descriptions of local residents:

> "When a small boy, I remember hearing the statement made by Rev. John M. Peck – a noted Baptist minister, who came from Connecticut to this part of Illinois in 1818, and afterward founded Rock Spring Seminary, three miles west of Lebanon – that, at that early day, a deeply-worn footpath, or trail, could be readily traced from Emerald Mound through the dense woods, crossing Silver Creek at a rocky shallow ford, to and down the bluffs and continuing through the Bottom directly to the mound on Cahokia Creek. This statement was corroborated by Gov. John Reynolds and other old pioneers of this region. On the top of one of the highest points of the bluffs, where this trail emerges from the uplands into the Bottom, is a large conical mound, locally known as the "Sugar Loaf", which probably served the pre-historic savages, who erected it, the purpose of a signal station" (Snyder 1894:263).

Snyder mentioned the Emerald Avenue again in 1909. These descriptions are likely based on those of his previous informants:

> "In the early settling of that part of the State there was still plainly seen a well-worn trail, or road, leading from the mound village on the banks of Cahokia creek to the eastern bluffs, and up that ravine between the two lofty signal stations, and on through the timbered hills and across Silver creek, to another square mound in the western edge of Looking Glass prairie, a distance of fifteen miles" (Walton 1962:259).

In sum, Snyder's descriptions claim the Emerald Avenue was a prominent footpath, trail, or road that ran from Cahokia (likely Monks Mound) to the eastern river bluffs, between two "Sugar Loaf" mounds, across Silver Creek, and finally to the front of Emerald's Mound 12 (see also Woods and Holley 1991:55; Pauketat 2013a:108). Apparently Snyder believed this trail or road was pre-Columbian, as he explicitly described it as connecting two major pre-Columbian sites. It also shows that the road was noticed by at least 1818, which is about the time the first Euro-American settlers arrived in the eastern upland area (see Brink, McDonough & Co. 1881).

The Avenue was next mentioned by Paul Titterington, a local physician and archaeologist, who claimed that "as late as 1818 a deeply worn trail could be traced from the Lebanon Group to the Cahokia Group" (Titterington 1938:3). Given this terse description, it is likely that Titterington simply drew from Snyder's account.

Not long after Titterington, Robert Grimm, a local avocational archaeologist, mentioned the Avenue in 1944: "an old farmer living nearby told me that, in the past, a trail lead from the Emerald Mounds Northwest to the Cahokia Mounds, a distance of about fifteen miles" (Grimm 1944:41). Unfortunately, Grimm did not mention the name of the farmer and whether the farmer had observed the trail himself or had been told of its existence secondhand. It is also possible that this description was based in part on Snyder's or Titterington's earlier accounts.

The Emerald Avenue was next mentioned by Howard Winters and Stuart Struever in 1962: "Earlier accounts by Dr. J. F. Snyder and others mention a trail some fifteen miles long from the Emerald Mound Group to the Cahokia Mounds, thus linking Emerald with one of the greatest ceremonial centers of the American continent" (Winters and Struever 1962:86). Like Titterington and Grimm's descriptions, Winters and Struever provided no new information on the Avenue itself, as it was solely based on earlier descriptions. However, Winters and Struever clearly believed that it was pre-Columbian in origin and hinted at its historical importance in connecting Emerald and Cahokia, which is something previous researchers did not emphasize.

In 1974, James Porter (1974:33-34) claimed to have identified the Avenue in old aerial photographs of the Emerald site area:

> "…Snyder suggested long ago that a trail could still be seen coming in from the east. In the early 1960s the writer secured the necessary aerial photographs of the Emerald Mound area and was able to partially follow a faint line that appears to represent this trail. It was difficult to follow in areas where recent expansion had disturbed the faint line on the photo. Near the mound, it was noted to go southeastward (generally), past the south side of the Emerald Mound and westward toward Silver Creek. In some fields there was no evidence of any historic reason for a continuous line. Walking the creek area produced no results, but since little time could be devoted to this aspect of prehistoric settlement communications, the project was dropped" (Porter 1974:33-34).

Porter was apparently more interested in the Avenue as it neared the Emerald site – he made no mention of potential traces between Cahokia and Emerald. As a result, Porter's description of the Avenue near Emerald was much more detailed than Snyder's. Importantly, Porter mentioned another part of the Avenue, apparently overlooked by Snyder, which began south of Emerald's Mound 12 and ran east for an undisclosed distance.

Elizabeth Benchley also mentioned the Avenue in 1974, though she relied solely on Snyder's description of the road and was primarily interested in its economic implications (Benchley 1974:238). Specifically, Benchley argued that the trail signified "that overland travel between the two sites was important" and that the Emerald site "apparently served as a funneling point through which goods and services flowed between Cahokia and the Kaskaskia sites" (Benchley 1974:238). Thus, she was the first scholar to offer a specific explanation on the Avenue's wider purpose and significance.

The next reference to the Avenue was made by John Walthall and Elizabeth Benchley (1987). Drawing explicitly from Titterington's descriptions of the Avenue and a handful of "early eighteenth-century trade items, including several glass beads" supposedly found at Emerald, they suggested that the Avenue was established and used by Illini Indians living at Monks Mound as a trail to "hunting camps near Lebanon" where they would camp "during trading expeditions to posts along the Wabash River" (Walthall and Benchley 1987:4).

The Emerald Avenue was briefly discussed in 1993 by Brad Koldehoff, Timothy Pauketat, and John Kelly during their discussion of the Emerald site (Koldehoff et al. 1993). Specifically, they claimed that "Emerald may have occupied a key position along an aboriginal trail that ran from the American Bottom to the Wabash Valley and beyond" (Koldehoff et al. 1993:333). The Avenue, or "aboriginal trail" as they called it, was not described or identified on the ground, which suggests that they, like most of the previous scholars, were relying exclusively on earlier descriptions. Regardless, Koldehoff has argued in more recent publications and presentations that this trail facilitated communication between and integrated groups in the American Bottom and Wabash Valley (Koldehoff 1996, 2014; Koldehoff and Galloy 2006).

A surge of research on the Emerald Avenue has taken place in the last few years. Timothy Pauketat (2013a) has provided the most detailed description of the Emerald Avenue to date. Like Porter, he identified the roadway using an old aerial photograph (from 1940) of the Emerald site area, reproduced in Figure 5.1. His findings generally correspond to Porter's.

According to Pauketat, a single faint line, coming from the west, terminates at the foot of the first terrace of Mound 12. Faint traces of another line, which appears to parallel the first, are also visible (see Figure 5.1). It is unclear if these different line segments are associated, though it seems likely given that they appear to be parallel to each other. Based on this aerial photo, the Avenue west of Mound 12 is approximately 1.8 km long. Coming from the east, the Avenue passes just south of Mound 12 and terminates at an open, flat space between Mounds 12 and 8 (Pauketat 2013a:143; I suggested that this flat space is a plaza in Chapter 4). Furthermore, in some places a second faint line runs parallel to the original line, which may represent two separate traces or the edges of a single large road (Pauketat 2013a:Figure 7.9). Based on the aerial photo, the visible extent of the eastern part of the Avenue is approximately 1.3 km long. Modern aerial photos and a surface survey of the site show that one of the lines marking the eastern portion of the Avenue has become a drainage channel (Figure 5.2). Unfortunately, modern agricultural practices and ongoing erosion make it unlikely that additional details of the road will be gleaned from aerial photographs.

Resistivity survey was performed on portions of the Avenue in 2012 as part of Alt and Pauketat's RIHA project, mentioned earlier in Chapter 4 (Larson et al. 2013). The goal of these investigations was to ground-truth the existence of the Avenue, as there were no obvious physical traces of it on the ground aside from the drainage channel mentioned above. This survey, performed by Timothy Larson of the Illinois State Geological Survey, revealed that a linear but discontinuous, kilometer-long anomaly about 43 cm beneath the ground surface exists east of Mound 12. This anomaly is believed to represent traces of the Avenue because it crosses three different farm fields and two modern roads, is distinguishable at a consistent depth across the landscape, and generally corresponds to the linear features in the aerial photos (Larson et al.

2013). Weaker linear anomalies at about the same depth, also assumed to represent traces of the Avenue, were also discovered west of Mound 12 (Larson et al. 2013).

Jeffery Kruchten (2012) has explored the Avenue's connection to other known landscape features and thoroughfares in the region. Extrapolating the possible west-trending trajectory of the Avenue from the 1940 aerial photo, Kruchten has argued that, between Emerald and Cahokia, the Avenue was purposefully constructed to pass between pairs of glacial ridges and knolls (see Figure 4.1). According to him, these knolls mimicked the conical "sugar loaf" mounds on the edge of the bluff through which the Avenue reportedly passed. Furthermore, Kruchten (2012) argues that the Avenue was likely an offshoot of the Vincennes Trace, a 250 km long path or road (once a buffalo trail) that connected Vincennes, Indiana, to St. Louis (Figure 5.3). Today, U.S. Route 50 generally follows the same trajectory of this trace. Kruchten (2012) argues, following Koldehoff and Walthall (2004) and McElrath et al. (2009), that this route was likely used for thousands of years by numerous pre-Columbian groups, including Cahokians beginning in the mid-1100s. Kruchten (2012) also suggests that portions of the Vincennes Trace passed through pairs of glacial knolls and ridges, similar to the Emerald Avenue on its way to Cahokia.

Overall, these investigations, and particularly Pauketat's (2013a) identification of the linear features (presumably the Emerald Avenue) in the aerial photos, suggest that the Avenue is very straight (at least when it enters and exits the Emerald site) and over 100 meters wide in some places (110 meters wide in the area west of Mound 12, 50 meters wide in the area east of Mound 12), which is far wider than a simple footpath. It is also crucial to note that the Avenue begins and ends at specific places within the Emerald site – the western portion of the Avenue begins/terminates at the base of the first terrace of Mound 12, and the eastern portion of the

Avenue begins/terminates within Emerald's plaza between Mounds 12 and 8. Furthermore, if this linear feature followed the same general trajectory as observed in the aerial photos, it certainly could have passed by the Sugarloaf Mounds and connected to Cahokia's central precinct to the west as well as the Vincennes Trace to the southeast (see Koldehoff 1996, 2014; Kruchten 2012).

2014 INVESTIGATIONS

Despite the information garnered from these earlier investigations, however, many questions regarding the Avenue remained unclear. For instance, are these linear features truly traces of the Avenue, or are they the remains of historical features or non-cultural subsoil anomalies? If the Avenue is pre-Columbian, when was it constructed? Do the linear features represent numerous parallel, thin trails, or do they represent two sides of a wider road or causeway? If the latter, was it constructed by depositing processed fill in alternating strata (such as the Rattlesnake Causeway; see Baires 2014b), digging a trench and mounding the fill on either side (like Hopewell roads; see Squier and David 1998 [1848]), or some other way (see Sofaer et al. 1989)? To answer these questions, I performed magnetic survey and targeted excavations in 2014 to further confirm the presence of the Emerald Avenue and determine when and how it was constructed. Answering these questions would also shed light on if and when pilgrims and other travelers journeyed between Emerald and Cahokia.

Magnetic Survey

Magnetic survey was performed in two areas (Figure 5.4). The first area was situated in a farm field northwest of Mound 12 in a place where the Avenue is visible in the aerial photo.

Fifteen 30 x 30 meter survey blocks were laid out and then surveyed using a Bartington Grad-601 dual fluxgate gradiometer. The results reveal two distinct, parallel linear features in the northern and southern extremes of the survey blocks (Figure 5.5). These generally match with the faint lines seen in the 1940 aerial photo identified by Pauketat (2013a:Figure 7.9) as the Emerald Avenue (see Figure 5.1). These linear features are approximately 110 meters apart. Importantly, another faint linear feature is visible between and parallel to the other two lines (see Figure 5.5). Based on its signature and orientation, this third line is likely associated with the other two. No other features (i.e., structures, pits, etc.) are readily identifiable in the magnetic survey.

The second survey was performed in the farm field directly southeast of Mound 12 (see Figure 5.4). Twenty-five 30 x 30 meter blocks were staked and surveyed in the same manner as the northwestern area. Unfortunately, due to land access issues, other farm fields in which the Avenue is more visible in the aerial photos could not be surveyed or excavated. The results of the eastern area survey are not as clear as those of the western area. A linear feature with a strong magnetic signature is clearly discernable in the southeastern-most blocks and corresponds to one of the linear features in the aerial photo (Figure 5.6). While remnants of other similar linear features may be discernable in other blocks, the feature is generally less visible in the blocks situated closer to Mound 12. This is probably due to the numerous erosional gullies and historic disturbances in this area, which likely destroyed the Avenue if it was present (see Figure 5.6). It is also possible that slope wash from the ridgetop covered and obscured the Avenue.

In sum, the magnetic survey revealed a series of linear features that generally overlap with the lines in aerial photos identified by Pauketat (2013a) as the Emerald Avenue. The western survey area shows two (and possibly three) linear, parallel features that likely represent the edges of a single road or perhaps a series of parallel trails or paths. The eastern survey area also reveals one obvious remnant of a linear but discontinuous feature, and possibly remnants of other faint linear features throughout the survey area that may represent portions of the Avenue.

Excavations

In addition to the magnetic surveys, portions of the Emerald Avenue were excavated to further confirm its existence and, if it is real, also determine its chronology and methods of construction. Thus, in 2014 a series of 1.5-meter wide trenches were excavated perpendicularly via backhoe into the Avenue – one continuous trench was excavated in the western survey area, four continuous trenches were excavated in the eastern survey area, and two discontinuous trenches were excavated along modern roadways further to the east (Figure 5.7).

The single long trench excavated in the western survey area, about 120 meters long, cut perpendicularly across all three linear features identified in the magnetic survey results (Figure 5.8). However, no features that may have represented the Avenue were identified in plan or in the trench wall profiles. This is surprising, given the clarity of the linear features in the magnetic survey data. However, a single wall trench structure (Feature 284) was identified (see Figure 5.8). Only a portion of the structure, measuring 4.6 meters north-south, was uncovered. Several associated internal post molds or pits were situated along the interior wall. No other features were identified.

In contrast, portions of a historic wagon road were identified in several of the trenches excavated east of Mound 12. For instance, a dark linear feature was identified in the southern end of East Trench 1 (Figure 5.9). This feature, which measured 4.1 meters in width, contained very dark black to gray fill with numerous metal fragments and a single sherd of historic tile (Table

5.1). In profile, this feature appears as two inward-slanting basins (Figure 5.10). Each basin is approximately 1.2 meters in width; one is 48 cm deep and the other 30 cm deep. Both basins exhibit several narrow, square-shaped depressions in their base. Numerous irregular fill zones were noted.

Three linear features were identified in East Trench 2, the trench situated closest to Mound 12. The feature in the northern end of the trench is only about 65 cm wide in plan and superimposed by numerous plow scars (Figure 5.11). In profile it is a shallow basin with an irregular base (Figure 5.12). No artifacts were recovered. The other two features were identified in the south end of East Trench 2 (Figure 5.13). The first is about 2.2 meters in width; the other, just to the north of the first, measures about 20 cm in width. In profile, both of these features appear as two shallow basins with irregular zones of dark colored fill; the base of the wider feature exhibits several square-shaped depressions (Figure 5.14). Notably, one small flake of Burlington chert and three tiny plain, grit-tempered pottery sherds were recovered from the smaller trench (Table 5.2). Two of these sherds and the Burlington chert flake are pre-Columbian in origin, and probably date to the TLW or Mississippian period. Although the shape of this small trench is reminiscent of a wall trench, no other associated trenches were identified in the surrounding area.

Another feature was uncovered in East Trench 3 (see Figure 5.7). In profile, this feature is an irregular basin shape that measures 2.6 meter in width and is about 40 cm in depth at its deepest point (Figure 5.15). The base of the feature exhibits a number of square-shaped depressions similar to those associated with the features in Trenches 1 and 2. The fill of this feature is much lighter than the feature fills encountered in the other trenches, though it still consists of various irregular fill zones. Its relationship to the other dark features previously described is unclear. However, no artifacts were recovered.

Similar features were identified in two of the three profiles excavated along Emerald Mound Grange Road (see Figure 5.7). The northernmost trench, labeled EMG 1, revealed a very wide feature in profile that consisted of two connected, irregular basins, which together measure 4.8 meters in width (Figure 5.16). Both individual basins measure a little over 1 meter in width and about 45 cm in depth. Importantly, both exhibit square-shaped depressions in the base. They contain numerous dark, irregular fill zones that produced nine historic artifacts including metal fragments, a brick fragment, and an angled piece of metal and bolt (see Table 5.1).

Another of these trenches, named EMG 3, also exhibits a wide, irregular, basin-shaped feature (Figure 5.17). In profile, this feature is approximately 4.5 meters in width and 35 cm in depth at its deepest point. There are several squared shaped depressions situated at intervals along the base of the feature (see Figure 5.17). The feature contains a number of irregular zones of dark fill with abundant amounts of natural manganese and iron concretions. A cinder was recovered from one of the square-shaped depressions (see Table 5.1). Three other historic artifacts were also recovered from the fills of this feature.

In summary, the east trenches uncovered numerous shallow, irregular, linear features that I believe are portions of a historic wagon road. It is probable that some of the features in the different profiles were portions of the same feature, meaning this road is generally linear but discontinuous. These features do not represent natural gullies or drainages. For one, the features in the aerial photo, magnetic survey, and these excavations confirm that this feature is unnaturally straight and cuts across the natural contours of the landscape, something that would not happen with natural gullies (Larson et al. 2013; see also Ferguson et al. 2009; Sofaer et al.

1989). Furthermore, the shape of the features in profile shows that they are man-made, not naturally made.

CHRONOLOGY

The morphology of the features uncovered in the excavations on the eastern side of Mound 12 clearly show that they are remnants of a historic wagon road and not a pre-Columbian road, path, or trail. Based on the excavations, this feature is unlike other pre-Columbian roadways known in the region. It is not a raised linear feature constructed of layers of prepared fill like the Rattlesnake Causeway at Cahokia (see Baires 2014b) or a sunken roadbed with parallel side ditches and mounded edges, reminiscent of Hopewell roads (see Lepper 1995; Squier and Davis 1998[1848]). Instead, the features uncovered in East Trenches 1, 2, and 3 and EMG 1 and 3 are irregular sunken depressions of various widths and depths with square-shaped ruts in their bases. Furthermore, these features are filled with irregular fill zones full of iron and manganese concretions. While such depressions or "troughs" are indicative of prehistoric trails in other parts of the world (see Ferguson et al. 2009), the features in this case are almost certainly the results of the continual pounding and compression of humans, draft animals, and carts, wagons, and other wheeled vehicles. Furthermore, the square-shaped indentations at the base of most of the depressions mimic wagon wheel ruts often found in association with historic roads (see Agbe-Davies 2013; Stearns 1997). Furthermore, the width between opposing wheel ruts range between three and eight feet (1 and 2.5 meters), which corresponds to the axel widths of wagons and carts used throughout the 19th century (cf. Gerhardt et al. 2012; Stearns 1997).

The artifacts recovered from this road also show that it dates to the historic period. The artifacts consisted of fragments of ceramic tile, brick, metal, and cinders (see Table 5.1).

Furthermore, an angular fragment of metal with a bolt, obviously of historic origin, was recovered from the fill of the road from EMG 1. Notably, however, the recovery of a few pre-Columbian artifacts – a single small flake of Burlington chert and two grit tempered sherds (see Table 5.2) – suggest that this historic road may have followed and/or overlapped portions or remnants of an earlier pre-Columbian road, trail, or other feature. The thin, shallow trench uncovered in East Trench 2 that yielded these pre-Columbian sherds may represent a surviving remnant of an earlier road. On the other hand, it could also represent another portion of the wagon road, given the similar color and texture of its fills – the pre-Columbian artifacts may simply have been washed into this feature.

Furthermore, two fragments of uncharred cedar wood from the fills of the historic road (one each from EMG 1 and 3) were submitted to the Illinois State Geological Survey for radiocarbon dating. One sample revealed a date of between 1777-1800 and the other between 1814-1836 (Table 5.3). While radiocarbon dates from wood samples should be used with caution (due to "old wood" problems), these dates suggest that this road was constructed, used, and filled in during the settlement of this region by the first Euro-American settlers and further verifies its historic period association.

In addition to the morphology of the road in profile, the historic period artifacts recovered from its fills, and the radiocarbon dates, further evidence suggests that this road was used during the 19th century. In 1840 a home was built into the southern base of Mound 12 (see Chapter 4); remnants of this home and several associated structures are still visible today (see Arjona 2015). This historic road may have been associated with this homestead. In fact, an artist's rendition of the homestead (see Brink, McDonough & Co. 1881:343) actually depicts a wagon road passing in front of the house (see Figure 4.5) and leading downslope to the general area where the road remnants were uncovered in the 2014 excavations.

On the other hand, the road may have been associated with an old blockhouse or fort recorded on an early 19th-century GLO map of the area. The blockhouse was located about 2.9 km northwest of the Emerald site and appears to have generally aligned with the western part of the linear features identified in the aerial photos (Figure 5.18). Presently, the exact location of this blockhouse is unclear, though future surface surveys may eventually verify its position. An early 1800s date for this roadway is also supported by the fact that it is not aligned to the cardinal directions. The state of Illinois was divided into square or rectangular parcels in the early 1800s with the passage of the Land Ordinance of 1785, meaning that any road not oriented to the cardinal directions (along the parcel boundaries) would likely have been constructed around or before the early 1800s.

In sum, the wagon road uncovered in the 2014 excavations was likely used during the early and perhaps the mid-1800s. However, as I will explain in greater depth below, it is very possible that this road followed and destroyed an earlier pre-Columbian road or trail, perhaps remnants of the Emerald Avenue. And again, remnants of this earlier pre-Columbian road or trail may have been uncovered in East Trench 2.

CONSTRUCTION METHODS

The 2014 excavations reveal that this historic road was an informally-constructed feature that was not maintained and gradually filled by natural processes. There are four reasons for this conclusion. First, the irregular shape of the road in both plan and profile suggests that it was constructed in a haphazard manner. In other words, while the depth of the road in some places suggests that it was intentionally dug out, the digging was not an organized or meticulous endeavor. The width and depth were not uniform in any of the profiles, and in some places the road was not evident at all. Furthermore, the roadbed was not prepared or lined with cobbles, stones, gravel, or other surface pavements as might be expected for more formal historic period roads (Agbe-Davies 2013; Enders 1979; Gerhardt et al. 2012). Second, the road was not maintained. The wide, irregular depressions and occasional deep ruts visible in the profile suggest that wagons and horses traversed the road in wet, slippery conditions. There was no evidence of any attempts to repair, smooth, or improve the condition of the road through re-digging, re-leveling, or paving. Third, the numerous irregular fill zones observed in each of the profiles suggest that the road was filled in naturally over a long period of time. These fill zones are indicative of periodic rainstorms, natural slumping events, and the overall poor condition of Illinois roads in the early 19th century (see Corliss 1956). And finally, this road is discontinuous. It was not identified in every eastern trench – no trace of it was found in East Trench 4, EMG 2, or any of the excavations trenches along Midgley Neiss Road.

CONCLUSION

In sum, the 2014 investigations did confirm the presence of a linear road feature that corresponds with what Pauketat (2013a) identified as the Emerald Avenue. However, excavations revealed that the linear feature east of Mound 12 is actually a historic wagon road used by draft animals and wagons in the early 1800s. Moreover, this road was informally constructed, not maintained, and was gradually filled in by natural processes. In short, then, the feature east of Mound 12 was not the formal, pre-Columbian roadway identified by Pauketat and Porter.

Does this mean that there was no Emerald Avenue that spanned between Emerald and Cahokia? Not at all. In fact, it is possible that the linear features identified in the magnetic survey west of Mound 12 may actually be portions of the Emerald Avenue, the majority of which have been plowed or eroded away. There are several lines of evidence for this. First, it is unlikely that Euro-American settlers would have constructed a road that linked two large and unique Mississippian mound centers. Second, the earliest descriptions of the Avenue only speak of it being situated west of Mound 12 (it connected Mound 12 to Cahokia) and not to the east. The proposed Avenue east of Mound 12 was mentioned much later, first by Porter and later by Pauketat. Third, the linear features identified in the magnetic survey west of the mound are clearly not natural features. Finally, the width of these western linear features is over 100 meters, which is far wider than any early 19th-century Euro-American road. Thus, while the discontinuous nature of the linear features east of Mound 12 does indeed suggest that they represent a historic road, it is possible that the features west of Mound 12 actually represent the Emerald Avenue.

It is also possible that the Emerald Avenue existed to the east of Mound 12 and once traced the same route as the historic road uncovered in these excavations. Evidence includes a potential remnant of the Avenue uncovered in Trench 2 right next to the historic road. Perhaps most importantly, previous research has shown that historic and modern roads throughout the Midwest and Southeast followed earlier routes established by Native Americans (Boylan 1933; Corliss 1956; Koldehoff 1996, 2014; Koldehoff and Galloy 2006; Kruchten 2012; Myer 1928; Snell et al. 2013; Tanner 1989). All too often, however, remnants of the earliest versions of these thoroughfares are destroyed, leaving very little evidence behind for archaeologists to uncover. This seems to be the case east of Mound 12, especially if the Emerald Avenue was a raised linear feature of constructed fill like the Rattlesnake Causeway (see Baires 2014b). As stated in Chapter 4, erosion and modern farming practices have virtually destroyed the upper portions of the Emerald site, including some mounds, and a raised linear feature like the Emerald Avenue would have undoubtedly suffered the same fate. Thus, it is still unclear what the Emerald Avenue east of Mound 12 may have looked like in plan (if it did indeed exist), though I assume that it followed the same general trajectory as the historic-period road uncovered in the excavations. Of course, it is important to understand that the use, meaning, and affordances of any road, trail, or path of travel are never confined to a single time period or instance of use – this same route could have been vital to movement, travel, and relationships during both Mississippian and historic times and thus had numerous uses, meanings, and levels of importance (Gibson 2015, see Chapter 2).

The likely presence of the Emerald Avenue west of Mound 12 that connected Emerald and Cahokia as well as the presence of a historic wagon road east of Mound 12 and the possibility that it was constructed on top of a pre-Columbian road or route is crucial. As stated in Chapter 2, Native American pilgrimages occur along well-known trails or routes of travel. In other words, the probable presence of the Avenue is one line of evidence that Emerald was a pilgrimage center. But more importantly, the existence of the Avenue suggests that people regularly moved between Cahokia, the only city in North America, and Emerald, the largest mound center in the uplands. It denotes a deep spatial and historical tie between these two places, one that mediated relationships between pilgrims, other-worldly beings and places, and past, present, and future. In this sense, then, knowing whether the Emerald Avenue was as grandiose as other pilgrimage routes throughout the world (see Lepper 1995; Marshall 1997; Ristvet 2011, 2015; Shaw 2008; Sofaer et al. 1989; Tozzer 1941:109, 146) or merely a single path or trail is not the fundamental point. Instead, the presence of the road, regardless of its properties, shows that journeys, religious and otherwise, to and from Emerald and Cahokia occurred and were a critical part of the movements and entanglements that created Cahokia.

FIGURES AND TABLES

Figure 5.1. 1940 aerial photograph of the Emerald site, with the supposed traces of the Emerald Avenue indicated by the arrows.

Figure 5.2. Modern Google Earth image of the Emerald site. The drainage channel indicated by the arrows is believed to be remnants of the Emerald Avenue.

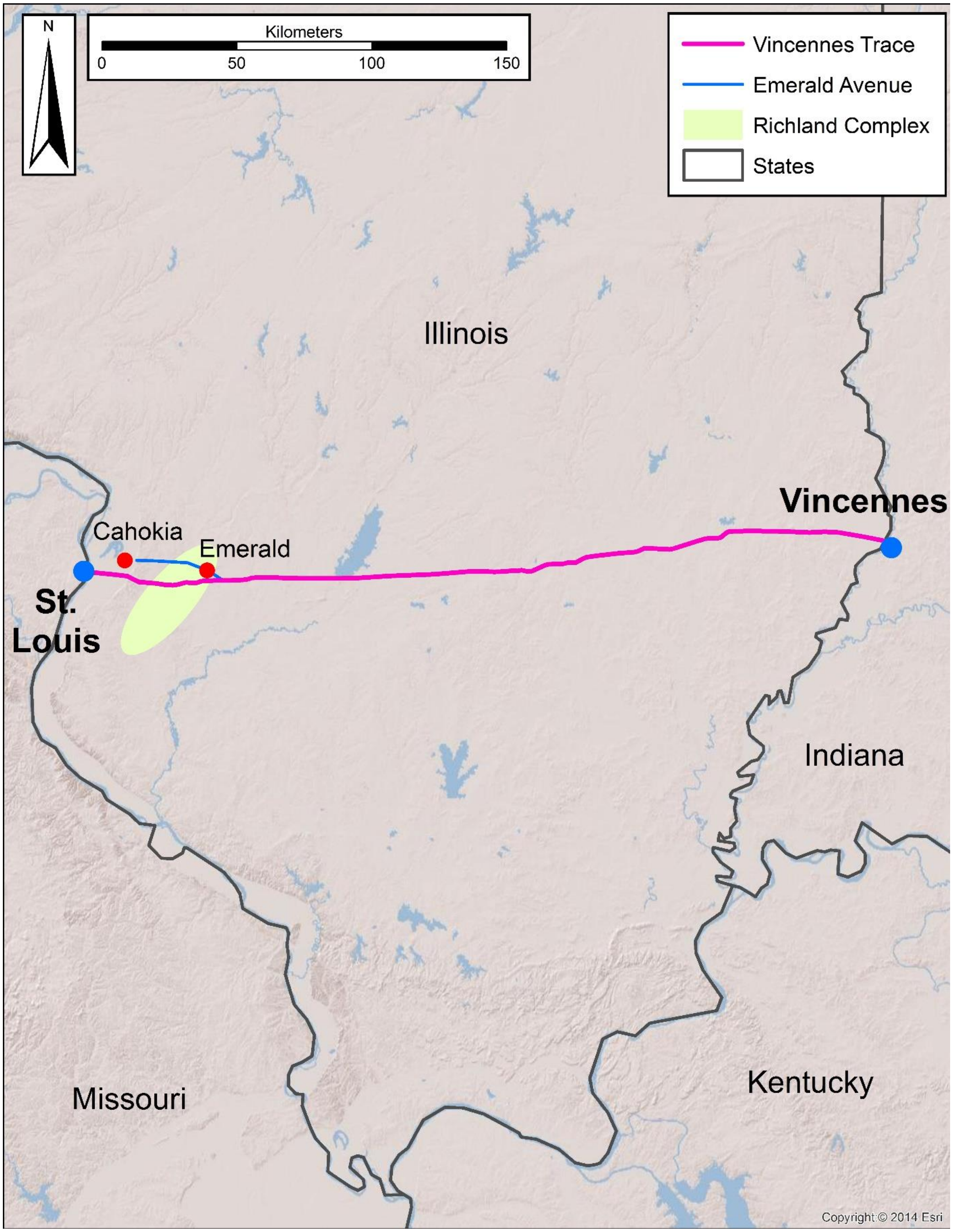

Figure 5.3. Map of the Vincennes Trace from St. Louis, Missouri, to Vincennes, Indiana. The Emerald Avenue, connecting Cahokia to Emerald, is also depicted.

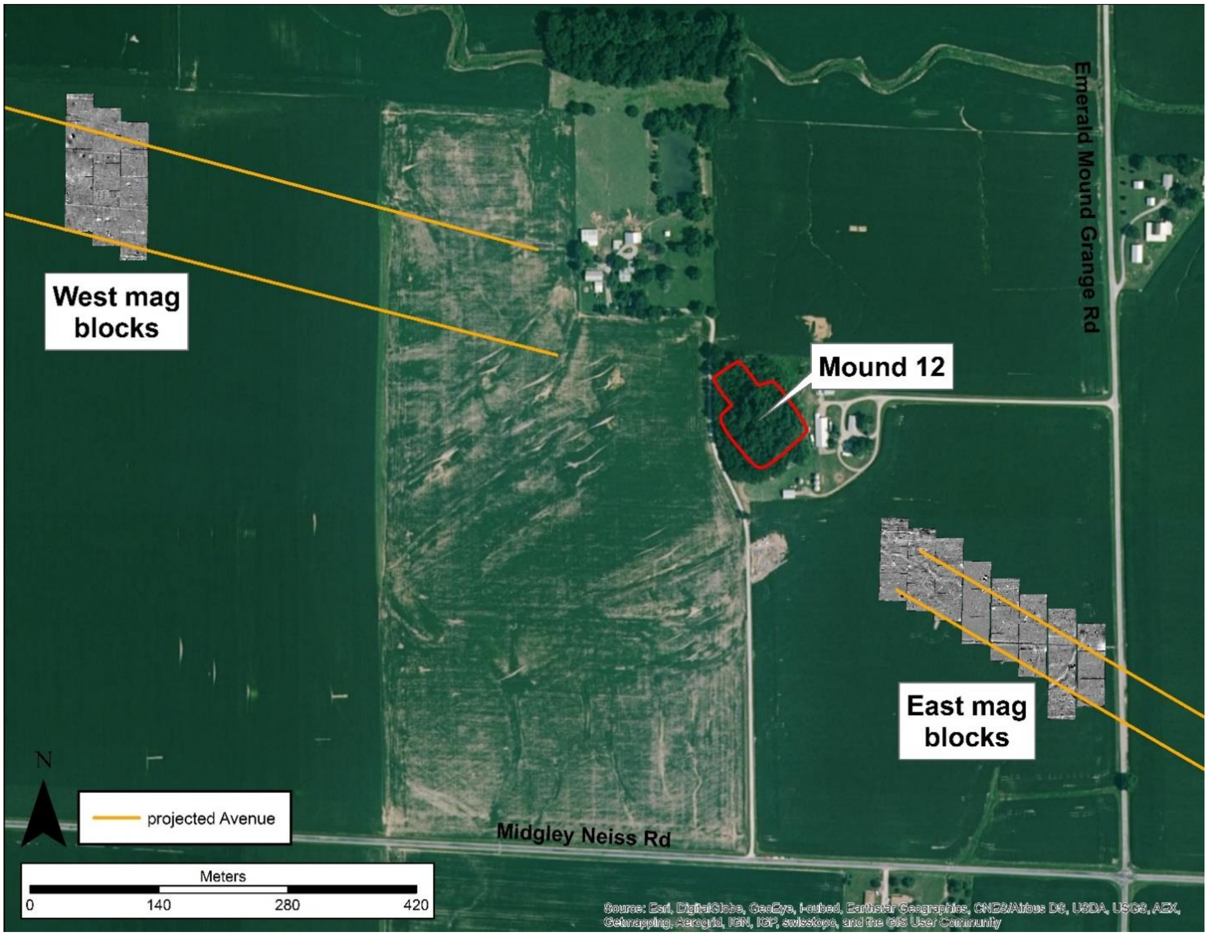

Figure 5.4. Map of the Emerald site with the locations of the 2014 magnetic survey to the east and west of Mound 12. Survey blocks are oriented to EAP grid north.

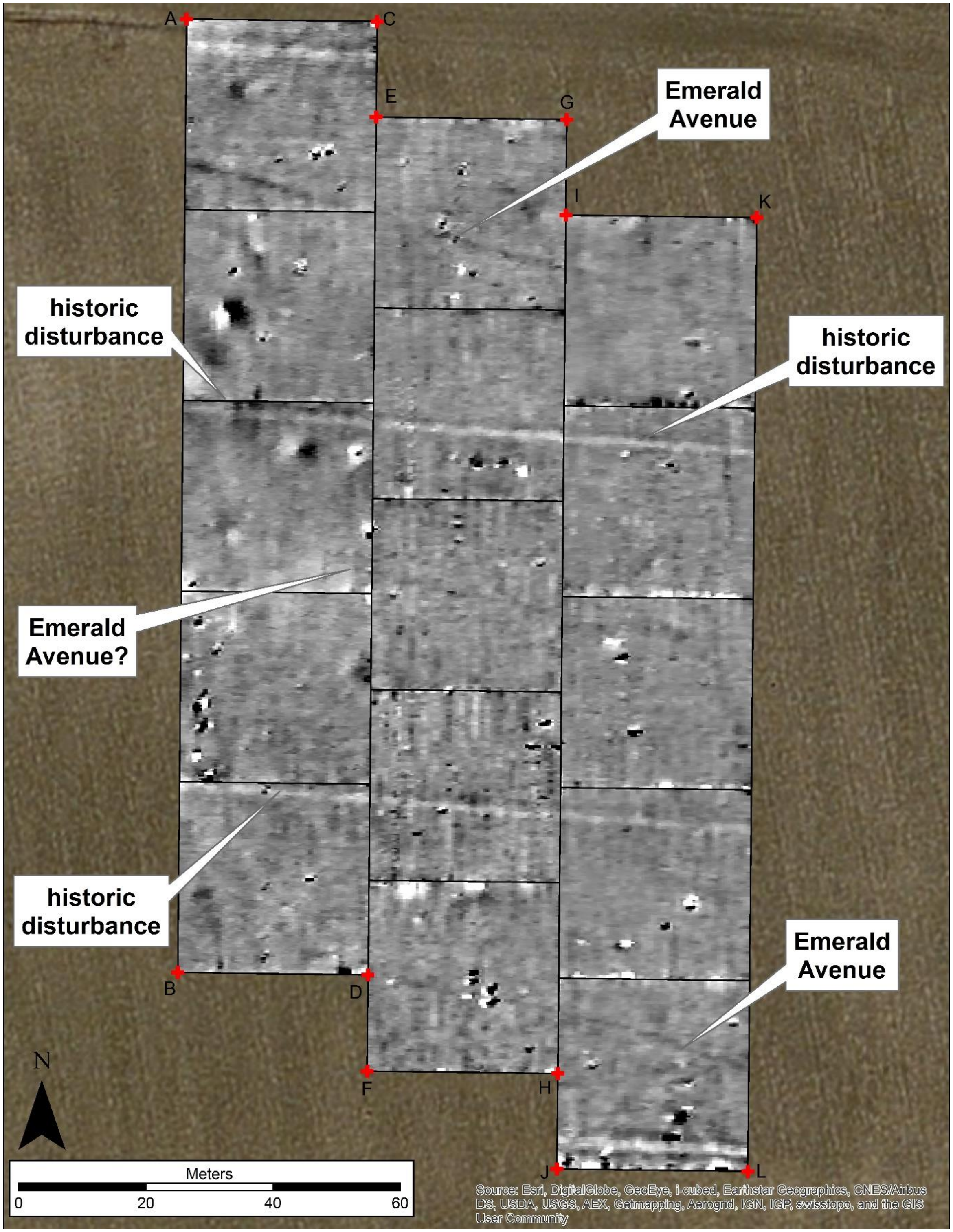

Figure 5.5. Results of the magnetic survey to the west of Mound 12, with the supposed Emerald Avenue and other anomalies indicated. Survey blocks are oriented to EAP grid north.

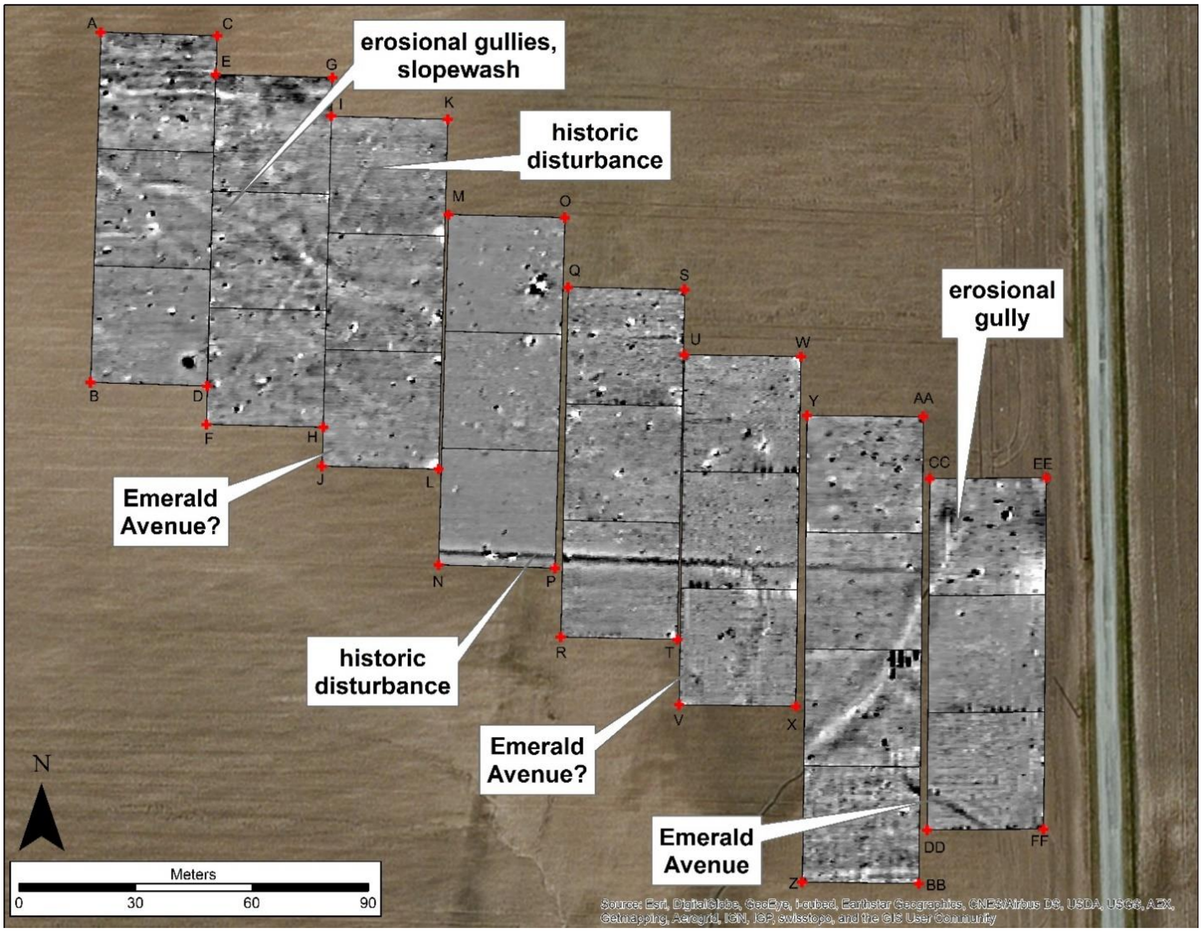

Figure 5.6. Results of the magnetic survey to the east of Mound 12, with the supposed Emerald Avenue and other anomalies mentioned in the text. Survey blocks are oriented to EAP grid north.

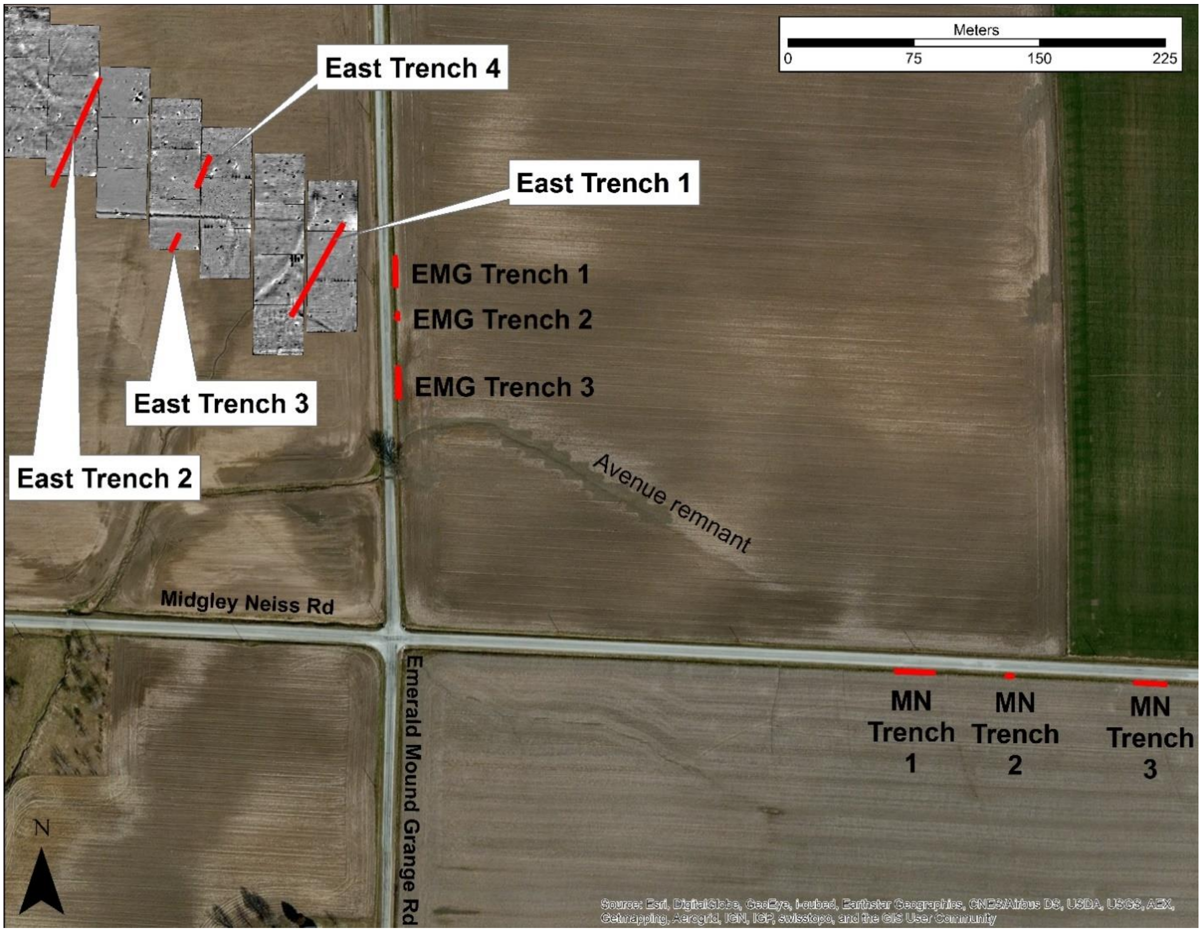

Figure 5.7. Overview of the 2014 backhoe trenches excavated into the Emerald Avenue east of Mound 12. Survey blocks and backhoe trenches are oriented to EAP grid north.

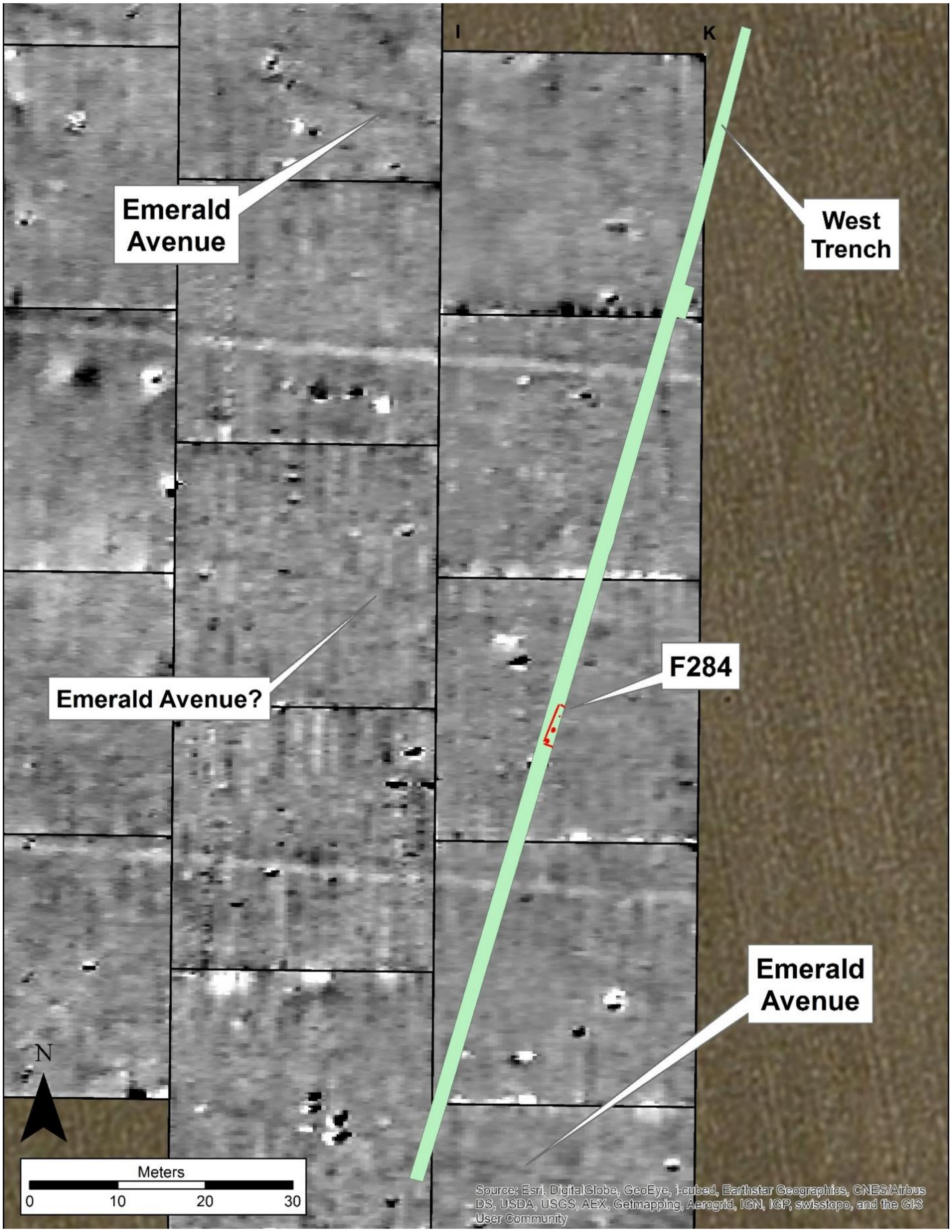

Figure 5.8. Overview of West Trench 1 with Feature 284 identified. Survey blocks, trench, and features are oriented to EAP grid north.

Figure 5.9. Plan photo of dark linear feature in the south end of East Trench 1, interpreted as a portion of a historic wagon road. View to the south.

Figure 5.10. Profile photo and map of historic wagon road in the south end of East Trench 1.

Figure 5.11. Plan photo of small feature in northern end of East Trench 2. View to the north.

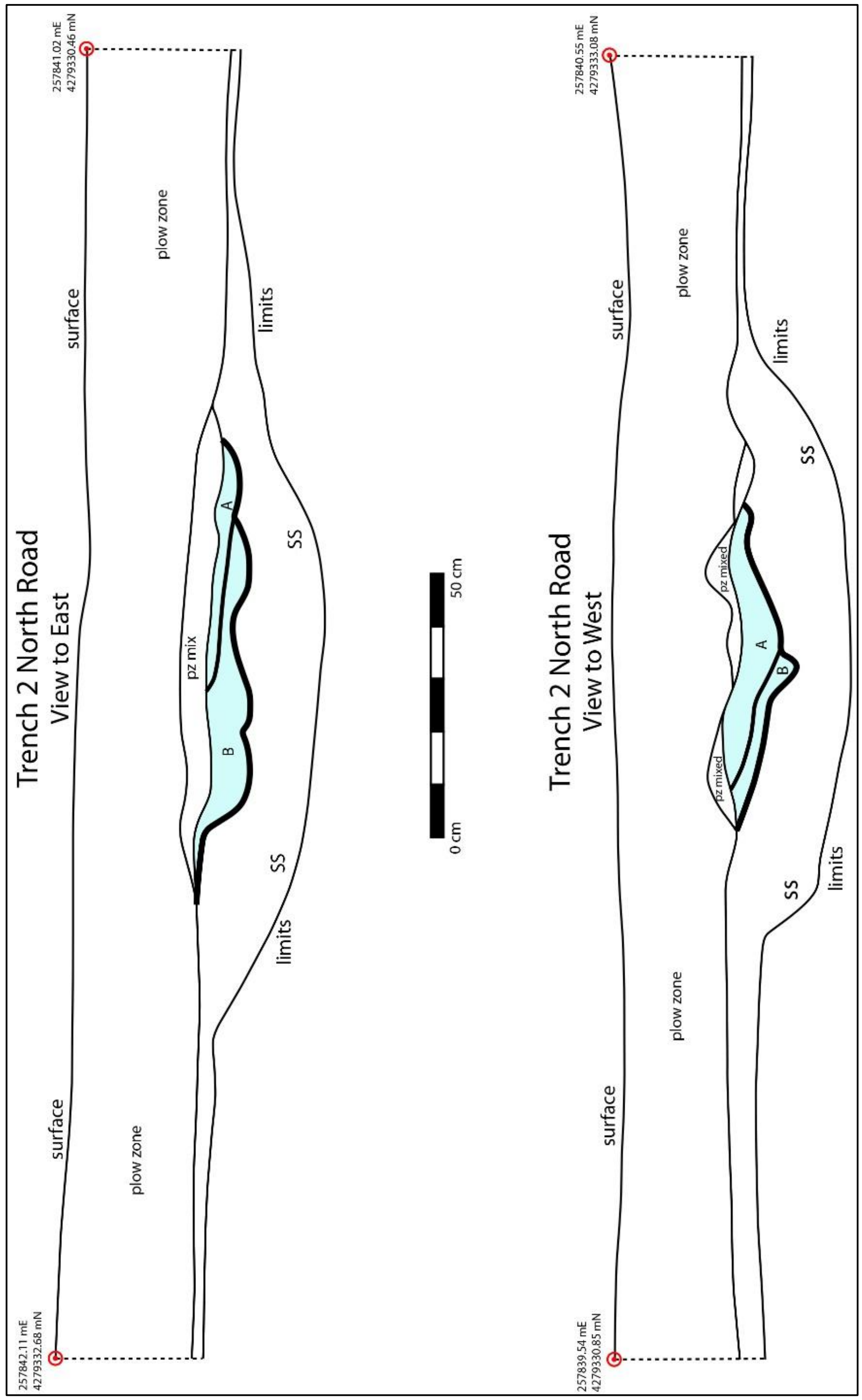

Figure 5.12. Profile map of small feature in northern end of East Trench 2.

Figure 5.13. Plan photo of two linear features in south end of East Trench 2, view to the north. The thinner of the two features contained pre-Columbian artifacts and may be a remnant of the Emerald Avenue.

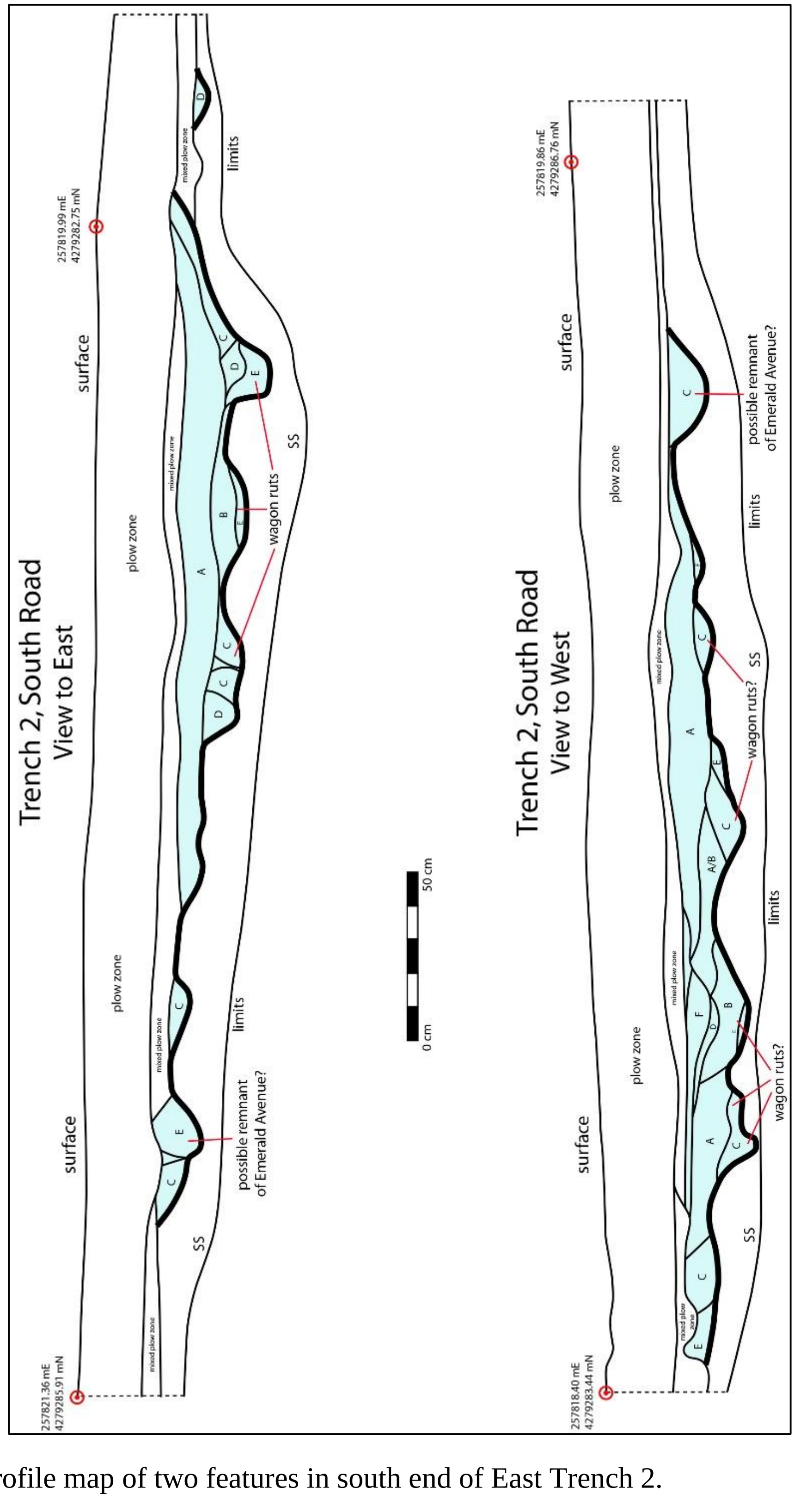

Figure 5.14. Profile map of two features in south end of East Trench 2.

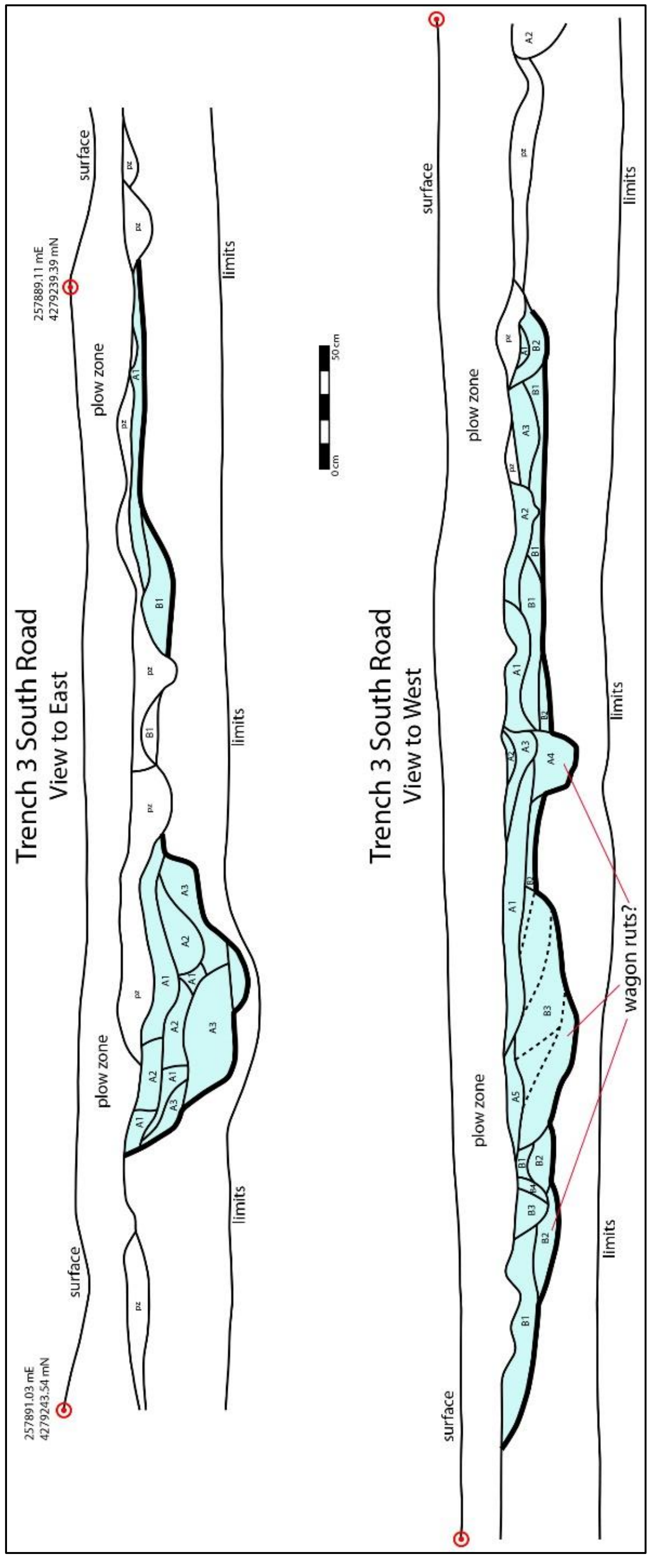

Figure 5.15. Profile map of basin-shaped feature uncovered in East Trench 3.

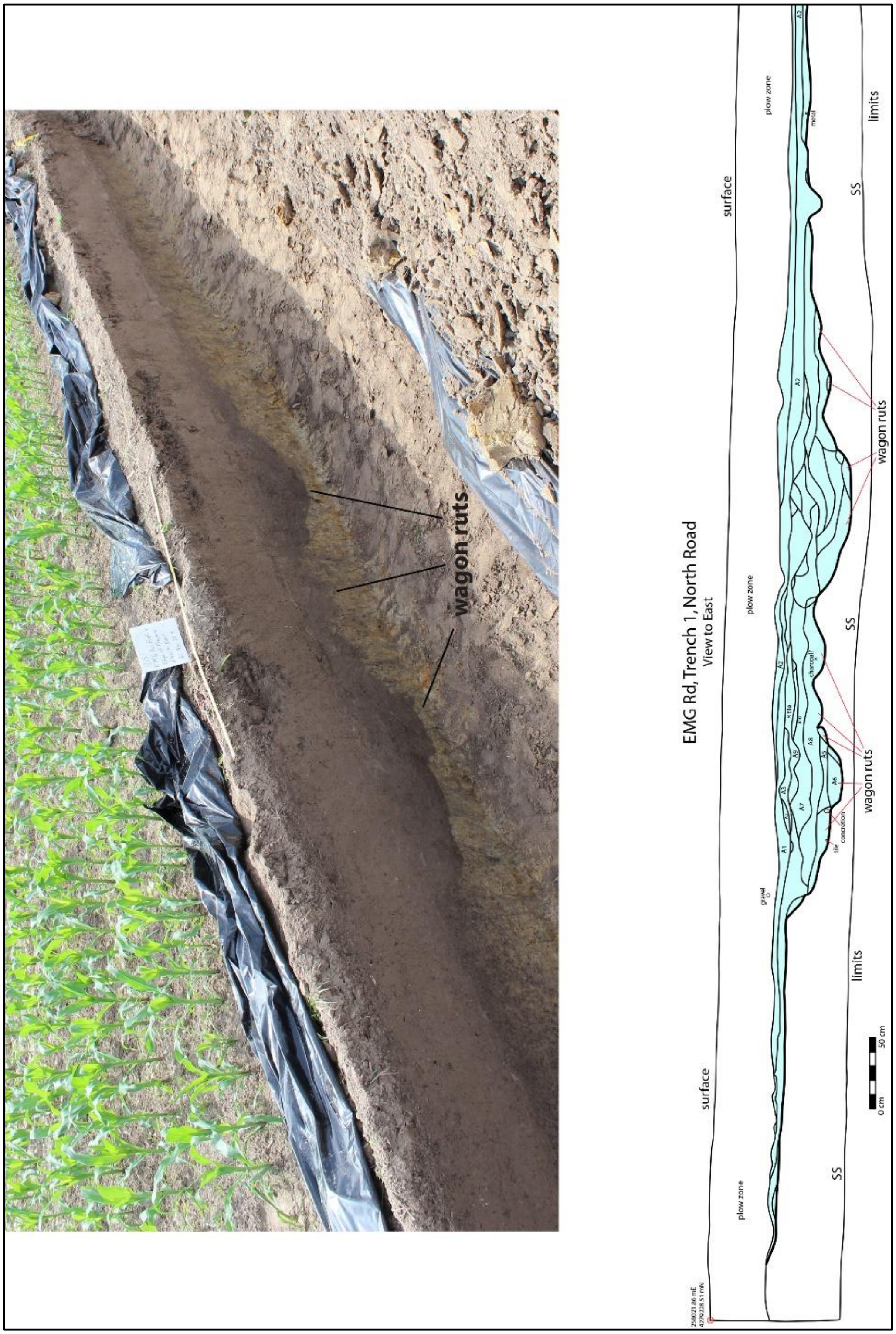

Figure 5.16. Profile photo and map of wide feature in EMG 1, interpreted as a remnant of a historic wagon road.

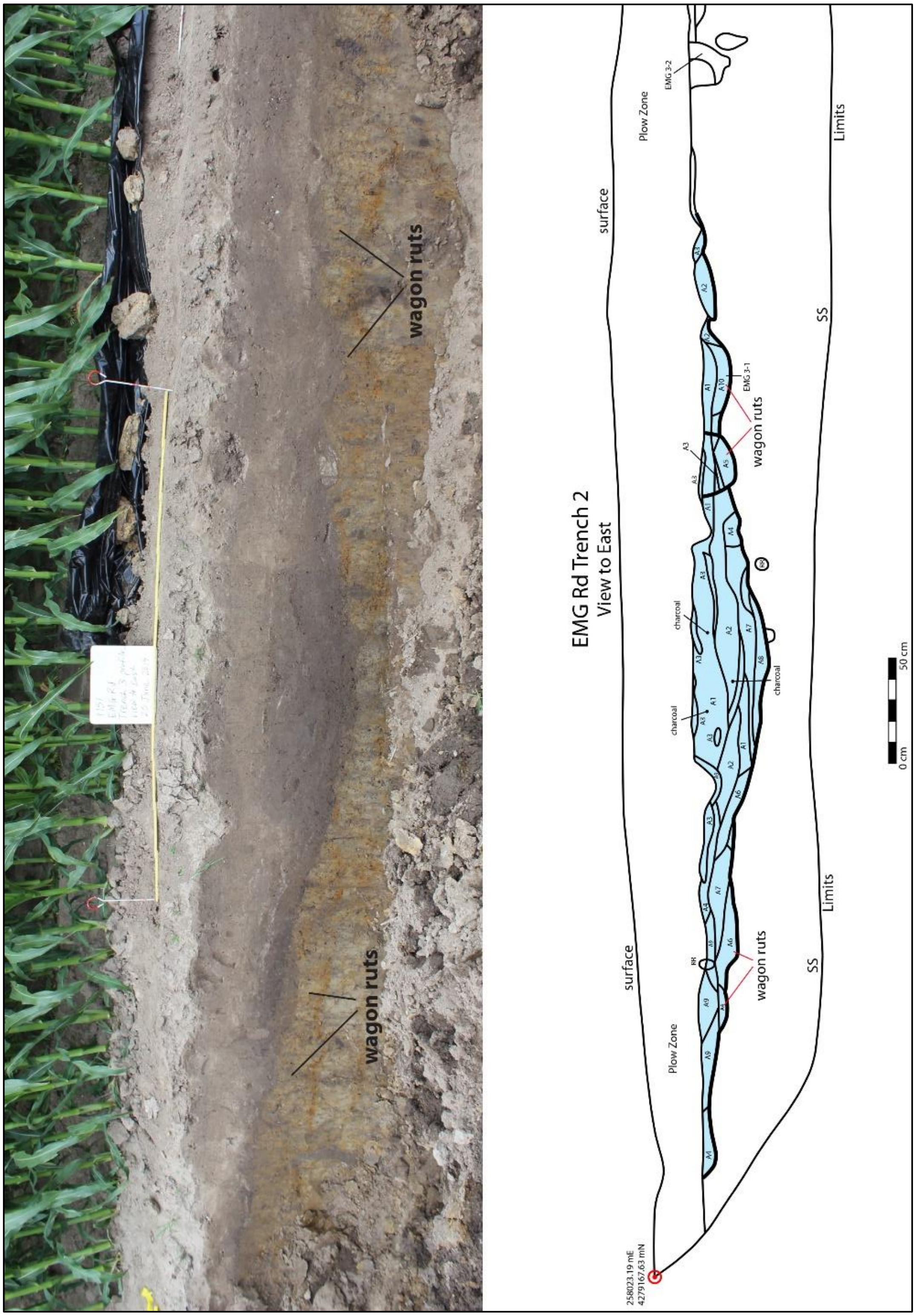

Figure 5.17. Profile photo and map of wide feature in EMG 3, interpreted as another remnant of a historic wagon road.

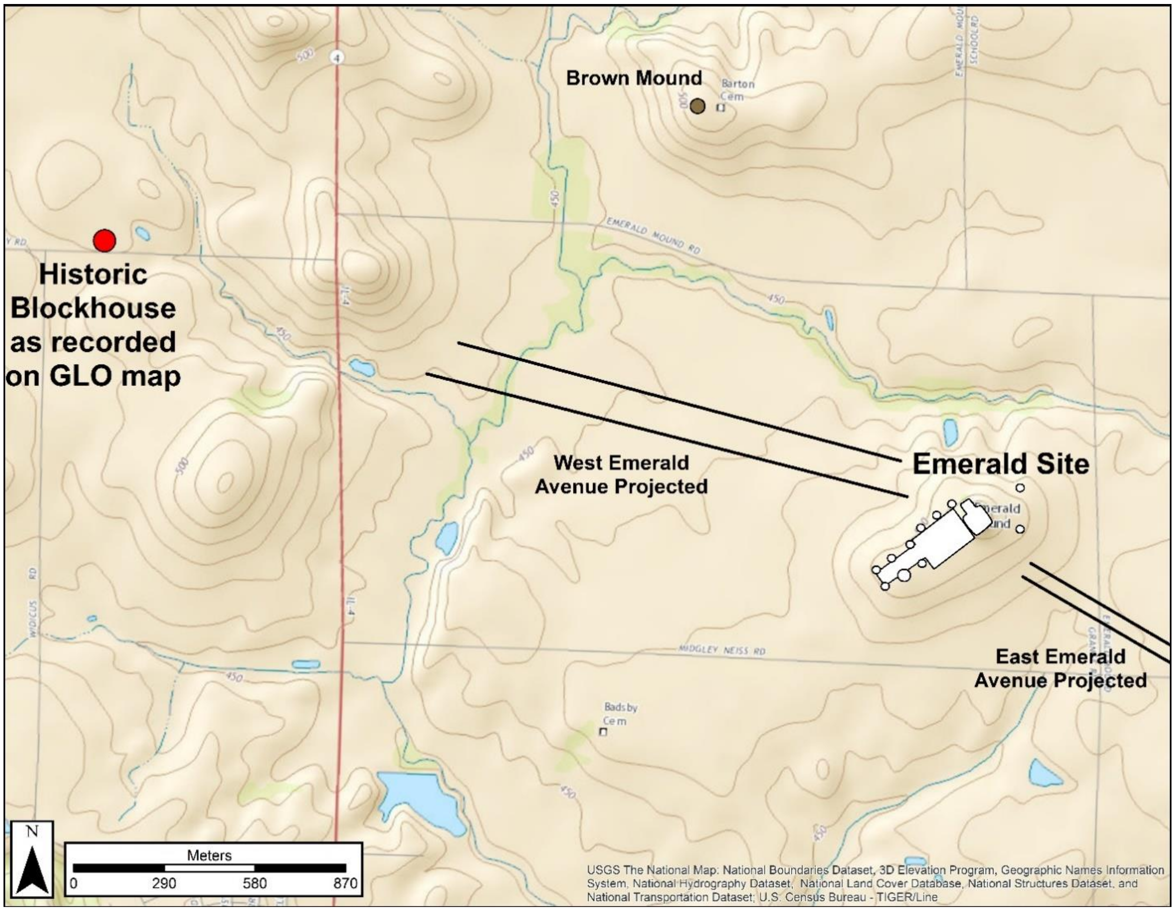

Figure 5.18. Location of a historic period blockhouse recorded on an early 19th century GLO map. Note that the Emerald Avenue generally aligns with the blockhouse.

Table 5.1. Historic Artifacts Recovered from 2014 Emerald Avenue Excavations.

Provenience	Material	No.	Wt. (g)	Comments
EMG 1	metal	3	0.6	-
EMG 1	metal	1	52.9	angled piece of metal with bolt, see Figure x for location
EMG 1	LS-chert	2	1.5	-
EMG 1, north road	metal	1	0.9	-
EMG 1, north road	brick	1	0.6	-
EMG 1, north road	concretion	1	8.5	possibly metal
EMG 3, south road	cinder	1	3.8	-
EMG 3, south road	pebble	1	1.1	-
EMG 3, south road	slate	1	0.6	-
EMG 3, south road, from wagon rut	cinder	1	0.4	-
East Trench 1, south road	ceramic	1	2.3	tile fragment
East Trench 1, south road	metal	11	6.1	-
East Trench 1, south road, south edge	metal	6	2.7	-
East Trench 2, south road, large trench	sandstone	2	8.1	mendable
East Trench 2, south road, large trench	pebbles/concretions	4	1.1	-

Table 5.2. Pre-Columbian Artifacts Recovered from 2014 Emerald Avenue Excavations.

Provenience	Material	Type	No.	Wt. (g)	Comments
East Trench 2, south end, small trench	Burlington	Flake	1	0.4	-
East Trench 2, south end, small trench	Ceramic	Sherds	3	0.7	2 clearly prehistoric, 1 may be historic

Table 5.3. Radiocarbon Dates from Historic Wagon Road.

Lab #	Sample #	Material	Context	^{14}C yr B.P.	1σ	$\delta^{13}C$	Cal. A.D. at 1σ	*p*	Cal A.D. at 2σ	*p*
ISGS A3616	CI-762	cedar wood	EMG Trench 1	200	±20	-24.4	1777-1800	0.49	1761-1804	0.49
							1662-1676	0.27	1654-1682	0.27
ISGS A3617	CI-763	cedar wood	EMG Trench 3	105	±15	-27.1	1814-1836	0.27	1810-1895	0.60
							1695-1714	0.21	1691-1729	0.29

Note: Cal A.D. derived from CALIB 7.02; see Stuiver and Reimer 1993

CHAPTER 6
SHRINES, FEASTS, AND ACTIVITIES AT THE EMERALD SITE

In this chapter I discuss my analyses of features and artifacts recovered from excavations at Emerald performed by ISAS in 1998 and 2011. I use these data to develop a detailed occupational history of this area of the site, determine the kinds of activities that took place, and infer the geographic origins of those who inhabited or visited Emerald. All of these things speak to the archaeological correlates of a pilgrimage center outlined in Chapter 2 (e.g., multiple occupations, short-term domestic structures, non-local participants, communal practices, religious architecture, and acts of remembering). These data also shed further light on the kinds of movements and entanglements that occurred at the site and how they were a key part of Cahokia's construction.

I begin this chapter with a general outline of the methods used to analyze the features, artifacts, and materials from these excavations. I then describe these data chronologically in four sections, each representing a distinct occupation in this area of the site (i.e., one for the Edelhardt phase, two for the Lohmann phase, one for the Stirling phase, and one for the Moorehead phase). Some of these data (e.g., botanical materials, faunal remains, body sherds, burnt clay artifacts, etc.) are only summarized in this chapter; the raw data itself can be found in Appendices A, B, D, and E.

METHODS OF ANALYSIS

The features and ceramic and lithic artifacts were analyzed according to standard analytical procedures used in the American Bottom (see Collins 1990; Milner 1984; Milner et al. 1984; Holley 1989; Koldehoff 1987, 1991; Pauketat 1998b, 2013c). The chronology of the features was determined primarily by ceramics and supplemented by radiocarbon dates, architectural styles, and contextual information. As discussed at length in Chapter 3, numerous changes in ceramic technology (temper type, surface treatment, and especially jar form) occurred throughout time, and these criteria were used to differentiate phases within the Mississippian period. The ceramic analysis included recording the temper type and surface treatment and measuring six continuous vessel attributes on jars: the lip protrusion (LP), lip shape (LS), rim curvature (RC), lip thickness (LT), lip bevel angle (LB), and rim angle (RA) (see Pauketat 1998b). The lip thickness (LT) was also recorded for bowls, beakers, and seed jars, and the rim curvature (RC) was recorded for seed jars (see Pauketat 1998b).

Seven radiocarbon dates were obtained from six separate features at the site (Table 6.1). These dates confirmed and in some cases refined the ceramic chronology. The one exception is a single Moorehead phase date obtained from Feature 16, which was the only evidence available to assign Feature 16 to a specific phase (see below). In addition, I refer to the TLW occupation at Emerald as an Edelhardt phase occupation because Emerald's TLW ceramic assemblage most closely resembles other Edelhardt phase ceramic assemblages throughout the region (see Alt 2002b; Emerson and Jackson 1984; Pauketat 1998b).

Architectural styles and feature associations were also used to confirm and refine some of these chronological designations. While wall trenches are a hallmark of the Mississippian period at Cahokia (Fowler and Hall 1975), single post structures were still built during the Lohmann phase outside of Cahokia, particularly at Richland Complex sites (see Alt 2001, 2002a; Milner et al. 1984; Pauketat 2003). Pauketat (2003) specifically argues that wall trench structures date no earlier than the late Lohmann phase at Richland Complex sites. Therefore, in my analysis I assumed that wall trench structures were constructed in the late Lohmann phase or later. As I will show, this corresponds well with the ceramic and radiocarbon dates obtained from these features.

Determining the length of occupation for individual structures is a key part of this project because short-term occupation is evidence of a pilgrimage center (see Chapter 2). The occupation span of each structure at Emerald was estimated using two methods: one based on structural rebuilds and the other based on ceramic refuse. Pauketat (2003) argues that, given the 50-year long Edelhardt and Lohmann phases and the presence of three or four house construction episodes during these phases at Cahokia, a typical residential building would have stood between 12.5 and 16.7 years before it was rebuilt (Pauketat 2003). Therefore, I assume that each rebuilding episode or the repair/rebuilding of a wall or walls on an Emerald structure means that the building was used for about 15 years.

Occupation span was also estimated using ceramic refuse. Specifically, I used an equation developed by Michael Schiffer (1976:60) and applied by Pauketat (1989) to household clusters in the American Bottom:

$$t = \frac{TdL}{S}$$

Td represents the minimum number of vessels (MNV) that were used when the structure was occupied, *S* is the projected number of vessels used by an average Cahokian household, and *L* is the use-life of a vessel.

The MNV from each structure was determined by tabulating the minimum number of vessels (based on the number of unique rim sherds) recovered from interior and exterior pits associated with the structure. Vessels from the basin fill of a structure are not included in the MNV. The fill and refuse in house basins was deposited after the structure was abandoned and dismantled, meaning that the vessels recovered from basins do not represent in-situ deposits from the initial occupation.

The number and types of vessels that comprised a typical Cahokian household assemblage was inferred from several Stirling-phase structures that burned with complete domestic assemblages intact on their floors (see Pauketat 1987). According to Pauketat (1987), plain cooking jars are the best vessel type to estimate occupation span because their average use-life exhibits the smallest range compared to other vessel forms. He also argued that on average 1.66 cooking jars were used by a single household (Pauketat 1989:300). Of course, this is only an estimate, as domestic vessel assemblages could vary due to inhabitants' wealth, the size of the group dwelling there, and pot replacement behaviors (see Pauketat 1989:293).

Evaluating the use-life of cooking jars is difficult due to the many factors involved in vessel breakage, such as durability, amount of use, accidents, value, and user ability (see Pauketat 1989:291). However, Pauketat (1989:Table 1) obtained three estimates of vessel use life from ethnographic examples: 0.33, 0.50, and 0.75 years. I used each in my estimates in my calculations. I assume that the range of these values reflect an accurate estimation of vessel use life.

While this is currently the best method for determining occupation span with ceramic refuse and is almost certainly more reliable than house construction estimates, it has several shortcomings. The most significant is determining what represents "normal" domestic activities at Mississippian sites. Archaeologically, seemingly every-day, quotidian activities were performed in tandem with religious activities – thus, separating domestic from religious activities is problematic (Baires and Baltus 2014; see also Fowles 2013). Furthermore, some sites (e.g., nodal sites) are clearly special and were places where religious ceremonies and communal activities regularly occurred (see Emerson 1997a). At such sites, activities and patterns of refuse disposal would almost certainly differ from, say, farmsteads or large population centers like Cahokia where these activities were not performed regularly. In sum, estimating occupation span is fraught with potential pitfalls, and this was probably the case at Emerald given its unique nature.

Another crucial part of this project is to determine the kinds of activities that took place at Emerald. As stated in Chapter 2, pilgrims often perform certain kinds of activities at pilgrimage centers, such as visiting with acquaintances, making social and/or political alliances, leaving offerings, performing ceremonies and rituals, reenacting mythical stories or narratives, and so on. If such activities were taking place at Emerald, then it is more likely that Emerald was a pilgrimage center. Furthermore, in the examples given in Chapter 2, such activities were crucial in establishing and renewing relationships between pilgrims and sacred places, other-worldly beings and powers, memories, and more. I inferred the kinds of activities that took place during each phase through the features, artifacts, and materials excavated in this area. Generally, the type, shape, size, and contents of Mississippian features (e.g., structures and pits) are indicative of their use(s), especially when compared with features from contemporaneous sites. In this case, I used the general functional designations established by other Cahokian scholars (see Alt 2006, 2013; Collins 1990; Emerson 1997a; Mehrer 1995) that were further defined by comparisons with features from other sites in the region.

Activities are also inferred by the artifacts and materials recovered from the features. The relative proportion of vessel types, the size of vessels, and use wear on vessels are linked to cooking, eating, and storage practices (see Braun 1983; Hally 1983, 1986; Hendrickson and McDonald 1983; Pauketat 1987). Therefore, I recorded the vessel type, size, and use wear on each vessel, which were then compared with other contemporaneous vessel assemblages throughout the region (see Alt 2002b; Emerson and Jackson 1984; Holley 1989; Milner 1984; Pauketat 1998b, 2013c). Similarly, the type and abundance of certain lithic tools is telling of the kinds of activities that occurred (Koldehoff 1987, 1991; Pauketat 1998b, 2013c); identifying the types of tools and their relative frequency was part of the lithic analysis. The botanical and faunal remains also shed light on the activities at Emerald. The botanical remains were analyzed by Kathryn Parker, and the faunal remains were analyzed by Steven Kuehn. While I refer to the results of the botanical and faunal remains throughout this chapter, a complete analysis and formal write-up of each data set was performed by the analysts and are included in Appendices A and B.

Inferring the geographical origins of Emerald's inhabitants is vital to evaluating whether Emerald was a pilgrimage center as well as better understanding the relationships that were made during these visits and their effects. Non-local individuals and populations are generally inferred by the presence of exotic pottery styles and vessels. As mentioned in Chapter 3, Alt, Pauketat, and others have argued that the presence of vessels with decorations and attributes of Varney Red Filmed, Yankeetown, and Coles Creek pottery at Richland Complex sites indicates that some non-local populations or individuals visited, established, and inhabited these villages (see Alt 2001, 2002a, 2002b, 2006; Pauketat 2003). Thus, I took particular care to identify and note the presence of pottery decorations and styles that match or are similar to non-local vessel styles from outside the greater Cahokia region. Non-local chert types are often used to infer the presence of non-local populations; however, nearly all of the chert artifacts recovered from Emerald came from quarries within 150 km from Cahokia such as the Crescent Hills quarries just southwest of Cahokia and the Union County quarries in southern Illinois (see Chapter 3).

These lithic procurement patterns are typical for Mississippian sites in the American Bottom region. Thus, there is no clear evidence of non-local populations at Emerald based on chert artifacts.

A number of scholars have argued that the movement and interaction of populations within the greater Cahokia region is evident through the presence of and mixes of different temper types, surface treatments, and vessel forms, particularly throughout the TLW period but also during the early Mississippian period (see Emerson 1991b; Emerson and Jackson 1984; Kelly 1991a; Pauketat 1998a, 2004). Recording the temper type, surface treatment, and vessel form was a major part of the ceramic analysis and was used to infer the presence, movement, and interaction between American Bottom populations. I also noted the presence of mixed temper types and surface treatments during the ceramic analysis, as this could be evidence of ceramic hybridization and thus non-local or diverse populations at the site (see Alt 2001, 2002a, 2006; Pauketat 2003). I noted if about 30 percent or more of the temper in a sherd differed from the primary temper type; the presence of a secondary temper was counted as an intentional additive and a potential form of hybridization (see Chapter 3). And, while I generally agree with Fortier et al.'s (2006) argument that temper types alone are not necessarily indicative of certain geographical areas, it is possible to infer geographical origin when coupling temper, vessel form, and surface treatment. Furthermore, I do believe that the distribution of certain ceramic vessel types (e.g., Monks Mound Red) suggests that they were made at particular locations and traded around the American Bottom region.

EDELHARDT PHASE (A.D. 1000-1050)

The Edelhardt phase occupation is represented by 29 features (five single post structures, one possible single post structure, 19 internal pits, one external pit, two hearths, one post mold), ceramic and lithic artifacts, and botanical and faunal remains (Table 6.2; see also Appendices A, B, D, and E). The 29 features date to the latter half of the Edelhardt phase. This assumption is based on the lower than normal average LP index of jar rims (see below) and four radiocarbon dates from Edelhardt phase contexts (see Table 6.1). Edelhardt features were identified on both sides of Emerald's ridge in Excavation Trenches (ET) 1 and 5 (Figure 6.1). In terms of numbers of features, the Edelhardt phase is the best represented occupation in this area.

The five Edelhardt phase structures are rectangular in shape, have basins or remnants of basins, and were constructed using single posts (Figures 6.2 and 6.3, Table. 6.3). Feature 25 was rebuilt once, with its rebuild was shifted to the southwest of the original structure (Figure 6.4). Feature 18 was burned, indicated by the presence of charred wood poles on its floor and charcoal in a number of its post molds. Feature 19 represents a series of post molds situated right next to Feature 18. Feature 19's post molds either belong to a structure that was not fully defined in the field or perhaps supported interior support posts for Feature 15 (a Lohmann phase structure) (see Table 6.3). Feature 20 contains numerous small pits along its interior walls (Figure 6.5). Feature 4, located in EB 1, is the largest of the Edelhardt structures and exhibits a hearth or, more accurately, a burned area on its floor that apparently did not consume the entire structure. I suspect that some, if not most, of these structures are contemporaneous, though there is no definitive evidence of this (e.g., crossmended ceramic or lithic artifacts). Similarly, there is no evidence that these structures are situated around a courtyard, as is common at other Edelhardt phase sites (see Chapter 3). However, most of Emerald's structures are aligned to within 10 degrees of the Emerald Axis (53 degrees of azimuth); Feature 4, which is 70 degrees of azimuth, deviates the most (see Figure 6.3; see also Pauketat 2013a:Table 7.12). Thus, while these structures were probably not organized around a plaza, they were clearly aligned to a similar orientation that conformed to Emerald's natural landscape (see Chapter 4).

The average floor area of these structures is 9.92 m^2, with a range from 7.60 to 11.20 m^2 (see Table 6.3). While they fall within the size range of other Edelhardt phase structures throughout the American Bottom region, they are slightly larger than TLW structures at Cahokia and BBB Motor but smaller than those at Knoebel (Figure 6.6). Additionally, with an average width to length ratio of 0.74, they are more square-shaped than Edelhardt structures at Cahokia and BBB Motor but similar to those at Knoebel (Figure 6.7). In short, the size, shape, and organization of these structures clearly differs from other Edelhardt phase sites in the American Bottom region.

The storage practices of this occupation are unique. Of the 20 Edelhardt phase pits at Emerald (Table 6.4), only one of these, Feature 22, is an external storage pit (see Figures 6.2 and 6.4). This is atypical for Edelhardt phase sites, as most have at least one external storage pit per structure (see Alt 2002b; Emerson and Jackson 1984; Pauketat 1998b). Of the 19 Edelhardt phase internal pits present at Emerald, 18 are situated within two features – 12 pits are in Feature 20 and six are in Feature 25 (see Figures 6.4 and 6.5). Notably, these pits are evenly spaced along the interior walls and in corners of these structures. And, with an average volume of 0.058 m^3 (see Table 6.4), they are much smaller than most Edelhardt internal pits (Emerson and Jackson 1984:148; see also Pauketat 1998b:Table 6.4). Due to their size and placement, I believe these are cache pits used to store small, special items or materials. Most of the pits in Feature 20, in fact, contained a dozen pieces of chert debitage at their bottom – additionally, one contained a complete projectile point and hoe, another exhibited a celt, and another a sandstone abrader

(Figures 6.8 and 6.10). Similarly, some of the internal cache pits in Feature 25 contained lithic tools, cores, and debitage. Apparently these lithic artifacts were deposited in these pits as an offering before the pits were backfilled. Feature 17 is the only large interior storage pit due to its rectangular shape and large volume (1.386 m^3). This pit, which takes up most of the floor space in Feature 18, is surrounded by a series of interior post molds that are either an earlier version of Feature 18 or supports for an internal bench in Feature 18 (see Figure 6.5). When compared to other Edelhardt phase sites, Emerald has a high pit to structure ratio (23:6 compared to 7:9 at Knoebel and 5:4 at Cahokia). However, when dividing the total pit volume by the total structure floor area, proportionally Emerald has about the same amount of storage space as the contemporaneous settlement at Cahokia (Emerald = 0.06, Cahokia EM3 = 0.06) (see Alt 2002b; Pauketat 1998b). It simply took three times as many pits to attain the same amount of storage space.

I contend that the size and shape of Emerald's structures and the deviant storage practices is due to the special nature of the Edelhardt phase occupation. Features 20 and 25 are akin to what Susan Alt (2013) has called "shrine houses," or small, semi-subterranean, rectangular buildings with colored floors and internal cache pits – these structures were a major part of the religious ceremonies performed at Emerald (see also Alt and Pauketat 2015; Pauketat and Alt 2015). I interpret Feature 18 as a special storage structure given its smaller size, square shape, and association with Feature 17, a large internal storage pit. Feature 4 may have been a temple or special elite structure due to its larger size, lack of internal features, and the widespread burning directly on its floor (this burning event is designated as Feature 6, a hearth, see Table 6.5). The Edelhardt phase occupation, in a word, is made up primarily of special ceremonial architecture.

Some of the refuse recovered from these features also suggests that the features were part of large feasts and other ceremonial activities. Masses of maygrass seeds, along with smaller but still significant numbers of chenopod, erect knotweed, and little barley seeds, were found within all the Edelhardt phase features analyzed for botanical remains (Appendix A). These seeds were especially prevalent within several interior pits (Features 17, 42, and 44), which suggests that these plants were consumed in large quantities within the structures and in the surrounding area (probably the plaza). Importantly, an abundance of seeds was recovered from the basins of three specific Edelhardt structures (Features 4, 18, and 20). Apparently, at the end of the feasts, these structures were dismantled and food refuse was dumped in the basins in a single episode, perhaps as part of a termination ceremony. The abundance and variety of pottery vessels and lithic artifacts recovered from these fills (particularly from Feature 20) suggests that the vessels and tools used during these feasts were also discarded with the food refuse.

Other special materials and objects were used during these feasts. Fragments of red cedar wood were recovered from several of Feature 20's internal pits and within a cluster of burned material on the floor of Feature 18. Red cedar wood is well-known for its use in religious ceremonies and sacred bundles (see Appendix A). Morning glory seeds were also recovered from the external storage pit and the burned area on the floor of Feature 18. Morning glory is known as a purgative and for its possible hallucinogenic properties when drunk as an infusion; it is found in ceremonial contexts throughout the American Bottom region (see Appendix A). The presence of red cedar and morning glory remains on structure floors and in interior pits suggests that they were used inside the structures. They were also used outside these structures, probably in the plaza, in conjunction with feasting events, after which they were dumped into the abandoned structure basins with the rest of the feasting debris.

Clay objects were also frequently used during these events (Table 6.6). Clay objects are fragments of deliberately shaped, fired lumps of clay that exhibit at least one smooth surface and occasionally shallow incisions on them (Figure 6.11). Similar clay objects were also recovered from the Pfeffer site, another shrine and potential pilgrimage center just south of Emerald (Timothy Pauketat, personal communication 2013) and the Grossmann site, a Cahokian administrative center in the Richland Complex (Alt 2006). While some of the clay objects at Grossmann may have been used as heating elements (Alt 2006:168, 175-176), many were used as temporary jar covers or stoppers that were broken open to reveal the contents of the jars (Susan Alt, personal communication, 2016). Since many of the clay objects at Emerald resemble the clay objects from Grossmann, and I assume they too were used as jar covers. The presence of these objects makes sense in this context – covered jars of food and liquids were carried to the site and were then broken open to retrieve their contents during the feasts. The best examples of these clay objects were recovered from the basin of Features 18 and 20 and their associated internal pits (see Table. 6.6, see Figure 6.11).

Some Edelhardt phase features and refuse at Emerald are more similar to typical features and refuse excavated from Edelhardt phase villages and farmsteads throughout the American Bottom region. The size and shape of two potential Edelhardt-phase structures at Emerald, Features 7 and 57, are comparable to other Edelhardt residences in the region; additionally, both have an internal storage pit (Table 6.7; Figures 6.12 and 6.13). Several of the Edelhardt-Lohmann external storage pits may actually date to the Edelhardt phase; as stated earlier, the presence of numerous external storage pits is common at other Edelhardt residential sites throughout the region (Table 6.8; see Figures 6.12 and 6.13). The few hammerstones, small cores and abraders, the presence of utilized/retouched flakes, and the lack of formal chipped stone tools and bifacial thinning flakes indicate a reliance on expedient flake tool technology for general cutting and scraping tasks (Tables 6.9 and 6.10) (see Koldehoff 1987). The three formal stone tools (a celt, hoe, and projectile point), mentioned earlier, were offerings placed in two of Feature 20's internal cache pits (see Table 6.10). However, the chert procurement patterns at Emerald are unlike other Edelhardt phase sites throughout the region. Ste. Genevieve chert makes up a very small proportion of total chert recovered (Table 6.11; see also Table 6.10) (Kelly 1980; Koldehoff 1991). Instead, Burlington chert is the most common type, followed by Mill Creek, which makes up about 40 percent of the total percentage by weight (Figure 6.14). While much of this percentage is due to a complete Mill Creek hoe recovered from Feature 45 (see Table 6.10), this is still the largest relative percentage of Mill Creek chert recovered from any Edelhardt phase site in the greater Cahokia region (see Figure 6.14). Moreover, hoe flakes make up about six percent of Emerald's chert debitage assemblage (see Table 6.11) (compare to Alt 2002b:115; Pauketat 1998b). The large proportion of Mill Creek chert and the presence of hoe flakes suggests that there were many digging tools at Emerald, probably used to tend and cultivate the seed grains used in the feasts. It is also possible that these tools were used for digging earth during landscape modification or mound construction (e.g., the preparation of Mound 12's construction, see Chapter 4), though there is no direct evidence of this (see Chapter 4).

The type and proportion of pottery vessels is similar to other sites in the region (Figure 6.15). Jars make up the vast majority of the assemblage (n = 61), followed by bowls (n = 9), seed jars (n = 7), stumpware (n = 3), beakers (n = 2), and a single funnel (Tables 6.12 through 6.14) (see Figures 6.16 through 6.18 for all Edelhardt phase rim profiles). Like most vessel assemblages throughout the region, the majority of Emerald's Edelhardt phase vessels are made from grit, grog, or shell temper, while only a few exhibit limestone temper; additionally, most have plain surfaces, though a few are cordmarked or slipped (see Tables 6.12 through 6.14). Soot or some form of thermal use-wear is visible on 40 percent of the jars, which suggests that these vessels were sometimes used for cooking (see Tables 6.12). Given the presence of a few stumpware vessels and funnels with lye residue, some lye was made at the site (see Table 6.14; Benchley 2003). While the proportion of vessel types and their characteristics are typical to other Edelhardt phase vessel assemblages, the size of the jars and bowls are not. For instance, Figure 6.19 shows that on average Emerald's jars are smaller, ranging between 11 and 20 cm, though one jar is unusually large. The bowls are also smaller overall, and it is clear that two distinct bowl sizes were preferred at Emerald – one between 15 and 20 cm, and another just over 30 cm (Figure 6.20). In contrast to other Edelhardt bowl assemblages, no large bowls are present at Emerald. Thus, these data suggest that smaller jars and bowls were used more regularly at the Emerald site. This was likely due to the type or amount of food, liquid, or materials stored, transported, or cooked in these jars. These vessels, along with the abundance of clay objects, suggest that smaller jars containing special foods and substances were carried to the site, where their clay seals were broken and their contents consumed or cooked as part of great feasts. The small size of the jars also indicates that there was little need for large, long-term storage or cooking jars at Emerald at this time.

The Edelhardt phase occupation was short-lived. Occupation span estimates of each Edelhardt phase structure were calculated using structure rebuilds and ceramic refuse. Table 6.15 includes the estimates based on structure rebuilds. Most Edelhardt phase structures were never rebuilt, meaning they were occupied for less than 15 years. However, Feature 25, one of the temples, was rebuilt once, which suggests that it was occupied for longer (see Figure 6.4). But since the position of the Feature 25 rebuild shifted substantially, it is possible that the original Feature 25 was abandoned for a time before it was rebuilt. In other words, this rebuild may be evidence of a limited, second Edelhardt phase occupation.

Occupation span estimates using ceramic refuse tells a similar but more refined story. To show how jars were divvied up between individual structures within a particular phase, Table 6.16 includes each structure and what I believe were their associated interior and exterior pits. The vessels recovered from these pits were used to calculate the estimate for their associated structure. As stated earlier, these calculations are likely problematic because many of the structures at Emerald are shrines, temples, and storage structures. In other words, jar use, breakage, and disposal at Emerald were likely very different from other contemporaneous habitation sites. More specifically, the majority of the jars from Edelhardt contexts (especially those recovered from Feature 20's basin fill) were likely deposited *en masse* after large feasts.

The estimates based on ceramic refuse are included in Table 6.17. They reveal even shorter occupation span estimates than the structure rebuilds. As Table. 6.17 shows, Features 4 and 20 were occupied for between one half year to two and a half years; Feature 18 may have been occupied for slightly longer, possibly up to three years. Feature 25 was occupied for less than a year. Of course, the other features assigned to the Edelhardt-Lohmann phase may actually date to the Edelhardt phase (e.g., Features 7 and 57), and combining these features and the vessels recovered from them would alter these estimates (Table. 6.18; see also Tables 6.7 and 6.8, Figure 6.21). Based on the available data, most of the Edelhardt phase structures (Features 4, 20, 25, and possibly 7 and 57) were built and used for a short period of time, probably in association with these short-term feasting events. Given the length of major feasting events recorded in ethnohistoric records, I suspect that this Edelhardt occupation and associated feast lasted a few days and perhaps a few weeks at the most.

There is evidence that at least some of the Edelhardt phase inhabitants or visitors at Emerald came from more distant regions, particularly southern Indiana and the lower Mississippi River Valley. For instance, the presence of a single rim castellation from a Yankeetown jar and two Coles Creek Incised beakers were recovered from Features 18, 20, and 44 (Figure 6.22). Yankeetown pottery was manufactured in southern Indiana and Coles Creek Incised pottery in the lower Mississippi River Valley (see Blasingham 1953; Phillips et al. 1951; Redmond 1988, 1990). The Yankeetown jar at Emerald, however, was a local imitation, as it was made with shell temper and paste derived from local clays. On the other hand, the fine grog temper and dark gray paste of the two Coles Creek Incised vessels suggest that they were made in the southern Mississippi River Valley and traded or brought to Emerald. While the presence of such exotic vessels and styles at Edelhardt phase sites in the region is common, the presence of these vessels at Emerald is particularly important. Their presence implies that at least a few individuals from these distant regions came to, witnessed, or participated in the communal events that occurred at Emerald. The Coles Creek beakers, probably containing special substances, may have been offerings or gifts during these events. The manufacture of a Yankeetown style jar, potentially at Emerald itself, suggests that someone heavily influenced by pottery manufacturing techniques from southern Indiana was present at the Emerald site. Additionally, two incised sherds, possibly from non-local vessels, are present in the assemblage, though their origins are unknown (see Figure 6.22).

A substantial number of Emerald's Edelhardt phase visitors came from the lower Illinois Valley. Just under half (44%) of the jars are tempered with grit, which is extremely high compared to other Edelhardt phase sites in the region (see Figure 6.23). Moreover, 10 of these jars have flat rims, four have notched rims, and one has a rim node (see Figures 6.16 and 6.17). The temper and forms of these jars strongly resemble jars recovered from the lower Illinois Valley sites (see Farnsworth et al. 1991; Studenmund 2000). The abundance of grit-tempered vessels at any Edelhardt site in the region is rare – at Emerald, this implies that these vessels were made in the lower Illinois Valley and brought to the site by pilgrims from this region.

Many of Emerald's Edelhardt phase visitors came from other places in the American Bottom, particularly Cahokia. Twenty-four percent of the Edelhardt vessels exhibit shell temper, which is somewhat similar to the percentage of shell-tempered vessels at Cahokia; this percentage is higher than at BBB Motor and Knoebel. Many of these shell-tempered vessels appear similar in form to TLW-early Lohmann jar forms found at Cahokia. However, there are far fewer grog tempered vessels (22% of the total vessel assemblage) at Emerald than at any other contemporaneous site, especially Cahokia; there are also fewer limestone tempered vessels at Emerald. The prevalence of shell-tempered vessels suggests that at least some of Emerald's visitors came from Cahokia itself, though the lack of grog-tempered vessels suggest that only certain groups or populations from Cahokia visited Emerald.

There is also evidence that people from other places throughout the American Bottom region visited Emerald. Two of the jars were made from Madison County Shale paste (and possibly more based on a number of body sherds made from Madison County Shale paste, see Appendix D), presumably obtained north of modern day St. Louis (see Porter 1963) (see Table 6.12). Also, the presence of three Monks Mound Red vessels (two seed jars and a bowl) suggests contact with or movement of southern American Bottom populations to Emerald (see Table 6.13). Interestingly, there are fewer Monks Mound Red vessels and body sherds at Emerald than at other Edelhardt phase sites, meaning that these contacts or visits were minimal compared to other sites (see Alt 2002b; Emerson and Jackson 1984; Pauketat 1998b).

The rim shape of jars from Emerald's jar assemblage differs from other Edelhardt phase sites in the region. The rim shapes of Emerald's Edelhardt phase jars are extremely diverse, as is typical for Edelhardt phase jars at other sites in the American Bottom region (see Alt 2002b; Emerson and Jackson 1984; Pauketat 1998b). However, the average LP index for these vessels (0.68) is low compared to other Edelhardt jar assemblages, which ranges between 0.74 and 1.00 (Figure 6.24). Furthermore, when comparing the LP indices of jars from different sites, Emerald's jars are more evenly distributed compared to other sites that are skewed toward 1.00 (see Figure 6.24). Furthermore, the average RC measurement is 0.09, which is slightly higher than those found at Cahokia and other sites (Figure 6.25). Clearly, the Edelhardt jar rim shapes at Emerald are different from Cahokia and other surrounding sites. While this may be in part because this assemblage dates to the second half of the Edelhardt phase and the jars would be more morphologically similar to Lohmann phase jars, these patterns are not evident in other assemblages that date to the same time, such as Tract 15A's EM3 subphase (Pauketat 1998b:52).

Overall, the ceramic evidence suggests that people from the greater Cahokia region, lower Illinois Valley, and more distant populations to the east and south visited Emerald during the Edelhardt phase occupation. Evidence includes shell-tempered pottery brought by certain populations or social/family groups from Cahokia, grit-tempered jars brought by people from the lower Illinois Valley, and variable jar forms which suggest the presence of heterogeneous populations throughout the region. The presence of Yankeetown and Coles Creek vessels is evidence for more distant contacts from the south and east, though these contacts were likely minimal – most of Emerald's visitors at this time and in this area, at least in terms of ceramic evidence, came from the lower Illinois Valley and Cahokia.

LOHMANN PHASE (A.D. 1050-1100)

The Lohmann phase is represented by 16 features, including five structures, five exterior pits, five interior pits, and a single burial. Ceramic and lithic refuse and botanical and faunal material was recovered from these features as well (see Table 6.2, Appendices A, B, D, and E). Based on ceramic evidence, radiocarbon dates, and architectural styles, there are likely two distinct Lohmann phase occupations, one in the early Lohmann phase (ca. A.D. 1050) and another in the late Lohmann phase (ca. A.D. 1080-1090) (see Table 6.1). Lohmann features lined the edges of the ridge – they were identified in ETs 1, 3, and 5 as well as EBs 4 and 9 (Figure 6.26). Based on this data, Lohmann phase features are the most widespread across the site compared to other occupations. Most of the Lohmann features, however, are concentrated in ET 5.

I was able to determine the shape, size, and construction style of three of the five structures (Table 6.19). These structures are rectangular in shape and have basins (Figure 6.27). Features 14 and 61 were constructed using single posts and Feature 15 was constructed using wall trenches. Feature 23 upper, one of the structures that was only partially excavated, also exhibits a basin and was constructed using wall trenches. Feature 64, identified in the profile of EB 4 (see Figure 4.32), also exhibits a deep basin, but the construction shape, style, and size is unclear. The mix of single post and wall trench construction styles is typical for Lohmann phase upland sites and most likely indicates a chronological division between the early and late Lohmann phase (Pauketat 2003). At Emerald, the earlier occupation is represented by Feature

61, one of the single-post structures. Feature 14, the single post storage structure, may also date to the early Lohmann phase, though single post storage structures are known to date as late as the Stirling phase (see Pauketat 2005b). As argued in Chapter 4, Feature 64 also dates to the early Lohmann phase, as Mound 7 was likely constructed as part of the construction explosion at Emerald around A.D. 1050. It is unclear whether these features were contemporaneous, though I suspect they were based on their spacing. The later occupation is represented by Features 15 and 23 upper, which were both built using wall trenches. A radiocarbon date from Feature 54, one of Feature 15's internal pits, yielded a late Lohmann date that confirms a later occupation, placing it around A.D. 1080 to 1090 (see Table 6.1). While it is very likely that Features 15 and 23 upper were contemporaneous, there is no direct evidence of this (e.g., artifact crossmends).

There is no evidence that the structures of either Lohmann occupation were organized around a courtyard, the standard Lohmann phase settlement organization in the uplands. Instead, the Lohmann phase structures were all oriented between 40 to 52 degrees of azimuth, or within about 10 degrees of the Emerald Axis (see Table 6.19). Furthermore, both of the late Lohmann structures, Features 15 and 23 upper, were constructed directly on top of earlier Edelhardt or early Lohmann phase structures (see Figure 6.27). Importantly, Feature 15, the shrine structure, was constructed directly on top of Feature 18, a special Edelhardt phase storage structure. It is as if the builders specifically constructed Feature 15 in this location to remember and draw on the power and importance of the earlier structure.

The floor areas of the Lohmann structures range from 4.37 to 8.58 m^2, which is small compared to other Lohmann phase features in the region (Figure 6.28), and even smaller than the size of Edelhardt structures at Emerald (see Figure 6.6). Additionally, the average W/L ratio of Emerald's Lohmann phase structures is 0.79, which means that they are squarer in shape (Figure

6.29). The small size and square shape of these structures may be due in part because of the small sample size; however, it is more likely due to the function of these features. Again, Feature 14 is a storage structure based on its size and shape – structures with similar sizes and attributes have been interpreted as storage structures at East St. Louis, Halliday, and Knoebel (see Alt 2001, 2002a, 2002b; Fortier 2007; Pauketat 2005b; Pauketat et al. 2013). Feature 15 is a shrine structure due to its small size, square shape, and small internal cache pits. Even though the size of Feature 64 could not be determined, it is likely that this was a special structure due to the presence of laminated fills in its basin (often a mark of shrine structures, see Alt 2013) and its position underneath Mound 7 (see Chapter 4).

Ten pits date to the Lohmann phase (Table 6.20). The five external pits are spread throughout the site – Features 1 and 2 are situated in ETs 3 and 1, respectively (Figures 6.30 and 6.31), while the rest are located in a loose cluster in ET 5 (see Figure 6.27). On average, the external pits are a little over a meter in diameter and have a volume of 0.21 m^3. These volumes generally match those of exterior storage pits found at other Lohmann phase sites (see Collins 1990:Tables 5.7-5.12; Esarey and Pauketat 1992:Table 7.5; Pauketat 1998b:Table 6.7). All five of the interior pits are situated within Feature 15 and are likely special cache pits (see Figure 6.27). All are less than 50 cm in diameter and have an average volume of 0.02 m^3, which is much smaller than most Lohmann phase pits found at the Cahokia and Lohmann sites; they are even smaller than the small cache pits identified at Cahokia by Collins (1990:Table 5.12; see also Esarey and Pauketat 1992:Table 7.5; Pauketat 1998b:Table 6.7). Generally, Lohmann phase storage practices at Emerald are similar to those found at Cahokia and other contemporaneous sites. For instance, the pit to structure ratio at Emerald is 5:3, similar to the 2:1 pit-structure ratio from Cahokia's ICT-II and the Halliday site (see Alt 2001, 2002a; Collins 1990). Similarly, the ratio of storage pit capacity to living space was about 0.03 at Emerald, comparable to 0.04 at Tract 15A (see Pauketat 1998b). Unlike the Edelhardt phase, then, the Lohmann phase storage practices are more similar to other contemporaneous sites.

Major feasting events occurred during the Lohmann phase occupation. Like the Edelhardt phase, larger than normal numbers of maygrass seeds, with smaller but still significant amounts of chenopod, erect knotweed, and little barley seeds were recovered from all nine of the Lohmann phase features analyzed for botanical remains (see Appendix A). However, several aspects of the Lohmann phase botanical assemblage deviate from those of the Edelhardt phase assemblage. While there were greater numbers of maygrass, chenopod, erect knotweed, and little barley seeds in Lohmann phase features compared to Lohmann features from other sites, Lohmann phase features at Emerald did not have nearly as much maygrass as did the Edelhardt phase features (see Appendix A). Additionally, maize makes up about 20 percent of the total Lohmann phase botanical assemblage. While maize is not nearly as abundant as the seed crops in Lohmann features, it is twice as abundant in Lohmann phase features as it was in Edelhardt phase features. Thus, maize makes up a greater proportion of the food consumed during these events. Finally, a few cucurbit rinds were recovered from Feature 41, one of the internal pits within Feature 15 (see Appendix A). Cucurbits were not recovered from any Edelhardt phase features.

As with the Edelhardt occupation, clay objects were abundant in Lohmann features. Based on their similar size and shape, I assume that they too are temporary covers for jars that were broken open during the feasts. A significant number of these clay objects were recovered from Lohmann phase external pits, particularly from Feature 1 (Table 6.21) (Figure 6.32). Additionally, the presence of morning glory seeds in several Lohmann phase features suggests that purgative or hallucinogenic substances were ingested during these events. Unlike the Edelhardt phase, red cedar wood was not used in the Lohmann phase.

Feasts occurred in the plaza area at this time, as it is certain that this special area had been established by the Lohmann phase (see Chapter 4). Like the Edelhardt phase, at least some of the remains of these feasts were discarded in the storage pits and open structure basins. I suspect that the Lohmann structures (particularly Feature 15, a shrine) were constructed in lieu of feasts and then dismantled shortly thereafter; however, the relatively shallow basins of the Lohmann structures were not deep enough to hold a substantial amount of refuse from the feasts. However, some of the storage pits were used as trash pits for feast refuse – Features 1 and 21 contained abundant maygrass and other starchy seeds, maize, morning glory seeds, clay objects, and fragments of turtle and bird bone (Appendices A and D).

There is also evidence of quotidian activities during both Lohmann phase occupations. Feature 61, the early Lohmann single post structure, appears to be a short-term structure used for sleeping due to its small size and the lack of internal features (hearths, storage pits, cache pits) and nearby external storage pits. Feature 23 upper, which dates to the second Lohmann occupation, may also have been a residence – it was rebuilt once, which suggests it was inhabited for longer (see below), and there were no internal cache pits (indicative of shrines) or internal storage pits or hearths. Feature 14 was a storage structure, similar to storage structures found at other sites in the region (see Alt 2001, 2002a, 2002b, 2006; Fortier 2007; Pauketat 2005b). The five external pits suggest that foodstuffs and other objects were stored, after which the pits were used as trash receptacles. While three of these pits were small and shallow and likely used for a short period of time, Features 21 and 27 were clearly larger than the others and had two zones, which suggests that trash was dumped in them on at least two separate occasions; it is possible that these pits were filled during both Lohmann phase occupations. Generally, these patterns are more typical of Lohmann phase household groups at other upland sites.

In some ways, the Lohmann phase refuse recovered from Emerald is similar to the materials found at other Lohmann phase sites in the uplands. For instance, the presence of hammerstones and cores, the lack of formal chipped stone tools, and the abundance of chipped stone debitage and flake tools shows that general expedient flake tool technology was the norm (Tables 6.22 through 6.24). Apparently blocks of chert (particularly Burlington) were brought and reduced on site in order to make these informal tools (Koldehoff 1987). Very little formal biface production and maintenance occurred at the site. The only formal stone tools were two fragments of a single hoe from Feature 61 (Figure 6.9) and an incomplete celt from Feature 27 (Figure 6.10). Three abraders (Figure 6.33), including one flat abrader and nutting stone (Figure 6.34), are also present (see Table 6.22). Furthermore, just under 40 percent of the total chert assemblage by weight is Mill Creek (see Tables 6.23 and 6.24) (Figure 6.35). This pattern is typical of upland sites during the Mississippian period, as is evident in Knoebel's Lohmann chert assemblage (see Figure 6.35) (see also Alt 2001, 2002a; Pauketat 2003). The greater abundance of Mill Creek chert at Emerald compared to other floodplain settlements may suggest a greater focus on agricultural activities, which would again make some sense with the large number of seed crops obtained for and consumed during feasts (cf. Alt 2001, 2002a; Pauketat 2003). On the other hand, digging tools were needed for the massive surge in mound construction activities that took place at Emerald at this time (see Chapter 4). At least 10 jars had evidence of soot or some sort of thermal use wear, suggesting they were used for cooking activities (Table 6.25), and some lye was being produced at the site given the presence of a few stumpware vessels (Table 6.26). In other words, evidence of quotidian activities during the Lohmann phase is clear.

However, other common patterns seen at other Lohmann phase upland sites were not evident at Emerald. For instance, no microdrills or spindle whorls were recovered, meaning that there was no production of fabric or shell beads in this portion of the site (see Alt 1999, 2001, 2002a; Pauketat 2003). Approximately 75 percent of Lohmann phase vessels recovered from Emerald are jars (n = 29), which is high compared to other sites; bowls (n = 5) seed jars (n = 2), and stumpware (n = 3) are far less common (Figure 6.36) (see Figures 6.37 and 6.38 for all Lohmann vessel rim profiles). The rim diameters of Emerald's Lohmann jars range from 12 to 56 cm and average at 26 cm (see Table 6.25). While this is similar to Lohmann jar sizes from Cahokia, there are clearly two distinct jar sizes evident at Emerald (Figure 6.39). Moreover, there is a lack of small vessels (10 cm and under) and larger vessels measuring between 35 and 50 cm, though one abnormally large jar (56 cm) is present. Overall, this suggests that jars of certain sizes were made, brought, and/or preferred at Emerald and probably used for specific purposes. Though the sample size is very small, Emerald's bowls also appear smaller than bowls from other Lohmann phase sites, which also suggests they were used for specific purposes (Figure 6.40).

The occupation span estimates for Lohmann phase structures show that each structure was occupied for a short period of time. Only one of the Lohmann phase structures, Feature 23 upper, was rebuilt, suggesting that is was occupied between 15 and 30 years (see Table 6.15). Presumably, the other structures, which were not rebuilt, were occupied for less than 15 years. Estimates based on ceramic refuse are much lower. No jars were recovered from any of the internal or external pits associated with these structures, which suggests that the Lohmann structures were occupied for less than a year (see Table 6.17). Of course, these estimates would change if some of the pits assigned to the Edelhardt-Lohmann phase actually dated to the

Lohmann phase, though the results would not change drastically since only a few jars were recovered from the Edelhardt-Lohmann pits (see Table 6.18). Importantly, while the Lohmann phase refuse at Emerald may in some ways mimic domestic use, these occupation span calculations are likely problematic. For one, just two of the Lohmann phase structures may have been used as residences, and only one of these (Feature 61) was fully excavated. The other structures – a storage structure (Feature 14) and two shrines or temples (Features 15 and 64) – had specific uses. Furthermore, feasting still took place at the site and probably accounts for the majority of the Lohmann phase refuse recovered from the structure basins and pits. Meaning, disposal patterns at this time may not be indicative of patterns at other residential sites (see Pauketat 1989). Despite all this, I still believe that Lohmann structures were occupied for a very short period of time.

There is no evidence of extra-local contacts or visitors during the Lohmann phase, as no exotic vessels were recovered from Lohmann features. However, there is evidence of visitors from other places throughout the American Bottom region. A few Monks Mound Red vessels were recovered, suggesting that there was some contact with the southern American Bottom region. But similar percentages of Monks Mound Red vessels are found at other sites throughout the northern American Bottom, meaning these connections, contacts, or visits were probably minimal (see Alt 2002b; Holley 1989; Pauketat 1998b, 2013c). One jar (and possibly a few more based on a handful of body sherds, see Appendix D) is made of Madison County Shale paste, which suggests that people from north of modern-day St. Louis were present (see Table 6.25).

The shapes of jars differ slightly from other Lohmann jar assemblages throughout the region, which suggests non-local visitors. The average LP index of Emerald's Lohmann jars is 0.78, with a range of 1.00-0.36 (Figure 6.41). While this range generally fits within the ranges of other Lohmann phase vessels in the region, the average is slightly higher than those from Cahokia and slightly lower than those from other upland sites (see Figure 6.41). The RC measurement on four of Emerald's jars averages at 0.11, which is higher than the 0.05 average of Cahokia's Lohmann jars (see Pauketat 1998b:Table 7.14) (Figure 6.42).

Importantly, temper percentages suggest that the majority of Emerald's Lohmann phase inhabitants came from Cahokia. Of all the vessels at Emerald, 64 percent are tempered with shell (see Tables 6.25 and 6.26). While the overall use of shell temper increases throughout the American Bottom region during this time (Fowler and Hall 1975; Holley 1989; Milner et al. 1984), 64 percent is high, particularly for an upland site (Figure 6.43) (see Alt 2001, 2002a; Pauketat 2003). Additionally, 14 percent of Emerald's vessels have mixed tempers, which is high compared to all other sites (see Figure 6.43). This may suggest experimentation with different temper mixtures, potential evidence of non-local visitors or populations. It is notable that even though grit-tempered vessels only make up eight percent of the vessel assemblage, this is higher than any other contemporaneous site; moreover, 10 percent of the body sherd assemblage by weight is grit-tempered, which also is comparatively high (Appendix D, see Holley 1989; Milner et al. 1984; Pauketat 1998b). Again, grit temper is commonly associated with vessels from the lower Illinois Valley. In sum, this evidence strongly suggests that the majority of Emerald's Lohmann phase population came from Cahokia, and at least some may have come from the lower Illinois Valley area.

STIRLING PHASE (A.D. 1100-1200)

The Stirling phase occupation is represented by two structures and a post mold, ceramic and lithic artifacts, and faunal and botanical remains (see Table 6.2). Unfortunately, none of these features were analyzed for botanical remains. The presence of only a single Ramey Incised jar and the high average LP index on jars shows that this occupation occurred in the first several decades of the Stirling phase. In contrast to the Edelhardt and Lohmann phase occupations, the Stirling phase occupation in these excavations is restricted to a small area in ET 5 (Figure 6.44).

Both Stirling structures are rectangular in shape, were built in basins, and were constructed using wall trenches (Table 6.27). The long axis walls of each structure were rebuilt once (Figure 6.45). The size of Feature 12 did not change when it was rebuilt, as the long walls were essentially reset in the same location as the original walls. In contrast, Feature 13's rebuild was slightly larger than the original frame. The average floor area of both structures and their rebuilds is 11.11 m^2, which is considerably larger than the other structures at Emerald (see above). When compared with structures from other Stirling phase sites, however, they are smaller (Figure 6.46). These structures are similar to the size of the early Stirling "small" wall trench structures at ICT-II (see Collins 1990:Table 5.68). Based on ethnographic analogies, Collins (1990:71) suggests that these smaller wall trench structures were used as "storage facilities, men's huts, newlyweds' housing, or women's huts." Certainly Features 12 and 13 could have been used for similar purposes or potentially as temporary quarters of pilgrims and/or caretakers. The shape of these structures is consistent with other Stirling phase structures based on W/L ratio measurements (Figure 6.47).

No internal or external pits or hearths are associated with these structures. This is unusual, as Stirling structures at Cahokia and other sites in the American Bottom usually have at least one internal storage pit (Collins 1990; Milner et al. 1984:173; Pauketat 2013c). The lack of associated pit or hearth features with these structures, in other words, suggests they were not typical residences. The only features associated with these structures are two post molds, one in each structure, situated near the southeastern wall (the post mold in Feature 12 is labeled Feature 51, see Table 6.28).

Moreover, it is likely that these structures had similar uses and were contemporaneous due to their proximity, the presence of a single interior post mold in virtually the same place, and because each had rebuilt long walls. However, there is no definitive evidence that these structures were situated around a courtyard as is common at other Stirling phase upland communities, nor are these structures closely spaced together like structures at the Grossmann site (see Alt 2001, 2002a, 2002b, 2006; Howe 2000; Pauketat 2003). Instead, these structures, like the earlier structures at the Emerald site, are generally aligned with the rest of Emerald's landscape, though not with a high degree of precision – Feature 12 is oriented 26 degrees of azimuth, while the orientation of Feature 13 is 42 degrees of azimuth.

In some ways, the activities that took place during the Stirling phase were similar to those that occurred in earlier occupations. Although no flotation samples from Stirling phase features were analyzed for botanical remains, other lines of evidence suggest that feasts took place. For one, the majority of the faunal remains recovered from the site came from Stirling phase features, particularly Feature 13 (see Appendix B). Most of the bone was unidentifiable mammal, bird, or fish, though some where remains of deer, duck, snake, and sunfish. Moreover, 38 clay objects were recovered from these features (Table 6.29). The relative shape, number, and weight of these clay objects is similar to those found in Edelhardt and Lohmann contacts, despite the less extensive Stirling occupation – thus, the high number of clay objects from these features suggests that they covered jars and were broken open during feasts. Moreover, expedient chipped stone tools were made and used regularly (Table 6.30). Very little to no biface production occurred due to the lack of formal chipped stone tools and bifacial thinning flakes (Table 6.31).

As was the case in the Lohmann phase, large nodules of chert were imported to the site for the manufacture of expedient tools (see Koldehoff 1987). A single hammerstone and several abraders are present (Table 6.32). Chert procurement during this time generally parallels with other Stirling sites (see Tables 6.30 and 6.31). Burlington chert is the most common at 64 percent by weight. A few fragments of Kaolin and Cobden chert were also recovered but did not make up a significant portion of the assemblage. Mill Creek makes up 18 percent of the assemblage, which is clearly higher than floodplain sites (Figure 6.48). Proportionally, however, it is much lower compared to other upland sites as well as earlier occupations at the site. This implies a drop in digging activities at Emerald, which corresponds to the apparent lack of mound construction during this time (see Chapter 4).

However, the distribution of vessel types clearly differs from other Stirling phase assemblages (Figure 6.49). Overall, there is less diversity at Emerald – jars (n = 19) are far more common at the expense of bowls (n = 2), seed jars (n = 1), and funnels (n = 1), and other standard Stirling forms were not noted in Emerald's assemblage at all (see Figure 6.50 for all Stirling phase rim profiles). Furthermore, Emerald's jars are smaller on average (Table 6.33). Rim diameters range from 12 to just over 60 cm, which is a wider range than Stirling phase jars from Cahokia (Figure 6.51). However, the majority of the Stirling phase jars at Emerald, including the single Ramey Incised jar, range from 12 to 20 cm, which is smaller on average compared to other Stirling phase jars (see Figure 6.51). Furthermore, while Stirling phase jars at Tract 15A conform to two general sizes (between 16 and 20 cm and 26 and 30 cm), at Emerald the only clear jar size falls between 10 and 15 cm (Pauketat 1998b:Figure 7.42). Notably, two of Emerald's jars are extremely large – in fact, this size is unusual even at major centers like Cahokia. Soot is visible on the exterior of six of the jars, which suggests that some of these vessels were used for cooking. The single measurable bowl has a rim diameter of 20-30 cm, which corresponds with the average Stirling phase bowl size from Cahokia (Holley 1989; Pauketat 1998b:Table 7.30). The presence of a single funnel with whitish residue on its exterior suggests that lye was being produced (Table 6.34).

The two occupation span estimates calculated for both structures (one using rebuilds and the other using ceramic refuse) contradict each other. Both Stirling phase structures were rebuilt once in virtually the same place, which suggests they were continually inhabited for 15 to 30 years. This suggests that, aside from perhaps Feature 23 upper, these structures were inhabited for longer than the earlier structures at the site (see Table 6.15). However, because no external or internal pits were associated with the Stirling structures, the occupation span estimates from ceramic refuse indicate that the structures were occupied for less than a year (see Table 6.17). While it is possible that exterior pits associated with these structures were not uncovered during ISAS's excavations, it is more likely that these structures were not regular domestic houses. Their size and lack of associated pits, hearths, and refuse suggest that they were unique and probably used for specific purpose. In sum, then, I believe that these were special structures used for a specific purpose, probably short-term residences. It is also possible, given that each structure was rebuilt once, that they were used more than once (evident through rebuilds) but only for a short period of time.

The only evidence of long distant contacts and populations at Emerald during this occupation is a single polished, grog-tempered jar rim sherd with a folded rim recovered from Feature 12 (see Figure 6.22). The folded rim is similar to typical folded rim forms of Dillinger phase jars in southern Illinois (Webb 1992). While this vessel does not appear to have been made from local clays, the lack of a cordmarked surface is rare for Dillinger jars (see Webb 1992). It is possible that this vessel is an import from southern Illinois. The presence of a grit/grog tempered jar with lip impressions suggests that a few of the Stirling phase visitors came from the lower Illinois Valley (see Table 6.33).

Other data suggests only limited intra-regional contacts or visitors. Two Monks Mound Red bowls date to the Stirling phase (see Table 6.34), which suggests the presence of a few people from the southern American Bottom. The shape of jars differs from typical Stirling jar assemblages. While some of the jars have the classic Stirling phase rolled rims and red slipped band on the interior rim (see Figure 6.50), the average LP index of the jars (0.76) is considerably higher than other Stirling phase jar assemblages in the region and more comparable to the average Lohmann phase LP Index at Cahokia (Figure 6.52; see Holley 1989; Pauketat 1998b). This may be due in part to the early date of this Stirling assemblage, though it may also indicate variable potting techniques or potters at the site. The only RC measurement (0.07) I was able to obtain was well within the range of RC measurements from Cahokia's jars (Pauketat 1998b). While very little of the motif on the Ramey Incised jar is visible, the jar itself is small, finely made, and has a glossy black-brown slip characteristic of other Ramey Incised vessels (see Figure 6.22). This small vessel, in short, was probably made at Cahokia and taken to Emerald, probably carrying some special material, food, or other substance (Pauketat and Emerson 1991).

While the temper and surface treatment distributions of Emerald's Stirling phase vessels generally reflect the patterns seen at other Stirling phase sites, there are some notable differences. Seventy-four percent of Emerald's vessels are tempered with shell, which is slightly lower than other sites in the region (Figure 6.53). As mentioned earlier, limestone-tempered vessels are present but minimal overall. Importantly, 13 percent of Emerald's assemblage has mixed temper, which is high compared to other sites. Although none of the vessels are grit-tempered, about six percent of the body sherd assemblage by weight is, which is not common in Stirling phase body sherd assemblages (Appendix D; see Fowler and Hall 1975; Holley 1989; Milner et al. 1984; Pauketat 1998b, 2013c). Slipped surfaces, and particularly dark-slipped surfaces, are much more common than in the earlier assemblages (see Tables 6.33 and 6.34). Overall, Emerald was ceramically similar to Cahokia in many ways, which suggests that Emerald's visitors made ceramic vessels using Cahokian potting techniques or, more likely, Emerald hosted visitors from Cahokia itself. Other evidence, however, suggests that a few of these visitors came from elsewhere.

MOOREHEAD PHASE (A.D. 1200-1300)

The Stirling phase represents the last major occupation in this area. However, the presence of a single hearth labeled Feature 16 shows that limited activity took place here during the Moorehead phase (see Table 6.5). Based on feature profiles and photos, Feature 16 was clearly dug into the center of the basin fill of Feature 15, the Lohmann phase shrines (see above). Overall, this hearth is small, measuring 70 cm in diameter and 11 cm in depth. Despite its small size, it contains numerous artifacts, including three hammerstones, a well-used diabase celt, and fragments of limestone and sandstone. Feature 16 also contains a unique array of botanical remains that clearly differ from earlier botanical patterns throughout the site (see Appendix A). Seeds of maygrass, chenopod, erect knotweed, and little barley were recovered, as were fragments of hickory, oak, and red cedar wood fragments. The presence of a large mass or bundle of hickory nutshell fragments, along with a few fragments of walnut and hazelnut shell, is especially notable – given their abundance, these nutshells were thrown or deposited in this feature all at once. No other feature of any phase contains this much nutshell. As mentioned earlier, a single radiocarbon date from one of these nutshell fragments yielded a date in the mid to late-1200s, which places Feature 16 squarely in the Moorehead phase (see Table 6.1). Given its placement and contents, this hearth was likely a dedicatory offering.

DISCUSSION

The data presented in this chapter shed light on Emerald's occupational history and strongly suggest that Emerald was a pilgrimage center. As stated in Chapter 2, potential archaeological correlates of a Native American pilgrimage center include numerous short-term occupations, few domestic houses, non-local visitors, acts of remembering, large-scale communal practices, and religious architecture. All of these things were recovered at Emerald. As stated before, while these correlates alone cannot convey the importance or affective qualities of Emerald, they can be used to evaluate whether Emerald was a place of pilgrimage. These data also shed light on the kinds of connections and relationships that were formulated during these journeys.

Ceramic, architectural, and radiocarbon data show that this area was occupied from the late Edelhardt phase to the Moorehead phase. However, the occupation was not continuous; there were at least five distinct occupations during this time. The first took place in the first few decades of the 11^{th} century, or several decades before Cahokia was constructed. Another occupation occurred around A.D. 1050, close to or synonymous with Cahokia's Big Bang and the construction boom at Emerald. The third occupation occurred in the last few decades of the 11^{th} century. Another occurred several decades later during the early 12^{th} century. The fifth and final occupation was in the Moorehead phase, or in the early 13^{th} century. Of course, it is somewhat misleading to label the Moorehead phase occupation as an occupation, as it is only represented by a single hearth and no residential habitation is evident (Figure 6.54).

Each of these occupations were distinct and separate from each other. The only potential evidence that a structure was inhabited continuously for more than one occupation was Feature 23 lower (potentially constructed during the late Edelhardt or early Lohmann phase) and Feature 23 upper (clearly constructed during the late Lohmann phase). In other words, Feature 23 lower could have been constructed in the early Lohmann phase and was continually inhabited until the late Lohmann phase 50 years later. However, there is no clear evidence of any other structure being occupied continuously for more than a single occupation. Furthermore, while the short occupation span estimates may be problematic as discussed earlier, I believe that the occupation span of most of these structures was short given the general lack of associated refuse and rebuilt walls. While these structures are not the "empty rectangular shells" of short-term houses "built by work crews in conjunction with major ceremonial events at the Emerald Acropolis" uncovered in other parts of the site (see Alt and Pauketat 2015:12), the relative frequency of special religious structures and lack of domestic structures and features suggests that few people lived at Emerald for an extended period of time. These patterns, in short, seem to correspond with the multiple, short-term occupations that we would expect to find at a pilgrimage center.

Given the apparent short-term occupations at the Emerald site once every few decades (aside from the hiatus from the early Stirling to the Moorehead), it is very likely that these occupations occurred in conjunction with lunar maximum or minimum standstill events. Pauketat (2013a:Table 6.8) has provided a list of the dates of lunar standstill events during Emerald's occupation and these dates are reproduced in Figure 4.35. Interestingly, the radiocarbon dates from Edelhardt and Lohmann features closely correspond with these dates (see Table 6.1).

Radiocarbon dates from Features 20 and 25, both late Edelhardt shrine structures, range between 1020 and 1045, which suggests that they may have been constructed during the 1020 or 1039 standstill event. A single radiocarbon date from one of Feature 15's internal pits, a late Lohmann feature, provided a date range of 1090 to 1120. This, along with Lohmann phase ceramics, suggests it may have been constructed during the 1094 event. Of course, confidently associating individual radiocarbon dates (with their range of error) with a specific calendar year is difficult, but the apparent correspondence of these dates with standstill events is noteworthy.

Most of Emerald's structures are unique and likely had special purposes. All of the Edelhardt phase structures, for example, are either shrines, temples, or storage structures. Even if the several Edelhardt/Lohmann domiciles actually dated to the Edelhardt phase, the ratio of special use structures to residential structures is still 4:3, which is high compared to other upland sites (see Alt 2002a, 2002b; 2006). Furthermore, only one typical residential structure, Feature 61, dates to the early Lohmann phase, while Feature 23 upper is the only potential domestic structure that dates to the late Lohmann phase. The rest of the Lohmann structures were either shrines or storage structures. Both Stirling phase structures may have housed a small group of pilgrims or year-round caretakers, but it is also possible that they too were special-use structures.

The special nature of Emerald is also evident in its settlement organization. Other sites in the Richland Complex exhibit a mix of residential structures, temples, council houses, elite homes, and sweat lodges organized around courtyards or closely clustered in a distinct area (see Alt 2001, 2002a, 2006; Holley et al. 2001a; Howe 2000; Pauketat 2003). At Emerald, however, no clear courtyard groups are evident in this area at any time, nor is there evidence of a tightly grouped series of structures like at the Grossmann site. Instead, Emerald's structures are scattered around the edges of the plaza, and the majority of them are oriented to within 10 degrees of the Emerald Axis. This pattern continued throughout this area's occupational history, meaning aligning structures to this orientation was more important than organizing around a courtyard. This practice was also a form of remembering – it entangled past alignments with present and future ones.

Features and refuse recovered from Emerald show that specific activities took place at the site. Typical activities at other Richland Complex sites include farming (presumably to supply Cahokia's burgeoning population), fabric and shell bead production, and in a few cases administrative and religious tasks (see Alt 1999, 2006; Benson et al. 2009; Pauketat 2003). Some of the visitors at Emerald may have participated in some farming due to the abundance of Mill Creek chert, though this may also indicate frequent earth-moving (e.g., mound building) activities. No microdrills or spindle whorls were uncovered at Emerald, meaning that no fabric and shell bead production occurred in this part of the site. No council houses or sweat lodges – used for administrative and religious activities – were identified in this area (though they were uncovered in other parts of the site; see Kruchten 2014; Pauketat et al. 2016). Storage practices were also unusual particularly during Emerald's Edelhardt and Stirling occupations. It took twice as many pits to match Emerald's Edelhardt occupation storage capacity, and nearly all the Edelhardt phase pits are small internal cache pits instead of external storage pits. Interestingly, storage practices are similar to other contemporaneous sites during the Lohmann phase, both in the pit to structure ratio and the pit storage capacity measurements (see above). No storage pits date to the Stirling phase, which is unusual considering the presence of two Stirling phase structures at the site. In sum, the features, refuse, and storage practices at Emerald suggest that the activities that occurred there were unlike those at other Richland Complex villages.

Importantly, feasting was one of the primary activities that took place in this area of the site, particularly during the Edelhardt and Lohmann occupations. These feasts occurred in the spring or early summer and involved consuming large quantities of maygrass, lesser quantities of other seed grasses (chenopod and little barley), and small amounts of maize in the Lohmann phase. Special hallucinogenic concoctions were ingested during these events and special woods were burned in hearths (though not during the Lohmann phase). Pilgrims brought sealed jars of special food to these feasts – the clay plugs were broken after their arrival to retrieve the food inside. Feasting took place within the plaza itself, which was established by the Lohmann phase and possibly earlier (see Chapter 4). The shrine and storage structures were likely built and used for special ceremonies as part of these events; in some cases, food from the feasts were consumed inside these structures or deposited as offerings in the internal cache pits. After these feasts concluded, these structures were dismantled and refuse from the feasts (e.g., food remains, broken pottery vessels, clay objects) were deposited in their open basins – the location of these features adjacent to and downslope from the plaza made cleanup convenient. While none of the Stirling phase features were analyzed for botanical remains, it is possible that feasts also took place during this time given the similar materials associated with them. Much like the world renewal pilgrimages discussed in Chapter 2, these spring or early summer feasts and their associated ceremonies were undoubtedly major events in which people gathered to renew social and political ties and to acknowledge and celebrate the other-worldly beings and powers that controlled the crops, weather, and overall balance of the world. These feasts, in other words, are another line of evidence that Emerald was a pilgrimage center.

The ceramic evidence from these excavations shed light on the geographical origins of Emerald's visitors. Several distinct groups visited the site during the Edelhardt phase occupation.

One of the primary groups was from the lower Illinois Valley, based on the abundance of grit-tempered jars with flat lips and lip notches. Another group was from Cahokia based on the abundance of shell-tempered vessels and jar forms similar to those found at Cahokia. The lack of grog-tempered vessels, however, imply that only certain people from Cahokia visited Emerald at this time. Small numbers of pilgrims from more distant places are evident – the few Coles Creek beakers suggest that a handful of individuals traveled from the lower Mississippi River Valley, perhaps bringing these special beakers as offerings or gifts. The presence of a Yankeetown jar made from local pastes and tempered with shell suggest that a few of Emerald's visitors were from the Yankeetown region in southern Indiana.

No non-local vessels were recovered from Lohmann phase features. However, the dominance of shell-tempered vessels and small number of limestone, grog, and even grit-tempered vessels reveals that most of Emerald's Lohmann phase visitors were Cahokians. The slightly higher number of mixed tempered vessels suggest some sort of ceramic experimentation or hybridization, which may be evidence of non-local or diverse populations (see Alt 2001, 2002, 2006; Pauketat 2003).

The relative temper percentages suggest that most of the Stirling phase pilgrims at Emerald were also from Cahokia. The few grit-tempered body sherds imply a few visitors from the lower Illinois Valley. Like the Lohmann phase occupation, the higher percentage of vessels with mixed tempers during the Stirling phase suggest at least some potential non-local individuals or potters at Emerald. A single Dillinger-like vessel recovered from Feature 12 implies that a few pilgrims from southern Illinois visited Emerald during the Stirling phase.

Overall, the activities and refuse from these excavations correspond well with the activities and material remains described in ethnohistories and contemporary accounts of Native

American pilgrimage and pilgrimage centers, and particularly of world renewal pilgrimage events (see Chapter 2). Each occupation was short-lived, and there is evidence of religious structures, a few short-term residences, large feasts, and special ceremonies involving shrine structures and hallucinogenic substances. The abundance of maygrass, chenopod, and little barley seeds at the site also reveal that Emerald pilgrimages took place in the spring or early summer. However, based on the evidence presented here, pilgrimages did not take place every year. Instead, they were rare, periodic events that took place every few decades, most likely during lunar standstill events (see Pauketat 2013a; Pauketat and Alt 2015). Moreover, these were short-term events, lasting for less than a month and probably only for a few days. Finally, ceramics show that these pilgrims came from particular regions – most came from Cahokia or the lower Illinois Valley. I suspect that at least some of the pilgrims from Cahokian were elites or religious specialists who sponsored, witnessed, organized, or participated in these events. Additionally, a few of these pilgrims came from more distant regions such as the lower Mississippi Valley, southern Illinois, and southern Indiana. Given that only a handful pilgrims from these more distant regions attended these events, I imagine they too were important political or religious figures in their respective communities.

Pilgrimages to Emerald, then, brought together important people from different regions. The feasts and ceremonies that took place there undoubtedly renewed social and political ties and perhaps created some sense of pan-Cahokian identity (see Hall 1991, 1997; Pauketat 2004; Pauketat and Alt 2003, 2004; Pauketat et al. 2002). At the same time, the influence, power, and authority of Cahokia was also reiterated as Cahokian priests and leaders controlled, sponsored, attended, and participated in these events. These pilgrimages also instigated relationships with powerful beings, other worlds, memories, and visions of the future. Repeatedly building special structures and renewing mounds that aligned to the Emerald Axis linked pilgrims with the moon, landscape, and memories of past events. As Pauketat (2013a) has argued, alignments were a crucial part of religious experience at Emerald. Undoubtedly stories, songs, dances, and ceremonies were performed in the plaza during these events, and special rituals took place in the shrine structures (Alt and Pauketat 2015; see Inomata 2006). Importantly, these events celebrated the harvest and turn of the season as well as the powers that controlled or influenced these occurrences. Overall, the relationships made at Emerald transformed pilgrims' relationship to each other, their notions of identity, and their links to Cahokia and the numerous beings and powers that influenced the cosmos.

CONCLUSION

Emerald was unique. It was a place where large numbers of people gathered periodically for feasts and special religious activities and ceremonies. Unlikely other villages and sites in the Richland Complex, few people stayed at Emerald for longer than a year, and most probably only for the duration of lunar standstill events that took place once a decade. Many of these visitors were from Cahokia itself (especially during and after the Lohmann phase), though many came from the lower Illinois Valley and a few traveled from more distant locations in southern Indiana, Illinois, and the lower Mississippi River Valley. These data, coupled with the evidence presented in Chapters 4 and 5, suggests that Emerald was indeed a pilgrimage center, similar in many ways to the world renewal pilgrimage centers described in ethnohistoric and contemporary accounts (see Chapter 2). Moreover, Emerald was established several decades before Cahokia's construction, extensively rebuilt during Cahokia's Big Bang, and visited numerous times throughout Cahokia's history in conjunction with lunar standstill events (see Pauketat 2013a).

Importantly, Cahokia and Emerald were intimately connected, as the reconstruction and expansion of both Emerald and Cahokia was simultaneous and the Emerald Avenue connected the two sites (see Chapter 5). The construction of Cahokia and Emerald, in other words, were part of the same master project.

Emerald was also a place where pilgrims continually renegotiated connections with otherworldly beings, places, memories, and imaginaries (see Pauketat 2013a; Skousen 2015a). These journeys were specifically crucial for Cahokians. I suspect that Cahokian elites and priests visited Emerald to draw on the powers of Emerald's animate landscape and connection with the moon, reconstruct their own sense of self and identity, enact and perpetuate social memories, and manipulate cosmic relationships and thus ensure Cahokia's present and future wellbeing. Indeed, it was only through these connections and relationships that the conditions for Cahokia's creation were formalized and enacted. These connections were part of the web that constituted Cahokia, and without them Cahokia would not have been the same.

FIGURES AND TABLES

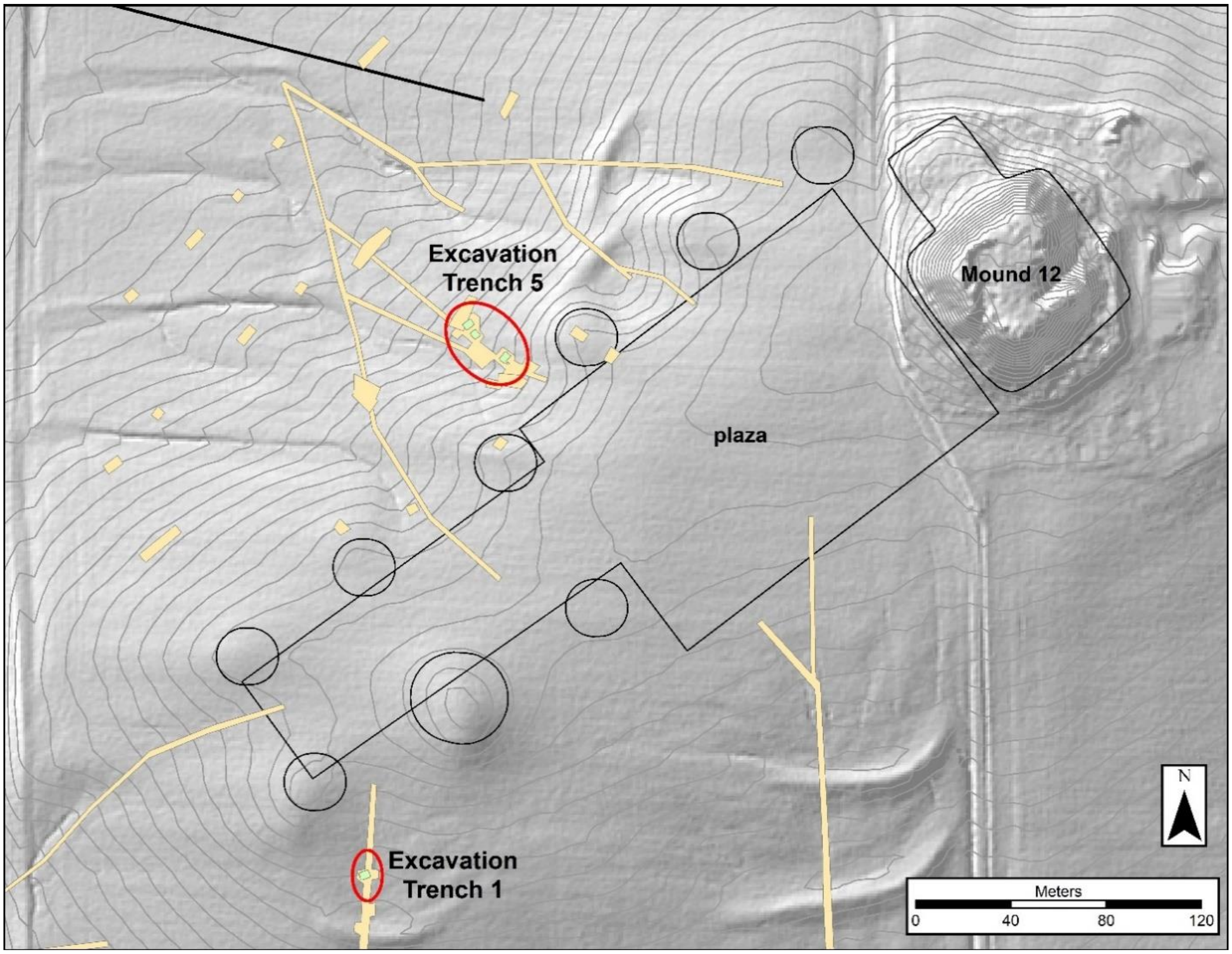

Figure 6.1. Location of Edelhardt phase features at the Emerald site. All excavation blocks and features are oriented to UTM grid north.

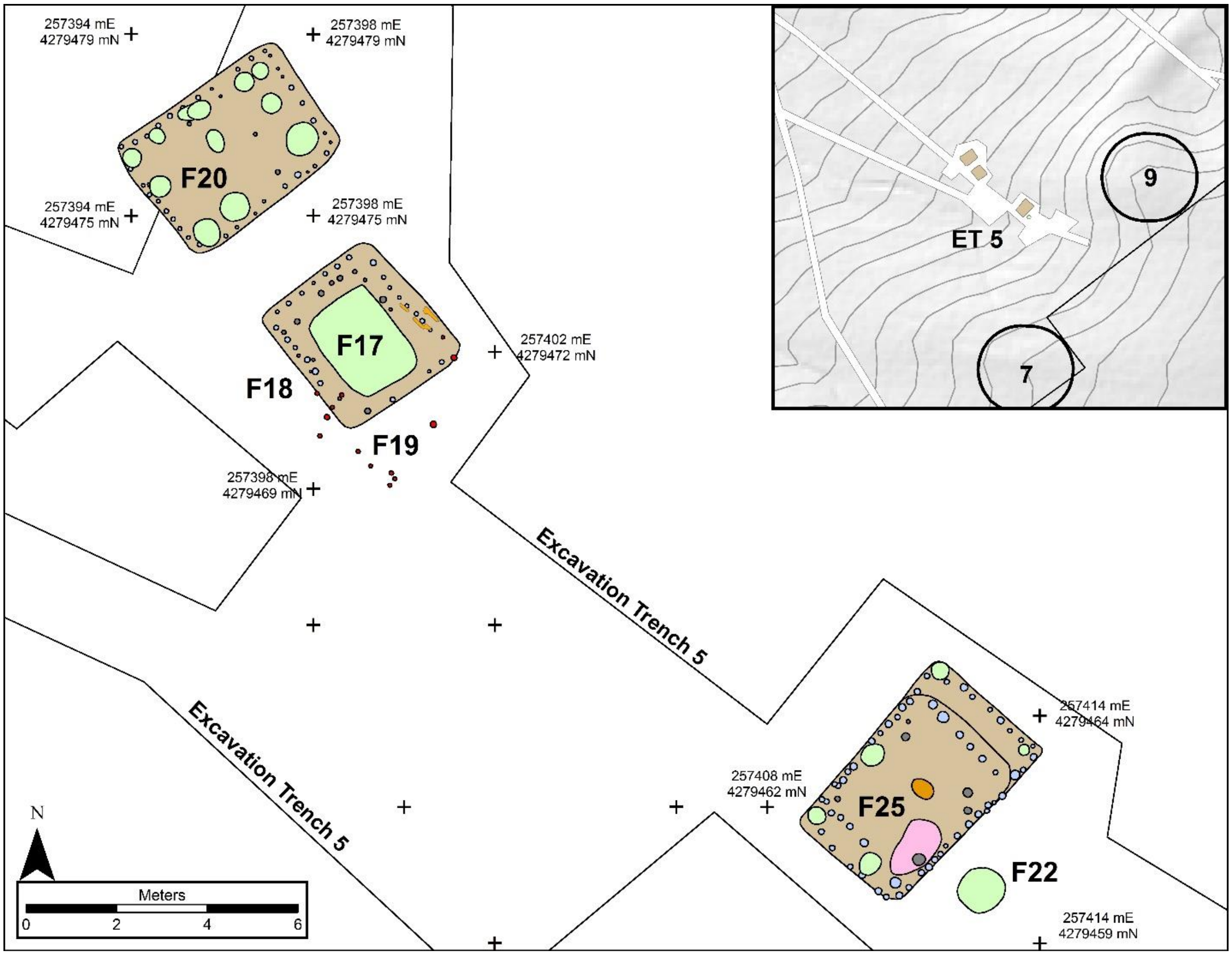

Figure 6.2. Edelhardt phase features in ET 5. All excavation blocks and features are oriented to UTM grid north.

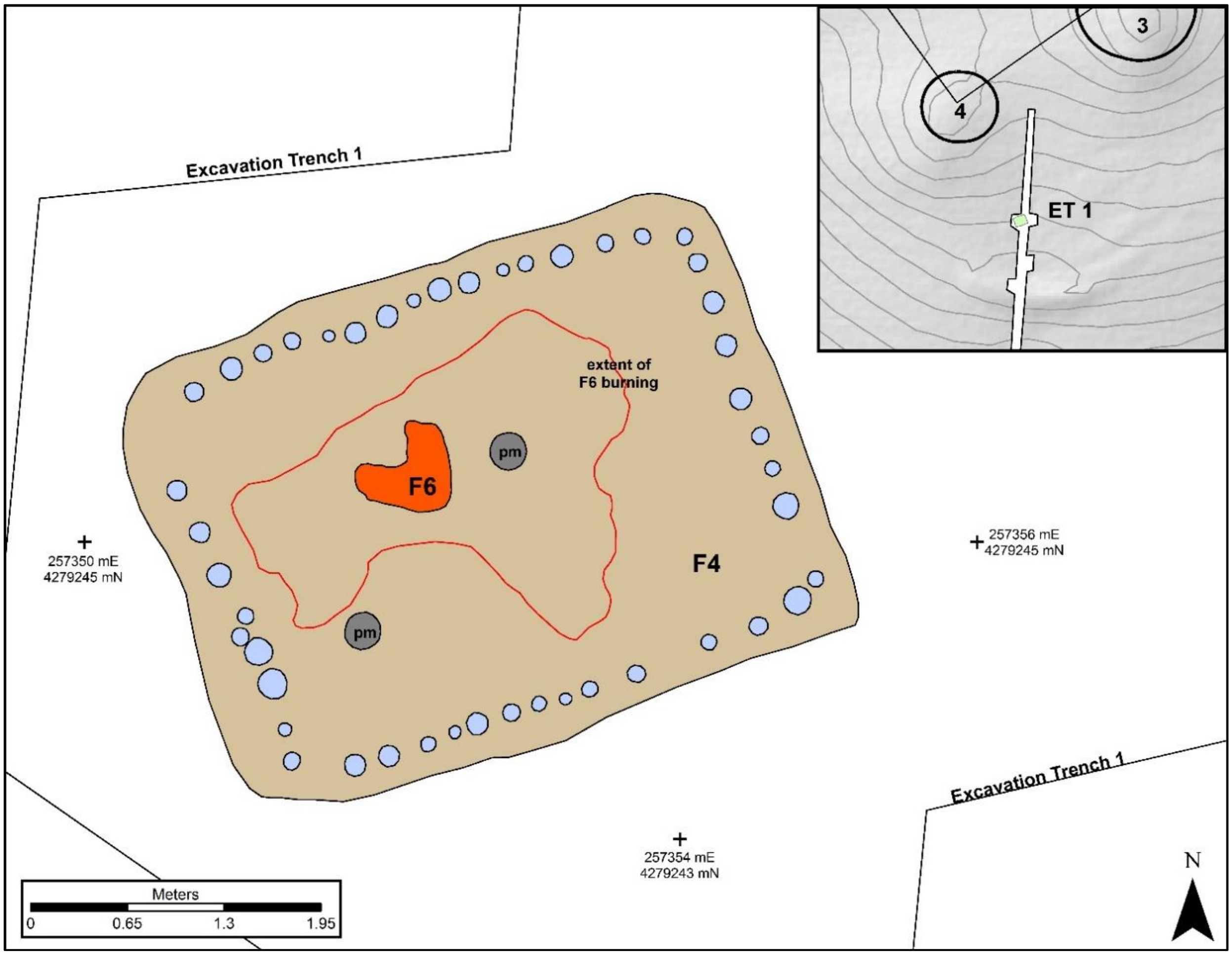

Figure 6.3. Edelhardt phase features in ET 1. All excavation blocks and features are oriented to UTM grid north.

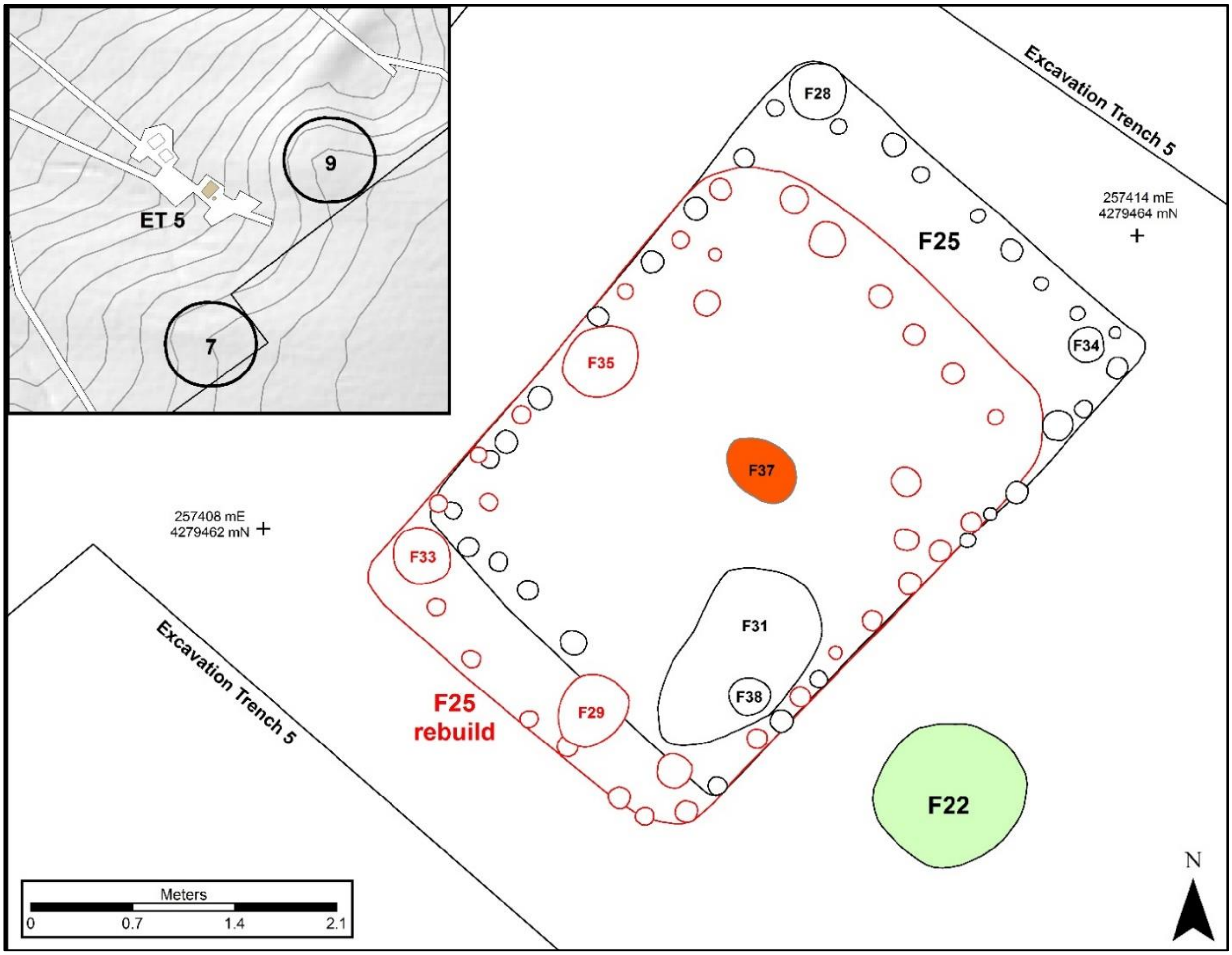

Figure 6.4. Close-up of Feature 25. All excavation blocks and features are oriented to UTM grid north.

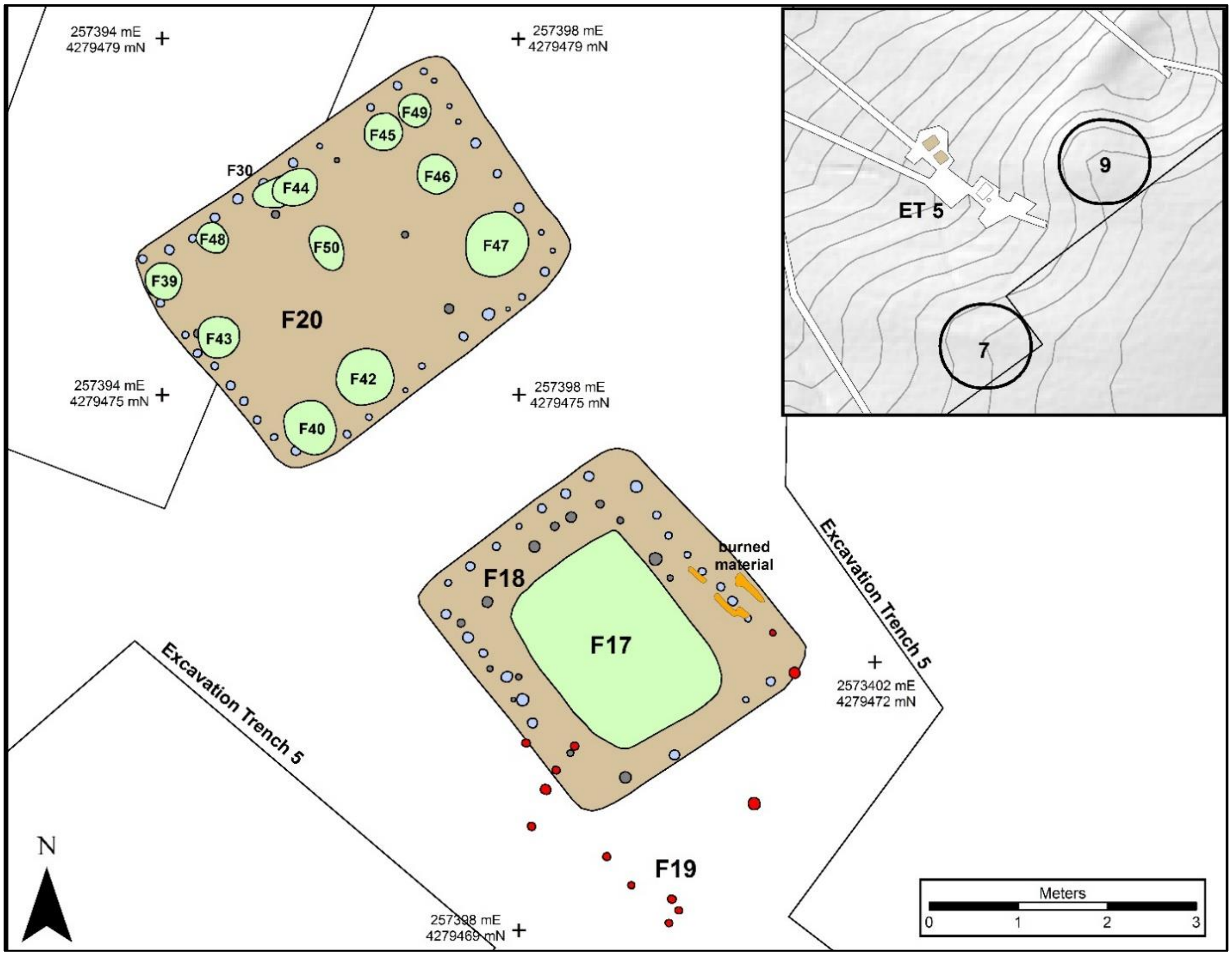

Figure 6.5. Edelhardt phase features in ET 5, focusing on internal cache pits in Feature 20. All excavation blocks and features are oriented to UTM grid north.

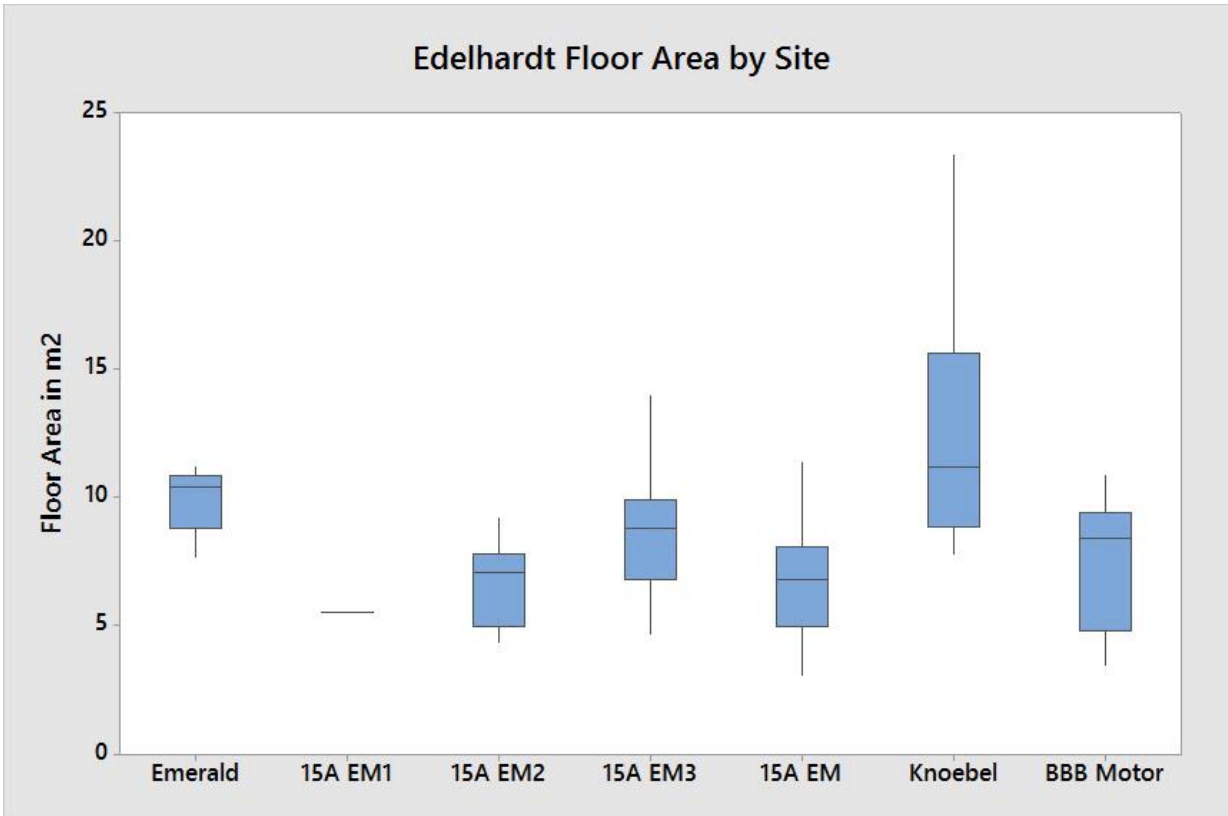

Figure 6.6. Comparison of floor area of Edelhardt structures from Emerald and select Edelhardt phase sites.

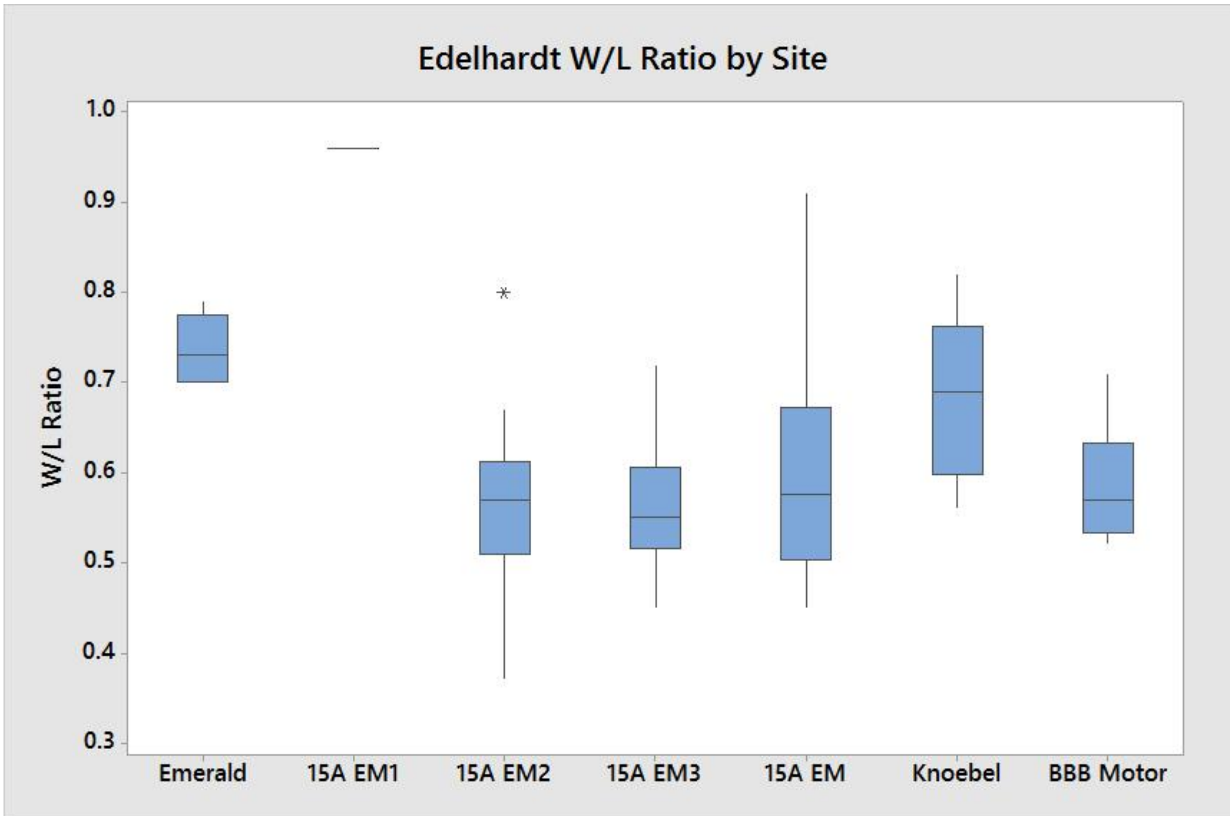

Figure 6.7. Comparisons of width to length ratio of Edelhardt structures from Emerald and select Edelhardt phase sites.

Figure 6.8. Projectile point from Feature 45.

Figure 6.9. All hoes from the Emerald site: a) Feature 61, Lohmann phase; b) Feature 45, Edelhardt phase.

Figure 6.10. All celts from the Emerald site: a) Feature 27, Lohmann phase; b) Feature 16, Moorehead phase; c) Feature 47, Edelhardt phase.

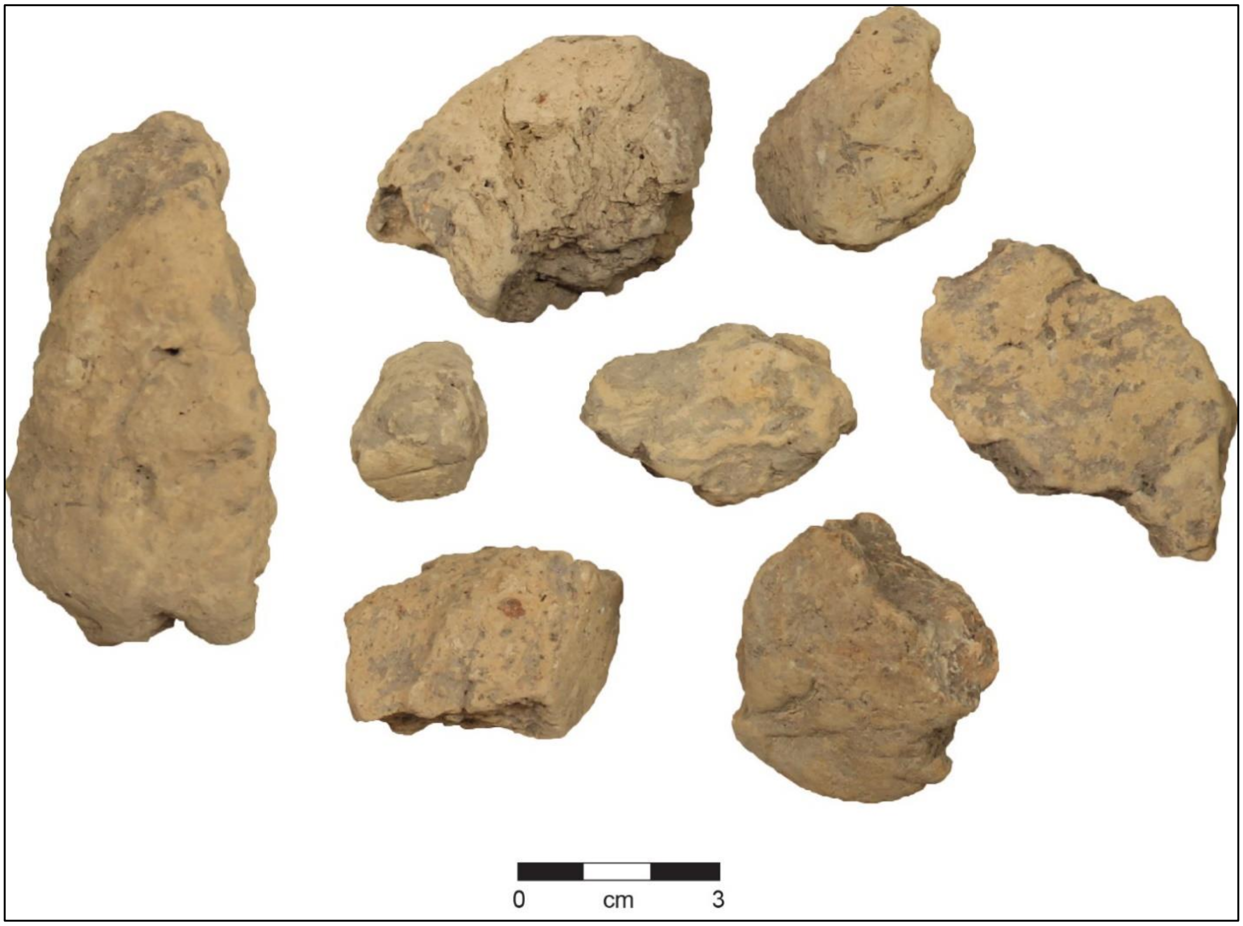

Figure 6.11. Sample of clay objects from Feature 20.

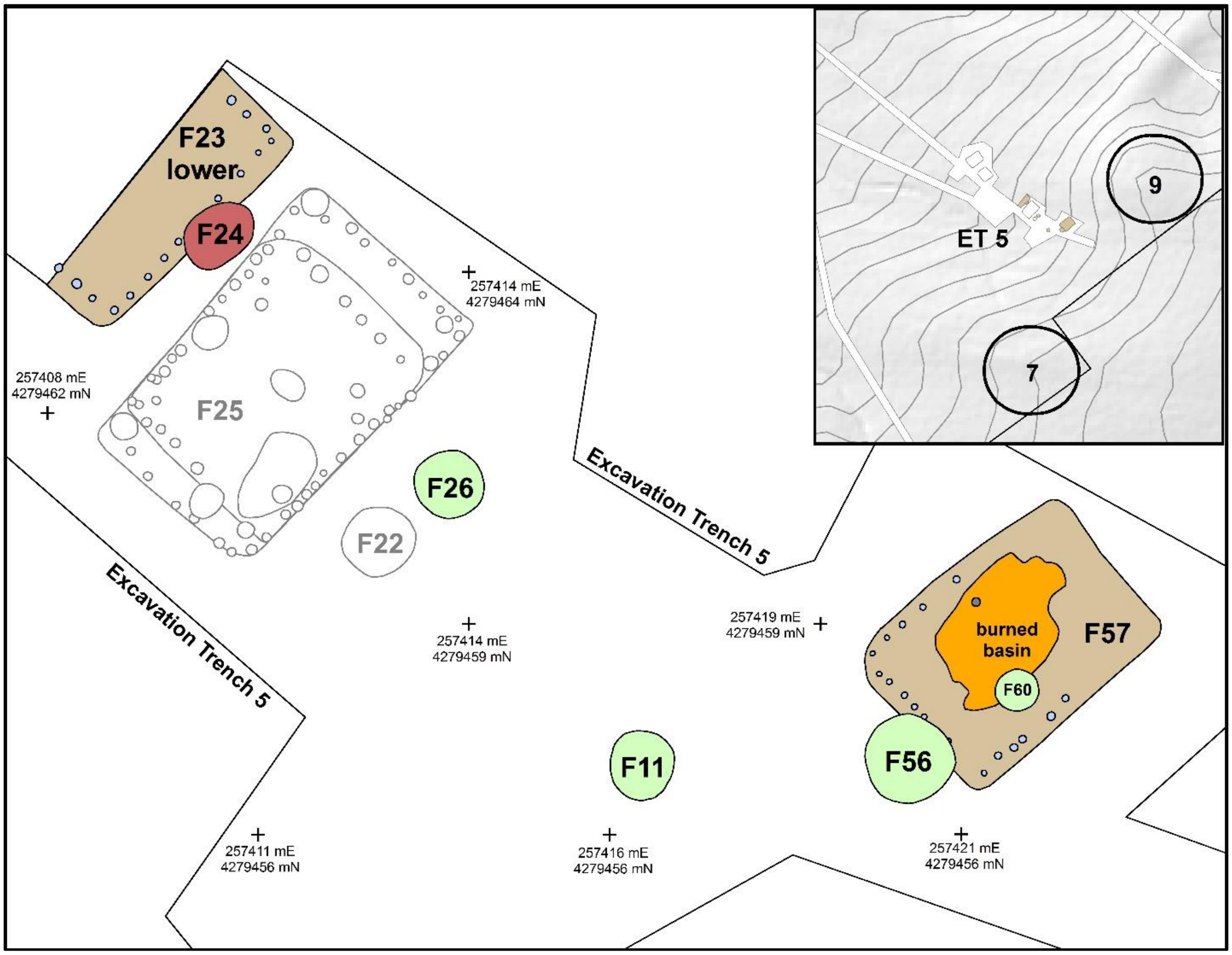

Figure 6.12. Edelhardt-Lohmann phase features in ET 5. All excavation blocks and features are oriented to UTM grid north.

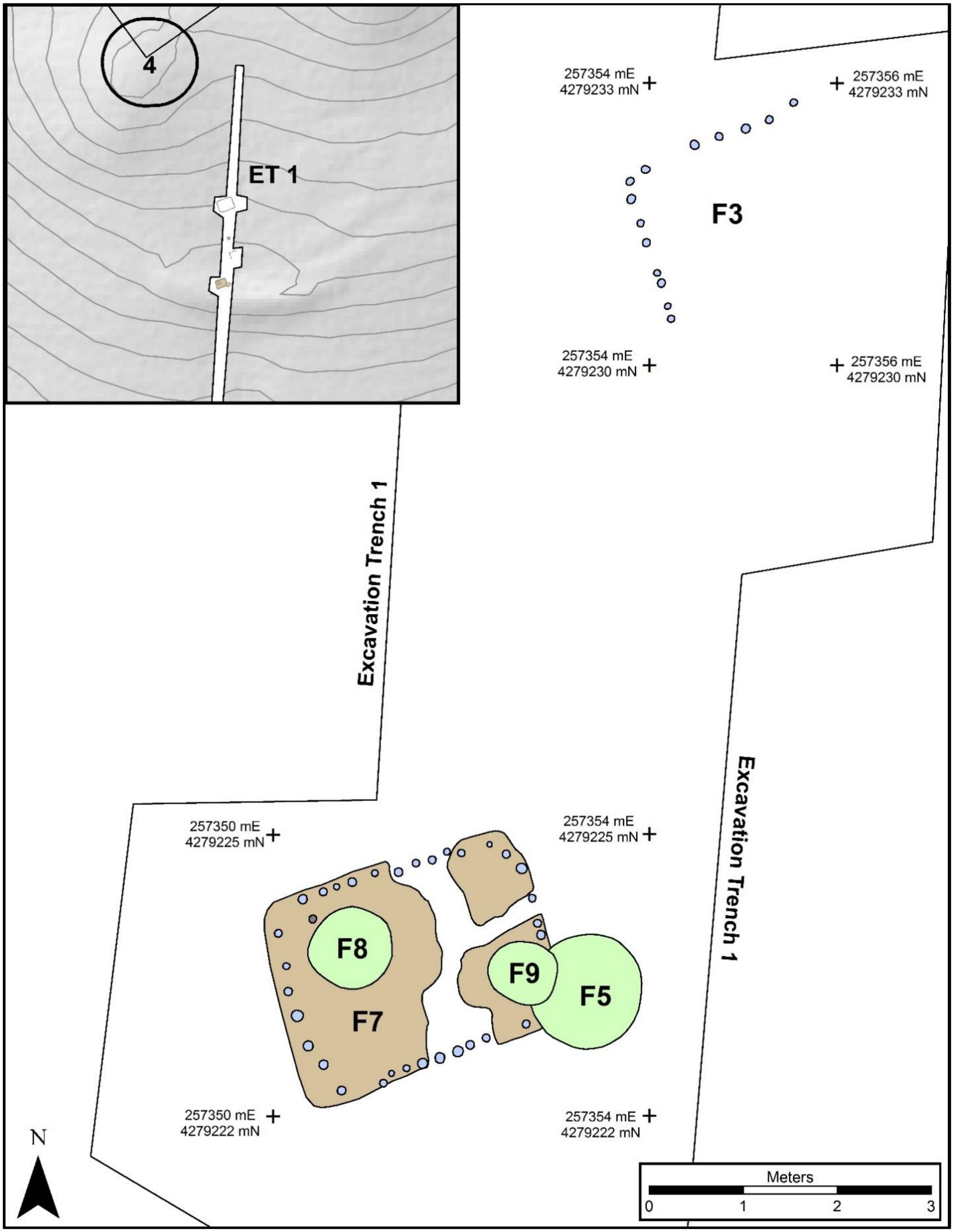

Figure 6.13. Edelhardt-Lohmann phase features in ET 1. All excavation blocks and features are oriented to UTM grid north.

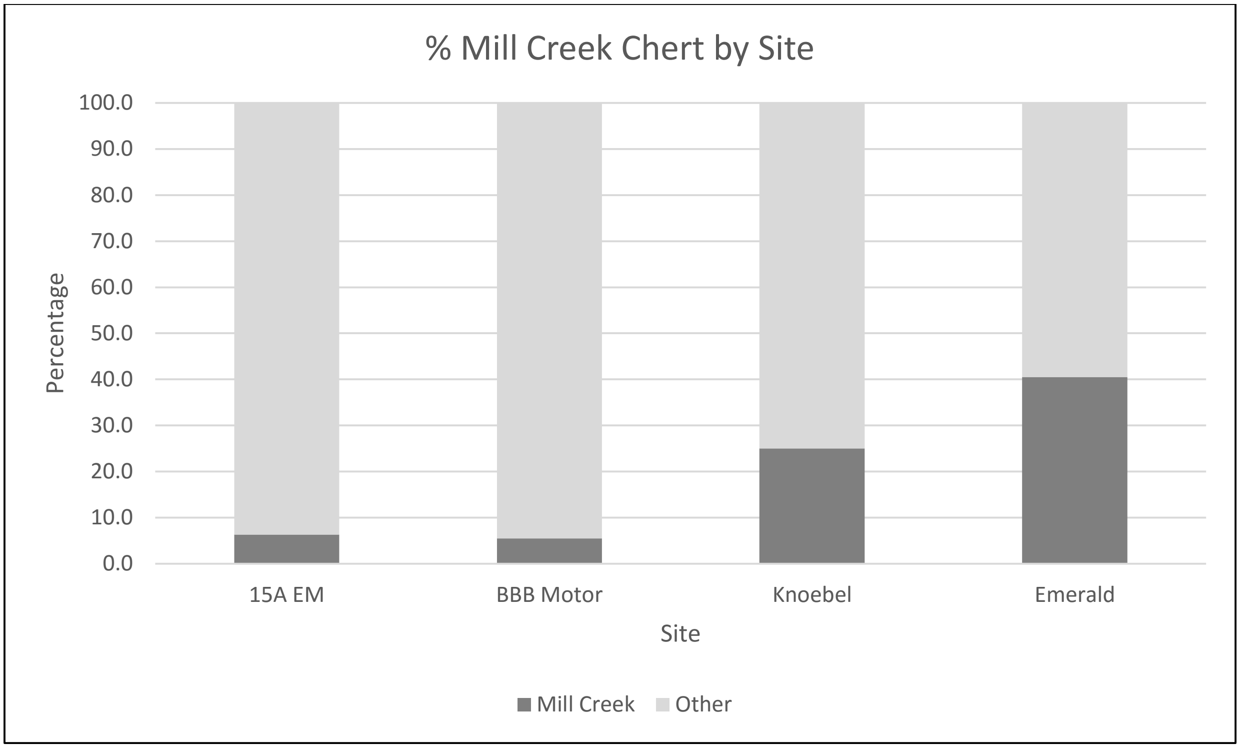

Figure 6.14. Comparison of percentage of Mill Creek chert from select Edelhardt phase sites.

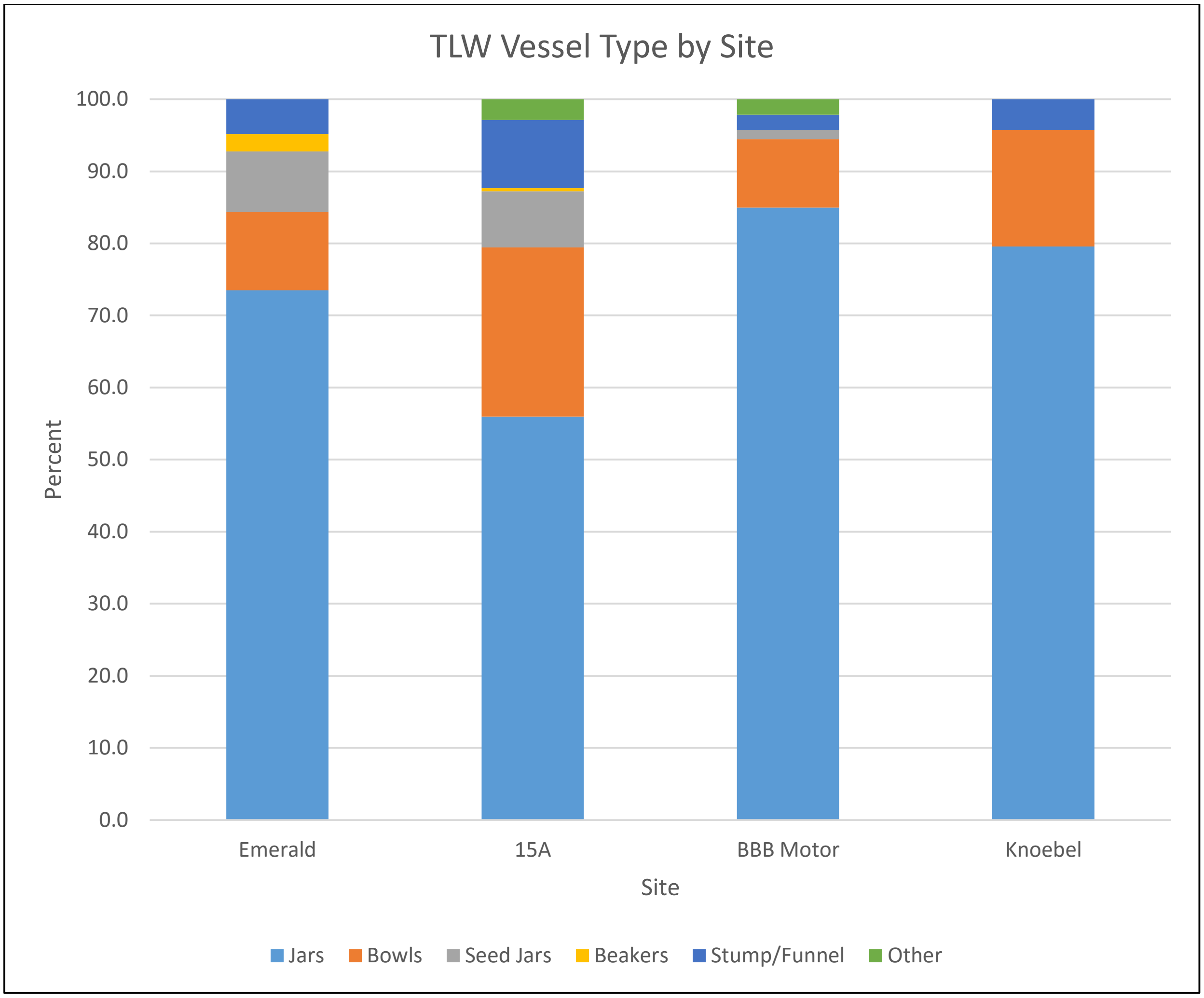

Figure 6.15. Comparison of proportion of vessel types from select Edelhardt phase sites.

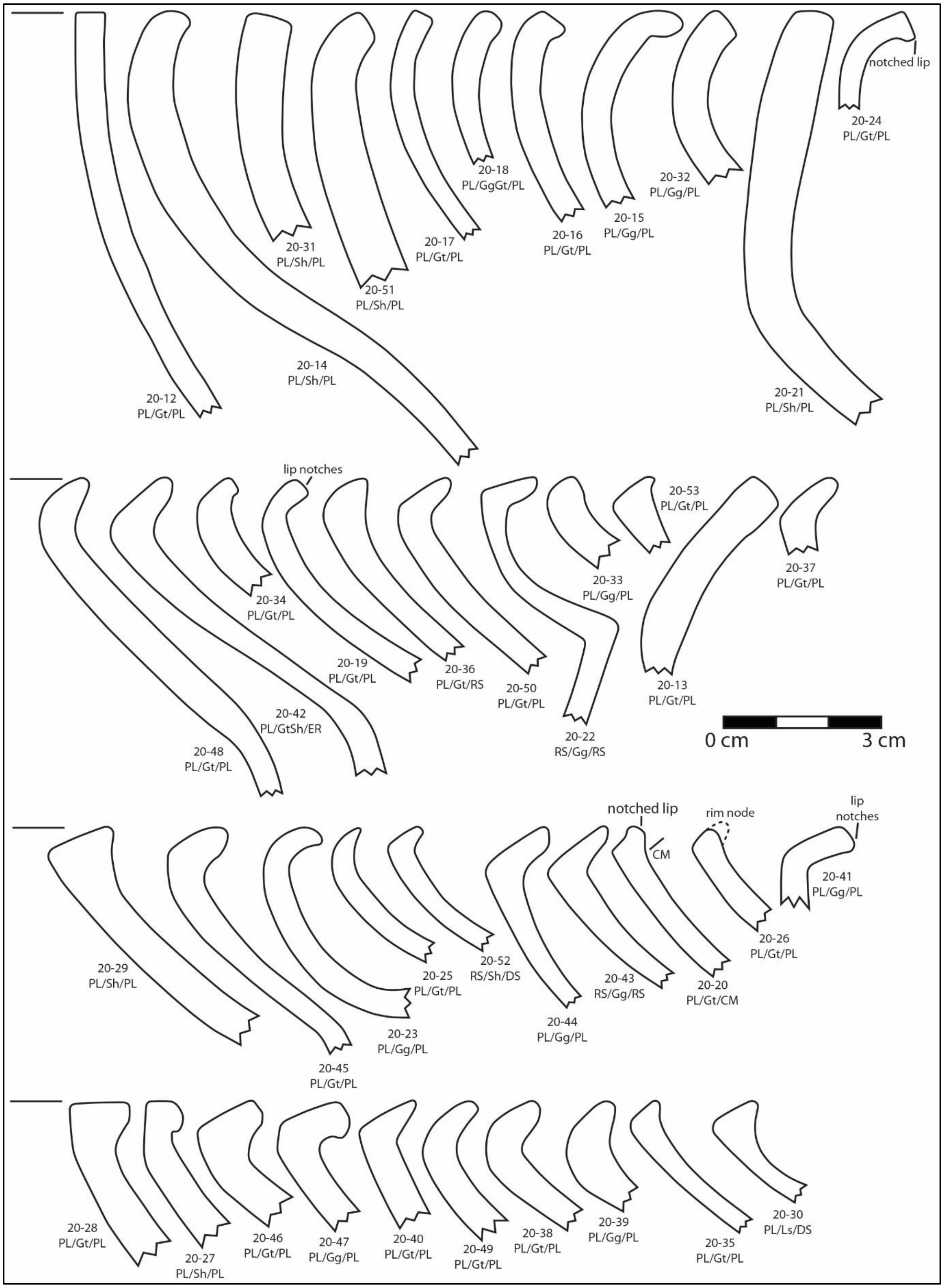

Figure 6.16. Jar rim profiles from Feature 20.

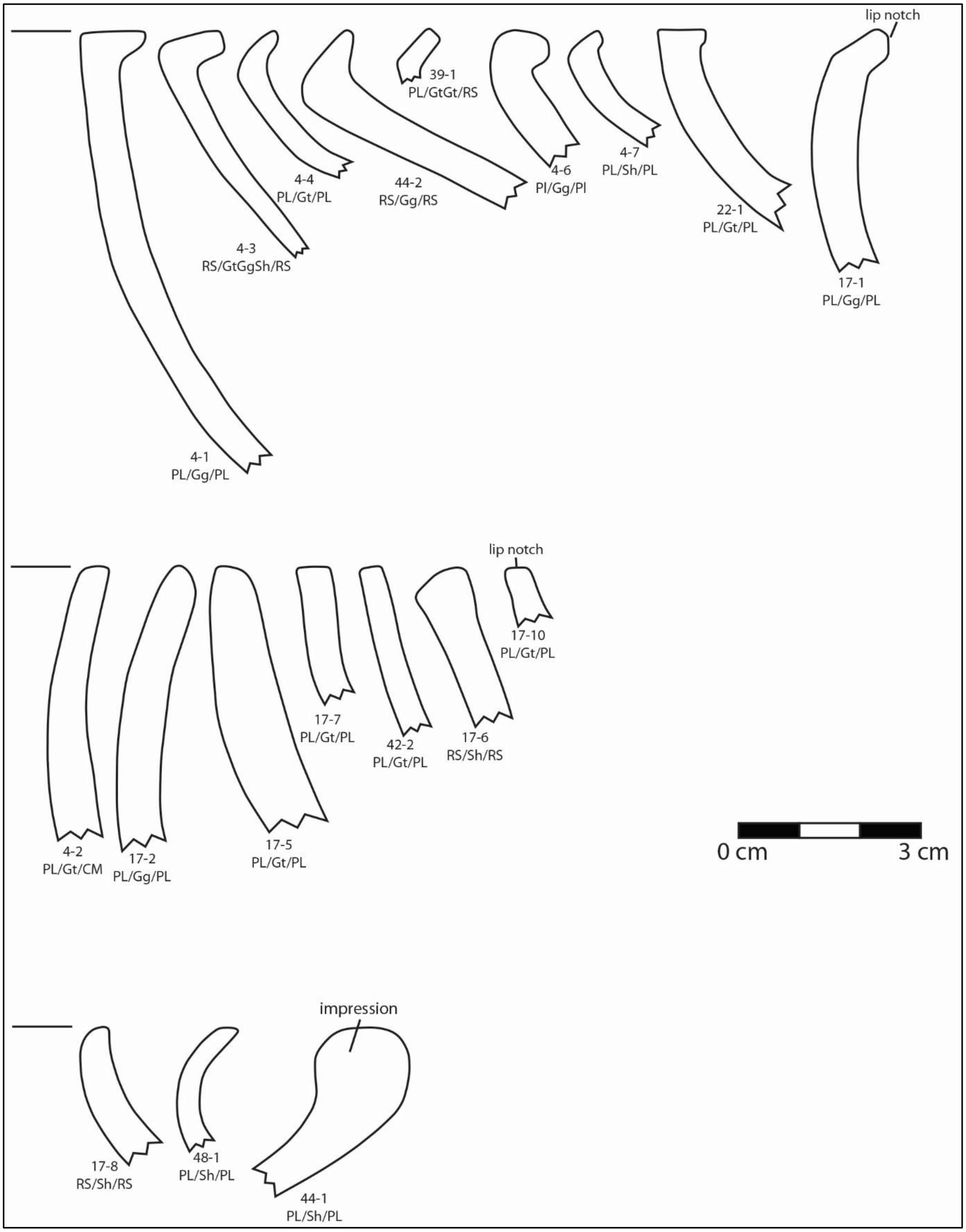

Figure 6.17. Jar rim profiles from all other Edelhardt phase features.

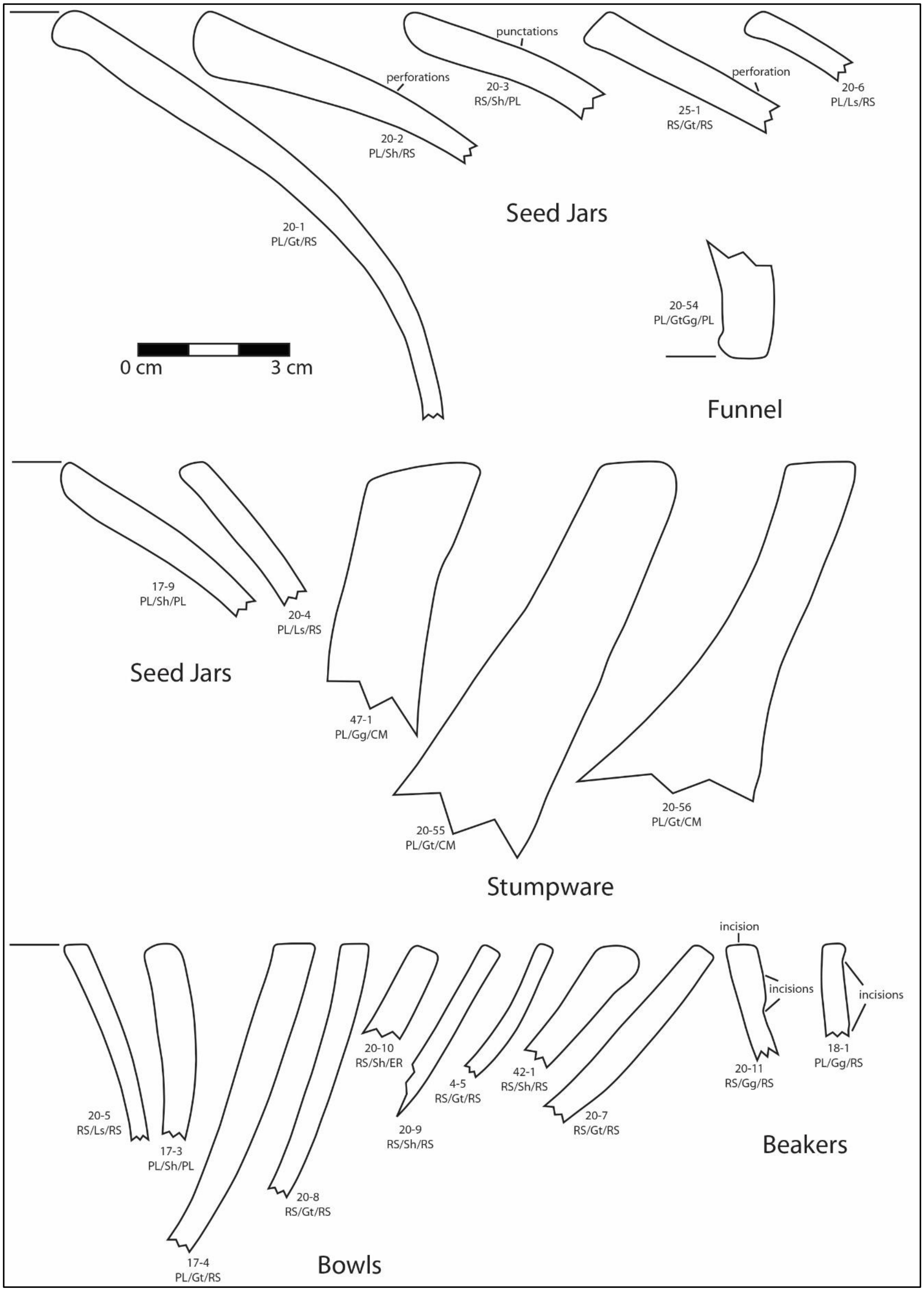

Figure 6.18. Rim profiles of other Edelhardt phase vessels.

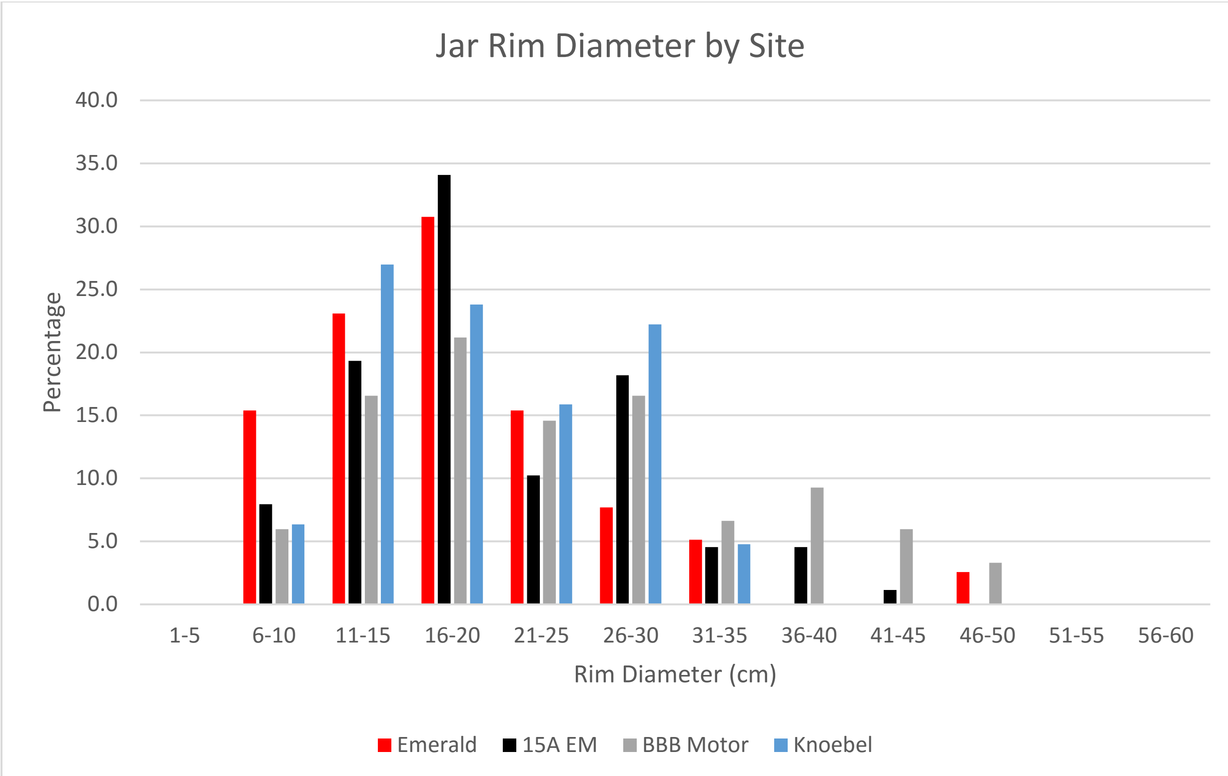

Figure 6.19. Comparison of jar rim diameters from Emerald and select Edelhardt phase sites.

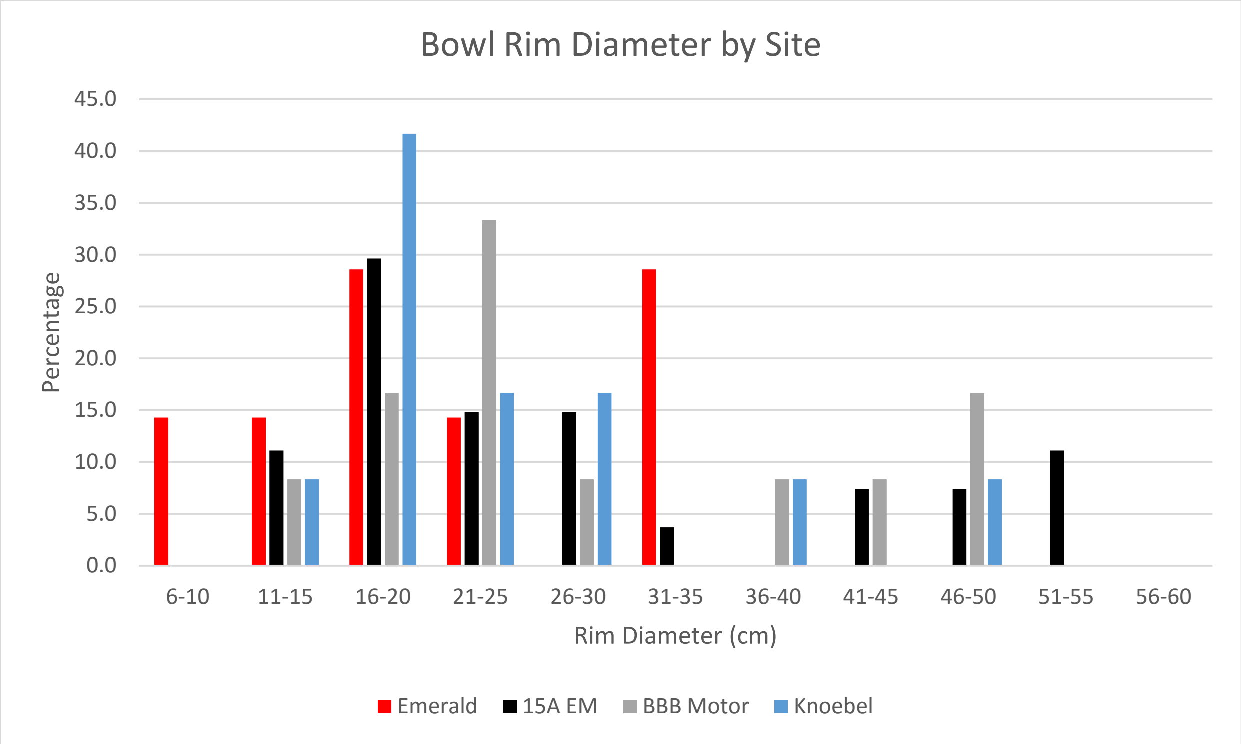

Figure 6.20. Comparison of bowl rim diameters from Emerald and select Edelhardt phase sites.

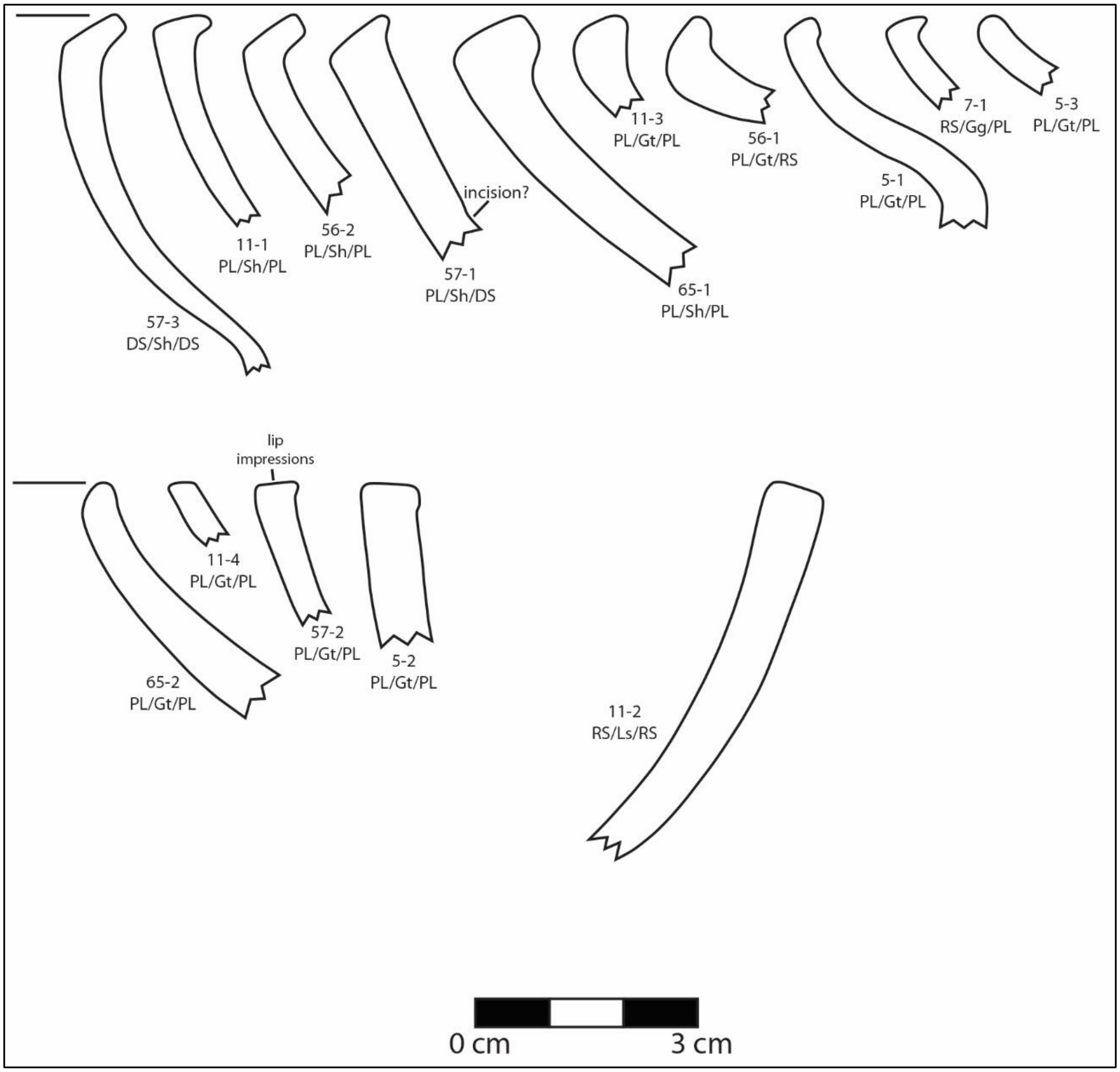

Figure 6.21. Rim profiles from all Edelhardt-Lohmann phase features.

Figure 6.22. Photo of non-local and decorated sherds from the Emerald site: a) Coles Creek beaker, Feature 20; b) Coles Creek beaker, Feature 18; c) Yankeetown jar rim castellation, Feature 44; d) Ramey Incised Jar, Feature 12; e) Dillinger jar, Feature 12; f) Incised sherd, Feature 20; g) Incised sherd, Feature 20.

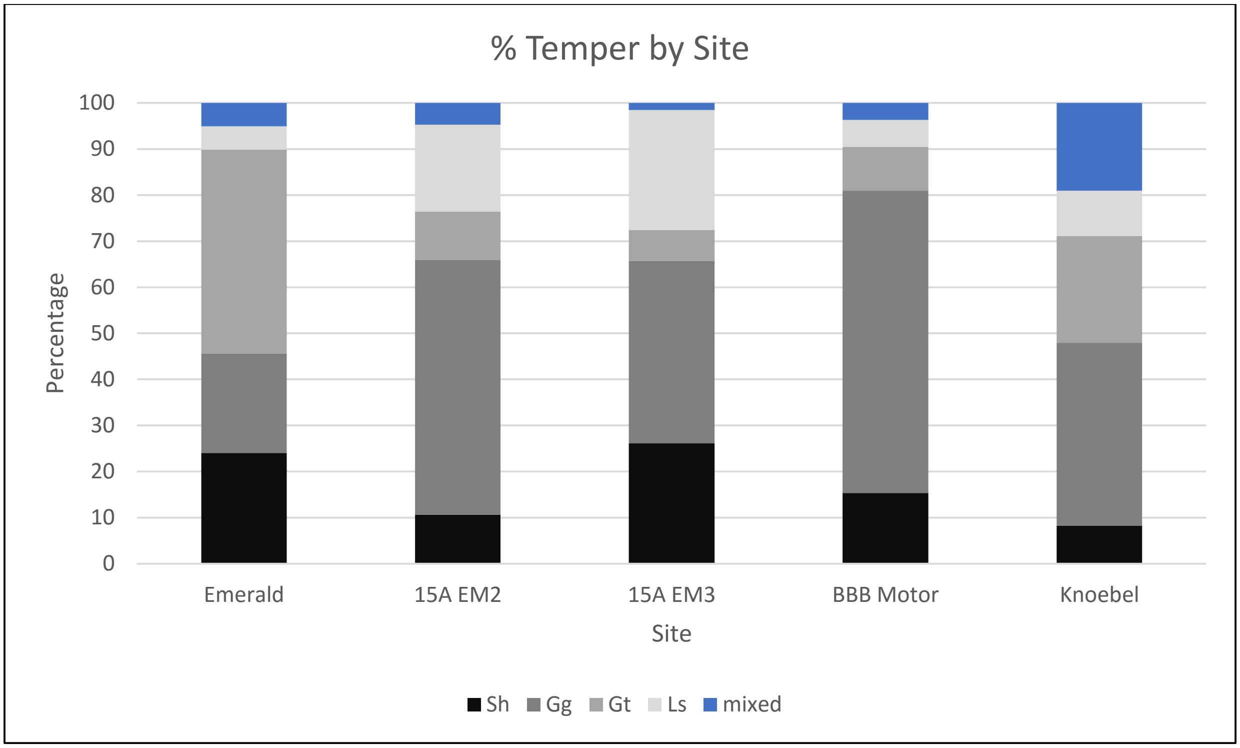

Figure 6.23. Comparison of temper proportions from select Edelhardt phase sites.

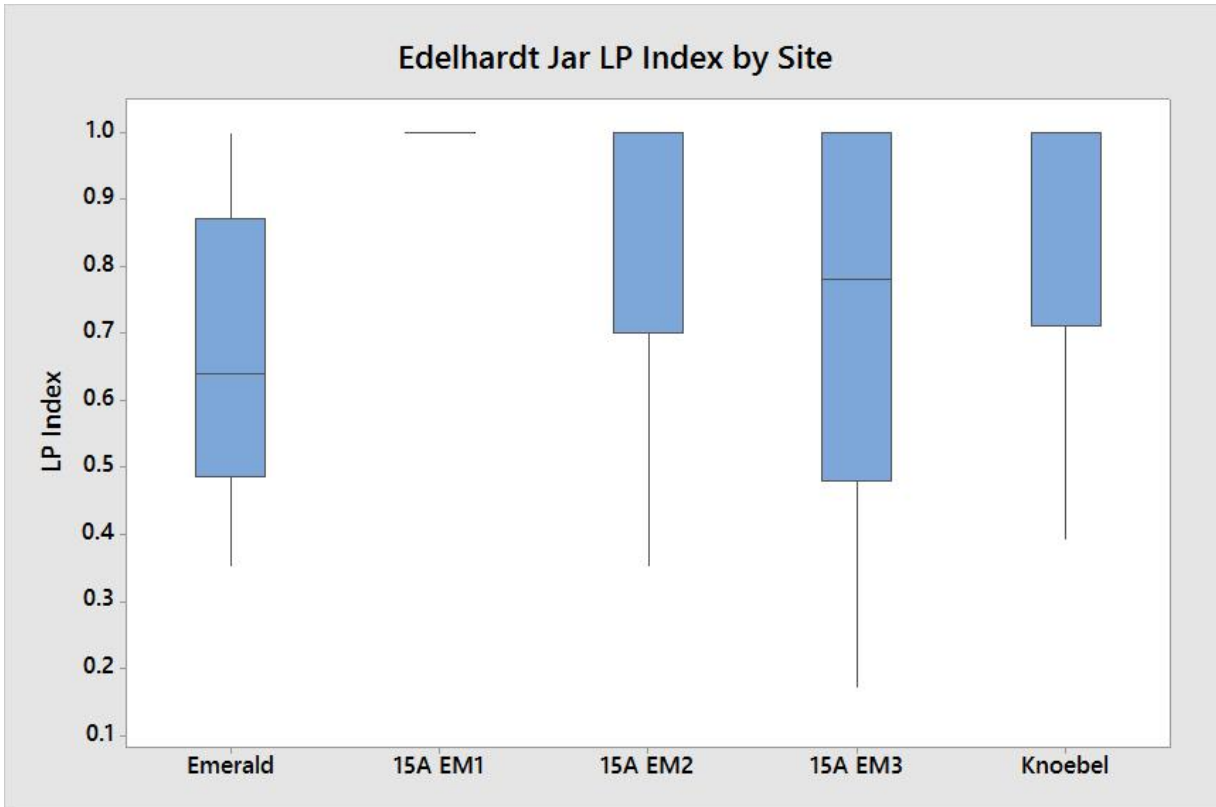

Figure 6.24. Comparison of LP indices of jars from Emerald and select Edelhardt phase sites.

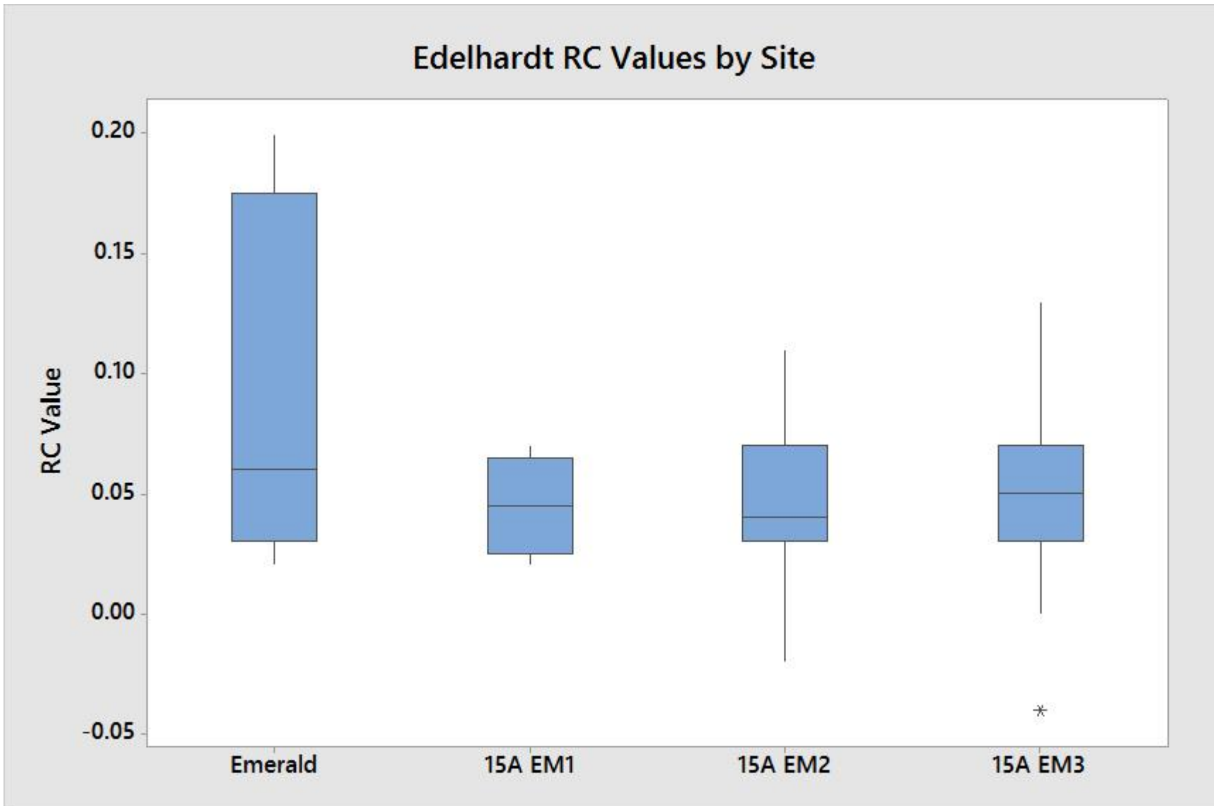

Figure 6.25. Comparison of RC measurements of jars from Emerald and select Edelhardt phase sites.

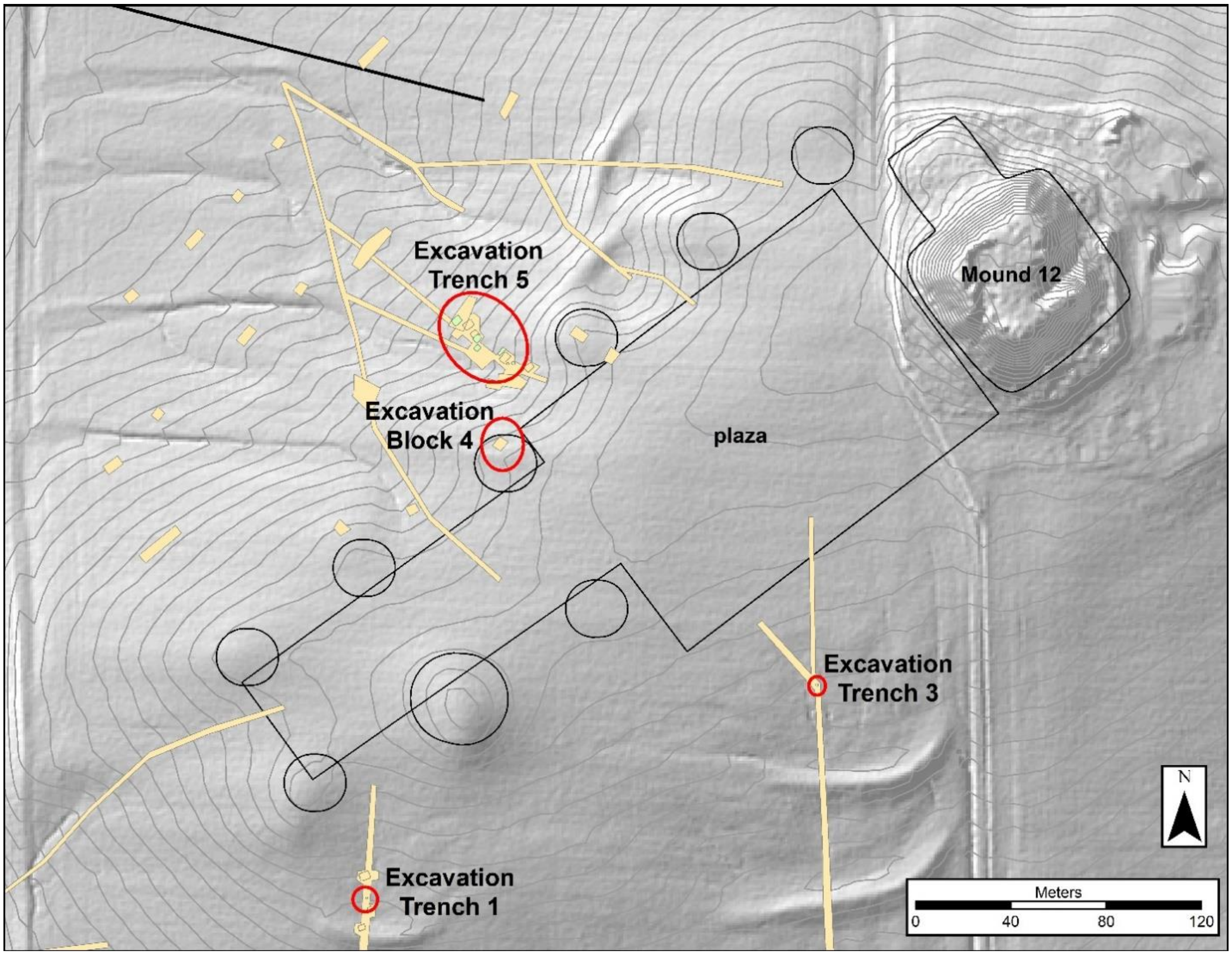

Figure 6.26. Location of Lohmann phase features at the Emerald site. All excavation blocks and features are oriented to UTM grid north.

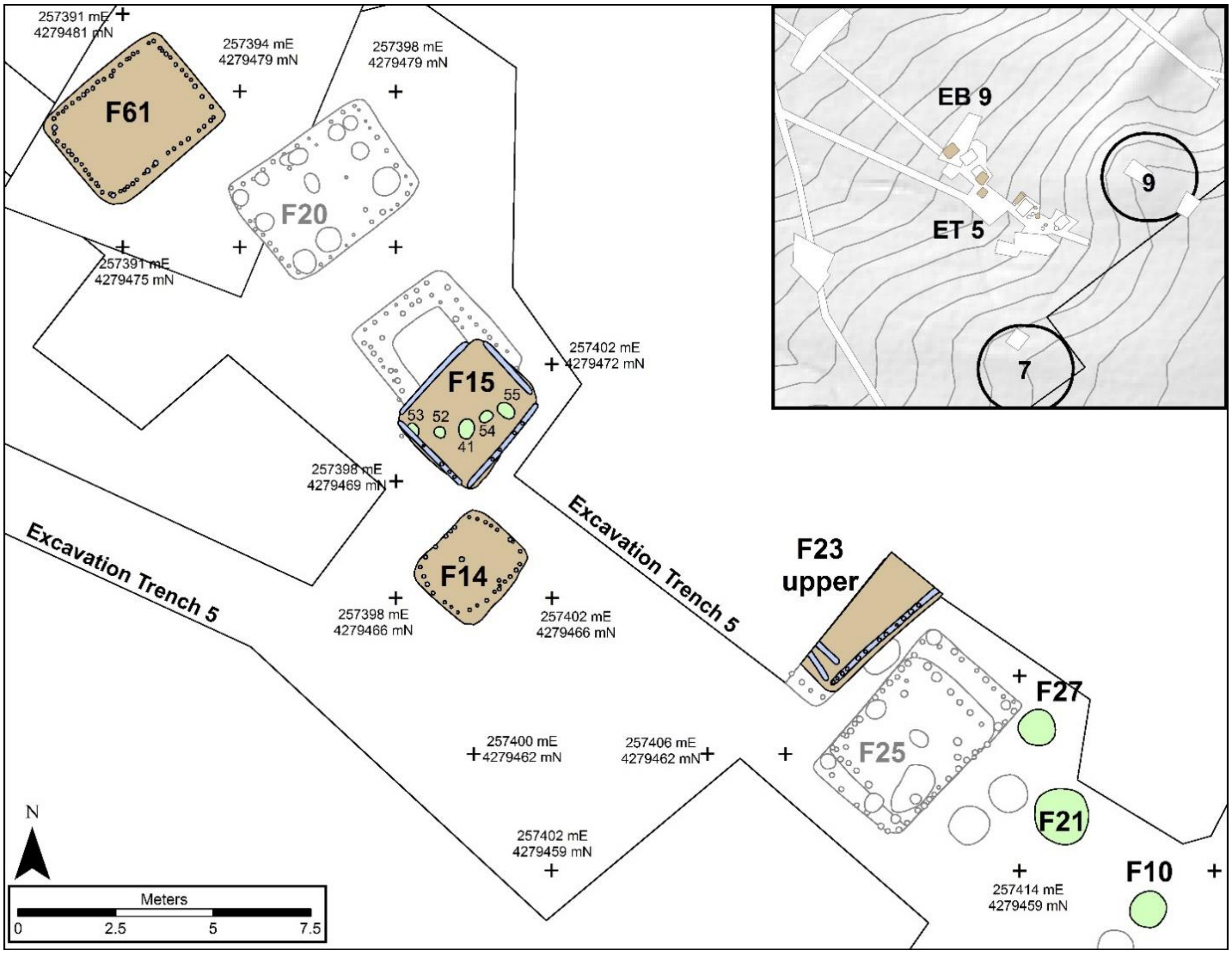

Figure 6.27. Plan map of Lohmann phase features in ET 5. All excavation blocks and features are oriented to UTM grid north.

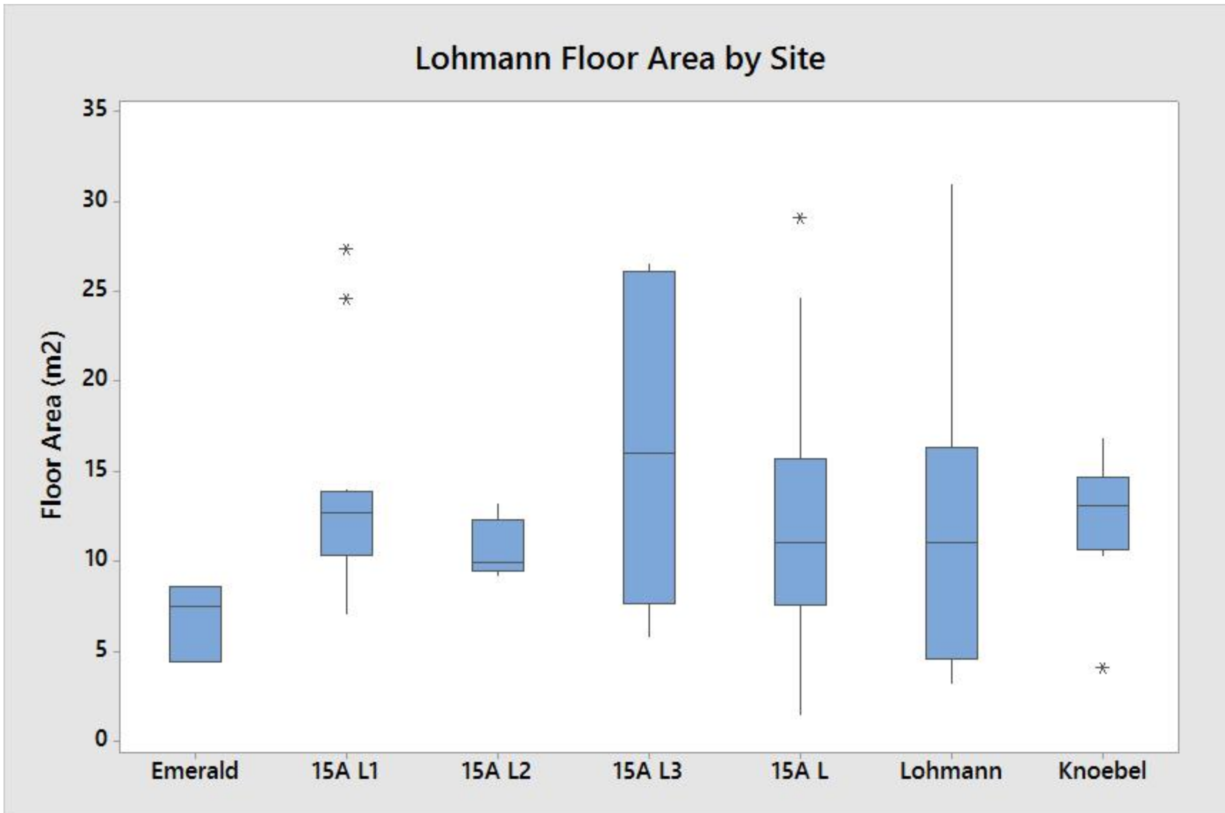

Figure 6.28. Comparison of floor area of structures from Emerald and select Lohmann phase sites.

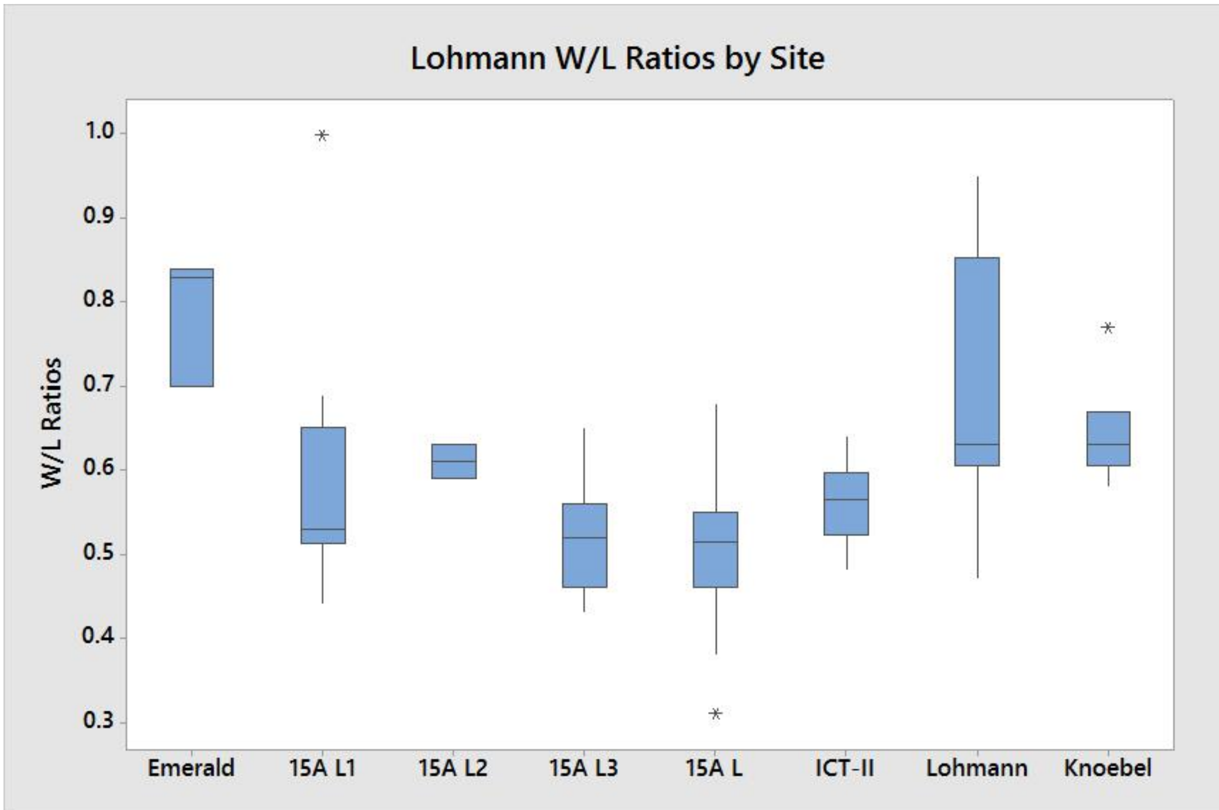

Figure 6.29. Comparisons of width to length ratio of structures from Emerald and select Lohmann phase sites.

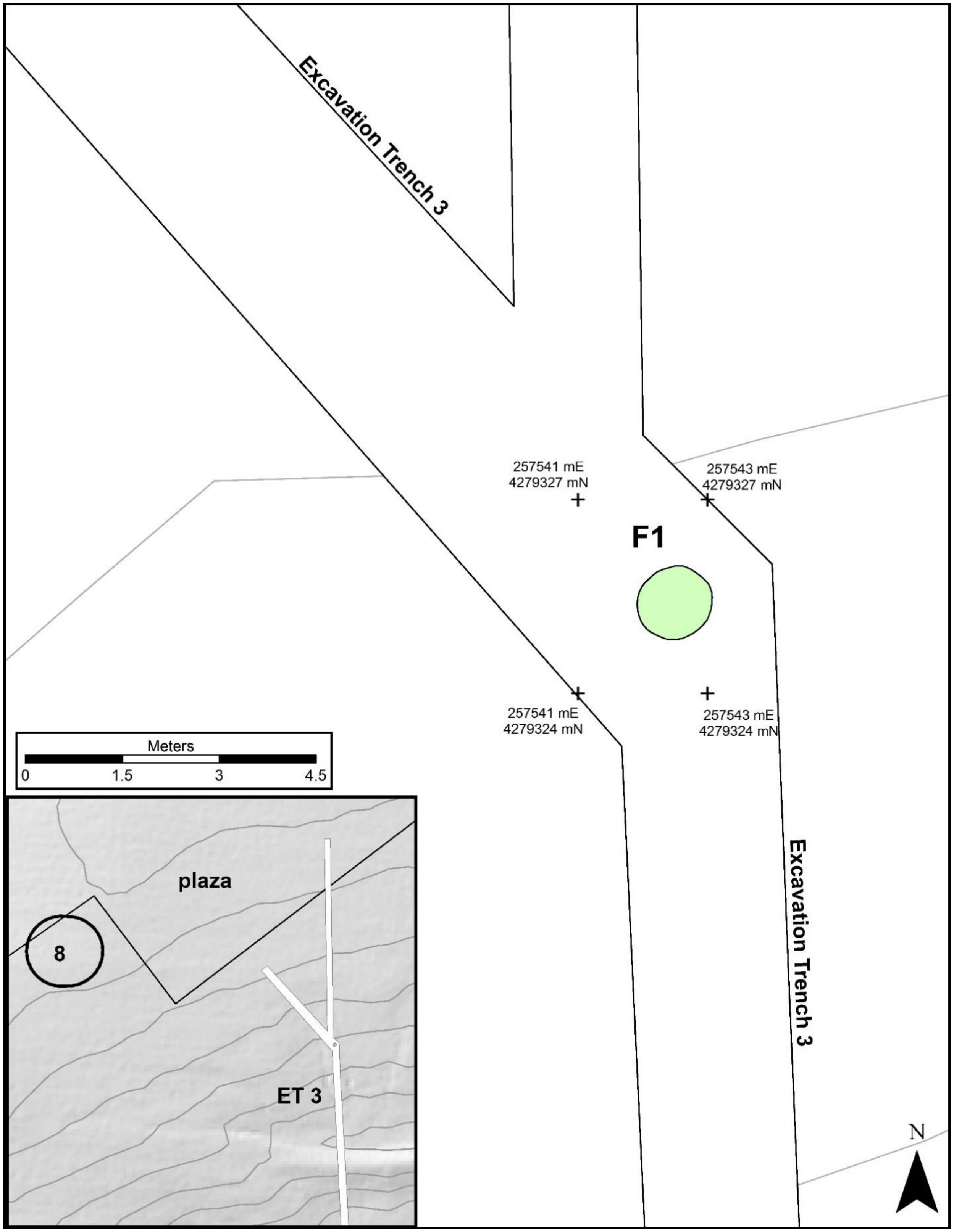

Figure 6.30. Feature 1, located in ET 3. All excavation blocks and features are oriented to UTM grid north.

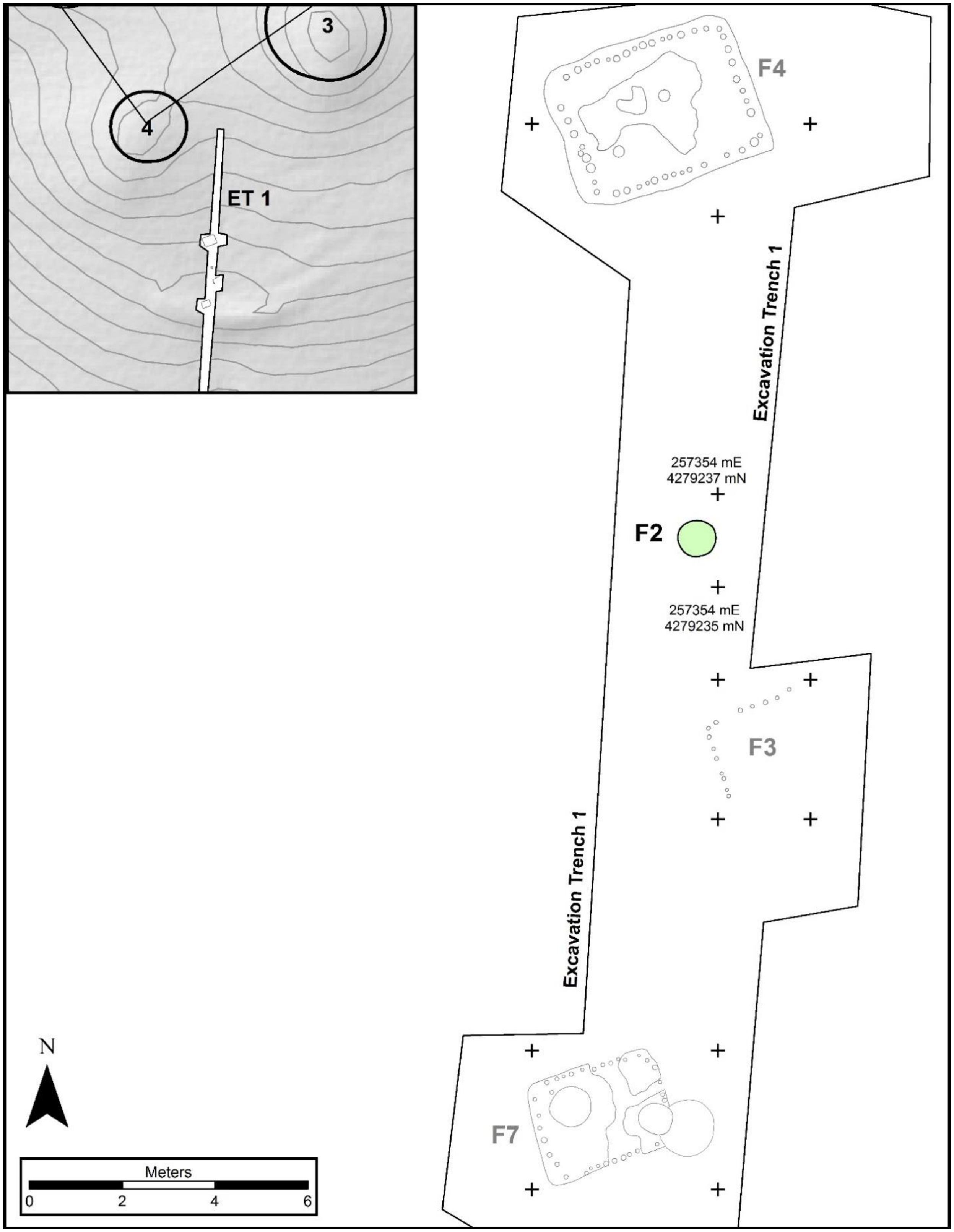

Figure 6.31. Feature 2, located in ET 1. All excavation blocks and features are oriented to UTM grid north.

Figure 6.32. Sample of clay objects from Feature 1.

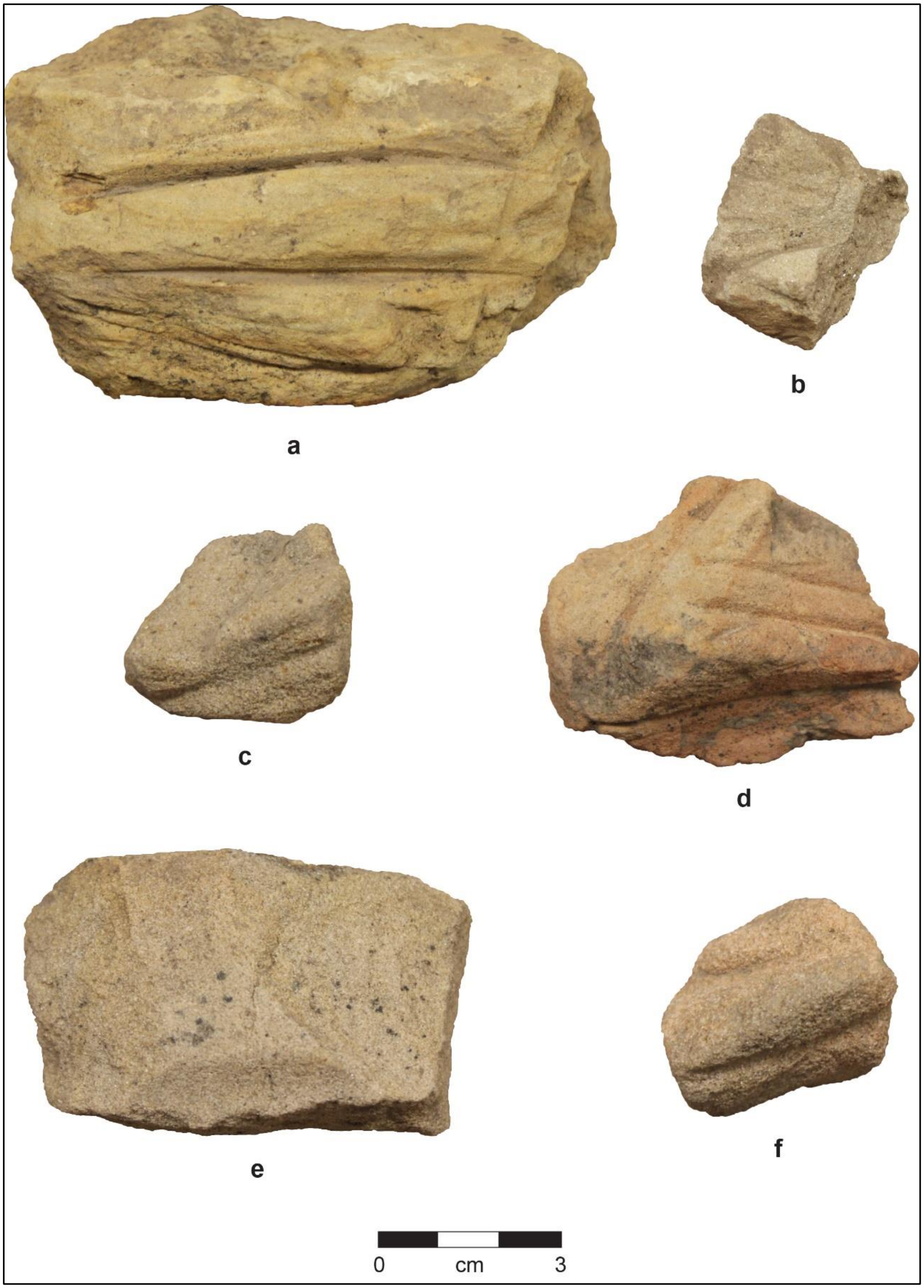

Figure 6.33. Select abraders from the Emerald site: a) Feature 23 upper, Lohmann; b) Feature 7, Edelhardt-Lohmann; c) Feature 57, Edelhardt-Lohmann; d) Feature 39, Edelhardt; e) Feature 28, Edelhardt; f) Feature 34, Edelhardt.

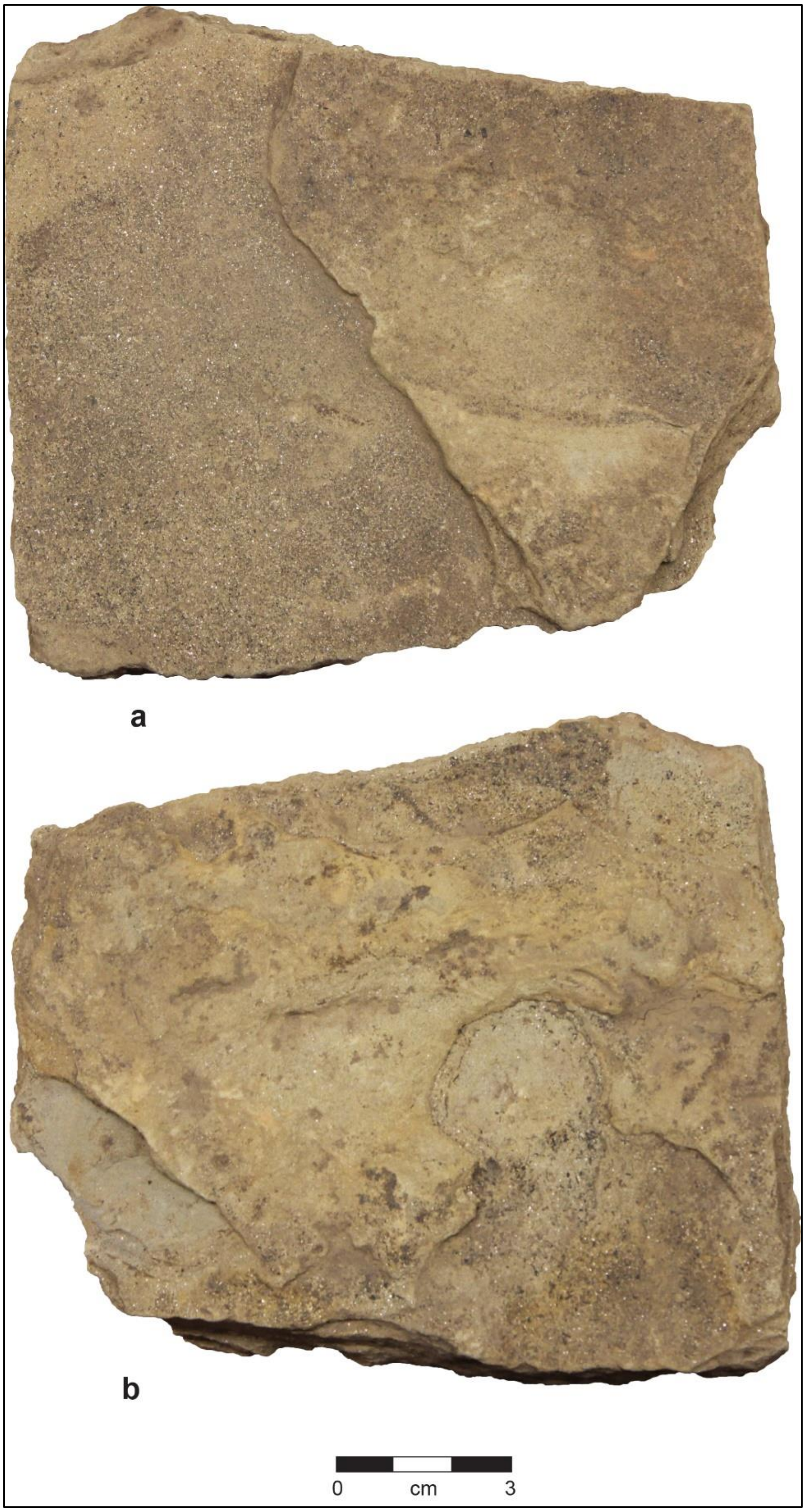

Figure 6.34. Photo of flat abrader/nutting stone, with both sides depicted.

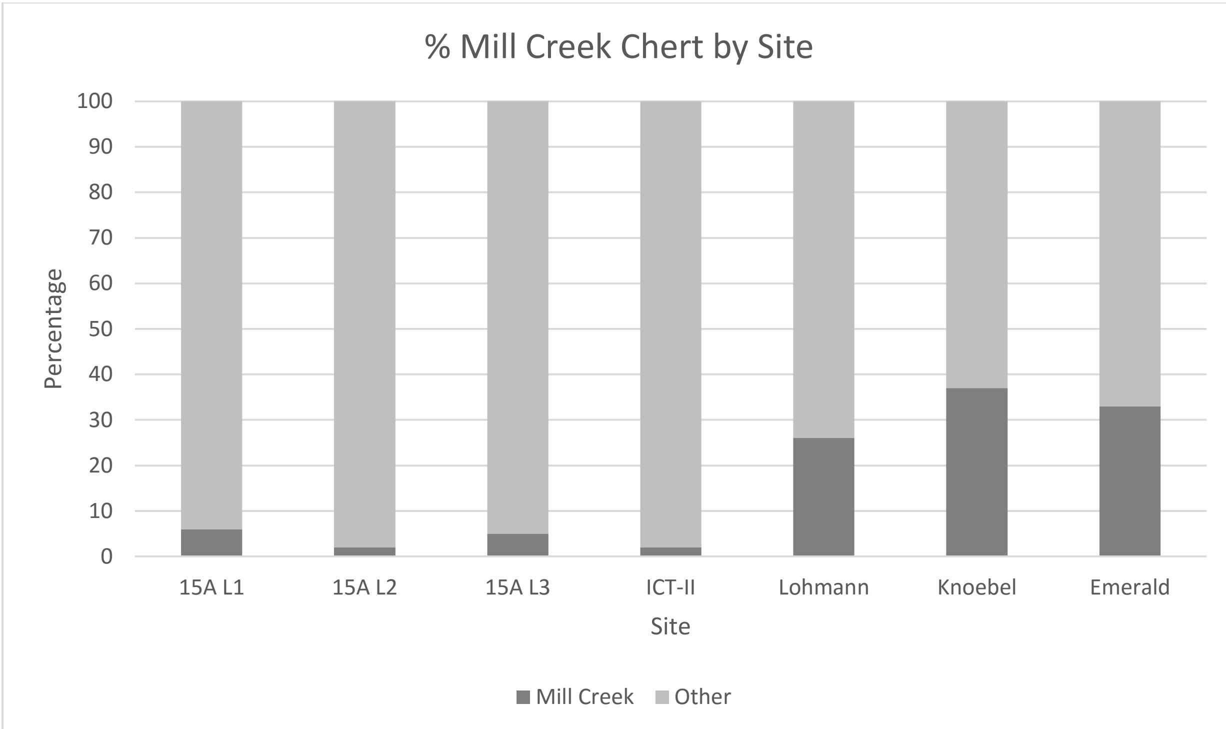

Figure 6.35. Comparison of percentage of Mill Creek chert from select Lohmann phase sites.

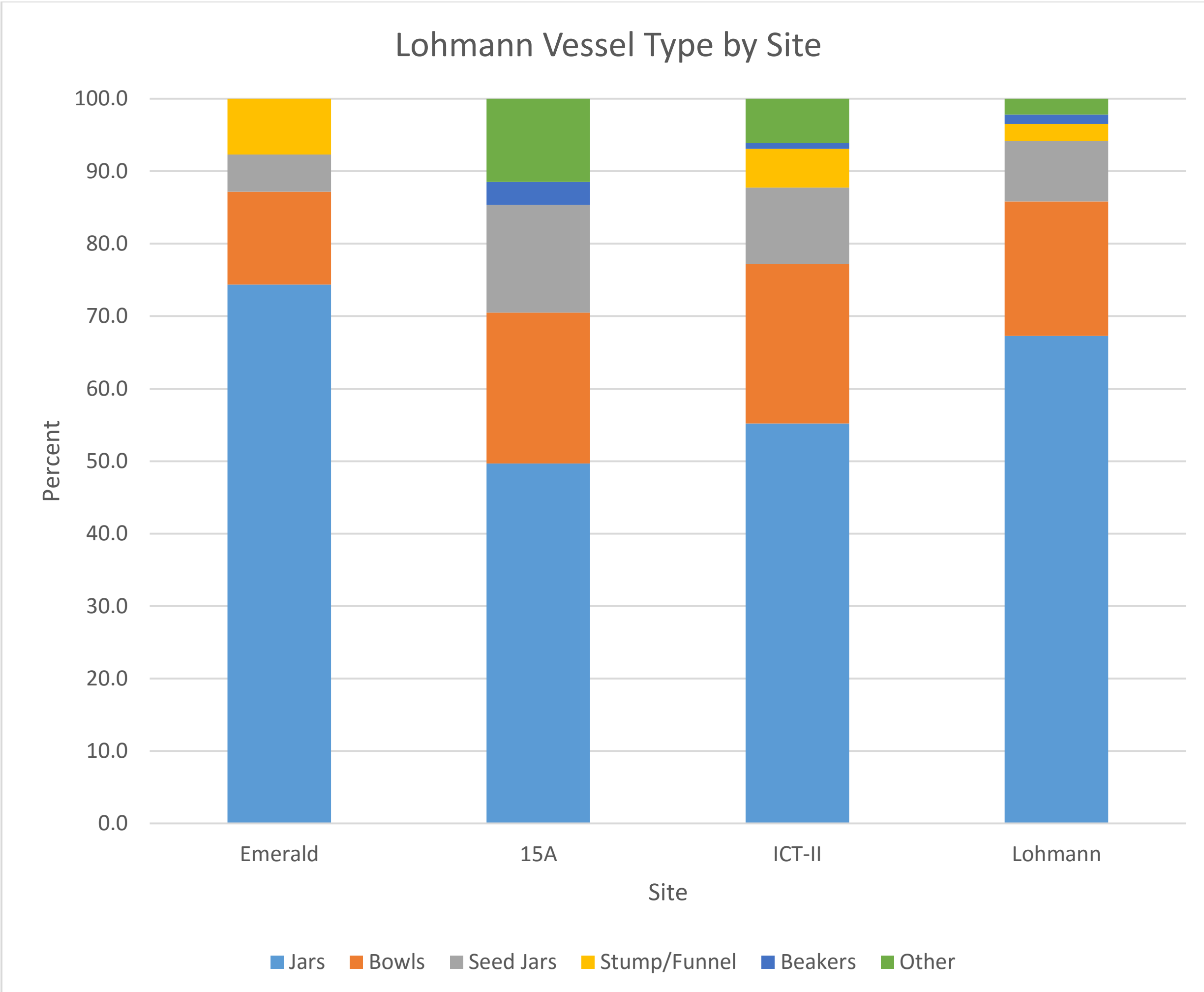

Figure 6.36. Comparison of proportion of vessel types from select Lohmann phase sites.

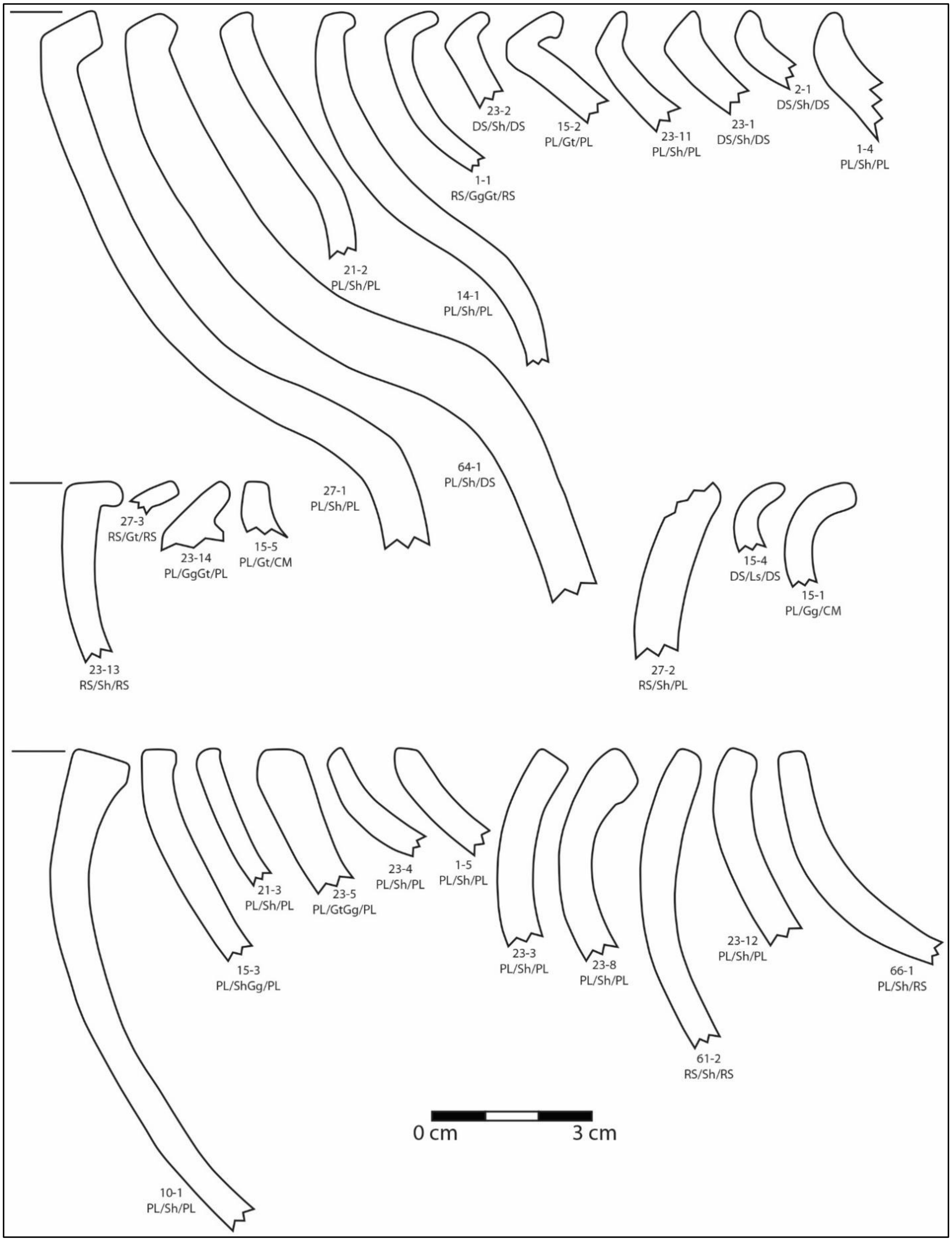

Figure 6.37. Lohmann phase jar rim profiles.

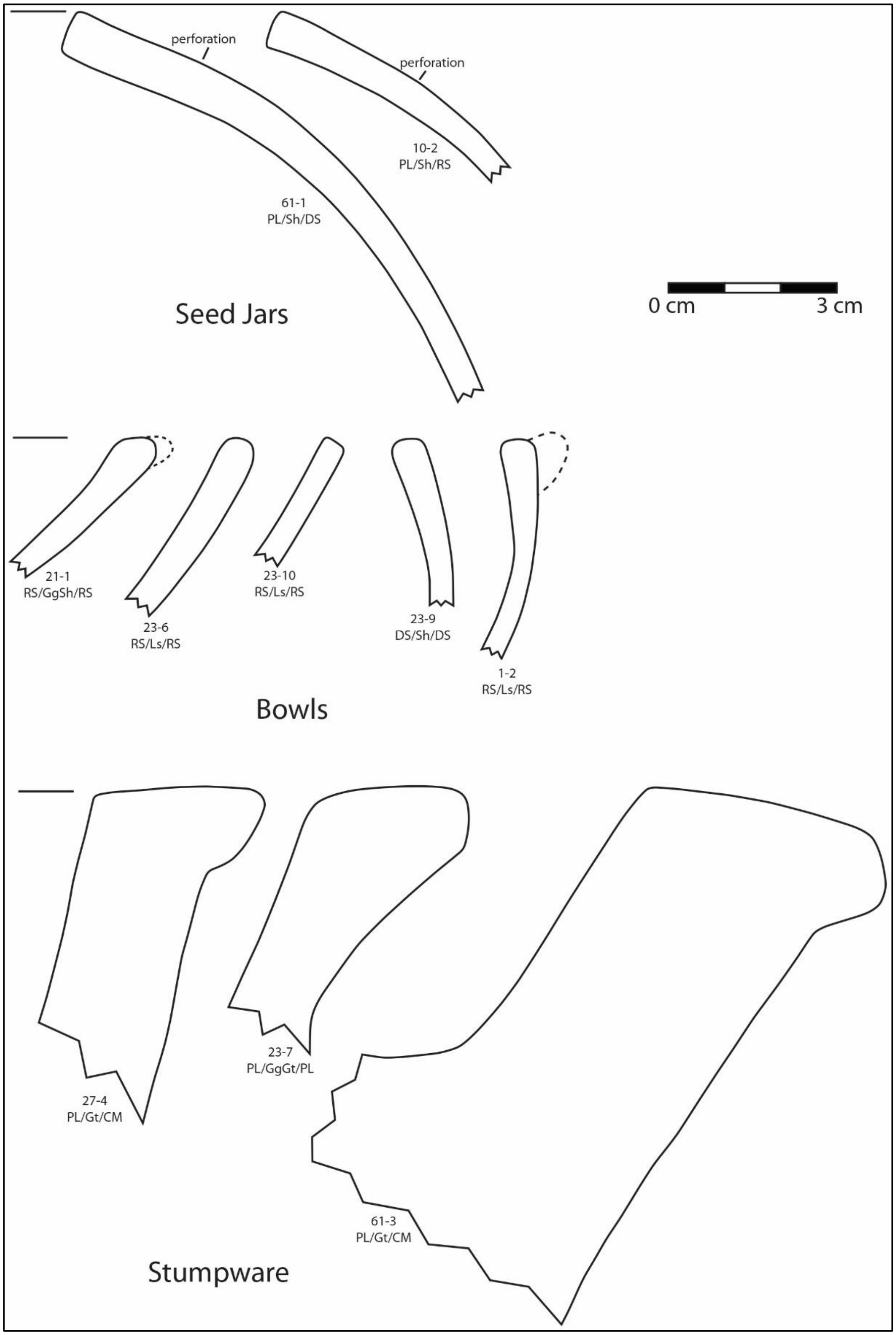

Figure 6.38. Rim profiles from other Lohmann phase vessels.

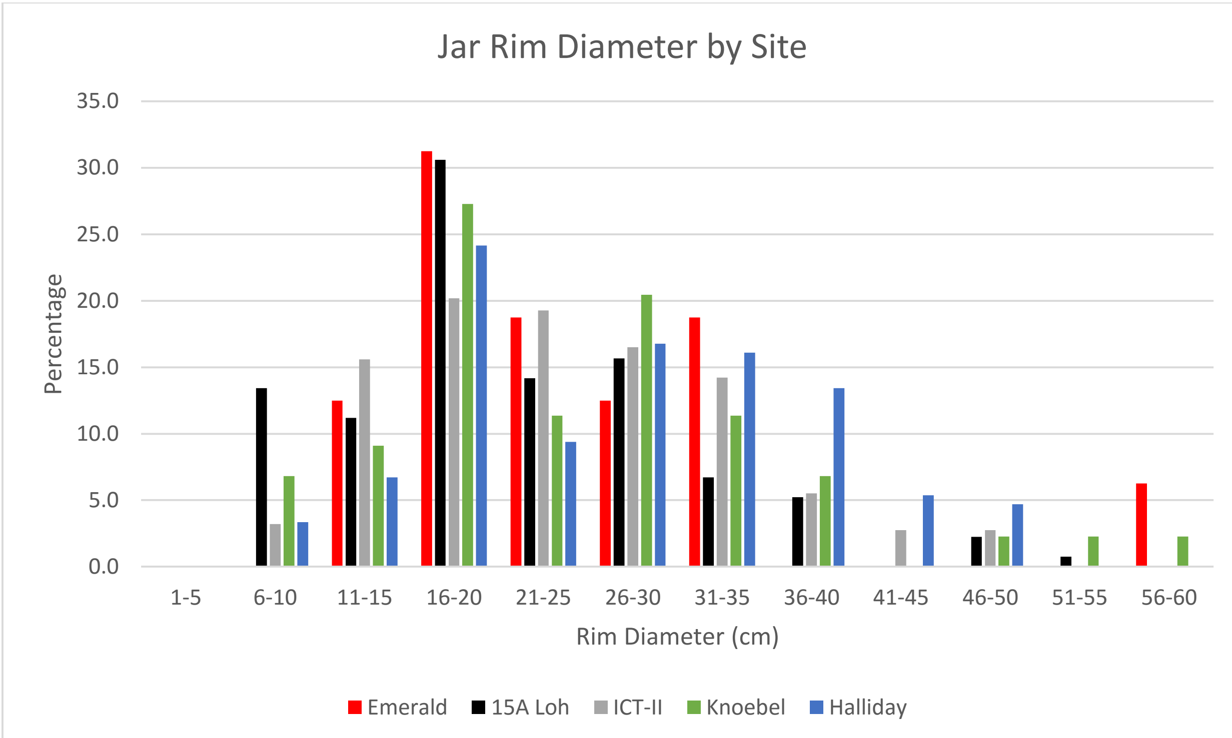

Figure 6.39. Comparison of jar rim diameters from Emerald and select Lohmann phase sites.

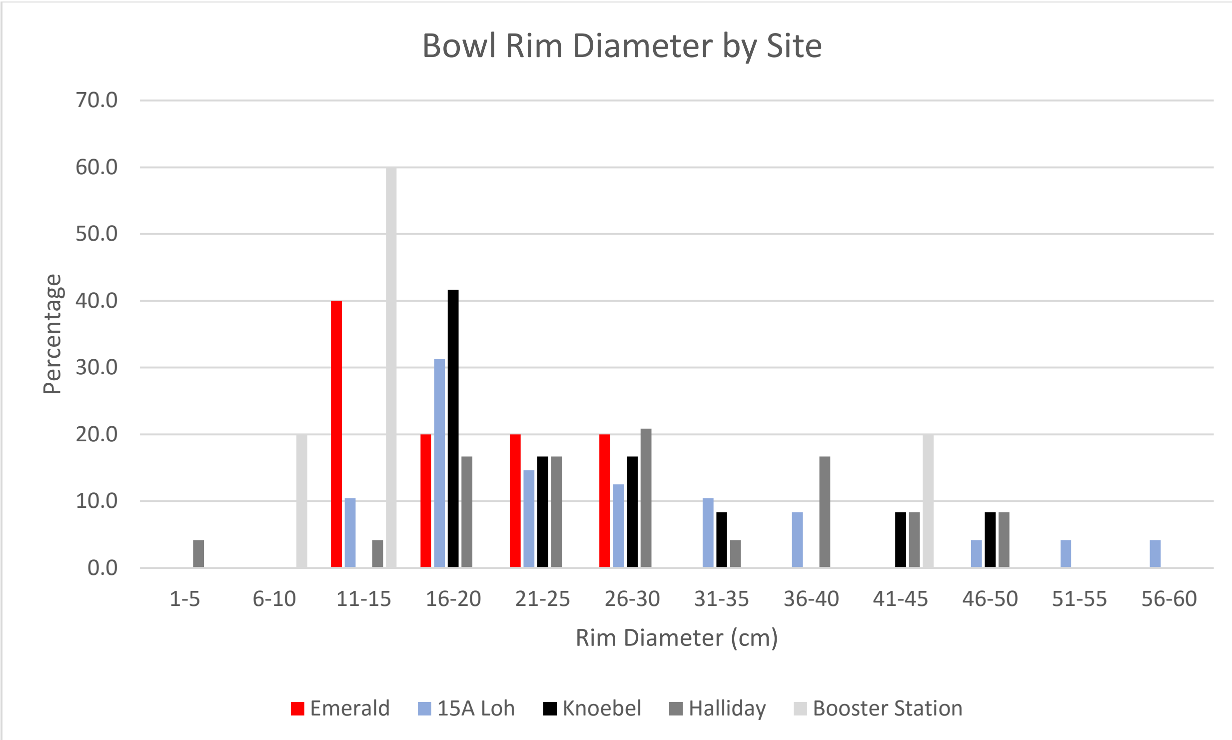

Figure 6.40. Comparison of bowl rim diameters from Emerald and select Lohmann phase sites.

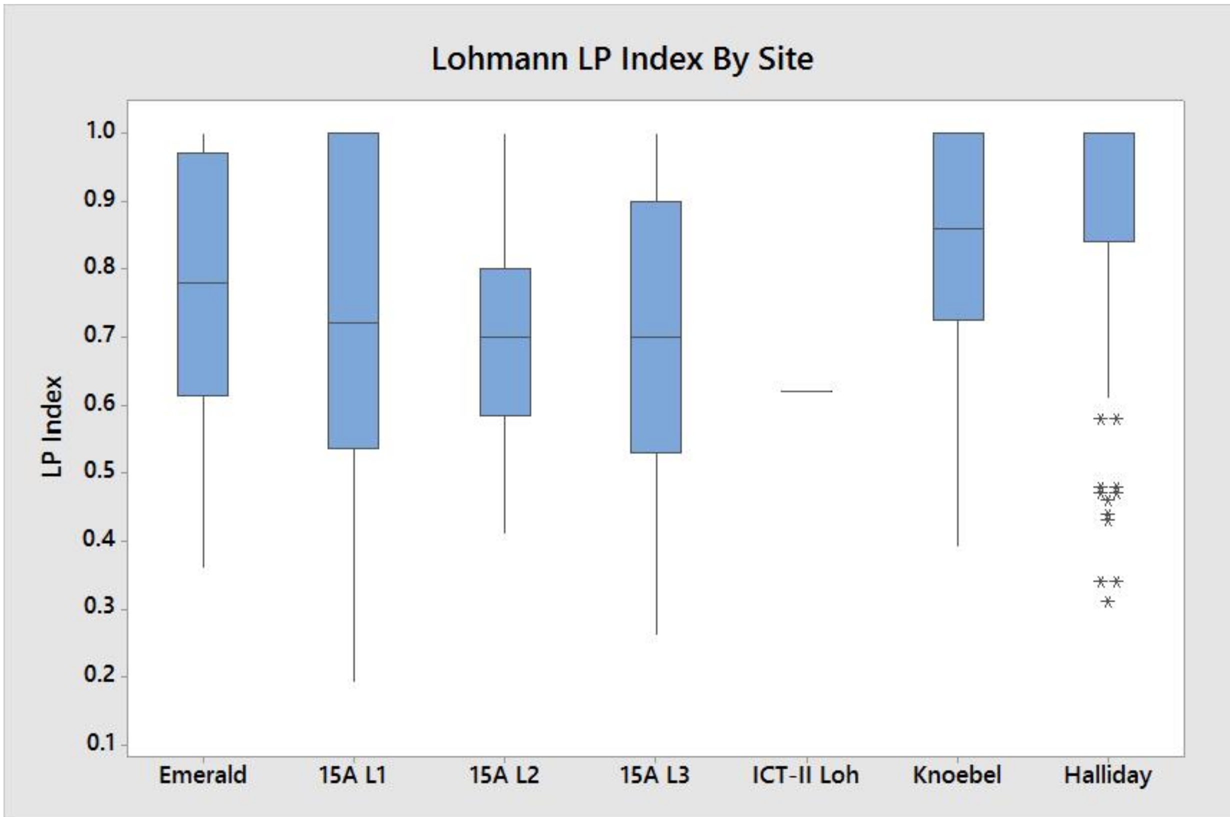

Figure 6.41. Comparison of LP indices of jars from Emerald and select Lohmann phase sites.

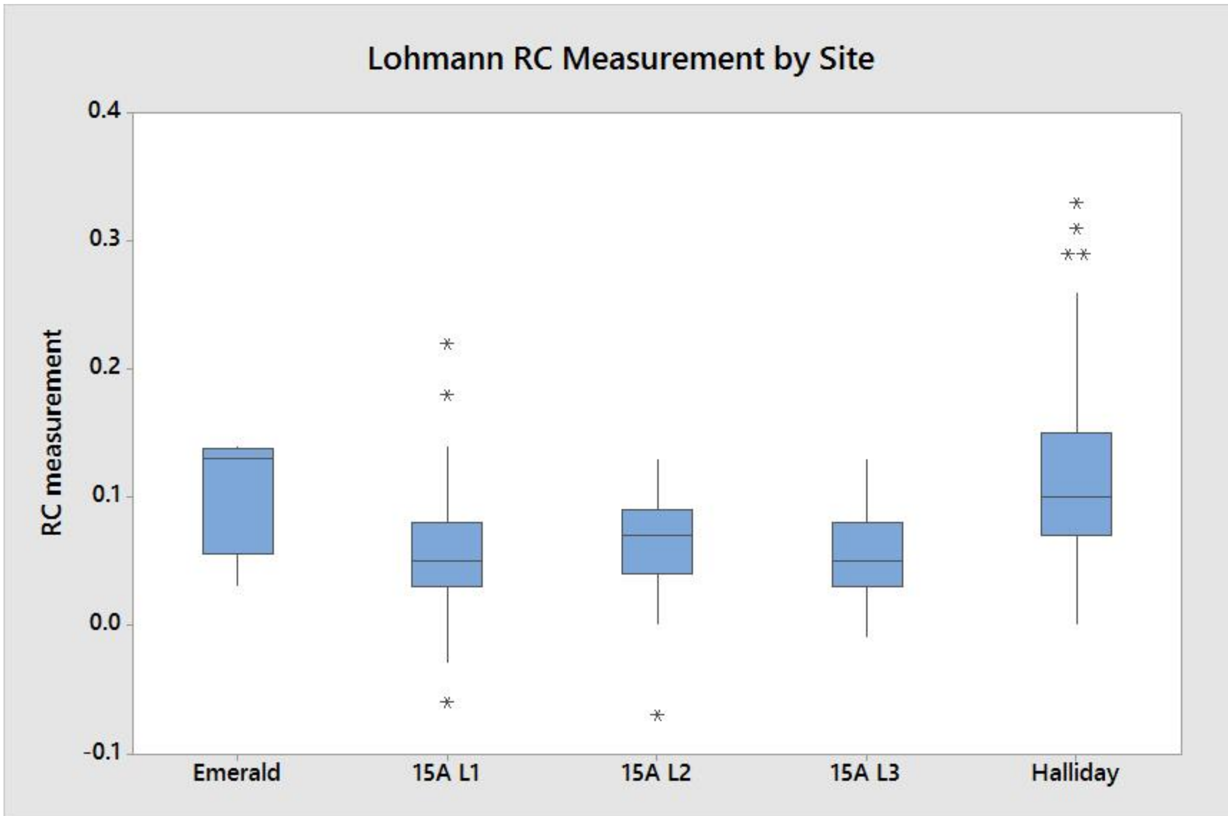

Figure 6.42. Comparison of RC measurements of jars from Emerald and select Lohmann phase sites.

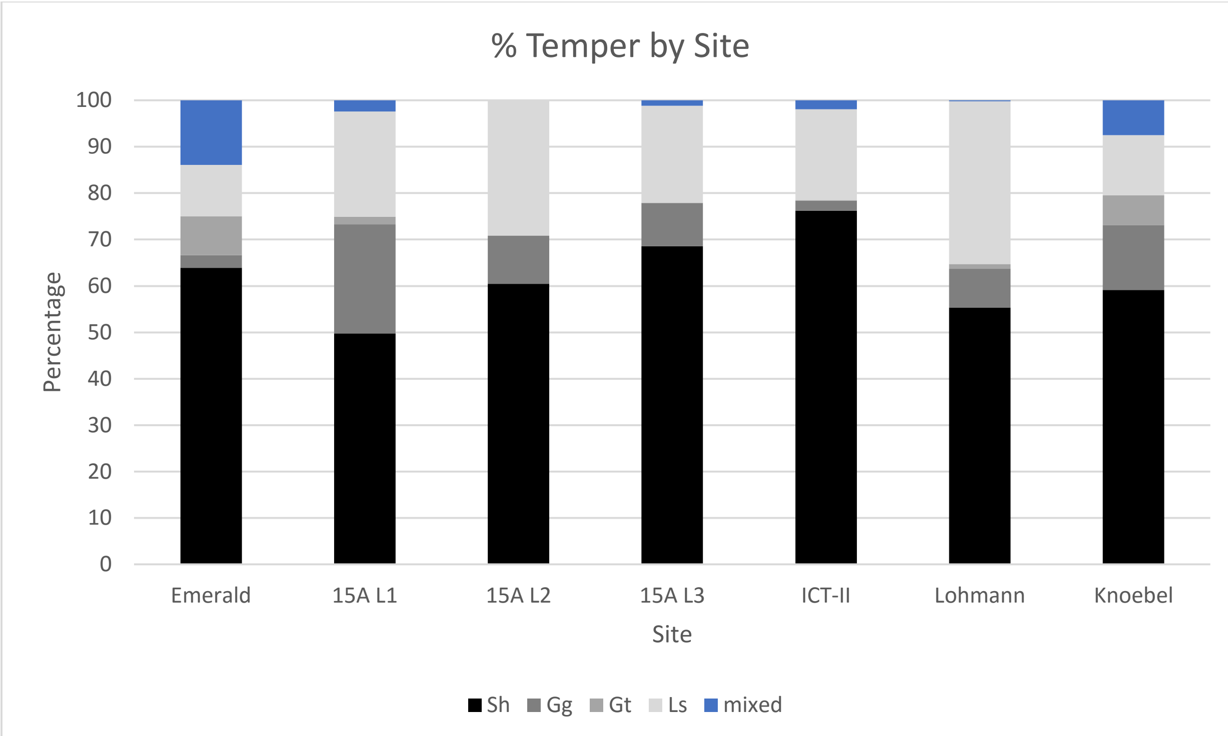

Figure 6.43. Comparison of temper percentages from Emerald and other select Lohmann phase sites.

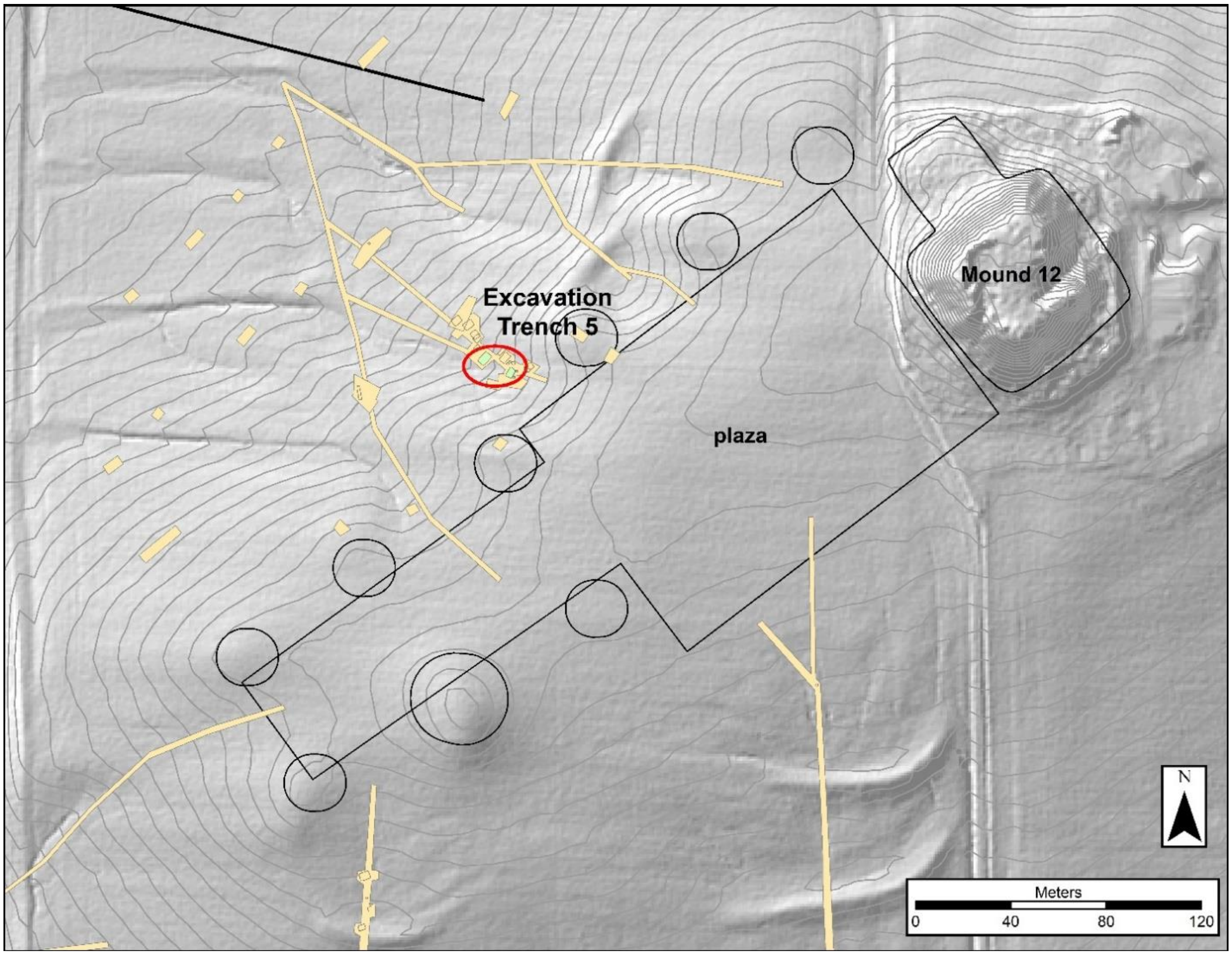

Figure 6.44. Location of Stirling phase features at the Emerald site. All excavation blocks and features are oriented to UTM grid north.

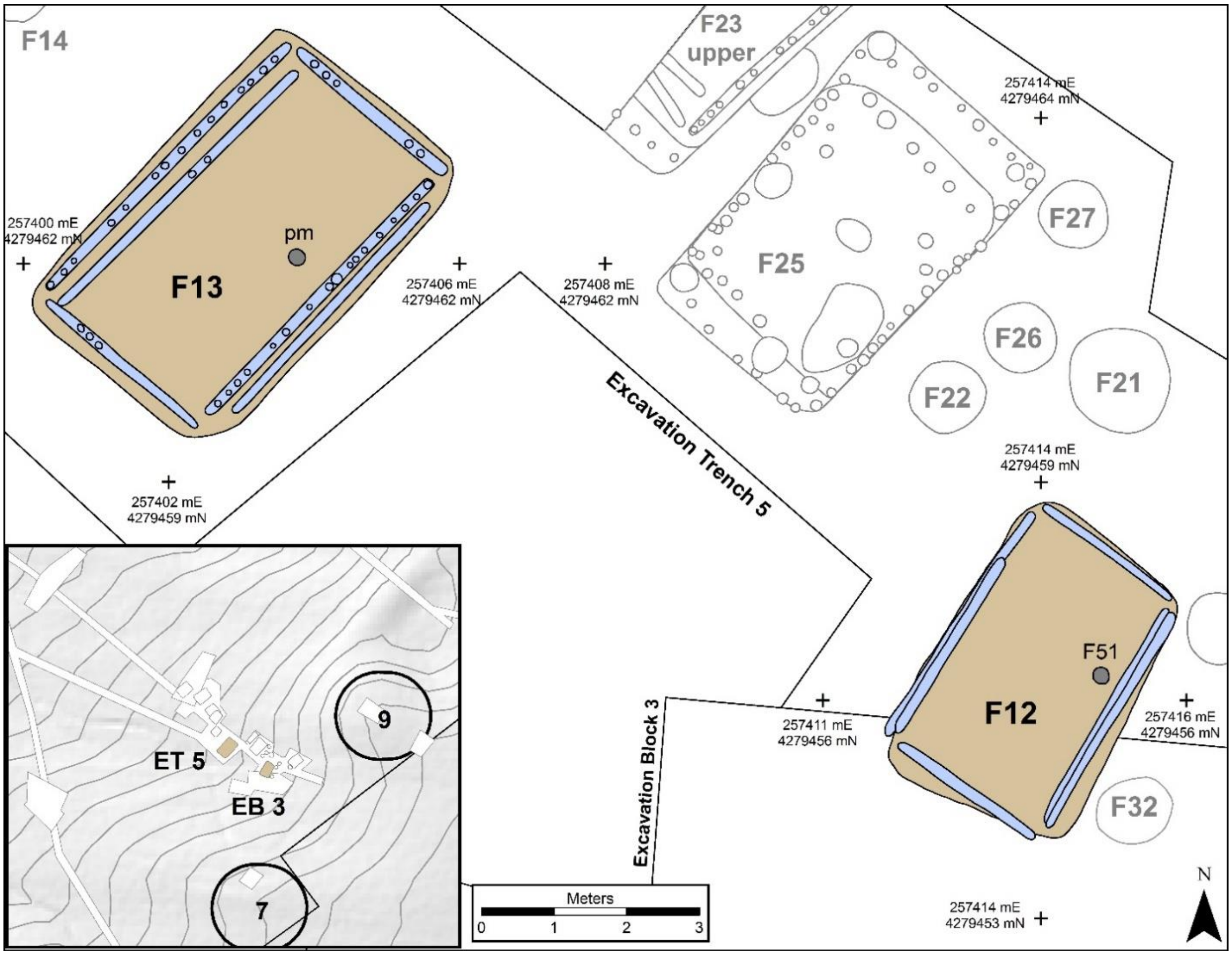

Figure 6.45. Plan map of Stirling phase features in ET 5. All excavation blocks and features are oriented to UTM grid north.

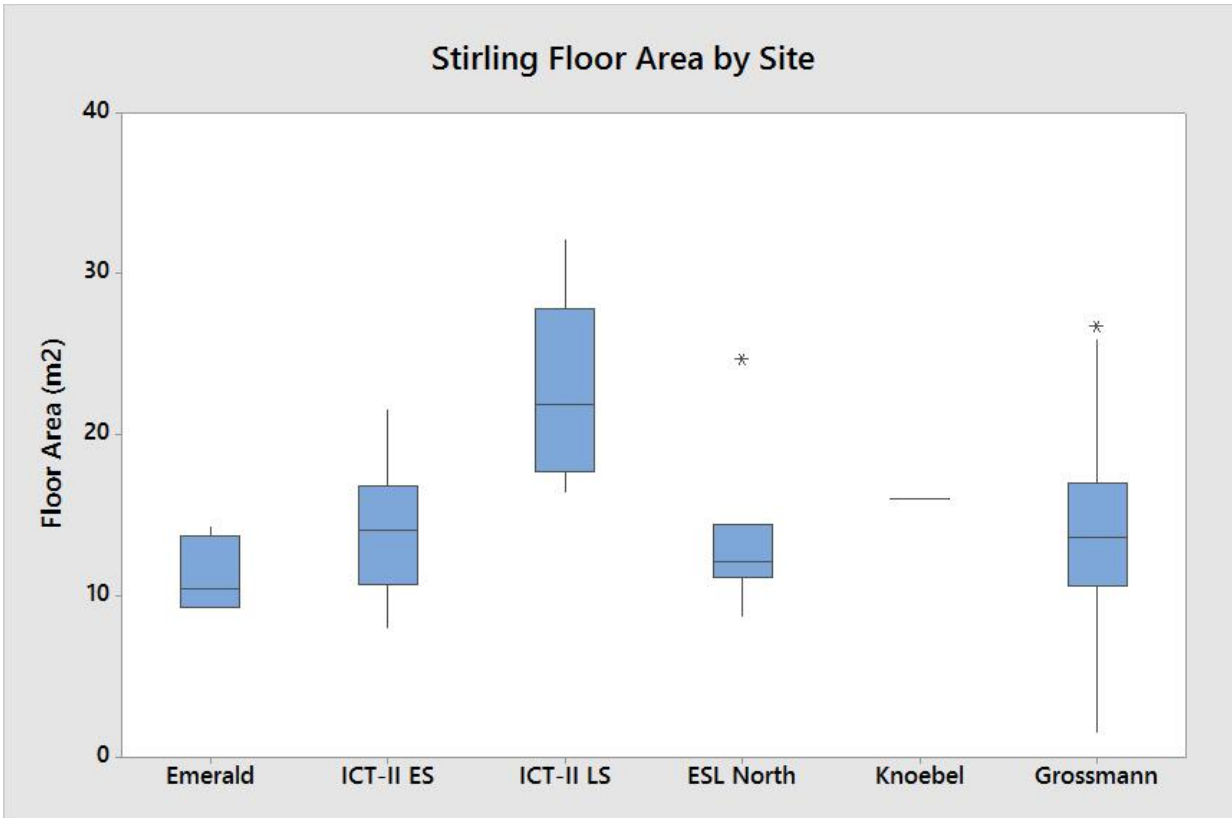

Figure 6.46. Comparison of floor area of structures from Emerald and select Stirling phase sites.

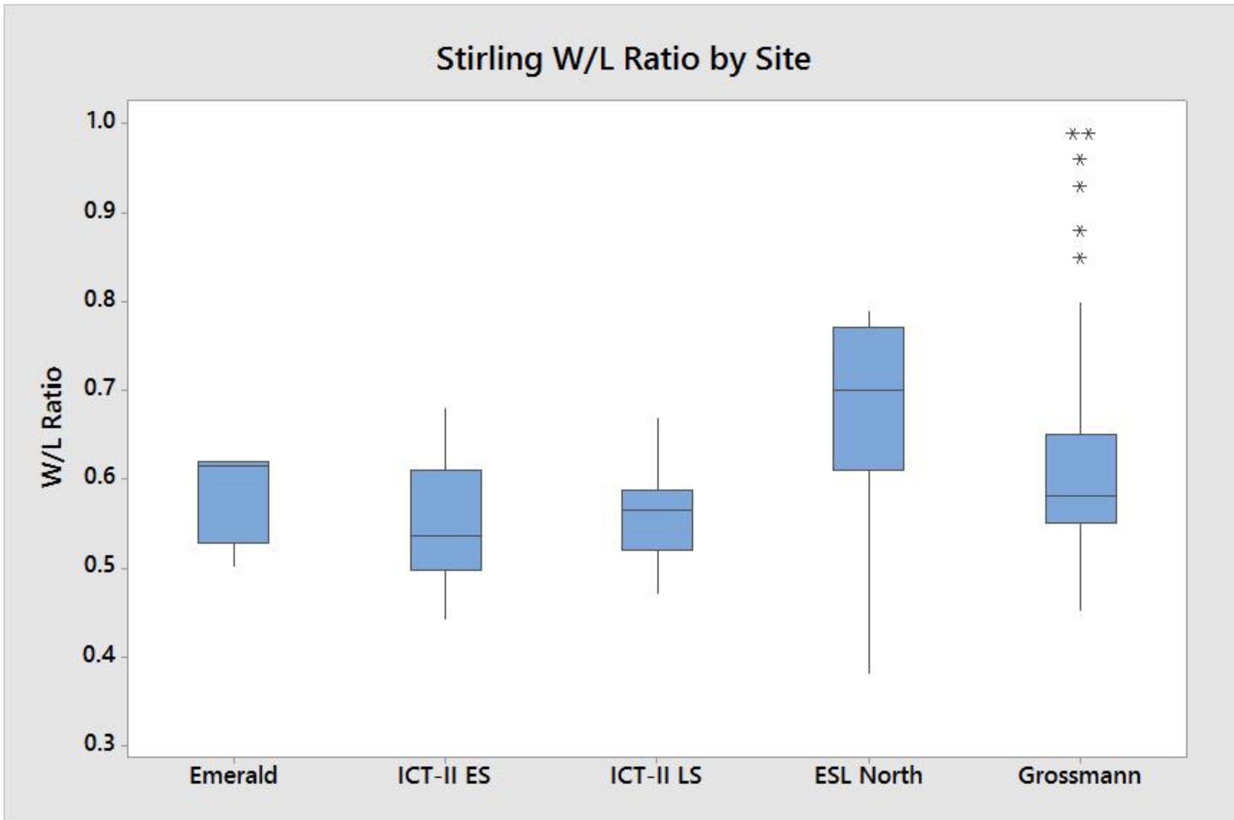

Figure 6.47. Comparison of width to length ratio of structures from Emerald and select Stirling phase sites.

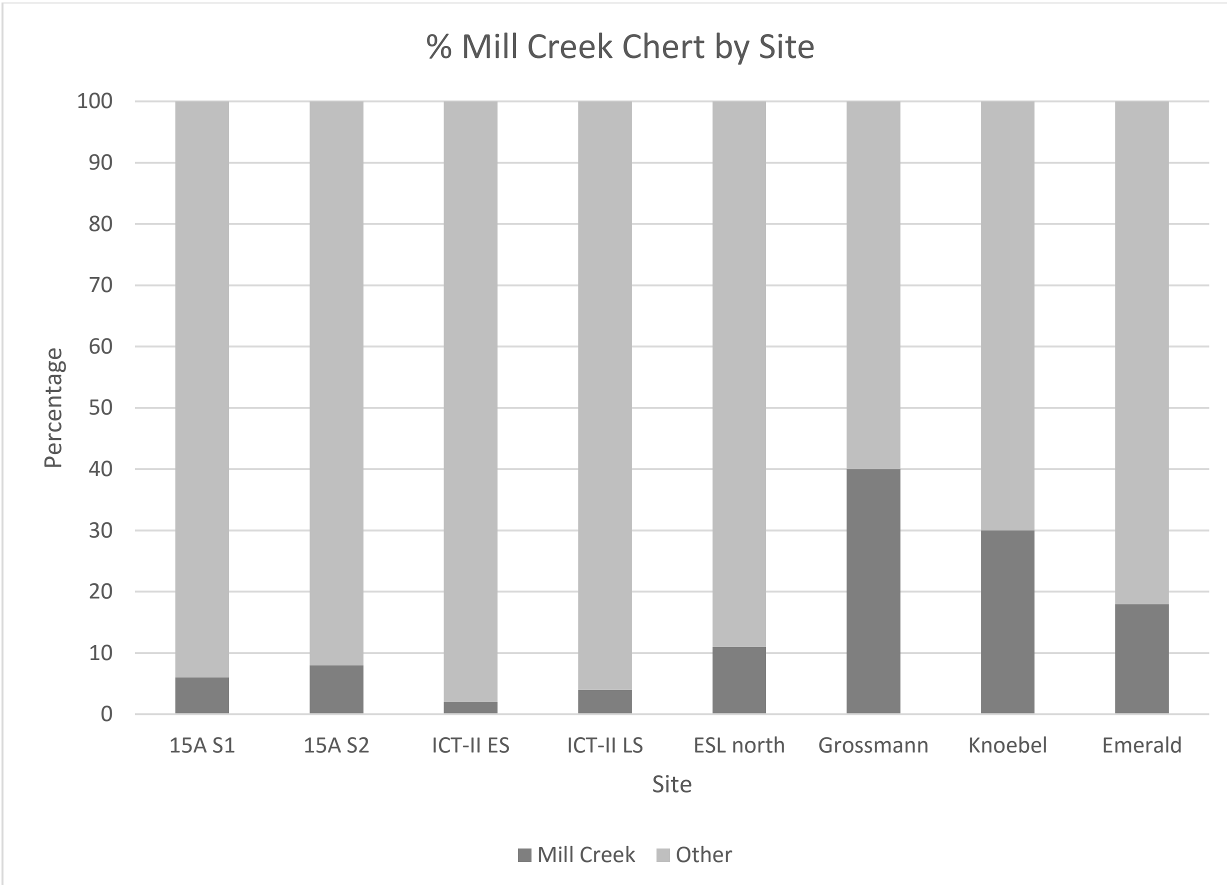

Figure 6.48. Comparison of percentage of Mill Creek chert from select Stirling phase sites.

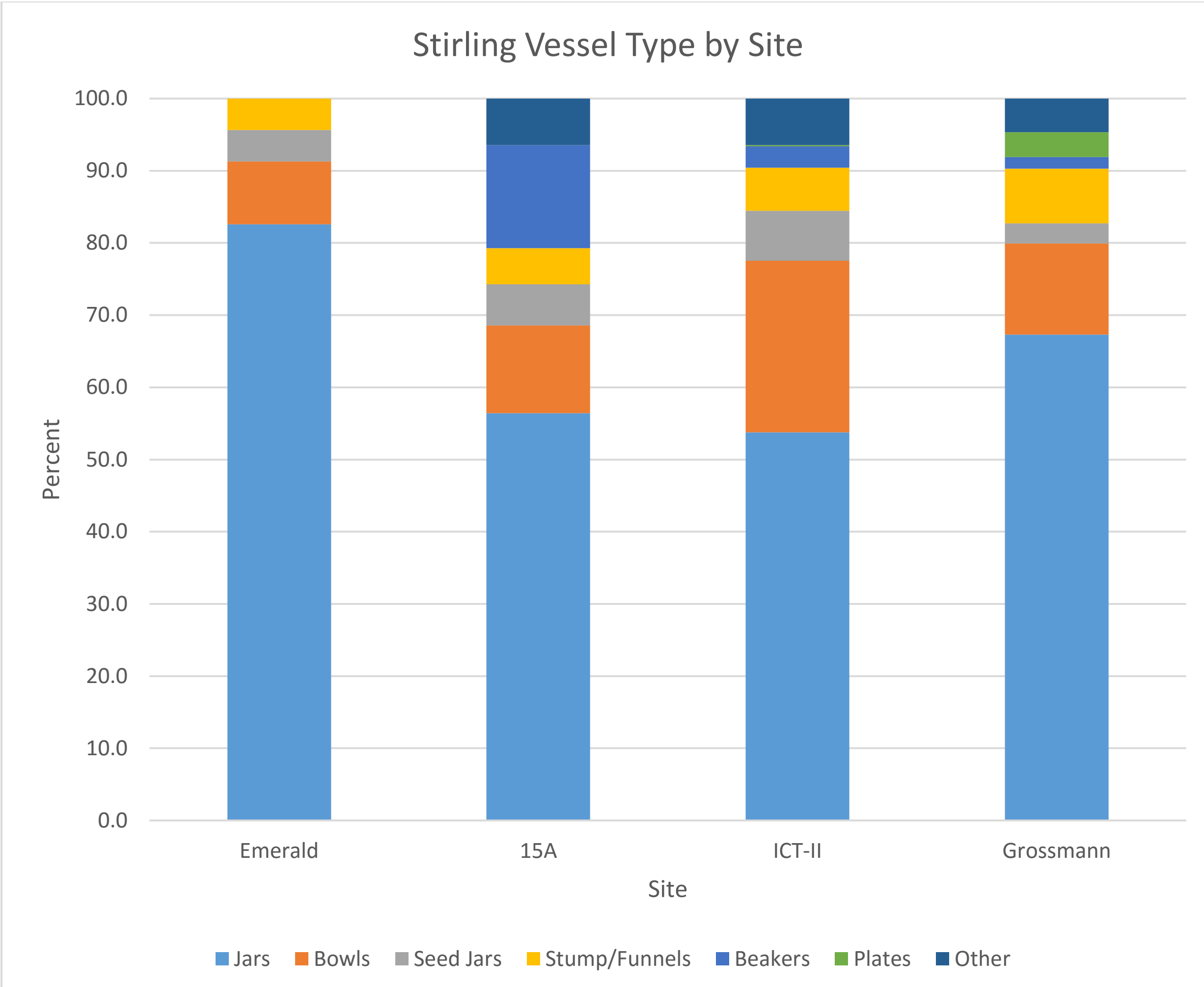

Figure 6.49. Comparison of proportion of vessel types from select Stirling phase sites.

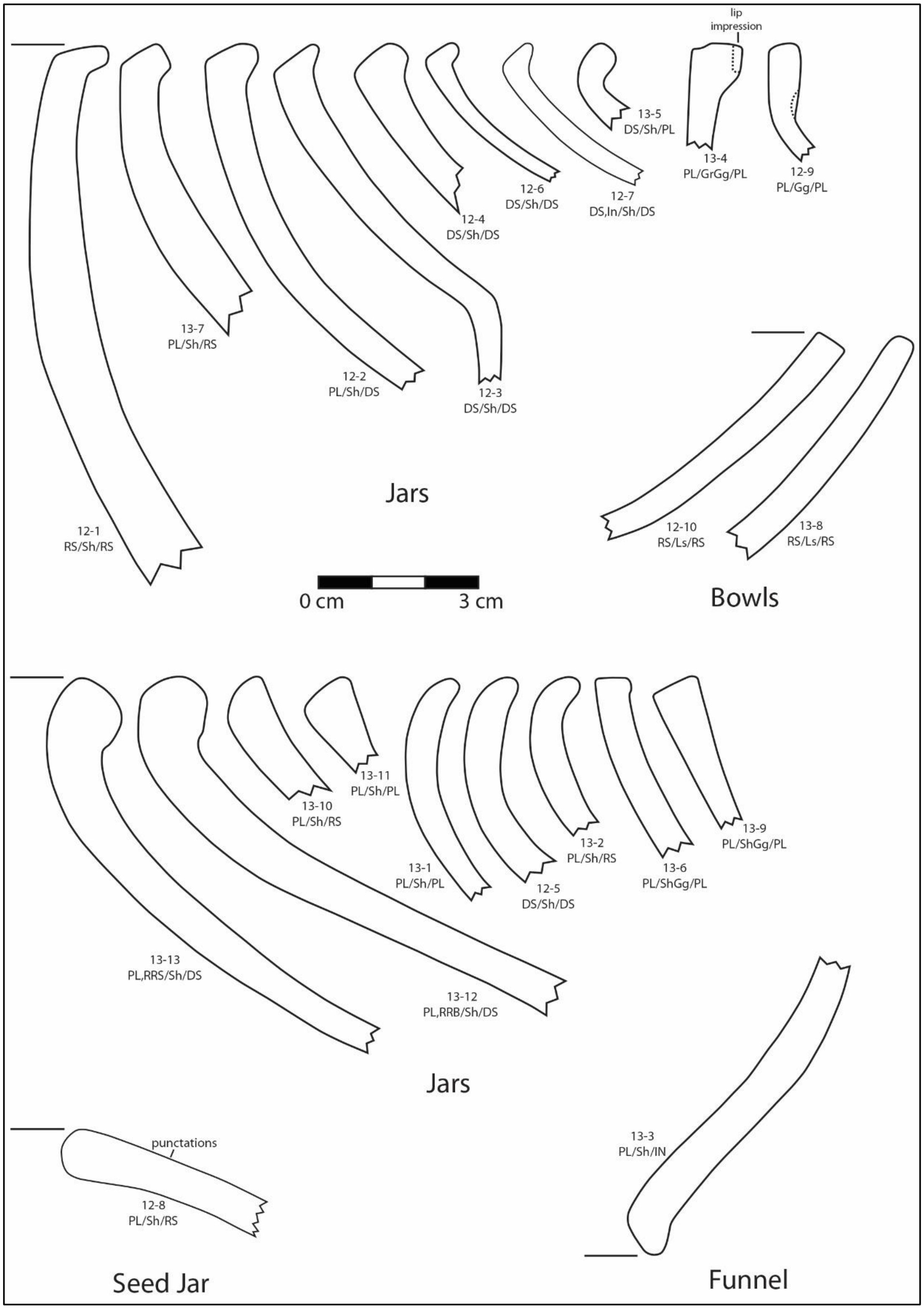

Figure 6.50. All Stirling phase rim profiles.

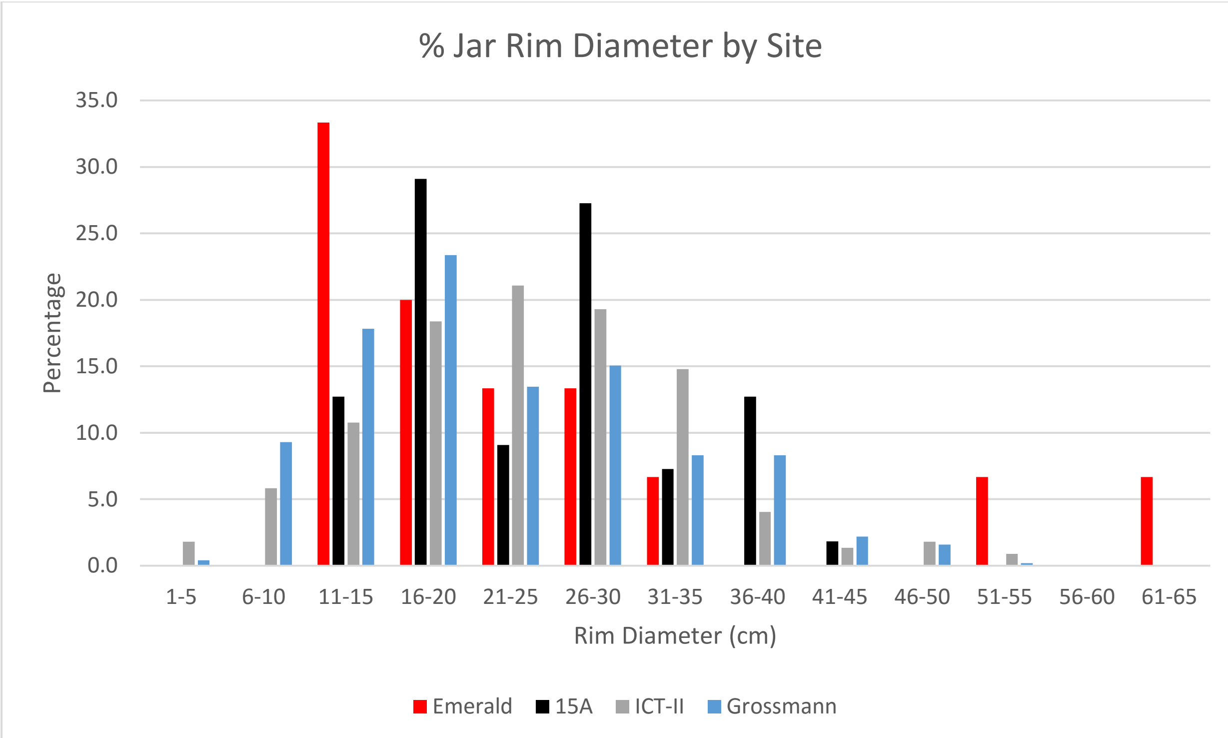

Figure 6.51. Comparison of jar rim diameters from Emerald and select Stirling phase sites.

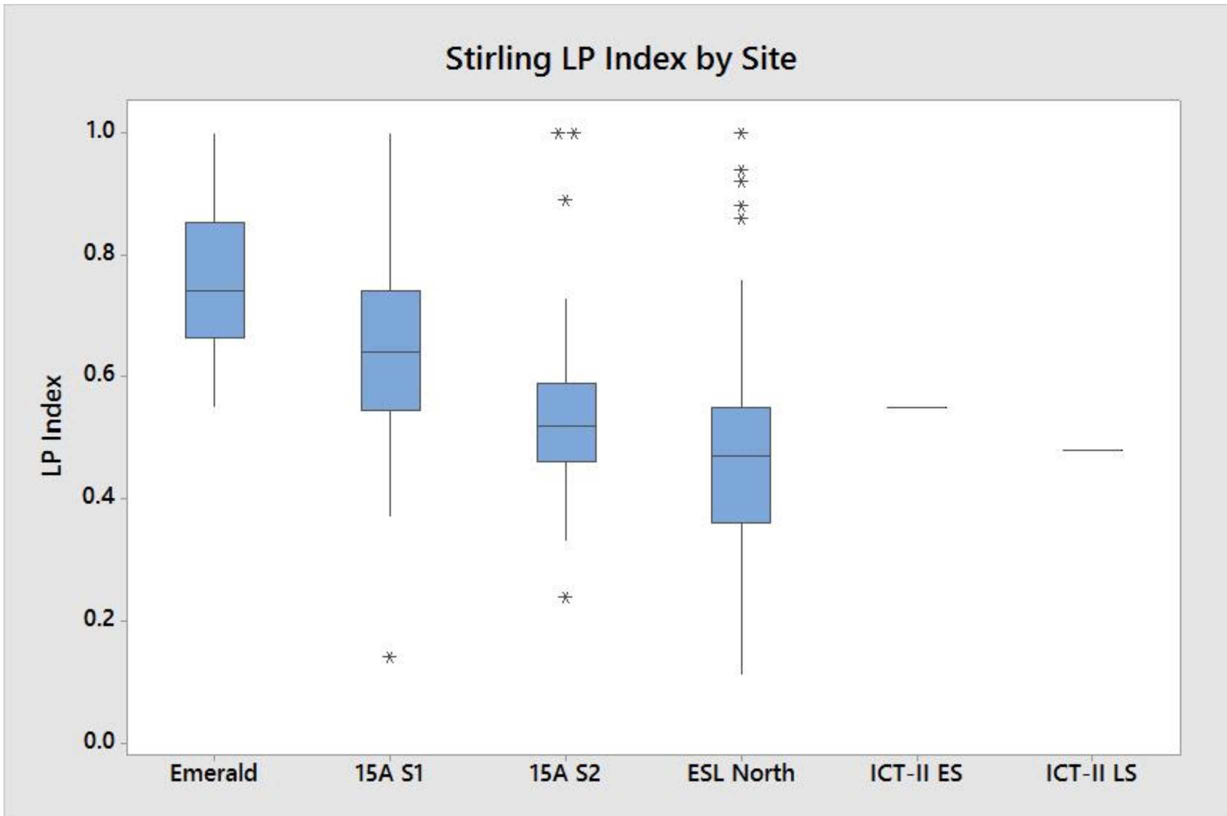

Figure 6.52. Comparison of LP indices of jars from Emerald and select Stirling phase sites.

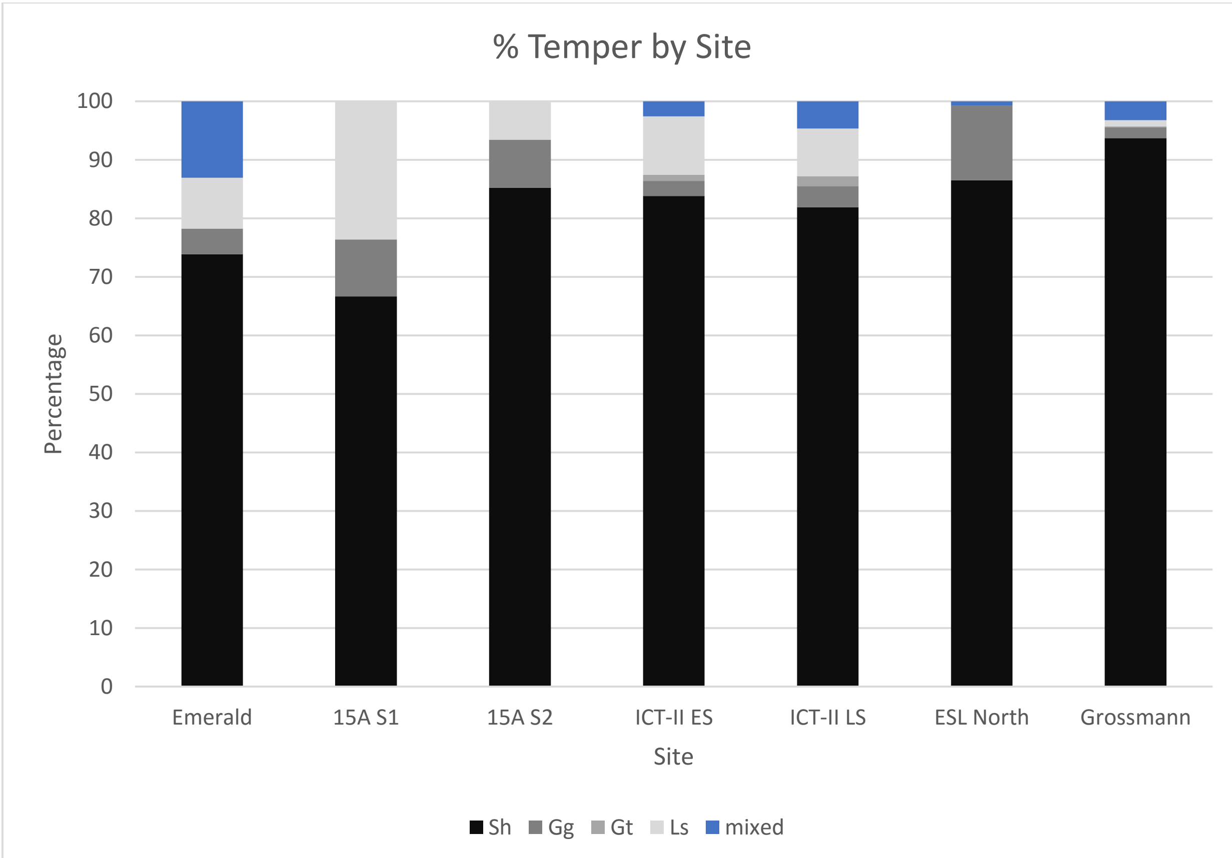

Figure 6.53. Comparison of temper percentages from Emerald and select Stirling phase sites.

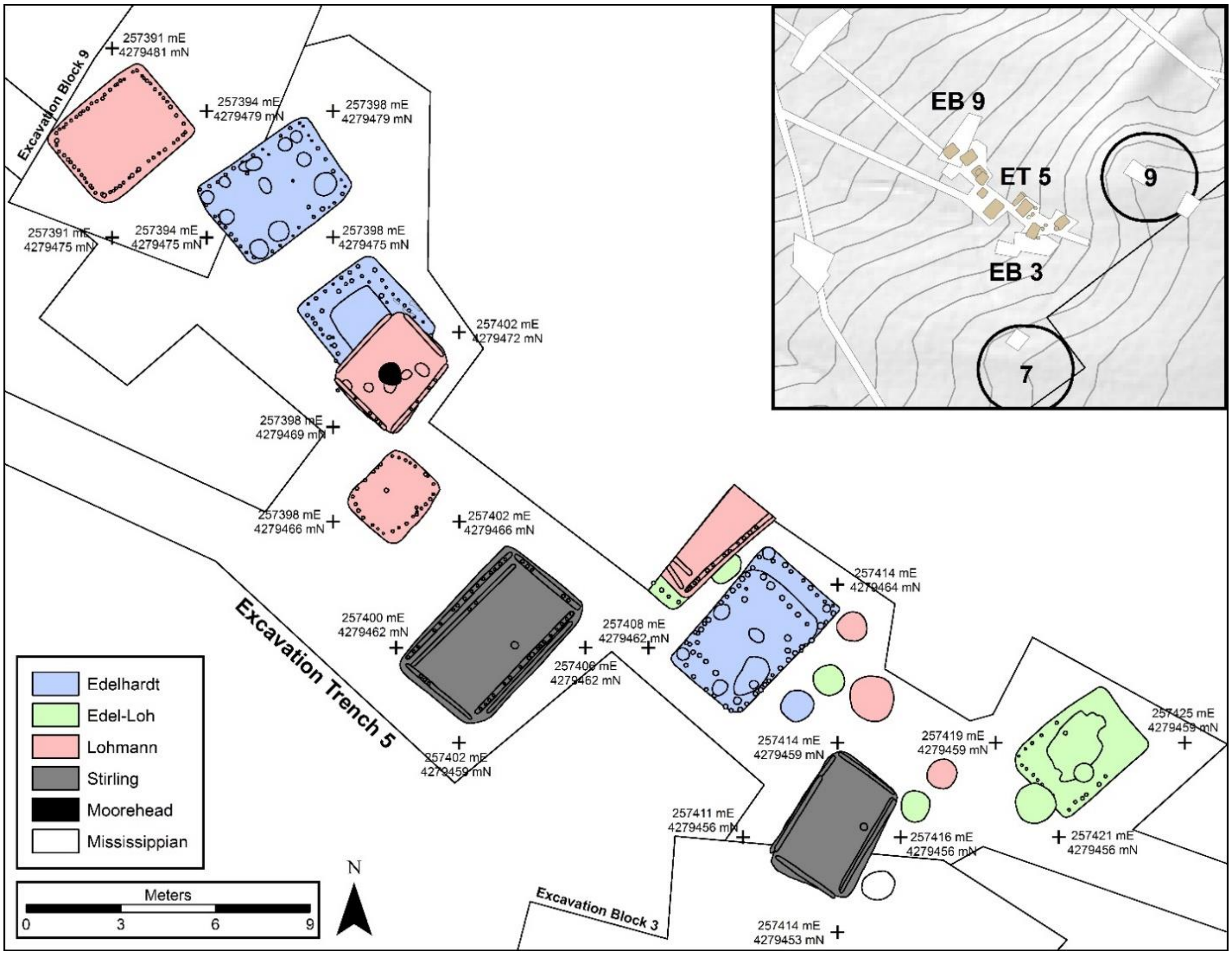

Figure 6.54. All features in ET 5. All excavation blocks and features are oriented to UTM grid north.

Table 6.1. Radiocarbon Dates from the Village Area.

Lab #	Sample #	Material	Context	^{14}C yr B.P.	1σ	$\delta^{13}C$	Cal. A.D. at 1σ	*p*	Cal A.D. at 2σ	*p*
ISGS A3269	CI-707	hickory nutshell	F8, Zone A fill	935	±15	-22.3	1080-1110	0.41	1063-1155	0.80
ISGS A3270	CI-708	hickory nutshell	F16, Zone A fill	750	±15	-25.3	1264-1276	1.00	1251-1283	0.99
ISGS A3271	CI-709	hickory nutshell	F17, Zone B fill	960	±15	-24.1	1095-1120	0.47	1081-1128	0.48
							1027-1045	0.42	1022-1052	0.37
ISGS A3272	CI-710	elm wood	F17, Zone F fill	985	±20	-23.9	1018-1042	0.83	1012-1049	0.65
ISGS A3273	CI-711	maize cupule	F44, Zone C fill	970	±20	-9.2	1022-1045	0.54	1018-1052	0.44
							1097-1119	0.39	1080-1129	0.42
ISGS A3274	CI-712	hickory nutshell	F54, Zone A fill	960	±20	-24.4	1092-1121	0.49	1077-1154	0.66
							1026-1046	0.39	1021-1055	0.34
ISGS A3275	CI-713	hickory wood	F25, PM 38	970	±15	-24.3	1023-1043	0.66	1020-1049	0.52
							1104-1118	0.31	1085-1124	0.38

Note: Cal A.D. derived from CALIB 7.02; see Stuiver and Reimer 1993

Table 6.2. Artifact Summary by Phase.

Phase	Ceramic Artifacts						Lithic Artifacts								Totals	
	Rim Sherds		Body Sherds		Burnt Clay Artifacts		Nonchipped Tools		Nonchipped Artifacts		Chipped Stone Tools		Debitage			
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)
Edelhardt	100	1621.8	1276	7203.8	121	739.8	21	2583.7	161	3708.5	85	1822.3	339	900.2	**2103**	**18580.1**
Edelhardt-Lohmann	26	131.1	356	1935.5	108	510.1	5	901.3	37	856.6	32	245.2	99	262.8	**663**	**4842.6**
Lohmann	78	1350.7	823	5066.7	243	1022.2	7	976.9	153	1890.7	44	1200.4	179	315.3	**1527**	**11822.9**
Stirling	48	686.2	602	2574.7	277	1329.6	6	273.5	351	4764.8	28	308.9	118	296.9	**1430**	**10234.6**
Moorehead	-	-	2	12.6	-	-	4	1302.1	9	378.6	-	-	5	3.7	**20**	**1697.0**
Mississippian	-	-	3	16.5	9	2.2	-	-	1	106.5	1	3.2	3	1.3	**17**	**129.7**
Totals	**252**	**3789.8**	**3062**	**16809.8**	**758**	**3603.9**	**43**	**6037.5**	**712**	**11705.7**	**190**	**3580.0**	**743**	**1780.2**	**5760**	**47306.9**

Table 6.3. Edelhardt Phase Structure Attributes from the Emerald Site. Orientations based on true north.

Feature	Excavation	Basin						Wall			Floor						Internal	Comments
	Trench	L (m)	W (m)	D (m)	V (dm3)	V (m3)	# zones	Type	Depth	# PM	L (m)	W (m)	A (LxW)	Shape (W/L)	Orientation	Int. PM	feature #	
4	**1**	4.28	3.31	0.33	4.68	0.005	3	PM	-	46	3.70	2.82	10.43	0.76	72	2	6	Large burned zones just above floor
18	**5**	-	-	-	-	-	-	PM	-	30	3.10	2.45	7.60	0.79	316 (46)	9	17	Possibly burned
19	**5**	-	-	-	-	-	-	PM	-	11	-	-	-	-	-	-	-	Structure, alcove for F18, or internal PM for F15
20	**5**	4.25	3.02	0.40	5.13	0.005	1	PM	-	39	3.85	2.70	10.40	0.70	53	6	30, 39, 40, 42, 43, 44, 45, 46, 47, 48, 49, 50	
25	**5**	4.20	2.95	0.05	0.62	0.001	1	PM	-	32	4.00	2.80	11.20	0.70	43	5	28, 34, 37, 38	
25 rebuild	**5**	4.10	2.88	0.05	0.59	0.001	1	PM	-	25	3.70	2.70	9.99	0.73	43	0	28, 34, 37, 38	
Total	**6**				**11.02**	**0.012**							**49.62**					
Ave.		**4.21**	**3.04**	**0.21**	**2.76**	**0.003**				**31**	**3.67**	**2.69**	**9.92**	**0.74**		**4**	**-**	**-**

Table 6.4. Edelhardt Phase Pit Attributes from the Emerald Site.

Feature	ET/EB	Type	Plan shape	Sidewalls	Base	L (cm)	W (cm)	D (cm)	V (dm3)	V (m3)	# zones	Comments
17	5	Internal	rectangular	vertical	basin	200	165	53	1385.7	1.386	6	F18 internal pit
22	5	External	circular	inslanted	basin	100	95	14	53.6	0.054	1	
28	5	Internal	circular	irregular	basin	40	39	42	51.4	0.051	2	F25 internal pit
29	5	Internal	oval	irregular	basin	42	23	48	39.8	0.040	2	F25 internal pit
30	5	Internal	circular	unknown	unknown	44	30	37	45.7	0.046	unknown	F20 internal pit
31	5	Internal	irregular	incurved	irregular	140	82	12	55.0	0.055	1	F25 internal feature, probably entrance area
33	5	Internal	circular	belled	basin	40	37	30	38.6	0.039	2	F25 internal pit
34	5	Internal	circular	vertical	basin	22	22	20	7.6	0.008	1	F25 internal pit
35	5	Internal	circular	inslanted	basin	54	47	27	37.2	0.037	1	F25 internal pit
39	5	Internal	circular	vertical	basin	40	40	27	33.9	0.034	1	F20 internal pit; cluster of chert flakes at bottom
40	5	Internal	circular	inslanted	basin	62	56	40	88.0	0.088	1	F20 internal pit; cluster of chert flakes at bottom
42	5	Internal	circular	incurved	basin	66	64	36	84.1	0.084	2	F20 internal pit; cluster of chert flakes at bottom
43	5	Internal	circular	vertical	basin	57	57	39	99.5	0.100	2	F20 internal pit; cluster of chert flakes at bottom
44	5	Internal	circular	inslanted	basin	51	40	25	28.2	0.028	3	F20 internal pit; bottom zone was clay
45	5	Internal	circular	inslanted	basin	45	42	34	50.5	0.051	2	F20 internal pit; hoe and proj pt at bottom
46	5	Internal	circular	inslanted	basin	44	44	26	29.0	0.029	2	F20 internal pit; cluster of chert flakes at bottom
47	5	Internal	circular	belled	basin	76	70	54	192.7	0.193	1	F20 internal pit; cluster of chert flakes and celt at bottom
48	5	Internal	oval	irregular	flat	38	32	36	36.6	0.037	1	F20 internal pit; cluster of chert flakes at bottom
49	5	Internal	circular	irregular	basin	44	41	45	63.8	0.064	3	F20 internal pit; cluster of chert flakes at bottom
50	5	Internal	oval	unknown	unknown	52	36	unknown	-	-	unknown	F20 internal central pit
Total	**20**								**2420.9**	**2.421**		
Ave						**63**	**53**	**34**	**127.4**	**0.127**		

Table 6.5. Hearth Attributes from the Emerald Site.

Feature	Phase	Trench/EB	Plan shape	Sidewalls	Base	L (cm)	W (cm)	D (cm)	# zones	Comments
6	Edelhardt	1	Irregular	Incurved	Flat	49	40	3	2	Burned area on floor of F4
16	Moorehead	5	Circular	Inslanted	Flat	73	70	11	1	Superimposes F15 and 41; contains abundant rocks
37	Edelhardt	5	Oval	Inslanted	Flat	53	37	5	1	Central hearth for F25

Table 6.6. Edelhardt Phase Burnt Clay Artifacts from the Emerald Site.

Feature	BC		Clay Object		Daub		Shaped Clay		Pinch Pot		Totals			
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	No. %	Wt. (g)	Wt. %
4	5	22.0	-	-	-	-	-	-	-	-	**5**	**4.1**	**22.0**	**3.0**
17	12	11.4	2	1.4	-	-	-	-	-	-	**14**	**11.6**	**12.8**	**1.7**
18	6	2.8	1	17.3	-	-	-	-	-	-	**7**	**5.8**	**20.1**	**2.7**
20	62	298.6	19	325.5	1	8.3	2	27.0	4	14.0	**88**	**72.7**	**673.4**	**91.0**
28	1	0.3	-	-	-	-	-	-	-	-	**1**	**0.8**	**0.3**	**0.0**
31	1	3.2	-	-	-	-	-	-	-	-	**1**	**0.8**	**3.2**	**0.4**
40	1	1.3	-	-	-	-	-	-	-	-	**1**	**0.8**	**1.3**	**0.2**
47	2	2.0	1	3.9	-	-	-	-	-	-	**3**	**2.5**	**5.9**	**0.8**
48	1	0.8	-	-	-	-	-	-	-	-	**1**	**0.8**	**0.8**	**0.1**
Totals	**91**	**342.4**	**23**	**348.1**	**1**	**8.3**	**2**	**27.0**	**4**	**14.0**	**121**	**100.0**	**739.8**	**100.0**
Total %	**75.2**	**46.3**	**19.0**	**47.1**	**0.8**	**1.1**	**1.7**	**3.6**	**3.3**	**1.9**				

Table 6.7. Edelhardt-Lohmann Phase Structure Attributes from the Emerald Site. Orientations based on true north.

Feature	Trench/EB	Basin						Wall			Floor						Internal	Comments
		L (m)	W (m)	D (m)	V (dm3)	V (m3)	# zones	Type	Depth	# PM	L (m)	W (m)	A (LxW)	Shape (W/L)	Orientation	Int. PM	features	
3	**1**	-	-	-	-	-	-	PM	-	14	>2.00	>1.60	>3.2	unknown	70	0	-	Only part of structure uncovered
7	**1**	>2.91	>2.20	0.14	-	-	2	PM	-	32	2.73	2.08	5.68	0.76	70	1	8	
23 lower	**5**	3.90	>1.30	0.21	-	-	1	PM	-	11	3.40	>1.14	>3.88	unknown	44	0	-	
57	**5**	3.70	2.75	0.24	2.44	0.002	4	PM	-	17	3.40	2.35	7.99	0.69	46	1	60	Floor measurements estimated
65	**?**	4.22	2.07	unknown	-	-	unknown	unknown	unknown	-	unknown	unknown	unknown	unknown		unknown	unknown	Only basin defined and mapped
Total	**5**				**2.44**	**0.002**							**>13.67**					
Ave.		**3.94**	**2.41**	**0.20**	**2.44**	**0.002**					**3.18**	**2.22**	**6.84**	**0.73**				

Table 6.8. Edelhardt-Lohmann Phase Pit Attributes from the Emerald Site.

Feature	Type	Trench/EB	Plan shape	Sidewalls	Base	L (cm)	W (cm)	D (cm)	V (dm3)	V (m3)	# zones	Comments
5	Exterior	1	circular	irregular	flat	120	110	52	539.8	0.54	3	-
8	Interior	1	circular	irregular	flat	90	88	20	66.4	0.07	2	F7 internal pit
9	Exterior	1	circular	irregular	basin	72	65	22	46.0	0.05	1	-
11	Exterior	5	circular	vertical	flat	98	88	20	135.8	0.14	1	-
26	Exterior	5	circular	inslanted	basin	48	44	10	8.8	0.01	1	-
56	Exterior	5	circular	inslanted	basin	126	126	27	178.5	0.18	1	-
60	Interior	5	circular	inslanted	basin	62	59	9	13.3	0.01	1	F57 internal pit
Total	**7**								**988.6**	**0.99**		
Ave						**88**	**83**	**23**	**141.2**	**0.14**		

Table 6.9. Edelhardt Phase Non-Chipped Stone Tools from the Emerald Site.

Feature	Cobble Tool quartzite		Cobble Tool sandstone		Cobble Tool gabbro		Cobble Tool granite		Cobble Tool quartz arenite		Abrader sandstone		Abrader limestone		Abrader quartzite		Celt diabase		Totals			
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	No. %	Wt. (g)	Wt. %
4	-	-	1	192.1	-	-	-	-	-	-	1	35.6	-	-	-	-	-	-	**2**	**9.5**	**227.7**	**8.8**
17	-	-	1	192.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**1**	**4.8**	**192.9**	**7.5**
20	-	-	3	141.2	1	65.4	2	389.2	-	-	3	136.0	1	25.1	-	-	-	-	**10**	**47.6**	**756.9**	**29.3**
25	-	-	-	-	-	-	-	-	1	173.2	-	-	-	-	-	-	-	-	**1**	**4.8**	**173.2**	**6.7**
28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	114.4	-	-	**1**	**4.8**	**114.4**	**4.4**
29	1	93.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**1**	**4.8**	**93.3**	**3.6**
31	1	399.2	-	-	1	205.8	-	-	-	-	-	-	-	-	-	-	-	-	**2**	**9.5**	**605.0**	**23.4**
34	-	-	-	-	-	-	-	-	-	-	1	28.5	-	-	-	-	-	-	**1**	**4.8**	**28.5**	**1.1**
39	-	-	-	-	-	-	-	-	-	-	1	68.2	-	-	-	-	-	-	**1**	**4.8**	**68.2**	**2.6**
47	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	323.6	**1**	**4.8**	**323.6**	**12.5**
Totals	**2**	**492.5**	**5**	**526.2**	**2**	**271.2**	**2**	**389.2**	**1**	**173.2**	**6**	**268.3**	**1**	**25.1**	**1**	**114.4**	**1**	**323.6**	**21**	**100.0**	**2583.7**	**100.0**
Total %	**9.5**	**19.1**	**23.8**	**20.4**	**9.5**	**10.5**	**9.5**	**15.1**	**4.8**	**6.7**	**28.6**	**10.4**	**4.8**	**1.0**	**4.8**	**4.4**	**4.8**	**12.5**				

Table 6.10. Edelhardt Phase Chipped Stone Tools from the Emerald Site.

Feature	Burlington Utilized Flake		Burlington Retouched Flake		Burlington Core		Burlington Projectile Point		Mill Creek Utilized Flake		Mill Creek Retouched Flake		Mill Creek Hoe	
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)
4	7	18.5	1	11.2	-	-	-	-	-	-	-	-	-	-
17	1	7.6	-	-	-	-	-	-	-	-	-	-	-	-
20	16	115.0	5	44.2	1	6.7	-	-	2	15.6	1	15.7	-	-
22	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	4	19.1	-	-	1	17.3	-	-	-	-	-	-	-	-
28	3	21.2	1	7.6	1	74.6	-	-	-	-	-	-	-	-
29	1	3.3	-	-	-	-	-	-	-	-	-	-	-	-
31	1	45.4	-	-	-	-	-	-	-	-	-	-	-	-
33	1	24.2	4	42.9	-	-	-	-	-	-	-	-	-	-
37	1	3.2	-	-	-	-	-	-	-	-	-	-	-	-
40	3	43.7	-	-	-	-	-	-	-	-	-	-	-	-
42	4	56.1	-	-	-	-	-	-	-	-	-	-	-	-
43	5	18.0	-	-	1	25.5	-	-	-	-	-	-	-	-
44	2	5.7	-	-	-	-	-	-	-	-	-	-	-	-
45	1	18.5	-	-	-	-	1	3.7	-	-	-	-	1	930.1
46	2	9.9	1	40.7	-	-	-	-	-	-	-	-	-	-
48	5	19.9	-	-	1	18.7	-	-	-	-	-	-	-	-
49	-	-	1	6.5	-	-	-	-	-	-	-	-	-	-
Totals	**57**	**429.3**	**13**	**153.1**	**5**	**142.8**	**1**	**3.7**	**2**	**15.6**	**1**	**15.7**	**1**	**930.1**
Total %	**67.1**	**23.6**	**15.3**	**8.4**	**5.9**	**7.8**	**1.2**	**0.2**	**2.4**	**0.9**	**1.2**	**0.9**	**1.2**	**51.0**

Feature	Ste. Gene Utilized Flake		Ste. Gene Core		Cobden Utilized Flake		Glacial Core		Totals			
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	No. %	Wt. (g)	Wt. %
4	-	-	-	-	-	-	-	-	**8**	**9.4**	**29.7**	**1.6**
17	-	-	-	-	-	-	-	-	**1**	**1.2**	**7.6**	**0.4**
20	-	-	-	-	-	-	-	-	**25**	**29.4**	**197.2**	**10.8**
22	-	-	-	-	-	-	1	8.1	**1**	**1.2**	**8.1**	**0.4**
25	-	-	-	-	-	-	-	-	**5**	**5.9**	**36.4**	**2.0**
28	-	-	-	-	-	-	-	-	**5**	**5.9**	**103.4**	**5.7**
29	-	-	-	-	1	8.4	-	-	**2**	**2.4**	**11.7**	**0.6**
31	-	-	-	-	-	-	-	-	**1**	**1.2**	**45.4**	**2.5**
33	-	-	-	-	-	-	-	-	**5**	**5.9**	**67.1**	**3.7**
37	-	-	-	-	-	-	-	-	**1**	**1.2**	**3.2**	**0.2**
40	-	-	-	-	-	-	-	-	**3**	**3.5**	**43.7**	**2.4**
42	-	-	-	-	-	-	-	-	**4**	**4.7**	**56.1**	**3.1**
43	-	-	-	-	-	-	-	-	**6**	**7.1**	**43.5**	**2.4**
44	-	-	1	48.2	-	-	1	63.3	**4**	**4.7**	**117.2**	**6.4**
45	-	-	-	-	-	-	-	-	**3**	**3.5**	**952.3**	**52.3**
46	-	-	-	-	-	-	-	-	**3**	**3.5**	**50.6**	**2.8**
48	1	4.0	-	-	-	-	-	-	**7**	**8.2**	**42.6**	**2.3**
49	-	-	-	-	-	-	-	-	**1**	**1.2**	**6.5**	**0.4**
Totals	**1**	**4.0**	**1**	**48.2**	**1**	**8.4**	**2**	**71.4**	**85**	**100.0**	**1822.3**	**100.0**
Total %	**1.2**	**0.2**	**1.2**	**2.6**	**1.2**	**0.5**	**2.4**	**3.9**				

Table 6.11. Edelhardt Phase Debitage from the Emerald Site.

Feature	Burlington Gen Debitage		Burlington Block Fracture		Burlington Thermal Shatter		Burlington Bifacial Thin		Burlington Hoe Flake		Mill Creek Gen Debitage		Mill Creek Block Fracture		Mill Creek Thermal Shatter		Mill Creek Bifacial Thin		Mill Creek Hoe Flake		Ste. Gene Gen Debitage	
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)
4	22	30.9	-	-	1	0.2	1	0.7	-	-	1	1.2	1	8.0	-	-	-	-	9	17.6	-	-
17	13	39.1	1	5.0	-	-	-	-	-	-	2	0.3	-	-	-	-	1	4.7	1	0.1	-	-
18	5	4.7	-	-	-	-	-	-			2	3.3	-	-	-	-	-	-	-	-	-	-
20	59	189.7	2	20.4	2	20.2	1	0.9	1	1.8	12	25.1	9	19.7	6	12.9	1	1.5	4	13.2	-	-
25	12	59.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	14.3	-	-
28	9	38.1	-	-	-	-	-	-	-	-	2	3.5	-	-	-	-	-	-	-	-	-	-
29	3	4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30	1	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31	5	9.2	-	-	-	-	-	-	-	-	2	0.7	-	-	-	-	-	-	1	1.1	-	-
33	8	11.2	-	-	-	-	1	0.5	-	-	-	-	-	-	-	-	-	-	1	1.1	-	-
35	1	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
39	15	15.0	-	-	-	-	1	0.4	-	-	1	0.5	-	-	-	-	-	-	-	-	-	-
40	5	20.2	-	-	-	-	1	6.6	-	-	2	1.7	-	-	-	-	-	-	-	-	-	-
42	7	15.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1.2	-	-
43	12	55.8	-	-	-	-	-	-	-	-	1	1.2	-	-	-	-	-	-	-	-	-	-
44	11	23.9	-	-	-	-	1	1.5	-	-	-	-	-	-	-	-	-	-	-	-	1	0.4
45	15	38.3	1	4.6	-	-	2	0.9	-	-	-	-	-	-	-	-	-	-	1	0.9	-	-
46	14	88.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
47	3	1.6	-	-	-	-	-	-	-	-	-	-	-	-	2	4.3	-	-	-	-	-	-
48	9	14.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
49	9	12.2	-	-	-	-	-	-	-	-	-	-	1	1.3	-	-	-	-	1	1.4	-	-
Totals	**238**	**673.3**	**4**	**30.0**	**3**	**20.4**	**8**	**11.5**	**1**	**1.8**	**25**	**37.5**	**11**	**29.0**	**8**	**17.2**	**2**	**6.2**	**21**	**50.9**	**1**	**0.4**
Total %	**70.2**	**74.8**	**1.2**	**3.3**	**0.9**	**2.3**	**2.4**	**1.3**	**0.3**	**0.2**	**7.4**	**4.2**	**3.2**	**3.2**	**2.4**	**1.9**	**0.6**	**0.7**	**6.2**	**5.7**	**0.3**	**0.0**

Feature	Ste. Gene Gen Debitage		Ste. Gene Block Fracture		Bailey Gen Debitage		Kaolin Gen Debitage		Glacial Gen Debitage		Glacial Block Fracture		Unknown Gen Debitage		Unknown Block Fracture		Unknown Thermal Shatter		Total			
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	No. %	Wt. (g)	Wt. %
4	-	-	-	-	1	0.3	-	-	1	1.3	1	4.0	-	-	-	-	-	-	**38**	**11.2**	**64.2**	**7.1**
17	-	-	-	-	-	-	1	0.2	-	-	-	-	-	-	1	0.2	1	0.8	**21**	**6.2**	**50.4**	**5.6**
18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**7**	**2.1**	**8.0**	**0.9**
20	1	3.4	1	7.4	-	-	-	-	-	-	-	-	1	0.8	-	-	2	1.1	**102**	**30.1**	**318.1**	**35.3**
25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**14**	**4.1**	**74.2**	**8.2**
28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**11**	**3.2**	**41.6**	**4.6**
29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**3**	**0.9**	**4.4**	**0.5**
30	1	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**2**	**0.6**	**1.0**	**0.1**
31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**8**	**2.4**	**11.0**	**1.2**
33	-	-	-	-	-	-	1	0.4	-	-	-	-	-	-	-	-	-	-	**11**	**3.2**	**13.2**	**1.5**
35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**1**	**0.3**	**0.1**	**0.0**
39	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**17**	**5.0**	**15.9**	**1.8**
40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.3	**9**	**2.7**	**28.8**	**3.2**
42	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**8**	**2.4**	**16.5**	**1.8**
43	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**13**	**3.8**	**57.0**	**6.3**
44	1	0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**14**	**4.1**	**26.2**	**2.9**
45	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.3	-	-	**20**	**5.9**	**45.0**	**5.0**
46	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.6	**15**	**4.4**	**89.3**	**9.9**
47	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**5**	**1.5**	**5.9**	**0.7**
48	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**9**	**2.7**	**14.5**	**1.6**
49	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**11**	**3.2**	**14.9**	**1.7**
Totals	**3**	**4.3**	**1**	**7.4**	**1**	**0.3**	**2**	**0.6**	**1**	**1.3**	**1**	**4.0**	**1**	**0.8**	**2**	**0.5**	**5**	**2.8**	**339**	**100.0**	**900.2**	**100.0**
Total %	**0.9**	**0.5**	**0.3**	**0.8**	**0.3**	**0.0**	**0.6**	**0.1**	**0.3**	**0.1**	**0.3**	**0.4**	**0.3**	**0.1**	**0.6**	**0.1**	**1.5**	**0.3**				

Table 6.12. Edelhardt Phase Jars from the Emerald Site.

Feature	Vessel	Temper	Exterior	Interior	Decoration	Oriface (cm)	%	No.	Wt. (g)	RA	LB	LL	WT	RC	LT	LP	LS	Use Wear	Comments
4	1	GG	pl	pl	-	18	8	2	58.8	-	0	11.10	6.22	-	4.48	0.56	0.40	Exterior soot?	-
4	2	GT	cm-v	pl	-	24-26	8	2	40.1	-	-	6.00	6.20	-	6.00	1.00	1.00	Soot on exterior rim	CMs smoothed over?
4	3	GT/GG/SH	rs	rs	-	12	5	1	11.8	55	13	11.04	5.25	-	4.94	0.48	0.45	Soot on exterior rim	-
4	4	GT	po	po	-	10	8	1	5.5	-	-	10.40	4.90	-	3.80	0.47	0.37	-	-
4	6	GG	pl	pl	-	-	-	1	6.9	-	-	9.30	7.40	-	5.71	0.80	0.61	-	-
4	7	SH	pl	pl	-	-	-	1	1.2	-	-	6.50	5.10	-	3.25	0.78	0.50	Soot on lip	-
17	1	GG	pl	pl	Notched lip	-	-	1	9.4	-	33	10.62	7.92	-	5.72	0.75	0.54	Blackened	Possible Madison County Shale paste
17	2	GG	pl	pl	-	20-28	3-4	1	15.0	-	-	6.70	7.33	-	6.70	1.00	1.00	Exterior soot	-
17	5	GT	pl	pl	-	24	7	1	37.2	75	-	7.51	10.05	-	7.51	1.00	1.00	-	-
17	6	SH	rs	rs	-	-	-	1	3.0	-	-	9.17	7.33	-	7.09	0.80	0.77	-	May be a bowl
17	7	GT	pl	pl	-	10	16	1	5.2	77	0	6.21	5.37	-	6.21	0.86	1.00	Blackened	-
17	8	SH	ds/rs	rs	-	8	12	1	4.0	-	-	-	-	-	5.23	-	-	Blackened	-
17	10	GT	pl	pl	Notched lip	-	-	1	0.6	-	-	-	-	-	4.83	-	-	-	-
20	12	GT	pl	pl	-	14-16	4	1	32.4	-	0	5.82	5.64	-	5.82	0.97	1.00	Interior soot	-
20	13	GT	pl	pl	-	48	2	1	18.4	-	-	7.83	7.19	-	7.83	0.92	1.00	-	-
20	14	SH	pl	pl	-	34	13	2	143.3	-	-	8.47	7.44	0.15	2.79	0.88	0.33	Exterior soot, interior blackened	-
20	15	GG	pl	pl	-	18-20	6	1	14.7	-	-	5.02	5.59	-	5.02	1.00	1.00	-	-
20	16	GT	pl	pl	-	12	10	1	14.8	-	-	8.69	6.22	-	4.23	0.72	0.49	Exterior soot	-
20	17	GT	pl	pl	-	20	10	1	17.8	-	-	4.81	4.31	-	4.81	0.90	1.00	-	Madison County Shale paste
20	18	GG some GT	pl	pl	-	28	3	1	8.1	-	-	5.62	5.45	-	5.62	0.97	1.00	Exterior soot	-
20	19	GT	pl	pl	Notched lip	16	10	1	17.7	-	46	10.37	5.04	-	4.48	0.49	0.43	-	-
20	20	GT	cm-vs	pl	Notched lip	-	-	1	8.7	-	-	7.00	5.38	-	4.02	0.77	0.57	Exterior soot	Foreign vessel?
20	21	SH	pl	pl	-	34	6	1	86.1	-	-	-	-	-	9.30	-	-	Soot on lip	-
20	22	GG	rs	rs	-	-	-	1	18.4	-	-	11.43	4.90	0.20	4.44	0.43	0.39	-	Red slipped shoulder, plain below
20	23	GG	pl/bu	pl	-	12	18	1	20.9	-	27	11.21	5.34	-	4.34	0.48	0.39	Soot under exterior rim	-
20	24	GT	pl/bu	pl	Notched lip	14-16	6	1	4.2	-	-	5.90	3.74	-	2.87	0.63	0.49	-	-
20	25	GT	pl	pl	-	-	-	1	4.2	-	-	-	-	-	-	-	-	-	-
20	26	GT	pl	pl	Rim node	-	-	1	3.6	-	-	5.61	4.57	-	4.81	0.81	0.86	Interior blackened	-
20	27	SH	pl	pl	-	24	5	1	8.2	55	0	7.00	5.67	-	5.81	0.81	0.83	-	-
20	28	GT	pl	pl	-	10	13	1	15.1	59	0	11.37	7.30	-	9.20	0.64	0.81	Exterior and interior soot	-
20	29	SH	pl	pl	-	-	-	2	16.0	-	-	13.14	7.07	-	10.95	0.54	0.83	-	-
20	30	LS	ds	pl	-	-	-	1	3.0	41	29	10.15	4.21	-	5.19	0.41	0.51	Soot on and under exterior rim	-
20	31	SH	pl	pl	-	-	-	1	8.2	-	-	-	-	-	8.80	-	-	-	-
20	32	GG	pl	pl	-	-	-	1	9.7	-	-	6.74	6.58	-	6.74	0.98	1.00	-	-
20	33	GG	pl	pl	-	28-32	2	1	3.1	44	38	7.87	7.28	-	6.83	0.93	0.87	-	-
20	34	GT	pl	pl	-	16	9	1	11.1	50	42	9.26	7.07	-	4.59	0.76	0.50	Soot on and under exterior rim	-
20	35	GT	bu	bu	-	-	-	1	3.6	44	43	7.88	4.58	-	4.20	0.58	0.53	-	Possible dark slip on exterior and red film on interior
20	36	GT	rs	pl	-	14-16	15-16	1	19.0	47	34	10.56	6.79	-	5.94	0.64	0.56	Possible soot on exterior	-
20	37	GT	pl	pl	-	10-14	5-7	1	2.8	-	42	15.03	5.90	-	5.61	0.39	0.37	-	-
20	38	GT	pl	pl	-	-	-	1	7.3	-	-	13.39	6.55	-	5.74	0.49	0.43	-	-
20	39	GG	pl	pl	-	18-20	5	2	8.4	-	44	12.85	8.42	-	8.10	0.66	0.63	-	-
20	40	GT	pl	pl	-	18-22	3-4	1	8.2	64	31	12.90	7.08	-	4.57	0.55	0.35	Blackened on exterior rim	-
20	41	GG	pl	pl	Notched lip	-	-	1	3.1	-	26	15.50	5.78	-	5.58	0.37	0.36	-	Foreign vessel?
20	42	GT some SH	er	pl	-	14	20	3	65.3	38	42	15.88	6.92	0.04	5.61	0.44	0.35	-	Discolorations on exterior
20	43	GG	rs	rs	-	18	8	1	13.0	44	39	14.92	6.50	-	5.20	0.44	0.35	Exterior soot	-
20	44	GG	pl	pl	-	22	5	1	9.2	58	33	15.08	5.29	-	6.43	0.35	0.43	-	-
20	45	GT	pl	pl	-	16	9	1	24.7	43	30	12.50	6.91	0.06	6.98	0.55	0.56	Exterior soot	-
20	46	GT	pl	pl	-	20	4	1	6.4	41	28	13.20	7.45	-	6.70	0.56	0.51	-	Coil mark visible on interior
20	47	GG	pl	pl	-	22	3	1	6.6	54	22	15.43	6.49	-	6.50	0.42	0.42	-	Possible impressions on lip
20	48	GT	pl	pl	-	18	26	3	123.4	46	38	12.83	6.14	0.02	7.05	0.48	0.55	-	Coil mark visible on interior
20	49	GT	pl	pl	-	-	-	1	5.4	51	39	14.97	6.19	-	5.90	0.41	0.39	-	-
20	50	GT	pl	pl	-	14	13	1	21.5	44	33	12.90	6.47	-	5.07	0.50	0.39	Exterior soot	Grog temper may be hematite inclusions
20	51	SH	pl	pl	-	30	8	4	44.6	-	-	-	-	-	8.12	-	-	Soot on interior rim	-
20	52	SH	ds	rs	-	16-18	5	2	8.5	-	33	8.47	5.10	-	4.09	0.60	0.48	-	Exterior may be burnished
20	53	GT	pl	pl	-	-	-	1	1.3	-	40	9.84	5.90	-	3.50	0.60	0.36	-	-
22	1	GT	pl	pl	-	-	-	1	8.7	-	0	7.90	6.50	-	2.99	0.82	0.38	-	-
39	1	GT/GG	rs	pl	-	-	-	1	0.7	-	-	7.64	-	-	3.16	-	0.41	Soot on interior rim	-
42	2	GT	pl	pl	-	-	-	1	3.7	-	-	4.24	4.62	-	4.24	1.00	1.00	-	-
44	1	SH	pl	pl	Rim castellation	-	-	1	7.3	-	-	-	-	-	-	-	-	-	Yankeetown rim castellation
44	2	GG	ds	rs	-	-	-	1	10.0	29	53	13.83	7.70	-	5.20	0.56	0.38	-	-
48	1	SH	pl	pl	-	6-8	15	1	2.2	-	-	3.18	3.42	-	3.18	1.00	1.00	-	-
Totals	**61**							**74**	**1101.2**										
Ave.						**19**				**50**	**28**	**9.79**	**6.15**	**0.09**	**5.59**	**0.68**	**0.61**		

Table 6.13. Edelhardt Phase Bowls and Seed Jars from the Emerald Site.

Feature	Vessel	Temper	Exterior	Interior	Decoration	Oriface (cm)	%	No.	Wt. (g)	RA	LB	Lip type	Use Wear	Comments
Bowls														
4	5	GT	rs	rs	-	-	-	2	6.6	-	-	unclear	-	-
17	3	SH	pl	pl	-	<10	5	1	6.7	-	-	Round	Lip wear	Constricted bowl
17	4	GT	rs	pl	One poss vertical incision	>30	<3	1	19.3	-	-	Flat	Lip slip wear	-
20	5	LS	rs	rs	-	20-22	3	1	6.4	-	-	Exterior beveled flat	-	Constricted bowl
20	7	GT	rs	rs	-	30-32	3	1	13.0	-	-	Flat	-	-
20	8	GT	rs	rs	-	18	8	1	22.7	-	-	Flat	Interior slip eroded	-
20	9	SH	rs	rs	-	14	4	1	4.0	-	-	Flat	-	-
20	10	SH	er	rs	-	>16	<5	3	4.2	-	-	Flat	Interior slip eroded	-
42	1	SH	rs	rs	-	-	-	1	2.7	-	-	Round	Soot on lip, lip slip wear	May be jar or seed jar
Totals	**9**							**12**	**85.5**					
Ave.						**20**								
Seed Jars														
17	9	SH	pl	pl	-	18-20	3	1	9.3	6.44	-	Interior beveled round	-	
20	1	GT	ds	pl	-	16	14	2	127.6	8.09	-0.05	Round	-	
20	2	SH	rs	pl	-	14	6	1	24.6	12.53	-	Interior beveled round	-	2 partial hanging holes
20	3	SH	ds	pl	Single row punctations	12	16	1	19.3	6.76	-	Interior beveled round	-	Row of puncations crooked
20	4	LS	rs	rs	-	30-32	2-3	1	6.0	5.68	-	Exterior beveled round	-	
20	6	LS	rs	pl	-	12	6	1	3.3	5.78	-	Exterior beveled round	-	
25	1	GT	rs	rs	-	12	5	1	12.5	8.33	-	Exterior beveled round	-	1 partial hanging hole
Totals	**7**							**8**	**202.5**	**7.66**				
Ave.						**17**								
Grand Total	**16**							**20**	**288**					

Table 6.14. Edelhardt Phase Stumpware, Funnels, and Beakers from the Emerald Site.

Feature	Vessel	Form	Temper	Exterior	Interior	Decoration	Oriface (cm)	%	No.	Wt. (g)	LT	Lip Shape	Usewear	Comments
20	54	Funnel	GT some GG	pl	pl	-	-	-	1	5.8	-	-	Lye residue exterior, poss interior	
20	55	Stumpware	GT	cm v s	pl	-	22-30	2-5	1	85.8	-	-	Lye residue on exterior	
20	56	Stumpware	GT	cm v z	pl	-	12-16	8-10	1	93.1	-	-	Surface eroded	
47	1	Stumpware	GG	cm v z	pl	-	-	-	1	41.6	-	-	Lye residue on exterior	
Totals	**4**								**4**	**226.3**				
18	1	Beaker	fine GG	rs	rs	2 horizontal broad incisions	~16-22	3-5	1	2.7	4.90	Flat	-	Coles Creek vessel
20	11	Beaker	fine GG	rs	rs	2 horizontal fine line incisions, 1 incision on lip	14-18	3-5	1	3.6	6.65	Flat	Slip on lip worn	Coles Creek vessel
Totals	**2**								**2**	**6.3**				

Table 6.15. Occupation Span Estimates Based on Structure Rebuilds.

Feature	Phase	Number of Rebuilds	Occupation Span (yrs)
4	Edelhardt	0	**≤ 15**
7	Edelhardt-Lohmann	0	**≤ 15**
18/19	Edelhardt	0	**≤ 15**
20	Edelhardt	0	**≤ 15**
25	Edelhardt	1	**15-30**
3	Edelhardt-Lohmann	0	**≤ 15**
23 lower	Edelhardt-Lohmann	0	**≤ 15**
57	Edelhardt-Lohmann	0	**≤ 15**
14	Lohmann	0	**≤ 15**
15	Lohmann	0	**≤ 15**
23 upper	Lohmann	1	**15-30**
61	Lohmann	0	**≤ 15**
12	Stirling	1	**15-30**
13	Stirling	1	**15-30**

Table 6.16. Structures and Associated Features from the Emerald Site.

Structure	Phase	Pits, Hearths, Post Molds, Burials
4	Edelhardt	6
7	Edelhardt-Lohmann	5, 8, 9
18/19	Edelhardt	17
20	Edelhardt	30, 39, 40, 42, 43, 44, 45, 46, 47, 48, 49, 50
25	Edelhardt	22, 28, 34, 37, 38
25 rebuild	Edelhardt	29, 31, 33, 35
3	Edelhardt-Lohmann	-
23 lower	Edelhardt-Lohmann	24
57	Edelhardt-Lohmann	11, 26, 56, 60
14	Lohmann	-
15	Lohmann	41, 52, 53, 54, 55
23 upper	Lohmann	10, 21, 27
61	Lohmann	-
64	Lohmann	-
12	Stirling	51
13	Stirling	-

Table 6.17. Occupation Span Estimates Based on Ceramic Refuse.

Feature	Phase	MNV (Td)	Use life (L) in years			# of Jars per household (S)	Occupation Span (t)		
							0.33	**0.50**	**0.75**
4	Edelhardt	0	0.33	0.50	0.75	1.66	**<1**	**<1**	**<1**
7	Edelhardt-Lohmann	3	0.33	0.50	0.75	1.66	**0.60**	**0.90**	**1.36**
18/19	Edelhardt	7	0.33	0.50	0.75	1.66	**1.39**	**2.11**	**3.16**
20	Edelhardt	5	0.33	0.50	0.75	1.66	**0.99**	**1.51**	**2.26**
25	Edelhardt	1	0.33	0.50	0.75	1.66	**0.20**	**0.30**	**0.45**
25 rebuild	Edelhardt	0	0.33	0.50	0.75	1.66	**<1**	**<1**	**<1**
3	Edelhardt-Lohmann	0	0.33	0.50	0.75	1.66	**<1**	**<1**	**<1**
23 lower	Edelhardt-Lohmann	0	0.33	0.50	0.75	1.66	**<1**	**<1**	**<1**
23 upper	Lohmann	0	0.33	0.50	0.75	1.66	**<1**	**<1**	**<1**
57	Edelhardt-Lohmann	5	0.33	0.50	0.75	1.66	**0.99**	**1.51**	**2.26**
14	Lohmann	0	0.33	0.50	0.75	1.66	**<1**	**<1**	**<1**
15	Lohmann	0	0.33	0.50	0.75	1.66	**<1**	**<1**	**<1**
61	Lohmann	0	0.33	0.50	0.75	1.66	**<1**	**<1**	**<1**
12	Stirling	0	0.33	0.50	0.75	1.66	**<1**	**<1**	**<1**
13	Stirling	0	0.33	0.50	0.75	1.66	**<1**	**<1**	**<1**

Table 6.18. Edelhardt-Lohmann Phase Vessels from the Emerald Site.

Feature	Vessel	Type	Temper	Exterior	Interior	Decoration	Oriface (cm)	%	No.	Wt. (g)	RA	LB	LL	WT	RC	LT	LP	LS	Use Wear	Comments
5	1	Jar	GT	pl	pl	-	-	-	1	10.0	-	48	5.41	4.15	0.07	3.26	0.77	0.60	-	-
5	2	Jar	GT	pl	pl	-	-	-	1	6.3	-	-	8.13	7.31	-	3.41	0.90	0.42	-	-
5	3	Jar	GT	pl	pl	-	-	-	2	1.9	-	-	4.27	4.06	0.00	4.27	0.95	1.00	-	-
7	1	Jar	GG	pl	rs	-	6-8	5	1	0.6	-	-	5.13	3.66	-	2.39	0.71	0.47	-	-
11	1	Jar	SH	pl	pl	-	32	4	3	3.6	65	16	8.13	4.69	-	2.92	0.58	0.36	-	-
11	3	Jar	GT	pl	pl	-	-	-	1	1.5	-	-	7.71	5.51	-	7.06	0.71	0.92	-	-
11	4	Jar	GT	pl	pl	-	-	-	1	0.4	-	-	3.23	3.68	-	3.23	1.00	1.00	-	-
56	1	Jar	GT	rs/cm-h	pl	-	20-22	3	1	3.1	-	57	9.91	7.25	-	4.41	0.73	0.45	Blackened on exterior	Red slip on lip
56	2	Jar	SH	po	pl	-	>20	<3	1	4.0	60	37	9.40	5.21	-	4.07	0.55	0.43	Soot on exterior rim	-
57	1	Jar	SH	er	pl	Incised?	-	-	1	10.0	-	-	10.20	8.50	-	2.55	0.83	0.25	-	Coil line on interior
57	2	Jar	GT	pl	pl	Notched lip	12-14	5	1	3.3	-	-	5.84	5.17	-	1.55	0.89	0.27	-	Faint lip impressions
57	3	Jar	SH	ds	ds	-	12	10	8	28.2	-	33	9.50	5.79	0.12	4.33	0.61	0.46	Exterior soot	-
65	1	Jar	SH	pl	pl	-	14-18	5	2	17.3	-	-	11.58	8.10	-	9.79	0.70	0.85	-	-
65	2	Jar	GT	pl	pl	-	20-24	4	1	18.0	-	-	5.82	4.84	-	5.82	0.83	1.00	Soot on exterior rim and lip	-
11	2	Bowl	LS	rs	rs	-	26	5	1	22.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-	-
Totals	**15**								**26**	**131.1**										
Ave.							**18 (Jars)**				**62.5**	**38**	**7.45**	**5.57**	**0.06**	**4.22**	**0.77**	**0.61**		

Table 6.19. Lohmann Phase Structure Attributes from the Emerald Site. Orientations based on true north.

Feature	Trench/EB	Basin					Wall			Floor						Internal features	Comments
		L (m)	W (m)	D (m)	V (m2)	# zones	Type	D (cm)	# PM	L (m)	W (m)	A (LxW)	Shape (W/L)	Orientation	Int. PM		
14	**5**	2.52	2.14	0.17	0.92	1	PM	-	30	2.30	1.90	4.37	0.83	45	2	-	PM angled toward structure interior
15	**5**	3.20	2.58	0.10	0.83	2	WT	29	-	2.97	2.50	7.43	0.84	42	2	F's 41, 52, 53, 54, 55	
23 upper 1	**5**	>3.74	>1.40	0.26	-	1	WT	29	-	>3.04	>1.47	>4.47	unknown	48	0	-	
23 upper 2	**5**	>3.74	>1.40	0.26	-	1	WT	26	-	>3.45	>1.47	>5.07	unknown	48	0	-	
61	**9**	3.87	3.01	0.19	2.21	1	PM	-	64	3.50	2.45	8.58	0.70		0	-	Broken hoe frags on floor
64	**4**	>5.04	unknown	0.41	-	6	WT?	unknown	-	unknown	unknown	unknown	unknown	unknown	unknown	unknown	Upper basin had several thin laminated zones
Total	**5**				**3.96**							**>29.92**					
Ave.		**3.20**	**2.58**	**0.23**	**1.32**					**2.92**	**2.28**	**6.79**	**0.79**		**1**		

Table 6.20. Lohmann Phase Pit Attributes from the Emerald Site.

Feature	Trench/EB	Plan shape	Sidewalls	Base	L (cm)	W (cm)	D (cm)	V (dm3)	V (m3)	# zones	Comments
External											
1	3	circular	incurved	basin	117	109	22	115.7	0.12	1	-
2	1	circular	incurved	flat	81	66	4	8.4	0.01	1	-
10	5	circular	incurved	flat	91	90	13	42.9	0.04	1	-
21	5	circular	vertical	basin	148	142	36	594.2	0.59	2	-
27	5	circular	irregular	flat	93	93	40	271.6	0.27	2	-
Total	**5**							**1032.8**	**1.03**		
Ave.					**106**	**100**	**23**	**206.6**	**0.21**		
Internal											
41	5	oval	inslanted	basin	51	40	18	17.5	0.02	1	Internal pit to F15
52	5	circular	inslanted	flat	30	27	11	4.2	0.01	1	Internal pit to F15
53	5	oval	inslanted	basin	42	30	7	3.6	0.01	1	Internal pit to F15
54	5	oval	vertical	flat	35	27	20	18.9	0.02	1	Internal pit to F15
55	5	oval	irregular	basin	49	34	30	40.6	0.04	2	Internal pit to F15
Total	**5**							**84.8**	**0.10**		
Ave.					**41**	**32**	**17**	**17.0**	**0.02**		

Table 6.21. Lohmann Phase Burnt Clay Artifacts from the Emerald Site.

Feature	BC		Clay Object		Daub		Oxidized Soil		Pinch Pot		Totals			
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	No. %	Wt. (g)	Wt. %
1	20	54.2	8	312.6	-	-	66	206.9	-	-	**94**	**38.7**	**573.7**	**56.1**
2	7	12.1	-	-	-	-	-	-	-	-	**7**	**2.9**	**12.1**	**1.2**
10	10	13.4	5	21.0	-	-	-	-	-	-	**15**	**6.2**	**34.4**	**3.4**
14	20	32.9	1	12.0	-	-	-	-	-	-	**21**	**8.6**	**44.9**	**4.4**
15	5	7.3	3	20.0	-	-	-	-	-	-	**8**	**3.3**	**27.3**	**2.7**
21	24	35.6	8	62.3	-	-	-	-	-	-	**32**	**13.2**	**97.9**	**9.6**
23	21	28.7	7	69.9	-	-	-	-	2	4.8	**30**	**12.3**	**103.4**	**10.1**
27	21	68.0	2	38.6	1	13.9	-	-	-	-	**24**	**9.9**	**120.5**	**11.8**
61	9	1.4	-	-	-	-	-	-	-	-	**9**	**3.7**	**1.4**	**0.1**
66	3	6.6	-	-	-	-	-	-	-	-	**3**	**1.2**	**6.6**	**0.6**
Totals	**140**	**260.2**	**34**	**536.4**	**1**	**13.9**	**66**	**206.9**	**2**	**4.8**	**243**	**100.0**	**1022.2**	**100.0**
Total %	**57.6**	**25.5**	**14.0**	**52.5**	**0.4**	**1.4**	**27.2**	**20.2**	**0.8**	**0.5**				

Table 6.22. Lohmann Phase Non-Chipped Stone Tools from the Emerald Site.

Feature	Cobble Tool quartzite		Cobble Tool igneous		Cobble Tool sandstone		Abrader sandstone		Celt diabase		Totals			
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	No. %	Wt. (g)	Wt. %
1	-	-	1	44.7	-	-	-	-	-	-	**1**	**14.3**	**44.7**	**4.6**
21	-	-	-	-	1	44.2	-	-	-	-	**1**	**14.3**	**44.2**	**4.5**
23	-	-	-	-	-	-	3	718.6	-	-	**3**	**42.9**	**718.6**	**73.6**
27	1	31.3	-	-	-	-	-	-	1	138.1	**2**	**28.6**	**169.4**	**17.3**
Totals	**1**	**31.3**	**1**	**44.7**	**1**	**44.2**	**3**	**718.6**	**1**	**138.1**	**7**	**100.0**	**976.9**	**100.0**
Total %	**14.3**	**3.2**	**14.3**	**4.6**	**14.3**	**4.5**	**42.9**	**73.6**	**14.3**	**14.1**				

Table 6.23. Lohmann Phase Chipped Stone Tools from the Emerald Site.

Feature	Burlington Utilized Flake		Burlington Retouched Flake		Burlington Core		Mill Creek Utilized Flake		Mill Creek Hoe/Hoe Frag		Ste. Gene Utilized Flake		Bailey Utilized Flake		Glacial Core		Total			
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	No. %	Wt. (g)	Wt. %
1	2	18.7	1	2.2	-	-	-	-	-	-	-	-	-	-	1	55.5	**4**	**9.1**	**76.4**	**6.4**
10	1	3.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**1**	**2.3**	**3.2**	**0.3**
14	6	31.6	1	3.9	-	-	-	-	-	-	-	-	-	-	-	-	**7**	**15.9**	**35.5**	**3.0**
15	3	34.9	-	-	-	-	1	2.5	-	-	-	-	-	-	-	-	**4**	**9.1**	**37.4**	**3.1**
21	3	49.2	2	43.1	-	-	2	4.3	-	-	-	-	-	-	-	-	**7**	**15.9**	**96.6**	**8.0**
23	4	17.1	1	21.0	1	55.8	-	-	-	-	1	2.3	1	7.6	-	-	**8**	**18.2**	**103.8**	**8.6**
27	2	11.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**2**	**4.5**	**11.9**	**1.0**
61	5	71.6	-	-	2	74.8	-	-	2	677.8	-	-	-	-	-	-	**9**	**20.5**	**824.2**	**68.7**
66	1	2.5	-	-	-	-	1	8.9	-	-	-	-	-	-	-	-	**2**	**4.5**	**11.4**	**0.9**
Totals	**27**	**240.7**	**5**	**70.2**	**3**	**130.6**	**4**	**15.7**	**2**	**677.8**	**1**	**2.3**	**1**	**7.6**	**1**	**55.5**	**44**	**100.0**	**1200.4**	**100.0**
Total %	**61.4**	**20.1**	**11.4**	**5.8**	**6.8**	**10.9**	**9.1**	**1.3**	**4.5**	**56.5**	**2.3**	**0.2**	**2.3**	**0.6**	**2.3**	**4.6**				

Table 6.24. Lohmann Phase Debitage from the Emerald Site.

Feature	Burlington Gen Debitage		Burlington Block Fracture		Burlington Thermal Shatter		Burlington Bifacial Thin		Burlington Bifacal Retouch		Mill Creek Gen Debitage		Mill Creek Block Fracture		Mill Creek Thermal Shatter		Mill Creek Hoe Flakes	
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)
1	11	15.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	-	-	1	11.5	-	-	-	-	-	-	-	-	-	-	1	6.8	-	-
10	11	9.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1.6
14	5	18.5	-	-	-	-	1	9.1	-	-	3	1.4	-	-	2	0.5	2	1.1
15	12	57.9	-	-	-	-	-	-	-	-	2	1.4	-	-	1	0.4	1	3.4
21	12	6.4	-	-	1	0.6	-	-	-	-	4	3.5	1	0.5	-	-	-	-
23	17	32.1	2	15.6	-	-	1	1.4	1	0.4	9	4.3	4	1.1	4	1.4	-	-
27	6	15.1	-	-	-	-	1	2.4	-	-	1	2.1	-	-	1	0.7	2	4.9
52	1	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
54	2	0.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
61	24	51.7	-	-	-	-	1	1.7	-	-	-	-	-	-	-	-	-	-
66	6	1.9	-	-	2	0.8	-	-	-	-	-	-	-	-	-	-	1	6.9
Totals	**107**	**210.5**	**3**	**27.1**	**3**	**1.4**	**4**	**14.6**	**1**	**0.4**	**19**	**12.7**	**5**	**1.6**	**9**	**9.8**	**8**	**17.9**
Total %	**59.8**	**66.8**	**1.7**	**8.6**	**1.7**	**0.4**	**2.2**	**4.6**	**0.6**	**0.1**	**10.6**	**4.0**	**2.8**	**0.5**	**5.0**	**3.1**	**4.5**	**5.7**

Feature	Cobden Gen Debitage		Kaolin Gen Debitage		Kaolin Bifacial Thin		Unknown Block Fracture		Unknown Thermal Shatter		Unknown Hoe Flakes		Total			
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	No. %	Wt. (g)	Wt. %
1	-	-	-	-	-	-	-	-	-	-	-	-	**11**	**6.1**	**15.8**	**5.0**
2	-	-	-	-	-	-	-	-	-	-	-	-	**2**	**1.1**	**18.3**	**5.8**
10	-	-	-	-	-	-	-	-	-	-	-	-	**13**	**7.3**	**11.4**	**3.6**
14	2	4.0	-	-	-	-	-	-	-	-	-	-	**15**	**8.4**	**34.6**	**11.0**
15	-	-	1	0.6	-	-	-	-	1	0.5	-	-	**18**	**10.1**	**64.2**	**20.4**
21	-	-	-	-	1	0.4	3	1.5	1	0.3	1	1.2	**24**	**13.4**	**14.4**	**4.6**
23	-	-	-	-	-	-	4	2.2	1	0.4	1	0.1	**44**	**24.6**	**59.0**	**18.7**
27	-	-	-	-	-	-	1	0.8	-	-	-	-	**12**	**6.7**	**26.0**	**8.2**
52	-	-	-	-	-	-	-	-	1	0.1	-	-	**2**	**1.1**	**0.7**	**0.2**
54	-	-	-	-	-	-	-	-	-	-	-	-	**2**	**1.1**	**0.7**	**0.2**
61	-	-	-	-	-	-	1	2.1	-	-	-	-	**26**	**14.5**	**55.5**	**17.6**
66	-	-	-	-	-	-	-	-	1	5.1	-	-	**10**	**5.6**	**14.7**	**4.7**
Totals	**2**	**4.0**	**1**	**0.6**	**1**	**0.4**	**9**	**6.6**	**5**	**6.4**	**2**	**1.3**	**179**	**100.0**	**315.3**	**100.0**
Total %	**1.1**	**1.3**	**0.6**	**0.2**	**0.6**	**0.1**	**5.0**	**2.1**	**2.8**	**2.0**	**1.1**	**0.4**				

Table 6.25. Lohmann Phase Jars from the Emerald Site.

Feature	Vessel	Temper	Exterior	Interior	Decoration	Oriface (cm)	%	No.	Wt. (g)	RA	LB	LL	WT	RC	LT	LP	LS	Use Wear	Comments
1	1	GG some GT	rs	rs	-	18	13	1	22.0	-	24	11.80	4.20	-	3.80	0.36	0.32	Lye residue?	-
1	3	SH	pl	pl	-	-	-	1	4.2	-	-	8.70	6.30	-	8.70	0.72	1.00	-	Some red inclusions in paste
1	4	SH	pl	pl	-	-	-	2	2.7	45	-	5.80	5.50	-	5.80	0.95	1.00	Interior soot	-
2	1	SH	ds	ds	-	-	-	1	2.5	35	66	6.05	5.40	-	5.86	0.89	0.97	-	-
10	1	SH	pl	pl	-	56	6	2	93.9	-	16	10.81	8.43	-	5.80	0.78	0.54	Blackening on interior	-
14	1	SH	pl	pl	-	16	12	1	42.3	-	8	6.60	5.06	0.13	3.80	0.77	0.58	-	-
15	1	GG	cm-hz	pl	-	30-32	3	1	5.8	-	-	11.33	5.50	-	6.00	0.49	0.53	-	-
15	2	GT	pl	pl	-	>22	<5	1	8.0	40	37	13.28	6.17	-	5.80	0.46	0.44	-	-
15	3	SH/GG	po	pl	-	18	7	1	11.7	62	0	6.64	6.62	-	4.13	0.99	0.62	-	Polish may be dark brown slip
15	4	LS	ds	ds	-	-	-	1	1.0	-	-	9.48	4.95	-	3.74	0.52	0.39	-	-
15	5	GT	cm-v	pl	-	-	-	1	2.1	-	-	-	-	-	4.80	-	-	Interior blackened	Possible MCS paste
21	2	SH	po	pl	-	-	-	1	10.0	59	32	7.19	6.96	0.03	3.91	0.97	0.54	Soot on exterior shoulder	Exterior polish may be slip
21	3	SH	pl	pl	-	-	-	1	2.9	-	-	5.24	5.10	-	2.53	0.97	0.48	Exterior soot	-
23	1	SH	ds	ds	-	18	3	1	1.5	47	55	9.00	7.05	-	4.99	0.78	0.55	-	-
23	2	SH	ds	ds	-	16-18	6	1	2.8	64	44	9.70	6.10	-	3.90	0.63	0.40	Soot under exterior rim	-
23	3	SH	pl	pl	-	26	7	2	12.1	-	-	7.20	7.00	-	7.20	0.97	1.00	-	-
23	4	SH	pl	pl	-	14	3	1	3.6	-	-	4.31	5.30	-	4.31	1.00	1.00	-	-
23	5	GT/GG	pl	pl	-	-	-	1	6.2	64	0	10.08	9.27	-	10.08	0.92	1.00	-	Possible incision on exterior
23	8	SH	pl	pl	-	32	6	1	16.6	-	-	9.07	6.45	-	7.20	0.71	0.79	Exterior and interior soot	-
23	11	SH	pl	pl	-	-	-	1	2.4	-	-	9.76	4.93	-	4.22	0.51	0.43	Soot on rim	-
23	12	SH	pl	pl	-	-	-	1	10.5	-	-	6.88	6.65	-	6.88	0.97	1.00	Soot on exterior and rim	-
23	13	SH	rs	rs	-	28	4	1	11.7	77	-	10.88	6.69	-	4.95	0.61	0.45	-	May be bowl
23	14	GG some GT	pl	pl	-	-	-	1	1.4	-	-	-	-	-	5.03	-	-	-	-
27	1	SH	pl	pl	-	32-34	5	3	68.9	-	29	12.31	7.58	0.13	8.00	0.62	0.65	-	-
27	2	SH	pl	rs	-	-	-	1	4.1	-	-	-	-	-	-	-	-	-	May be bowl
27	3	GT	rs	rs	-	12	5	1	0.7	-	21	-	-	-	3.70	-	-	-	-
61	2	SH	rs	rs	-	-	-	3	23.3	-	-	5.40	6.70	-	5.40	1.00	1.00	-	-
64	1	SH	ds	pl	-	20-22	20	11	198.6	-	28	11.11	9.16	0.14	7.52	0.82	0.68	Soot on exterior shoulder; Interior blackened	-
66	1	SH	rs	pl	-	20-24	4	2	12.8	-	-	5.12	5.37	-	5.12	1.00	1.00	-	-
Totals	**29**							**47**	**586.2**										
Ave						**26**				**55**	**28**	**8.55**	**6.34**	**0.11**	**5.47**	**0.78**	**0.69**		

Table 6.26. Lohmann Phase Non-Jar Vessels from the Emerald Site.

Feature	Vessel	Temper	Exterior	Interior	Decoration	Oriface (cm)	%	No.	Wt. (g)	RA	LB	Lip Type	Use Wear	Comments
Bowls														
1	2	LS	rs	rs	Rim tab	16-18	9	5	17.5	-	-	N/A	-	-
21	1	GG some SH	rs	rs	Segmented rim	12	8	1	10.1	-	-	Round	Interior darkened	-
23	6	LS	rs	rs	-	26-28	2	1	6.7	-	-	Round	-	-
23	9	SH	ds	ds	-	12-14	5-6	1	3.1	-	-	Round	Light soot on exterior	-
23	10	LS	rs	rs	-	24	4	1	3.9	-	-	Flat	Some slip wear on int rim	-
Totals	**5**							**9**	**41.3**					
Ave.						**19**								
Seed Jars														
10	2	SH	rs	pl	-	16-18	13	2	17.0	N/A	N/A	N/A	-	-
61	1	SH	ds	pl	-	20	28	17	101.1	7.94	-0.12	Flat	1 complete hanging hole	-
Totals	**2**							**19**	**118.1**					
Ave.						**19**								
Stumpware														
23	7	GG some GT	pl	pl	-	12-14	15	1	65.8	-	-	-	Lye residue and soot on exterior	-
27	4	GT	cm v z	pl	-	14	8	1	92.4	-	-	-	Lye residue on exterior	-
61	3	GT	cm v z	pl	-	14	24	1	446.9	-	-	-	Lye residue on exterior	-
Totals	**3**							**3**	**605.1**					
Ave.						**14**								
Grand Totals	**10**							**31**	**764.5**					

Table 6.27. Stirling Phase Structure Attributes from the Emerald Site. Orientations based on true north.

Feature	Basin					Wall			Floor						Internal features	Comments
	L (m)	W (m)	D (m)	V (m3)	# zones	Type	Depth	# PM	L (m)	W (m)	A (LxW)	Shape (W/L)	Orientation	Int. PM		
12	4.10	2.80	0.13	1.49	1	WT	29	-	3.85	2.40	9.24	0.62	28	1 (F51)	-	-
12 rebuild	4.10	2.80	0.13	1.49	1	WT	25	-	3.85	2.40	9.24	0.62	28	1 (F51)	-	-
13	5.32	3.40	0.28	5.06	2 (1 slump)	WT	30	-	4.84	2.40	11.62	0.50	44	1	-	-
13 rebuild	5.32	3.40	0.28	5.06	2 (1 slump)	WT	26	-	4.84	2.96	14.33	0.61	44	1	-	-
Total				**13.10**							**44.43**					
Ave	**4.71**	**3.10**	**0.21**	**3.28**			**28**			**2.54**	**11.11**	**0.59**		**-**		

Table 6.28. All Post Molds and Post Pits from the Emerald Site.

Feature	Phase	Trench/EB	Plan shape	Sidewalls	Base	L (cm)	W (cm)	D (cm)	# zones	Comments
38	Edelhardt	5	Circular	Incurved	Basin	26	26	9	1	Internal post mold in F25
51	Stirling	5	Circular	Incurved	Basin	24	22	13	1	Internal post for F12
62	Miss	8	Irregular	Irregular	Flat	600	120	46	2	Ramp only; post mold overlooked
63	Edel/Loh	11	Circular	Irregular	Flat	95	85	100	5	Post pit and ramp; laminated zone in ramp

Table 6.29. Stirling Phase Burnt Clay Artifacts from the Emerald Site.

Feature	BC		Clay Object		Oxidized Soil		Shaped Clay		Totals			
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	No. %	Wt. (g)	Wt. %
12	132	397.1	27	486.5	7	13.7	-	-	**166**	**59.9**	**897.3**	**67.5**
13	98	276.1	11	153.5	-	-	1	1.0	**110**	**39.7**	**430.6**	**32.4**
51	1	1.7	-	-	-	-	-	-	**1**	**0.4**	**1.7**	**0.1**
Totals	**231**	**674.9**	**38**	**640.0**	**7**	**13.7**	**1**	**1.0**	**277**	**100.0**	**1329.6**	**100.0**
Total %	**83.4**	**50.8**	**13.7**	**48.1**	**2.5**	**1.0**	**0.4**	**0.1**				

Table 6.30. Stirling Phase Chipped Stone Tools from the Emerald Site.

Feature	Burlington Utilized Flake		Burlington Retouched Flake		Mill Creek Utilized Flake		Mill Creek Retouched Flake		Cobden Core		Glacial Core		Totals			
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	No. %	Wt. (g)	Wt. %
12	7	25.0	3	18.2	2	36.3	-	-	-	-	-	-	**12**	**42.9**	**79.5**	**25.7**
13	11	89.8	2	17.7	-	-	1	31.0	1	38.0	1	52.9	**16**	**57.1**	**229.4**	**74.3**
Totals	**18**	**114.8**	**5**	**35.9**	**2**	**36.3**	**1**	**31.0**	**1**	**38.0**	**1**	**52.9**	**28**	**100.0**	**308.9**	**100.0**
Total %	**64.3**	**37.2**	**17.9**	**11.6**	**7.1**	**11.8**	**3.6**	**10.0**	**3.6**	**12.3**	**3.6**	**17.1**				

Table 6.31. Stirling Phase Debitage from the Emerald Site.

Feature	Burlington Gen Debitage		Burlington Block Fracture		Burlington Thermal Shatter		Burlington Hoe Flakes		Mill Creek Gen Debitage		Mill Creek Block Fracture		Mill Creek Hoe Flakes		Ste. Gene Gen Debitage	
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)
12	27	58.6	2	3.9	3	1.1	-	-	3	11.3	-	-	1	1.3	-	-
13	51	164.9	2	4.9	3	5.4	1	0.1	10	13.5	1	0.5	5	14.2	2	2.4
Totals	**78**	**223.5**	**4**	**8.8**	**6**	**6.5**	**1**	**0.1**	**13**	**24.8**	**1**	**0.5**	**6**	**15.5**	**2**	**2.4**
Total %	**66.1**	**75.3**	**3.4**	**3.0**	**5.1**	**2.2**	**0.8**	**0.0**	**11.0**	**8.4**	**0.8**	**0.2**	**5.1**	**5.2**	**1.7**	**0.8**

Feature	Cobden Gen Debitage		Kaolin Gen Debitage		Glacial Gen Debitage		Unknown Block Fracture		Unknown Bifacial Thin		Total			
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	No. %	Wt. (g)	Wt. %
12	2	7.1	-	-	1	0.6	1	0.3	-	-	**40**	**33.9**	**84.2**	**28.4**
13	1	4.0	1	1.0	-	-	-	-	1	1.8	**78**	**66.1**	**212.7**	**71.6**
Totals	**3**	**11.1**	**1**	**1.0**	**1**	**0.6**	**1**	**0.3**	**1**	**1.8**	**118**	**100.0**	**296.9**	**100.0**
Total %	**2.5**	**3.7**	**0.8**	**0.3**	**0.8**	**0.2**	**0.8**	**0.1**	**0.8**	**0.6**				

Table 6.32. Stirling Phase Non-Chipped Stone Tools from the Emerald Site.

Feature	Cobble Tool granite		Abrader sandstone		Totals			
	No.	Wt. (g)	No.	Wt. (g)	No.	No. %	Wt. (g)	Wt. %
12	1	92.7	3	161.7	**4**	**66.7**	**254.4**	**93.0**
13	-	-	2	19.1	**2**	**33.3**	**19.1**	**7.0**
Totals	**1**	**92.7**	**5**	**180.8**	**6**	**100.0**	**273.5**	**100.0**
Total %	**16.7**	**33.9**	**83.3**	**66.1**				

Table 6.33. Stirling Phase Jars from the Emerald Site.

Feature	Vessel	Temper	Exterior	Interior	Decoration	Oriface (cm)	%	No.	Wt. (g)	RA	LB	LL	WT	RC	LT	LP	LS	Use Wear	Comments
12	1	SH	rs	rs	-	24-28	10	1	147.8	-	13	10.75	7.61	-	4.88	0.71	0.45	-	Rim warped
12	2	SH	po	po	-	24-26	3	1	21.6	-	27	11.70	7.46	-	7.14	0.64	0.61	-	Polish may be brown slip
12	3	SH	ds	ds	-	18	14	2	42.8	48	39	9.21	6.88	0.07	3.86	0.75	0.42	-	-
12	4	SH	ds/rs	ds	-	14-16	6	1	5.1	53	44	11.13	7.51	-	6.23	0.67	0.56	Exterior soot?	-
12	5	SH	ds	rs	-	18	5	2	5.3	-	-	-	-	-	5.11	-	-	-	-
12	6	SH	ds	ds	-	10-12	5	1	5.4	-	35	6.63	4.05	-	4.10	0.61	0.62	-	-
12	7	SH	ds	ds	Incised	14	4	2	3.1	-	-	7.76	5.23	-	3.79	0.67	0.49	Exterior soot	Ramey Incised
12	9	GG	po	pl	-	12-14	6	1	3.1	-	-	5.60	3.79	-	5.60	0.68	1.00	-	Rim fold - Dillinger?
13	1	SH	pl	pl	-	18	9	1	15.0	-	-	5.51	6.19	-	5.51	1.00	1.00	Whitish residue on interior rim	-
13	2	SH	rs	pl	-	20-22	8	4	11.0	-	-	5.21	5.68	-	5.21	1.00	1.00	-	-
13	4	GT some GG	pl	pl	Notched lip	-	-	1	4.9	180	0	9.63	6.08	-	9.73	0.63	1.01	-	-
13	5	SH	ds	pl	-	-	-	1	1.9	43	58	9.07	5.00	-	5.92	0.55	0.65	Exterior soot	-
13	6	SH/GG	po	pl	-	12	10	1	14.4	63	0	6.81	6.26	-	3.33	0.92	0.49	-	-
13	7	SH	rs	pl	-	34	8	1	38.5	-	32	8.68	7.20	-	6.57	0.83	0.76	Possible exterior soot	-
13	9	SH some GG	po	pl	-	28	5	2	9.1	63	26	9.00	7.57	-	9.00	0.84	1.00	-	-
13	10	SH	rs	pl	-	-	-	1	3.2	-	-	9.77	8.68	-	9.77	0.89	1.00	-	-
13	11	SH	pl	pl	-	-	-	1	3.0	-	-	10.80	7.92	-	10.80	0.73	1.00	-	-
13	12	SH	rs/ds	pl	-	52	5-6	3	165.5	29	-	13.01	10.58	-	12.94	0.81	0.99	Exterior soot	Red slip on internal rim
13	13	SH	ds	pl	-	62-64	5	1	105.7	-	-	13.92	10.97	-	13.69	0.79	0.98	Exterior soot	Red slip on internal rim
Totals	**19**							**28**	**606.2**										
Ave.						**25**				**68**	**27**	**9.12**	**6.93**	**0.07**	**7.01**	**0.76**	**0.78**		

Table 6.34. Stirling Phase Non-Jar Vessels from the Emerald Site.

Feature	Vessel	Type	Temper	Exterior	Interior	Decoration	Oriface (cm)	%	No.	Wt. (g)	Lip Type	Use Wear	Comments
12	10	Bowl	LS	rs	rs	-	20-30	3-5	3	21.7	Flat	Dark spot on exterior	-
13	8	Bowl	LS	rs	rs	-	-	-	1	10.2	Round	Lip slip wear	-
12	8	Seed Jar	SH	rs	pl	single row puncations	16	8	3	16.8	Round	-	
13	3	Funnel	SH	in	pl	-	12	14	13	31.3	-	Blackening on exterior rim, residue on exterior	Diagonal incision
Totals	**4**								**40**	**80.0**			

CHAPTER 7
THE EMERALD SITE: A CAHOKIAN PILGRIMAGE CENTER

The data presented in Chapters 4 through 6 shows that Emerald is a unique site that had a complex, dynamic history of visitation, construction, abandonment, and reoccupation. Overall, this data supports my contention that Emerald was a pilgrimage center. In this chapter I synthesize all of these data into a coherent whole. In the first half of the chapter I summarize the data chronologically and in terms of the correlates of a Native American pilgrimage center developed in Chapter 2. The archaeological evidence corresponds surprisingly well with these correlates. Chronological evidence also shows that while Emerald was established a few decades before A.D. 1050, the site was extensively reconstructed during Cahokia's Big Bang and inhabited sporadically throughout Cahokia's 250-year history. In short, there is ample evidence that Emerald was Cahokian pilgrimage center formally established and revamped during Cahokia's Big Bang that was used for nearly two centuries thereafter. These data also shed light on the nature of these pilgrimages, including their frequency, the people who participated in them, and the kinds of activities that took place when pilgrims arrived at Emerald, all of which I discuss in this first section.

In the second half of the chapter I talk about the kinds of relationships that pilgrimages to Emerald engendered. As I argued in Chapter 2, all pilgrimages create specific kinds of convergences that do not regularly happen, and I have reiterated this theme throughout this book – namely, that periodic pilgrimages to Emerald afforded connections between important people, powerful beings, other-worldly places, memories, and visions of the future. However, I have not expounded on precisely what these relationships were and in what ways they influenced Cahokia's emergence. Therefore, I discuss the specific people, beings, places, and memories that became entangled at Emerald and how these phenomena were vital components of Cahokia's religion and emergence (see also Emerson 1989, 1997a, 1997c; Hall 1989; Pauketat 2013a).

PILGRIMAGE TO THE EMERALD SITE: A SYNOPIS

The archaeological evidence presented in Chapters 4 through 6 corresponds with many of the correlates of a Native American pilgrimage center. In sum, the site was built in a unique place and occupied a number of times, though only for short periods of time. Additionally, the site is situated along a major processional road or avenue and exhibits evidence of non-local populations. Numerous large-scale feasts and mound construction events occurred during each occupation, a large plaza was constructed at the center of the site, and special shrine structures were built and used in conjunction with these activities. While I am not suggesting that pilgrimages to Emerald were synonymous with world renewal pilgrimages recorded historically (e.g., the Sun Dance or Green Corn pilgrimage), the general similarities are notable.

In terms of location, the Emerald site is situated in a liminal zone within the Richland Complex consisting primarily of dispersed ridges and knolls, bands of forests, and scattered prairies. This contrasts to the ponds, sloughs, streams, bottomland prairies, and forests of the American Bottom and the more open prairies to the east. Moreover, the Emerald site was constructed atop a high glacial drift ridge. This particular ridge is naturally oriented to 53 degrees of azimuth and aligns to major lunar standstill events that occur every 18.6 years (Pauketat 2013a). Additionally, a spring at the base of this ridge to the north once existed, though it has disappeared today. While this spring undoubtedly served as the primary source of water throughout Emerald's history, it doubled as a portal or opening to the underworld (Skousen

2015a). The Emerald site, in other words, is situated in a place where worlds converged – it was an ideal place for a pilgrimage center (see Pauketat 2013a; Skousen 2015a).

The Emerald site was first occupied in the late Edelhardt phase. Radiocarbon dates specifically show that the first inhabitants visited around A.D. 1020. Based on the abundance of grit-tempered pots with flat lips and rim notches, many of these people came from settlements in the lower Illinois Valley settlements, and the presence of shell-tempered pots suggest that many others came from Cahokia. A few even journeyed from more distant locations based on a few imported Coles Creek Incised beakers and a locally-made Yankeetown jar. Many of these pilgrims, especially those from Cahokia, likely traveled to the site via the Emerald Avenue, which may have connected Emerald to Cahokia even at this time. The Avenue may also have served pilgrims from the Illinois Valley and those who entered the area via the Vincennes Trace, a major overland trail that had long been a primary route of travel between the American Bottom, Wabash River, and more distant places to the south and east (Benchley 1974:238; Koldehoff 1996, 2014; Koldehoff et al. 1993; Kruchten 2012).

The different groups of people who journeyed to Emerald at this time all clearly recognized the site's unique nature. Upon their arrival, they constructed a series of special structures near the summit of the ridge. Some of these structures (e.g., Features 20 and 25) were shrines, or single-post structures with a series of small cache pits situated along their interior walls and often exhibiting central hearths (see Alt 2013; Alt and Pauketat 2015). A special storage structure (Feature 17), was also present and likely associated with Feature 20. Feature 4, an isolated structure, was probably a shrine, temple, or some other special-use building. Importantly, all of these buildings were aligned to within about 10 degrees of the natural ridge, which pointed to lunar standstill events. In fact, the consistent orientation of the Edelhardt phase structures suggest that this initial occupation took place during one of the lunar standstill events. The tight cluster of the radiocarbon dates from several Edelhardt phase features show that this occupation may have occurred during the 1020 lunar maximum standstill event (see Figure 4.35).

Very few people resided permanently at Emerald during this time. None of the six Edelhardt structures uncovered in these excavations were residences, though two of the Edelhardt-Lohmann structures (Features 7 and 57, one or both of which may date to the Edelhardt phase) were probably short-term habitations given the presence of a single storage pit inside of each and the associated (but limited) refuse. The lack of external storage pits also indicates short-term occupation – all but two of Emerald's Edelhardt phase pits are small caches situated in shrine structures that contained offerings of chert debitage and in some cases formal stone tools. Occupation span estimates similarly show that none of these structures were used for more than a year or two – in fact, most were occupied for less a year. Even the few potential residential structures (e.g., Feature 7 and 57) were occupied for a year at the most. Overall, the abundance of special, non-domestic structures, relative lack of residential structures and storage pits, and short occupation spans suggest that people traveled to and stayed at Emerald for a very short time.

Feasting was the primary activity that took place once people arrived at Emerald during this occupation. Based on the types of seeds recovered (maygrass, chenopod, erect knotweed), the feast took place in the spring or early summer. Moreover, the sheer number of these seeds recovered as well as their presence in all Edelhardt phase features suggests that the feast involved large numbers of people. Massive clumps of seeds, particularly maygrass, were recovered from the large interior storage pit (Feature 17) as well as from the small cache pits in the shrines; seeds were also abundant in the basin fill of Features 18 and 20. The presence of seeds in the internal cache pits suggests that the food was prepared and/or consumed inside the structures or perhaps deposited as offerings along with a few stone tools (see Chapter 6). The large numbers of seeds in basin fill reveals that people also feasted outside the structures, probably on the ridgetop. After the feasts were over, the structures were dismantled and the resultant refuse was dumped in abandoned structure basins. This may have also been part of a formal decommissioning process; this was particularly the case in Feature 20, which yielded far more seeds and artifacts than any other feature at the site. Similarly, Feature 18 was intentionally burned perhaps as part of this formal closing and decommissioning ceremony. Not surprisingly, other shrines at Emerald were closed in a similar manner (see Alt 2013; Alt and Pauketat 2015). Purgatives or hallucinogenic substances were made and ingested as part of ceremonies, and special red cedar wood was used during special ceremonies and highlights the special events that took place in and around them. Pilgrims brought sealed jars with special foods to these feasts, which were opened by breaking the clay seals.

More quotidian objects and tools were recovered from the site, but this refuse is clearly different from refuse recovered from other Edelhardt sites in the region. Some hammerstones and abraders were recovered as were chert cores, debitage, and expedient stone tools, which is typical of the expedient stone tool technology used throughout the region (see Koldehoff 1987). However, the procurement of chert is unlike those at other Edelhardt phase sites. Forty percent of the assemblage is Mill Creek, which is much higher comparatively, and almost all the rest is Burlington chert. Clearly, Emerald’s Edelhardt phase inhabitants obtained or received their chert from two primary sources, one of which is much farther away. The high abundance of Mill Creek chert further suggests that many digging tools were being made and used at Emerald, perhaps for tending and cultivating the seed crops used during the feasts. Perhaps some larger scale earth moving activities were taking place, though there is no evidence that any of the mounds were constructed at this time – it is possible that the ridge was sculpted and the plaza prepared as early as the Edelhardt phase. In fact, the presence of the plaza (or a space similar to a plaza) at this time makes sense considering the refuse disposal patterns – the abundance of feasting refuse found in structure basins on the sides of the ridge suggests that feasts took place on the ridgetop.

Furthermore, Edelhardt jars and bowls at Emerald are smaller on average than vessels from contemporaneous assemblages. The majority of Emerald's jars are under 20 cm in diameter. A popular jar size at other Edelhardt phase sites (26-30 cm in diameter) is present but not common at Emerald. Moreover, one of Emerald's jars is abnormally large. This pattern suggests that there was no need for large storage vessels as would be needed at a long-term residential site. This also implies that smaller amounts of food, substances, liquids, or other materials were transported to the site during the feasts. The presence of the single very large jar may have been for the temporary storage of large amounts of seeds used during these feasts. Bowls are also smaller on average. Two sizes of bowls were clearly preferred at Emerald, and no large bowls were recovered. Overall, this evidence indicates different transportation, eating, and serving practices at Emerald during this time.

The initial occupation of the Emerald site, then, involved a number of groups traveling from the surrounding region to build special structures, feast, and perform ceremonies to celebrate rare lunar standstill events and commemorate and renegotiate the convergences that occurred at this special place. This gathering, which probably occurred during the 1020 lunar standstill event, was brief, lasting only a few days or weeks. After the lunar event and the feasts and ceremonies had concluded, the pilgrims left, traveling back to their homes. Perhaps a few of the pilgrims stayed at the site, but only long enough to dismantle the structures and clean up the feasting debris. Thus, from its conception, Emerald was a pilgrimage center, made specifically to facilitate the convergence of pilgrims and the moon at this particular place (see Pauketat 2013a; Skousen 2015a).

Around A.D. 1050, an explosion of construction activity took place at Emerald that was closely associated with Cahokia's Big Bang and performed in part by Cahokians (see Pauketat 1994). The first terrace of Mound 12, the base of Mound 2, and the submound base for Mound 7 were all constructed at this time. Excavations into Mound 12's first terrace by myself and Winters and Struever (1962; see also Skousen 2011) uncovered early Lohmann phase rims and mostly shell-tempered body sherds, both of which indicate an early Lohmann date for its construction. More recent excavations into the basal remnants of Mound 2 also suggest that the initial portions of Mound 2 were constructed in the early Lohmann date as well (Barzilai 2015). A platform that would eventually support Mound 7 was built on top of and immediately after an early Lohmann structure was dismantled. Given their regular spacing and alignment, it is likely that the other circular mounds that line the plaza and their associated platforms were also constructed at this time. While the plaza or some precursor to the plaza may have existed during the Edelhardt phase, the lines of circular mounds along the ridge highlighted and formalized this space. Overall, this construction effort was a major ordeal that dramatically transformed the Emerald site.

Based on the number and size of these mounds as well as the rapidity of their construction (more on this below), these events would have required the labor of large numbers of people. Labor estimates suggest that five hundred to as many as two thousand people were required to build Emerald's mounds during the initial A.D. 1050 event. Of course, this is a low estimate, as it only includes the people who actually helped dig and pile the earth and not for those who coordinated, organized, supported, and provided provisions and tools for the builders, and so on. This, along with the overall lack of a permanent residential occupation at Emerald during this time (more on this below) shows that large numbers of people traveled to Emerald to participate in these construction events.

The high percentage of shell-tempered pots in Emerald's assemblage (higher than other Lohmann phase sites in the Richland Complex, see Alt 2001, 2002a; Pauketat 2003) suggests that many of these pilgrims were not from settlements in the surrounding uplands but more likely from the floodplain and probably Cahokia itself. The pottery from the basin of Feature 15 is one obvious exception, as it looks more similar to Edelhardt phase pottery (very few vessels tempered with shell, Edelhardt rim shapes) and may be evidence of non-local inhabitants. Moreover, the diversity of jar shapes suggests that while these were most likely Cahokians, they came from specific family and/or social groups, each of whom made their pots a little differently or obtained their vessels from potters who did. A handful of others came from more distant places, particularly the lower Illinois Valley.

Pilgrims from Cahokia would have traveled to Emerald via the Emerald Avenue, which almost certainly existed at this time given its termination at the foot of Mound 12 and within Cahokia's central precinct, both of which were constructed in the Lohmann phase. The Avenue also strongly implies that the early Lohmann construction effort at Emerald was orchestrated, sponsored, and performed largely by Cahokians. At the very least, a handful of these pilgrims were important leaders, elites, or priests who directed these activities.

The A.D. 1050 pilgrimage and reconstruction of the entire site was clearly a major ordeal. However, other significant visits occurred throughout Emerald's history. Excavations show that Mound 12 was built in numerous pulses of construction throughout the Lohmann phase and possibly into the early Stirling phase. The first terrace alone, built entirely during the Lohmann phase, was constructed in three or four stages, each of which consisted of about 30 cm of basketloaded fills capped by several very thin blankets of alternating light and dark fill. The second terrace was built in at least two stages, though the chronology of the earlier episode is unclear. These fills were capped by many laminated layers of fill deposited during rainstorms, indicating a hiatus in mound construction. Based on labor estimates, these later additions would have required hundreds of builders to be there at one time. Again, while these activities were not as large as the early Lohmann construction boom, these later events were still major affairs that would have required the influx of people from outlying settlements and regions.

The length of time that passed between episodes is unclear. There was no visible soil development on any of the thin cap layers that marked the end of individual episodes in the first terrace, which would suggest very little time (possibly a year) had passed between construction events. On the other hand, the many thin bands of laminated fills between the second terrace stages imply that a longer period of time passed between construction events. I suspect that each major construction pulse was short – a burst of coordination, energy, and labor – and occurred in conjunction with a lunar standstill event, perhaps every decade or two (every 9.3 or 18.6 years). This seems to correspond with settlement evidence from the site.

Though the early Lohmann phase construction boom drastically changed Emerald's landscape, the layout of this newly constructed pilgrimage center was still based on a plan that had been established several decades earlier. As stated previously, the plaza and all of the mounds at the site were tied to the Emerald Axis, the 53-degree orientation of the natural ridge that points to lunar standstill events and was formalized during the early Lohmann construction boom. However, this alignment was clearly recognized during the initial founding of the site several decades earlier when Edelhardt phase occupants visited the site and aligned their structures to this same orientation. So, while the massive reconstruction of the site around A.D. 1050 clearly altered the overall landscape and formally established Emerald as a Cahokian pilgrimage center, it still referenced and reiterated Emerald's natural connection with this rare lunar event noted decades earlier.

There is evidence for two Lohmann phase occupations at the site. The first occupation, which occurred during A.D. 1050 construction boom, is marked by two structures. Feature 64, situated beneath the fills supporting Mound 7, was a shrine or other special use structure. Moreover, Feature 64 was likely one of the first Lohmann phase structures built at the site and was intimately tied to the construction of Mound 7 and thus stood for a very short period of time. Feature 61, a short-term residence, contains early Lohmann pottery and is constructed using single posts, which indicates that it belongs to the early Lohmann phase occupation. A single post storage structure (Feature 14) and some or all of the external storage pits may also date to the early Lohmann phase, though this is uncertain.

The second Lohmann occupation consists of Feature 15, a shrine structure with numerous interior cache pits, and Feature 23 upper, a wall trench structure. These features are separated from the earlier Lohmann phase occupation because both are constructed using wall trenches, indicative of a later Lohmann date (see Pauketat 2003). Furthermore, a single radiocarbon date from Feature 54, one of Feature 15's internal cache pits, yields a date of about A.D. 1090, which places it within the late Lohmann phase. Evidence of two Lohmann phase occupations at

Emerald makes sense given the evidence of multiple Lohmann phase construction events at the site. While the early Lohmann phase occupation is probably associated with the site's initial mound construction events, it is not possible to associate the later Lohmann phase occupation with a particular later Lohmann construction event.

Despite the apparent importance of the Lohmann construction activities at Emerald, other activities that are similar to practices performed during the Edelhardt phase also occurred. For example, feasting clearly took place based on the large amounts of maygrass and other seed crops recovered from Lohmann phase features. Maize played a larger role in these Lohmann phase feasts, as maize is proportionally more common in Lohmann phase features compared to Edelhardt features (see Appendix A). This marks a minor but important shift in feasting activities in the Lohmann phase. Like the Edelhardt phase, Lohmann phase botanical remains were found in many contexts, including external storage pits, internal cache pits, and structure basins. The wide distribution of these remains throughout the Lohmann phase features shows that these feasts were substantial and probably took place in the plaza, though some foods were consumed inside the shrine structures. The shrine structures were built for and used during these events and then dismantled and filled with feasting debris after the feast was over. The recovery of morning glory seeds from several of the pits (one of which was an internal cache pit for Feature 15) suggests that consuming purgative or hallucinogenic substances were part of these feasts, but no red cedar wood was used during this occupation. As before, sealed jars were carried to and broken open during these feasts. Importantly, these feasts occurred in conjunction with the major mound construction events and involved potentially thousands of pilgrims.

Although several of the Lohmann phase structures at the site are either storage or special use structures, a few were residences. As mentioned earlier, Feature 61, a single post structure, is a short-term residence due to its rectangular shape, small size, lack of internal cache pits and other features typically associated with shrines, and occupation span estimate of less than a year. Feature 23 upper may also have been a residence for many of the same reasons. Though the structure was rebuilt once, the lack of associated internal storage features suggests it too was used for a short amount of time. Of course, some of the Edelhardt-Lohmann residential structures could date to the Lohmann phase (e.g., Feature 57). The presence of five external storage pits also alludes to some residential, but likely short-term, occupation.

While some of the refuse recovered from Lohmann phase features is indicative of feasting, much of the refuse is more typical of Lohmann phase farmsteads and residential settlements. For example, expedient flake tools were made and used, and only two formal tools (a broken celt and a broken hoe) were recovered. Mill Creek chert tools were undoubtedly used to excavate fill for mound construction as well as cultivate crops. Unlike other Richland Complex sites, however, no microdrills or spindle whorls were recovered, meaning no shell beads or cloth were produced (at least in this part of the site). At Emerald there are more jars than bowls, seed jars, and other vessel types. Also, the prevalence of two distinct jar sizes at Emerald implies that they were used for specific purposes. The lack of large storage jars reveals that there was no need for long-term storage. The presence of an abnormally large cooking jar with minimal thermal wear also implies that it was used to cook a large amount of food but that it was not used repeatedly. Clearly, the refuse shows that cooking, eating, and other more quotidian activities took place, though these activities were atypical compared to other Lohmann phase settlements.

It is worth noting that, based on this evidence alone, the Lohmann phase occupation seems limited, especially compared to the extent of mound construction and the apparent influx of a large number of pilgrims during these events. However, excavations in other areas of the site have revealed an extensive Lohmann phase occupation (Alt and Pauketat 2015; Pauketat and Alt 2015; Pauketat et al. 2016). Importantly, clusters of wall trench structures, located north of ISAS's excavations and many of which were rebuilt numerous times, were likely short-term residences for pilgrims (see Alt and Pauketat 2015; Pauketat and Alt 2015). In other words, there is abundant evidence of short-term occupation and virtually no evidence of long-term occupation at the site during the Lohmann phase. In sum, Emerald was completely reconstructed by throngs of pilgrims, most of whom came from Cahokia during a lunar standstill event at the beginning of the Lohmann phase (perhaps A.D. 1048 or 1057?), but very few of them stayed for long. However, pilgrims returned to the site at least twice more during the Lohmann phase (again, probably during standstill events) to add to and renew Mound 12 and possibly others. Although these later construction events may not have been as large as the initial construction boom, the lack of long-term domestic remains shows that they still involved an influx of outlying populations. Each of these construction events included large-scale feasts and other communal ceremonies, which were a way to celebrate and commemorate the harvest, turn of the season, and rare lunar events.

Another distinct occupation occurred a few decades later in the early Stirling phase. The pottery suggests that this occupation took place in the decade or two following A.D. 1100. This occupation was clearly more limited than the others. Only two structures and two post molds date to this phase, which contrasts with the five structures and 10 pits of the Lohmann phase and five structures and 20 pits of the Edelhardt phase, not to mention the handful of Edelhardt-Lohmann features. Moreover, the Stirling structures are situated next to each other, meaning the occupation was confined to a specific area in the site. Additional excavations at the Emerald site confirm the general lack of Stirling phase features and therefore the limited number of people who visited or lived at the site at this time (Alt and Pauketat 2015; Pauketat and Alt 2015; Pauketat et al. 2016). These Stirling phase pilgrims probably came from Cahokia by way of the Emerald Avenue.

The Stirling phase occupation at Emerald is different from other Stirling phase villages in both the floodplain and uplands. These structures were not used as long-term residences. Their shape is generally consistent with the shapes of other Stirling residential structures in the region, but they are smaller. There is no refuse on the floor of either structure or any associated pits, hearths, or other features (aside from a single internal post mold in each structure), which is extremely rare for Stirling residential clusters and strong evidence that they were not occupied for long. The likely short occupation is confirmed by the occupation span estimates. These structures were contemporaneous given their positions next to each other, the rebuilding of their long walls, and the presence of a single post mold in the same place within the structures. I suspect that, given their small size and lack of associated features, these buildings were used for special ceremonies or activities – in fact, they may have been Stirling phase equivalents to the earlier shrine structures. They also may have been used as short-term shelters for a small number of pilgrims or caretakers. The rebuilt walls of each structure suggests that they were used separately at least twice, though the time that had elapsed between each use is unclear.

The majority of the Stirling phase artifacts are the remains of feasts. Clay objects, indicative of the sealed jars used in feasting activities at Emerald, were recovered. Additionally, the vast majority of faunal remains recovered during these excavations came from these Stirling features, and the abundance of mammals, birds, and fish elements suggests that these animals were consumed during feasts. Although none of the Stirling phase features were analyzed for botanical remains, the presence and abundance of faunal remains in Stirling contexts represents a distinct shift in feasting patterns – apparently wild game and fish was obtained and carried to the site for the Stirling phase event. Given the smaller number of pilgrims at Emerald during the Stirling phase occupation, however, these feasts were undoubtedly smaller than the feasts that occurred earlier in Emerald's history. Still, the presence of a single zone in the structures' basin fill suggests that the refuse was deposited in a single episode, probably right after the feast had ended and the structures were dismantled.

The jars recovered from these contexts are smaller on average compared to other Stirling jar assemblages. This suggests that there was little concern for the long-term storage of food or liquid at the site, and also that small amounts of special food, substances, materials, or objects were brought to the site. A few of these vessels, however, are unusually large and both have soot on their exteriors. These overly large vessels were undoubtedly used to cook larger portions of food for these feasts, much like the earlier occupations at Emerald.

There is no evidence of mound construction during the Stirling phase. It is possible that earlier portions of Mound 12's second terrace were constructed during the Stirling phase, though no diagnostic artifacts were recovered from the second terrace fills that would confirm this. Likewise, there is no evidence that any of the other mounds at the site were built, modified, or used at this time. This lag in mound construction is confirmed by the fewer visitors at the site at this time and the drop in Mill Creek chert digging tools, which indicates less earth-moving activities.

After this early Stirling phase occupation, the site was deserted. The abandonment of the Emerald site matches the general Late Stirling abandonment of Richland Complex villages (see Benchley 1974:239; Koldehoff et al. 1993; Pauketat 1998a, 2003; Woods and Holley 1991). The reasons for this abandonment are uncertain, though several scholars have argued that it was part of the incorporation or centralization of upland communities into Cahokia or other mound centers (see Koldehoff et al. 1993; Woods and Holley 1991). Regardless of the precise reason, this movement away from upland settlements was extensive. Like the Lohmann phase dispersal of farmers and Cahokians into the greater Cahokia region, the dispersal of Richland Complex populations undoubtedly had crucial effects on the relationships between families, groups, identities, and more throughout the region (see Pauketat 2003; Pauketat and Emerson 1997a; Pauketat and Lopinot 1997).

Emerald's hiatus ended around A.D. 1200 when pilgrims once again returned to the site. However, this "reoccupation" was very different from those of earlier periods. There is no evidence of short-term residential structures, meaning that visitors did not stay long enough to construct even temporary shelters – apparently, the lived elsewhere and journeyed to Emerald for an even shorter period of time. While at Emerald, these pilgrims built structures on Mound 12 and added fill to Mounds 12 and 2. The upper levels of Mound 12's second terrace may have been constructed at this time. It is clear that a low conical mound was constructed on Mound 12's second terrace summit, after which a series of features were constructed on its summit. The exact number and duration of these Moorehead phase visits is unclear. The series of clearly superimposed features (a post pit and two structures) points to at least three distinct occupations. One of these structures (Feature 176) was rebuilt in the same place twice, suggesting that the structure was maintained or continually occupied for a longer period of time. Given their placement on the largest mound in the region, these structures were likely temples or elite structures. After the last structure was dismantled, the second terrace was capped with several layers of fill. At its thickest point, this veneer or cap measures about a meter in thickness, and apparently extends down the sides of the second terrace (see Chapter 4).

Mound 2 was also enlarged during these brief visits. The enlargement began with a hearth being dug into the early stages of Mound 2 (constructed in the early Lohmann phase). The hearth was lined with clay. Due to the presence of several young turtle shells and fawn bone in the hearth's fill, it is likely that this hearth was used for ceremonial activities and not typical food preparation (Winters and Struever 1962:87). After the hearth was used and backfilled, Mound 2 was enlarged in several stages. The first stage was a "truncated pyramid" shape, made from dark fill, and the later stages were constructed from a lighter yellow fill (see Winters and Struever 1962). The exact timing of these stages' construction within the Moorehead phase is uncertain. Due to its flat summit, ceremonies or other special practices were likely performed on top of Mound 2.

Very few activities took place in the plaza or along the edges of the plaza (where feasts, dances, and other ceremonies took place in earlier occupations) during this occupation. The only evidence of Moorehead phase activity in this area is a single hearth, dug into a Lohmann phase structure basin on the edge of the plaza. The placement of this hearth shows that the Moorehead phase visitors clearly knew about the earlier occupation. Moreover, the hearth's contents – red cedar wood, maygrass and other seed crops, a celt, several large stone tools, sandstone and limestone, and a large amount of nutshell – suggest that it was part of a dedicatory ceremony to reconnect with past activities that took place there. In a way, it may have been similar to the hearth dug into the basal stages of Mound 2. The plaza and surrounding area, in sum, were used and remembered in an entirely different way – there is no evidence of shrines, temples, storage structures, or short-term residences in this area. This general lack of Moorehead phase features is evident throughout the rest of the site as well (see Alt and Pauketat 2015; Pauketat and Alt 2015; Pauketat et al. 2016).

The number of pilgrims that visited the Emerald site at this time is unclear. As I just mentioned, there is no evidence of a residential occupation at the site aside from perhaps a single elite group or family on the summit of Mound 12. This means that large numbers of pilgrims came, quickly constructed mounds and performed ceremonies, and left. Unfortunately, the excavations reported here do not reveal the full extent of Moorehead phase mound construction on Mound 12 and thus do not allow for accurate labor estimates for mound building activities. Still, I suspect that the capping of Mound 12 and enlargement of Mound 2 (particularly if completed in a single short-term construction event) would have required a substantial number of people.

Obviously the lack of a residential population at Emerald would mean that these visitors or pilgrims came from elsewhere, but it is unclear where they came from. The pottery recovered during the Mound 2 and 12 excavations is virtually identical to Moorehead phase pottery found at Cahokia and other Moorehead phase sites, and no non-local Moorehead pottery was recovered at Emerald. It is certainly plausible that these visitors came from Cahokia, which would make sense if the Emerald Avenue was still being used at this time. Pauketat (2013a:110, 136-137) argues that the Emerald Avenue may have been redirected to connect to the Copper site, a Moorehead phase mound center northwest of Emerald (see Baltus 2014). This does not mean that the Emerald Avenue was disconnected from Cahokia, but it is possible that some of these pilgrims may have lived at other upland villages or mound centers like Copper or Kuhn Station (see Koldehoff et al. 1993; Woods and Holley 1991). This potential rerouting of the Avenue also implies that a ceremonial circuit existed in the uplands at this time.

In sum, around A.D. 1200, the Emerald site was revisited and restructured by a number of pilgrims after at least a 50-year abandonment. The nature of these visits was clearly different from the earlier occupations at Emerald, as there was no residential population and the activities focused on adding to particular mounds. At the same time, this "reoccupation" reconfigured entire fields of relations that undoubtedly had consequences that paralleled those of Emerald's early Lohmann phase reconstruction (see Baltus 2014, 2015). These new relationships depended on and drew from past ones. Pilgrims altered, added to, or renewed mounds that had been built generations earlier. They dug into the fills of previous construction events to place special hearths for commemorative ceremonies. They recognized and referenced the Emerald Axis as they added to the mounds and aligned a mound top temple or elite structure to this orientation. Past relationships, in other words, were not ignored or forgotten but reconfigured into the landscape as part of a newly conceived Cahokian world (see Baltus 2014, 2015).

The Moorehead phase activities that occurred at Emerald are surprisingly similar to many of the activities that took place throughout the American Bottom region at that time. The ceremonial architecture in Cahokia's central precinct, for example, was dismantled and replaced by clusters of domestic structures (see Alt et al. 2010; Pauketat 1998b, 2013c). The Ramey Plaza and its associated mounds, which were constructed at about this same time, became the center of ceremonial activity and feasting at the site (Kelly 1997; Kelly et al. 2007; Kelly et al. 2008). Similarly, the East St. Louis site was largely abandoned at the beginning of the Moorehead phase, with only an elite family or group living on one of its mounds, though people from elsewhere traveled to the site to build one of the mounds (Pauketat et al. 2013). As Melissa Baltus (2014, 2015) has suggested, these processes were undoubtedly part of a political-religious movement that rearranged Cahokia's relational milieu. Clearly, making pilgrimages to certain places and spaces in the landscape, and particularly to Emerald, were part of the reconfiguration of relationships with deities, powers, and memories at this time (see Skousen 2015a).

FORGING RELATIONSHIPS AT THE EMERALD SITE

Exactly what kinds of relationships were formulated at the Emerald site? Who and what were brought together during these pilgrimages? While it may be impossible to fully comprehend the number and complexity of relationships that coalesced at Emerald (or at any other pilgrimage center for that matter), the evidence shows that several key relationships were created. Perhaps the most significant were the convergences between pilgrims themselves. Clearly Cahokians visited the site through time, and clearly over several generations. Some of these Cahokian pilgrims were undoubtedly religious specialists and/or elites who directed the feasts, ceremonies, and mound construction activities. These leaders would have met and conversed with the handful of pilgrim-religious specialists from more distant regions such as the lower Illinois Valley, lower Mississippi Valley, and southern Illinois and Indiana. Participating in the feasts, mound construction events, and other ceremonies would have created a sense of cooperation and thus created important social and political alliances; these activities may also have constructed and spread a pan-Cahokian identity (see Emerson 1997a; Pauketat and Alt 2003, 2004; Pauketat et al. 2002). Of course the sheer number of pilgrims needed to construct the mounds suggest that not all of these pilgrims were religious specialists (see Chapter 4); thus, general workers also would have journeyed to the site and forged links with other pilgrims from distant lands and traded, arranged marriages, and made alliances with other groups.

Another key relationship was established between pilgrims (most of whom came from Cahokia) and certain celestial bodies and mythical beings. The moon was clearly a crucial component at the Emerald site (see Pauketat 2013a). The entire site layout and the major events that took place there (e.g., feasts, mound construction episodes) were closely linked to lunar standstill events – indeed, every 18.6 years (or every 9.3 years if one counts the minimum lunar standstills), the moon and pilgrims would converge at the Emerald site (see Pauketat 2013a; Skousen 2015a). For many native groups throughout the Plains, Midwest, and Southeast, specific celestial bodies were seen as social persons. Tribal myths and stories portray them as mythical beings that had power to influence the environment, weather, social relations, health, and the overall wellbeing of the world (see Hall 1997; Lame Deer and Erdoes 1972; Lankford 2007a; McCleary 1997; Pauketat 2013a; Reilly 2004; Swanton 1946). The moon was one of these beings. More specifically, among many historic period native groups the moon was a female deity known as Corn Mother, Earth Mother, or a number of other names. She was the creator of life, the provider of food, and assisted in childbirth; she was also associated with rain, water, agriculture, fertility, and menstruation (Hudson 1976, 1989; Swanton 1929, 1946). The moon or Earth Mother, in other words, was responsible for or ensured fertility, renewal, and life and was a key cosmological theme throughout eastern North America (Hudson 1976; Reilly 2004; Swanton 1946).

Cahokians recognized a deity or mythical being very similar to the Earth Mother. Thomas Emerson (1989, 1997a, 1997c, 2015; see also Emerson et al. 2002, 2003; Hall 2000) claims that this earth goddess is portrayed in some of the Cahokian-style flint clay figurines found throughout the greater Cahokia region. More specifically, he argues that the association of flint clay figurines with temples, sacred fire structures, crystals, mica, red cedar wood, and feasting pits at certain sites in the region is evidence of an Earth Mother cult that was a crucial part of Cahokian power, prestige, and religion. The centrality of the moon at Cahokia, and by extension the Earth Mother, is also evident in the recent work of Bill Romain (2015b), who argues that the entire plan of the Cahokia site was based on the movements of the moon. Pauketat (2013a) has also argued that numerous Mississippian structures and earthworks with lunar associations are scattered throughout the greater Cahokia region and beyond. The evidence at Emerald and the prevalence of the moon, fertility, and Earth Mother symbolism throughout the region shows that formulating relationships with the moon (and by association, the Earth Mother and notions of fertility and renewal) were critical to Emerald pilgrimages.

The themes of the moon, Earth Mother, fertility, and renewal are also intimately tied to the Under World; thus, we can assume that journeys to Emerald also linked pilgrims to this other-worldly realm. Ethnohistoric records reveal that many native groups throughout eastern North America believed the world is divided into three general levels: the Upper World, Middle World, and Under World (Hall 1997; Hudson 1976; Lankford 2004, 2007b; Romain 2015b; Swanton 1928). James Knight (1989:283) contends that Muskogee, Chickasaw, Choctaw, and Cherokee ethnohistories indicate that mounds are associated with "autochthony, the underworld, birth, fertility, death, burial, the placation of spirits, emergence, purification, and supernatural protection." The link between mounds and the Under World is also evident through the Choctaw's origin story of Nanih Waiya, summarized in Chapter 2. Moreover, many native groups describe the Upper and Under Worlds being manifest at certain times of the day. Due to the continual rotation of the sky vault up and down the earth's horizon, the Upper World was visible in the sky during the daytime whereas the Under World was visible during the night. Emerald's mounds undoubtedly referenced and were linked to the Under World given the general association of mounds with Under Worldly themes and the alignment of Emerald's mounds to lunar standstills (see Brown 1997; Emerson et al. 2008; Hall 1997; Knight 1986, 1989). Thus, there was a distinct link between the moon, night, and Under World apparent at Emerald, particularly during pilgrimages when visitors constructed mounds in conjunction with lunar standstill events.

The association of Emerald with the Under World is also manifest in the spring at the base of the ridge. For many historic-period southeastern Native American groups, streams, springs, and other bodies of water were associated with the Under World (see Hudson 1976). According to Mooney (1900), for example, many Cherokees saw streams as trails that lead to the Under World and springs as actual portals to the Under World. Emerald's spring was most likely viewed a portal to the Under World and a way to access various beings and creatures such as serpents, underwater panthers, and perhaps even the Uktena, a creature with a mix of serpent, bird, and deer characteristics (Hudson 1976). These underworld creatures were dangerous but full of power, and sometimes specialized practitioners would intentionally travel to the Under World to obtain these powers (Hudson 1976). Thus, pilgrimages to Emerald allowed at least some pilgrims to simultaneously travel to the Under World and encounter powerful, other-worldly beings (see Skousen 2015a). In a way, pilgrimages to Emerald were similar to burial processions along Cahokia's Rattlesnake Causeway, which Sarah Baires (2014a, 2014b) has argued linked living persons, the dead, and the spirit world.

Journeys to Emerald also entangled pilgrims with different temporalities. This was in part because of the repetitive practices that took place there and the projected outcomes these actions would have on the future. After the initial founders established Emerald because of its natural alignment and spring, pilgrims returned at least every 18.6 years during the springtime to commemorate and tap into the powers inherent there. They followed the Emerald Avenue, which dictated the way pilgrims' approached and departed from the site and in turn affected their experience. They built and renewed mounds in ways that highlighted the natural alignment of the ridge and constructed their shrines and short-term domiciles to the same orientation. They feasted on springtime seed plants to celebrate the harvest and turn of the season and ensure the future health of the tribe. Ingesting hallucinogenic substances transported them through time. These practices were repeated to remember the past as well as alter the future.

Pilgrims also reconnected with past through reenacting mythical narratives. For example, the earth diver myth may have been recreated at Emerald. This myth tells of a small animal (e.g., beetle, muskrat, crawfish, etc., the specific animal depends on the version) that dives into the primordial sea to retrieve a bit of mud which then expands to form the Middle World. A number of scholars have suggested that mound construction practices throughout the eastern Woodlands generally referenced or imitated the earth diver myth (Hall 1997; Knight 1989; Pauketat and Alt 2003). Digging into the earth as well as obtaining sticky mud from swampy areas for the construction of mounds mimicked the actions of the beetle, muskrat, or crawfish retrieving the muck from beneath the water, and the piling and layering of mounds represented the creation of the world. The primordial sea from which the mud derived is associated with the Under World, water, and the renewal of life, all of which are related to fertility, agriculture, the moon, and the Earth Mother as mentioned earlier.

Overall, pilgrimages to Emerald instigated important relationships between pilgrims, deities, beings, other-worldly places, myths, and imagined futures. Moreover, many of these phenomena – the Under World, Earth Mother, fertility, renewal, agriculture, water – are clearly interrelated. But in what ways were these relationships crucial to Cahokia's formation? I argue that pilgrimages to Emerald established amiable social relationships between different social groups and negotiated relationships with powerful beings (e.g., the Earth Mother), other-worldly places (the Under World), and a mythical past (the creation of the world), all of which effected people's current and future wellbeing. This negotiation was necessary for Cahokia's construction and ongoing success. For example, if the Cahokian version of the Earth Mother was anything like comparable beings in historic times as Emerson has suggested, creating bonds with her was crucial to ensure fertility, renewal, and life itself. Indeed, the greater Cahokia region is replete with evidence of world renewal ceremonies. At Cahokia, large feasts (far larger than those at Emerald) were held in the Grand Plaza that also involved mound construction, reconstructing structures, making special objects, and manipulating powerful materials (Pauketat et al. 2002). Similar renewal ceremonies and celebrations of fertility and successful harvests were performed at nodal sites scattered throughout the region, albeit at a much smaller scale (see Emerson 1997a, 1997c). Mound construction, which occurred at numerous locations, was also part of this renewal process and was a way to commemorate and recreate the mythical past in the present and thus renew the world (Hall 1997; Knight 1989; Pauketat and Alt 2003). These pilgrimages and the relationships they made, in other words, were necessary for Cahokia's construction and wellbeing.

Importantly, however, pilgrimages to and ceremonies at Emerald were not simply about maintaining a static, unchanging state of societal equilibrium and balance. This view reproduces the problems of early pilgrimage studies and their functionalist underpinnings (Cohn and Marriott 1958; Durkheim 2008; Spiro 1970; Wolf 1958; see Bowie 2006:238-244; Coleman and Elsner 1995:196-213), and such a perspective is contrary to the relational tenets adopted in this book. Instead, I suggest that these pilgrimages were a way to continually reform relationships that dictated Cahokia's wellbeing in an ever-changing world. This is why pilgrimages to Emerald were repeated through time – Cahokians had to continually reconstruct and renegotiate relationships with the beings and powers that dictated their survival and success (cf. Lucero and Kinkella 2015; Palka 2014). Pilgrimage, in short, is all about making particular relationships, often repeatedly, but these relationships are always translated in meaningful and effective ways into the present context. This was the case at Emerald.

CONCLUSION

Overall, the archaeological evidence presented throughout this book shows that Emerald was indeed a pilgrimage center, and that by A.D. 1050, it was closely associated with Cahokia. Feature, ceramic, lithic, and botanical data as well as the data obtained from the mound and Avenue excavations correspond with the archaeological correlates of a Native American pilgrimage center outlined in Chapter 2. Emerald was constructed on a high, prominent ridge that was uniquely aligned and exhibited a spring at its base. Indirect evidence suggests that a formal roadway, the Emerald Avenue, existed and connected Emerald to Cahokia, meaning that formal movements or pilgrimages between the two sites regularly took place. Most of these pilgrims were not local to the upland area, especially beginning in A.D. 1050. Instead, most came from Cahokia and the lower Illinois Valley, and a few came from more distant places in southern Illinois and Indiana and the lower Mississippi Valley. Emerald was visited multiple times throughout its history – there is evidence of distinct occupations in the late Edelhardt, early Lohmann, late Lohmann, early Stirling, and early Moorehead phases. Moreover, these were short visits, probably lasting a few days to a few weeks. There is no evidence of long-term habitation at the site, and mound construction data suggests that each occupation was large, as mound stages were built quickly during these brief visits. There is also abundant evidence of religious structures at Emerald. Shrines are common in the Edelhardt and Lohmann phases, and even the few Stirling phase structures may have been used for special ceremonies or rituals. The plaza also provided an extensive open space for various communal activities that involved hundreds and perhaps thousands of people, the foremost being large-scale feasts. Finally, Emerald was a place where pilgrims remembered lunar standstill events and reenacted mythical narratives, which renewed the world and ensured Cahokia's overall success.

More importantly, Emerald was a place where numerous moving bodies, entities, and phenomena converged. These convergences obviously involved the hundreds of pilgrims who came from outlying areas, specifically Cahokia. They also included the movements of the moon, as pilgrimages likely took place during lunar standstill events. The moon, if not viewed specifically as the Earth Mother, was linked to the Under World and notions of fertility, rebirth, renewal, water, and agriculture. This Under World connection was reiterated by the presence of a spring, which acted as a portal in which pilgrims could visit the Under World and the beings that lived there. Continual mound construction and feasts imply life renewal ceremonies and the reenactment of the creation of the world. In sum, people, celestial bodies, other-worldly beings, and memories all moved and coalesced at this special place.

CHAPTER 8
PILGRIMAGE AND THE CONSTRUCTION OF A NATIVE AMERICAN CITY

Ancient cities were never static things that can be described, analyzed, or understood as a set of traits. In reality, cities were complex entanglements of all kinds of entities that were constantly moving and thus always in the process of becoming (Amin and Thrift 2002; Barley 2000; Farias and Bender 2010; Janusek 2006, 2008, 2015a, 2015b). While many archaeologists hesitate calling Mississippian centers and ceremonial centers cities, some were unquestionably city-like (especially Cahokia, see Pauketat 2007), and I argue that they too should be viewed relationally. Archaeological evidence supports this idea – using ever-amassing data from Mississippian sites, archaeologists are finding that Mississippian centers were complex arrays of people, places, things, and other phenomena that were permeable and dynamic, much like Amin and Thrift's conception of cities (see Alt 2010; Blitz 2009; Cobb 2003; Pauketat 2007). This is how I have treated Cahokia in this study – as a heterogeneous entanglement of people, places, things, ideas, practices, and memories that were always on the move and thus repositioning themselves in relation to others (see Chapter 3).

Movement was a key factor in the construction of Mississippian centers. In a broad sense, movement is the fundamental phenomena that brings entities together. It is the mechanism underlying relationality, life, and experience, and it instigates the formation of the entanglements that constitute reality (see Ingold 2011, 2007, 2013; Pauketat 2013a; Skousen and Buchanan 2015). Throughout this book I have suggested that to approach, study, and understand a Mississippian center like Cahokia archaeologists must investigate the movements of all kinds of phenomena that occurred throughout its history.

In doing so, however, it is vital to view movement in the broadest sense possible. For instance, movement is not solely a human characteristic – humans, animals, things, ideas, practices, emotions, non-human entities, and more move or are moved in various ways, and these movements matter in one's experience of the world. There are also many ways of conceiving movement. I discussed three kinds of movement – transport, wayfaring, and linear movements – as a way to think through the kinds of relationships that movement bring about. Transport, according to Ingold (2007:77), is a form of movement that carries people and things from location to location "in such a way as to leave their basic natures unaffected." It keeps the moving or moved phenomena aloof from the messiness of the world. Wayfaring, on the other hand, is unintentional, undirected, and meandering. They affect and are affected by all sorts of entities in all sorts of ways, and the kinds, numbers, ways, and timing of these entanglements are unpredictable (Ingold 2007:75-81). Linear movements are directed, focused, and intentional and thus are more structured, goal oriented, and predictable. While linear movements are improvised to a certain degree, they create certain relationships in certain ways that have certain effects. Like wayfaring, linear movements are a part of everyday life, but they are also sometimes performed during special events, ceremonies, and rituals that occur less frequently.

I argue that pilgrimage should be viewed as a form of linear movement. These journeys are intentional – pilgrims travel to specific places for specific reasons (though those reasons are diverse, see Chapter 2). Furthermore, pilgrimages are usually planned and associated with particular hopes and expectations. It is a movement that is powerful, meaningful, and entangles humans, places, deities, practices, and beliefs – they engender convergence and change. Evidence from around the world shows that pilgrimages are often tied to major historical events or happenings. In many cases, they were closely associated with the formation of ancient cities, ceremonial centers, states, and empires throughout the world because they were able to bring about convergences between various entities, beings, and phenomena that do not typically occur in everyday life (Bauer and Stanish 2001; Boone 2002; Coleman and Elsner 1995; Mack 2002, 2004; McCorriston 2011, 2013; Ristvet 2011, 2015; Silverman 1994). For most Native Americans, pilgrimage entangles participants, other-worldly beings and power, and the past, present, and future. These journeys bring balance to the world, as they appease beings and powers who control the availability of resources and the success of inter and intragroup relationships. They ensure a tribe's wellbeing and relationship with the larger cosmos.

Archaeological evidence has shown that the movement of people (e.g., population displacements, migrations, processions, war parities, trade) was clearly vital to Cahokia's formation (see Chapter 3). In this book, I have argued that pilgrimage also played a significant role in Cahokia's formation. More specifically, the Emerald site was a Cahokian pilgrimage center and an integral part of Cahokia's beginnings. There are two general lines of evidence that support this argument. First, a major processional avenue called the Emerald Avenue connected Cahokia to Emerald, suggesting that there were regular movements between the two sites and these movements were important enough to demarcate with a road. Second, the entire Emerald site was enlarged and expanded around A.D. 1050, which corresponded with Cahokia's transformation into a city. In other words, the construction explosions at both Cahokia and Emerald, which included the building of the Avenue, was not a coincidence – the reconstruction of Emerald and visits to it were a necessary part of Cahokia's beginnings. Finally, evidence recovered from Emerald is similar to material correlates of Native American pilgrimage centers recorded in ethnohistories and contemporary accounts.

But what exactly did these pilgrimages do, and how were they connected to Cahokia's emergence? For one, these pilgrimages brought together groups throughout the greater Cahokia region and beyond, through which political and social alliances were formed. Pilgrimages to Emerald were also a vital part of Cahokia's new religion – they initiated entanglements with powerful beings, deities, and other-worldly places. More specifically, they connected pilgrims to the moon, Earth Mother, Under World, and mythical narratives. These relationships played an active, affective role in Cahokian life and society – it was by visiting, encountering, petitioning, or otherwise connecting with these beings, places, and narratives that the world was renewed, successful harvests were ensured, amiable social relationships were created, and so on. In a word, these journeys and the relationships they created promoted renewal, life, abundance, and balance. They guaranteed the general wellbeing and continued prosperity of Cahokian society, thus allowing the construction of Cahokia to occur. Cahokia would not have been the same without these journeys. And, while examples of Native American pilgrimages recorded in ethnographies, ethnohistories, and contemporary accounts are not direct analogs to past pilgrimages, they support this point – that pilgrimages were about making relationships with powerful entities and places which in turn promoted renewal and cosmic balance. In sum, Cahokia's web was made in part by the movements of pilgrims, the Earth Mother, Under World, memories, mythical narratives, and imagined futures that continually converged and were reconfigured at the Emerald site.

Importantly, my argument is not based on a functional perspective as are many archaeological studies of pilgrimage (Kantner and Vaughn 2012:67; see Bauer and Stanish 2001; Hammond and Bobo 1994; Mack 2002; Renfrew 2001; Silverman 1994). Instead, this study and the ideas of entanglement, renegotiation, and continual change support a relational perspective of pilgrimage, which I outlined in Chapter 2. The primary difference between the two views is that a functional perspective considers pilgrimage as a mechanism to maintain a static, unchanging order or "society" or as a way to reestablish this order when it becomes "unstable" (Cohn and Marriott 1958; Durkheim 2008; Spiro 1970; Wolf 1958; see also Bowie 2006:238-244; Coleman and Elsner 1995:196-213; Kantner and Vaughn 2012). A relational perspective, on the other hand, views the world as continually in flux, meaning there is no such thing as a pristine, unchanging society or world. It views pilgrimage as a special form of movement that negotiates relationships with special people, places, beings, and memories within an ever-changing world of relationships. From this perspective, pilgrimages can and do have major effects on individuals, places, and cultures – they alter history.

The importance of pilgrimage in the formation of many cities, empires, states, and ceremonial centers throughout the ancient world was vital. This was clearly the case with the only pre-Columbian city in North America – pilgrimages to the Emerald site occurred and mattered in Cahokia's construction. Additionally, the movements and the relationships that ensued at Emerald almost certainly caused wider historical reverberations that effected distant villages, centers, people, and cultures. Pilgrims undoubtedly described their experiences at Emerald when they returned to their homes. Stories of great pilgrimages to this unique place where powerful beings, worlds, and temporalities converged, mounds were constructed, and feasts were held were spread by missionaries, colonists, traders, and immigrants to distant lands. Thus, these pilgrimages not only affected local webs of relations but also affected others and instigated the movement of people, objects, ideas, practices, religions, and information throughout the Midwest and Southeast during the Mississippian period. In this way, pilgrimages to Emerald (and beyond) were integral to the spread of Mississippian culture throughout eastern North America.

REFERENCES

Adair, James
1968 *The History of the American Indians*. Johnson Reprint Corp., New York.

Adams, Robert McC.
1966 *The Evolution of Urban Society: Early Mesopotamia and Prehispanic Mexico*. Aldine, Chicago.

Agbe-Davies, Anna S.
2013 King Street, North of Block 8. New Philadelphia Archaeology Project: 2013 Archaeology Report for 2008-2011. Accessed online at http://www.anthro.illinois.edu/faculty/cfennell/NP/2013ReportMenu.html, September 2014.

Alt, Susan M.
1999 Spindle Whorls and Fiber Production at Early Cahokian Settlements. *Southeastern Archaeology* 18:124-133.
2001 Cahokian Change and the Authority of Tradition. In *The Archaeology of Traditions*, edited by Timothy R. Pauketat, pp. 147-156. University Press of Florida, Gainesville.
2002a Identities, Traditions, and Diversity in Cahokia's Uplands. *Midcontinental Journal of Archaeology* 27:217-235.
2002b The Knoebel Site: Tradition and Change in the Cahokian Suburbs. Unpublished master's thesis, Department of Anthropology, University of Illinois, Urbana.
2006 Cultural Pluralism and Complexity: Analyzing a Cahokian Ritual Outpost. Unpublished Ph.D. dissertation, Department of Anthropology, University of Illinois, Urbana.
2008 Unwilling Immigrants: Culture, Change, and the "Other" in Mississippian Societies. In *Invisible Citizens: Captives and Their Consequences*, edited by C. M. Cameron, pp. 205-222. University of Utah Press, Salt Lake City.
2010 Complexity in Action(s): Retelling the Cahokia Story. In *Ancient Complexities: New Perspectives in Precolumbian North America*, pp. 119-137. University of Utah Press, Salt Lake City.
2012 Making Mississippian at Cahokia. In *The Oxford Handbook of North American Archaeology*, edited by Timothy R. Pauketat, pp. 497-508. Oxford University Press, New York.
2013 A Tale of Two Temples: Paper presented at the 2013 Annual Meeting of the Midwestern Archaeology Conference, Columbus, Ohio.

Alt, Susan M., Jeffery D. Kruchten, and Timothy R. Pauketat
2010 The Construction and Use of Cahokia's grand Plaza. *Journal of Field Archaeology* 35(2):131-146.

Alt, Susan M., and Timothy R. Pauketat
2007 Sex and the Southern Cult. In *The Southeastern Ceremonial Complex*, edited by A. King, pp. 232-250. University of Alabama Press, Tuscaloosa.
2011 Why Wall Trenches? *Southeastern Archaeology* 30(1):108-122.

2015 The Elements of Cahokian Shrine Complexes and the Basis of Mississippian Religion. In *Religion and Politics in the Ancient Americas*, edited by S. Barber and A. Joyce, in press.

Amin, Ash, and Nigel Thrift
2002 *Cities: Reimagining the Urban*. Polity Press, Oxford.

Amiotte, Arthur
1989 The Road to the Center. In *I Become Part of It: Sacred Dimensions in Native American Life*, edited by D. M. Dolling and Paul Jordan-Smith, pp. 246-254. Parabola Books, New York.

Anderson, David G.
1994 *The Savannah River Chiefdoms: Political Change in the Late Prehistoric Southeast*. University of Alabama Press, Tuscaloosa.
1997 The Role of Cahokia in the Evolution of Southeastern Mississippian Society. In *Cahokia: Domination and Ideology in the Mississippian World*, edited by Timothy R. Pauketat and Thomas E. Emerson, pp. 248-268. University of Nebraska Press, Lincoln.

Anderson, James
1969 A Cahokia Palisade Sequence. In *Explorations into Cahokia Archaeology*, edited by Melvin L. Fowler, pp. 89-99. Bulletin No. 7. Illinois Archaeological Survey, Urbana.

Archambault, JoAllyn
1999 Sun Dance. In *Handbook of North American Indians, Plains, Vol. 13, part 2 of 2*, edited by William C. Sturtevant, pp. 983-995. Smithsonian Institution Press, Washington, D.C.

Arjona, Jamie M.
2015 Sublime Perversions: Capturing the Uncanny Affects of Queer Temporalities in Mississippian Ruins. *Journal of Social Archaeology* 0(0):1-27.

Astor-Aguilera, Miguel, and Robert Jarvenpa
2008 Comparing Indigenous Pilgrimages: Devotion, Identity, and Resistance in Mesoamerica and North America. *Anthropos* 103(2):482-506.

Baires, Sarah E.
2014a Cahokia's Origins: Religion, Complexity and Ridge-Top Mortuaries in the Mississippi River Valley. Unpublished Ph.D. dissertation, Department of Anthropology, University of Illinois, Urbana-Champaign.
2014b Cahokia's Rattlesnake Causeway. *Midcontinental Journal of Archaeology* 39(1):1-18.

Baires, Sarah E., Amanda J. Butler, B. Jacob Skousen, and Timothy R. Pauketat
2013 Fields of Movement in the Eastern Woodlands. In *Archaeology After Interpretations: Materials, Relations, Becomings*, edited by Benjamin Alberti, Andrew M. Jones, and Joshua Pollard, pp. 197-218. Left Coast Press, Walnut Creek, California.

Baltus, Melissa R.

2014 Transforming Material Relationships: 13th Century Revitalization of Cahokian Religious-Politics. Unpublished Ph.D. dissertation, Department of Anthropology, University of Illinois, Urbana-Champaign.
2015 Unraveling Entanglements: Reverberations of Cahokia's Big Bang. In *Tracing the Relational: The Archaeology of Worlds, Spirits, and Temporalities*, edited by Meghan E. Buchanan and B. Jacob Skousen, pp. 146-160. University of Utah Press, Salt Lake City.

Baltus, Melissa R., and Sarah E. Baires
2012 Elements of Ancient Power in the Cahokian World. *Journal of Social Archaeology* 12:167-192.
2014 Rethinking "Ritual" Depositions: Using Relational Ontology to Explore Mississippian Depositional Acts. Paper presented at the Southeastern Archaeological Conference, Greenville, South Carolina.

Bareis, Charles J.
1975 Report of the 1972 University of Illinois-Urbana Excavations at the Cahokia Site. In *Cahokia Archaeology: Field Reports*, edited by Melvin L. Fowler, pp. 12-15. Illinois state Museum Research Series, Papers in Anthropology No. 3, Springfield.
1976 *The Knoebel Site, St. Clair County, Illinois*. Circular Number One, Illinois Archaeological Survey, Urbana.

Bareis, Charles J., and James W. Porter (editors)
1984 *American Bottom Archaeology: A Summary of the FAI-270 Project Contribution to the Culture History of the Mississippi River Valley*. University of Illinois Press, Urbana.

Barley, Nick (editor)
2000 *Breathing Cities: The Architecture of Movement*. Basel, Boston.

Barrett, Samuel A.
1933 *Ancient Aztalan*. Bulletin of the Public Museum of the City of Milwaukee 13, Milwaukee.

Barrett, John C.
1994 *Fragments from Antiquity: An Archaeology of Social Life in Britain, 2900-1200 BC*. Blackwell, Oxford.
1999 The Mythical Landscapes of the British Iron Age. In *Archaeologies of Landscape*, edited by W. Ashmore and A. B. Knapp, pp. 253-265. Blackwell, Oxford.

Barth, Robert J.
1991 The Emergence of the Vincennes Culture in the Lower Wabash Drainage. In *Cahokia and the Hinterlands: Middle Mississippian Cultures of the Midwest*, edited by T. E. Emerson and R. B. Lewis, pp. 257-263. University of Illinois Press, Urbana.

Barzilai, Rebecca
2015 Refining the Map of the Emerald Site (11S1): The Search for Mound 2. Paper presented at the 60th Midwest Archaeological Conference, Milwaukee, Wisconsin.

Basso, Keith H.
1996 *Wisdom Sits in Places: Landscape and Language among the Western Apache*. University of New Mexico Press, Albuquerque.

Bauer, Brian S., and Charles Stanish
2001 *Ritual and Pilgrimage in the Ancient Andes: The Islands of the Sun and the Moon*. University of Texas Press, Austin.

Beaudry, Mary C., and Travis G. Parno (editors)
2013 *Archaeologies of Mobility and Movement*. Springer, New York.

Beck, Robin A. Jr.
2003 Consolidation and Hierarchy: Chiefdom Variability in the Mississippian Southeast. *American Antiquity* 68(4):641-661.

Beekman, Christopher S., and Alexander F. Christensen
2003 Controlling for Doubt and Uncertainty through Multiple Lines of Evidence: A New Look at the Mesoamerican Nahua Migrations. *Journal of Archaeological Method and Theory* 10(2):11-164.

Benchley, Elizabeth D.
1974 *Mississippian Secondary Mound Loci: A Comparative Functional Analysis in a Time-Space Perspective*. Unpublished Ph.D. dissertation, Department of Anthropology, University of Wisconsin, Milwaukee.
2003 Mississippian Alkali Processing of Corn. *The Wisconsin Archaeologist* 84(1&2):127-138.

Benden, Danielle
2004 The Fisher Mounds Site Complex: Early Middle Mississippian Exploration in the Upper Mississippi Valley. *The Minnesota Archaeologist* 63:7-24.

Bender, Barbara
2001 Landscapes on the Move. *Journal of Social Archaeology* 1(1):75-89.

Benson, Larry, Timothy R. Pauketat, and Edward Cook
2009 Cahokia's Boom and Bust in the Context of Climate Change. *American Antiquity* 74:467-483.

Betzenhauser, Alleen Mae
2011 Creating the Cahokian Community: The Power of Place in Early Mississippian Sociopolitical Dynamics. Unpublished Ph.D. dissertation, University of Illinois, Urbana.

Binford, Lewis R., Sally R. Binford, Robert Whallon, and Margaret Ann Hardin
1970 *Archaeology at Hatchery West*. Memoirs of the Society for American Archaeology. *American Antiquity* 35(4).

Blaeser, Kimberly M.
2003 Sacred Journey Cycles: Pilgrimage as Re-turning and Re-telling in American Indigenous Literatures. *Religion and Literature* 35:83-104.

Blasingham, Emily Jane
1953 *Temporal and Spatial Distribution of the Yankeetown Cultural Manifestation*. Unpublished Masters paper, Department of Anthropology, Indiana University, Bloomington, Indiana.

Blitz, John
1993 Big Pots for Big Shots: Feasting and Storage in a Mississippian Community. *American Antiquity* 58(1):80-96.
1999 Mississippian Chiefdoms and the Fission-Fusion Process. *American Antiquity* 64:577-592.
2009 New Perspectives in Mississippian Archaeology. *Journal of Archaeological Research*. Available online at http://www.springerlink.com/openurl.asp?genre=article&id=doi:10.1007/s10814-009-9033-y.

Boas, Franz
1896 The Limitations of the Comparative Method of Anthropology. *Science* 4(103):901-908.

Boone, Elizabeth Hill
2002 Venerable Place of Beginnings: The Aztec Understanding of Teotihuacan. In *Mesoamerica's Classic Heritage: From Teotihuacan to the Aztecs*, edited by David Carrasco, pp. 371-395. University Press of Colorado, Boulder.

Bowie, Fiona
2006 *The Anthropology of Religion: An Introduction*, 2nd ed. Blackwell Publishing, Malden, MA.

Bowser, Brenda J., and Maria Nieves Zedeno (editors)
2009 *The Archaeology of Meaningful Places*. University of Utah Press, Salt Lake City.

Boylan, Josephine
1933 Illinois Highways, 1700-1848: Roads, Rivers, Ferries, Canals. *Journal of the Illinois State Historical Society (1908-1984)* 26(1/2):5-59.

Bradley, Richard
1997 *Rock Art and the Prehistory of Atlantic Europe: Signing the Land*. Routledge, London.
1999 Pilgrimage in Prehistoric Britain? In *Pilgrimage Explored*, edited by J. Stopford, pp. 1-23. York Medieval Press, Woodbridge, UK.
2000 *An Archaeology of Natural Places*. Routledge, London.
2002 The Land, the Sky, and the Scottish Stone Circle. In *Monuments and Landscape in Atlantic Europe: Perception and Society During the Neolithic and Early Bronze Age,* edited by Chris Scarre, pp. 122-138. Routledge, London.

Brain, Jeffrey P.
1991 Cahokia from the Southern Periphery. In *New Perspectives on Cahokia: Views from the Periphery*, edited by James B. Stoltman, pp. 93-100. Prehistory Press, Madison, Wisconsin.

Braun, David P.
1983 Pots as Tools. In *Archaeological Hammers and Theories*, edited by A. S. Keene and J. A. Moore, pp. 107-134. Academic Press, New York.

Brescia, William, Jr.
1985 Choctaw Oral Tradition Relating to Tribal Origin. In *The Choctaw before Removal*, edited by Carolyn Keller Reeves, pp. 3-16. University Press of Mississippi, Jackson.

Brink, McDonough & Co.
1881 *History of St. Clair County, Illinois*. Philadelphia.

Brown, James A.
1997 The Archaeology of Ancient Religion in the Eastern Woodlands. *Annual Review of Anthropology* 26:465-485.
2003 The Cahokia Mound 72-Sub 1 Burials as Collective Representation. In *A Deep-Time Perspective: Studies in Symbols, Meaning, and the Archaeological Record: Papers in Honor of Robert L. Hall*. The Wisconsin Archaeologist 84(1&2):83-99.
2004 The Cahokian Expression: Creating Court and Cult. In *Hero, Hawk, and Open Hand: American Indian Art of the Ancient Midwest and South*, edited by R. F. Townsend and R. V. Sharp, pp. 105-121. Art Institute of Chicago and Yale University Press, New Haven, Connecticut.

Brown, James A., and John E. Kelly
2000 Cahokia and the Southeastern Ceremonial Complex. In *Mounds, Modoc, and Mesoamerica: Papers in Honor of Melvin L. Fowler*, edited by Steven R. Ahler, pp. 469-510. Illinois State Museum Scientific Papers Series Vol. XXVIII, Springfield.

Brown, James A., Richard A. Kerber, and Howard D. Winters
1990 Trade and the Evolution of Exchange Relations at the Beginning of the Mississippian Period. In *The Mississippian Emergence*, edited by Bruce D. Smith, pp. 251-280. Smithsonian Institution Press, Washington, D.C.

Brown, Joseph Epes
1953 *The Sacred Pipe: Black Elk's Account of the Seven Rites of the Oglala Sioux*. University of Oklahoma Press, Norman.

Buchanan, Meghan E.
2014 Warfare and the Materialization of Daily Life at the Mississippian Common Field Site. Unpublished Ph.D. Dissertation, Indiana University, Bloomington.

Butler, Amanda J.
2014 The Siren's Song of Portable X-ray Florescence: Lessons Learned and What All Archaeologists Need to Know. Unpublished master's Thesis, Department of Anthropology, University of Illinois Urbana-Champaign.
2015 The Collins Complex: Salvaging an Unexpected Cahokian Mission. Paper presented at the Southeastern Archaeological Conference,

Butler, Brian M., R. Berle Clay, Michael L. Hargrave, Staffan D. Peterson, John E. Schwegman, John A. Schwegman, and Paul D. Welch
2011 A New Look at Kincaid: Magnetic Survey of a Large Mississippian Town. *Southeastern Archaeology* 30(1):20-37.

Butler, Brian M., and Charles R. Cobb
2001 The Dillow's Ridge Site and the Production of Mill Creek Chert Tools. *Illinois Archaeology* 13:57-87.

Butler, Judith
1993 *Bodies that Matter: On the Discursive Limits of Sex*. Routledge, New York.

Byers, A. Martin
2006 *Cahokia: A World Renewal Cult Heterarchy*. University Press of Florida, Gainesville.

Candy, Julie M.
2009 *The Archaeology of Pilgrimage on the Camino de Santiago de Compostela: A Landscape Perspective*. Archaeopress, Oxford.

Carleton, Kenneth
1996 Nanih Waiya: Mother Mound of the Choctaw. Common Ground 1(1). http://www.nps.gov/archaeology/cg/vol1_num1/mother.htm, accessed January 2, 2016.

Carr, Christopher
2006 Rethinking Interregional Hopewellian "Interaction". In *Gathering Hopewell: Society, Ritual, and Ritual Interaction*, edited by C. Carr and D. T. Case, pp. 575-623. Springer, New York.

Catlin, George
1839 Account of a Journey to the Coteau des Prairies, with a description of the Red Pipe Stone Quarry and Granite bowlders found there. *The American Journal of Science and Arts* 38(1):138-146.

Cave, Alfred A.
2006 *Prophets of the Great Spirit: Native American Revitalization Movements in Eastern North America*. University of Nebraska Press, Lincoln.

Chapman, Jefferson, and Andrea Brewer Shea

1981 The Archaeobotanical Record: Early Archaic to Contact in the Lower Tennessee River Valley. *Tennessee Anthropologist* 6:61-84.

Chapman, John
2000 *Fragmentation in Archaeology, People, Places and Broken Objects in the Prehistory of Southeastern Europe*. Routledge, London.

Childe, Vere Gordon
1950 The Urban Revolution. *The Town Planning Review* 21(1):3-17.
1969 [1950] *Prehistoric Migrations in Europe*. Anthropological Publications, Oosterhout, The Netherlands.

Christe, Jessica Joyce (editor)
2009 *Landscapes of Origin in the Americans: Creation Narratives Linking Ancient Places and Present Communities*. University of Alabama Press, Tuscaloosa.

Claassen, Cheryl
2011 Waning Pilgrimage Paths and Modern Roadscapes: Moving Through Landscape in Northern Guerrero, Mexico. *World Archaeology* 43(3):493-504.

Claflin, John
1991 The Shire Site: Mississippian Outpost in the Central Illinois Prairie. In *New Perspectives on Cahokia: Views from the Periphery*, edited by James B. Stoltman, pp. 155-176. Prehistory Press, Madison, Wisconsin.

Close, Angela E.
2000 Reconstructing Movement in Prehistory. *Journal of Archaeological Method and Theory* 7(1):49-77.

Cobb, Charles R.
1989 An Appraisal of the Role of Mill Creek Chert Hoes in Mississippian Exchange Systems. *Southeastern Archaeology* 8(2):79-92.
2000 *From Quarry to Cornfield: The Political Economy of Mississippian Hoe Production*. University of Alabama Press, Tuscaloosa.
2003 Mississippian Chiefdoms: How Complex? *Annual Review of Anthropology* 32:48-64.

Cohen, Erik
1988 Traditions in the Qualitative Sociology of Tourism. *Annals of Tourism Research* 15(1):29-46.
1992 Pilgrimage and Tourism: Convergence and Divergence. In *Sacred Journeys: The Anthropology of Pilgrimage*, edited by Alan Morinis, pp. 47-61. Greenwood Press, Westport, Connnecticut.

Cohn, B. S., and M. Marriott
1958 Networks and Centers in the Integration of Indian Civilization. *Journal of Social Research* 1:1-9.

Coleman, Simon
2002 Do You Believe in Pilgrimage? Communitas, Contestation, and Beyond. *Anthropological Theory* 2(3):355-368.
2013 Ritual Remains: Studying Contemporary Pilgrimage. In *A Companion to the Anthropology of Religion,* 1st ed., edited by Janice Boddy and Michael Lambek, pp. 294-308. John Wiley and Sons.

Coleman, Simon, and John Elsner
1994 The Pilgrim's Progress: Art, Architecture and Ritual Movement at Sinai. *World Archaeology* 26(1):73-89.
1995 *Pilgrimage: Past and Present in the World Religions*. Harvard University Press, Cambridge, Massachusetts.

Collins, James M.
1990 *The Archaeology of the Cahokia Mounds ICT-II: Site Structure*. Illinois Cultural Resources Study No. 10. Illinois Historic Preservation Agency, Springfield.
1997 Cahokia Settlement and Social Structures as Viewed from the ICT-II. In *Cahokia: Domination and Ideology in the Mississippian World*, edited by T. R. Pauketat and T. E. Emerson, pp. 124-140. University of Nebraska Press, Lincoln.

Collins, Kreiner, N.
2010 Researching Pilgrimage: Continuity and Transformations. *Annals of Tourism Research* 37(2):440-456.

Connerton, Paul
1989 *How Societies Remember*. Cambridge University Press, Cambridge.

Conrad, Lawrence A.
1991 The Middle Mississippian Cultures of the Central Illinois River Valley. In *Cahokia and the Hinterlands: Middle Mississippian Cultures of the Midwest*, edited by T. E. Emerson and R. B. Lewis, pp. 119-156. University of Illinois Press, Urbana.

Corliss, Carlton J.
1956 *Trails to Rails: A Story of Transportation Progress in Illinois*. Published Privately.

Cowgill, George L.
2004 Origins and Development of Urbanism: Archaeological Perspectives. *Annual Review of Anthropology* 33:525-549.

Crane, Cathy J.
1982 Plant Utilization at Spoonbill, an Early Caddo Site in Northeast Texas. *Midcontinental Journal of Archaeology* 7(1):81-98.

Creekmore, Andrew T. III, and Kevin D. Fisher (editors)

2014 *Making Ancient Cities: Space and Place in Early Urban Societies*. Cambridge University Press, Cambridge.

Crown, Patricia L., Thomas E. Emerson, Jiyan Gu, W. Jeffrey Hurst, Timothy R. Pauketat, and Timothy Ward
2012 Ritual Black Drink Consumption at Cahokia. *PNAS early edition*:1-6.

Cummings, Vicki, and Robert Johnston (editors)
2007 *Prehistoric Journeys*. Oxbow Books, Oxford.

Dalan, Rinta A.
1997 The Construction of Mississippian Cahokia. In *Cahokia: Domination and Ideology in the Mississippian World*, edited by T. R. Pauketat and T. E. Emerson, pp. 89-102. University of Nebraska Press, Lincoln.

Dalan, Rinta A., George R. Holley, William I. Woods, Harold W. Watters, Jr., and John A. Koepke
2003 *Envisioning Cahokia: A Landscape Perspective*. Northern Illinois University Press, DeKalb.

DeBoer, William R.
1993 Like a Rolling Stone: The Chunkey Game and Political Organization in Eastern North America. *Southeastern Archaeology* 12(2):83-92.

Certeau, Michel de
1984 *The Practice of Everyday Life*. University of California Press, Berkeley.

Deleuze, Gilles, and Felix Guattari
2004 *A Thousand Plateaus; Capitalism and Schizophrenia*. Continuum, London.

Deloria, Vine, Jr.
2003 *God Is Red: A Native View of Religion*. 3rd ed. Fulcrum, Golden, Colorado.

Douglas, John G.
1976 *Collins: A Late Woodland Ceremonial Complex in the Woodfordian Northeast*. Unpublished Ph.D. dissertation, Department of Anthropology, University of Illinois, Urbana.

Dubey, D. P., J. McKim Malville, and Rana P. B. Singh
2000 Chitrakut: A Hindu Tirtha and Its Cosmic Geometry. In *Ancient Cities, Sacred Skies: Cosmic Geometries and City Planning in Ancient India*, edited by J. M. Malville and L. M. Gujral, pp. 40-57. Indira Gandhi National Centre for the Arts, New Delhi.

Dunavan, Sandra L.
1990 Floral Remains. In *Selected Early Mississippian Household Sites in the American Bottom, Part 5: The Olszewski Site (11-S-465)*, edited by Ned H. Hannenberger, pp. 389-

403. American Bottom Archaeology FAI-270 Site Reports 22, University of Illinois Press, Urbana.

Durkheim, Emile
2008 The Elementary forms of Religious Life, translated by Carol Cosman. Oxford University Press, Oxford.

Dyas, Dee
2001 *Pilgrimage in the Medieval English Literature, 700-1500*. D.S. Brewer, Woodbridge, UK.

Eade, John, and Michael Sallnow (editors)
1991 *Contesting the Sacred: The Anthropology of Christian Pilgrimage*. Routledge, London.
1992 Pilgrimage and Tourism at Lourdes, France. *Annals of Tourism Research* 19:18-32.

Echo-Hawk, Roger C.
2000 Ancient History in the New World: Integrating Oral Traditions and the Archaeological Record. *American Antiquity* 65(2):267-290.

Emerson, Thomas E.
1989 Water, Serpents, and the Underworld: An Exploration into Cahokia Symbolism. In *The Southeastern Ceremonial Complex: Artifacts and Analysis,* edited by P. Galloway, pp. 45-92. University of Nebraska Press, Lincoln.
1991a The Apple River Mississippian Cultures of Northwestern Illinois. In *Cahokia and the Hinterlands: Middle Mississippian Cultures of the Midwest,* edited by T. E. Emerson and R. B. Lewis, pp. 164-182. University of Illinois Press, Urbana.
1991b Some Perspectives on Cahokia and the Northern Mississippian Expansion. In *Cahokia and the Hinterlands: Middle Mississippian Cultures of the Midwest*, edited by T. E. Emerson and R. B. Lewis, pp. 221-236. University of Illinois Press, Urbana.
1997a *Cahokia and the Archaeology of Power*. University of Alabama Press, Tuscaloosa.
1997b Reflections from the Countryside on Cahokian Hegemony. In *Cahokia: Domination and Ideology in the Mississippian World*, edited by T. R. Pauketat and T. E. Emerson, pp. 167-189. University of Nebraska Press, Lincoln.
1997c Cahokian Elite Ideology and the Mississippian Cosmos. In *Cahokia: Domination and Ideology in the Mississippian World*, edited by T. R. Pauketat and T. E. Emerson, pp. 190-228. University of Nebraska Press, Lincoln.
2002 An Introduction to Cahokia 2002: Diversity, Complexity, and History. *Midcontinental Journal of Archaeology* 27(2):127-148.
2003 Materializing Cahokia Shamans. *Southeastern Archaeology* 22:135-154.
2007 Cahokia and the Evidence for Late Pre-Columbian War in the North American Midcontinent. In *North American Indigenous Warfare and Ritual Violence*, edited by Richard J. Chacon and Ruben G. Mendoza, pp. 129-148. University of Arizona Press, Tucson.
2015 The Earth Goddess Cult at Cahokia. In *Medieval Mississippians: The Cahokian World*, edited by Timothy R. Pauketat and Susan M. Alt, pp. 55-62. School for Advanced Research Press, Santa Fe.

Emerson, Thomas E., and Douglas K. Jackson
1984 *The BBB Motor Site*. American Bottom Archaeology FAI-270 Site Report Vol. 6. University of Illinois Press, Urbana.

Emerson, Thomas E., Susan M. Alt, and Timothy R. Pauketat
2008 Locating American Indian Religion at Cahokia and Beyond. In *Religion, Archaeology, and the Material World*, edited by L. Fogelin, pp. 216-236. Center for Archaeological Investigations, Occasional Paper No. 36, Southern Illinois University, Carbondale.

Emerson, Thomas E., and Eve Hargrave
2000 Strangers in Paradise: Recognizing Ethnic Mortuary Diversity on the Fringes of Cahokia. *Southeastern Archaeology* 19:1-23.

Emerson, Thomas E., Randal Hughes, Mary R. Hynes, and Sarah U. Wisseman
2002 Implications of Sourcing Cahokia-Style Flint Clay Figurines in the American Bottom and the Upper Mississippi River Valley. *Midcontinental Journal of Archaeology* 27(2):309-338.
2003 The Sourcing and Interpretation of Cahokia-Style Figurines in the Trans-Mississippi South and Southeast. *American Antiquity* 68:287-314.

Emerson, Thomas E., and R. Barry Lewis (editors)
1991 *Cahokia and the Hinterlands: Middle Mississippian Cultures of the Midwest*. University of Illinois Press, Urbana.

Emerson, Thomas E., and Timothy R. Pauketat
2007 Unpacking the Southern Cult and Mississippian Religion. In *Belief in the Past: Theorizing an Archaeology of Religion*, edited by D. S. Whitley and K. Hays-Gilpin. Left Coast Press, Walnut Creek, California.
2008 Historical-Processual Archaeology and Culture Making: Unpacking the Southern Cult and Mississippian Religion. In *Belief in the Past: Theoretical Approaches to the Archaeology of Religion*, edited by Kelley Hays-Gilpin and David S. Whitley, pp. 167-188. AltaMira Press, Walnut Canyon, California.

Enders, Donald L.
1979 Platting the City Beautiful: A Historical and Archaeological Glimpse of Nauvoo Streets. *Brigham Young University Studies*, Spring:409-415.

Esarey, Duane, and Timothy R. Pauketat
1992 *The Lohmann Site: An Early Mississippian Center in the American Bottom*. American Bottom Archaeology FAI-270 Site Reports. University of Illinois Press, Urbana.

Farias, Ignacio, and Thomas Bender (editors)
2010 *Urban Assemblages: How Actor-Network Theory Changes Urban Studies*. Routledge, London.

Farnell, Brenda
1994 Ethno-Graphics and the Moving Body. *Man* 29(4):929-974.
1995 *Human Actions Signs in Cultural Context: The Visible and the Invisible in Movement and Dance*. Scarecrow Press, Metuchen, New Jersey.
1996 Metaphors we Move By. *Visual Anthropology* 8:311-335.
1999 Moving Bodies, Acting Selves. *Annual Review of Anthropology* 28:341-373.
2003 Kinesthetic Sense and Dynamically Embodied Action. *Journal for the Anthropological Study of Human Movement* 12(4):132-144.

Farnell, Brenda, and Charles R. Varela
2008 The Second Somatic Revolution. *Journal for the Theory of Social Behavior* 38(3):215-240.

Farnsworth, Kenneth B., Thomas E. Emerson, and Rebecca Miller Glenn
1991 Patterns of Late Woodland/Mississippian Interaction in the Lower Illinois Valley Drainage: A View from Starr Village. In *Cahokia and the Hinterlands: Middle Mississippian Cultures of the Midwest*, edited by Thomas E. Emerson and R. Barry Lewis, pp. 83-118. University of Illinois Press, Urbana.

Ferguson, T. J., G. Lewis Berlin, and Leigh J. Kuwanwisiwma
2009 Kukhepya: Searching for Hopi Trails. In *Landscapes of Movement: Trails, Paths, and Roads in Anthropological Perspective*, edited by J. E. Snead, C. L. Erickson, and J. A. Darling, pp. 20-41. University of Pennsylvania Museum of Archaeology and Anthropology, Philadelphia.

Finney, Fred A.
2000 Theodore H. Lewis and the Northwestern Archaeological Survey's 1891 Fieldwork in the American Bottom. *Illinois Archaeology* 12:244-276.

Finney, Fred A., and James B. Stoltman
1991 The Fred Edwards Site: A Case of Stirling Phase Culture Contact in Southwestern Wisconsin. In *New Perspectives on Cahokia: Views from the Periphery*, edited by J. B. Stoltman, pp. 229-252. Monographs in World Archaeology No. 2. Prehistory Press, Madison, Wisconsin.

Fortier, Andrew C.
2007 *The Archaeology of the East St. Louis Mound Center, Part II: The Northside Excavations*. Illinois Transportation Archaeological Research Program, Transportation Archaeological Research Reports No. 22, University of Illinois, Urbana.

Fortier, Andrew C., and Douglas K. Jackson
2000 The Formation of a Late Woodland Heartland in the American Bottom, Illinois cal A.D. 650-900. In *Late Woodland Societies: Tradition and Transformation across the Midcontinent*, edited by Thomas E. Emerson, Dale L. McElrath, and Andrew C. Fortier, pp. 123-148. University of Nebraska Press, Lincoln.

Fortier, Andrew C., and Dale L McElrath
2002 Deconstructing the Emergent Mississippian Concept: The Case for the Terminal Late Woodland in the American Bottom. *Midcontinental Journal of Archaeology* 27(2):171-215.

Fortier, Andrew C., Thomas E. Emerson, and Dale L. McElrath
2006 Calibrating and Reassessing American Bottom Culture History. *Southeastern Archaeology* 25(2):170-211.

Fowler, Catherine S.
2009 Reconstructing southern Paiute-Chemehuevi Trails in the Mojave Desert of Southern Nevada and California: Ethnographic Perspectives from the 1930s. In *Landscapes of Movement: Trails, Paths, and Roads in Anthropological Perspective*, edited by James E. Snead, Clark L. Erickson, and J. Andrew Darling, pp. 84-105. Pennsylvania Museum of Archaeology and Anthropology, Philadelphia.

Fowler, Melvin L.
1974 *Cahokia: Ancient Capital of the Midwest*. Addison-Wesley Module in Anthropology, No. 48. Reading, Massachusetts.
1978 Cahokia and the American Bottom: Settlement Archaeology. In *Mississippian Settlement Patterns*, edited by Bruce D. Smith, pp. 455-478. Academic Press, New York.
1991 Mound 72 and Early Mississippian at Cahokia. In *New Perspectives on Cahokia: Views from the Periphery*, edited by James B. Stoltman, pp. 1-28. Prehistory Press, Madison, Wisconsin.
1997 *The Cahokia Atlas: A Historical Atlas of Cahokia Archaeology*. Illinois Transportation Archaeological Research Program, Studies in Archaeology No. 2. University of Illinois, Urbana.

Fowler, Melvin L., and Robert L. Hall
1975 Archaeological Phases at Cahokia. In *Perspectives in Cahokia Archaeology*, pp. 1-14. Illinois Archaeological Survey Bulletin No. 10, Urbana.
1978 Late Prehistory of the Illinois Area. In *Handbook of North American Indians: Northeast, Vol. 15*, edited by Bruce G. Trigger, pp. 560-568. Smithsonian Institution, Washington, D.C.

Fowler, Melvin L., Jerome Rose, Barbara Vander Leest, and Steven A. Ahler
1999 *The Mound 72 Area: Dedicated and Sacred Space in Early Cahokia*. Reports of Investigations No. 54. Illinois State Museum, Springfield.

Fowles, Severin M.
2013 *An Archaeology of Doings: Secularism and the Study of Pueblo Religion*. School for Advanced Research Press, Santa Fe.

Fox, Steve
1994 Sacred Pedestrians: The Many Faces of Southwest Pilgrimage. *Journal of the Southwest* 36(1):33-53.

Freidel, David, Linda Schele, and Joy Parker
1993 *Maya Cosmos: Three Thousand Years on the Shaman's Path*. William Marrow and Company, New York.

Friemuth, Glen A.
1974 *The Lunsford-Pulcher Site: An Examination of Selected Traits and Their Social Implications in American Bottom Prehistory*. Unpublished pre-dissertation paper, Department of Anthropology, University of Illinois, Urbana.

Galloy, Joseph
2010 The Janey B. Goode Site (11s1232): Highlights of Investigations at a Massive Late Prehistoric Site in the American Bottom. *Illinois Archaeology* 22(2):529-552.
2011 The East St. Louis Mound Center: America's Original "Second City". *Cahokian* Fall 11-14.

Gell, James J.
1998 *Art and Agency: An Anthropological Theory*. Oxford University Press, Oxford.

Gerhardt, Juliette J., Tim Mancl, and Elisabeth LaVigne
2012 *Phase I Archaeological Testing: Regrade, Stabilize, and Pave Unpaved Section of Back Entrance Road, Hopewell Furnace National Historic Site, Elverson, Pennsylvania*. John Milner Associates, Inc. West Chester, PA.

Gibbon, Guy E.
1974 A Model of Mississippian Development and Its Implications for the Red Wing Area. In *Aspects of Upper Great Lakes Anthropology*, edited by Eldon Johnson, pp. 129-137. Minnesota Prehistoric Archaeology Series No. 11. Minnesota Historical Society, St. Paul.

Gibbon, Guy E., and Clark A. Dobbs
1991 The Mississippian Presence in the Red Wing Area, Minnesota. In *New Perspectives on Cahokia: Views from the Periphery*, edited by James B. Stoltman, pp. 281-305. Prehistory Press, Madison, Wisconsin.

Gibson, Erin
2007 The Archaeology of Movement in a Mediterranean Landscape. *Journal of Mediterranean Archaeology* 20(1):61-87.
2015 Movement, Power and Place: The Biography of a Wagon Road in a Contested First Nations Landscape. *Cambridge Archaeological Journal* 25(2):417-434.

Gibson, James J.
1986 *The Ecological Approach to Visual Perception*. Lawrence Erlbaum, Hillsdale, New Jersey.

Gill, Sam D.
2005 *Native American Religions: An Introduction*. 2nd ed.Wadsworth, Belmont, California.

Gillespie, Susan D.
2008 History in Practice: Ritual Deposition at La Venta Complex A. In *Memory Work: Archaeologies of Material Practices*, edited by Barbara J. Mills and William H. Walker, pp. 109-136. School for Advanced Research Press, Santa Fe.

Gitlitz, David M. and Linda Kay Davidson
2006 *Pilgrimage and the Jews*. Praeger, Westport, Connecticut.

Goldstein, Lynne
1991 The Implications of Aztalan's Location. In *New Perspectives on Cahokia: Views from the Periphery*, edited by James B. Stoltman, pp. 209-228. Prehistory Press, Madison, Wisconsin.

Goldstein, Lynne G., and John D. Richards
1991 Ancient Aztalan: The Cultural and Ecological Context of a Late Prehistoric Site in the Midwest. In *Cahokia and the Hinterlands: Middle Mississippian Cultures of the Midwest*, edited by T. E. Emerson and R. B. Lewis, pp. 193-206. University of Illinois Press, Urbana.

Green, William, and Roland L. Rodell
1994 The Mississippian Presence and Cahokia Interaction at Trempealeau, Wisconsin. *American Antiquity* 59(2):334-359.

Gregg, Michael L.
1975 A Population Estimate for Cahokia. In *Perspectives in Cahokia Archaeology*, pp. 126-136. Illinois Archaeological Survey, Bulletin 10.

Grimm, R. E.
1944 Mound Group Near Lebanon, Illinois. *Journal of the Illinois State Archaeological Society* 3:40-41.

Gulliford, Andrew
2000 *Sacred Objects and Sacred Places: Preserving Tribal Traditions*. University Press of Colorado, Boulder.

Halbert, H. S.
1899 *Nanih Waiya, The Sacred Mound of the Choctaws*. Mississippian Historical Society vol. II.

Hall, Robert L.
1965 Current Research. *American Antiquity* 30:523-546.
1966 Cahokia Chronology. Paper presented at the Annual Meeting of the Central States Anthropological Society, St. Louis, Missouri.

1989 The Cultural Background of Mississippian Symbolism. In *The Southeastern Ceremonial Complex*, edited by Patricia Galloway, pp. 239-278. University of Nebraska Press, Lincoln.
1991 Cahokia Identity and Interaction Models of Cahokia Mississippian. In *Cahokia and Hinterlands: Middle Mississippian Cultures of the Midwest*, edited by T. E. Emerson and R. B. Lewis, pp. 3-34. University of Illinois Press, Urbana.
1997 *An Archaeology of the Soul: North American Indian Belief and Ritual*. University of Illinois Press, Urbana.
2000 Sacrificed Foursomes and Green Corn Ceremonialism. In *Mounds, Modoc, and Mesoamerica: Papers in Honor of Melvin L. Fowler*, edited by Steven R. Ahler, pp. 245-253. Illinois State Museum Scientific Papers Series Vol. XXVIII. Springfield.
2006 Exploring the Mississippian Big Bang at Cahokia. In *A Pre-Columbian World*, edited by Jeffrey Quilter and Mary Miller, pp. 187-230. Dumbarton Oaks Research Library and Collection, Washington, D.C.

Hally, David J.
1983 Use Alteration of Pottery Vessel Surfaces: An Important Source of Evidence for the Identification of Vessel Function. *North American Archaeologist* 4(1):3-26.
1986 The Identification of Vessel Function: A Case Study from Northwest Georgia. *American Antiquity* 51:267-295.

Hammond, Norman, and Matthew R. Bobo
1994 Pilgrimage's Last Mile: Late Maya Monument Veneration at La Milpa, Belize. *World Archaeology* 26(1):19-34.

Hanson, Jeffery R., and David Moore
1999 Applied Anthropology at Devils Tower National Monument. *Plains Anthropologist* 44(170):53-60.

Harbison, Peter
1994 Early Irish Pilgrim Archaeology in the Dingle Peninsula. *World Archaeology* 26(1):90-103.

Harn, Alan D.
1991a Comments on Subsistence, Seasonality, and Site Function at Upland Subsidiaries in the Spoon River Area: Mississippianization at Work on the Northern Frontier. In *Cahokia and the Hinterlands: Middle Mississippian Cultures of the Midwest*, edited by Thomas E. Emerson and R. Barry Lewis, pp. 157-163. University of Illinois Press, Urbana.
1991b The Eveland Site: Inroad to Spoon River Mississippian Society. In *New Perspectives on Cahokia: Views from the Periphery*, edited by James B. Stoltman, pp. 129-154. Prehistory Press, Madison, Wisconsin.

Harre, Rom
1986 *The Social Construction of Emotions*. Blackwell, Oxford.

Harris, Oliver J. T., and John Robb

2012 Multiple Ontologies and the Problem of the Body in History. *American Anthropologist* 114(4):668-679.

Hargrave, Michael L., Gerald L. Oetelaar, Neal H. Lopinot, Brian M. Butler, and Deborah H. Billings
1983 *The Bridges Site (11MR11): A Late Prehistoric Settlement in the Central Kaskaskia Valley*. Research Paper Number 38: Center for Archaeological Investigations, Southern Illinois University, Carbondale.

Helms, Mary
1988 *Ulysses' Sail: An Ethnographic Odyssey of Power, Knowledge, and Geographical Distance*. Princeton University Press, Princeton, New Jersey.

Hendrickson, Elizabeth F., and Mary McDonald
1983 Ceramic Form and Function: An Ethnographic Search and an Archaeological Application. *American Anthropologist* 85:630-643.

Hitchner, R. Bruce
2012 Roads, Integration, Connectivity, and Economic Performance in the Roman Empire. In *Highways, Byways, and Road Systems in the Pre-Modern World*, 1st ed., edited by Susan E. Alcock, John Bodel, and Richard J. A. Talbert, pp. 222-234. John Wiley & Sons.

Hoadley, R. Bruce
1990 *Identifying Wood: Accurate Results with Simple Tools*. The Taunton Press, Newtown, Connecticut.

Hodder, Ian, and Craig Cessford
2004 Daily Practice and Social Memory at Catalhoyuk. *American Antiquity* 69(1):17-40.

Holley, George R.
1989 *The Archaeology of the Cahokia Mounds ICT-II: Ceramics*. Illinois Cultural Resources Study No. 11, Illinois Historic Preservation Agency, Springfield.
2006 Perspectives from the Edge of Looking Glass Prairie: The Scott Joint-Use Archaeological Project. *Southeastern Archaeology* 25(2):301-328.

Holley, George R., Rinita A. Dalan, and Phillip A. Smith
1993 Investigations in the Cahokia Site Grand Plaza. *American Antiquity* 58:306-319.

Holley, George R., Neal H. Lopinot, Rinita A. Dalan, and William I. Woods
1990 *The Archaeology of the Cahokia Palisade: South Palisade Investigations*. Illinois Cultural Resources Study No. 14. Illinois Historic Preservation Agency, Springfield.

Holley, George R., Kathryn E. Parker, Mikels Skele, Julie N. Harper, and Donald L. Booth
2001b Knoebel Community Core (S-71, S-816). In *The Prehistoric Archaeology of the Knoebel Locality, Scott Joint Use Archaeological Project*, edited by George R. Holley, Kathryn E. Parker, Harold W. Watters, Jr., Julie N Harper, Mikels Skele, Jennifer E. Ringberg, Alan

J. Brown, and Donald L. Booth. Office of Contract Archaeology, Southern Illinois University at Edwardsville.

Holley, George R., Kathryn E. Parker, Harold W. Watters, Jr., Julie H. Harper, Michels Skele, Jennifer E. Ringberg, Alan J. Brown, and Don L. Booth
2001a *The Knoebel Locality, Scott Joint-Use Archaeological Project*. Office of Contract Archaeology, Southern Illinois University, Edwardsville.

Howe, Jennifer L.
2000 Cultural Diversity Within and Between Villages: A Ceramic Analysis of Two American Bottom Upland Sites. Unpublished thesis, University of Illinois Urbana-Champaign.

Howey, Meghan C. L.
2012 Regional Ritual Organization in the Northern Great Lakes, AD 1200-1600. In *The Oxford Handbook of North American Archaeology*, edited by Timothy R. Pauketat, pp. 285-296. Oxford University Press, Oxford.

Hudson, Charles
1976 *The Southeastern Indians*. University of Tennessee Press, Knoxville.
1989 The Southeast Woodlands. In *Native American Religions: North America*, edited by Lawrence E. Sullivan, pp. 139-146. Macmillan, New York.

Hultkrantz, Ake
1987 *Native Religions of North America*. Harper and Row, San Francisco.

Ingold, Tim
2000 *The Perception of the Environment: Essays on Livelihood, Dwelling and Skill*. Routlege, London.
2007 *Lines: A Brief History*. Routledge, London.
2011 *Being Alive: Essays on Movement, Knowledge and Description*. Routledge, London.
2012 Introduction. In *Redrawing Anthropology: Materials, Movements, Lines*, edited by T. Ingold, pp. 1-20. Anthropological Studies of Creativity and Perception, Ashgate.
2013 *Making: Anthropology, Archaeology, Art and Architecture*. Routledge, London.

Inomata, Takeshi
2006 Plazas, Performers, and Spectators: Political Theaters of the Classic Maya. *Current Anthropology* 47(5):805.

Irwin, Lee
1994 *The Dream Seekers: Native American Visionary Traditions of the Great Plains*. University of Oklahoma Press, Norman.

Iseminger, William R., Timothy R. Pauketat, Brad Koldehoff, Lucretia S. Kelly, Leonard Blake
1990 *The Archaeology of the Cahokia Palisade: East Palisade Investigations*. Illinois Cultural Resources Study No. 14. Illinois Historic Preservation Agency. Springfield.

Jackson, Douglas K., and Philip G. Millhouse
2003 *The Vaughn Branch and Old Edwardsville Road Sites: Late Stirling and Early Moorehead Phase Mississippians in the Northern American Bottom*. Transportation Archaeological Research Reports No. 2. Illinois Transportation Archaeological Research Program, University of Illinois Press, Urbana.

Jackson, Harley H. T.
1961 *Mammals of Wisconsin*. University of Wisconsin Press, Madison.

Janusek, John W.
2006 The Changing "Nature" of Tiwanaku Religion and the Rise of an Andean State. *World Archaeology* 38(3):469-492.
2008 *Ancient Tiwanaku*. Cambridge University Press, Cambridge.
2015a Incipient Urbanism at the Early Andean Center of Khonkho Wankane, Bolivia. *Journal of Field Archaeology* 40(2):127-142.
2015b Tiwanaku Urban Origins: Distributed Centers and Animate Landscapes. In *The Cambridge World History: Volume III, Early Cities in Comparative Perspective, 4000 BCE-1200 CE*, edited by Normann Yoffee, pp. 229-252. Cambridge University Press, Cambridge.

Jenkins, Mark
2013 Devils Tower, Sacred Space. *Virginia Quarterly Review* Winter:233-237.

Jenne, Steve
1971 Illinois Archaeological Survey Site Recording Form: 11S278. Manuscript on file, Illinois State Museum, Springfield.

Jeske, Robert J.
1999 World Systems Theory, Core Periphery Interactions and Elite Economic Exchange in Mississippian Societies. In *World Systems Theory and Practice*, edited by P. N. Kardulias, Rowman and Littlefield Publishing, Boulder.

Johannessen, Sissel
1984 Plant Remains from the Julian Site. In *The Julian Site*, edited by George R. Milner, pp. 244-273. American Bottom Archaeology FAI-270 Site Reports 7. University of Illinois Press, Urbana.

Jones, Andrew
2001 Drawn from Memory: The Archaeology of Aesthetics and the Aesthetics of Archaeology in Earlier Bronze Age Britain and the Present. *World Archaeology* 33(2):334-356.
2007 *Memory and Material Culture*. Cambridge University Press, Cambridge.

Joyce, Rosemary A.
2003 Concrete Memories: Fragments of the Past in the Classic Maya Present (500-1000 AD). In *Archaeologies of Memories*, edited by R. Van Dyke and S. E. Alcock, pp. 104-125. Blackwell, Oxford.

2008 Practice in and as Deposition. In *Memory Work: Archaeologies of Material Practices*, edited by B. J. Mills and W. H. Walker, pp. 25-40. School for Advanced Research Press, Santa Fe, New Mexico.

Judge, W. James
1989 Chaco Canyon – San Juan Basin. In *Dynamics of Southwest Prehistory*, edited by Linda S. Cordell and George J. Gumerman, pp. 209-261. Smithsonian Institution, Washington, D.C.

Kaeppler, A.
1971 Aesthetics of Tongan Dance. *Ethnomusicology* 15(2):175-185.

Kantner, John, and Kevin J. Vaughn
2012 Pilgrimage as Costly Signal: Religiously Motivated Cooperation in Chaco and Nasca. *Journal of Anthropological Archaeology* 31:66-82.

Katz, Jack
1999 *How Emotions Work*. University of Chicago Press, Chicago.

Keane, Webb
2005 Signs Are not the Garb of Meaning: On the Social Analysis of Material Things. In *Materiality*, edited by D. Miller, pp. 182-205. Duke University Press, Durham, North Carolina.

Kehoe, Alice B.
1998 *The Land of Prehistory: A Critical History of American Archaeology*. Routledge, New York.
2005 Wind Jewels and Paddling Gods: The Mississippian Southeast in the Postclassic Mesoamerican World. In *Gulf Coast Archaeology: The Southeastern United States and Mexico*, edited by N. M. White, pp. 260-280. University Press of Florida, Gainesville.

Kehoe, Alice B., and F. Kent Reilly, III
2003 A Mohican Meets Mesoamericans. In *A Deep-Time Perspective: Studies in Symbols, Meaning, and the Archaeological Record*, edited by John D. Richards and Melvin L. Fowler. The Wisconsin 84(1&2):257-264.

Kelly, John E.
1980 Formative Developments at Cahokia and the Adjacent American Bottom: A Merrell Tract Perspective. Ph.D. dissertation, University of Wisconsin, Madison. University Microfilms. Ann Arbor.
1990a The Emergence of Mississippian Culture in the American Bottom Region. In *The Mississippian Emergence*, edited by Bruce D. Smith, pp. 113-152. Smithsonian Institution Press, Washington, D.C.
1990b Range Site Community Patterns and the Mississippian Emergence. In *The Mississippian Emergence*, edited by Bruce D. Smith, pp. 67-112. Smithsonian Institution Press, Washington, D.C.

1991a Cahokia and Its Role as a Gateway Center in Interregional Exchange. In *Cahokia and the Hinterlands: Middle Mississippian Cultures of the Midwest*, edited by Thomas E. Emerson and R. Barry Lewis, pp. 61-82. University of Illinois Press, Urbana.
1991b The Evidence for Prehistoric Exchange and Its Implications for the Development of Cahokia. In *New Perspectives on Cahokia: Views from the Periphery*, edited by J. B. Stoltman, pp. 65-92. Prehistory, Madison.
1994 The Archaeology of the East St. Louis Mound Center: Past and Present. *Illinois Archaeology* 6:1-57.
1997 Stirling-Phase Sociopolitical Activity at East St. Louis and Cahokia. In *Cahokia: Domination and Ideology in the Mississippian World*, edited by T. R. Pauketat and T. E. Emerson, pp. 141-166. University of Nebraska Press, Lincoln.
2002 The Pulcher Tradition and the Ritualization of Cahokia: A Perspective from Cahokia's Southern Neighbor. *Southeastern Archaeology* 21(2):136-148.
2003 The Context of the Post Pit and Meaning of the Sacred Pole at the East St. Louis Mound Group. *The Wisconsin Archaeologist* 84:107-125.
2004 The Mitchell Mound Center: Then and Now. In *Aboriginal Ritual and Economy in the Eastern Woodlands: Essays in Memory of Howard Dalton Winters*, edited by A. M. Cantwell, L. A. Conrad, and J. E. Reyman, pp. 269-284. Illinois State Museum, Scientific Papers, Vol. XXX Springfield.

Kelly, John E., and James A. Brown
2012 In Search of Cosmic Power: Contextualizing Spiritual Journeys between Cahokia and the St. Francois Mountains. In *Archaeology of Spiritualties*, edited by Kathryn Rountree, Christine Morris, and Alan Peatfield, pp. 107-129. Springer, New York.

Kelly, John E., James A. Brown, Jenna M. Hamlin, Lucretia S. Kelly, Laura Kozuch, Kathryn Parker, and Julieann Van Nest
2007 Mound 34: The Context for the Early Evidence of the Southeastern Ceremonial Complex at Cahokia. In *Southeastern Ceremonial Complex: Chronology, Content, Context*, edited by Adam King, pp. 57-87. The University of Alabama Press, Tuscaloosa.

Kelly, John E., James A. Brown, and Lucretia S. Kelly
2008 The Context of Religion at Cahokia: The Mound 34 Case. In *Religion, Archaeology, and the Material World*, edited by Lars Fogelin, pp. 297-318. Center for Archaeological Investigations, Occasional Paper No. 36. Southern Illinois University, Carbondale.

Kelly, John E., Fred A. Finney, Dale L. McElrath, and Steven J. Ozuk
1984a Late Woodland Period. In *American Bottom Archaeology: A Summary of the FAI-270 Project Contribution to the Culture History of the Mississippi River Valley*, edited by C. J. Bareis and J. W. Porter, pp. 104-125. University of Illinois Press, Urbana.

Kelly, John E., Steven J. Ozuk, Douglas K. Jackson, Dale L. McElrath, Fred A. Finney, and Duane Esarey
1984b Emergent Mississippian Period. In *American Bottom Archaeology: A Summary of the FAI-270 Project Contribution to the Culture History of the Mississippi River Valley*, edited by C. J. Bareis and J. W. Porter, pp. 128-154. University of Illinois Press, Urbana.

Kelly, Lucretia S.
1997 Patterns of Faunal Exploitation at Cahokia. In *Cahokia: Domination and Ideology in the Mississippian World*, edited by Timothy R. Pauketat and Thomas E. Emerson, pp. 69-88. University of Nebraska Press, Lincoln.
2000 Results of Preliminary Analysis of Faunal Remains from the Halliday Site. Manuscript on file, Illinois State Archaeological Survey, University of Illinois at Urbana-Champaign.

Kidder, Tristram R.
2004 Plazas as Architecture: An Example from the Raffman Site, Northeast Louisiana. *American Antiquity* 69(3):514-532.

Kidder, Tristram R., Anthony Ortmann, and Thurman Allen
2004 Testing Mounds B and E at Poverty Point. *Southeastern Archaeology* 23(1):98-113.

King, Adam
2003 *Etowah: The Political History of a Chiefdom Capital*. University of Alabama Press, Tuscaloosa.

Knight, Vernon James, Jr.
1986 The Institutional Organization of Mississippian Religion. *American Antiquity* 51(4):675-687.
1989 Symbolism of Mississippian Mounds. In *Powhatan's Mantle: Indians in the Colonial Southeast*, edited by Peter H. Wood, Gregory A. Waselkov, and M. Thomas Hatley, pp. 279-291. University of Nebraska Press, Lincoln.
1990 Social Organization and the Evolution of Hierarchy in Southeastern Chiefdoms. *Journal of Anthropological Research* 46(1):1-23.

Knight, Vernon James Jr., and Vincas P. Steponaitis
1998 A New History of Moundville. In *Archaeology of the Moundville Chiefdom*, edited by V. J. Knight and V. P. Steponaitis, pp. 1-25. Smithsonian Institution Press, Washington, D.C.

Knott, Kim, and Sean McLoughlin (editors)
2010 *Diasporas: Concepts, Intersections, Identities*. Zed Books, London.

Kolb, Michael F.
2011 *Emerald Mound Geo*. Report Submitted to the Illinois State Archaeological Survey, University of Illinois, Urbana.

Koldehoff, Brad
1980 An Inventory of Prehistory in Southwestern Illinois: The Russell Fischer Collection. *Rediscovery, Journal of the Illinois Association for the Advancement of Archaeology* 1:1-9.

1987 The Cahokia Flake Tool Industry: Socioeconomic Implications for Late Prehistory in the Central Mississippi Valley. In *The Organization of Core Technology*, edited by J. Johnson and C. Marrow, pp. 151-186. Westview Press, Boulder, Colorado.
1991 Lithics. In *The Archaeology of the Cahokia Palisade: The East Palisade Investigations*, by William R. Iseminger et al., pp. 77-108. Illinois Cultural Resources Study No. 14. Illinois Historic Preservation Agency, Springfield.
1996 Transportation Corridors and Cahokia's Hinterlands. Paper presented at the Southeastern Archaeological Conference, Lexington, Kentucky.
2014 Transportation Corridors: Layers of Roads, Layers of History. *Illinois Heritage* 17(3):10-14.

Koldehoff, Brad, and Tamira Brennen
2010 Exploring Mississippian Polity Interaction and Craft Specialization with Ozarks Chipped-Stone Resources. *The Missouri Archaeologist* 71:131-164.

Koldehoff, Brad, and Joseph M. Galloy
2006 *Late Woodland Frontiers: Patrick Phase Settlement along the Kaskaskia Trail, Monroe County, Illinois*. Transportation Archaeological Research Reports No. 23. Illinois Transportation Archaeological Research Program, Urbana.

Koldehoff, Brad, Timothy R. Pauketat, and John E. Kelly
1993 The Emerald Site and the Mississippian Occupation of the Central Silver Creek Valley. *Illinois Archaeology* 5:331-343.

Koldehoff, Brad, and John A. Walthall
2004 Settling In: Hunter-Gatherer Mobility During the Pleistocene-Holocene Transition in the Central Mississippi Valley. In *Aboriginal Ritual and Economy in the Eastern Woodlands: Essays in Honor of Howard Dalton Winters*, edited by A. M. Cantwell, L. A. Conrad, and J. E. Reyman, pp. 49-72. Scientific Papers, Volume 30. Illinois State Museum, Springfield.

Koldehoff, Brad, and Gregory D. Wilson
2010 Mississippian Celt Production and Resource Extraction in the Upper Big River Valley of St. Francois County, Missouri. *The Missouri Archaeologist* 71:217-248.

Koyiyumptewa, Stewart B., and Chip Colwell-Chanthaphonh
2011 The Past Is Now: Hopi Connections to Ancient Times and Places. In *Movement, Connectivity, and Landscape Change in the Ancient Southwest*, edited by Margaret C. Nelson and Colleen Strawhacker, pp. 443-455. University Press, of Colorado, Boulder.

Kozuch, Laura
1998 Marine Shells from Mississippian Archaeological Sites. Unpublished Ph.D. dissertation, University of Florida.

Kruchten, Jeffery D.

2012 Tracing Emerald through a Natural Landscape. Manuscript on File, University of Illinois Urbana-Champaign.
2014 Water Symbolism and Closing Emerald. Paper presented at the Midwest Archaeological Conference, Urbana, Illinois.

Kubler, George
1985 Pre-Columbian Pilgrimages in Mesoamerica. In *Fourth Palenque Round Table*, edited by M. C. Robertson, pp. 313-316. The Pre-Columbian Art Research Institute, San Francisco.

Lame Deer, John (Fire), and Richard Erodes
1972 *Lame Deer Seeker of Visions: The Life of a Sioux Medicine Man*. Simon and Schuster, New York.

Lankford, George E.
2004 World on a String: Some Cosmological Components of the Southeastern Ceremonial Complex. In *Hero, Hawk, and Open Hand: American Indian Art of the Ancient Midwest and South*, edited by Richard F. Townsend, pp. 207-218. Yale University Press, New Haven.
2007a *Reachable Stars: Patterns in the Ethnoastronomy of Eastern North America*. University of Alabama Press, Tuscaloosa.
2007b Some Cosmological Motifs in the Southeastern Ceremonial Complex. In *Ancient Objects and Sacred Realms: Interpretations of Mississippian Iconography*, edited by F. Kent Reilly, III. And James F. Garber, pp. 8-38. University of Texas press, Austin.

Lankford, George E., F. Kent Reilly III, James F. Garber (editors)
2011 *Visualizing the Sacred: Cosmic Visions, Regionalism, and the Art of the Mississippian World*. University of Texas Press, Austin.

LaPointe, J.
1976 *Legends of the Lakota*. The Indian Historian Press, San Francisco.

Larson, Timothy, B. Jacob Skousen, Michael DeLucia, Timothy R. Pauketat, and Susan M. Alt
2013 Resistivity Profiling to Delineate a Mississippian Culture Trail at the Emerald Site, Southwest Illinois. Paper presented at the Symposium on the Application of Geophysics to Engineering and Environmental Problems, Denver, Colorado.

Latour, Bruno
2005 *Reassembling the Social: An Introduction to Actor-Network Theory*. Oxford University Press, Oxford.

Leary, Jim (editor)
2014 *Past Mobilities: Archaeological Approaches to Movement and Mobility*. Ashgate, Farnham, UK.

Lepper, Bradley T.
1995 Tracking Ohio's Great Hopewell Road. *Archaeology* 48(6):52-56.

2004 The Newark Earthworks: Monumental Geometry and Astronomy at a Hopewellian Pilgrimage Center. In *Hero, Hawk, and Open Hand: American Indian Art of the Ancient Midwest and South*, edited by Richard F. Townsend, pp. 72-81. Art Institute of Chicago, Chicago; Yale University Press, New Haven.
2006 The Great Hopewell Road and the Role of Pilgrimage in the Hopewell Interaction Sphere. In *Recreating Hopewell*, edited by Douglas K. Charles and Jane E. Buikstra, pp. 122-133. University Press of Florida, Gainesville.

Lucero, Lisa J., and Andrew Kinkella
2015 Pilgrimage to the Edge of the Watery Underworld: An Ancient Maya Water Temple at Cara Blanca, Belize. *Cambridge Archaeological Journal* 25(1):163-185.

Lust, John
1987 *The Herb Book*. Bantam Books edition, New York.

Mack, Alexandra
2002 *Spiritual Journey, Imperial City: Pilgrimage to the Temples of Vijayanagara*. Vedams, New Delhi, India.
2004 One Landscape, Many Experiences: Differing Perspectives of the Temple Districts of Vijayanagara. *Journal of Archaeological Method and Theory* 11(1):59-81.

Malville, J. McKim, and Nancy J. Malville
2001 Pilgrimage and Periodic Festivals as Processes of Social Integration in Chaco Canyon. *Kiva* 66(3):327-344.

Marcus, Joyce, and Jeremy Sabloff (editors)
2008 *The Ancient City: New Perspectives on Urbanism in the Old and New World*. School for Advanced Research Press, Santa Fe.

Marshall, Michael P.
1997 The Chacoan Roads: A Cosmological Interpretation. In *Anasazi Architecture and American Design*, edited by Baker H. Morrow and V. B. Price, pp. 62-74. University of New Mexico Press, Albuquerque.

Martin, Alexander C., and William D. Barkley
1961 *Seed Identification Manual*. University of California Press, Berkley.

Mauss, Marcell
1979 [1935] Techniques of the Body. In *Sociology and Psychology: Essays by Marcell Mauss*, edited by K. Paul, pp. 97-123. Routledge, London.

McCleary, Timothy P.
1997 *The Stars We Know: Crow Indian Astronomy and Lifeways*. Waveland Press, Prospect Height, Illinois.

McConaughy, Mark A.

1991 The Rench Site Late Late Woodland/Mississippian Farming Hamlet from the Central Illinois River Valley: Food for Thought. In *New Perspectives on Cahokia: Views from the Periphery*, edited by James B. Stoltman, pp. 101-154. Prehistory Press, Madison, Wisconsin.

McCorriston, Joy
2011 *Pilgrimage and Household in the Ancient Near East*. Cambridge University Press, Cambridge.
2013 Pastoralism and Pilgrimage: Ibn Khaldun's Bayt-State Model and the Rise of Arabian Kingdoms. *Current Anthropology* 54(5):607-641.

McElrath, Dale L., and Fred A. Finney
1987 *The George Reeves Site*. American Bottom Archaeology FAI-270 Site Reports Vol. 15. University of Illinois Press, Urbana.

McElrath, Dale L., Andrew C. Fortier, Brad Koldehoff, and Thomas E. Emerson
2009 The American Bottom: An Archaic Cultural Crossroads. In *Archaic Societies: Diversity and Complexity Across the Midcontinent*, edited by Thomas E. Emerson, Dale L. McElrath, and Andrew C. Fortier, pp. 317-375. State University of New York Press, Albany.

Medicine, Bea
1981 Native American Resistance to Integration: Contemporary Confrontations and Religious Revitalization. *The Plains Anthropologist* 26(94):277-286.

Mehrer, Mark W.
1995 *Cahokia's Countryside: Household Archaeology, Settlement Patterns and Social Power*. Northern Illinois University Press, De Kalb.

Merleau-Ponty, Maurice
1962 *The Phenomenology of Perception*. Routledge and Kegan Paul, London.

Meskell, Lynn M.
2003 Memory's Materiality: Ancestral Presence, Commemorative Practice and Disjunctive Locales. In *Archaeologies of Memory*, edited by R. M. Van Dyke and S. E. Alcock, pp. 34-55. Blackwell Publishers, Oxford.
2004 *Object Worlds in Ancient Egypt: Material Biographies Past and Present*. Berg, London.
2008 Memory Work and Material Practices. In *Memory Work: Archaeologies of Material Practices*, edited by B. J. Mills and W. H. Walker, pp. 233-243. School of Advanced Research Press, Santa Fe, New Mexico.

Messer, Ellen
1978 Present and Future Prospects of Herbal Medicine in a Mexican Community. In *The Nature and Status of Ethnobotany*, edited by Richard I. Ford, pp. 137-161. Anthropological Paper 67, University of Michigan, Ann Arbor.

Millhouse, Phillip G.
2012 The John Chapman Site and Creolization on the Northern Frontier of the Mississippian World. Unpublished Ph.D. Dissertation. University of Illinois Urbana-Champaign.

Mills, Barbara J.
2002 Recent Research on Chaco: Changing Views of Economy, Ritual, and Society. *Journal of Archaeological Research* 10-65-117.

Mills, J. Barbara, and William H. Walker (editors)
2008a *Memory Work: Archaeologies of Material Practices*. School for Advanced Research Press, Santa Fe. New Mexico.

Mills, J. Barbara, and William H. Walker
2008b Memory, Materiality, and Depositional Practice. In *Memory Work: Archaeologies of Material Practices*, edited by B. J. Mills and W. H. Walker, pp. 3-24. School for Advanced Research Press, Santa Fe, New Mexico.

Mills, Jessica
2005 Movement as a Mentalite: Mobile Lifeways in the Neolithic and Bronze Age Great Ouse, Nen and Welland Valleys. In *Elements of Being: Mentalities, Identities and Movements*, edited by D. Hofmann, J. Mills, and A. Cochrane, pp. 96-106. British Archaeological Reports, International Series 1437, Oxford.

Milner, George R.
1984 *The Julien Site*. American Bottom Archaeology FAI-270 Site Reports Vol. 7. University of Illinois Press, Urbana.
1985 *The Robinson's Lake Site*. American Bottom Archaeology FAI-270 Site Reports Vol. 10. University of Illinois Press, Urbana.
1998 *The Cahokia Chiefdom: The Archaeology of a Mississippian Society*. Smithsonian Institution Press, Washington, D.C.
1999 Warfare in Prehistoric and Early Historic Eastern North America. *Journal of Archaeological Research* 7(2):105-151.

Milner, George R., Thomas E. Emerson, Mark W. Mehrer, Joyce A. Williams, and Duane Esarey
1984 Mississippian and Oneota Period. In *American Bottom Archaeology: A Summary of the FAI-270 Project Contribution to the Culture History of the Mississippi River Valley*, edited by C. J. Bareis and J. W. Porter, pp. 15-33. University of Illinois Press, Urbana.

Moerman, Daniel E.
1986 *Medicinal Plants of Native America*. Research Reports in Ethnobotany, Contribution 2. Technical Reports 19. Museum of Anthropology, University of Michigan, Ann Arbor.

Moffat, Charles R.
1991 Mississippian in the Upper Kaskaskia Valley: New Data from the Lake Shelbyville and New Interpretations. In *Cahokia and the Hinterlands: Middle Mississippian Cultures of*

the Midwest, edited by Thomas E. Emerson and R. Barry Lewis, pp. 239-256. University of Illinois Press, Urbana.

Mohlenbrock, Robert H.
1986 *Guide to the Vascular Flora of Illinois*. Southern Illinois University Press, Carbondale.

Momaday, N. Scott
1968 *House Made of Dawn*. Harper & Row, New York.
1969 *The Way to Rainy Mountain*. University of New Mexico Press, Albuquerque.
1975 To the Singing, to the Drums. *Natural History* 84(2):38-46.

Mooney, James
1900 *Myths of the Cherokee*. Nineteenth Annual Report of the Bureau of American Ethnology. Washington, D.C.

Moorehead, Warren K.
2000 [1929] *The Cahokia Mounds*. University of Alabama Press, Tuscaloosa.

Morinis, Alan
1984 *Pilgrimage in the Hindu Tradition: A Case Study of West Bengal*. Oxford University Press, Delhi.

Morinis, Alan, and N. Ross Crumrine
1991 La Peregrinacion: The Latin American Pilgrimage. In *Pilgrimage in Latin America*, edited by N. Ross Crumrine and Alan Morinis, pp. 1-17. Greenwood Press, New York.

Morse, Phyllis A., and Dan F. Morse
1990 The Zebree Site: An Emergent Early Mississippian Expression in Northeast Arkansas. In *The Mississippian Emergence*, edited by Bruce D. Smith, pp. 51-66. Smithsonian Institution Press, Washington, D.C.

Muller, Jon D.
1997 *Mississippian Political Economy*. Plenum Press, New York.

Myer, William E.
1928 Indians Trails of the Southeast. In *Forty-second Annual Report of the Bureau of American Ethnology*, pp. 727-857. Smithsonian Institution, Washington, D.C.

Nabokov, Peter
2006 *Where the Lightning Strikes: The Lives of American Indian Sacred Places*. Penguin, New York.

Naranjo, Tessie
1995 Thoughts on Migration by Santa Clara Pueblo. *Journal of Anthropological Archaeology* 14:247-250.

Neihardt, John G.
2014 *Black Elk Speaks: The Complete Edition*. University of Nebraska Press, Lincoln.

Nolan, Mary Lee
1991 The European Roots of Latin American Pilgrimage. In *Pilgrimage in Latin America*, edited by N. Ross Crumrine and Alan Morinis, pp. 19-52. Greenwood Press, New York.

O'Brien, Patricia Joan
1972 *A Formal Analysis of Cahokia Ceramics from the Powell Tract*. Monograph No. 3. Illinois Archaeological Survey, Urbana.

Oetelaar, Gerald A.
2012 The Archaeological Imprint of Oral Traditions on the Landscape of Northern Plains Hunter-Gatherers. In *The Oxford Handbook of North American Archaeology*, edited by Timothy R. Pauketat, pp. 30-51. University of Nebraska Press, Lincoln.
2015 Entanglements of the Blackfoot: Relationships with the Spiritual and Material Worlds. In *Tracing the Relational: The Archaeology of Worlds, Spirits, and Temporalities*, edited by Meghan E. Buchanan and B. Jacob Skousen, pp. 131-145. University of Utah Press, Salt Lake City.

Oetelaar, Gerald A., and D. Joy Oetelaar
2006 People, Places and Paths: The Cypress Hills and the Niitsitapi Landscape of Southern Alberta. *Plains Anthropologist* 51(199):375-397.

Ostler, Jeffrey
2010 *The Lakotas and the Black Hills: The Struggle for Sacred Ground*. Viking, New York.

Pacheco, Paul J.
2010 Why Move? Ohio Hopewell Sedentism Revisited. In *Hopewell Settlement Patterns, Subsistence, and Symbolic Landscapes*, edited by Martin A. Byers and DeeAnne Wymer, pp. 37-55. University Press of Florida, Gainesville.

Palka, Joel W.
2014 *Maya Pilgrimage to Ritual Landscapes: Insights from Archaeology, History, and Ethnography*. University of New Mexico Press, Albuquerque.

Parker, Kathryn E.
1992 Archaeobotany. In *The Sponemann Site 2: The Mississippian and Oneota Occupations (11-Ms-517)*, edited by Douglas K. Jackson, Andrew C. Fortier, and Joyce A. Williams. American Bottom Archaeology FAI-270 Site Reports 24, University of Illinois Press, Urbana.
1998 Plant Remains from Archaeological Investigations at the Wal-Mart Site. In The Wal-Mart Site (11MS1369): A Lohmann Phase Occupation in the Northern American Bottom, edited by Charles L. Rohrbaugh.
2003 Botanical Remains from the Lehmann-Sommers Site. Report submitted to Dr. John Kelly, Powell Archaeological Research Center, Columbia, Illinois.

2005 Botanical Remains from the Pfeffer Site. Report submitted to Dr. Timothy Pauketat, University of Illinois Urbana-Champaign.

Parker, Kathryn E., and Elizabeth Scott
2007 Prehistoric Plant and Animal Use in the Interior Uplands of Silver Creek, Southwestern Illinois. In *People, Plants, and Animals: Archaeological Studies of Human-Environment Interactions in the Midcontinent*, edited by Robert E. Warren. *Illinois Archaeology* 15&16:58-89.

Patel, Shankari
2005 Pilgrimage and Caves on Cozumel. In *Stone Houses and Earth Lords: Maya Religion in the Cave Context*, edited by K. M. Prufer and J. E. Brady, pp. 91-112. University Press of Colorado, Boulder.

Pauketat, Timothy R.
1987 A Burned Domestic Dwelling at Cahokia. *The Wisconsin Archeologist* 68(3):212-237.
1989 Monitoring Mississippian Homestead Occupation Span and Economy Using Ceramic Refuse. *American Antiquity* 54:288-310.
1993 *Temples for Cahokia Lords: Preston Holder's 1955-1956 Excavations of Kunnemann Mound*. Memoirs No. 26. Museum of Anthropology, University of Michigan, Ann Arbor.
1994 *The Ascent of Chiefs: Cahokia and Mississippian Politics in Native North America*. University of Alabama Press, Tuscaloosa.
1998a Refiguring the Archaeology of Greater Cahokia. *Journal of Archaeological Research* 6(1):45-89.
1998b *The Archaeology of Downtown Cahokia: The Tract 15A and Dunham Tract Excavations*. Illinois Transportation Archaeological Research Program, Studies in Archaeology No. 1. University of Illinois, Urbana.
2000 Early Cahokia Project Excavations at the Emerald Site (11-S-2). Report submitted to Illinois Historic Preservation Agency, Springfield.
2001 Practice and History in Archaeology: An Emerging Paradigm. *Anthropological Theory* 1:73-98.
2002 A Fourth-Generation Synthesis of Cahokia and Mississippianization. *Midcontinental Journal of Archaeology* 27(2):149-170.
2003 Resettled Farmers and the Making of a Mississippian Polity. *American Antiquity* 68:39-66.
2004 *Ancient Cahokia and the Mississippians*. Cambridge University Press, Cambridge.
2005a The Forgotten History of the Mississippians. In *North American Archaeology*, edited by Timothy R. Pauketat and Diana DiPaolo Loren, pp. 187-211. Blackwell, Oxford.
2007 *Chiefdoms and Other Archaeological Delusions*. AltaMira Press, Walnut Creek, California.
2008 Founders' Cults and the Archaeology of Wa-Kan-da. In *Memory Work: Archaeologies of Material Practices*, edited by Barbara J. Mills and William H. Walker, pp. 61-79. School for Advanced Research Press, Santa Fe, New Mexico.
2009 Wars, Rumors of Wars, and the Production of Violence. In *Warfare in Cultural Context: Practice, Agency and the Archaeology of Violence*, edited Axel Nielsen and William Walker, pp. 244-261. University of Arizona Press, Tuscon.

2010 The Missing Persons in Mississippian Mortuaries. In *Mississippian Mortuary Practices: Beyond Hierarchy and the Representationalist Perspective*, edited by Lynne P. Sullivan and Robert C. Mainfort, pp. 15-28. University Press of Florida, Gainsville.
2013a *An Archaeology of the Cosmos: Rethinking Agency and Religion in Ancient America*. Routledge, London.
2013b Bundles in/of/as Tim. In *Big Histories, Human Lives, Tackling Problems of Scale in Archaeology*, edited by John Robb Timothy R. Pauketat, pp. 35-56. School for Advanced Research Press, Santa Fe, New Mexico.
2013c *The Archaeology of Downtown Cahokia II: The 1960 Excavation of Tract 15B*. Illinois State Archaeological Survey, Studies in Archaeology No. 8. University of Illinois, Urbana.
2014 From Memorials to Imaginaries in the Monumentality of Ancient North America. In *Approaching Monumentality in Archaeology*, edited by J. F. Osborne, IEMA Proceedings, Volume 3, pp. 431-446. State University of New York Press, Albany.

Pauketat, Timothy R. (editor)
2005b *The Archaeology of the East St. Louis Mound Center, Part I: The Southside Excavations*. Illinois Transportation Archaeological Research Program, Transportation Archaeological Research Reports, No. 21, University of Illinois, Urbana.

Pauketat, Timothy R., and Susan M. Alt
2003 Mounds, Memory, and Contested Mississippian History. In *Archaeologies of Memory*, edited by Ruth Van Dyke and Susan Alcock, pp. 151-179. Blackwell Press, Oxford.
2004 The Making and Meaning of a Mississippian Axe-Head Cache. *Antiquity* 78(302):779-797.
2005 Agency in a Postmold? Physicality and the Archaeology of Culture-Making. *Journal of Archaeological Method and Theory* 12(3):213-236.
2015 Religious Innovation at The Emerald Acropolis: Something New Under the Moon. In *Something New Under the Sun: Perspectives on the Interplay of Religion and Innovation*, edited by D. Yerxa. Bloomsbury Press, London, in press.

Pauketat, Timothy R., Susan M. Alt, and Jeffery D. Kruchten
2016 The Emerald Acropolis: Elevating the Moon and Water in the Rise of Cahokia. *Antiquity*, in press.

Pauketat, Timothy R., Robert F. Boszhardt, and Danielle M. Benden
2015 Trempealeau Entanglements: An Ancient Colony's Causes and Effects. *American Antiquity* 80(2):260-289.

Pauketat, Timothy R., and Thomas E. Emerson
1991 The Ideology of Authority and the Power of the Pot. *American Anthropologist* 93:919-941.
1997a Introduction: Domination and Ideology in the Mississippian World. In *Cahokia: Domination and Ideology in the Mississippian World*, edited by T. R. Pauketat and T. E. Emerson, pp. 1-29. University of Nebraska Press, Lincoln.

1997b Conclusion: Cahokia and the Four Winds. In *Cahokia: Domination and Ideology in the Mississippian World*, edited by Timothy R. Pauketat and Thomas E. Emerson, pp. 269-278. University of Nebraska Press, Lincoln.
2008 Star Performances and Cosmic Clutter. *Cambridge Archaeological Journal* 18:78-85.

Pauketat, Timothy R., Andrew C. Fortier, Susan M. Alt, and Thomas E. Emerson
2013 A Mississippian Conflagration at East St. Louis and its Political-Historical Implications. *Journal of Field Archaeology* 38(3):208-224.

Pauketat, Timothy R., Lucretia S. Kelly, Gayle J. Fritz, Neal H. Lopinot, Scott Elias, and Eve Hargrave
2002 The Residues of Feasting and Public Ritual at Early Cahokia. *American Antiquity* 67:257-279.

Pauketat, Timothy R., and Neal H. Lopinot
1997 Cahokia Population Dynamics. In *Cahokia: Domination and Ideology in the Mississippian World*, edited by Timothy R. Pauketat and Thomas E. Emerson, pp. 103-123. University Nebraska Press, Lincoln.

Pauketat, Timothy R., Mark A Rees, and Stephanie l. Pauketat
1998 *An Archaeological Survey of the Horseshoe Lake State Park, Madison County, Illinois*. Illinois State Museum Society, Springfield.

Pauketat, Timothy R., Mark A. Rees, Amber M. VanDerwarker, and Kathryn E. Parker
2010 Excavations into Cahokia's Mound 49. *Illinois Archaeology* 22:397-436.

Peebles, Charlie S., and Susan M. Kus
1977 Some Archaeological Correlates of Ranked Society. *American Antiquity* 42:471-484.

Peregrine, Peter N.
1992 *Mississippian Evolution: A World-System Perspective*. Prehistory, Madison.

Peregrine, Peter N., Ilia Peiros, and Marcus Feldman (editors)
2009 *Ancient Human Migrations: A Multidisciplinary Approach*. University of Utah Press, Salt Lake City.

Petersen, Andrew
1994 The Archaeology of the Syrian and Iraqi Hajj Routes. *World Archaeology* 26(1):47-56.

Phillips, Philip, James A. Ford, and James B. Griffin
1951 *Archaeological Survey in the Lower Mississippi Alluvial Valley, 1940-1947*. Papers of the Peabody Museum of Archaeology and Ethnology, Vol. 25. Harvard University, Cambridge, Massachusetts.

Plog, Stephen, and Adam S. Watson

2012 The Chaco Pilgrimage Model: Evaluating the Evidence from Pueblo Alto. *American Antiquity* 77(3):449-477.

Pollard, Joshua
2008 Deposition and Material Agency in the Early Neolithic of Southern Britain. In *Memory Work: Archaeologies of Material Practices*, edited by B. J. Mills and W. H. Walker, pp. 41-60. School for Advanced Research Advanced Seminar Series, Santa Fe, New Mexico.

Porter, James W.
1963 *Bluff Pottery Analysis – This Section Experiment No. 1: Thin Sectioning All Sherds from One Trash Pit (C484 through C-521)*. Southern Illinois University Museum Lithic Laboratory, Research Report No. 3. Carbondale.
1969 The Mitchell Site and Prehistoric Exchange Systems at Cahokia: AD 1000±300. In *Explorations into Cahokia Archaeology*, edited by Melvin L. Fowler, pp. 137-164. Bulletin No. 7. Illinois Archaeological Survey, Urbana.
1974 Cahokia Archaeology as Viewed from the Mitchell Site: A Satellite Community at AD 1150-1200. Unpublished Ph.D. dissertation, Department of Anthropology, University of Wisconsin, Madison.

Pursell, Corin C.
2004 Geographic Distribution and Symbolism of Colored Mound Architecture in the Mississippian Southeast. Unpublished Master's thesis, Southern Illinois University Carbondale.

Ray, Himanshu, Prabha
1994 Kanheri: The Archaeology of an Early Buddhist Pilgrimage Centre in Western India. *World Archaeology* 26(1):35-46.

Redmond, Brian G.
1988 Yankeetown, Duffy, or Duffytown? An Examination of Ceramic Variability in the Lower Ohio Valley. *North American Archaeologist* 9(4):299-318.
1990 The Yankeetown Phase: Emergent Mississippian Cultural Adaptation in the Lower Ohio River Valley. Unpublished Ph.D. dissertation, Indiana University, Bloomington.

Reed, Nelson A.
1969 Monks and Other Mississippian Mounds. In *Explorations in Cahokia Archaeology*, edited by M. L. Fowler, pp. 31-42. Illinois Archaeological Survey, Bulletin No. 7, Urbana, Illinois.
2009 Excavations on the Third Terrace and Front Ramp of Monks Mound, Cahokia: A Personal Narrative. *Illinois Archaeology* 21:1-89.

Reed, Nelson A., John W. Bennett, and James W. Porter
1968 Solid Core Drilling of Monks Mound: Technique and Findings. *American Antiquity* 33(2);137-148.

Rees, Mark A.

1997 Coercion, Tribute and Chiefly Authority: The Regional Development of Mississippian Political Culture. *Southeastern Archaeology* 16(2):113-133.

Reilly, F. Kent, III
2004 People of Earth, People of Sky: Visualizing the Sacred in Native American Art of the Mississippian Period. In *Hero, Hawk, and Open Hand: American Indian Art of the Ancient Midwest and South*, edited by R. F. Townsend and R. V. Sharp, pp. 125-137. Art Institute of Chicago and Yale University Press, New Haven, Connecticut.

Reilly, F. Kent, III, and James F. Garber (editors)
2007 *Ancient Objects and Sacred Realms: Interpretations of Mississippian Iconography*. University of Texas Press, Austin.

Renfrew, Colin
2001 Production and Consumption in a Sacred Economy: The Material Correlates of High Devotional Expression at Chaco Canyon. *American Antiquity* 66(1):14-25.

Richards, Colin
1993 Monumental Choreography: Architecture and Spatial Representation in Late Neolithic Orkney. In *Interpretive Archaeology*, edited by C. Tilley, pp. 143-178. Berg, Oxford.
1996 Monuments as Landscape: Creating the Centre of the World in Late Neolithic Orkney. *World Archaeology* 28(2):190-208.

Richards, John D.
2003 Collars, Castellations, and Cahokia: A Regional Perspective on the Aztalan Ceramic Assemblage. *Wisconsin Archaeologist*, special issue: A Deep-Time Perspective, Studies in Symbols, Meaning, and the Archaeological Record; Papers in Honor of Robert L. Hall 86(1-2):139-153.

Ristvet, Lauren
2011 Travel and the Making of North Mesopotamian Polities. *Bulletin of the American Schools of Oriental Research* 361:1-31.
2015 *Ritual, Performance, and Politics in the Ancient Near East*. Cambridge University Press, New York.

Rollingson, Martha Ann
1990 The Toltec Mounds Site: A Ceremonial Center in the Arkansas River Lowland. In *The Mississippian Emergence*, edited by Bruce D. Smith, pp. 27-49. Smithsonian Institution Press, Washington, D.C.

Romain, William F.
2015a Adena-Hopewell Earthworks and the Milky Way Path of Souls. In *Tracing the Relational: The Archaeology of Worlds, Spirits, and Temporalities*, edited by Meghan E. Buchanan and B. Jacob Skousen, pp. 54-84. University of Utah Press, Salt Lake City.

2015b Moonwatchers of Cahokia. In *Medieval Mississippians*, edited by Timothy R. Pauketat and Susan M. Alt, pp. 33-41. School for Advanced Research Press, Santa Fe, New Mexico.

Sallnow, Michael J.
1981 Communitas Reconsidered: The Sociology of Andean Pilgrimage. *Man* 16:163-182.
1987 *Pilgrims of the Andes*. Smithsonian Institution Press, Washington, D.C.
1991 Dual Cosmology and Ethnic Division in an Andean Pilgrimage Cult. In *Pilgrimage in Latin America*, edited by N. Ross Crumrine and Alan Morinis, pp. 281-306. Greenwood Press, New York.

Sassaman, Kenneth E.
2012 Futurologists Look Back. *Archaeologies* 8(3):250-268.

Scarre, Chris
2002 Coasts and Cosmos: The Neolithic Monuments of Northern Brittany. In *Monuments and Landscape in Atlantic Europe: Perception and Society During the Neolithic and Early Bronze Age*, edited by Chris Scarre, pp. 84-102. Routlege, London.
2015 Editorial. *Antiquity* 89:5-11.

Schachner, Gregson
2011 Ritual Places and Pilgrimages: Movement, Connectivity, and Landscape. In *Movement, Connectivity, and Landscape Change in the Ancient Southwest*, edited by Margaret C. Nelson and Colleen Strawhacker, pp. 423-441. University Press of Colorado, Boulder.

Schmutz, Ervin M., and Lucretia Hamilton
1979 *Plants that Poison*. Northland Press, Flagstaff, Arizona.

Schiffer, Michael B.
1976 *Behavioral Archaeology*. Academic Press, New York.

Schwegman, J. E.
1973 *Comprehensive Plan for the Illinois Nature Preserves System*. The Natural Divisions of Illinois. Illinois Nature Preserves Commission, Rockford.

Seymour, Deni J. (editor)
2012 *From the Land of Ever Winter to the American Southwest: Athapaskan Migrations, Mobility, and Ethnogenesis*. University of Utah Press, Salt Lake City.

Shaw, Justine M.
2008 *White Roads of the Yucatan: Changing Social Landscapes of the Yucatec Maya*. University of Arizona Press, Tucson.

Sheets-Johnstone, Maxine
2011 *The Primary of Movement*. Expanded 2nd ed. John Benjamins, Amsterdam.

2012 The Imaginative Consciousness of Movement: Linear Quality, Kinaesthesia, Language and Life. In *Redrawing Anthropology: Materials, Movements, Lines*, edited by T. Ingold, pp. 115-128. Anthropological studies of Creativity and Perception. Ashgate.

Sherwood, Sarah C., and Tristram R. Kidder
2011 The DaVincis of Dirt: Geoarchaeological Perspectives on Native American Mound Building in the Mississippi River Basin. *Journal of Anthropological Archaeology* 30:69-87.

Silko, Leslie Marmon
1977 *Ceremony*. Signet, New York.

Silverman, Helaine
1994 The Archaeological Identification of an Ancient Peruvian Pilgrimage Center. *World Archaeology* 26(1):1-18.

Singh, Rana P. B.
2000 Kashi as Cosmogram: Sacred Geometry of Varanasi. In *Ancient Cities, Sacred Skies: Cosmic Geometries and City Planning in Ancient India*, edited by J. M. Malville and L. M. Gujral, pp. 58-81. Indira Gandhi National Centre for the Arts, New Delhi.
2003 *Where the Buddha Walked: A Companion to the Buddhist Places of India*. Indica Books, Varanasi, India.

Skousen, B. Jacob
2011 The Emerald Site: The 1960s Excavations. Paper presented at the 57th Annual Meeting of the Midwest Archaeological Conference, LaCrosse, Wisconsin.
2012 Posts, Places, Ancestors, and Worlds: Dividual Personhood in the American Bottom Region. *Southeastern Archaeology* 31:57-69.
2013 Memory, Monuments, and the Moorehead Phase Occupation at the Emerald Site. Paper presented at the 59th Annual Meeting of the Midwest Archaeological Conference, Columbus, Ohio.
2015a Moonbeams, Water, and Smoke: Tracing Otherworldly Relationships at the Emerald Site. In *Tracing the Relational: The Archaeology of Worlds, Spirits, and Temporalities*, edited by Meghan E. Buchanan and B. Jacob Skousen, pp. 38-53. University of Utah Press, Salt Lake City.
2015b *Archaeological Investigations at 11MO768 (Booster Station site) for the IL Route 3 (FAP-14) Waterloo Bypass Project*. Archaeological Testing Short Report 464. Illinois State Archaeological Survey, Prairie Research Institute, University of Illinois Urbana-Champaign.

Skousen, B. Jacob, and Meghan E. Buchanan
2015 Introduction: Advancing an Archaeology of Movements and Relationships. In *Tracing the Relational: The Archaeology of Worlds, Spirits, and Temporalities*, edited by Meghan E. Buchanan and B. Jacob Skousen, pp. 1-20. University of Utah Press, Salt Lake City.

Skousen, B. Jacob, and Timothy R. Pauketat

2014 Preliminary Report of the 2014 Excavations on the Primary Mound at the Emerald Site (11S1), Lebanon, Illinois. Report submitted to the Illinois Historic Preservations Agency, Springfield.

Slater, Phillip A., Kristin M. Hedman, Thomas E. Emerson
2014 Immigrants at the Mississippian Polity of Cahokia: Strontium Isotope Evidence for Population Movement. *Journal of Archaeological Science* 44:117-127.

Smith, Adam T.
2003 *The Political Landscape: Constellations of Authority in Early Complex Polities*. University of California Press, Berkeley.

Smith, Bruce D.
1978 Variation in Mississippian Settlement Patterns. In *Mississippian Settlement Patterns*, edited by Bruce D. Smith, pp. 479-503. Academic Press, New York.

Smith, Bruce D. (editor)
1990 *The Mississippian Emergence*. University of Alabama Press, Tuscaloosa.

Smith, Harriett M.
1969 The Murdock Mound, Cahokia. In *Explorations into Cahokia Archaeology*, edited by Melvin L. Fowler, pp. 49-88. Bulletin No. 7. Illinois Archaeological Survey, Bulletin 7, Urbana.

Smith, Monica L. (editor)
2003 *The Social Construction of Ancient Cities*. Smithsonian Books, Washington, D.C.

Snead, James E., Clark L. Erickson, and J. Andrew Darling (editors)
2009 *Landscapes of Movement: Trails, Paths, and Roads in Anthropological Perspective*. University of Pennsylvania Museum of Archaeology and Anthropology, Philadelphia.

Snell, Samuel P., Ryan L. Jackson, and Angie R. Krieger
2013 Lost and Forgotten Historic Roads: The Buffalo Trace, a Case Study. Presented at the National Historic Road Conference, Indianapolis, Indiana.

Snyder, John F.
1877 Deposits of Flint Implements. *Annual Report of the Smithsonian Institution 1876*, pp. 433-441. Government Printing Office, Washington, D.C.
1894 An Illinois "Teocalli." *The Archaeologist* 2:259-264.

Sofaer, Anna, Michael P. Marshall, and Rolf M. Sinclair
1989 The Great North Road: A Cosmographic Expression of the Chaco Culture of New Mexico. In *Chaco Astronomy: An Ancient American Cosmology*, edited by Anna Sofaer, pp. 129-142. Ocean Tree Books, Santa Fe.

Spiro, M.

1970 *Buddhism and Society: A Great Tradition and its Burmese Vicissitudes*. Harper & Row, New York.

Squier, Ephraim G., and Edwin H. Davis
1998 [1848] *Ancient Monuments of the Mississippi River Valley*. Smithsonian Books, Washington D.C.

Stearns, Richard G.
1997 Geology, Width, and Wear of the Chickasaw Path and the Old Natchez Trace at Meriwether Lewis Monument, Lewis County, Tennessee. *Journal of the Tennessee Academy of Science* 72(3-4):65-72.

Steyermark, Julian A.
1963 *Flora of Missouri*. The Iowa State University Press, Ames, Iowa.

Stoddard, Robert H.
1997 Defining and Classifying Pilgrimages. In *Sacred Places, Sacred Spaces, the Geography of Pilgrimage*, edited by Robert H. Stoddard and Alan Morinis, pp. 41-60. Louisiana State University Geoscience and Man Series no. 34, Baton Rouge, LA.

Stoltman, James B. (editor)
1991 *New Perspectives on Cahokia: Views from the Periphery*. Monographs in World Archaeology No. 2. Prehistory Press, Madison, Wisconsin.

Stopford, J.
1994 Some Approaches to the Archaeology of Christian Pilgrimage. *World Archaeology* 26(1):57-72.

Studenmund, Sarah
2000 Late Woodland Occupations in the Lower Illinois Valley: Research Questions and Data Sets. In *Late Woodland Societies: Tradition and Transformation Across the Midcontinent*, edited by Thomas E. Emerson, Dale L. McElrath, and Andrew C. Fortier, pp. 301-344. University of Nebraska Press, Lincoln.

Stuiver, M., and Reimer, P. J.
1993 Extended 14C Data Base and Revised CALIB 3.0 14C Age Calibration Program. *Radiocarbon* 35:215-230.

Sullivan, Lynne P., and Timothy R. Pauketat
2007 Cahokia's Mound 31: A Short-Term Construction at a Long-Term Site. *Southeastern Archaeology* 26(1):12-31.

Sundstrom, Linea
1996 Mirror of Heaven: Cross-Cultural Transference of the Sacred Geography of the Black Hills. *World Archaeology* 28(2):177-189.
1997 The Sacred Black Hills: An Ethnohistorical Review. *Great Plains Quarterly* 17:185-212.

2012 Will the Circle Be Unbroken? The Roots of Plains Indian Views of the Cosmos. In *Enduring Motives: The Archaeology of Tradition and Religion in Native America*, edited by Linea Sundstrom and Warren DeBoer, pp. 60-83. University of Alabama Press, Tuscaloosa.

Swanton, John Reed
1911 Indian Tribes of the Lower Mississippi Valley and Adjacent Coast of the Gulf of Mexico. Bureau of American Ethnology Bulletin, no. 43. Washington, D.C.
1928 *Religious Beliefs and Medical Practices of the Creek Indians*. Forty-Second Annual Report of the Bureau o American Ethnology, pp. 473-672. Washington, D.C.
1929 *Myths and Tales of the Southeastern Indians*. Bureau of American Ethnology Bulletin, no. 88. Washington, D.C.
1931 *Source Material for the Social and Ceremonial Life of the Choctaw Indians*. U.S. Government Printing Office, Washington, D.C.
1946 *The Indians of the Southeastern United States*. Bureau of American Ethnology, Bulletin 137. Smithsonian Institution, Washington, D.C.

Tanner, Helen Hornbeck
1989 The Land and Water Communication Systems of the Southeastern Indians. In *Powhatan's Mantle: Indians in the Colonial Southeast*, edited by Gregory V. Waselkov, Peter H. Wood, and Tom Hatley, pp. 27-42. University of Nebraska Press, Lincoln.

Thomas, Julian
1990 Monuments from the Inside: The Case of Irish Megalithic Tombs. *World Archaeology* 22:168-178.
1993 The Hermeneutics of Megalithic Space. In *Interpretive Archaeology*, edited by C. Tilley, pp. 73-97. Berg, Oxford.

Thrift, Nigel J.
2008 *Non-representational Theory: Space, Politics, Affect*. Routledge, Milton Park.

Tiffany, Joseph A.
1991a Modeling Mill Creek-Mississippian Interaction. In *New Perspectives on Cahokia: Views from the Periphery*, edited by James B. Stoltman, pp. 319-347. Prehistory Press, Madison, Wisconsin.
1991b Models of Mississippian Culture History in Western Prairie Peninsula: A Perspective from Iowa. In *Cahokia and the Hinterlands: Middle Mississippian Cultures of the Midwest*, edited by Thomas E. Emerson and R. Barry Lewis, pp. 183-192. University of Illinois Press, Urbana.

Tilley, Christopher
1994 *A Phenomenology of Landscape: Places, Paths and Monuments*. Berg, Oxford.
2004 *The Materiality of Stone: Explorations in Landscape Phenomenology 1*. Berg, Oxford.
2010 *Interpreting Landscapes: Geologies, Topographies, Identities. Explorations in Landscape Phenomenology 3*. Walnut Creek, California.

Titterington, Paul F.
1938 *The Cahokia Mound Group and Its Village Site Materials*. Privately Printed, St. Louis.

Toll, H. Walcott
1985 Pottery, Production, Public Architecture, and the Chaco Anasazi System. Unpublished Ph.D. dissertation, Department of Anthropology, University of Colorado, Boulder.

Tozzer, Alfred M. (editor)
1941 *Landa's Relacion De Las Cosas De Yucatan: A Translation*. Papers of the Peabody Museum of American Archaeology and Ethnology, Harvard.

Trigger, Bruce G.
2003 *Understanding Early Civilizations*. Cambridge University Press, Cambridge.
2006 *A History of Archaeological Thought*. 2nd ed. Cambridge University Press, Cambridge.

Trombold, Charles D. (editor)
1991 *Ancient Road Networks and Settlement Hierarchies in the New World*. Cambridge University Press, Cambridge.

Trubitt, Mary Beth D.
2000 Mound Building and Prestige Goods Exchange: Changing Strategies in the Cahokia Chiefdom. *American Antiquity* 65(4):669-690.

Tuan, Yi-Fu
1977 *Space and Place: The Perspective of Experience*. University of Minnesota Press, Minneapolis.

Turner, Victor
1974 Pilgrimages as Social Processes. In *Fields, Dramas, and Metaphors*, pp. 166-230. Cornell University Press, Ithaca.

Turner, Victor, and Edith Turner
1978 *Image and Pilgrimage in Christian Culture: Anthropological Perspectives*. Columbian University Press, New York.

Underhill, Ruth
1975 The Salt Pilgrimage. In *Teachings from the American Earth: Indian Religion and Philosophy*, edited by Dennis Tedlock and Barbara Tedlock, pp. 42-74. Liveright, New York.

United States Department of Agriculture (http://plants.usda.gov/java/factSheet).

Van der Veer, Peter
1988 *Gods on Earth: The Management of Religious Experience and Identity in a North Indian Pilgrimage Centre*. Athlone Press, London.

VanDerwarker, Amber M.
1996 Domestic Dogs in the Diet: An Analysis of Canid Fauna from the Halliday Site, an Early Mississippian Upland Village in the American Bottom. Paper presented at the 1996 Southeastern Archaeological Conference, Birmingham, Alabama.

VanDerwarker, Amber M., and Gregory D. Wilson
2015 War, Food, and Structural Violence in the Mississippian Central Illinois Valley. In *The Archaeology of Food and Warfare*, edited by Amber M. VanDerwarker and Gregory D. Wilson, pp. 75-105. Springer, Switzerland.

Van Doren, Mark (editor)
1955 *Travels of William Bartram*. Dover Publications, New York.

Van Dyke, Ruth
2004 Memory, Meaning, and Masonry: The Late Bonito Chacoan Landscape. *American Antiquity* 69:413-431.
2007 *The Chaco Experience: Landscape and Ideology at the Center Place*. School of American Research Press, Santa Fe, New Mexico.

Van Dyke, Ruth, and Susan Alcock (editors)
2003 *Archaeologies of Memory*. Blackwell Press, Oxford.

Vogel, Joseph O.
1975 Trends in Cahokia Ceramics: Preliminary Study of the Collections from Tracts 15A and 15B. In *Perspectives in Cahokia Archaeology*, pp. 32-125. Illinois Archaeological Survey, Bulletin 10. University of Illinois, Urbana.

Wagner, Gail E.
1976 *IDOT Flotation Procedure Manual*. Ms. on file, Illinois Department of Transportation, District 8, Fairview Heights.

Wagner, Philip L.
1997 Pilgrimage: Culture and Geography. In *Sacred Places, Sacred Spaces: The Geography of Pilgrimages*, edited by Robert H. Stoddard and Alan Morinis, pp. 299-323. Geoscience and Man, Department of Geography and Anthropology, Louisiana State University, Baton Rouge.

Wagner, Mark J., Bethany J. Myers, and Charles A. Swedlund
2000 The Power of Place and Rock Art in Southern Illinois: The Austin Hollow Rock Site. *Illinois Archaeology* 12:161-198.

Walthall, John A.
1981 *Galena and Aboriginal Trade in Eastern North America*. Illinois State Museum Scientific Papers, no. 17. Springfield.

Walthall, John A., and Elizabeth D. Benchley

1987 *The River L'Abbe Mission: A French Colonial Church for the Cahokia Illini on Monks Mound*. Studies in Illinois Archaeology, Number 2. Illinois Historic Preservation Agency, Springfield.

Walton, Clyde C.
1962 *John Francis Snyder: Selected Writings*. Illinois State Historical Society, Springfield.

Webb, Paul A. (editor)
1992 *The Petitt Site (11-Ax-253), Alexander County, Illinois*. Center for Archaeological Excavations Investigations, Research Paper No. 58. Southern Illinois University, Carbondale.

Weber, Max
1966 [1921] *The City*. Free Press, New York.

Wells, E. Christian, and Ben A. Nelson
2007 Ritual Pilgrimage and Material Transfers in Prehispanic Northwest Mexico. In *Mesoamerican Ritual Economy: Archaeological and Ethnological Perspectives*, edited by E. Christian Wells and Karla L. Davis-Salazar, pp. 137-166. University Press, of Colorado, Boulder.

Wells, Joshua J.
2008 *The Vincennes Phase: Mississippians and Ethnic Plurality in the Wabash Drainage of Illinois and Indiana*. Unpublished Ph.D. dissertation, Department of Anthropology, Indiana University, Bloomington.

Welsh, Paul D.
1991 *Moundville's Economy*. University of Alabama Press, Tuscaloosa.

Wesler, Kit W.
2001 *Excavations at Wickliffe Mounds*. University of Alabama Press, Tuscaloosa.

Whalley, Lucy A.
1984 Plant Remains from the Stirling Phase. In *The BBB Motor Site*, edited by Thomas E. Emerson and Douglas K. Jackson, pp. 321-335. American Bottom Archaeology FAI-270 Site Reports 6, University of Illinois Press, Urbana.

Wheatley, Paul
1971 *The Pivot of the Four Quarters*. Aldine, Chicago.

White, William P., Sissel Johannessen, Paula G. Cross, and Lucretia S. Kelly
1984 Environmental Setting. In *American Bottom Archaeology: A Summary of the FAI-270 Project Contribution to the Culture History of the Mississippi River Valley*, edited by C. J. Bareis and J. W. Porter, pp. 15-33. University of Illinois Press, Urbana.

Whitridge, Peter

2004 Landscapes, Houses, Bodies, Things: "Place" and the Archaeology of Inuit Imaginaries. *Journal of Archaeological Method and Theory* 11(2):213-250.
2013 The Imbrication of Human and Animal Paths: An Arctic Case Study. In *Relational Archaeologies: Humans, Animals, Things*, edited by C. Watts, pp. 228-244. Routledge, London.

Williams, Drid
1975 *The Role of Movement in Selected Symbolic Systems*. Ph.D. thesis, Oxford University, Oxford.
1997 *Anthropology and Human Movement: The Study of Dances. Readings in the Anthropology of Human Movement*, Vol. 1. Scarecrow Press, Lanham, Maryland.

Wilson, Gregory D.
1999 The Production and Consumption of Mississippian Fineware in the American Bottom. *Southeastern Archaeology* 18(2):98-109.
2008 *The Archaeology of Everyday Life at Early Moundville*. University of Alabama Press, Tuscaloosa.
2010 Community, Identity, and Social Memory at Moundville. *American Antiquity* 75(1):3-18.

Winters, Howard D.
1967 *An Archaeological Survey of the Wabash Valley in Illinois*. Illinois State Museum Reports of Investigations no. 10. Springfield.
1981 Excavating in Museums: Notes on Mississippian Hoes and Middle Woodland Copper Gouges and Celts. In *The Research Potential of Anthropological Museum Collections*, edited by Anne-Marie Cantwell, James B. Griffin, and Nan A. Rothschild, pp. 17-34. Annals of the New York Academy of Sciences Vol. 376. New York.

Winters, Howard D., and Stuart Struever
1962 The Emerald Mound Group and Village. *Living Museum* 23:86-87.

Witthoft, John
1949 *Green Corn Ceremonialism in the Eastern Woodlands*. Occasional Paper from the Museum of Anthropology of the University of Michigan, no. 13. University of Michigan Press, Ann Arbor.

Wittry, Warren L.
1969 The American Woodhenge. In *Explorations into Cahokia Archaeology*, pp. 43-48. Illinois Archaeological Survey Bulletin 7. University of Illinois, Urbana.
1996 Discovering and Interpreting the Cahokia Woodhenges. *Wisconsin Archaeologist* 77:26-35.

Wolf, Eric R.
1958 The Virgin of Guadalupe: A Mexican National Symbol. *The Journal of American Folklore* 71(279):34-39.

Woods, William I., and George R. Holley

1991 Upland Mississippian Settlement in the American Bottom Region. In *Cahokia and the Hinterlands: Middle Mississippian Cultures of the Midwest*, edited by Thomas E. Emerson and R. Barry Lewis, pp. 46-60. University of Illinois Press, Urbana.

Yankovsky, Elias
1936 *Food Plants of the North American Indians*. United States Department of Agriculture Miscellaneous Publications 237. Washington, D.C.

Yarnell, Richard A.
1978 Domestication of Sunflower and Sumpweek in Eastern North America. In *The Nature and Status of Ethnobotany*, edited by Richard I. Ford, pp. 289-299. Anthropological Papers 67. University of Michigan Museum of Anthropology, Ann Arbor.

Yerkes, Richard W.
1983 Microwear, Microdrills, and Mississippian Craft Specialization. *American Antiquity* 48:499-518.
1991 Specialization in Shell Artifact Production at Cahokia. In *New Perspectives on Cahokia: Views from the Periphery*, edited by J. B. Stotlman, pp. 49-64. Prehistory Press, Madison, Wisconsin.

Zedeno, Maria Nieves, and Richard W. Stoffle
2003 Tracking the Role of Pathways in the Evolution of a Human Landscape. In *Colonization of Unfamiliar Landscapes: The Archaeology of Adaptation*, edited by Marcy Rockman and James Steele, pp. 59-80. Routledge, London.

Zych, Thomas J.
2013 The Construction of a Mound and a New Community: An Analysis of the Ceramic and Feature Assemblages from the Northeast Mound at the Aztalan Site. Unpublished thesis, University of Wisconsin-Milwaukee.

APPENDIX A
BOTANICAL REMAINS

Kathryn E. Parker

Methods of Botanical Analysis

Flotation Samples

During 1998 Emerald Site excavations, sediment samples were collected from each discrete fill zone observed within cultural features. Volume of the samples was measured, and the samples processed using a system of water flotation similar to that developed for the Illinois Department of Transportation (Wagner 1976). Following this standardized methodology, the samples were placed in a box lined with #40 mesh (0.42 mm) screen, which was immersed in a tub of water. Sediments were dispersed using gentle hand agitation, and floating materials (the light fraction) skimmed off using a #40 mesh net. Materials sinking to the bottom of the box comprised the heavy fraction.

After drying, carbonized botanical materials in each flotation sample were separated into two size fractions with the aid of a No. 10 geological sieve (2 mm mesh). Using a standard binocular microscope at low magnification (10x), all carbonized materials in the large fraction (>2 mm) were extracted and sorted into categories (i.e. maize, wood, nutshell, seed, etc.). Maize, nutshell and wood fragments were weighed and counted; other types of remains occasionally encountered in the large fraction were counted but not weighed. An attempt was made to identify all non-wood plant materials and the first 20 randomly selected wood fragments in the large fraction (or all wood, if there were less than 20 fragments in the sample).

Wood fragments examined but found to be unidentifiable at least to the taxonomic level of family were grouped into one of five categories: diffuse porous hardwood, ring porous hardwood, gymnosperm, bark and unidentifiable. Diffuse porous woods include such tree taxa as maple (*Acer* sp.) and willow or poplar (Salicaceae). Ring porous woods may be from any of several tree types commonly occurring in southwest Illinois, including oak (*Quercus* sp.), hickory (*Carya* sp.) and ash (*Fraxinus* sp.). Among gymosperm taxa, Eastern red cedar (*Juniperus virginiana*) would have been more accessible to residents of an upland Mississippian community than others, such as pine *(Pinus* sp.) and bald cypress (*Taxodium distichum*). Bark consists of non-distinctive pieces, and the unidentifiable category incorporates wood in which diagnostic morphological traits were destroyed during carbonization or had been otherwise distorted.

The small fraction of each sample (<2 mm) was examined carefully at 10-30x for seeds, cucurbit rind, and other kinds of miscellaneous materials. Any of these items observed were extracted, identified if possible, and counted, but not weighed.

Field-Collected Specimens

Individual specimens of charred botanical material (primarily wood) hand-collected during feature excavations were examined and identified. Items in each field-collected sample were sorted into categories (wood, nutshell, etc.). Each category was then weighed, except when plant materials were embedded in heavy soil matrix. Within each sample, a subsample of at least five wood fragments (or all fragments if there were less than five), were selected for identification, in addition to all other (non-wood) carbonized plant materials.

Methods of Identification

Plant materials from both kinds of samples, water-processed and hand-collected, were identified to the lowest possible taxon, usually to genus. Species identifications were attempted only when morphological comparisons ruled out other members of a genus (i.e. *Polygonum erectum*, *Juniperus virginiana*), or when only one member of a genus is native to the Illinois region. Seed, nut, and wood identifications were based on morphological characteristics, with reference to modern comparative specimens, standard pictorial guides (e.g. Martin and Barkley 1961; Hoadley 1990), and a USDA electronic database (http://plants.usda.gov/java/factSheet). Scientific nomenclature and general floristics information follows Mohlenbrock's *Guide to Vascular Flora of Illinois* (1986).

Results of Analysis

Botanical Remains from Flotation

Botanical materials recovered by flotation of sediments from 38 early Mississippian Lohmann through Stirling phase features (Table 1). This number represents a subsample of excavated features selected for analysis because 1. they offered the best potential for recovery of diverse and/or abundant plant remains; 2. they provided wide coverage of feature types over the entire excavated area; and 3. contexts that offered potential insights into the non-consumptive or ceremonial use of plant materials. The subsample of 38 analyzed features included seven single post structures, one small wall trench structure, two interior hearths, 26 interior and exterior pits, and two structure posts. Flotation samples equivalent to 698 liters of sediment yielded 173.9 g of carbonized wood and nutshell (fragments >2 mm in size), for a mean botanical density of 2.5 g/liter. The figure is about average among all reported Lohmann/Stirling phase components from the greater American Bottom region. However, it is on the low side by comparison with nearby contemporaneous sites, Pfeffer and Halliday, and to the Knoebel core community in the interior Silver Creek Valley (Holley et al. 2001b). Maize and Eastern Complex (EC) starchy cultigens were ubiquitous, but native cultigens can be described as abundant. Maize fragments were typically present, but amounts tended to be less than those of EC seeds. Single post structures Features 18, 20, and 25, non-domestic shrines or ritual buildings, and pits associated with them, yielded high densities of agricultural staples from feasting or other consumptive events. In addition, these unique structures and accompanying pits produced a set of particular plant items that occur most commonly in this region in Mississippian ritual deposits.

Wood was recovered from all but two of the analyzed features; a wall trench structure, Feature 15, and a central hearth, Feature 37, located within Feature 25. Masses of charred wood were recorded from burned zones in an unusually large rectangular pit, Feature 17, on the floor of burned ritual structure Feature 18. In contrast to the ubiquity of charred wood in Emerald Site deposits, nutshell fragments were scattered diffusely and many samples had none. One exception to light nutshell distribution was associated with Feature 16, a shallow central hearth, within Feature 16, which yielded over 50% of all nutshell in the botanical assemblage.

Wood

At least twelve tree taxa were represented among the 685 wood fragments identified (out of an estimated 11,517 total recovered, and 1116 examined). Hickory predominated (>64.0 %), followed by oaks, especially red subgroup, but also a trace of white subgroup (*Quercus* spp., subgenera *Erythrobalanus* and *Lepidobalanus*) (Table 2). Other tree types identified in descending order of numerical frequency were willow or poplar (Salicaceae), various taxa in the elm family (Ulmaceae) including hackberry (*Celtis* sp.) and American elm (*Ulmus americana*), ash (*Fraxinus* sp.), maple (*Acer* sp.), Eastern red cedar (*Juniperus virginiana*), cherry *(Prunus* sp.), honey locust/Kentucky coffeetree (*Gleditsia triacanthos/Gymnocladus dioicus*), and black walnut/butternut (*Juglans* sp.).

Hickory and/or oak were present in every sample with identifiable wood, with one exception. All wood identified in a sample from a burnt area within the Feature 18 basin was willow /poplar, frequently employed in light flexible structural posts. Masses of charred wood (= 3.5 to 4.4 g/ liter) from burnt zones in Feature 17, the extremely large rectangular pit on the floor of Feature 18, were comprised mainly of hickory and or/ oak. Deposits with highest wood densities also usually had high frequencies of cultivated seeds suggesting food refuse from intense or repeated cooking fires.

Hickory and oak wood from forests in the Emerald site immediate vicinity were heavily exploited for construction and fuel, as they were throughout the greater American Bottom prehistorically, especially at sites in upland locales. These two tree types were co-dominants of forested uplands prior to modern landscape modifications. Wood types like elm and hackberry, maple, and ash and cherry would have been secondary constituents of mixed deciduous woodlands on lower slopes and along streams. They may have been used opportunistically, or possibly were targeted for a particular technological purpose.

Most red cedar wood was recovered from two adjacent ritual buildings, Feature 18 and Feature 20 along with its interior pits. A few additional cedar fragments were recovered from the shallow hearth, Feature 16 (which also contained a celt) located within Feature 15 and from single post structure, Feature 7.

Archaeologically, prehistoric distribution of cedar in the greater American Bottom is spatially and temporally restricted, rarely recovered outside of Cahokia and its Mississippian satellite communities. These communities, defined by Emerson (1997) as ritual nodes, whether in upland or floodplain settings, are typically within a day's walk from Cahokia itself. Early Mississippian (Richland Complex) agricultural communities in the uplands east of the American Bottom including the Emerald, Lehmann-Sommers, and Pfeffer sites, have had red cedar in varying amounts. At each of these sites, red cedar has most often been recovered from special "T"-shaped or other non-domestic structures, and from associated pits and interior hearths.

Because cedar was imbued with sacred attributes in Mississippian culture, even a small quantity of the reddish- hued wood in a building, and/or the scent of cedar burning in a central hearth, would have been potent symbols, perhaps comparable to a crucifix and incense immediately recognized today as Roman Catholic religious emblems. Archaeologically, the clear association of cedar with special ritual or shrine structures at the Emerald Site underscores ceremonial activities here, and by extension, a structured politico- religious relationship with the Cahokia power center.

Nutshell

Most analyzed features produced nutshell, but frequencies were typically low. Over 95 % of the 1903 fragments recovered across the site were thick-shelled hickory (*Carya* sp.) (Table 3). Small amounts of other nut taxa included black walnut (*Juglans nigra*), amorphous pieces in the hickory/walnut family (Juglandaceae), pecan (*C. illinoensis*), and hazelnut (*Corylus americana*) (Table 3). Considering that most Juglandaceae fragments are more likely to be hickory rather than walnut, the actual proportion of hickory probably approaches 99%.

Curiously, considering Emerald's upland site location and the amount of oak in the wood assemblage, acorn (*Quercus sp*.) was limited to a single fragment. Acorns must have proliferated every fall, but for some reason this mast resource apparently was either ignored or underutilized.

In general, however, the nutshell recovery pattern suggests that all masts, including a vast hickory biomass, was of considerably less subsistence interest than the products of agriculture.

Seed Cultigens and Domesticates

A diverse assemblage of at least 26 plant taxa was represented among the 6677 seeds identified (of 7189 total recovered) (Table 4). The large majority (96.7 %) were Eastern Complex (EC) native starchy cultigens. Maygrass (*Phalaris caroliniana*) alone comprised 82 % of all those identified, with the other three EC grains: erect knotweed (*Polygonum erectum*), chenopod (*Chenopodium berlandieri*), and little barley (*Hordeum pusillum*), occurring at lower frequencies. Consistent with established archaeological recovery for this region, little barley frequency and ubiquity were significantly lower than the primary starchy grain trio of maygrass, chenopod and erect knotweed.

Among all recorded Early Mississippian assemblages in the greater American Bottom, maygrass, an early season grain, has been recovered more often than any other seed type. Findings from the Emerald site (maygrass total N=approximately 5502) are therefore typical of the regional pattern. However, frequency of maygrass in flotation samples is even higher than totals recorded from other Lohmann/ Stirling phase components of similar size and complexity. Maygrass occurred in all 38 analyzed features (although not in every sample), often in very high numbers, and occasionally in clumps. For example, Feature 17, zone C; the burnt area of the Feature 18 basin; and two pits, Features 42 and 44, both defined as possible caches inside Feature 20, had maygrass fused in charred clumps. Similar high counts of maygrass, and of seeds fused by charring, were also recorded in shrine houses or sacred structure contexts at the Pfeffer site.

Erect knotweed and chenopod, the late season EC grains, although occurring less frequently than maygrass, nonetheless were often present with maygrass in analyzed samples. Erect knotweed was identified from 21 of 38 features (55 % ubiquity), with greatest abundance in a sample from the burnt floor area of Feature 18. The majority of 602 knotweed seeds were complete and fragmentary kernels lacking distinctive pericarps. Predominance of naked kernels is fairly common in late prehistoric knotweed, and may indicate removal of outer pericarps by threshing. Intact achenes were comparatively few but included both the slender elongate and squat terete morphs in almost equal proportions.

Seeds of chenopod totaled 251, dispersed in 60.5 % of features, rarely numbering more than ten per sample. A Feature 1 sample with 59 chenopod specimens included a mix of morphologically wild and domesticated seeds, while a second sample from Feature 17 had 42 morphologically wild chenopod, a composition underscored by a proliferation of loose, thick testa fragments. Chenopod with truncate profiles and thin testae, characteristic of the domesticated *C. berlandieri* ssp. *jonesianum* were sprinkled here and there in features, but were clearly a minority of this taxon overall.

Common sunflower (*Helianthus annuus* ssp. *macrocarpus*) was the only one of the three known prehistoric oily-seeded domesticated plants with seeds in this assemblage. Neither cucurbit (*Cucurbita pepo*) nor sumpweed (*Iva annua* ssp. *macrocarpa*) seeds were recovered. A small intact sunflower kernel (without pericarp) from Feature 5 measured 5.8 x 2.6 (l x w in mm). Dimensions of a second eroded fragmentary kernel from Feature 32 could not be assessed, but appeared similar to the Feature 5 specimen. Cumulative data reported over the past 20 years shows that sunflower seeds (including numerous specimens recovered in ceremonial contexts) from Mississippian components in the American Bottom (see, for example, Parker 1992, 1998, 2003, 2005; Dunavan 1990, etc.) are very often below the size threshold established by Yarnell (1978:293) for *H. annuus macrocarpus* of the period There is little doubt that the majority of specimens, despite their diminutive size, from Emerald and other Mississippian contexts represent agricultural products, possibly a selected regional variant grown for particular attributes that are not readily apparent.

Seeds of Uncultivated Economic Plants

Among the 71 seeds of uncultivated (wild) food plants were fleshy fruit and berry taxa including black nightshade (*Solanum ptycanthum*), sumac (*Rhus* sp.), persimmon (*Diospyros virginiana*), and raspberry/blackberry (*Rubus* sp.). Nightshade was by far the majority of this taxonomic group, with seeds recovered primarily from Features 17, 18 and 20 (presumably ritual contexts). However, a few also occurred in deposits without clear ritual overtones, for example, in Feature 5. Fruit and berry seeds were also prominent in samples from Cahokia's Sub-Mound 51 (Pauketat et. al. 2002:265), and in specialized ceremonial contexts at the Pfeffer site, suggesting foods selected and consumed in feasts or other events. Based on complete and partial cotyledons, wild bean *(Strophostyles helvola*) numbered a minimum of nine whole seeds. Wild bean, much smaller in size than domesticated *Phaseolus* but with similar nutritional value, is consistently present in low numbers from Archaic through Mississippian components. However, above normal frequencies of *Strophostyles* seeds are recorded from a few early Mississippian sites, such as Lehmann-Sommers, Wal-Mart, and Olszewski, all defined as ritual nodes in the Cahokia sphere.

Wild morning glory (*Ipomoea* sp.) was represented by twelve seeds recovered in samples from Features 18, 21, 22, and 54. The seeds are not typical in archaeological assemblages from Greater American Bottom sites or other areas of southern and mid-latitude North America.

Components in this region with reports of *Ipomoea* are primarily Terminal Late Woodland II and early Mississippian sites with ritual contexts and connections to Cahokia. They include the Lohmann, BBB Motor, Pfeffer, and Lehmann-Sommers sites.

The species of morning glory represented archaeologically is not known. Mohlenbrock (1986:364) lists two species native to Illinois, wild sweet potato (*I. pandurata)* being the one most likely to have grown in the greater American Bottom region prior to Euro-American settlement. According to ethnohistoric sources *I. pandurata* was widely used by native groups as a digestive aid, usually as a purgative or cathartic (see, for example King 1984; Moerman 1985:235-236; Steyermark 1981:1216; Yanovsky 1936:53). Some historic references (Swanton 1946:285) claim that *I. pandurata* roots were eaten by native peoples. Websites catering to wild food enthusiasts further report that the roots, thoroughly cooked, are edible and similar to sweet potatoes (http://www.eattheweeds.com). At the same time, however, both online and print herbal guides (i.e. Lust 1974 caution that the ingestion of raw *I. pandurata* root has highly effective purgative results, producing sudden and violent emptying of the bowels.

From the perspective of paleoethnobotany, it is the seeds of *Ipomoea* rather than the roots (which have not been recovered or identified archaeologically) that are of particular interest. Chemical analysis of seeds from several species of *Ipomoea* has shown they contain a number of organic compounds with mild psychoactive properties, among them lysergic acid related to LSD. According to early Spanish accounts from Mexico, Aztecs consumed *Ipomoea tricolor* seeds as an hallucinogen in shamanistic or religious rituals (Schmutz and Hamilton 1979:133). Infusions of *I. pauciflora* seeds have been used in modern times by Zapotec communities of Mexico as a treatment for inflammation and toothache (Messer 1978:148-150).

Limited flotation sampling of six features at the early Caddoan (A.D. 800-1300) Spoonbill site in northeast Texas, disclosed remains of maize, EC seed crops, fleshy fruits, and from two pits, a total of 57 morning glory seeds (Crane 1982:86). From the contexts of recovery, Crane concluded that the seeds of morning glory had been deliberately collected. In the Lower Tennessee Valley, large numbers of carbonized *Ipomoea* seeds have been recovered from Early and Late Mississippian components (Chapman and Shea 1980:76).

In the Greater American Bottom, archaeobotanical evidence for use of morning glory in Mississippian ceremonial has been stronger at some sites than others. *Ipomoea* seeds from Pfeffer, for example, were abundant and closely associated with a "Big House" ceremonial structure (Parker 2005). At Lehmann-Sommers, the seeds were unusually numerous in samples from three pits located proximal to a large "T-shaped" specialized communal structure (Parker 2003). Elsewhere, partially sprouted morning glory seeds from the WalMart (Parker 1998:82) and Olszewski (Dunavan 1990:401-402) nodal communities were recovered in contexts that strongly suggested they had been gathered and stored for a particular purpose. However, *Ipomoea* was either absent or recovered in low frequencies from the BBB Motor, Julian, Sponemann, and Range sites (Whalley 1984; Johannessen 1984; Parker 1992, 2003), all with special buildings with ceremonial purposes. Similarly, no medicinal or ceremonial significance could be ascribed to single seeds of *Ipomoea* and another plant with psychoactive properties, *Datura stramonium*, both recovered from the Halliday site (Parker 1997).

Seeds from various wild herbaceous taxa with uncertain or negligible benefits to Mississippians at the Emerald site include: pigweed (*Amaranthus* sp.), smartweed (*Polygonum* sp.), purslane (*Portulaca oleracea*), tick trefoil (*Desmodium* sp.), small unknown members of the bean family (Fabaceae), yellow stargrass (*Hypoxis hirsuta*), and prickly sida (*Sida spinosa*).

Each of these taxa numbered from one to eight seeds. All are from plants that would have grown normally in the site area with seeds arriving in fires though various avenues of natural dispersal. Some, such as purslane, pigweed, tick trefoil, prickly sida represent plants now commonly regarded as weeds, although at least two of them, pigweed and purslane, produce edible and tasty greens.

Seeds of various wild grasses and grass-like plants totaled 88 from seven different taxa: panic grass (*Panicum* sp.), crabgrass/witchgrass (*Digitaria / Leptoloma* spp.), barnyard grass (*Echinochloa muricata*), three-awn (*Aristida* sp.), fescue (*Festuca* sp.), sedge family (Cyperaceae), and unknown non-distinctive members of the grass family (Poaceae). *Panicum* is frequently the most abundant non-cultivated grass type in late prehistoric assemblages, especially those with high frequencies of EC grains. The general pattern of wild *Panicum* and starchy cultigen co-occurrence has yet to be satisfactorily explained. Despite the extremely small seeds, it is possible that a common perennial *Panicum* species such as switchgrass was viewed as a reliable source of grain that didn't require annual planting. Among other alternatives, Panicum may have been accepted as companion field weeds, and the seeds either intentionally or inadvertently harvested with those of cultigens.

Arboreal (tree and shrub) taxa were represented by two seeds of hackberry/sugarberry (*Celtis* sp.), interpreted as incidental byproducts of *Celtis* wood occasionally collected for fuel.

<u>Maize</u>

Flotation samples yielded a total of 2418 maize fragments, consisting of cupules, glumes, kernels, embryos, and rachis segments, with a combined weight of 15.87 g. Fragments of inedible cob (cupules and glumes) outnumbered those of edible kernels and embryos, although a majority of most features had both types of remains. A cob: kernel ratio of. 3.1:1, comparing fragment counts, demonstrates the higher recovery of cupules and glumes. Maize was nearly ubiquitous, occurring in all but five analyzed samples. Quantities were typically modest, however, with the exception of a single sample from pit Feature 1, which had over 4.0 g of maize. A well-preserved Feature 4 cob segment had connected cupules with measured width x height in mm of 6.9 x 3.1 and angles of 65 degrees, denoting an ear with approximately eleven rows of kernels. Loose cupules in other samples were not measured but were observed to be uniformly narrow, less than 7.0 mm in width, and square in form, typical of Early Mississippian maize assemblages from the greater American Bottom. Components of this period with significant amounts of well-preserved maize reported have rarely shown influence or input from the variety Eastern Eight Row.

Miscellaneous Materials

A total of 281 items were incorporated within a category of miscellaneous remains. Grass stems comprised over 70% of the total with 198 fragments (>2 mm fraction only), assumed to reflect the constant use and disposal of thatch and matting. Next in order of recovery were 41 remnants of vegetative or fruit tissue having glossy irregular or cratered surfaces. The majority were from pit features 17 and 46, both associated with specialized ceremonial structures.

Among other kinds of miscellaneous remains were one to nine fragments each of gracile dicot stem, bud, grass awn, pedicel (fruit stalk), small tuber or rhizome, and plant silica. Most of these items may have been part of fuel, or incidental to the fires in pits. Grayish white vitrified silica particles are produced in the burning of grass stems, and may reflect incineration of discarded thatch or threshing wastes.

A fragmentary insect larva, about 1.0 – 2.0 mm in length, was present in a sample from the burnt area in Feature 18. Insect remains are rarely reported, but most likely relate directly to larvae feeding on organic residues in open pits. Also deserving special mention were seven unusual charred remnants of spun or twisted fibers, suggesting extremely fine or delicate cordage. Samples with strands of twisted fiber included Feature 17, 20, 27, 42 (three fragments), and 55. All were in the small (<2mm) fraction. The two largest fragments, each 5.0 mm long and approximately 1.5 in diameter, were recovered from Features 17 and 20, while Feature 42, a pit interior to Feature 20, yielded three extremely delicate braided fragments.

Hand-Collected Botanical Specimens

A total of thirteen botanical samples were collected during excavation of Feature 17 (Table 5), and another 38 from additional pits and structures (Table 6). The great majority of the hand-collected materials consist of carbonized wood, and generally repeat the taxa identified in flotation samples. Feature 17 wood specimens included more hackberry (also elm family) and honey locust than were represented in flotation samples. Seventeen of the 38 specimens from other feature contexts were entirely or partially comprised of hickory wood, with oak and red oak group also common. Taxa less often represented included walnut, ash, maple and willow/poplar. None of the specimens had red cedar wood, possibly affirming the interpretation that it was a material reserved for specialized use, and was not employed as general fuel or structural timbers.

In addition to wood, other remains included thatch remnants incorporating grass stem and small diameter willow/poplar twig were collected from Features 8 and 17. A few hickory nutshell fragments and a partial acorn were the only residues of nut masts, underscoring low frequencies characterizing flotation remains. One water-screened Feature 4 sample exhibited relatively high taxonomic diversity for a non-flotation sample, with elm, hickory, and oak wood, as well as a hickory nutshell fragment, maize kernel and cupule, and seeds of purslane and maygrass.

Summary

The Emerald site was occupied over a period of years spanning the Lohmann/Stirling phases of the Early Mississippian period, serving as an important politico-religious hub. Many of the features analyzed in this study were situated adjacent to, or downslope from, a mound and plaza complex. Among the various classes of botanical materials recovered from these features, only two were particularly ubiquitous and abundant: EC cultivated starchy grains - (a staple food), and high quality oak and hickory wood. Botanical materials with clear ritual connotations were limited to red cedar wood. Tobacco seeds, representing a second plant taxon often associated with Mississippian ceremonial contexts in this region, were not identified. However, the absence of tobacco is more likely due to variables of preservation and flotation recovery than to non-use in communal religious practice. In contrast, seeds of morning glory were recovered from four features including a structure and pits believed to have served non-domestic, communal, and/or ritual uses. Because several species of morning glory seeds contain psychoactive compounds, and because of an archaeological recovery pattern associated with Mississippian nodal centers, cumulative evidence increasingly supports a medicinal/shamanistic role for this item.

Although EC staple grains were routinely present in features, the high frequency of cultigens, especially maygrass, is primarily a reflection of deposits next to the plaza (Features 4 and 5) and to pits associated with Feature 25, interpreted as a temple.

Grain concentrations in these deposits, like the small amounts of a specialty wood, Eastern red cedar, and psychoactive seeds from this area of the Emerald Site are considered waste byproducts from feasting, and/or other rituals of ceremonial purification, renewal, and community solidarity.

Ethnohistoric accounts of native religious practices are probably not directly analogous to Emerald site ceremonial activities. However, but in his 18th century travels through the southeast, William Bartram's report on feasting (the busk) in the Creek Confederacy (Van Doren 1955) may offer insights into archaeological site formation:

> "They have …feasts or festivals almost for every month in the year, which are chiefly dedicated to hunting and agriculture. The busk, or feast of first fruits, is their principal festival; this seems to end the last, and begin the new year. It commences in August, when their new crops of corn are arrived to perfect maturity: and every town celebrates the busk separately, when their own harvest is ready. When a town celebrates the busk,…they collect all their worn-out cloaths and other despicable things, sweep and cleanse their houses, squares and the whole town, of their filth, which, with all the remaining grain and other old provisions, they cast together into one common heap, and consume it with fire. After having taken medicine and fasted for three days, all the fire in the town is extinguished"
>
> "On the fourth morning, the high priest, by rubbing wood together, produces new fire in the public square, from whence every habitation in the town is supplied with the new and pure flame."
>
> "Then the women go forth to the harvest field, and bring from thence new corn and fruits, which, being prepared in the best manner, in various dishes, and drink…is brought…to the

square, where people are assembled, appareled in their new cloaths and decorations. The men having regaled themselves, the remainder is carried off and distributed amongst the families of the town." (Bartram p. 399)

Table A.1. Analyzed Samples.

Feature Provenience	1, all S1/2	1, zone A, N1/2	4, zone A, SE1/4	4, zone A, SE1/4	4, zone A, SE1/4	4, zone B, SE1/4	4, zone A, SW1/4	4, zone A, SW1/4	4, zone B, SW1/4	4, zone B, SW1/4
Feature Type or Function	pit		single post structure							
Sample Number	1-10	1-6	4-1	4-2	4-3	4-4	4-7	4-8	4-11	4-12
ISAS FLOAT NUMBER	25699	25700	25701	25702	25703	25704	25705	25706	25707	25708
Sample Volume (liters)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0

Feature Provenience	4, zone A, NE1/4	4, zone A, NE1/4	4, zone A, NW1/4	4, zone A, NW1/4	4, zone B, NW1/4	4, zone B, NW1/4	4, zone B, NW1/4	5, zone A, N1/2	7, zone A, S1/2	7, zone A, S1/2
Feature Type or Function								pit	single post structure	
Sample Number	4-15	4-16	4-19	4-20	4-17	4-21	4-23	5-3	7-1	7-2
ISAS FLOAT NUMBER	25709	25710	25711	25712	25713	25714	25715	25716	25717	25718
Sample Volume (liters)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	8.0	10.0

Feature Provenience	7, zone A, S1/2	7, zone A, N1/2	7, zone A, N1/2	7, zone A, N1/2	8, zone A, N1/2	9, zone A, N1/2	10, zone A, E1/2	11, zone A, E1/2	15, zone B, wt 'C'	16, zone A, E1/2
Feature Type or Function					pit	pit	pit assoc with F. 12	pit assoc with F. 12	wall trench structure	hearth
Sample Number	7-3	7-5	7-6	7-7	8-2	9-2	10-4	11-4	15-18	16-3
ISAS FLOAT NUMBER	25719	25720	25721	25722	25723	25724	25725	25726	25727	25728
Sample Volume (liters)	10.0	10.0	11.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0

Feature Provenience	17, zone B	17, zone C, NW1/4	NE1/4, burnt area	E, NW1/4, burnt area	18, burnt area	18, zone A, burnt area	18, posts	18, posts	20, all W1/2	20, zone A, all W1/2
Feature Type or Function	large pit inside F. 18				single post structure	next to F. 20			single post structure	
Sample Number	17-8	17-32	17-26	17-36	18-10	18-12	18-5	18-8	20-4	20-5
ISAS FLOAT NUMBER	25729	25730	25731	25732	25733	25734	25735	25736	25737	25738
Sample Volume (liters)	10.0	10.0	10.0	10.0	7.0	10.0	2.0	2.0	10.0	10.0

Feature Provenience	20, zone A, 1st 10 cm	20, zone A, 2nd 10 cm	21, zone A, E1/2	21, zone B, E1/2	22, zone A, E1/2	23, all N1/2	25, all S1/2	25, all N12	26, zone A, E1/2	27, zone A
Feature Type or Function			pit assoc with F. 25		pit assoc with F. 25	single post structure	single post structure		pit assoc with F. 25	pit assoc with F. 25
Sample Number	20-8	20-10	21-3	21-8	22-2	23-5	25-2	25-4	26-3	27-3
ISAS FLOAT NUMBER	25739	25740	25741	25742	25743	25744	25745	25746	25747	25748
Sample Volume (liters)	10.0	10.0	10.0	10.0	10.0	10.0	8.0	10.0	10.0	10.0

Feature Provenience	27, zone B, S1/2	31, zone A, W1/2	32, zone A, all	33, zone A, N1/2	34, zone A, all	35, zone A, W1/2	37, all	39, zone A, SW1/2	40, zone A, E1/2	41, zone A, SE1/2
Feature Type or Function		shallow pit	shallow pit	shallow pit	shallow pit	shallow pit	hearth inside F. 25	shallow pit in F. 20	shallow pit in F. 20	shallow pit in F.15
Sample Number	27-6	31-2	32-2	33-2	34-2	35-1	37-1	39-2	40-2	41-2
ISAS FLOAT NUMBER	25749	25750	25751	25752	25753	25754	25755	25756	25757	25758
Sample Volume (liters)	10.0	10.0	10.0	10.0	9.0	10.0	10.0	10.0	10.0	10.0

Feature Provenience	42, zone A, S1/2	42, zone B, S1/2	43, zone A, SW1/2	43, zone B, SW1/2	44, zone C, W1/2	45, zone A, NW1/2	46, zone A, NE1/2	46, zone B, NE1/2	47, zone A, NE1/2	49, zone A, NW1/2
Feature Type or Function	shallow pit in F. 20		shallow pit in F. 20		shallow pit in F. 20	shallow pit in F. 20	shallow pit in F. 20		shallow pit in F. 20	shallow pit in F. 20
Sample Number	42-3	42-4	43-2	43-4	44-5	45-4	46-5	46-7	47-5	49-3
ISAS FLOAT NUMBER	25759	25760	25761	25762	25763	25764	25765	25766	25767	25768
Sample Volume (liters)	10.0	10.0	10.0	10.0	10.0	10.0	7.0	8.0	10.0	10.0

Feature Provenience	54, zone A, W1/2	55, zone A	57, zone C, W1/4
Feature Type or Function	pit	pit	single post structure
Sample Number	54-2	55-1	57-9
ISAS FLOAT NUMBER	25769	25770	
Sample Volume (liters)	6.0	10.0	10.0

Table A.2. Wood Samples.

Wood Type	**N of Fragments**	**Percentage**
Acer sp. (maple)	14	2.04%
Carya sp. (hickory)	441	64.38%
Celtis *sp. (hackberry/sugarberry)*	3	0.44%
Fraxinus sp. (ash)	16	2.34%
Gleditsia/ Gymnocladus spp. (honey locust/coffeetree)	1	0.15%
Juglans sp. (walnut/butternut)	1	0.15%
Juniperus virginiana (Eastern red cedar)	12	1.75%
Prunus sp. (cherry)	4	0.58%
Quercus sp. (oak)	71	10.36%
Q. sp., subgenus *Erythrobalanus* (red oak subgroup)	46	6.72%
Q. sp., subgenus *Lepidobalanus* (white oak subgroup)	2	0.29%
Salicaceae (willow/poplar)	51	7.45%
Ulmaceae (elm family)	8	1.17%
Ulmus americana (American elm)	15	2.19%
Total	**685**	**100.00%**

Table A.3. Summary of Identified Nutshell.

Nut Type	**N of Fragments**	**Percentage**
Carya sp. (hickory)	1820	95.64%
C. illinoensis (pecan)	3	0.16%
Corylus americana (hazelnut)	2	0.11%
Juglandaceae (hickory/walnut family)	64	3.36%
Juglans nigra (black walnut)	13	0.68%
Quercus sp. (acorn)	1	0.05%
Total	**1903**	**100.00%**

Table A.4. Seed Summary.

Seed Type	**Identified Seeds (N)**	**Percentage**
Amaranthus sp. (pigweed)	7	0.10%
Aristida sp.(three-awn)	2	0.03%
Celtis sp. (hackberry/sugarberry)	2	0.03%
Chenopodium berlandieri (chenopod)	251	3.76%
Cyperaceae (sedge family)	1	0.01%
Desmodium sp. (tick trefoil)	1	0.01%
Diospyros virginiana (persimmon)	4	0.06%
Digitaria/ Leptoloma spp. (crabgrass/ witchgrass)	2	0.03%
Echinochloa muricata (barnyard grass)	5	0.07%
Fabaceae (bean family)	4	0.06%
Festuca sp. (fescue)	1	0.01%
Helianthus annuus (sunflower)	2	0.03%
Hordeum pusillum (little barley)	99	1.48%
Hypoxis hirsuta (yellow stargrass)	5	0.07%
Ipomoea sp. (morning glory)	12	0.18%
Panicum sp. (panic grass)	58	0.87%
Phalaris caroliniana (maygrass)	5502	82.40%
Poaceae (grass family)	19	0.28%
Polygonum sp. (smartweed)	8	0.12%
P. erectum (erect knotweed)	602	9.02%
Portulaca oleracea (purslane)	7	0.10%
Rhus sp. (sumac)	2	0.03%
Rubus sp. (raspberry/ blackberry)	3	0.04%
Sida spinosa (prickly sida)	7	0.10%
Solanum ptycanthum (black nightshade)	62	0.93%
Strophostyles helvola (wild bean)	9	0.13%
Total	**6,677**	**100.00%**

Table A.5. Feature 17 Hand Collected Botanical Specimens.

Sample Provenience	Sample No.	Materials Identified	Wt. (g)
S1/2, all zones	17-1	Elm family & honey locust wood	2.7
S1/2, all zones	17-4	Honey locust wood	n/a
SE1/4, zone B	17-11	Elm family	18.35
SE1/4, zone B	17-11	Red oak stick (8 rings, no bark)	8.73
SE1/4, zone B	17-11	Thatch: grass stems & small dia willow/popular twigs	n/a
SE1/4, zone B	17-11	Hickory, red oak & hackberry wood	5.41
SE1/4, zone B, PP#4	17-15	Hackberry wood	19.55
SW1/4, zone A	17-13	Hackberry & honey locust wood	n/a
Balk, zone B	17-18	Hickory wood, one fragment	1.26
Balk, zone C	17-20	Elm family, cf. American elm	8.2
Profile wall, zone E	17-21	Willow/poplar	0.95
Profile wall, zone E	17-22	Oak & maple wood	n/a
Balk, zone E	17-27	Elm family & hickory wood	n/a
NW1/4, zone E	17-35	Red oak, cf. post remnant	n/a
NW1/4	17-39	Elm family, cf. hackberry stick, min 4 rings, no bark	3.21
Note: Wood embedded in soil matrix was not weighed.			

Table A.6. Botanical Specimens Hand Collected from all Features.

Sample Provenience	Sample No.	Materials Identified	Wt. (g)
Fea. 4, E1/2, zone A (water screened)	4-6	Elm family, hickory, oak wood	0.19
Fea. 4, E1/2, zone A (water screened)	4-6	Hickory nutshell (one)	0.03
Fea. 4, E1/2, zone A (water screened)	4-6	Maize kernel & 23 cupule frags	0.09
Fea. 4, E1/2, zone A (water screened)	4-6	Seeds: purslane (one), maygrass (two)	
Fea. 4, SE1/2	4-5	Hickory wood	n/a
Fea. 4, SW1/4, zone A	4-9	Red oak & hackberry wood	4.4
Fea. 4, NW1/4, zone A & B	4-18	Willow/poplar wood	0.05
Fea. 4, NW1/4, zone B, PP#3	4-22	Wood, cf. maple	1.57
Fea. 7, N1/2, PP#1	7-8	Hickory wood	1.16
Fea. 8, N1/2, zone A	8-4	Thatch: compressed grass stems	n/a
Fea. 10, E1/2	10-3	Honey locust/Kentucky coffeetree	1.09
Fea. 11, W1/2	11-1	Walnut & red oak wood	1.34
Fea. 11, E1/2	11-3	Oak, cf. red subgroup	1.21
Fea. 11, E1/2, zone A	11-5	Red oak wood	n/a
Fea. 12, SE1/4, trench above basin	12-15	one acorn in fragments	0.14
Fea. 13, S1/2, all zones	13-2	Hickory and oak wood	0.93
Fea. 13, SE1/4, all zones	13-4	Red oak wood	0.14
Fea. 13, NE1/4	13-15	Hickory wood	8.32
Fea. 13, NE1/4, basin	13-16	Wood, cf. walnut	n/a
Fea. 15, W1/2, trench A	15-11	Hickory stick, min 19 rings	3.7
Fea. 15, all zones	15-13	Red oak wood	10.95
Fea. 16, all W1/2	16-1	Oak wood	0.21
Fea. 16, all W1/2	16-4	Hickory wood	0.95
Fea. 16, all W1/2	16-4	Hickory nutshell (2)	0.15
Fea. 18, basin	18-2	Oak wood in soil matrix	n/a
Fea. 18, PM#11	18-4	Oak	n/a
Fea. 18, zone A, Timber #1	18-14	Oak & hickory	n/a
Fea. 18, zone A, Timber #2	18-15	Red oak	n/a
Fea. 18, PM#17	18-17	Hickory wood	n/a
Fea. 23, all zones, SW1/4	23-1	Hickory wood	2.72
Fea. 23, all S1/2	23-6	Hickory wood	4.48
Fea. 25, PM#38	25-10	Hickory wood	0.05
Fea. 28, all zones	28-1	Hickory wood	0.09
Fea. 29, all E1/2	29-2	Hickory wood	5.21
Fea. 39, all W1/2	39-1	Hickory wood	0.48
Fea. 42, all zones	42-1	Red oak wood	3.71
Fea. 45, zone A, NW1/2	45-6	Red oak wood	2.31
Fea. 47, all SW1/2	47-1	Willow/poplar wood	2.33
Fea. 53, all zones, E1/2	53-1	Ash wood	0.29
Fea. 54, E1/2, zone A	54-1	Hickory wood	0.05
Fea. 64, zone E, profile	64-1	Hickory wood	1.38
Fea. 66, zone A, S1/2	66-3	Hackberry wood	0.75
Note: Wood embedded in soil matrix was not weighed.			

Table A.7. Raw Botanical Data.

Feature Provenience	1, all S1/2	1, zone A, N1/2	4, zone A, SE1/4	4, zone A, SE1/4	4, zone A, SE1/4	4, zone B, SE1/4	4, zone A, SW1/4	4, zone A, SW1/4	4, zone B, SW1/4	4, zone B, SW1/4
Feature Type or Function	pit		single post structure							
Sample Number	1-10	1-6	4-1	4-2	4-3	4-4	4-7	4-8	4-11	4-12
Sample Volume (liters)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Total Wood (N)	125	55	76	238	165	54	130	145	82	26
Total Wood Wt. (g)	2.09	0.56	0.73	2.42	2.01	0.32	1.07	1.3	0.88	0.2
Breakdown by taxon (N)										
Acer sp. (maple)										
Carya sp. (hickory)	1	*3*	18	15	15	4	6	16	14	3
Celtis *sp. (hackberry/ sugarberry)*										
Fraxinus sp. (ash)							4	2	2	
Gleditsia/Gymnocladus spp. (honey locust/coffeetree*)*										
Juglans sp. (walnut/butternut)										
Juniperus virginiana (Eastern red cedar)										
Prunus sp. (cherry)										4
Quercus sp. (oak)	2	5				1	2	1		3
Q. sp., subgenus Erythrobalanus (red oak subgroup)		1		1						
Q. sp., subgenus Lepidobalanus (white oak subgroup)										
Salix/Populus spp. (willow/poplar)	*5*									
Ulmaceae (elm family)		1			1				1	
Ulmus americana (American elm)						1				
Bark	1		2				1	1	1	3
Diffuse porous	4						2			
Ring porous	1	4		2		6	3		2	3
Unidentifiable	6	6		2	4	8	2			4
Total Nutshell (N)	29	1	0	0	10	0	1	8	2	0
Total Nutshell Wt. (g)	0.56	0.01			0.12		0.02	0.12	0.03	
Breakdown by taxon (N and Wt.)										
Carya sp.	*28*							8		
(hickory)	0.52							0.12		
C. illinoensis										
(pecan)										
Corylus americana	1									
(hazelnut)	0.04									
Juglandaceae		1			10		1		2	
(hickory/walnut family)		0.01			0.12		0.02		0.03	
Juglans nigra										
(black walnut)										
Quercus sp.										
(acorn)										
Total Seeds (N)	87	0	32	18	14	7	26	222	21	94
Breakdown by taxon (N)										
Amaranthus sp. (pigweed)										
Aristida sp. (three awn)										
Celtis *sp. (hackberry/ sugarberry)*										
Chenopodium berlandieri (chenopod)	59		2	1	1		3	2	6	
Cyperaceae (sedge family)										
Desmodium sp. (tick trefoil)										
Digitaria/ Leptoloma spp. (crabgrass/ witchgrass)										
Diospyros virginian a (persimmon)										
Echinochloa muricata (barnyard grass)										
Fabaceae (bean family)										
Festuca sp. (fescue)										
Helianthus annuus (common sunflower)										
Hordeum pusillum (little barley)										1
Hypoxis sp. (yellow stargrass)	1									
Ipomoea sp. (morning glory)										
Panicum sp. (panic grass)								1		
Phalaris caroliniana (maygrass)	1		19	12	13	7	18	210	9	93
Poaceae (grass family)										
Polygonum sp. (smartweed)				1						
P. erectum (erect knotweed)	16		3	1			2	4	1	
Portulaca oleracea (purslane)										
Rhus sp. (sumac)										
Rubus sp. (blackberry/ raspberry)										
Sida spinosa (prickly mallow)			1							
Solanum ptycanthum (black nightshade)										
Strophostyles helvola (wild bean)										
Unidentifiable	10		7	3			3	5	5	
Total *Zea mays* (maize) (N)	341	51	19	36	103	13	88	49	53	1
Total Wt. (g)	4.09	0.31	0.12	0.29	0.55	0.04	0.5	0.23	0.25	0.01
kernel	40	9	3	1	4	4	14	15	9	
cupule	300	40	15	35	92	8	61	30	35	1
glume		1	1		7	1	12	4	9	
embryo		1								
rachis segment	1						1			
Miscellaneous Materials	4	0	0	0	0	0	0	0	1	0
bud										
tuber/rhizome										
Cucurbita pepo (cucurbit) rind										
cuticle or other vegetative tissue	1									
dicot stem										
fiber cordage										
grass awn										
grass stem	3								1	
insect larva										
pedicel										
silica										

Table A.7. Raw Botanical Data (cont.).

Feature Provenience	NE1/4	NE1/4	NW1/4	NW1/4	NW1/4	NW1/4	NW1/4	N1/2	S1/2
Feature Type or Function								pit	structure
Sample Number	4-15	4-16	4-19	4-20	4-17	4-21	4-23	5-3	7-1
Sample Volume (liters)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	8.0
Total Wood (N)	4	13	3	8	9	22	595	160	81
Total Wood Wt. (g)	0.02	0.13	0.04	0.06	0.15	0.44	7.20	1.42	0.65
Breakdown by taxon (N)									
Acer sp. (maple)					1	2	2		
Carya sp. (hickory)	1	2	1	2	4	4	17	12	12
Celtis *sp. (hackberry/ sugarberry)*									
Fraxinus sp. (ash)						1			
Gleditsia/Gymnocladus spp. (honey locust/coffeetree*)*									
Juglans sp. (walnut/butternut)									
Juniperus virginiana (Eastern red cedar)									
Prunus sp. (cherry)									
Quercus sp. (oak)		2	1	1		3		2	
Q. sp., subgenus Erythrobalanus (red oak subgroup)									1
Q. sp., subgenus Lepidobalanus (white oak subgroup)									
Salix/Populus spp. (willow/poplar)									
Ulmaceae (elm family)				1		1			
Ulmus americana (American elm)									
Bark						1	1	3	
Diffuse porous		2							
Ring porous	1	3	1	1	1	1		3	4
Unidentifiable	2	4		3	3	7		1	3
Total Nutshell (N)	0	1	1	0	1	2	1	6	0
Total Nutshell Wt. (g)		0.01	0.01		0.01	0.05	0.01	0.04	
Breakdown by taxon (N and Wt.)									
Carya sp.						2			
(hickory)						0.05			
C. illinoensis								3	
(pecan)								0.02	
Corylus americana									
(hazelnut)									
Juglandaceae		1	1		1		1	3	
(hickory/walnut family)		0.01	0.01		0.01		0.01	0.02	
Juglans nigra									
(black walnut)									
Quercus sp.									
(acorn)									
Total Seeds (N)	44	27	4	8	2	40	573	228	21
Breakdown by taxon (N)									
Amaranthus sp. (pigweed)									
Aristida sp. (three awn)	1								
Celtis *sp. (hackberry/ sugarberry)*									
Chenopodium berlandieri (chenopod)	1							12	1
Cyperaceae (sedge family)	1								
Desmodium sp. (tick trefoil)									
Digitaria/ Leptoloma spp. (crabgrass/ witchgrass)									
Diospyros virginian a (persimmon)									
Echinochloa muricata (barnyard grass)				1					
Fabaceae (bean family)									
Festuca sp. (fescue)									
Helianthus annuus (common sunflower)								1	
Hordeum pusillum (little barley)	1						7		
Hypoxis sp. (yellow stargrass)									
Ipomoea sp. (morning glory)									
Panicum sp. (panic grass)								4	
Phalaris caroliniana (maygrass)	40	23	4	5	1	37	550	147	17
Poaceae (grass family)							1	2	
Polygonum sp. (smartweed)								2	
P. erectum (erect knotweed)		1				2		16	
Portulaca oleracea (purslane)							3	1	
Rhus sp. (sumac)									
Rubus sp. (blackberry/ raspberry)							3		
Sida spinosa (prickly mallow)									
Solanum ptycanthum (black nightshade)								10	
Strophostyles helvola (wild bean)									
Unidentifiable		3		2	1	1	9	33	3
Total *Zea mays* (maize) (N)	22	22	19	37	22	30	53	86	28
Total Wt. (g)	0.06	0.04	0.09	0.11	0.08	0.1	0.25	0.42	0.18
kernel	1	3	3	11	5	4	11	35	
cupule	10	15	15	17	12	22	31	45	23
glume	11	4	1	9	5	4	11	5	5
embryo								1	
rachis segment									
Miscellaneous Materials	0	1	1	0	1	2	15	0	0
bud		1							
tuber/rhizome									
Cucurbita pepo (cucurbit) rind									
cuticle or other vegetative tissue									
dicot stem							1		
fiber cordage									
grass awn									
grass stem			1		1	2	14		
insect larva									
pedicel									
silica									

Table A.7. Raw Botanical Data (cont.).

Feature Provenience	7, zone A, S1/2	7, zone A, S1/2	7, zone A, N1/2	7, zone A, N1/2	7, zone A, N1/2	8, zone A, N1/2	9, zone A, N1/2	10, zone A, E1/2	11, zone A, E1/2	15, zone B, wt 'C'
Feature Type or Function						pit	pit	pit assoc with F. 12	pit assoc with F. 12	wall trench structure
Sample Number	7-2	7-3	7-5	7-6	7-7	8-2	9-2	10-4	11-4	15-18
Sample Volume (liters)	10.0	10.0	10.0	11.0	10.0	10.0	10.0	10.0	10.0	10.0
Total Wood (N)	5	0	28	23	19	26	56	98	34	0
Total Wood Wt. (g)	0.03		0.50	0.28	0.17	0.24	1.21	0.86	0.38	
Breakdown by taxon (N)										
Acer sp. (maple)			2							
Carya sp. (hickory)	2		4		2	3	1	7	8	
Celtis *sp. (hackberry/ sugarberry)*									1	
Fraxinus sp. (ash)				3						
Gleditsia/Gymnocladus spp. (honey locust/coffeetree*)*										
Juglans sp. (walnut/butternut)										
Juniperus virginiana (Eastern red cedar)				1						
Prunus sp. (cherry)										
Quercus sp. (oak)			2	1	2	1		1		
Q. sp., subgenus Erythrobalanus (red oak subgroup)							14		1	
Q. sp., subgenus Lepidobalanus (white oak subgroup)										
Salix/Populus spp. (willow/poplar)			1							
Ulmaceae (elm family)										
Ulmus americana (American elm)										
Bark				2	2			2	1	
Diffuse porous			2			5		1		
Ring porous			2	5	9	2	5	4	5	
Unidentifiable	3		7	8	4	9		4	4	
Total Nutshell (N)	0	0	0	1	1	1	2	5	10	1
Total Nutshell Wt. (g)				0.01	0.06	0.06	0.01	0.16	0.19	0.01
Breakdown by taxon (N and Wt.)										
Carya sp.					1	1		5	10	
(hickory)					0.06	0.06		0.16	0.19	
C. illinoensis										
(pecan)										
Corylus americana										
(hazelnut)										
Juglandaceae				1			2			1
(hickory/walnut family)				0.01			0.01			0.01
Juglans nigra										
(black walnut)										
Quercus sp.										
(acorn)										
Total Seeds (N)	0	14	27	2	14	2	14	47	32	16
Breakdown by taxon (N)										
Amaranthus sp. (pigweed)										
Aristida sp. (three awn)										
Celtis *sp. (hackberry/ sugarberry)*										
Chenopodium berlandieri (chenopod)							1	2	3	
Cyperaceae (sedge family)										
Desmodium sp. (tick trefoil)										
Digitaria/ Leptoloma spp. (crabgrass/ witchgrass)										
*Diospyros virginian*a (persimmon)										
Echinochloa muricata (barnyard grass)			1							
Fabaceae (bean family)										
Festuca sp. (fescue)										
Helianthus annuus (common sunflower)										
Hordeum pusillum (little barley)										
Hypoxis sp. (yellow stargrass)										
Ipomoea sp. (morning glory)										
Panicum sp. (panic grass)									2	
Phalaris caroliniana (maygrass)		14	24	1	12	2	12	34	15	16
Poaceae (grass family)										
Polygonum sp. (smartweed)										
P. erectum (erect knotweed)							1	4		
Portulaca oleracea (purslane)										
Rhus sp. (sumac)										
Rubus sp. (blackberry/ raspberry)										
Sida spinosa (prickly mallow)										
Solanum ptycanthum (black nightshade)										
Strophostyles helvola (wild bean)									2	
Unidentifiable			2	1	2			7	10	
Total *Zea mays* (maize) (N)	18	15	59	43	36	90	29	27	35	0
Total Wt. (g)	0.08	0.06	0.47	0.30	0.22	0.81	0.11	0.24	0.18	
kernel	5	1	19	9	11	2	1	11	7	
cupule	11	14	33	27	19	68	22	15	24	
glume	1		5	7	5	20	6		3	
embryo	1		2		1			1	1	
rachis segment										
Miscellaneous Materials	2	0	0	9	0	0	0	1	0	3
bud										
tuber/rhizome	2									
Cucurbita pepo (cucurbit) rind										
cuticle or other vegetative tissue										2
dicot stem										
fiber cordage										
grass awn										
grass stem				9				1		1
insect larva										
pedicel										
silica										

Table A.7. Raw Botanical Data (cont.).

Feature Provenience	16, zone A, E1/2	17, zone B	17, zone C, NW1/4	17, zone E, NE1/4, burnt area	17, zone E, NW1/4, burnt area	18, burnt area	18, zone A, burnt area	18, posts	18, posts
Feature Type or Function	hearth	large pit inside F. 18				single post structure	next to F. 20		
Sample Number	16-3	17-8	17-32	17-26	17-36	18-10	18-12	18-5	18-8
Sample Volume (liters)	10.0	10.0	10.0	10.0	10.0	7.0	10.0	2.0	2.0
Total Wood (N)	168	125	39	4000	2500	125	390	8	2
Total Wood Wt. (g)	1.57	1.16	0.42	44.25	36.59	1.67	3.16	0.03	0.01
Breakdown by taxon (N)									
Acer sp. (maple)									
Carya **sp. (hickory)**	1	8	10	12					2
Celtis ***sp. (hackberry/ sugarberry)***		1							
Fraxinus **sp. (ash)**				1					
Gleditsia/Gymnocladus spp. (**honey locust/coffeetree)**			1						
Juglans **sp. (walnut/butternut)**	1								
Juniperus virginiana **(Eastern red cedar)**	1						2		
Prunus sp. (cherry)									
Quercus sp. (oak)	3	3		4				1	
Q. sp., subgenus Erythrobalanus (red oak subgroup)		1			9		6		
Q. sp., subgenus Lepidobalanus (white oak subgroup)									
Salix/Populus **spp. (willow/poplar)**	5					20		6	
Ulmaceae (elm family)									
Ulmus americana (American elm)					7		7		
Bark				1	3				
Diffuse porous	5						1		
Ring porous	2	6	3	2	1		2		
Unidentifiable	2	1	5				2	1	
Total Nutshell (N)	638	3	2	0	0	1	3	0	0
Total Nutshell Wt. (g)	10.40	0.07	0.03			0.09	0.02		
Breakdown by taxon (N and Wt.)									
Carya **sp.**	625	3				1			
(hickory)	9.93	0.07				0.09			
C. illinoensis									
(pecan)									
Corylus americana	1								
(hazelnut)	0.05								
Juglandaceae			1				3		
(hickory/walnut family)			0.02				0.02		
Juglans nigra	12								
(black walnut)	0.42								
Quercus **sp.**			1						
(acorn)			0.01						
Total Seeds (N)	34	234	579	0	0	115	474	30	36
Breakdown by taxon (N)									
Amaranthus **sp. (pigweed)**		3	1						
Aristida **sp. (three awn)**									
Celtis ***sp. (hackberry/ sugarberry)***		1							
Chenopodium berlandieri **(chenopod)**	5	42	3			3	5	1	
Cyperaceae (sedge family)									
Desmodium **sp. (tick trefoil)**									
Digitaria/ Leptoloma **spp. (crabgrass/ witchgrass)**							2		
Diospyros virginian **a (persimmon)**									
Echinochloa muricata **(barnyard grass)**		1	2						
Fabaceae (bean family)									
Festuca sp. (fescue)									
Helianthus annuus (common sunflower)									
Hordeum pusillum **(little barley)**	8	1							
Hypoxis **sp. (yellow stargrass)**		1							
Ipomoea **sp. (morning glory)**							6		
Panicum **sp. (panic grass)**		2	1				27		
Phalaris caroliniana **(maygrass)**	12	123	560			65	130	17	30
Poaceae (grass family)		2				4	3	1	
Polygonum sp. (smartweed)	1					1			
P. erectum (**erect knotweed)**	1	13	1			30	273	5	
Portulaca oleracea (purslane)		2							
Rhus sp. (sumac)									
Rubus **sp. (blackberry/ raspberry)**									
Sida spinosa **(prickly mallow)**									
Solanum ptycanthum (**black nightshade)**	2	14	1				6		
Strophostyles helvola **(wild bean)**							1	1	
Unidentifiable	5	29	10			12	21	5	6
Total ***Zea mays*** **(maize) (N)**	18	78	33	0	5	8	15	0	2
Total Wt. (g)	0.17	0.42	0.20		0.06	0.04	0.08		0.01
kernel	9	2	12		4	3	7		2
cupule	8	75	16		1	3	6		
glume		1	5			1	2		
embryo	1					1			
rachis segment									
Miscellaneous Materials	0	26	1	0	45	10	86	2	1
bud									
tuber/rhizome									
Cucurbita pepo **(cucurbit) rind**									
cuticle or other vegetative tissue		13							
dicot stem		2					5		
fiber cordage		1							
grass awn		3							
grass stem		7			45	10	80	2	1
insect larva							1		
pedicel									
silica			1						

Table A.7. Raw Botanical Data (cont.).

Feature Provenience	20, all W1/2	20, zone A, all W1/2	20, zone A, 1st 10 cm	20, zone A, 2nd 10 cm	21, zone A, E1/2	21, zone B, E1/2	22, zone A, E1/2	23, all N1/2	25, all S1/2
Feature Type or Function	single post structure				pit assoc with F. 25		pit assoc with F. 25	single post structure	single post structure
Sample Number	20-4	20-5	20-8	20-10	21-3	21-8	22-2	23-5	25-2
Sample Volume (liters)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	8.0
Total Wood (N)	44	19	55	180	5	15	20	135	15
Total Wood Wt. (g)	0.61	0.20	0.70	1.99	0.03	0.10	0.18	1.73	0.18
Breakdown by taxon (N)									
Acer sp. (maple)									
***Carya* sp. (hickory)**	6	5	13	16	1	10	4	19	5
Celtis *sp. (hackberry/ sugarberry)*									
***Fraxinus* sp. (ash)**	1								
***Gleditsia/Gymnocladus spp. (* honey locust/coffeetree)**									
***Juglans* sp. (walnut/butternut)**									
***Juniperus virginiana* (Eastern red cedar)**	3	1							
Prunus sp. (cherry)									
Quercus sp. (oak)									
Q. sp., subgenus Erythrobalanus (red oak subgroup)									
Q. sp., subgenus Lepidobalanus (white oak subgroup)									
***Salix/Populus* spp. (willow/poplar)**									
Ulmaceae (elm family)	1								
Ulmus americana (American elm)									
Bark	1			2			1	1	
Diffuse porous			1						
Ring porous	4	5		2	3	4	2		3
Unidentifiable	4	8	6		1	1	13		7
Total Nutshell (N)	21	3	96	991	1	3	1	2	1
Total Nutshell Wt. (g)	0.51	0.04	3.08	19.79	0.01	0.08	0.02	0.01	0.03
Breakdown by taxon (N and Wt.)									
***Carya* sp.**	21	3	96	990		3			1
(hickory)	0.51	0.04	3.08	19.79		0.08			0.03
C. illinoensis									
(pecan)									
Corylus americana									
(hazelnut)									
Juglandaceae					1		1	2	
(hickory/walnut family)					0.01		0.02	0.01	
Juglans nigra				1					
(black walnut)				0.16					
***Quercus* sp.**									
(acorn)									
Total Seeds (N)	87	102	107	141	120	173	80	58	19
Breakdown by taxon (N)									
***Amaranthus* sp. (pigweed)**							3		
***Aristida* sp. (three awn)**					1				
Celtis *sp. (hackberry/ sugarberry)*									
***Chenopodium berlandieri* (chenopod)**	5		2	5	4	7	5		3
Cyperaceae (sedge family)									
***Desmodium* sp. (tick trefoil)**				1					
***Digitaria/ Leptoloma* spp. (crabgrass/ witchgrass)**							1		
***Diospyros virginian*a (persimmon)**					1		1		
***Echinochloa muricata* (barnyard grass)**									
Fabaceae (bean family)							1		
Festuca sp. (fescue)					1				
Helianthus annuus (common sunflower)									
***Hordeum pusillum* (little barley)**	2	1	4	6		1			
***Hypoxis* sp. (yellow stargrass)**				1			1		
***Ipomoea* sp. (morning glory)**					1	2	1		
***Panicum* sp. (panic grass)**	1	1	2	4	2	3	2		
***Phalaris caroliniana* (maygrass)**	65	95	93	84	76	83	21	50	12
Poaceae (grass family)					1	2			
Polygonum sp. (smartweed)	1								
***P. erectum (* erect knotweed)**				2	16	51	13	2	1
Portulaca oleracea (purslane)									
Rhus sp. (sumac)									
***Rubus* sp. (blackberry/ raspberry)**									
***Sida spinosa* (prickly mallow)**					1		1		
***Solanum ptycanthum (* black nightshade)**				26					
***Strophostyles helvola* (wild bean)**			1		1	2			
Unidentifiable	13	5	5	12	15	22	30	6	3
Total *Zea mays* (maize) (N)	39	38	47	51	66	63	43	21	10
Total Wt. (g)	0.22	0.21	0.34	0.43	0.27	0.25	0.26	0.10	0.03
kernel	22	15	24	35	7	16	10	5	2
cupule	16	18	18	15	45	38	22	12	8
glume	1	4	5	1	14	9	10	4	
embryo		1					1		
rachis segment									
Miscellaneous Materials	1	1	3	9	0	4	0	1	0
bud									
tuber/rhizome			1						
***Cucurbita pepo* (cucurbit) rind**									
cuticle or other vegetative tissue			1	5		2			
dicot stem									
fiber cordage		1							
grass awn									
grass stem	1		1	2		2			
insect larva									
pedicel				2				1	
silica									

Table A.7. Raw Botanical Data (cont.).

Feature Provenience	25, all N12	26, zone A, E1/2	27, zone A	27, zone B, S1/2	31, zone A, W1/2	32, zone A, all	33, zone A, N1/2	34, zone A, all	35, zone A, W1/2	37, all
Feature Type or Function		pit assoc with F. 25	pit assoc with F. 25		shallow pit	shallow pit	shallow pit	shallow pit	shallow pit	hearth inside F. 25
Sample Number	25-4	26-3	27-3	27-6	31-2	32-2	33-2	34-2	35-1	37-1
Sample Volume (liters)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	9.0	10.0	10.0
Total Wood (N)	88	25	465	54	18	11	88	1	12	0
Total Wood Wt. (g)	1.64	0.24	4.76	0.44	0.22	0.17	1.61	0.02	0.09	
Breakdown by taxon (N)										
Acer sp. (maple)										
***Carya* sp. (hickory)**	20	9	8			8	16		4	
Celtis *sp. (hackberry/ sugarberry)*					1					
***Fraxinus* sp. (ash)**										
***Gleditsia/Gymnocladus spp. (* honey locust/coffeetree)**										
***Juglans* sp. (walnut/butternut)**										
***Juniperus virginiana* (Eastern red cedar)**										
Prunus sp. (cherry)										
Quercus sp. (oak)			4	5	1				2	
Q. sp., subgenus Erythrobalanus (red oak subgroup)			1						1	
Q. sp., subgenus Lepidobalanus (white oak subgroup)										
***Salix/Populus* spp. (willow/poplar)**										
Ulmaceae (elm family)			1							
Ulmus americana (American elm)										
Bark			1		1		2	1		
Diffuse porous			1	1						
Ring porous		3	4	5	3	3			3	
Unidentifiable		7		8	8		2		2	
Total Nutshell (N)	3	10	2	6	0	1	3	1	2	1
Total Nutshell Wt. (g)	0.03	0.10	0.06	0.06		0.01	0.05	0.01	0.02	0.01
Breakdown by taxon (N and Wt.)										
***Carya* sp.**			2	*6*			3			
(hickory)			0.06	0.06			0.05			
C. illinoensis										
(pecan)										
Corylus americana										
(hazelnut)										
Juglandaceae	3	10				1		1	2	1
(hickory/walnut family)	0.03	0.10				0.01		0.01	0.02	0.01
Juglans nigra										
(black walnut)										
***Quercus* sp.**										
(acorn)										
Total Seeds (N)	37	45	124	168	18	18	34	5	7	4
Breakdown by taxon (N)										
***Amaranthus* sp. (pigweed)**										
***Aristida* sp. (three awn)**										
Celtis *sp. (hackberry/ sugarberry)*			1							
***Chenopodium berlandieri* (chenopod)**			4		1	7	5		2	1
Cyperaceae (sedge family)										
***Desmodium* sp. (tick trefoil)**										
***Digitaria/ Leptoloma* spp. (crabgrass/ witchgrass)**			1							
***Diospyros virginian*a (persimmon)**										
***Echinochloa muricata* (barnyard grass)**										
Fabaceae (bean family)			2	1						
Festuca sp. (fescue)										
Helianthus annuus (common sunflower)						1				
***Hordeum pusillum* (little barley)**		5								
***Hypoxis* sp. (yellow stargrass)**										
***Ipomoea* sp. (morning glory)**										
***Panicum* sp. (panic grass)**					1					
***Phalaris caroliniana* (maygrass)**	25	32	80	120	12	7	21	5	3	3
Poaceae (grass family)				1		1				
Polygonum sp. (smartweed)										
***P. erectum (* erect knotweed)**	4	2	14	9			1			
Portulaca oleracea (purslane)		*1*								
Rhus sp. (sumac)										
***Rubus* sp. (blackberry/ raspberry)**										
***Sida spinosa* (prickly mallow)**			1		1					
***Solanum ptycanthum (* black nightshade)**										
***Strophostyles helvola* (wild bean)**						1				
Unidentifiable	8	5	21	37	3	1	7		2	
Total *Zea mays* (maize) (N)	13	23	91	52	17	22	27	2	0	0
Total Wt. (g)	0.11	0.20	0.63	0.30	0.05	0.09	0.11	0.01		
kernel	6	7	38	17	3	4	8	1		
cupule	5	13	42	28	12	13	14	1		
glume	1	3	9	6	2	5	5			
embryo	1		2	1						
rachis segment										
Miscellaneous Materials	1	1	5	3	0	0	1	2	3	1
bud										
tuber/rhizome										
***Cucurbita pepo* (cucurbit) rind**										
cuticle or other vegetative tissue			1	1					3	
dicot stem		1								
fiber cordage			1							
grass awn										
grass stem			3	1			1	2		1
insect larva										
pedicel										
silica	1			1						

Table A.7. Raw Botanical Data (cont.).

Feature Provenience	39, zone A, SW1/2	40, zone A, E1/2	41, zone A, SE1/2	42, zone A, S1/2	42, zone B, S1/2	43, zone A, SW1/2	43, zone B, SW1/2	44, zone C, W1/2
Feature Type or Function	shallow pit in F. 20	shallow pit in F. 20	F. 20 post pit?	shallow pit in F. 20		shallow pit in F. 20		shallow pit in F. 20
Sample Number	39-2	40-2	41-2	42-3	42-4	43-2	43-4	44-5
Sample Volume (liters)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Total Wood (N)	1	16	78	12	11	28	7	80
Total Wood Wt. (g)	0.01	0.20	1.36	0.12	0.07	0.31	0.04	1.72
Breakdown by taxon (N)								
Acer sp. (maple)	1							
***Carya* sp. (hickory)**			5	3	4	14	2	9
Celtis *sp. (hackberry/ sugarberry)*								
***Fraxinus* sp. (ash)**		1						
***Gleditsia/Gymnocladus spp. (* honey locust/coffeetree)**								
***Juglans* sp. (walnut/butternut)**								
***Juniperus virginiana* (Eastern red cedar)**				3				
Prunus sp. (cherry)								
Quercus sp. (oak)		3			1			
Q. sp., subgenus Erythrobalanus (red oak subgroup)								5
Q. sp., subgenus Lepidobalanus (white oak subgroup)								
***Salix/Populus* spp. (willow/poplar)**			14					
Ulmaceae (elm family)								
Ulmus americana (American elm)								
Bark			1	1		1		2
Diffuse porous								
Ring porous		5		1	5	3	1	4
Unidentifiable		7		3	2	2	4	
Total Nutshell (N)	0	5	3	0	2	1	1	0
Total Nutshell Wt. (g)		0.12	0.05		0.06	0.01	0.01	
Breakdown by taxon (N and Wt.)								
***Carya* sp.**		5	3		2			
(hickory)		0.12	0.05		0.06			
C. illinoensis								
(pecan)								
Corylus americana								
(hazelnut)								
Juglandaceae						1	1	
(hickory/walnut family)						0.01	0.01	
Juglans nigra								
(black walnut)								
***Quercus* sp.**								
(acorn)								
Total Seeds (N)	5	55	1015	106	61	24	3	705
Breakdown by taxon (N)								
***Amaranthus* sp. (pigweed)**								
***Aristida* sp. (three awn)**								
Celtis *sp. (hackberry/ sugarberry)*								
***Chenopodium berlandieri* (chenopod)**	1	2	13	1	1	1	2	
Cyperaceae (sedge family)								
***Desmodium* sp. (tick trefoil)**								
***Digitaria/ Leptoloma* spp. (crabgrass/ witchgrass)**								
***Diospyros virginian* a (persimmon)**								
***Echinochloa muricata* (barnyard grass)**								
Fabaceae (bean family)								
Festuca sp. (fescue)								
Helianthus annuus (common sunflower)								
***Hordeum pusillum* (little barley)**	1			1				
***Hypoxis* sp. (yellow stargrass)**								
***Ipomoea* sp. (morning glory)**								
***Panicum* sp. (panic grass)**								
***Phalaris caroliniana* (maygrass)**	1	49	940	95	58	19	1	700
Poaceae (grass family)								
Polygonum sp. (smartweed)								
***P. erectum (* erect knotweed)**	1		46					
Portulaca oleracea (purslane)								
Rhus sp. (sumac)			1	1				
***Rubus* sp. (blackberry/ raspberry)**								
***Sida spinosa* (prickly mallow)**								
***Solanum ptycanthum (* black nightshade)**			1					
***Strophostyles helvola* (wild bean)**								
Unidentifiable	1	4	14	8	2	4		5
Total *Zea mays* (maize) (N)	3	3	23	7	5	1	2	9
Total Wt. (g)	0.01	0.01	0.13	0.04	0.02	0.01	0.01	0.06
kernel	1	1	8	5	1			3
cupule	1	2	14	2	1	1	2	6
glume	1		1		3			
embryo								
rachis segment								
Miscellaneous Materials	0	0	16	3	1	1	0	0
bud								
tuber/rhizome								
***Cucurbita pepo* (cucurbit) rind**			5					
cuticle or other vegetative tissue			2					
dicot stem								
fiber cordage				3				
grass awn								
grass stem			3		1	1		
insect larva								
pedicel			3					
silica			3					

Table A.7. Raw Botanical Data (cont.).

Feature Provenience	45, zone A, NW1/2	46, zone A, NE1/2	46, zone B, NE1/2	47, zone A, NE1/2	49, zone A, NW1/2	54, zone A, W1/2	55, zone A	57, zone C, W1/4	Totals
Feature Type or Function	shallow pit in F. 20	shallow pit in F. 20		shallow pit in F. 20	shallow pit in F. 20	pit	pit	single post structure	
Sample Number	45-4	46-5	46-7	47-5	49-3	54-2	55-1	57-9	
Sample Volume (liters)	10.0	7.0	8.0	10.0	10.0	6.0	10.0	10.0	100.0
Total Wood (N)	9	28	18	38	39	81	29	155	1,096
Total Wood Wt. (g)	0.12	0.35	0.21	0.27	0.42	0.84	0.19	2.09	11.58
Breakdown by taxon (N)									
Acer sp. (maple)						6			0
***Carya* sp. (hickory)**	1	5	4	5	8	7	4	16	95
Celtis *sp. (hackberry/ sugarberry)*									0
***Fraxinus* sp. (ash)**		1							8
***Gleditsia/Gymnocladus spp. (* honey locust/coffeetree)**									0
***Juglans* sp. (walnut/butternut)**									0
***Juniperus virginiana* (Eastern red cedar)**		1							0
Prunus sp. (cherry)									4
Quercus sp. (oak)	2	1	3	2	1	1	3	1	14
Q. sp., subgenus Erythrobalanus (red oak subgroup)			3			2			2
Q. sp., subgenus Lepidobalanus (white oak subgroup)					1		1		0
***Salix/Populus* spp. (willow/poplar)**									5
Ulmaceae (elm family)	1								3
Ulmus americana (American elm)									1
Bark		1		2					9
Diffuse porous		1		1	2	1			6
Ring porous	3	3	3	5	3	2	8	1	21
Unidentifiable	1	7	4	5	5	1	4	2	32
Total Nutshell (N)	0	0	0	2	1	8	1	0	51
Total Nutshell Wt. (g)				0.01	0.01	0.06	0.14		0.86
Breakdown by taxon (N and Wt.)									
***Carya* sp.**							1		36
(hickory)							0.14		0.64
C. illinoensis									0
(pecan)									0.00
Corylus americana									1
(hazelnut)									0.04
Juglandaceae				2	1	8			14
(hickory/walnut family)				0.01	0.01	0.06			0.18
Juglans nigra									0
(black walnut)									0.00
***Quercus* sp.**									0
(acorn)									0.00
Total Seeds (N)	37	31	18	155	60	180	175	74	521
Breakdown by taxon (N)									
***Amaranthus* sp. (pigweed)**									0
***Aristida* sp. (three awn)**									0
Celtis *sp. (hackberry/ sugarberry)*									0
***Chenopodium berlandieri* (chenopod)**	2	1	1		3	13		6	74
Cyperaceae (sedge family)									0
***Desmodium* sp. (tick trefoil)**									0
***Digitaria/ Leptoloma* spp. (crabgrass/ witchgrass)**									0
***Diospyros virginian*a (persimmon)**									0
***Echinochloa muricata* (barnyard grass)**									0
Fabaceae (bean family)									0
Festuca sp. (fescue)									0
Helianthus annuus (common sunflower)									0
***Hordeum pusillum* (little barley)**			1	58	1				1
***Hypoxis* sp. (yellow stargrass)**				1					1
***Ipomoea* sp. (morning glory)**						2			0
***Panicum* sp. (panic grass)**					1			4	1
***Phalaris caroliniana* (maygrass)**	35	26	13	79	51	135	100	40	382
Poaceae (grass family)						1			0
Polygonum sp. (smartweed)						2			1
***P. erectum (* erect knotweed)**		1		2	1	9	39	14	27
Portulaca oleracea (purslane)									0
Rhus sp. (sumac)									0
***Rubus* sp. (blackberry/ raspberry)**									0
***Sida spinosa* (prickly mallow)**							1	1	1
***Solanum ptycanthum (* black nightshade)**							1	1	0
***Strophostyles helvola* (wild bean)**									0
Unidentifiable		3	3	15	3	18	34	8	33
Total *Zea mays* (maize) (N)	4	3	2	6	6	83	11	41	754
Total Wt. (g)	0.02	0.01	0.01	0.03	0.03	0.41	0.05	0.24	6.39
kernel	1	3	1	2	4	19	6	16	99
cupule	3		1	3	2	45	2	21	617
glume				1		19	3	4	35
embryo									1
rachis segment									2
Miscellaneous Materials	0	2	10	0	0	0	1	0	5
bud									0
tuber/rhizome									0
***Cucurbita pepo* (cucurbit) rind**									0
cuticle or other vegetative tissue			10						1
dicot stem									0
fiber cordage							1		0
grass awn									0
grass stem		1							4
insect larva									0
pedicel									0
silica		1							0

APPENDIX B
FANUAL REMAINS

Steven R. Kuehn

A small faunal assemblage was recovered during archaeological investigations at the Emerald site (11S1), located in the American Bottom uplands. Faunal preservation was minimal with relatively few specimens identifiable to element or specific taxon. As a result, analysis of the faunal assemblage provides little insight on faunal exploitation or dietary practices at the site.

Method of Analysis

Faunal material from the Emerald site was obtained through hand collection and 0.25 inch dry screening in the field and flotation of feature fill in the lab. 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) was recorded when it could be reliably determined, 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 or unit. Each specimen was examined for exposure to heat in the form of burned or calcined bone. No butchering marks, rodent or carnivore gnawing, or evidence of modification was observed on any of the Emerald faunal remains. 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 mammal 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. Due to the paucity of specifically identifiable specimens, minimum number of individuals per taxon (MNI) estimates are provided only for the assemblage as a whole, and only for specimens identifiable to the genus and species level. A detailed inventory of the Emerald faunal assemblage is presented in Appendix I.

Results

The Emerald faunal assemblage contains 409 pieces of bone and fish scale (Table 1). The majority of specimens (NISP=403) were recovered from feature context, with faunal material recovered from 13 features. Five pieces of bone were obtained from three units, and one piece of bone was found in backdirt context. None of the faunal remains exhibit butchery marks or evidence of modification.

In addition, five modern/historic bones from a juvenile horse (*Equus caballus*) were recovered from Trench 6. As intrusive items, the horse remains are not included in this analysis.

Five white-tailed deer (*Odocoileus virginianus*) elements were recovered, consisting of a lumbar vertebra, the distal portion of a left humerus, a rib shaft fragment, and two cheek tooth fragments. A minimum of two individuals are represented based on the recovery of adult and juvenile deer elements. The presence of teeth suggests that entire field-dressed deer were brought to the site for processing, but the paucity of remains precludes any detailed discussion of deer exploitation and procurement strategies. White-tailed deer occur in a variety of habitats but prefer forest-edge settings (Jackson 1961).

One left calcaneus is identifiable as cottontail rabbit (*Sylvilagus floridanus*). The element was recovered from the upper stratum of a unit (Unit 6, Level 1) and may be modern or intrusive. A single animal is indicated. Cottontail rabbits inhabit brushy areas, forest-edge zones, and similar areas with adequate vegetative cover (Jackson 1961).

One right tibia is categorized as indeterminate rodent (Rodentia). The element is missing the proximal epiphysis and is classified as a juvenile. Although recovered from feature context, it may be modern or intrusive in origin.

Fifty-five pieces of bone are listed as large-sized mammal. Thirty-five are long bone shaft fragments, one is a vertebral centrum, and 19 cannot be identified to element. Thirteen large-sized mammal bones are burned or calcined.

Two rib shaft pieces, a tooth root, and an indeterminate fragment are categorized as medium-large mammal. Three small-sized mammal bones were identified, consisting of a complete caudal vertebra, a phalanx fragment, and the shaft portion of a right femur. One medium-large and two small-sized mammal bones are burned. Seventy pieces of bone, of which 11 are burned, are listed as indeterminate mammal. The indeterminate mammal remains consist of one tooth fragment and 69 specimens unidentifiable to element.

Seven bird bones are present in the Emerald assemblage. One furculum fragment is identifiable as indeterminate duck (Anatinae), most likely from a small to medium-sized species. One complete carpometacarpus is from a small perching bird (Passeriformes). Two long bone shaft pieces are categorized as large-sized bird and one long bone shaft fragment is from a medium-sized bird. One carpometacarpus fragment is listed as a small-sized bird. One fragment is classified as an indeterminate bird.

One carapace/plastron fragment is listed as indeterminate turtle and one trunk vertebra fragment is identifiable as non-venomous snake (Colubridae). Both specimens are burned.

Ninety-two fish bones and scales are present in the Emerald assemblage. All were recovered from feature context. Forty-seven scales and scale fragments are classified as sunfish (Centrarchidae), although the specific taxon cannot be determined. Forty-five cranial pieces, spine/rib shaft fragments, scales, and vertebral centra are listed as indeterminate fish.

The remaining 169 pieces of bone cannot be identified to element or taxon and are listed as taxon indeterminate (Vertebrata). Thirty-three Vertebrata remains are burned or calcined.

Discussion

The majority of remains are from feature context, with 404 specimens obtained from 13 features (see Table 1). Feature 13, an early Stirling phase structure, contained 333 faunal remains or 81.4 percent of the total assemblage. The second largest faunal assemblage was recovered from Feature 20, which contained 26 remains or 6.4 percent. Feature 20 is interpreted as a Terminal Late Woodland temple or shrine structure. The remaining 11 features in total contained 45 pieces of bone (11.0 percent), with only Features 16 and 64 producing any specifically identifiable specimens (both deer remains). Six specimens were recovered from non-feature context.

The overall paucity of well-preserved faunal material precludes detailed discussion of faunal exploitation patterns at the Emerald site. In general, faunal preservation is poor at upland American Bottom sites but there are some exceptions (e.g., Alt 2006:80; Holley 2006; Kelly

2000; Parker and Scott 2007; VanDerwarker 1996). The near-exclusive recovery of deer and large-sized mammal bone from Feature 20 may represent feasting remains, although differential preservation must be taken into account.

Feature 13 produced the largest and most diverse faunal assemblage, although relatively few specimens were specifically identifiable. White-tailed deer and indeterminate sunfish, perching bird, rodent, and snake remains were observed, along with various-sized indeterminate bird and mammal bones. Overall, the composition of the Feature 13 assemblage is generally consistent with the types of remains typically recovered from a domestic structure or habitation locale. The Feature 13 assemblage reflects a broad-based exploitation strategy in which large mammals (e.g., deer), fish, and a variety of other taxa (e.g., birds, other mammals) are incorporated into the diet. However, the limited nature of the recovered faunal material prevents application of these data to the site as a whole. Due to the limited size and poor preservation of the faunal remains, the assemblage unfortunately can provide little significant information on faunal exploitation or subsistence practices at the Emerald site.

Table B.1. Summary of Faunal Data.

Taxon	Feature													Unit			Back dirt	Total
	1	4	5	12	13	16	20	23	46	48	54	57	64	4	6	10		
Deer (*Odocoileus virginianus*)	--	--	--	--	2	1	1	--	--	--	--	--	1	--	--	--	--	5
Cottontail rabbit (*Sylvilagus floridanus*)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	--	--	1
Rodent, indet. (Rodentia)	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	1
Large-sized mammal	--	--	--	--	25	--	20	1	--	6	--	1	--	--	--	2	--	55
Medium-large mammal	--	1	--	1	2	--	--	--	--	--	--	--	--	--	--	--	--	4
Small-sized mammal	--	--	1	--	2	--	--	--	--	--	--	--	--	--	--	--	--	3
Mammal, indet.	1	2	--	--	54	1	5	1	1	--	--	2	1	1	--	1	--	70
Duck, indet. (Anatinae)	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	1
Perching bird, indet. (Passeriformes)	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	1
Large-sized bird	--	--	--	--	2	--	--	--	--	--	--	--	--	--	--	--	--	2
Medium-sized bird	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	1
Small-sized bird	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
Bird, indet.	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
Turtle, indet.	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1
Snake, indet. (Colubridae)	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	1
Sunfish, indet. (Centrarchidae)	--	--	--	--	47	--	--	--	--	--	--	--	--	--	--	--	--	47
Fish, indet.	--	1	--	2	42	--	--	--	--	--	--	--	--	--	--	--	--	45
Taxon indet. (Vertebrata)	2	2	8	2	152	--	--	1	--	--	1	--	--	--	--	--	1	169
Total NISP	**6**	**6**	**9**	**5**	**333**	**2**	**26**	**3**	**1**	**6**	**1**	**3**	**2**	**1**	**1**	**3**	**1**	**409**

Table B.2. Raw Data.

Provenience	NISP	Element, Portion	Taxon	Burned	Age	Comments
F1-2 S1/2 Zall hf	1	indeterminate, fragment	bird, indet.	1		
F1-2 S1/2 Zall hf	2	indeterminate, fragment	Vertebrata	2		
F1-4 S1/2 Zall hf	1	indeterminate, fragment	mammal, indet.	1		
F1-4 S1/2 Zall hf	1	carpometacarpus, proximal fragment	small-sized bird	1		
F1-4 S1/2 Zall hf	1	carapace/plastron, fragment	turtle, indet.	1		
F4-11 hf	1	vertebra, centrum fragment	fish, indet.	1		
F4-8 hf	2	indeterminate, fragment	mammal, indet.	1		
F4-8 hf	1	tooth, root fragment	medium-large mammal			
F4-8 hf	2	indeterminate, fragment	Vertebrata	1		
F5-3 hf	1	phalanx, distal fragment	small-sized mammal	1		
F5-3 hf	8	indeterminate, fragment	Vertebrata	8		
F12-2 hf	1	indeterminate, fragment	medium-large mammal	1		
F12-2 hf	1	indeterminate, fragment	Vertebrata	1		
F12-32 ZC hf	2	cranial, fragment	fish, indet.			
F12-4 hf	1	indeterminate, fragment	Vertebrata			
F13-1 hf	1	scale, complete	Centrarchidae			
F13-1 hf	5	scale, fragment	Centrarchidae			
F13-1 hf	3	scale, fragment	Centrarchidae			
F13-1 hf	7	scale, fragment	Centrarchidae			
F13-1 hf	1	cranial, fragment	fish, indet.			
F13-1 hf	6	scale, fragment	fish, indet.			
F13-1 hf	4	scale, fragment	fish, indet.			
F13-1 hf	2	spine/rib, shaft fragment	fish, indet.			
F13-1 hf	2	vertebra, centrum fragment	fish, indet.	1		
F13-1 hf	1	vertebra, centrum fragment	fish, indet.			
F13-1 hf	34	indeterminate, fragment	mammal, indet.	3		
F13-1 hf	1	indeterminate, fragment	mammal, indet.	1		
F13-1 hf	1	rib, shaft fragment	medium-large mammal			
F13-1 hf	8	indeterminate, fragment	Vertebrata			
F13-1 hf	2	indeterminate, fragment	Vertebrata	1		
F13-1 hf	32	indeterminate, fragment	Vertebrata			
F13-1 SE1/4 ZA hf	1	vertebra, centrum fragment	fish, indet.			
F13-1 SE1/4 ZA hf	1	rib, shaft fragment	medium-large mammal			
F13-12 hf	8	scale, fragment	Centrarchidae			
F13-12 hf	22	scale, fragment	Centrarchidae			
F13-12 hf	3	scale, fragment	fish, indet.			
F13-12 hf	1	indeterminate, fragment	mammal, indet.	1		
F13-12 hf	3	indeterminate, fragment	mammal, indet.			
F13-12 hf	1	cheek tooth, fragment	Odocoileus virginianus			
F13-12 hf	1	left carpometacarpus, complete	Passeriformes			
F13-12 hf	1	right femur, proximal shaft fragment	small-sized mammal			cf Rodentia
F13-12 hf	9	indeterminate, fragment	Vertebrata			
F13-14 NW1/4	7	indeterminate, fragment	mammal, indet.			
F13-14 NW1/4	15	indeterminate, fragment	Vertebrata			
F13-17 hf	9	indeterminate, fragment	Vertebrata			
F13-2 S1/2 Zall	2	long bone, shaft fragment	large-sized bird			
F13-2 S1/2 Zall	1	indeterminate, fragment	large-sized mammal	1		
F13-2 S1/2 Zall	2	long bone, shaft fragment	large-sized mammal	2		
F13-2 S1/2 Zall	1	indeterminate, fragment	mammal, indet.			
F13-2 S1/2 Zall	1	lumbar vertebra, fragment	Odocoileus virginianus		J	
F13-21 hf	6	indeterminate, fragment	Vertebrata	5		
F13-3 hf	1	furculum, fragment	Anatinae			small-medium
F13-3 hf	1	scale, fragment	Centrarchidae			
F13-3 hf	1	cranial, fragment	fish, indet.			
F13-3 hf	2	cranial, fragment	fish, indet.			
F13-3 hf	1	scale, fragment	fish, indet.			
F13-3 hf	2	scale, fragment	fish, indet.			
F13-3 hf	1	vertebra, centrum fragment	fish, indet.			
F13-3 hf	2	indeterminate, fragment	mammal, indet.			
F13-3 hf	5	indeterminate, fragment	mammal, indet.			
F13-3 hf	1	long bone, shaft fragment	medium-sized bird	1		
F13-3 hf	1	caudal vertebra, complete	small-sized mammal	1		
F13-3 hf	2	indeterminate, fragment	Vertebrata			
F13-3 hf	25	indeterminate, fragment	Vertebrata			
F13-4 SE1/4 Zall	3	long bone, shaft fragment	large-sized mammal	1		
F13-4 SE1/4 Zall	1	right tibia, complete -px epiphysis	Rodentia		J	
F13-4 SE1/4 Zall	9	indeterminate, fragment	Vertebrata			
F13-5 hf	1	trunk vertebra, fragment	Colubridae	1		
F13-5 hf	15	scale, fragment	fish, indet.			
F13-5 hf	35	indeterminate, fragment	Vertebrata	12		
F13-7 SE1/4	1	long bone, shaft fragment	large-sized mammal	1		
F13-9	18	long bone, shaft fragment	large-sized mammal			

Table B.2. Raw Data (cont.).

Provenience	NISP	Element, Portion	Taxon	Burned	Age	Comments
F16-3 hf	1	tooth, fragment	mammal, indet.			
F16-3 W1/2 Zall	1	cheek tooth, fragment	Odocoileus virginianus			
F20-10 hf	1	indeterminate, fragment	mammal, indet.	1		
F20-11 1/5 E1/2 ZA	6	indeterminate, fragment	large-sized mammal			mostly cancellous
F20-11 1/5 E1/2 ZA	12	indeterminate, fragment	large-sized mammal			cf pel OV-size
F20-11 1/5 E1/2 ZA	1	vertebra, centrum fragment	large-sized mammal			
F20-11 1/5 E1/2 ZA	2	indeterminate, fragment	mammal, indet.			mostly cancellous
F20-11 1/5 E1/2 ZA	1	left humerus, distal fragment	Odocoileus virginianus		A	
F20-3 W1/2 Zall	1	long bone, shaft fragment	large-sized mammal	1		
F20-5 hf	2	indeterminate, fragment	mammal, indet.	2		
F23-13 W outer trench ZA hf	1	long bone, shaft fragment	Vertebrata	1		
F23-6 S1/2 Zall	1	long bone, shaft fragment	large-sized mammal			
F23-6 S1/2 Zall	1	indeterminate, fragment	mammal, indet.	1		
F46-1 SW1/2 PP	1	indeterminate, fragment	mammal, indet.			in matrix
F48-3 W1/2 ZA	6	long bone, shaft fragment	large-sized mammal	6		
F54-4 N1/2 ZA	1	indeterminate, fragment	Vertebrata	1		
F57-11 hf	2	indeterminate, fragment	mammal, indet.			
F57-7 hf	1	long bone, shaft fragment	large-sized mammal	1		
F64-1 ZE profile	1	rib, shaft fragment	Odocoileus virginianus			
F64-2 ZE profile	1	indeterminate, fragment	mammal, indet.			
U4-10 floor clearing	1	indeterminate, fragment	mammal, indet.			
U6-1 L1 upper str	1	left calcaneus, fragment	Sylvilagus floridanus			
U10-4 L2 upper str	1	long bone, shaft fragment	large-sized mammal			
U10-6 L2 upper str	1	indeterminate, fragment	mammal, indet.			
U10-7 L2 pit	1	long bone, shaft fragment	large-sized mammal			
Backdirt 900-95	1	indeterminate, fragment	Vertebrata	1		
Total	**409**			**67**		
Trench6 PZ 900-8	1	phalanx 1, complete	Equus caballus		J	Historic
Trench6 PZ 900-8	1	right accessory metacarpus, diaphysis	Equus caballus		J	Historic
Trench6 PZ 900-8	1	right metacarpus, complete	Equus caballus		J	Historic
Trench6 PZ 900-8	1	right radius, diaphysis	Equus caballus		J	Historic
Trench6 PZ 900-8	1	right ulna, diaphysis	Equus caballus		J	Historic

APPENDIX C
LITHIC AND HISTORIC ARTIFACTS FROM THE MOUND 12 EXCAVATIONS

Table C.1. Debitage from Mound 12 Summit Excavations.

Unit	Level	Type	Material	Modification	Heat Mod.	No.	Wt. (g)	Comments
4	**2**	gen debitage	Burlington	-	n	2	2.6	
4	**2**	gen debitage	Burlington	utilized	y	1	6.2	
4	**3**	gen debitage	Burlington	-	y	1	0.3	
4	**3**	gen debitage	Burlington	-	n	1	0.1	
4	**wall scrape**	gen debitage	Burlington	-	n	1	0.2	May be heated treated
5	**2**	blk fracture	Mill Creek	-	y	1	2.4	
5	**3**	gen debitage	Burlington	-	y	1	1.5	
5	**3**	gen debitage	Burlington	-	n	1	0.3	
5	**3**	gen debitage	Unknown	-	y	1	0.2	
5	**6**	gen debitage	Burlington	-	n	1	0.6	
6	**1**	gen debitage	Burlington	-	n	2	0.8	
6	**1**	gen debitage	Mill Creek	-	n	1	0.8	
6	**1**	gen debitage	Cobden	-	n	1	0.4	
6	**1**	hoe flake	Mill Creek	-	n	2	0.6	
6	**1**	blk fracture	Burlington	-	n	1	0.5	
7	**1**	gen debitage	Burlington	utilized	n	1	1.4	
7	**1**	gen debitage	Mill Creek	-	n	1	0.2	
7	**1**	gen debitage	Unknown	-	y	1	0.1	May be Cobden
7	**1**	blk fracture	Burlington	-	y	1	0.5	
8	**1**	gen debitage	Mill Creek	-	n	1	3.4	
8	**floor scrape**	gen debitage	Kaolin	-	n	1	0.1	
8	**floor scrape**	gen debitage	Unknown	-	n	1	0.8	
10	**1**	gen debitage	Burlington	utilized	y	1	1	
10	**1**	gen debitage	Mill Creek	-	n	1	0.1	
10	**1**	gen debitage	Mill Creek	-	y	1	0.3	
10	**1**	gen debitage	Unknown	-	y	3	0.8	May be Mill Creek
10	**1**	hoe flake	Mill Creek	-	y	1	0.3	
10	**1**	bifacial thin	Burlington	utilized	y	1	3.5	
10	**3**	blk fracture	Unknown	-	n	1	2.7	
10	**2**	gen debitage	Burlington	-	y	2	0.8	
10	**2**	gen debitage	Mill Creek	-	n	1	0.1	
10	**2**	gen debitage	Kaolin	-	n	1	0.1	
10	**2**	gen debitage	Unknown	-	y	1	0.4	
10	**2**	gen debitage	Unknown	-	n	1	1	
10	**2**	blk fracture	Burlington	-	n	2	1.7	
Totals						**42**	**36.8**	

Table C.2. Non-Chipped Stone Artifacts from Mound 12 Summit Excavations.

Unit	Level	Pebbles		Concretions		Rough Rock		Totals			
		No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	No. %	Wt. (g)	Wt. %
4	**1**	-	-	2	13.9	-	-	2	0.5	13.9	6.2
4	**2**	5	4.0	5	2.0	-	-	10	2.6	6.0	2.7
4	**3**	5	2.9	5	2.0	-	-	10	2.6	4.9	2.2
4	**4**	-	-	21	5.8	-	-	21	5.5	5.8	2.6
4	**wall scrape**	1	0.8	-	-	-	-	1	0.3	0.8	0.4
4	**floor scrape**	2	0.8	19	6.4	1	3.3	22	5.8	10.5	4.7
5	**2**	3	0.9	3	1.4	-	-	6	1.6	2.3	1.0
5	**3**	7	4.6	11	3.9	1	6.0	19	5.0	14.5	6.5
5	**5**	-	-	6	2.6	-	-	6	1.6	2.6	1.2
5	**6**	3	3.8	2	0.6	-	-	5	1.3	4.4	2.0
5	**shovel test**	-	-	2	0.4	-	-	2	0.5	0.4	0.2
5	**wall scrape**	1	1.3	-	-	-	-	1	0.3	1.3	0.6
6	**1**	3	2.1	4	1.8	-	-	7	1.8	3.9	1.7
8	**1**	3	1.2	10	3.1	1	1.5	14	3.7	5.8	2.6
8	**wall scrape**	3	1.3	1	0.4	1	5.0	5	1.3	6.7	3.0
8	**floor scrape**	16	9.4	19	5.3	-	-	35	9.2	14.7	6.6
10	**1**	43	28.7	38	10.9	3	13.5	84	22.1	53.1	23.8
10	**2**	45	24.2	75	21.3	5	24.3	125	32.9	69.8	31.3
10	**wall scrape**	-	-	5	1.5	-	-	5	1.3	1.5	0.7
Totals		**140**	**86.0**	**228**	**83.3**	**12**	**53.6**	**380**	**100.0**	**222.9**	**100.0**
Total %		**36.8**	**38.6**	**60.0**	**37.4**	**3.2**	**24.0**				

Table C.3. Debitage from Mound 12 Interface Excavations.

Unit	Level	Type	Material	Modification	Heat Mod.	No.	Wt. (g)	Comments
1	**6**	gen debitage	Unknown	-	y	1	3.3	
1	**6**	gen debitage	Burlington	-	n	1	0.3	
1	**7**	gen debitage	Burlington	-	n	1	0.4	
1	**8**	gen debitage	Burlington	-	y	1	0.5	
1	**9**	gen debitage	Burlington	retouched	n	1	9.4	possibly utilized
1	**9**	gen debitage	Burlington	-	n	1	0.2	
1	**10**	gen debitage	Burlington	-	n	2	0.6	
2	**5**	gen debitage	Burlington	-	y	1	0.5	
2	**5**	blk fracture	Unknown	-	y	1	0.6	
2	**6**	gen debitage	Burlington	-	n	1	0.2	
2	**6**	gen debitage	Burlington	-	y	1	0.5	
2	**6**	gen debitage	Mill Creek	-	n	1	0.3	
2	**6**	gen debitage	Unknown	-	y	1	0.5	
2	**6**	gen debitage	Blair	-	n	1	0.4	
2	**6**	blk fracture	Unknown	-	n	1	0.4	
2	**7**	gen debitage	Burlington	-	n	2	1.4	
2	**7**	gen debitage	Kaolin	-	n	1	3.6	
2	**7**	gen debitage	Unknown	-	n	1	0.3	
2	**7**	gen debitage	Unknown	-	y	1	2.4	
2	**7**	hoe flake	Mill Creek	-	y	1	19.1	
3	**5**	gen debitage	Burlington	-	y	2	0.8	
3	**5**	hoe flake	Mill Creek	-	n	2	0.6	
3	**6**	gen debitage	Burlington	-	n	3	0.6	
3	**6**	gen debitage	Burlington	-	y	1	0.8	
3	**6**	gen debitage	Burlington	utilized	y	1	0.5	
3	**6**	gen debitage	Mill Creek	-	n	1	0.7	
3	**6**	blk fracture	Unknown	-	y	1	0.6	possible Burlington
3	**7**	bifacial thin	Burlington	-	n	1	0.4	
3	**8**	gen debitage	Mill Creek	-	n	1	0.3	
3	**9**	bifacial thin	Mill Creek	-	n	1	7.7	
3	**wall scrape**	gen debitage	Burlington	-	n	1	0.4	
3	**11**	gen debitage	Unknown	-	y	1	0.2	possibly Mill Creek
3	**11**	gen debitage	Unknown	-	y	1	0.4	
3	**12**	gen debitage	Burlington	-	n	1	0.2	
3	**wall scrape**	gen debitage	Cobden	-	n	1	0.1	
9	**1**	gen debitage	Burlington	-	n	1	0.2	
9	**1**	gen debitage	Burlington	-	y	1	0.3	
9	**1**	bifacial thin	Mill Creek	-	n	1	0.3	
9	**2, 3**	gen debitage	Burlington	-	y	1	0.2	
9	**4**	gen debitage	Burlington	-	n	1	0.1	
Totals						**46**	**60.3**	

Table C.4. Non-Chipped Stone Artifacts from Interface Excavations.

Unit	Level	Pebbles		Concretions		Igneous flake		FCR		Rough Rock		Totals			
		No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	No. %	Wt. (g)	Wt. %
1	**6**	19	15.7	14	5.4	-	-	-	-	-	-	**33**	**2.6**	**21.1**	**2.2**
1	**7**	40	33.3	13	5.1	-	-	-	-	-	-	**53**	**4.2**	**38.4**	**4.0**
1	**8**	77	72.4	32	14.6	-	-	3	19.9	-	-	**112**	**9.0**	**106.9**	**11.2**
1	**9**	15	15.4	1	0.4	-	-	-	-	-	-	**16**	**1.3**	**15.8**	**1.7**
1	**10**	32	24.7	18	5.6	-	-	-	-	-	-	**50**	**4.0**	**30.3**	**3.2**
1	**3**	2	1.5	-	-	-	-	-	-	-	-	**2**	**0.2**	**1.5**	**0.2**
1	**6**	9	6.4	18	8.3	-	-	-	-	-	-	**27**	**2.2**	**14.7**	**1.5**
2	**6**	107	102.1	41	15.3	1	1.4	-	-	-	-	**149**	**11.9**	**118.8**	**12.4**
2	**wall scrape**	5	3.6	5	2.6	-	-	-	-	-	-	**10**	**0.8**	**6.2**	**0.6**
2	**7**	64	50.8	19	7.7	-	-	-	-	-	-	**83**	**6.6**	**58.5**	**6.1**
2	**4**	1	0.3	-	-	-	-	-	-	-	-	**1**	**0.1**	**0.3**	**0.0**
2	**5**	33	27.3	26	10.0	-	-	-	-	-	-	**59**	**4.7**	**37.3**	**3.9**
3	**5**	10	13.1	3	0.9	-	-	-	-	-	-	**13**	**1.0**	**14.0**	**1.5**
3	**6**	54	59.0	36	16.2	-	-	-	-	-	-	**90**	**7.2**	**75.2**	**7.9**
3	**7**	80	81.9	37	19.5	-	-	2	19.7	1	14.0	**120**	**9.6**	**135.1**	**14.1**
3	**8**	26	33.9	16	6.2	-	-	-	-	-	-	**42**	**3.4**	**40.1**	**4.2**
3	**9**	24	14.9	23	6.8	-	-	-	-	-	-	**47**	**3.8**	**21.7**	**2.3**
3	**10**	11	6.7	12	3.4	-	-	-	-	-	-	**23**	**1.8**	**10.1**	**1.1**
3	**11**	12	8.4	8	2.1	-	-	-	-	-	-	**20**	**1.6**	**10.5**	**1.1**
3	**12**	8	2.8	-	-	-	-	-	-	-	-	**8**	**0.6**	**2.8**	**0.3**
3	**13**	5	2.0	1	1.2	-	-	-	-	-	-	**6**	**0.5**	**3.2**	**0.3**
3	**14**	1	0.6	-	-	-	-	-	-	-	-	**1**	**0.1**	**0.6**	**0.1**
3	**15**	1	0.8	-	-	-	-	-	-	-	-	**1**	**0.1**	**0.8**	**0.1**
3	**wall scrape**	35	26.3	9	4.0	-	-	-	-	-	-	**44**	**3.5**	**30.3**	**3.2**
9	**1**	79	43.8	57	19.0	-	-	-	-	2	7.2	**138**	**11.0**	**70.0**	**7.3**
9	**2**	28	20.8	18	6.5	-	-	-	-	-	-	**46**	**3.7**	**27.3**	**2.9**
9	**2, 3**	11	12.3	-	-	-	-	-	-	-	-	**11**	**0.9**	**12.3**	**1.3**
9	**3**	6	3.1	2	2.5	-	-	-	-	-	-	**8**	**0.6**	**5.6**	**0.6**
9	**4**	6	4.7	1	0.6	-	-	-	-	-	-	**7**	**0.6**	**5.3**	**0.6**
9	**wall scrape**	21	12.7	7	2.7	-	-	1	25.1	-	-	**29**	**2.3**	**40.5**	**4.2**
Totals		**822**	**701.3**	**417**	**166.6**	**1**	**1.4**	**6**	**64.7**	**3**	**21.2**	**1249**	**100.0**	**955.2**	**100.0**
Total %		**65.8**	**73.4**	**33.4**	**17.4**	**0.1**	**0.1**	**0.5**	**6.8**	**0.2**	**2.2**				

Table C.5. Debitage from Mound 12 First Terrace Excavations.

Unit	Level	Elevation (cmbd)	Type	Material	Modification	Heat Mod.	No.	Wt. (g)	Comments
11	2	22-29	heat spall	Burlington	-	y	1	0.2	
11	3	29-39	gen debitage	Burlington	retouched	-	1	3.1	
11	3	29-39	blk fracture	unknown	-	y	1	0.6	
11	3	29-39	gen debitage	unknown	-	-	1	0.1	
11	4	39-49	gen debitage	unknown	-	y	1	0.1	may be Kaolin
11	6	59-69	gen debitage	Burlington	-	-	2	0.8	
11	10	99-112	gen debitage	Burlington	-	-	1	0.2	
11	10	99-112	gen debitage	Burlington	-	y	1	0.1	
11	10	99-112	gen debitage	unknown	-	-	1	0.3	may be heat treated
11	11	112-122	gen debitage	Cobden	-	-	1	0.1	
11	11	112-122	biface thin	Cobden	-	-	1	0.5	
11	12	122-132	gen debitage	unknown	-	y	1	0.3	
11	floor scrape	-	gen debitage	unknown	-	-	1	0.2	
11	wall scrape	-	gen debitage	Burlington	utilized <75	y	1	2.1	
11	wall scrape	-	gen debitage	Burlington	-	-	1	0.1	
12	1	26-59	biface retouch	unknown	-	-	1	0.1	
12	3	79-89	gen debitage	unknown	-	-	1	0.3	white and transluscent
12	6	109-119	gen debitage	unknown	-	-	1	0.9	possibly heat treated
12	6	109-119	gen debitage	Burlington	-	-	1	0.1	
12	7	119-129	gen debitage	Cobden	utilized <75	-	1	0.7	
12	7	119-129	gen debitage	Burlington	-	-	2	0.2	
12	7	119-129	gen debitage	unknown	-	-	1	0.2	possible Fern Glen chert
14	1	5-55	gen debitage	Burlington	-	-	1	0.1	
14	4	75-85	gen debitage	Burlington	-	-	1	0.7	
14	5	85-97	gen debitage	unknown	-	-	1	0.4	
	Totals						27	12.5	

Table C.6. Non-Chipped Stone Artifacts from Mound 12 First Terrace Excavations.

Unit	Level	Elevation (cmbd)	Pebbles/Concretions		Rough Rock		Totals			
			No.	Wt. (g)	No.	Wt. (g)	No.	No. %	Wt. (g)	Wt. %
11	1	2-22	5	3.9	-	-	5	1.0	3.9	1.5
11	2	22-29	7	3.0	1	0.6	8	1.6	3.6	1.4
11	3	29-39	18	6.9	1	8.1	19	3.9	15.0	5.8
11	4	39-49	16	6.9			16	3.3	6.9	2.7
11	5	49-59	16	6.5	-	-	16	3.3	6.5	2.5
11	6	59-69	17	8.0	-	-	17	3.5	8.0	3.1
11	7	69-79	19	5.3	-	-	19	3.9	5.3	2.0
11	8	79-89	14	4.3	-	-	14	2.9	4.3	1.7
11	9	89-99	11	3.6	-	-	11	2.3	3.6	1.4
11	10	99-112	8	2.5	-	-	8	1.6	2.5	1.0
11	11	112-122	5	1.7	-	-	5	1.0	1.7	0.7
11	12	122-132	7	3.1	-	-	7	1.4	3.1	1.2
11	13	132-142	9	4.4	-	-	9	1.9	4.4	1.7
11	floor scrape	-	2	2.4	-	-	2	0.4	2.4	0.9
11	wall scrape	-	6	1.8	-	-	6	1.2	1.8	0.7
12	1	26-59	19	9.2	-	-	19	3.9	9.2	3.5
12	2	59-79	29	9.3	1	19.7	30	6.2	29.0	11.2
12	3	79-89	17	5.3	2	6.3	19	3.9	11.6	4.5
12	4	89-99	16	11.3	-	-	16	3.3	11.3	4.3
12	5	99-109	24	5.7	-	-	24	4.9	5.7	2.2
12	6	109-119	12	3.8	1	4.5	13	2.7	8.3	3.2
12	7	119-129	8	1.9	-	-	8	1.6	1.9	0.7
12	8	129-139	1	0.2	-	-	1	0.2	0.2	0.1
13	1	2-42	13	5.5	-	-	13	2.7	5.5	2.1
13	2	42-62	32	13.4	-	-	32	6.6	13.4	5.2
13	3	62-72	15	6.6	-	-	15	3.1	6.6	2.5
13	4	72-82	11	5.3	-	-	11	2.3	5.3	2.0
13	5	82-92	14	4.4	-	-	14	2.9	4.4	1.7
13	wall scrape	-	2	1.3	-	-	2	0.4	1.3	0.5
14	1	5-55	18	17.0	-	-	18	3.7	17.0	6.5
14	3	65-75	33	28.7	-	-	33	6.8	28.7	11.0
14	4	75-85	5	2.5	-	-	5	1.0	2.5	1.0
14	5	85-97	7	2.4	-	-	7	1.4	2.4	0.9
14	wall scrape	-	44	22.6	-	-	44	9.1	22.6	8.7
Totals			480	220.7	6	39.2	486	100.0	259.9	100.0
Total %			98.8	84.9	1.2	15.1				

Table C.7. Historic Artifacts from Mound 12 First Terrace Excavations.

Unit	Level	Type	No.	Wt. (g)	Comments
11	4	glass	1	0.2	clear
11	4	tile fragment	1	0.1	
11	4	nail and barbed wire fragments	11	27.6	
11	4	plastic tarp fragments	2	0.3	
11	5	metal fragments	9	8.7	Includes small nail frags
11	5	graphite	1	1.1	thin cylinder shape
11	6	barbed wire fragments	16	7.7	Includes small nail and other metal frags
11	7	Nail and other metal fragments	7	7.5	
11	9	metal fragments	7	1.0	
11	10	metal fragments	1	0.3	
11	11	metal fragments	2	0.4	
11	wall scrape	gravel	4	2.5	
11	wall scrape	metal fragments	12	4.0	
11	floor scrape	gravel	5	2.4	
11	floor scrape	metal fragments	1	0.3	
12	1	metal fragments	16	17.3	Includes small frags of nails and barbed wired
12	2	barbed wire fragments	12	21.4	
12	3	Shell casing	1	0.3	.22 caliber
12	3	metal fragments	1	0.4	
12	4	metal fragments	3	2.5	
12	5	metal fragments	10	7.9	Includes small nail, barbed wire, and other metal frags
12	6	metal fragments	4	1.6	
12	11	gravel	2	2.3	
12	wall scrape	gravel	1	2.6	
12	wall scrape	barbed wire fragments	1	1.2	
13	1	metal fragments	12	8.4	Includes small nail, barbed wire, and other metal frags
13	2	metal fragments	19	7.8	Includes small nail, barbed wire, and other metal frags
13	3	metal fragments	1	0.4	
13	4	barbed wire fragments	2	3.2	
13	5	cement fragment	1	360.6	
13	5	glass	1	0.3	blue-green tint
13	6	gravel	1	0.3	
13	7	gravel	1	0.3	
13	10	gravel	4	2.4	
14	1	metal fragments	1	0.2	
14	2	gravel	7	2.8	
14	2	barbed wire fragments	4	5.1	
14	3	barbed wire fragments	5	12.5	
14	4	gravel	189	101.6	
14	4	barbed wire fragments	6	11.5	
14	4	ceramic	3	40.3	1 glazed white earthenware; 2 drainage pipe frags
14	4	cinder	1	0.8	
14	5	gravel	1631	1005.7	
14	5	metal fragments	10	5.9	
14	6	gravel	1257	786.3	
14	6	metal fragments	3	9.5	
14	6	gravel	714	468.6	
14	6	metal fragments	3	0.5	
14	7	gravel	78	58.3	
14	7	barbed wire fragments	1	2.1	
14	8	gravel	27	21.9	
14	wall scrape	gravel	190	145.5	
Totals			4303	3184.4	

APPENDIX D
BODY SHERDS AND BURNT CLAY ARTIFACTS

Table D.1. Edelhardt Body Sherds.

Feature	SH rs		SH ds		SH pl		SH cm		SH rs/cm		SH some GG rs		SH some GG ds		SH some GG pl		SH some GT pl		LS rs		LS ds		LS pl	
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)
4	8	16.7	19	139.2	34	326.3	-	-	-	-	-	-	-	-	-	-	3	23.8	-	-	-	-	2	1.9
17	11	23.0	2	0.6	42	104.1	1	0.7	-	-	-	-	-	-	-	-	-	-	3	5.6	-	-	-	-
18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20	81	516.6	35	229.8	289	1622.7	1	3.0	2	18.6	-	-	2	10.1	-	-	-	-	15	115.9	5	21.1	-	-
22	1	3.9	-	-	2	16.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	1	5.4	1	1.3	3	10.4	-	-	-	-	-	-	-	-	-	-	-	-	1	4.4	-	-	-	-
28	1	3.6	7	12.8	1	0.9	-	-	-	-	2	7.2	-	-	-	-	-	-	-	-	-	-	-	-
29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	17.9
31	2	6.3	-	-	3	11.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.3
37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
39	-	-	1	1.6	2	2.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
42	-	-	1	1.3	1	0.6	1	3.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43	-	-	-	-	2	3.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
44	-	-	-	-	7	16.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
45	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
46	5	19.1	-	-	7	6.8	-	-	-	-	3	6.7	-	-	1	0.8	-	-	-	-	-	-	-	-
47	2	4.9	-	-	14	35.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48	-	-	-	-	2	1.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
49	-	-	1	4.4	1	6.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Totals	**112**	**599.6**	**67**	**391.0**	**410**	**2166.7**	**3**	**7.6**	**2**	**18.6**	**5**	**13.9**	**2**	**10.1**	**1**	**0.8**	**3**	**23.8**	**19**	**125.9**	**5**	**21.1**	**5**	**20.1**
Total %	**10.0**	**9.4**	**6.0**	**6.2**	**36.7**	**34.1**	**0.3**	**0.1**	**0.2**	**0.3**	**0.4**	**0.2**	**0.2**	**0.2**	**0.1**	**0.0**	**0.3**	**0.4**	**1.7**	**2.0**	**0.4**	**0.3**	**0.4**	**0.3**

Table D.1. Edelhardt Body Sherds (cont.).

Feature	GG rs		GG ds		GG pl		GG cm		GG cm/rs		GG MCS cm		GG some SH rs		GG some SH pl		GG some GT pl		GT rs		GT pl		GT cm		GT MCS pl	
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)
4	-	-	-	-	8	22.4	-	-	-	-	-	-	-	-	-	-	1	3.2	3	2.5	13	17.3	5	30.3	-	-
17	-	-	-	-	3	5.6	-	-	-	-	1	3.6	-	-	-	-	-	-	3	18.2	19	78.5	18	152.9	-	-
18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1.8	-	-
20	10	149.4	5	20.2	53	320.5	15	158.2	1	1.2	-	-	5	41.6	2	19.8	1	8.3	10	107.8	93	473.2	89	770.4	4	29.7
22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	4.9	-	-
25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	3.8	-	-	-	-
28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29	-	-	-	-	-	-	2	5.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2.1	-	-
31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.7	-	-
37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	6.5	-	-	-	-
39	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1.9	1	2.5	-	-
42	-	-	-	-	1	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	8.6	-	-	-	-
43	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16	14.5	-	-	-	-
44	-	-	-	-	2	2.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	8.6	-	-	-	-
45	-	-	-	-	1	2.0	-	-	-	-	-	-	-	-	-	-	-	-	1	3.8	-	-	1	2.7	-	-
46	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
47	-	-	-	-	3	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2.9	-	-
48	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	24	42.1	-	-	-	-
49	2	18.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Totals	**12**	**167.9**	**5**	**20.2**	**71**	**358.4**	**17**	**163.8**	**1**	**1.2**	**1**	**3.6**	**5**	**41.6**	**2**	**19.8**	**2**	**11.5**	**17**	**132.3**	**173**	**655.0**	**120**	**971.2**	**4**	**29.7**
Total %	**1.1**	**2.6**	**0.4**	**0.3**	**6.4**	**5.6**	**1.5**	**2.6**	**0.1**	**0.0**	**0.1**	**0.1**	**0.4**	**0.7**	**0.2**	**0.3**	**0.2**	**0.2**	**1.5**	**2.1**	**15.5**	**10.3**	**10.7**	**15.3**	**0.4**	**0.5**

Table D.1. Edelhardt Body Sherds (cont.).

Feature	GT MCS cm		GT some GG rs		GT some GG pl		GT some GG cm		GT some GG sm cm		SH/GG pl		SH/GT pl		GG/GT rs		GG/GT pl		GG/GT cm		GG/GT MCS cm		Total			
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	% No.	Wt. (g)	% Wt.
4	-	-	1	24.4	-	-	-	-	-	-	-	-	1	0.8	-	-	6	52.1	2	10.4	1	6.5	**107**	**9.6**	**677.8**	**10.7**
17	1	2.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1.8	-	-	-	-	**105**	**9.4**	**397.1**	**6.3**
18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**1**	**0.1**	**1.8**	**0.0**
20	6	29.2	-	-	5	53.1	13	90.6	-	-	-	-	1	5.2	-	-	5	29.8	2	21.8	2	10.5	**752**	**67.3**	**4878.2**	**76.8**
22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**4**	**0.4**	**25.8**	**0.4**
25	-	-	-	-	-	-	-	-	1	21.7	-	-	-	-	1	3.2	-	-	1	1.5	-	-	**10**	**0.9**	**51.7**	**0.8**
28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**11**	**1.0**	**24.6**	**0.4**
29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**5**	**0.4**	**25.6**	**0.4**
31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**7**	**0.6**	**19.2**	**0.3**
37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**1**	**0.1**	**6.5**	**0.1**
39	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**3**	**0.3**	**4.4**	**0.1**
40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**2**	**0.2**	**4.4**	**0.1**
42	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2.8	**7**	**0.6**	**18.7**	**0.3**
43	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**18**	**1.6**	**17.8**	**0.3**
44	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**12**	**1.1**	**27.6**	**0.4**
45	1	5.8	-	-	-	-	-	-	-	-	1	1.6	-	-	-	-	-	-	-	-	-	-	**5**	**0.4**	**15.9**	**0.3**
46	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**16**	**1.4**	**33.4**	**0.5**
47	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**21**	**1.9**	**46.8**	**0.7**
48	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**26**	**2.3**	**43.9**	**0.7**
49	1	1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**5**	**0.4**	**30.5**	**0.5**
Totals	**9**	**38.8**	**1**	**24.4**	**5**	**53.1**	**13**	**90.6**	**1**	**21.7**	**1**	**1.6**	**2**	**6.0**	**1**	**3.2**	**12**	**83.7**	**5**	**33.7**	**4**	**19.8**	**1118**	**100.0**	**6351.7**	**100.0**
Total %	**0.8**	**0.6**	**0.1**	**0.4**	**0.4**	**0.8**	**1.2**	**1.4**	**0.1**	**0.3**	**0.1**	**0.0**	**0.2**	**0.1**	**0.1**	**0.1**	**1.1**	**1.3**	**0.4**	**0.5**	**0.4**	**0.3**				

Table D.2. Edelhardt Body Sherds by Temper.

Feature	Sh		Ls		Gg		Gt		ShGg		ShGt		GgGt		Total			
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	No. %	Wt. (g)	Wt. %
4	61	482.2	2	1.9	8	22.4	21	50.1	-	-	4	24.6	11	96.6	**107**	**9.6**	**677.8**	**10.7**
17	56	128.3	3	5.6	4	9.2	41	252.2	-	-	-	-	1	1.8	**105**	**9.4**	**397.1**	**6.3**
18	-	-	-	-	-	-	1	1.8	-	-	-	-	-	-	**1**	**0.1**	**1.8**	**0.0**
20	408	2390.8	20	137.0	84	649.5	202	1410.2	9	71.4	1	5.2	28	214.1	**752**	**67.3**	**4878.2**	**76.8**
22	3	20.9	-	-	-	-	1	4.9	-	-	-	-	-	-	**4**	**0.4**	**25.8**	**0.4**
25	5	17.1	1	4.4	1	3.8	-	-	-	-	-	-	3	26.3	**10**	**0.9**	**51.7**	**0.8**
28	9	17.3	-	-	-	-	-	-	2	7.2	-	-	-	-	**11**	**1.0**	**24.6**	**0.4**
29	-	-	2	17.9	2	5.6	1	2.1	-	-	-	-	-	-	**5**	**0.4**	**25.6**	**0.4**
31	5	18.2	1	0.3	-	-	1	0.7	-	-	-	-	-	-	**7**	**0.6**	**19.2**	**0.3**
37	-	-	-	-	-	-	1	6.5	-	-	-	-	-	-	**1**	**0.1**	**6.5**	**0.1**
39	3	4.4	-	-	-	-	-	-	-	-	-	-	-	-	**3**	**0.3**	**4.4**	**0.1**
40	-	-	-	-	-	-	2	4.4	-	-	-	-	-	-	**2**	**0.2**	**4.4**	**0.1**
42	3	5.8	-	-	1	1.5	2	8.6	-	-	-	-	1	2.8	**7**	**0.6**	**18.7**	**0.3**
43	2	3.3	-	-	-	-	16	14.5	-	-	-	-	-	-	**18**	**1.6**	**17.8**	**0.3**
44	7	16.6	-	-	2	2.4	3	8.6	-	-	-	-	-	-	**12**	**1.1**	**27.6**	**0.4**
45	-	-	-	-	1	2.0	3	12.3	1	1.6	-	-	-	-	**5**	**0.4**	**15.9**	**0.3**
46	12	25.9	-	-	-	-	-	-	4	7.5	-	-	-	-	**16**	**1.4**	**33.4**	**0.5**
47	16	39.9	-	-	3	4.0	2	2.9	-	-	-	-	-	-	**21**	**1.9**	**46.8**	**0.7**
48	2	1.8	-	-	-	-	24	42.1	-	-	-	-	-	-	**26**	**2.3**	**43.9**	**0.7**
49	2	10.9	-	-	2	18.5	1	1.1	-	-	-	-	-	-	**5**	**0.4**	**30.5**	**0.5**
Totals	**594**	**3183.4**	**29**	**167.1**	**108**	**718.9**	**322**	**1823.0**	**16**	**87.8**	**5**	**29.8**	**44**	**341.6**	**1118**	**100.0**	**6351.6**	**100.0**
Total %	**53.1**	**50.1**	**2.6**	**2.6**	**9.7**	**11.3**	**28.8**	**28.7**	**1.4**	**1.4**	**0.4**	**0.5**	**3.9**	**5.4**				

Table D.3. Edelhardt Body Sherds by Surface Treatment.

Feature	Red Slip		Dark Slip		Plain		Cordmarked		RS/CM		CM smoothed over		Totals			
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	No. %	Wt. (g)	Wt. %
4	12	43.6	19	139.2	68	447.8	8	47.2	-	-	-	-	**107**	**9.6**	**677.8**	**10.7**
17	17	46.8	2	0.5	65	190.0	21	159.8	-	-	-	-	**105**	**9.4**	**397.1**	**6.3**
18	-	-	-	-	-	-	1	1.8	-	-	-	-	**1**	**0.1**	**1.8**	**0.0**
20	121	931.3	47	281.2	453	2562.2	128	1083.7	3	19.8	-	-	**752**	**67.3**	**4878.2**	**76.8**
22	1	3.9	-	-	2	16.9	1	4.9	-	-	-	-	**4**	**0.4**	**25.8**	**0.4**
25	3	13.0	1	1.4	4	14.2	1	1.5	-	-	1	21.7	**10**	**0.9**	**51.7**	**0.8**
28	3	10.9	7	12.8	1	0.9	-	-	-	-	-	-	**11**	**1.0**	**24.6**	**0.4**
29	-	-	-	-	2	17.9	3	7.7	-	-	-	-	**5**	**0.4**	**25.6**	**0.4**
31	2	6.3	-	-	4	12.2	1	0.7	-	-	-	-	**7**	**0.6**	**19.2**	**0.3**
37	-	-	-	-	1	6.5	-	-	-	-	-	-	**1**	**0.1**	**6.5**	**0.1**
39	-	-	1	1.6	2	2.8	-	-	-	-	-	-	**3**	**0.3**	**4.4**	**0.1**
40	-	-	-	-	1	1.9	1	2.5	-	-	-	-	**2**	**0.2**	**4.4**	**0.1**
42	-	-	1	1.3	4	10.7	2	6.7	-	-	-	-	**7**	**0.6**	**18.7**	**0.3**
43	-	-	-	-	18	17.8	-	-	-	-	-	-	**18**	**1.6**	**17.8**	**0.3**
44	-	-	-	-	12	27.6	-	-	-	-	-	-	**12**	**1.1**	**27.6**	**0.4**
45	1	3.8	-	-	2	3.6	2	8.5	-	-	-	-	**5**	**0.4**	**15.9**	**0.3**
46	8	25.8	-	-	8	7.6	-	-	-	-	-	-	**16**	**1.4**	**33.4**	**0.5**
47	2	4.9	-	-	17	39.0	2	2.9	-	-	-	-	**21**	**1.9**	**46.8**	**0.7**
48	-	-	-	-	26	43.9	-	-	-	-	-	-	**26**	**2.3**	**43.9**	**0.7**
49	2	18.5	1	4.4	1	6.5	1	1.1	-	-	-	-	**5**	**0.4**	**30.5**	**0.5**
Totals	**172**	**1108.8**	**79**	**442.4**	**691**	**3430.1**	**172**	**1329.0**	**3**	**19.8**	**1**	**21.7**	**1118**	**100.0**	**6351.7**	**100.0**
Total %	**15.4**	**17.5**	**7.1**	**7.0**	**61.8**	**54.0**	**15.4**	**20.9**	**0.3**	**0.3**	**0.1**	**0.3**				

Table D.4. Edelhardt Burnt Clay Artifacts.

Feature	BC		Clay Object		Daub		Shaped Clay		Pinch Pot		Totals			
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	No. %	Wt. (g)	Wt. %
4	5	22.0	-	-	-	-	-	-	-	-	**5**	**4.1**	**22.0**	**3.0**
17	12	11.4	2	1.4	-	-	-	-	-	-	**14**	**11.6**	**12.8**	**1.7**
18	6	2.8	1	17.3	-	-	-	-	-	-	**7**	**5.8**	**20.1**	**2.7**
20	62	298.6	19	325.5	1	8.3	2	27.0	4	14.0	**88**	**72.7**	**673.4**	**91.0**
28	1	0.3	-	-	-	-	-	-	-	-	**1**	**0.8**	**0.3**	**0.0**
31	1	3.2	-	-	-	-	-	-	-	-	**1**	**0.8**	**3.2**	**0.4**
40	1	1.3	-	-	-	-	-	-	-	-	**1**	**0.8**	**1.3**	**0.2**
47	2	2.0	1	3.9	-	-	-	-	-	-	**3**	**2.5**	**5.9**	**0.8**
48	1	0.8	-	-	-	-	-	-	-	-	**1**	**0.8**	**0.8**	**0.1**
Totals	**91**	**342.4**	**23**	**348.1**	**1**	**8.3**	**2**	**27.0**	**4**	**14.0**	**121**	**100.0**	**739.8**	**100.0**
Total %	**75.2**	**46.3**	**19.0**	**47.1**	**0.8**	**1.1**	**1.7**	**3.6**	**3.3**	**1.9**				

Table D.5. Edelhardt/Lohmann Body Sherds.

Feature	SH rs		SH ds		SH pl		SH cm		LS pl		GG rs		GG pl		GG cm		GT rs		GT pl	
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)
5	19	114.4	11	94.5	22	57.9	-	-	1	5.9	-	-	-	-	-	-	8	14.1	28	77.1
7	-	-	-	-	1	8.2	-	-	-	-	1	1.3	-	-	-	-	-	-	2	4.0
8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1.4
9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11	-	-	6	11.8	32	50.3	-	-	-	-	-	-	1	1.3	-	-	-	-	3	6.9
26	-	-	4	3.0	1	3.0	-	-	-	-	-	-	-	-	-	-	1	7.6	-	-
56	6	13.6	-	-	17	97.9	-	-	-	-	-	-	-	-	-	-	-	-	5	37.2
57	36	214.2	1	31.2	41	162.2	1	4.9	1	12.0	-	-	2	3.0	1	27.8	-	-	8	158.0
63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
65	1	4.0	-	-	-	-	-	-	-	-	-	-	1	12.3	-	-	-	-	5	94.7
Totals	**62**	**346.1**	**22**	**140.5**	**114**	**379.6**	**1**	**4.9**	**2**	**17.9**	**1**	**1.3**	**4**	**16.6**	**1**	**27.8**	**9**	**21.7**	**52**	**379.3**
Total %	**17.4**	**17.9**	**6.2**	**7.3**	**32.0**	**19.6**	**0.3**	**0.3**	**0.6**	**0.9**	**0.3**	**0.1**	**1.1**	**0.9**	**0.3**	**1.4**	**2.5**	**1.1**	**14.6**	**19.6**

Table D.5. Edelhardt/Lohmann Body Sherds (cont.).

Feature	GT cm		GT MCS pl		GT MCS cm		GT some GG pl		SH/GG pl		SH/GT pl		SH/GT cm		GG/GT pl		Total			
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	% No.	Wt. (g)	% Wt.
5	44	221.9	-	-	-	-	-	-	-	-	2	8.4	4	14.1	1	0.7	**140**	**39.3**	**609.0**	**31.5**
7	9	78.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**13**	**3.7**	**92.4**	**4.8**
8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**1**	**0.3**	**1.4**	**0.1**
9	4	149.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**4**	**1.1**	**149.3**	**7.7**
11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**42**	**11.8**	**70.3**	**3.6**
26	-	-	-	-	-	-	1	0.6	-	-	-	-	-	-	-	-	**7**	**2.0**	**14.3**	**0.7**
56	5	38.7	-	-	1	1.6	-	-	1	5.5	-	-	-	-	-	-	**35**	**9.8**	**194.5**	**10.0**
57	7	72.0	1	4.8	-	-	-	-	-	-	-	-	-	-	-	-	**99**	**27.8**	**690.0**	**35.6**
63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	3.4	**8**	**2.2**	**3.4**	**0.2**
65	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**7**	**2.0**	**111.0**	**5.7**
Totals	**69**	**560.8**	**1**	**4.8**	**1**	**1.6**	**1**	**0.6**	**1**	**5.5**	**2**	**8.4**	**4**	**14.1**	**9**	**4.1**	**356**	**100.0**	**1935.6**	**100.0**
Total %	**19.4**	**29.0**	**0.3**	**0.2**	**0.3**	**0.1**	**0.3**	**0.0**	**0.3**	**0.3**	**0.6**	**0.4**	**1.1**	**0.7**	**2.5**	**0.2**				

Table D.6. Edelhardt/Lohmann Body Sherds by Temper.

Feature	Sh		Ls		Gg		Gt		ShGg		ShGt		GgGt		Total			
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	No. %	Wt. (g)	Wt. %
5	52	266.8	1	5.9	-	-	80	313.1	-	-	6	22.5	1	0.7	**140**	**39.3**	**609.0**	**31.5**
7	1	8.2	-	-	1	1.3	11	82.9	-	-	-	-	-	-	**13**	**3.7**	**92.4**	**4.8**
8	-	-	-	-	-	-	1	1.4	-	-	-	-	-	-	**1**	**0.3**	**1.4**	**0.1**
9	-	-	-	-	-	-	4	149.3	-	-	-	-	-	-	**4**	**1.1**	**149.3**	**7.7**
11	38	62.1	-	-	1	1.3	3	6.9	-	-	-	-	-	-	**42**	**11.8**	**70.3**	**3.6**
26	5	6.1	-	-	-	-	1	7.6	-	-	-	-	1	0.6	**7**	**2.0**	**14.3**	**0.7**
56	23	111.5	-	-	-	-	11	77.5	1	5.5	-	-	-	-	**35**	**9.8**	**194.5**	**10.0**
57	79	412.5	1	12.0	3	30.8	16	234.7	-	-	-	-	-	-	**99**	**27.8**	**690.0**	**35.6**
63	-	-	-	-	-	-	-	-	-	-	-	-	8	3.4	**8**	**2.2**	**3.4**	**0.2**
65	1	4.0	-	-	1	12.3	5	94.7	-	-	-	-	-	-	**7**	**2.0**	**111.0**	**5.7**
Totals	**199**	**871.0**	**2**	**17.9**	**6**	**45.7**	**132**	**968.2**	**1**	**5.5**	**6**	**22.5**	**10**	**4.8**	**356**	**100.0**	**1935.5**	**100.0**
Total %	**55.9**	**45.0**	**0.6**	**0.9**	**1.7**	**2.4**	**37.1**	**50.0**	**0.3**	**0.3**	**1.7**	**1.2**	**2.8**	**0.2**				

Table D.7. Edelhardt/Lohmann Body Sherds by Surface Treatment.

Feature	Red Slip		Dark Slip		Plain		Cordmarked		Totals			
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	No. %	Wt. (g)	Wt. %
5	27	128.5	11	94.5	54	150.0	48	236.0	**140**	**39.3**	**609.0**	**31.5**
7	1	1.3	-	-	3	12.2	9	78.9	**13**	**3.7**	**92.4**	**4.8**
8	-	-	-	-	1	1.4	-	-	**1**	**0.3**	**1.4**	**0.1**
9	-	-	-	-	-	-	4	149.3	**4**	**1.1**	**149.3**	**7.7**
11	-	-	6	11.8	36	58.5	-	-	**42**	**11.8**	**70.3**	**3.6**
26	1	7.6	4	3.0	2	3.7	-	-	**7**	**2.0**	**14.3**	**0.7**
56	6	13.6	-	-	23	140.6	6	40.3	**35**	**9.8**	**194.5**	**10.0**
57	36	214.1	1	31.2	53	340.0	9	104.7	**99**	**27.8**	**690.0**	**35.6**
63	-	-	-	-	8	3.4	-	-	**8**	**2.2**	**3.4**	**0.2**
65	1	4.0	-	-	6	107.0	-	-	**7**	**2.0**	**111.0**	**5.7**
Totals	**72**	**369.0**	**22**	**140.5**	**186**	**816.8**	**76**	**609.2**	**356**	**100.0**	**1935.6**	**100.0**
Total %	**20.2**	**19.1**	**6.2**	**7.3**	**52.2**	**42.2**	**21.3**	**31.5**				

Table D.8. Edelhardt/Lohmann Burnt Clay Artifacts.

Feature	BC		Clay Object		Daub		Totals			
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	No. %	Wt. (g)	Wt. %
5	30	35.2	1	23.6	**-**	**-**	**31**	**28.7**	**58.8**	**11.5**
7	1	1.4	-	-	**-**	**-**	**1**	**0.9**	**1.4**	**0.3**
8	3	1.6	-	-	**-**	**-**	**3**	**2.8**	**1.6**	**0.3**
11	15	21.4	-	-	-	-	**15**	**13.9**	**21.4**	**4.2**
56	16	48.9	5	33.0	-	-	**21**	**19.4**	**81.9**	**16.1**
57	26	151.4	10	185.7	1	7.9	**37**	**34.3**	**345.0**	**67.6**
Totals	**91**	**259.9**	**16**	**242.3**	**1**	**7.9**	**108**	**100.0**	**510.1**	**100.0**
Total %	**84.3**	**51.0**	**14.8**	**47.5**	**0.9**	**1.5**				

Table D.9. Lohmann Body Sherds.

Feature	SH rs		SH ds		SH pl		SH cm		SH some GG pl		SH some GT pl		LS rs		LS pl		GG rs		GG pl	
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)
1	19	47.9	-	-	128	1144.9	-	-	2	6.5	1	29.0	5	28.4	-	-	-	-	12	69.9
2	12	26.1	9	20.2	10	3.6	-	-	-	-	2	5.1	1	2.2	-	-	-	-	-	-
10	4	9.5	-	-	9	30.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14	3	2.3	2	10.0	22	165.0	1	0.2	-	-	-	-	1	2.2	1	1.5	-	-	13	31.1
15	3	5.9	2	1.0	20	106.2	-	-	-	-	-	-	-	-	1	1.7	1	2.8	-	-
21	12	57.8	11	26.5	28	91.5	-	-	-	-	-	-	3	6.4	-	-	-	-	4	8.9
23	9	28.1	5	11.5	57	237.5	-	-	-	-	-	-	3	16.2	2	28.6	-	-	1	1.4
27	8	62.4	2	27.8	22	86.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
41	2	1.6	-	-	1	12.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
52	-	-	-	-	1	0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
54	1	1.5	-	-	2	1.6	-	-	-	-	-	-	-	-	1	3.7	-	-	-	-
61	5	11.1	7	21.1	193	1762.6	-	-	-	-	-	-	-	-	-	-	-	-	2	6.2
64	-	-	1	2.1	4	31.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
66	11	22.1	1	5.6	15	32.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Totals	**89**	**276.1**	**40**	**125.8**	**512**	**3706.5**	**1**	**0.2**	**2**	**6.5**	**3**	**34.1**	**13**	**55.4**	**5**	**35.5**	**1**	**2.8**	**32**	**117.5**
Total %	**10.8**	**5.4**	**4.9**	**2.5**	**62.2**	**73.2**	**0.1**	**0.0**	**0.2**	**0.1**	**0.4**	**0.7**	**1.6**	**1.1**	**0.6**	**0.7**	**0.1**	**0.1**	**3.9**	**2.3**

Table D.9. Lohmann Body Sherds (cont.).

Feature	GG cm		GG sm cm		GG some GT pl		GT rs		GT pl		GT cm		GT MCS pl		GT MCS cm		GT MCS rs/cm		GT some GG pl	
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)
1	5	6.4	-	-	-	-	1	3.3	-	-	1	0.8	-	-	-	-	2	25.7	-	-
2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	-	-	-	-	-	-	-	-	1	1.7	-	-	-	-	-	-	-	-	-	-
14	1	6.3	-	-	-	-	1	3.1	1	1.5	6	31.3	-	-	-	-	-	-	-	-
15	-	-	-	-	-	-	-	-	2	4.4	4	43.6	-	-	-	-	-	-	-	-
21	1	1.2	-	-	-	-	-	-	18	22.6	10	68.4	-	-	-	-	-	-	-	-
23	-	-	-	-	1	5.7	4	18.1	6	23.5	13	187.5	1	0.8	1	3.0	-	-	3	13.0
27	-	-	1	6.5	-	-	-	-	4	18.7	3	9.6	-	-	-	-	-	-	-	-
41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
52	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
54	-	-	-	-	-	-	-	-	-	-	1	0.4	-	-	-	-	-	-	-	-
61	2	6.2	-	-	-	-	-	-	3	0.6	-	-	-	-	-	-	-	-	-	-
64	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
66	-	-	-	-	1	0.3	-	-	4	15.4	2	22.7	-	-	-	-	-	-	1	2.7
Totals	**9**	**20.1**	**1**	**6.5**	**2**	**6.0**	**6**	**24.5**	**39**	**88.3**	**40**	**364.2**	**1**	**0.8**	**1**	**3.0**	**2**	**25.7**	**4**	**15.6**
Total %	**1.1**	**0.4**	**0.1**	**0.1**	**0.2**	**0.1**	**0.7**	**0.5**	**4.7**	**1.7**	**4.9**	**7.2**	**0.1**	**0.0**	**0.1**	**0.1**	**0.2**	**0.5**	**0.5**	**0.3**

Table D.9. Lohmann Body Sherds (cont.).

Feature	GT some GG cm		GT some GG sm cm		SH/GG rs		GG/GT rs		GG/GT pl		GG/GT cm		Total			
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	% No.	Wt. (g)	% Wt.
1	-	-	-	-	-	-	-	-	9	29.6	2	7.4	187	22.7	1399.8	27.6
2	-	-	-	-	-	-	-	-	-	-	-	-	34	4.1	57.2	1.1
10	-	-	-	-	-	-	-	-	-	-	-	-	14	1.7	41.5	0.8
14	-	-	-	-	1	6.9	-	-	1	1.0	-	-	54	6.6	262.4	5.2
15	-	-	-	-	-	-	-	-	-	-	-	-	33	4.0	165.5	3.3
21	1	1.9	-	-	-	-	-	-	-	-	-	-	88	10.7	285.1	5.6
23	-	-	-	-	-	-	-	-	-	-	1	83.0	107	13.0	657.7	13.0
27	-	-	1	5.0	-	-	2	6.3	1	3.7	1	7.1	45	5.5	233.2	4.6
41	-	-	-	-	-	-	-	-	-	-	-	-	3	0.4	13.9	0.3
52	-	-	-	-	-	-	-	-	-	-	-	-	1	0.1	0.8	0.0
54	-	-	-	-	-	-	-	-	-	-	-	-	5	0.6	7.2	0.1
61	-	-	-	-	-	-	-	-	-	-	-	-	212	25.8	1807.7	35.7
64	-	-	-	-	-	-	-	-	-	-	-	-	5	0.6	33.9	0.7
66	-	-	-	-	-	-	-	-	-	-	-	-	35	4.3	101.0	2.0
Totals	**1**	**1.9**	**1**	**5.0**	**1**	**6.9**	**2**	**6.3**	**11**	**34.3**	**4**	**97.6**	**823**	**100.0**	**5066.9**	**100.0**
Total %	**0.1**	**0.0**	**0.1**	**0.1**	**0.1**	**0.1**	**0.2**	**0.1**	**1.3**	**0.7**	**0.5**	**1.9**				

Table D.10. Lohmann Body Sherds by Temper.

Feature	Sh		Ls		Gg		Gt		ShGg		ShGt		GgGt		Total			
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	No. %	Wt. (g)	Wt. %
1	147	1192.8	5	28.4	17	76.3	4	29.8	2	6.5	1	29.0	11	37.0	**187**	**22.7**	**1399.8**	**27.6**
2	31	49.9	1	2.2	-	-	-	-	-	-	2	5.1	-	-	**34**	**4.1**	**57.2**	**1.1**
10	13	39.8	-	-	-	-	1	1.7	-	-	-	-	-	-	**14**	**1.7**	**41.5**	**0.8**
14	28	177.5	2	3.7	14	37.4	8	35.9	1	6.9	-	-	1	1.0	**54**	**6.6**	**262.4**	**5.2**
15	25	113.1	1	1.7	1	2.8	6	47.9	-	-	-	-	-	-	**33**	**4.0**	**165.5**	**3.3**
21	51	175.7	3	6.4	5	10.1	28	91.0	-	-	-	-	1	1.9	**88**	**10.7**	**285.1**	**5.6**
23	71	277.0	5	44.7	1	1.4	25	232.8	-	-	-	-	5	101.7	**107**	**13.0**	**657.6**	**13.0**
27	32	176.4	-	-	1	6.5	7	28.2	-	-	-	-	5	22.0	**45**	**5.5**	**233.1**	**4.6**
41	3	13.9	-	-	-	-	-	-	-	-	-	-	-	-	**3**	**0.4**	**13.9**	**0.3**
52	1	0.8	-	-	-	-	-	-	-	-	-	-	-	-	**1**	**0.1**	**0.8**	**0.0**
54	3	3.1	1	3.7	-	-	1	0.4	-	-	-	-	-	-	**5**	**0.6**	**7.2**	**0.1**
61	205	1794.8	-	-	4	12.3	3	0.6	-	-	-	-	-	-	**212**	**25.8**	**1807.7**	**35.7**
64	5	33.9	-	-	-	-	-	-	-	-	-	-	-	-	**5**	**0.6**	**33.9**	**0.7**
66	27	59.9	-	-	-	-	6	38.0	-	-	-	-	2	3.0	**35**	**4.3**	**101.0**	**2.0**
Totals	**642**	**4108.5**	**18**	**90.8**	**43**	**146.9**	**89**	**506.4**	**3**	**13.4**	**3**	**34.1**	**25**	**166.6**	**823**	**100.0**	**5066.7**	**100.0**
Total %	**78.0**	**81.1**	**2.2**	**1.8**	**5.2**	**2.9**	**10.8**	**10.0**	**0.4**	**0.3**	**0.4**	**0.7**	**3.0**	**3.3**				

Table D.11. Lohmann Body Sherds by Surface Treatment.

Feature	Red Slip		Dark Slip		Plain		Cordmarked		RS/CM		CM smoothed over		Totals			
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	No. %	Wt. (g)	Wt. %
1	25	79.6	-	-	152	1279.9	8	14.6	2	25.7	-	-	**187**	**22.7**	**1399.8**	**27.6**
2	13	28.3	9	20.2	12	8.7	-	-	-	-	-	-	**34**	**4.1**	**57.2**	**1.1**
10	4	9.5	-	-	10	32.0	-	-	-	-	-	-	**14**	**1.7**	**41.5**	**0.8**
14	6	14.5	2	10.0	38	200.1	8	37.8	-	-	-	-	**54**	**6.6**	**262.4**	**5.2**
15	4	8.6	2	1.0	23	112.3	4	43.6	-	-	-	-	**33**	**4.0**	**165.5**	**3.3**
21	15	64.2	11	26.4	50	123.0	12	71.5	-	-	-	-	**88**	**10.7**	**285.1**	**5.6**
23	16	62.3	5	11.4	71	310.4	15	273.5	-	-	-	-	**107**	**13.0**	**657.6**	**13.0**
27	10	68.6	2	27.8	27	108.5	4	16.7	-	-	2	11.5	**45**	**5.5**	**233.1**	**4.6**
41	2	1.6	-	-	1	12.4	-	-	-	-	-	-	**3**	**0.4**	**13.9**	**0.3**
52	-	-	-	-	1	0.8	-	-	-	-	-	-	**1**	**0.1**	**0.8**	**0.0**
54	1	1.5	-	-	3	5.3	1	0.4	-	-	-	-	**5**	**0.6**	**7.2**	**0.1**
61	5	11.1	7	21.1	198	1769.4	2	6.2	-	-	-	-	**212**	**25.8**	**1807.7**	**35.7**
64	-	-	1	2.1	4	31.8	-	-	-	-	-	-	**5**	**0.6**	**33.9**	**0.7**
66	11	22.1	1	5.6	21	50.6	2	22.7	-	-	-	-	**35**	**4.3**	**101.0**	**2.0**
Totals	**112**	**371.9**	**40**	**125.7**	**611**	**4045.1**	**56**	**486.9**	**2**	**25.7**	**2**	**11.5**	**823**	**100.0**	**5066.7**	**100.0**
Total %	**13.6**	**7.3**	**4.9**	**2.5**	**74.2**	**79.8**	**6.8**	**9.6**	**0.2**	**0.5**	**0.2**	**0.2**				

Table D.12. Lohmann Burnt Clay Artifacts.

Feature	BC		Clay Object		Daub		Oxidized Soil		Pinch Pot		Totals			
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	No. %	Wt. (g)	Wt. %
1	20	54.2	8	312.6	-	-	66	206.9	-	-	**94**	**38.7**	**573.7**	**56.1**
2	7	12.1	-	-	-	-	-	-	-	-	**7**	**2.9**	**12.1**	**1.2**
10	10	13.4	5	21.0	-	-	-	-	-	-	**15**	**6.2**	**34.4**	**3.4**
14	20	32.9	1	12.0	-	-	-	-	-	-	**21**	**8.6**	**44.9**	**4.4**
15	5	7.3	3	20.0	-	-	-	-	-	-	**8**	**3.3**	**27.3**	**2.7**
21	24	35.6	8	62.3	-	-	-	-	-	-	**32**	**13.2**	**97.9**	**9.6**
23	21	28.7	7	69.9	-	-	-	-	2	4.8	**30**	**12.3**	**103.4**	**10.1**
27	21	68.0	2	38.6	1	13.9	-	-	-	-	**24**	**9.9**	**120.5**	**11.8**
61	9	1.4	-	-	-	-	-	-	-	-	**9**	**3.7**	**1.4**	**0.1**
66	3	6.6	-	-	-	-	-	-	-	-	**3**	**1.2**	**6.6**	**0.6**
Totals	**140**	**260.2**	**34**	**536.4**	**1**	**13.9**	**66**	**206.9**	**2**	**4.8**	**243**	**100.0**	**1022.2**	**100.0**
Total %	**57.6**	**25.5**	**14.0**	**52.5**	**0.4**	**1.4**	**27.2**	**20.2**	**0.8**	**0.5**				

Table D.13. Stirling Body Sherds.

Feature	SH rs		SH ds		SH pl		SH cm		SH some GG pl		SH some GT/GG pl		LS rs		LS ds	
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)
12	54	227.7	58	232.1	121	389.5	3	5.9	-	-	2	3.2	9	48.5	-	-
13	69	530.1	57	172.4	142	493.5	-	-	10	81.7	1	47.3	-	-	1	1.3
51	-	-	10	81.3	8	13.0	-	-	-	-	-	-	-	-	-	-
Totals	**123**	**757.8**	**125**	**485.8**	**271**	**896.0**	**3**	**5.9**	**10**	**81.7**	**3**	**50.5**	**9**	**48.5**	**1**	**1.3**
Total %	**20.4**	**29.4**	**20.8**	**18.9**	**45.0**	**34.8**	**0.5**	**0.2**	**1.7**	**3.2**	**0.5**	**2.0**	**1.5**	**1.9**	**0.2**	**0.1**

Feature	GG ds		GG pl		GG cm		GG some SH ds		GG some GT cm		GT rs		GT ds		GT pl	
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)
12	2	0.5	3	3.1	2	18.4	-	-	1	4.3	1	3.7	2	29.6	9	24.5
13	-	-	4	6.0	1	5.9	1	5.6	1	14.7	-	-	1	2.3	14	43.5
51	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Totals	**2**	**0.5**	**7**	**9.1**	**3**	**24.3**	**1**	**5.6**	**2**	**19.0**	**1**	**3.7**	**3**	**31.9**	**23**	**68.1**
Total %	**0.3**	**0.0**	**1.2**	**0.4**	**0.5**	**0.9**	**0.2**	**0.2**	**0.3**	**0.7**	**0.2**	**0.1**	**0.5**	**1.2**	**3.8**	**2.6**

Feature	GT cm		GT MCS pl		GT MCS cm		GT some GG pl		GT some GG cm		SH/GG pl		Total			
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	% No.	Wt. (g)	% Wt.
12	4	14.7	1	1.0	1	4.5	-	-	-	-	-	-	**273**	**45.3**	**1011.1**	**39.3**
13	2	5.7	-	-	4	24.5	1	5.9	1	5.6	-	-	**310**	**51.5**	**1445.8**	**56.2**
51	-	-	-	-	-	-	-	-	-	-	1	23.4	**19**	**3.2**	**117.7**	**4.6**
Totals	**6**	**20.3**	**1**	**1.0**	**5**	**29.0**	**1**	**5.9**	**1**	**5.6**	**1**	**23.4**	**602**	**100.0**	**2574.7**	**100.0**
Total %	**1.0**	**0.8**	**0.2**	**0.0**	**0.8**	**1.1**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.9**				

Table D.14. Stirling Body Sherds by Temper.

Feature	Sh		Ls		Gg		Gt		ShGg		GgGt		ShGgGt		Total			
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	No. %	Wt. (g)	Wt. %
12	236	855.2	9	48.5	7	22.0	18	77.8	-	-	1	4.3	2	3.2	**273**	**45.3**	**1011.1**	**39.3**
13	268	1196.0	1	1.3	5	11.9	21	76.0	11	87.3	3	26.2	1	47.3	**310**	**51.5**	**1445.9**	**56.2**
51	18	94.3	-	-	-	-	-	-	1	23.4	-	-	-	-	**19**	**3.2**	**117.7**	**4.6**
Totals	**522**	**2145.5**	**10**	**49.8**	**12**	**33.9**	**39**	**153.8**	**12**	**110.7**	**4**	**30.5**	**3**	**50.5**	**602**	**100.0**	**2574.7**	**100.0**
Total %	**86.7**	**83.3**	**1.7**	**1.9**	**2.0**	**1.3**	**6.5**	**6.0**	**2.0**	**4.3**	**0.7**	**1.2**	**0.5**	**2.0**				

Table D.15. Stirling Body Sherds by Surface Treatment.

Feature	Red Slip		Dark Slip		Plain		Cordmarked		Totals			
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	No. %	Wt. (g)	Wt. %
12	64	279.9	62	262.2	136	421.3	11	47.7	**273**	**45.3**	**1011.1**	**39.3**
13	69	530.1	60	181.6	172	677.9	9	56.3	**310**	**51.5**	**1445.9**	**56.2**
51	-	-	10	81.3	9	36.4	-	-	**19**	**3.2**	**117.7**	**4.6**
Totals	**133**	**810.0**	**132**	**525.1**	**317**	**1135.6**	**20**	**104.0**	**602**	**100.0**	**2574.7**	**100.0**
Total %	**22.1**	**31.5**	**21.9**	**20.4**	**52.7**	**44.1**	**3.3**	**4.0**				

Table D.16. Stirling Burnt Clay Artifacts.

Feature	BC		Clay Object		Oxidized Soil		Shaped Clay		Totals			
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	No. %	Wt. (g)	Wt. %
12	132	397.1	27	486.5	7	13.7	-	-	**166**	**59.9**	**897.3**	**67.5**
13	98	276.1	11	153.5	-	-	1	1.0	**110**	**39.7**	**430.6**	**32.4**
51	1	1.7	-	-	-	-	-	-	**1**	**0.4**	**1.7**	**0.1**
Totals	**231**	**674.9**	**38**	**640.0**	**7**	**13.7**	**1**	**1.0**	**277**	**100.0**	**1329.6**	**100.0**
Total %	**83.4**	**50.8**	**13.7**	**48.1**	**2.5**	**1.0**	**0.4**	**0.1**				

Table D.17. Mississippian Ceramic Artifacts.

Feature	SH pl		GT pl		BC		Totals	
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)
32	1	12.1	1	1.9	-	-	**2**	**14.0**
58 (nf)	-	-	1	2.5	-	-	**1**	**2.5**
62	-	-	-	-	9	2.2	**9**	**2.2**
Totals	**1**	**12.1**	**2**	**4.4**	**9**	**2.2**	**12**	**18.7**

APPENDIX E
NON-CHIPPED LITHIC ARTIFACTS

Table E.1. Edelhardt Non-Chipped Lithic Artifacts.

Feature	Rough Rock sandstone		Rough Rock limestone		Rough Rock granite		Rough Rock igneous		Rough Rock gabbro		Rough Rock basalt		Rough Rock schist		Rough Rock gneiss		Rough Rock quartzite	
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)
4	12	110.9	2	72.3	1	36.6	-	-	-	-	-	-	-	-	-	-	-	-
17	7	76.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20	85	1682.3	4	235.0	5	255.7	1	12.0	7	760.9	1	77.9	1	18.9	1	66.8	2	51.9
25	2	40.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29	1	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31	1	3.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
39	5	3.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
42	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43	1	0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
45	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
47	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48	2	0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
49	2	8.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Totals	**118**	**1927.2**	**6**	**307.3**	**6**	**292.3**	**1**	**12.0**	**7**	**760.9**	**1**	**77.9**	**1**	**18.9**	**1**	**66.8**	**2**	**51.9**
Total %	**73.3**	**52.0**	**3.7**	**8.3**	**3.7**	**7.9**	**0.6**	**0.3**	**4.3**	**20.5**	**0.6**	**2.1**	**0.6**	**0.5**	**0.6**	**1.8**	**1.2**	**1.4**

Feature	Rough Rock meta-quartzite		Rough Rock silicified limestone		FCR basalt		FCR granite		Pebbles		Concretions		Totals			
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	No. %	Wt. (g)	Wt. %
4	-	-	-	-	-	-	-	-	1	2.9	-	-	**16**	**9.9**	**222.7**	**6.0**
17	-	-	-	-	-	-	-	-	1	1.3	-	-	**8**	**5.0**	**77.9**	**2.1**
20	1	8.6	-	-	1	39.1	2	80.1	4	6.8	-	-	**115**	**71.4**	**3296.0**	**88.9**
25	-	-	-	-	-	-	-	-	-	-	-	-	**2**	**1.2**	**40.9**	**1.1**
29	-	-	-	-	-	-	-	-	-	-	-	-	**1**	**0.6**	**0.5**	**0.0**
31	-	-	-	-	-	-	-	-	1	0.5	2	0.6	**4**	**2.5**	**4.2**	**0.1**
39	-	-	-	-	-	-	-	-	-	-	-	-	**5**	**3.1**	**3.6**	**0.1**
42	-	-	1	44.3	-	-	-	-	-	-	-	-	**1**	**0.6**	**44.3**	**1.2**
43	-	-	-	-	-	-	-	-	-	-	-	-	**1**	**0.6**	**0.2**	**0.0**
45	-	-	-	-	-	-	-	-	1	1.6	-	-	**1**	**0.6**	**1.6**	**0.0**
47	-	-	-	-	-	-	-	-	2	2.2	-	-	**2**	**1.2**	**2.2**	**0.1**
48	-	-	-	-	-	-	-	-	1	5.3	-	-	**3**	**1.9**	**5.5**	**0.1**
49	-	-	-	-	-	-	-	-	-	-	-	-	**2**	**1.2**	**8.9**	**0.2**
Totals	**1**	**8.6**	**1**	**44.3**	**1**	**39.1**	**2**	**80.1**	**11**	**20.6**	**2**	**0.6**	**161**	**100.0**	**3708.5**	**100.0**
Total %	**0.6**	**0.2**	**0.6**	**1.2**	**0.6**	**1.1**	**1.2**	**2.2**	**6.8**	**0.6**	**1.2**	**0.0**				

Table E.2. Edelhardt Non-Chipped Lithic Artifacts by Material.

Feature	Sandstone		Limestone		Granite		Igneous		Gabbro		Basalt		Schist		Gneiss	
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)
4	12	110.9	2	72.3	1	36.6	-	-	-	-	-	-	-	-	-	-
17	7	76.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20	85	1682.3	4	235.0	7	335.8	1	12.0	7	760.9	2	117.0	1	18.9	1	66.8
25	2	40.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29	1	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31	1	3.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
39	5	3.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
42	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43	1	0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
45	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
47	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48	2	0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
49	2	8.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Totals	**118**	**1927.2**	**6**	**307.3**	**8**	**372.4**	**1**	**12.0**	**7**	**760.9**	**2**	**117.0**	**1**	**18.9**	**1**	**66.8**
Total %	**73.3**	**52.0**	**3.7**	**8.3**	**5.0**	**10.0**	**0.6**	**0.3**	**4.3**	**20.5**	**1.2**	**3.2**	**0.6**	**0.5**	**0.6**	**1.8**

Feature	Quartzite		Meta-quartzite		Silicified limestone		Pebbles		Concretions		Totals			
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	No. %	Wt. (g)	Wt. %
4	-	-	-	-	-	-	1	2.9	-	-	**16**	**9.9**	**222.7**	**6.0**
17	-	-	-	-	-	-	1	1.3	-	-	**8**	**5.0**	**77.9**	**2.1**
20	2	51.9	1	8.6	-	-	4	6.8	-	-	**115**	**71.4**	**3296.0**	**88.9**
25	-	-	-	-	-	-	-	-	-	-	**2**	**1.2**	**40.9**	**1.1**
29	-	-	-	-	-	-	-	-	-	-	**1**	**0.6**	**0.5**	**0.0**
31	-	-	-	-	-	-	1	0.5	2	0.6	**4**	**2.5**	**4.2**	**0.1**
39	-	-	-	-	-	-	-	-	-	-	**5**	**3.1**	**3.6**	**0.1**
42	-	-	-	-	1	44.3	-	-	-	-	**1**	**0.6**	**44.3**	**1.2**
43	-	-	-	-	-	-	-	-	-	-	**1**	**0.6**	**0.2**	**0.0**
45	-	-	-	-	-	-	1	1.6	-	-	**1**	**0.6**	**1.6**	**0.0**
47	-	-	-	-	-	-	2	2.2	-	-	**2**	**1.2**	**2.2**	**0.1**
48	-	-	-	-	-	-	1	5.3	-	-	**3**	**1.9**	**5.5**	**0.1**
49	-	-	-	-	-	-	-	-	-	-	**2**	**1.2**	**8.9**	**0.2**
Totals	**2**	**51.9**	**1**	**8.6**	**1**	**44.3**	**11**	**20.6**	**2**	**0.6**	**161**	**100.0**	**3708.5**	**100.0**
Total %	**1.2**	**1.4**	**0.6**	**0.2**	**0.6**	**1.2**	**6.8**	**0.6**	**1.2**	**0.0**				

Table E.3. Edelhardt Non-Chipped Lithic Artifacts by Type.

Feature	Rough Rock		FCR		Pebbles		Concretions		Totals			
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	No. %	Wt. (g)	Wt. %
4	15	219.8	-	-	1	2.9	-	-	**16**	**9.9**	**222.7**	**6.0**
17	7	76.6	-	-	1	1.3	-	-	**8**	**5.0**	**77.9**	**2.1**
20	108	3170.0	3	119.2	4	6.8	-	-	**115**	**71.4**	**3296.0**	**88.9**
25	2	40.9	-	-	-	-	-	-	**2**	**1.2**	**40.9**	**1.1**
29	1	0.5	-	-	-	-	-	-	**1**	**0.6**	**0.5**	**0.0**
31	1	3.1	-	-	1	0.5	2	0.6	**4**	**2.5**	**4.2**	**0.1**
39	5	3.6	-	-	-	-	-	-	**5**	**3.1**	**3.6**	**0.1**
42	1	44.3	-	-	-	-	-	-	**1**	**0.6**	**44.3**	**1.2**
43	1	0.2	-	-	-	-	-	-	**1**	**0.6**	**0.2**	**0.0**
45	-	-	-	-	1	1.6	-	-	**1**	**0.6**	**1.6**	**0.0**
47	-	-	-	-	2	2.2	-	-	**2**	**1.2**	**2.2**	**0.1**
48	2	0.2	-	-	1	5.3	-	-	**3**	**1.9**	**5.5**	**0.1**
49	2	8.9	-	-	-	-	-	-	**2**	**1.2**	**8.9**	**0.2**
Totals	**145**	**3568.1**	**3**	**119.2**	**11**	**20.6**	**2**	**0.6**	**161**	**100.0**	**3708.5**	**100.0**
Total %	**90.1**	**96.2**	**1.9**	**3.2**	**6.8**	**0.6**	**1.2**	**0.0**				

Table E.4. Lohmann Non-Chipped Lithic Artifacts.

Feature	Rough Rock sandstone		Rough Rock limestone		Rough Rock andesite		FCR Chert		Igneous flake gabbro		Igneous flake quartzite		Mineral hematite	
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)
1	4	18.3	7	479.0	1	134.4	-	-	-	-	-	-	3	21.9
2	-	-	24	54.5	-	-	-	-	-	-	-	-	-	-
10	2	4.4	-	-	-	-	1	4.0	1	6.5	-	-	-	-
14	3	9.3	-	-	-	-	-	-	-	-	-	-	-	-
15	2	6.4	-	-	-	-	-	-	-	-	-	-	-	-
21	1	2.7	-	-	-	-	-	-	-	-	1	2.9	-	-
23	41	603.1	3	148.6	-	-	-	-	-	-	-	-	-	-
27	10	41.6	-	-	-	-	-	-	-	-	-	-	-	-
51	1	33.0	-	-	-	-	-	-	-	-	-	-	-	-
54	2	17.1	-	-	-	-	-	-	-	-	-	-	-	-
61	14	96.6	-	-	-	-	-	-	-	-	-	-	-	-
64	-	-	17	113.7	-	-	-	-	-	-	-	-	-	-
66	4	66.5	-	-	-	-	-	-	-	-	-	-	-	-
Totals	**84**	**899.0**	**51**	**795.8**	**1**	**134.4**	**1**	**4.0**	**1**	**6.5**	**1**	**2.9**	**3**	**21.9**
Total %	**54.9**	**47.5**	**33.3**	**42.1**	**0.7**	**7.1**	**0.7**	**0.2**	**0.7**	**0.3**	**0.7**	**0.2**	**2.0**	**1.2**

Feature	Mineral quartz		Mineral limonite		Pebbles		Concretions		Totals			
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	No. %	Wt. (g)	Wt. %
1	-	-	-	-	-	-	-	-	15	9.8	653.6	34.6
2	-	-	-	-	-	-	-	-	24	15.7	54.5	2.9
10	-	-	-	-	-	-	-	-	4	2.6	14.9	0.8
14	-	-	-	-	1	0.3	-	-	4	2.6	9.6	0.5
15	-	-	-	-	-	-	1	0.5	3	2.0	6.9	0.4
21	-	-	-	-	3	2.1	-	-	5	3.3	7.7	0.4
23	1	0.7	1	3.8	1	4.6	-	-	47	30.7	760.8	40.2
27	-	-	-	-	1	10.6	-	-	11	7.2	52.2	2.8
51	-	-	-	-	-	-	-	-	1	0.7	33.0	1.7
54	-	-	-	-	1	2.6	-	-	3	2.0	19.7	1.0
61	-	-	-	-	-	-	-	-	14	9.2	96.6	5.1
64	-	-	-	-	-	-	-	-	17	11.1	113.7	6.0
66	-	-	-	-	1	1.0	-	-	5	3.3	67.5	3.6
Totals	**1**	**0.7**	**1**	**3.8**	**8**	**21.2**	**1**	**0.5**	**153**	**100.0**	**1890.7**	**100.0**
Total %	**0.7**	**0.0**	**0.7**	**0.2**	**5.2**	**1.1**	**0.7**	**0.0**				

Table E.5. Lohmann Non-Chipped Lithic Artifacts by Material.

Feature	Sandstone		Limestone		Andesite		Chert		Gabbro		Quartzite		Hematite	
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)
1	4	18.3	7	479.0	1	134.4	-	-	-	-	-	-	3	21.9
2	-	-	24	54.5	-	-	-	-	-	-	-	-	-	-
10	2	4.4	-	-	-	-	1	4.0	1	6.5	-	-	-	-
14	3	9.3	-	-	-	-	-	-	-	-	-	-	-	-
15	2	6.4	-	-	-	-	-	-	-	-	-	-	-	-
21	1	2.7	-	-	-	-	-	-	-	-	1	2.9	-	-
23	41	603.1	3	148.6	-	-	-	-	-	-	-	-	-	-
27	10	41.6	-	-	-	-	-	-	-	-	-	-	-	-
51	1	33.0	-	-	-	-	-	-	-	-	-	-	-	-
54	2	17.1	-	-	-	-	-	-	-	-	-	-	-	-
61	14	96.6	-	-	-	-	-	-	-	-	-	-	-	-
64	-	-	17	113.7	-	-	-	-	-	-	-	-	-	-
66	4	66.5	-	-	-	-	-	-	-	-	-	-	-	-
Totals	**84**	**899.0**	**51**	**795.8**	**1**	**134.4**	**1**	**4.0**	**1**	**6.5**	**1**	**2.9**	**3**	**21.9**
Total %	**54.9**	**47.5**	**33.3**	**42.1**	**0.7**	**7.1**	**0.7**	**0.2**	**0.7**	**0.3**	**0.7**	**0.2**	**2.0**	**1.2**

Feature	Quartz		Limonite		Pebbles		Concretions		Totals			
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	No. %	Wt. (g)	Wt. %
1	-	-	-	-	-	-	-	-	**15**	**9.8**	**653.6**	**34.6**
2	-	-	-	-	-	-	-	-	**24**	**15.7**	**54.5**	**2.9**
10	-	-	-	-	-	-	-	-	**4**	**2.6**	**14.9**	**0.8**
14	-	-	-	-	1	0.3	-	-	**4**	**2.6**	**9.6**	**0.5**
15	-	-	-	-	-	-	1	0.5	**3**	**2.0**	**6.9**	**0.4**
21	-	-	-	-	3	2.1	-	-	**5**	**3.3**	**7.7**	**0.4**
23	1	0.7	1	3.8	1	4.6	-	-	**47**	**30.7**	**760.8**	**40.2**
27	-	-	-	-	1	10.6	-	-	**11**	**7.2**	**52.2**	**2.8**
51	-	-	-	-	-	-	-	-	**1**	**0.7**	**33.0**	**1.7**
54	-	-	-	-	1	2.6	-	-	**3**	**2.0**	**19.7**	**1.0**
61	-	-	-	-	-	-	-	-	**14**	**9.2**	**96.6**	**5.1**
64	-	-	-	-	-	-	-	-	**17**	**11.1**	**113.7**	**6.0**
66	-	-	-	-	1	1.0	-	-	**5**	**3.3**	**67.5**	**3.6**
Totals	**1**	**0.7**	**1**	**3.8**	**8**	**21.2**	**1**	**0.5**	**153**	**100.0**	**1890.7**	**100.0**
Total %	**0.7**	**0.0**	**0.7**	**0.2**	**5.2**	**1.1**	**0.7**	**0.0**				

Table E.6. Lohmann Non-Chipped Lithic Artifacts by Type.

Feature	Rough Rock		FCR		Igneous flake		Mineral		Pebbles		Concretions		Totals			
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	No. %	Wt. (g)	Wt. %
1	12	631.7	-	-	-	-	3	21.9	-	-	-	-	**15**	**9.8**	**653.6**	**34.6**
2	24	54.5	-	-	-	-	-	-	-	-	-	-	**24**	**15.7**	**54.5**	**2.9**
10	2	4.4	1	4.0	1	6.5	-	-	-	-	-	-	**4**	**2.6**	**14.9**	**0.8**
14	3	9.3	-	-	-	-	-	-	1	0.3	-	-	**4**	**2.6**	**9.6**	**0.5**
15	2	6.4	-	-	-	-	-	-	-	-	1	0.5	**3**	**2.0**	**6.9**	**0.4**
21	1	2.7	-	-	1	2.9	-	-	3	2.1	-	-	**5**	**3.3**	**7.7**	**0.4**
23	44	751.7	-	-	-	-	2	4.5	1	4.6	-	-	**47**	**30.7**	**760.8**	**40.2**
27	10	41.6	-	-	-	-	-	-	1	10.6	-	-	**11**	**7.2**	**52.2**	**2.8**
51	1	33.0	-	-	-	-	-	-	-	-	-	-	**1**	**0.7**	**33.0**	**1.7**
54	2	17.1	-	-	-	-	-	-	1	2.6	-	-	**3**	**2.0**	**19.7**	**1.0**
61	14	96.6	-	-	-	-	-	-	-	-	-	-	**14**	**9.2**	**96.6**	**5.1**
64	17	113.7	-	-	-	-	-	-	-	-	-	-	**17**	**11.1**	**113.7**	**6.0**
66	4	66.5	-	-	-	-	-	-	1	1.0	-	-	**5**	**3.3**	**67.5**	**3.6**
Totals	**136**	**1829.2**	**1**	**4.0**	**2**	**9.4**	**5**	**26.4**	**8**	**21.2**	**1**	**0.5**	**153**	**100.0**	**1890.7**	**100.0**
Total %	**88.9**	**96.7**	**0.7**	**0.2**	**1.3**	**0.5**	**3.3**	**1.4**	**5.2**	**1.1**	**0.7**	**0.0**				

Table E.7. Stirling Non-Chipped Lithic Artifacts.

Feature	Rough Rock sandstone		Rough Rock limestone		Rough Rock granite		Rough Rock gabbro		Rough Rock basalt		Rough Rock diabase		FCR gabbro	
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)
12	46	747.4	6	67.2	1	4.4	2	272.7	-	-	-	-	3	507.1
13	209	2289.5	50	718.7	-	-	-	-	1	34.9	1	48.4	-	-
51	1	33.0	-	-	-	-	-	-	-	-	-	-	-	-
Totals	**256**	**3069.9**	**56**	**785.9**	**1**	**4.4**	**2**	**272.7**	**1**	**34.9**	**1**	**48.4**	**3**	**507.1**
Total %	**72.9**	**64.4**	**16.0**	**16.5**	**0.3**	**0.1**	**0.6**	**5.7**	**0.3**	**0.7**	**0.3**	**1.0**	**0.9**	**10.6**

Feature	Igneous flake gabbro		Mineral red ochre		Pebbles		Concretions		Totals			
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	No. %	Wt. (g)	Wt. %
12	1	1.2	-	-	4	7.4	3	0.8	**66**	**18.8**	**1608.2**	**33.8**
13	-	-	13	15.5	8	15.8	2	0.8	**284**	**80.9**	**3123.6**	**65.6**
51	-	-	-	-	-	-	-	-	**1**	**0.3**	**33.0**	**0.7**
Totals	**1**	**1.2**	**13**	**15.5**	**12**	**23.2**	**5**	**1.6**	**351**	**100.0**	**4764.8**	**100.0**
Total %	**0.3**	**0.0**	**3.7**	**0.3**	**3.4**	**0.5**	**1.4**	**0.0**				

Table E.8. Stirling Non-Chipped Lithic Artifacts by Material.

Feature	Sandstone		Limestone		Granite		Gabbro		Basalt		Diabase		Red ochre		Pebbles		Concretions		Totals			
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	No. %	Wt. (g)	Wt. %
12	46	747.4	6	67.2	1	4.4	6	781.0	-	-	-	-	-	-	4	7.4	3	0.8	66	18.8	1608.2	33.8
13	209	2289.5	50	718.7	-	-	-	-	1	34.9	1	48.4	13	15.5	8	15.8	2	0.8	284	80.9	3123.6	65.6
51	1	33.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.3	33.0	0.7
Totals	256	3069.9	56	785.9	1	4.4	6	781	1	34.9	1	48.4	13	15.5	12	23.2	5	1.6	351	100.0	4764.8	100.0
Total %	72.9	64.4	16.0	16.5	0.3	0.1	1.7	16.4	0.3	0.7	0.3	1.0	3.7	0.3	3.4	0.5	1.4	0.0				

Table E.9. Stirling Non-Chipped Lithic Artifacts by Types.

Feature	Rough Rock		FCR		Igneous flake		Mineral		Pebbles		Concretions		Totals			
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	No. %	Wt. (g)	Wt. %
12	55	1091.7	3	507.1	1	1.2	-	-	4	7.4	3	0.8	**66**	**18.8**	**1608.2**	**33.8**
13	261	3091.5	-	-	-	-	13	15.5	8	15.8	2	0.8	**284**	**80.9**	**3123.6**	**65.6**
51	1	33.0	-	-	-	-	-	-	-	-	-	-	**1**	**0.3**	**33.0**	**0.7**
Totals	**317**	**4216.2**	**3**	**507.1**	**1**	**1.2**	**13**	**15.5**	**12**	**23.2**	**5**	**1.6**	**351**	**100.0**	**4764.8**	**100.0**
Total %	**90.3**	**88.5**	**0.9**	**10.6**	**0.3**	**0.0**	**3.7**	**0.3**	**3.4**	**0.5**	**1.4**	**0.0**				

Table E.10. Mississippian All Lithic Artifacts.

Feature	Burlington Gen Debitage		Burlington Utilized Flake		Sandstone Rough Rock		Total	
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)
32	3	1.3	1	3.2	1	106.5	5	111.0

APPENDIX F
EDELHARDT/LOHMANN LITHIC ARTIFACTS

Table F.1. Debitage from Edelhardt/Lohmann Phase Features.

Feature	Burlington Gen Debitage		Burlington Block Fracture		Burlington Thermal Shatter		Burlington Bifacial Thin		Mill Creek Gen Debitage		Mill Creek Hoe Flakes		Mill Creek Bifacial Thin	
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)
3	1	0.2	-	-	-	-	-	-	-	-	-	-	-	-
5	10	17.7	1	29.9	4	7.5	-	-	5	4.9	-	-	-	-
7	9	40.3	-	-	-	-	-	-	-	-	1	2.3	-	-
8	6	15.6	-	-	-	-	-	-	-	-	2	7.0	-	-
9	3	6.6	-	-	-	-	-	-	-	-	-	-	-	-
11	7	7.8	1	3.8	5	3.7	-	-	1	0.3	1	0.2	1	0.3
26	1	1.2	-	-	1	0.9	-	-	1	1.0	-	-	-	-
56	8	25.1	-	-	1	1.0	1	1.2	-	-	-	-	-	-
57	18	53.3	-	-	-	-	1	2.9	1	1.5	3	8.5	1	0.6
Totals	**35**	**87.6**	**1**	**3.8**	**7**	**5.6**	**2**	**4.1**	**3**	**2.8**	**4**	**8.7**	**2**	**0.9**
Total %	**35.4**	**33.3**	**1.0**	**1.4**	**7.1**	**2.1**	**2.0**	**1.6**	**3.0**	**1.1**	**4.0**	**3.3**	**2.0**	**0.3**

Feature	Cobden Gen Debitage		Kaolin Gen Debitage		Glacial Block Fracture		Unknown Gen Debitage		Total			
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	No. %	Wt. (g)	Wt. %
3			-	-	-	-	-	-	**1**	**1.0**	**0.2**	**0.1**
5	1	1.1	-	-	-	-	-	-	**21**	**21.2**	**61.1**	**23.2**
7	-	-	-	-	-	-	-	-	**10**	**10.1**	**42.6**	**16.2**
8	-	-	-	-	-	-	-	-	**8**	**8.1**	**22.6**	**8.6**
9	-	-	-	-	-	-	-	-	**3**	**3.0**	**6.6**	**2.5**
11	-	-	1	0.1	-	-	-	-	**17**	**17.2**	**16.2**	**6.2**
26	-	-	-	-	1	14.7	-	-	**4**	**4.0**	**17.8**	**6.8**
56	-	-	-	-	-	-	-	-	**10**	**10.1**	**27.3**	**10.4**
57	-	-	-	-	-	-	1	1.6	**25**	**25.3**	**68.4**	**26.0**
Totals	**1**	**1.1**	**1**	**0.1**	**1**	**14.7**	**1**	**1.6**	**99**	**100.0**	**262.8**	**100.0**
Total %	**1.0**	**0.4**	**1.0**	**0.0**	**1.0**	**5.6**	**1.0**	**0.6**				

Table F.2. Non-Chipped Stone Artifacts from Edelhardt/Lohmann Phase Features.

	Rough Rock		Rough Rock		Rough Rock		Rough Rock		Mineral		Pebbles		Totals			
Feature	sandstone		limestone		Glacial		gabbro		Hematite							
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	No. %	Wt. (g)	Wt. %
5	4	96.1	6	13.0	-	-	-	-	1	0.7	1	2.9	**12**	**32.4**	**112.7**	**13.2**
7	-	-	-	-	1	9.1	-	-	-	-	-	-	**1**	**2.7**	**9.1**	**1.1**
8	-	-	-	-	-	-	1	2.2	-	-	-	-	**1**	**2.7**	**2.2**	**0.3**
11	4	2.7	-	-	-	-	-	-	-	-	2	1.3	**6**	**16.2**	**4.0**	**0.5**
56	-	-	-	-	-	-	-	-	-	-	1	8.9	**1**	**2.7**	**8.9**	**1.0**
57	7	260.2	8	459.2	-	-	-	-	-	-	1	0.3	**16**	**43.2**	**719.7**	**84.0**
Totals	**15**	**359.0**	**14**	**472.2**	**1**	**9.1**	**1**	**2.2**	**1**	**0.7**	**5**	**13.4**	**37**	**100.0**	**856.6**	**100.0**
Total %	**40.5**	**41.9**	**37.8**	**55.1**	**2.7**	**1.1**	**2.7**	**0.3**	**2.7**	**0.1**	**13.5**	**1.6**				

Table F.3. Chipped Stone Tools from Edelhardt/Lohmann Phase Features.

Feature	Burlington Utilized Flake		Burlington Retouched Flake		Burlington Core		Mill Creek Utilized Flake		Mill Creek Retouched Flake		Kaolin Utilized Flake		Glacial Utilized Flake		Totals			
	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	Wt. (g)	No.	No. %	Wt. (g)	Wt. %
5	3	33.3	1	8.7	-	-	-	-	-	-	-	-	1	51.0	**5**	**15.6**	**93.0**	**37.9**
7	1	9.1	1	10.6	-	-	-	-	-	-	-	-	-	-	**2**	**6.3**	**19.7**	**8.0**
8	-	-	-	-	-	-	1	2.7	-	-	-	-	-	-	**1**	**3.1**	**2.7**	**1.1**
9	1	2.9	1	8.4	1	14.8	-	-	1	29.9	-	-	-	-	**4**	**12.5**	**56.0**	**22.8**
11	-	-	1	5.8	-	-	-	-	-	-	1	7.0	-	-	**2**	**6.3**	**12.8**	**5.2**
26	2	7.3	-	-	-	-	-	-	-	-	-	-	-	-	**2**	**6.3**	**7.3**	**3.0**
56	4	3.8	-	-	-	-	-	-	-	-	-	-	-	-	**4**	**12.5**	**3.8**	**1.5**
57	10	37.5	1	1.5	1	10.9	-	-	-	-	-	-	-	-	**12**	**37.5**	**49.9**	**20.4**
Totals	**21**	**93.9**	**5**	**35.0**	**2**	**25.7**	**1**	**2.7**	**1**	**29.9**	**1**	**7.0**	**1**	**51.0**	**32**	**100.0**	**245.2**	**100.0**
Total %	**65.6**	**38.3**	**15.6**	**14.3**	**6.3**	**10.5**	**3.1**	**1.1**	**3.1**	**12.2**	**3.1**	**2.9**	**3.1**	**20.8**				

APPENDIX G
MUNSELL LABELS FOR MOUND AND AVENUE EXCAVATIONS

Table G.1. Munsells for EB 1.

Zone	Munsell	Texture
Plow Zone	10YR 4/3	silt loam
1	10YR 4/3 with many small mottles of 10YR 6/3, few medium mottles of 10YR 5/6, and common small mottles of 10YR 4/1	silt loam
2	10YR 4/2 with many large mottles of 10YR 5/4	silt loam
3	10YR 4/2 with many small mottles of 10YR 6/4 and 4/1, common medium mottles of 10YR 5/6, and few charcoal flecks	silt loam
4	10YR 3/2 with many small mottles of 10YR 5/4 and 5/8 and common fine charcoal flecks	silt loam
5	10YR 5/2	silt loam
6	10YR 4/2 with many small-medium mottles of 10YR 5/6 and common small mottles of 10YR 4/2	silt loam
7	10YR 4/2 with few medium mottles of 10YR 6/4	silt loam
8	10YR 4/3 with common medium mottles of 10YR 5/4	silt loam
9	10YR 4/2 with common small-medium mottles of 10YR 5/4	silt loam
10	10YR 5/8, 6/4, and 5/2 with finely mixed fine common iron staining	silt loam
11	10YR 3/2 with few fine mottles of 10YR 5/8	silt loam
12	10YR 4/2 with many medium-large mottles of 10YR 5/4 and few fine charcoal flecks	silt loam
13	fine laminated bands of 10YR 8/1 and 6/3	very fine silt
14	10YR 3/1 with common fine charcoal flecking and common bands of iron staining	fine silty loam
15	10YR 4/1.5 with common small mottles of 10YR 6/1, many fine BC and iron inclusions, and common fine-medium charcoal flecks	silt loam
16	10YR 4/2 with common small mottles of 10YR 5/6	silt loam
17	10YR 4.5/2	silt loam
18	10YR 2/2 (slightly oxidized)	silt loam
19	10YR 4/2 with common large mottles of 10YR 5/6 and common small mottles of 10YR 4/2	silt loam
20	10YR 4/3 with common small mottles of 10YR 5/6	silt loam
21	10YR 4/3 with many small mottles of 10YR 5/4	silt loam
22	10YR 4/4 with small BC inclusions and common fine charcoal flecks	silt loam
SS	10YR 4/4 with common fine iron inclusions	silt loam

Table G.2. Munsells for EB 2.

Zone	Munsell	Texture
Plow Zone	10YR 4/2	silt loam
1	10YR 4/2 with large common mottles of 10YR 5/3	silt loam
2	10YR 4/3 with common small mottles of 10YR 5/4 and common fine iron inclusions	silt loam
3	10YR 4/3 with many small-medium mottles of 10YR 5/5 and common small mottles of 10YR 4/2 and 6/3	silt loam
4	10YR 4/3 evenly mottled with 10YR 5/2 (fine silt)	silt loam
5	10YR 4/3 with common small mottles of 10YR 5/3	silt loam
6	10YR 4/2 even mottled with 10YR 4/6	silt loam
7	10YR 4/3	silt loam
8	10YR 3/2 with few small mottles of 10YR 6/4	silt loam
9	10YR 4/3 with many small mottles of 10YR 5/2 and 6/4	silt loam
10	10YR 4/2	silt loam
11	10YR 4/3 with common small mottles of 10YR 6/4	silt loam
12	2.5Y 6/3 with common large mottles of 10YR 4/3	silt loam
13	10YR 4/2 with many small mottles of 10YR 6/2 and few medium mottles of 10YR 5/8	silt loam
14	10YR 4/4 with many small mottles of 10YR 6/2	silt loam
15	evenly distributed fine mottles of 10YR 5/4 and 6/2 with common medium mottles of 10YR 5/6	silt loam
16	10YR 4/2 with common medium mottles of 10YR 5/6 and 3/2	silt loam
17	10YR 4/3 with common medium mottles of 10YR 5/6	silt loam
18	10YR 5/4 with common medium mottles of 10YR 4/2	silt loam
19	10YR 4/3 with common small-medium mottles of 10YR 5/5 and 6/3	silt loam
20	10YR 5/4 with common medium mottles of 10YR 4/1	silt loam
21	10YR 4/3 with many medium mottles of 10YR 6/2 (fine silt)	silt loam
22	10YR 4/3	silt loam
23	10YR 5.5/4 with common medium-large mottles of 10YR 4/2	silt loam
24	10YR 4/3 with many small mottles of 10YR 6/2 (fine silt) and common small-large mottles of 10YR 5/6	silt loam
25	evenly distributed medium mottles 10YR 4/2, 5/6, and 6/4	silt loam
26	10YR 4/2 with many small mottles of 10YR 6/4 (fine silt) and common medium mottles of 10YR 5/7	silt loam
27	10YR 5/4 with common medium-large mottles of 10YR 4/2	silt loam
28	10YR 5/4 with common medium mottles of 10YR 4/2 and many small mottles of 10YR 6/4 and 6/6	silt loam
29	10YR 5/3 with many fine mottles of 10YR 5/2 (fine silt) and few medium mottles of 10YR 4/3	silt loam
30	10YR 4/2 with few small mottles of 10YR 5/4 and common small mottles of 10YR 6/3	silt loam
31	10YR 5/3 with many small mottles of 10YR 6/1 (fine silt) and 5/6	silt loam
SS	10YR 5/6 with common medium mottles of 10YR 6/2 (fine silt) and common fine hematite or manganese inclusions	silt loam

Table G.3. Munsells for EB 4.

Zones	Munsell	Texture
Plow Zone	10YR 4/4	silty clay loam
Md 7 ZA	10YR 4/3 with many fine charcoal and BC inclusions	silt loam
Md 7 ZB	10YR 4/3 with common small mottles of 10YR 5/4 and few fine charcoal flecks	silt loam
Md 7 ZC	10YR 4/3 with few small mottles of 10YR 5/4 and few fine charcoal flecks	silt loam
Md 7 ZD	10YR 4/3 with common small mottles of 10YR 4/6 and few medium charcoal inclusions	silt loam
F64 ZA	10YR 4/3 with many fine mottles of 10YR 6/2 (fine silt) and common fine charcoal inclusions	silt loam
F64 ZB	10YR 3/3 with many fine charcoal and BC inclusions	silty clay loam
F64 ZC	Laminated bands of 10YR 5/4 and 6/3	fine silt loam
F64 ZD	10YR 5/4	silt loam
F64 ZE	10YR 4/3 with many small mottles of 10YR 6/2 and common medium-large charcoal inclusions	fine silt loam
F64 ZF	10YR 4/2 with common medium mottles of 10YR 4/6 and many medium charcoal inclusions	silt loam
SS	10YR 5/5-5/6	silt loam

Table G.4. Munsells for EMG Trench 1.

Zone	Munsell	Texture
Plow Zone	10YR 3/2	silt loam
A1	10YR 3/2 with few small mottles of 10YR 5/3	silt loam
A2	10YR 3/2-4/2 with few small mottles of 10YR 5/3	silt loam
A3	10YR 3/2 with few small mottles of 10YR 5/3 and some laminations	silt loam
A4	10YR 3/1-3/2 with few small mottles of 10YR 4/4 with abundant manganese/iron concretions	silt loam
A5	10YR 3/2 with common small mottles of 10YR 4/3 with few manganese/iron concretions	silt loam
A6	10YR 3/1 with common small mottles of 10YR 4/3-4/4	silty clay loam
A7	10YR 2/2 with many small mottles of 10YR 3/2	silt loam
A8	10YR 3/1-3/2 with common small mottles of 10YR 4/2	silt loam
A9	10YR 3/1-3/2 with few small mottles of 10YR 4/3-5/3 and few laminations and common manganese/iron concretions	silt loam
A10	10YR 3/1 with many small mottles of 10YR 4/2 with few manganese/iron concretions	silt loam
SS	10YR 2/1-3/1 with many medium mottles of 10YR 4/4	silty clay loam
	*profile collapsed before other Munsells and textures were taken	

Table G.5. Munsells for EMG Trench 2.

Zone	Munsell	Texture
Plow Zone	10YR 3/2-4/2	silty loam
A1	10YR 3/1-3/2 with few small mottles of 10YR 3/2	very silty loam
A2	10YR 3/1-3/2 with common small mottles of 10YR 3/2	very silty loam
A3	10YR 3/1-3/2 with many small mottles of 10YR 3/4 with abundant manganese/iron concretions	silty loam
A4	10YR 3.5/2 with common laminations of 10YR 5/2	very silty loam
A5	10YR 3.5/2 with many laminations of 10YR 5/2	very silty loam
A6	10YR 3/1.5 with common small mottles of 10YR 4/3 and common manganese/iron concretions	silty loam
A7	10YR 3/1 with many small mottles of 10YR 3/2 and few small mottles of 10YR 4/6 and many manganese/iron concretions	silty clay loam
A8	10YR 3/1 with many small mottles of 10YR 3/2 with common small mottles of 10YR 4/6	silty clay loam
A9	10YR 3/2-4/2 with few laminations	silty loam
A10	10YR 3/1-3/2	very silty loam
SS	10YR 3/1-3/2 with common medium-large mottles of 10YR 4/6	clay loam

Table G.6. Munsells for Mound 12 First Terrace Trench.

Zone	Munsell	Texture
Topsoil	10YR 3/2	silty clay loam
A1	10YR 4/3 with many small mottles of 10YR 5/3	silt
A2	10YR 4/3 with many small mottles of 10YR 5/3 and few small mottles of 10YR 3/3	silt
A3	10YR 3/2 with many small-medium mottles of 10YR 4/3	silt loam
A4	10YR 3/2 with many small mottles of 10YR 4/3 and occasional small lamination lenses	silt loam
A5	10YR 3/2 with many small mottles of 10YR 4/3 and occasional large lamination lenses	silt loam
A6	10YR 3/2 with many small-medium mottles of 10YR 3/3	silt loam
A7	10YR 3/2 with many small mottles of 10YR 3/3	silt loam
B1	10YR 3/2 with many small mottles of 10YR 4/3 and common small mottles of 10YR 5/2	silt loam
B2	10YR 3/2 with common small mottles of 10YR 3/1	silt
B3	10YR 3/2 with common small mottles of 10YR 3/1 and few small-medium mottles of 10YR 3/4	silt
B4	10YR 3/2-3/3 with many small-medium mottles of 10YR 5/2	silt
C1	10YR 3/2 with many small mottles of 10YR 4/2 and few medium mottles of 10YR 5/2	silt loam
C2	10YR 3/2 with many small mottles of 10YR 4/2 and common small mottles of 10YR 5/2	silt loam
C3	10YR 3/2 with many small mottles of 10YR 4/3 and common small mottles of 10YR 5/2	silt loam
C4	10YR 3/2 with many small mottles of 10YR 4/3-3/3 and common small-medium mottles of 10YR 5/2	silt loam
C5	10YR 3/3 with many small mottles of 10YR 5/3	silt loam
C6	10YR 3/2 with many small mottles of 10YR 4/3 and common medium mottles of 10YR 5/2	silty clay loam
C7	10YR 3/2 with common small mottles of 10YR 4/3 and common small mottles of 10YR 4/4 and few small mottles of 10YR 5/2	silty clay loam
C8	10YR 3/2 with many small mottles of 10YR 4/3 and many small mottles of 10YR 4/4 and few small mottles of 10YR 5/2	silty clay loam
C9	10YR 3/2 with many small mottles of 10YR 4/3	silt loam
C10	10YR 3/2.5 with common small mottles of 10YR 4/3	silt loam
C11	10YR 3/2 with common small mottles of 10YR 4/6	silty clay loam
C12	10YR 4/3 with common small mottles of 10YR 5/2	silt
H1	10YR 3/2 with many small-medium mottles of 10YR 3/3	silt loam
H2	10YR 3/2 with common small mottles of 10YR 3/3	silty clay loam
H3	10YR 3/2 with many small-medium mottles of 10YR 3/3 and common lamination lenses	silt loam
H4	10YR 3/2 with few small mottles of 10YR 3/3	silt loam
H5	10YR 3/2 with common small mottles of 10YR 3/3 and few small mottles of 10YR 5/2	silt loam
Pit/Post pit	10YR 4/3 with many small-medium mottles of 10YR 4/4	silty clay loam

Table G.7. Munsells for Mound 12 Interface Trench.

Zone	Munsell	Texture
Upper fill 1	10YR 3/2 with few small mottles of 10YR 5/6	very silty loam
Upper fill 2	10YR 3/2 with common medium-large mottles of 10YR 5/6	very silty loam
Upper fill 3	10YR 4/4 with common medium mottles of 10YR 3/2	very silty loam
A1	10YR 3/3 with many small mottles of 10YR 6/3 and common large mottles of 10YR 5/6	very silty loam
A2	10YR 5/6 with common small mottles of 10YR 3/3	silt loam
A3	10YR 4/3-5/3 with common medium mottles of 10YR 5/6	very silty loam
A4	10YR 4/3-3/3 with common small mottles of 10YR 4/3-5/3	very silty loam
A5	10YR 4/3-3/3 with common small mottles of 10YR 5/6-6/3	very silty loam
B1	10YR 4/4 with common small mottles of 10YR 6/3	very silty loam
B2	10YR 4/4-4/6 with common small mottles of 10YR 6/3	very silty loam
B3	10YR 4/3-4/4 with few small mottles of 10YR 5/3	very silty loam
B4	10YR 4/4 with common small mottles of 10YR 6/3 and few iron/manganese concretions	very silty loam
B5	10YR 4/3 with many small mottles/laminations of 10YR 6/3	very silty loam
B6	10YR 3/3-3/4 with many iron/manganese concretions	very silty loam
B7	10YR 4/3-3/3	very silty loam
C1	10YR 4/4-4/6 with many small mottles of 10YR 6/3	very silty loam
C2	10YR 5/3 with many mottles of 10YR 4/4	very silty loam
D1	10YR 4/3-3/3 with many small mottles of 10YR 4/4	silt loam
D2	10YR 4/3-3/3 with many medium mottles of 10YR 4/4	silt loam
D3	10YR 4/4 with many small mottles of 10YR 4/3	silt loam
D4	10YR 4/4 with many small mottles of 10YR 3/3	very silty loam
D5	10YR 3/3 with many small mottles of 10YR 4/4	very silty loam
D6	10YR 4/3-3/3 with many short, thin laminations of 10YR 7/3	very silty loam
D7	10YR 3.5/4-4/4	very silty loam
D8	10YR 3/3-4/4	very silty loam
D9	10YR 4/4 with many large mottles of 10YR 3/3	very silty loam
D10	10YR 3.5/4-4/4 with common small mottles of 10YR 5/4 and occasional charcoal flecks	very silty loam
D11	10YR 3.5/3-4/4 with few small mottles of 10YR 5/4	very silty loam
D12	10YR 3.5/4-4/4 with common small mottles of 10YR 5/4 (slightly lighter)	very silty loam
D13	10YR 3/3-3/4 with many small mottles of 10YR 4/4-5/4	very silty loam
D14	10YR 4/4-3/4 with common small mottles of 10YR 6/3	very silty loam
D15	10YR 3/3 with many small mottles of 10YR 4/4-5/4	very silty loam
D16	10YR 4/4-3/4 with few medium mottles of 10YR 5/4-6/4	very silty loam
D17	10YR 4.5/4 with many htin laminations of 10YR 6/3-7/3	very silty loam
D18	10YR 3/3-4/4 with few small mottles of 10YR 4/3	very silty loam
D19	10YR 3/4 with few small mottles of 10YR 4/6	very silty loam
D20	10YR 4/4-3/4 with common mottles of 10YR 5/4	very silty loam
D21	10YR 3.5/4 with many small mottles of 10YR 4/4 and common manganese flecks	very silty loam
D22	10YR 3.5/4 with many small mottles of 10YR 4/4 and few manganese flecks	very silty loam
D23	10YR 5/4-4/4 with common small to medium mottles of 10YR 4/3	very silty loam
D24	10YR 5/4-4/4 with common large mottles of 10YR 4/3	very silty loam
D25	10YR 5/4-4/4 with common small to medium mottles of 10YR 4/3	very silty loam
D26	10YR 5/4-4/4 with common small to medium mottles of 4/3 (slightly lighter than D23)	very silty loam
D27	10YR 4/2-4/3	very silty loam
D28	10YR 4/4 with many small mottles of 10YR 4/3-5/4	very silty loam
D29	10YR 6/3	very silty loam
Laminations	layers range in color 10YR 4/4-3/3; all exhibit small mottles/bands of 10YR 6/3-7/3	very silty loam

Table G.8. Munsells for Mound 12 Summit Units.

Zone	Munsells	Texture
Topsoil	10YR 3/3-3/4	very silty loam
A	10YR 4/3-4/4	very silty loam
B1	10YR 4/3-5/3	very silty loam
B2	10YR 4/3-4/2	very silty loam
B3	10YR 3/3-4/3 (slightly lighter than A2)	very silty loam
C1	10YR 4/3	very silty loam
C2	10YR 5/3-4/3	very silty loam
C3	10YR 5/3 with common small-medium mottles of 10YR 4/4-4/6	very silty loam
wall trenches	10YR 3/3 with few small-medium mottles of 10YR 4/4-4/6	very silty loam
post mold	10YR 3/3	very silty loam (slightly more clay than WT)
thin bands	10YR 3/4-4/4	very silty loam

Table G.9. Munsells for East Trench 1, South Profile.

Zone	Munsell	Texture
Upper Plow Zone	10YR 3/2 with many small mottles of 10YR 3/3	silty loam
Lower Plow Zone	10YR 3/2 with many small mottles of 10YR 3/3 with a few laminations	silty loam
A1	10YR 2/1 with many small-medium mottles of 10YR 3/2	silty loam
A2	10YR 2/1 with many large mottles of 10YR 3/2 and common laminations	silty loam
A3	10YR 2/1 with common small-medium mottles of 10YR 4/4	silty loam
A4	10YR 2/1 with many small mottles of 10YR 3/2 and 6/2	silty loam
A5	10YR 2/1 with few small mottles of 10YR 3/2 and 5/3	silty loam
A6	10YR 3/1 with many medium mottles of 10YR 3/4	silty clay loam
A7	10YR 2/1 with few small mottles of 10YR 3/2	silty loam
A8	10YR 2/1 with common small mottles of 10YR 3/2 and few small mottles of 10YR 5/3	silty loam
A9	10YR 3/1 with common small mottles of 10YR 3/4	silty clay loam
A10	10YR 2.5/1 with common small mottles of 10YR 4/2	silty loam
A11	10YR 3/2 with common small-medium mottles of 10YR 2/1 and 4/2	silty loam
B1	10YR 2/1 with few small-medium mottles of 10YR 4/3	silty clay loam
B2	10YR 2/1 with common small-medium mottles of 10YR 4/3	silty clay loam
B3	10YR 2/1 with few small-medium mottles of 10YR 4/4	silty loam
B4	10YR 2.5/1 with common small mottles of 10YR 4/4	silty clay loam
B5	10YR 2.5/1 with few small mottles of 10YR 4/4	silty clay loam
SS	10YR 3/2 with common small-medium mottles of 10YR 4/4	silty clay loam

Table G.10. Munsells for East Trench 2, North Profile.

Zone	Munsells	Texture
Plow Zone	10YR 3/2 with many small mottles of 10YR 3/1	silty clay loam
Plow Zone M	10YR 3/2 with manny small mottles of 10YR 3/1 and many small mottles of 10YR 3.5/1	silty clay loam
A	10YR 3.5/1 with common small mottles of 10YR 5/1 and abundant maganese/iron concretions	silty clay loam
B	10YR 3/1 with many small mottles of 10YR 3/2 and abundant maganese/iron concretions	silty clay loam
SS	10YR 4/1 with many small-medium mottles of 10YR 3/4	silty clay loam

Table G.11. Munsells for East Trench 2, South Profile.

Zone	Munsell	Texture
Plow Zone	10YR 3/2	silty clay loam
Mixed Plow Zone	10YR 3/2 with common small-medium mottles of 10YR 3.5/1	silty clay loam
A	10YR 3.5/1 with common small-medium mottles of 10YR 4/3	silty clay loam
B	10YR 3/1 with many small mottles of 10YR 3/2 and a few small mottles of 10YR 4/4 with common manganese/iron concretions	silty clay loam
C	10YR 3/1 with common medium mottles of 10YR 4/4-3/4	silty clay loam
D	10YR 3/1 with common small mottles of 10YR 4/4-3/4 with abundant manganese/iron concretions	silty clay loam
E	10YR 3.5/1 with common small mottles of 10YR 4/4	silty clay loam
SS	10YR 3.5/1 with many small-medium mottles of 10YR 4/4	silty clay loam

Table G.12. Munsells for East Trench 3, South Profile View East.

Zone	Munsell	Texture
Upper Plow Zone	10YR 4/2-3/2 with common laminations	silty loam
Lower Plow Zone	10YR 4/2-3/2 with common laminations and few small mottles of 10YR 3/1	silty loam
A1	10YR 3/1 with many small mottles of 10YR 3/2	silty loam
A2	10YR 3.5/1 with common medium mottles of 10YR 4/4	silty loam
A3	10YR 3/1 with few small mottles of 10YR 3/2	silty clay loam
A4	10YR 3/1 with few small mottles of 10YR 3/2 with few laminations	silty clay loam
B1	10YR 3/1 with few medium-large mottles of 10YR 4/2	silty clay loam
SS	10YR 3/1 with common small mottles of 10YR 4/4	silty clay loam

Table G.13. Munsells for East Trench 3, South Profile View West.

Zone	Munsell	Texture
Plow Zone	10YR 4/2-3/2 with common laminations	silty loam
A1	10YR 3/2 with common small mottles of 10YR 4/4	silty clay loam
A2	10YR 4/2-3/2	silty loam
A3	10YR 4/1-3/1 with common small mottles of 10YR 4/4	silty clay loam
A4	10YR 3/1 with common medium mottles of 10YR 4/4	silty clay loam
A5	10YR 3/2 with few small mottles of 10YR 4/2	clay loam
B1	10YR 3/1 with few small mottles of 10YR 3/4	clay loam
B2	10YR 3/1 with common small-medium mottles of 10YR 3/4	clay loam
B3	10YR 3/1 with common small-medium mottles of 10YR 3/4 and few medium-large mottles of 10YR 4/3	clay loam
B4	10YR 3/1 with common small-medium mottles of 10YR 3/4 and many large mottles of 10YR 4/3	clay loam
SS	10YR 3/1 with common small mottles of 10YR 4/4	silty clay loam

APPENDIX H
UTM POINTS FOR MOUND EXCAVATION TRENCHES, MAGNETIC SURVEY BLOCKS, AND AVENUE EXCAVATION TRENCHES

Table H.1. Summit Unit Points.

		Easting	Northing	Elev.
Summit Units	Unit 6 NE corner	257610.28	4279498.34	166.91
	Unit 7 NE corner	257610.99	4279497.67	166.75
	Unit 7 SE corner	257611.69	4279496.97	166.76
	Unit 4 SE corner	257611.00	4279496.25	166.84
	Unit 4 SW corner	257610.30	4279495.53	166.94
	Unit 10 SE corner	257609.56	4279496.23	167.05
	Unit 5 NE corner	257609.58	4279497.63	167.10
	Unit 10 NW corner	257607.45	4279495.49	166.96
	Unit 10 SW corner	257608.17	4279494.80	166.76

Table H.2. Interface Trench Points.

		Easting	Northing	Elev.
Interface Trench	Unit 3 NW corner	257611.81	4279530.07	161.73
	Unit 3 NE corner	257612.63	4279530.64	161.73
	Unit 3 SE corner	257613.20	4279529.82	161.91
	Unit 1 SE corner	257614.33	4279528.16	162.44
	Unit 1 SW corner	257613.50	4279527.60	162.46
	Unit 3 SW corner	257612.37	4279529.25	161.91

Table H.3. First Terrace Trench Points.

		Easting	Northing
First Terrace Trench	Unit 14 NW corner	257570.77	4279545.22
	Unit 14 NE corner	257571.72	4279545.44
	Unit 14 SW corner	257571.00	4279544.23
	Unit 14 SE corner	257571.97	4279544.50
	Unit 11 NW corner	257573.63	4279545.93
	Unit 11 NE corner	257574.62	4279546.17
	Unit 11 SW corner	257573.90	4279544.98
	Unit 11 SE corner	257574.86	4279545.20

Table H.4. Mag Grid West Points.

	Easting	Northing
A	256869.16	4279854.99
B	256867.77	4279705.03
C	256899.12	4279854.57
D	256897.69	4279704.65
E	256898.97	4279839.55
F	256897.55	4279689.50
G	256928.92	4279839.16
H	256927.53	4279689.13
I	256928.80	4279824.13
J	256927.38	4279674.11
K	256958.81	4279823.76
L	256957.41	4279673.73

Table H.5. Mag Grid East Points.

	Easting	Northing
A	4279393.87	257754.99
B	4279303.76	257752.36
C	4279392.93	257784.94
D	4279302.83	257782.33
E	4279382.98	257784.56
F	4279292.96	257782.18
G	4279382.19	257814.61
H	4279292.20	257812.23
I	4279372.26	257814.33
J	4279282.20	257811.97
K	4279371.41	257844.34
L	4279281.42	257841.98
M	4279346.96	257844.50
N	4279256.80	257841.94
O	4279346.15	257874.50
P	4279255.96	257871.99
Q	4279328.25	257875.35
R	4279238.25	257873.46
S	4279327.64	257905.34
T	4279237.57	257903.44
U	4279310.85	257905.26
V	4279220.77	257903.92
W	4279310.40	257935.27
X	4279220.34	257933.96
Y	4279295.16	257936.84
Z	4279175.08	257935.66
AA	4279294.96	257966.82
BB	4279174.75	257965.64
CC	4279278.98	257968.49
DD	4279188.59	257967.78
EE	4279279.17	257998.52
FF	4279188.76	257997.81

Table H.6. Emerald Avenue West Trench Points.

	Easting	Northing
NW corner	256962.93	4279826.99
NE corner	256964.08	4279826.63
SW corner	256925.04	4279695.62
SE corner	256926.62	4279695.24
F284 mapping nail	256941.46	4279744.58
F284 mapping nail	256939.67	4279744.78
F284 mapping nail	256942.94	4279749.42
F284 mapping nail	256941.3	4279749.93

Table H.7. Emerald Avenue East Trench Points.

		Easting	Northing
Trench 1	NW corner	257988.71	4279253.34
	NE corner	257990.14	4279252.45
	SW corner	257958.04	4279199.07
	SE corner	257959.48	4279198.12
Trench 2	NW corner	257844.04	4279339.89
	NE corner	257845.08	4279339.53
	SW corner	257815.62	4279276.20
	SE corner	257816.78	4279275.70
Trench 3	NW corner	257890.81	4279247.20
	NE corner	257892.14	4279246.63
	SW corner	257886.26	4279237.47
	SE corner	257887.49	4279236.89
Trench 4	NW corner	257909.21	4279293.55
	NE corner	257910.70	4279292.73
	SW corner	257901.65	4279275.87
	SE corner	257903.09	4279274.98

Table H.8. Emerald Avenue Emerald Mound Grange Trench Points.

		Easting	Northing
EMG Trench 1	NW corner	258019.81	4279233.55
	NE corner	258021.41	4279233.78
	SW corner	258019.82	4279216.18
	SE corner	258021.74	4279215.76
	Profile North Nail	258021.86	4279228.51
	Profile South Nail	258021.93	4279216.75
EMG Trench 2	NW corner	258021.20	4279199.93
	NE corner	258022.52	4279200.24
	SW corner	258021.09	4279196.16
	SE corner	258022.82	4279196.09
EMG Trench 3	NW corner	258021.54	4279167.99
	NE corner	258023.19	4279167.63
	SW corner	258021.40	4279149.42
	SE corner	258023.79	4279149.31

Table H.9. Emerald Avenue Midgley Neiss Road Trench Points.

		Easting	Northing
MN Trench 1	NW corner	258319.25	4278987.20
	NE corner	258342.37	4278986.15
	SW corner	258319.31	4278985.38
	SE corner	258342.49	4278984.64
MN Trench 2	NW corner	258385.34	4278984.38
	NE corner	258389.62	4278984.19
	SW corner	258384.95	4278982.93
	SE corner	258389.57	4278982.73
MN Trench 3	NW corner	258462.02	4278980.20
	NE corner	258480.69	4278979.30
	SW corner	258461.91	4278978.77
	SE corner	258480.67	4278977.89