May 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

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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

by

Thomas J. Zych

A Thesis in

Partial Fulfillment of the

Requirements for the Degree of

Master of Science

in Anthropology

at

The University of Wisconsin-Milwaukee

May 2013

ABSTRACT

THE CONSTRUCTION OF A MOUND AND A NEW COMMUNITY:
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Under the Supervision of Professor John Richards, Ph.D.

By the start of the 12th century A.D., the Aztalan site in southeastern Wisconsin was home to Middle Mississippian immigrants from the south and local Late Woodland residents. The amalgamated population coexisted, maintained defensive works, and constructed earthen monuments in the spirit of Middle Mississippian mound construction. One mound, located within the domestic complex of the site in the northeast corner of the palisaded area, was the focus of Wisconsin Historical Society excavations during the 1960s. This thesis utilizes the unreported results of these investigations to highlight the social implication resulting from the prehistoric construction of Aztalan's northeast platform mound. Results demonstrate the Late Woodland sub-mound space was transformed into a Middle Mississippian monument not by means of coercion or cooptation, but rather through socially integrative practices creating a space that symbolized a new pluralistic community unique to Aztalan and the multiple social groups involved.

For my wife, Melissa.

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ACKNOWLEDGEMENTS

I would first like to extend my appreciation to my thesis committee, Dr. John Richards, Dr. Robert Jeske, and Dr. Thomas Emerson. Their insightful comments and substantive remarks on my earlier drafts and during my thesis defense challenged me to explore new directions and avenues in which to contextualize my work and perspectives toward Midwestern Archaeology. I cannot overstate the appreciation I have toward my advisor, Dr. John Richards, for his ceaseless support, guidance, and patience during my time at UWM. He continually challenged and encouraged me in my studies and frequently permitted me to take advantage of his 'open door' policy to his office, for which I am, and always will be grateful. His expertise and archeological brilliance (especially when pertaining to Aztalan) has contributed more to my thesis, and our understanding of the Aztalan site, than can be said with these few words.

I would also like to extend my gratitude to the Wisconsin Historical Society (WHS) and its director, Jennifer Kolb, for permission to work with the Aztalan Collection. I am grateful to Paul Bourcier, the WHS Chief Curator, for his time and assistance during my numerous visits, and for providing me with space at the historical society to conduct my analyses. Additional members of the WHS staff who deserve my appreciation include Angela Glasker, Scott Roller, and Denise Wiggins. I am grateful for their time and assistance with accessing the Aztalan collections. I would also like to thank Kelly Hamilton, Director of the Museum Archaeology Program (MAP) at the Wisconsin Historical Society, for permission to use images from the WHS-MAP Aztalan Archaeology Images collection.

Elissa Hulit deserves my endless gratitude for her assistance with my numerous questions regarding the statistical procedures used for the pXRF analysis. I would also like to acknowledge Seth Schneider and Bill Balco for their insights during our many discussions regarding pXRF and ceramic analysis. Jeffery Kruchten and Dr. Timothy Pauketat deserve my gratitude for their many years of friendship and support, always encouraging me to move

forward. I must also thank Bob Birmingham and Ernie Boszhardt who first provided me with the idea of analyzing the unreported Northeast mound materials during one of Bob's tours of the Aztalan site in the summer of 2011. I would like to thank my parents, Zbigniew, and Antoinette, my personal exemplars of hard work and perseverance. They, like the rest of my family and friends, are an endless source of love and support for which I will forever be grateful.

Last, but perhaps the most important, I would like to thank my wife Melissa. I devote my deepest gratitude to her, for the endless love and support during this process. I find myself fortunate and humbled to have married such an amazing woman and fantastic archaeologist. Her brilliant mind never ceases to challenge my own ideas and interpretations about archaeology and life. This thesis would not have come to pass if not for her unabridged encouragement and enthusiasm for my own endeavors.

In that it is a feature of people's relationship with their world, place is something which can emerge anywhere. As soon as we are aware that we are *somewhere*, it is already a place...[W]hen human beings do make a deliberate and lasting change to a place, something quite important takes place. *Building* involves a transformation of place in which a location becomes the 'place of' something. When people set up a structure or dig a ditch, the resulting evidence of human activity identifies a place with something historical, an act of construction. In this way, the location comes to visibly manifest the interconnection between people and their world [Thomas, 1996:89; emphasis in original].

CHAPTER 1: INTRODUCTION AND RESEARCH GOALS

THESIS STATEMENT

For decades, archaeologists have studied aboriginal earthen monuments to underscore the greater social implications resulting from their construction. However, the Middle Mississippian mounds at the Aztalan site (47Je-0001) in Southeast Wisconsin have not received the same attention as other sites throughout the Midwest. This thesis utilizes unreported results from past excavations at the Aztalan site to highlight the social implications resulting from the prehistoric construction of Aztalan's northeast platform mound. Using records and materials from the Wisconsin Historical Society (WHS) excavations into the northeast mound, I demonstrate the Late Woodland sub-mound space was transformed into a Middle Mississippian monument not by means of coercion or cooptation, but rather through socially integrative practices creating a space that symbolized a new pluralistic community unique to Aztalan and the multiple social groups involved.

The artifacts and features from the mound provide insight into the social practices and negotiations resulting from the political-religious movements and the construction of new communities spurred by Middle Mississippian immigrants and a local Late Woodland adoption of introduced traditions. These sociological changes may be of significance for understanding the larger, region-wide social-political-religious changes in the Western Great Lakes during the tenth, eleventh and twelfth centuries.

INTRODUCTION

The Aztalan site (47Je-0001) is a fortified village and mound complex with a central plaza located in Jefferson County, Wisconsin (Figure 1.1) in Aztalan Township (T17N R14E Sections 17, 20, and 21). It is situated five miles north of the confluence of the Rock River and Crawfish River, fifteen miles north of Lake Koshkonong. The main occupation is located on the west bank of the Crawfish River. This location is marked by three mounds and a gravel knoll encompassed by a low earthen berm denoting the footprint of former

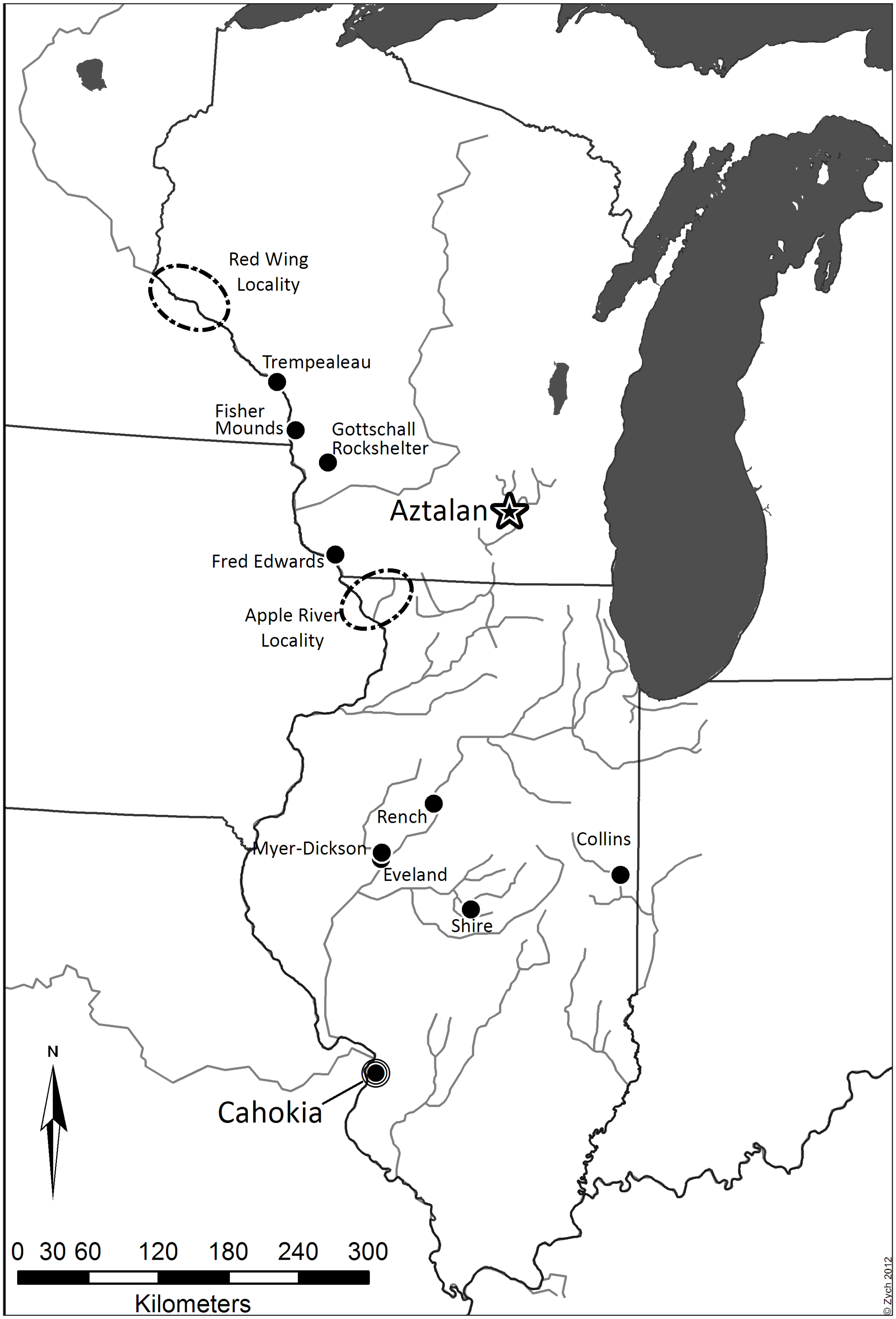


Figure 1.1. Location of Aztalan and select Middle Mississippian contact sites.

palisade walls (Figure 1.2). The outermost walls contained an area of approximately nine hectares. Outside the walls to the northwest, a line of conical mounds straddle the top of a natural ridge. South of the palisaded area several natural springs flow into the river. On the east bank a poorly understood series of earthen mounds and berms occupies a high ridge overlooking the fortified site across the river. These earthen features are not suspected to be directly associated with the prehistoric western bank occupation (Barrett 1933; Goldstein 1979), though few archaeological investigations have been undertaken in this part of the site.

These man-made and natural features marking the landscape were entangled with the lives of the local inhabitants. That is, landscapes are the spatial dimension in which social interactions, experiences, and relationships exist, and their configuration frames the experiences and histories of people, and vice-versa (Lefebvre 1991; Pauketat 2010:1). Social interaction and practices are at the epicenter of culture creation and re-creation (Geertz 1975:5). Archaeologists can recognize these interactions through different material expressions of social identity embodied in lithic tools, architecture, pottery, landscapes, and so on. Social interactions and identities are central to the relationships between different groups, which in turn, embody how these relationships create communities (B. R. Anderson 1991; Canuto and Yaeger 2000).

Prior to Middle Mississippian influence at Aztalan, natural springs and earlier Woodland mounds already imbued the landscape with a meaning-laden reality that fashioned the “lived relationship” local inhabitants maintained with themselves and their surroundings (Basso 1996:106). This reality became incorporated into the traditions and practices of the local Late Woodland population during the tenth and eleventh centuries, and it was recalled and recreated through their interaction with the landscape and with immigrant social groups. These latter interactions are made most vivid at the Aztalan site by the presence of pyramidal earthen mounds.

Flat-topped pyramidal mounds are considered a hallmark of Middle Mississippian society (Griffin 1983; Peebles and Kus 1977; B. D. Smith 1978b). In eastern North America,

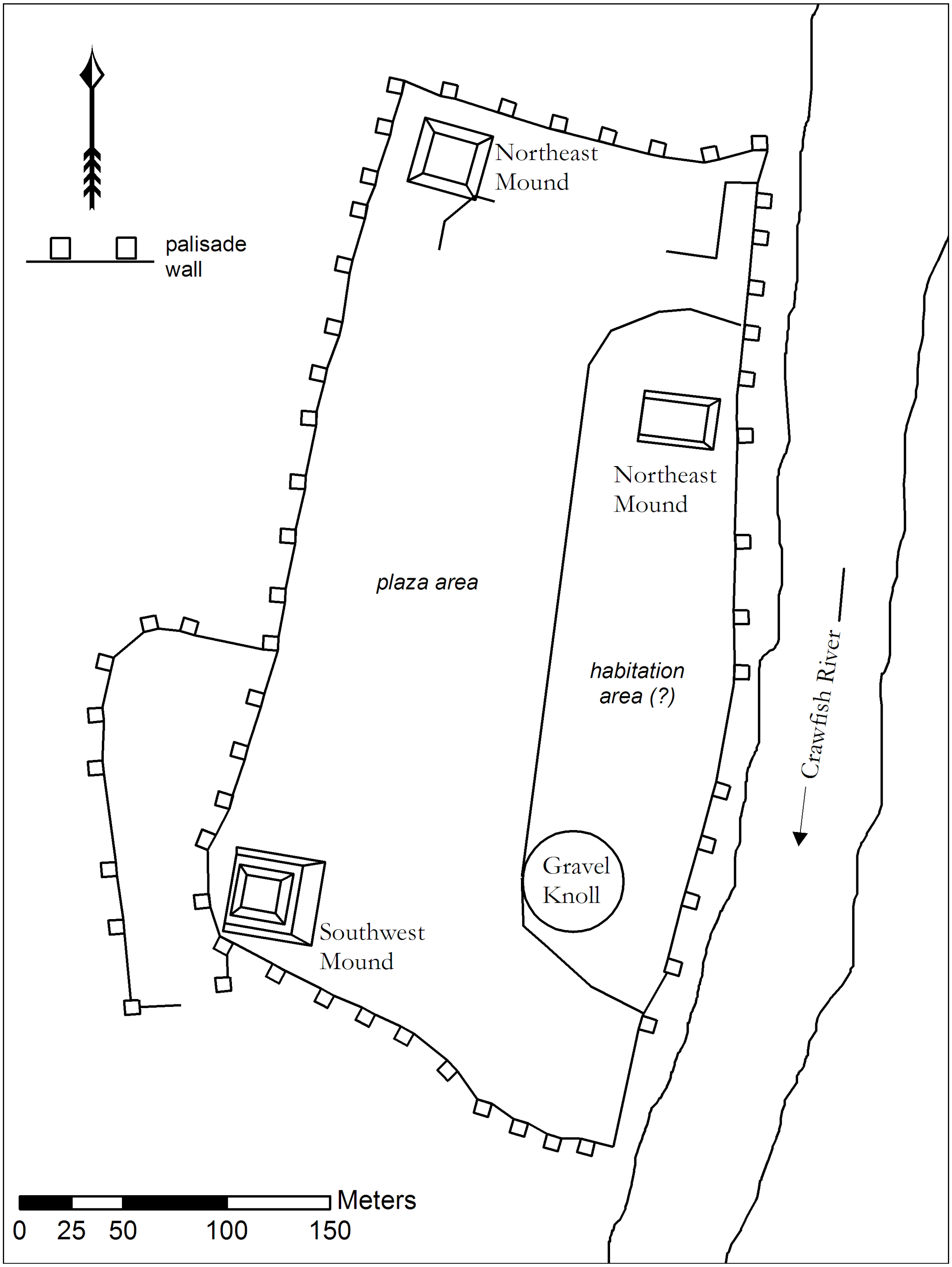


Figure 1.2. Aztalan site layout.

Native American mounds are often interpreted as signifying the social-political-religious practices and cultural configurations of traditions belonging to and spanning across entire ethnic groups (Muller 1997:278; Pauketat and Alt 2003:151; Pursell 2004:13). The presence of these earthen monuments at sites home to indigenous Late Woodland groups provides a means to explore the practices associated with Middle Mississippian and Late Woodland group contact, interaction, and community construction. Between the 11th and 12th century A.D., as Middle Mississippian society was flourishing in the American Bottom, their associated lifeways were emerging outward through Middle Mississippian immigrants throughout the northern woodlands. Eventually these 'movements' reached the Aztalan site and brought about discrete changes in the arrangement of the physical and social landscape. Thus, the Northeast Mound at Aztalan represents a culturally built feature, incorporated (i.e. constructed) into the physical and social landscape likely near the end of the 11th century, in the center of a pre-existing Late Woodland village. The practices associated with the building of this earthen monument provided an avenue for social exchanges of ideas and traditions that are part of the community building process.

Construction of the northeast platform mound succeeded the burning of a large wall-trench/single-post structure at the same location (Joan Freeman 1967-1968 field records on file, Wisconsin Historical Society, Madison). Evidence from in and around Cahokia, the epicenter of Middle Mississippian society during the late 10th through early 14th centuries A.D., suggests similar Middle Mississippian, sub-mound structures were terminated (even sometimes renewed, then terminated again) only to be covered by the construction of an earthen mound (Pauketat 1993, 2008; H. M. Smith 1969). I contend the creation and subsequent removal of the sub-mound Middle Mississippian-like, wall-trench structure followed by the construction of the earthen platform monument exemplifies how the extant Late Woodland population and their landscape were connected to a larger Middle Mississippian world view (sensu Hodder 1990, cited in Cummings 2003:35).

THE PROBLEM

The core of this thesis focuses on establishing evidence for mutual social integration versus socio-religious-political co-optation between the Late Woodland and Middle Mississippian at Aztalan. Sporadic episodes of Middle Mississippian spatial conscription have been cited around Cahokia in the American Bottom. For instance, north of the Cahokia site, along the shores of Horseshoe Lake, Middle Mississippians constructed a mound over a Middle Woodland burial ground (Pauketat and Alt 2003:157; Pauketat, et al. 1998). During the transition from the Lohmann (A.D. 1050-1100) to Stirling (A.D. 1100- 1200) phase at Cahokia's Tract 15A, Cahokian elites co-opted their own domestic space and transformed it into a public, or perhaps religious space (Pauketat 1998). Cahokia itself is located over a Late Woodland village (not unlike Aztalan), but in this instance the inhabitants, along with the surrounding populace, rapidly coalesced, expanded, and flourished, transforming into 'Middle Mississippian' culture. This cultural transformation appears less like a coercive co-opting event, but rather a flourishing amalgamation of diverse people that served as a catalyst for the rise of new Mississippian ideology and power (Alt 2002, 2012; Emerson 1991a, b, 1997a, b; Hall 1991; Pauketat 1994, 2004; Pauketat and Emerson 1997).

Truthfully, it is unlikely that any of these sorts of events represent a wholesale co-optation or, conversely, a purely harmonious venture. However, it is arguable that a landscape marked with existing mounds would be instilled with memories, reminders of the works of past peoples. These memories can underscore a group's deliberate citation of past histories and traditions to establish (or re-establish) power. In the Western Great Lakes Region, during the initial century of Middle Mississippian influence, Late Woodland construction of effigy mounds had all but completely faded away; replaced by new material and ideological symbols (e.g. platform mounds and Ramey Incised-like pottery) (Rosebrough 2010:110-111). Whatever scattered effigy mound ceremonialism that persisted during this time was seemingly associated with Mississippianized populations (Jeske 1927; Maxwell 1950; Rosebrough 2010:579). As Howard Williams (2003:10) notes, "the reuse of earlier monu-

ments [and sacred space] is perhaps the most graphic and visible way in which we can see ancient people engaging directly with the past." Individuals can revive and reshape their histories in conjunction with their present social trajectories. The social engagements regarding people actively building upon (both physically and metaphorically) and sharing a common history represents the core of what this thesis explores in the Northeast Mound and its associated deposits: the integration of Late Woodland and Middle Mississippian lifeways at Aztalan.

RESEARCH GOALS

Despite the multitude of research undertaken at Aztalan, the nature of the interaction between Late Woodland and Middle Mississippian peoples remains poorly understood. In fact, impetus of the Middle Mississippian influence remains uncertain (Hall 1962, 1991; Richards 2003), though Cahokia's initial emergence undoubtedly played a role (Richards 2007a:22). These Mississippian movements may be a consequence of individuals who became disenfranchised by the new Cahokia and moved into the hinterlands (Emerson 1991b). Multiple lines of evidence have demonstrated that, along with the migrations to Aztalan in south central Wisconsin (Barrett 1933; Goldstein and Richards 1991), Middle Mississippians moved outward from Cahokia into the far corners of the Upper Midwest.

Middle Mississippian movement has been documented along Missouri River in western Missouri (O'Brien 1993) and northwest Iowa (Tiffany 1991), up the Mississippi River to the Apple River region of northwest Illinois (Bennett 1945; Emerson 1991a; Millhouse 2012), as well as further north near modern day La Crosse, Wisconsin (Boszhardt, et al. 2012; Boszhardt, et al. 2011; Emerson 1991b; Green and Rodell 1994; Stoltman, et al. 2008). Middle Mississippians traveled at least as far north as the Red Wing and the Cambria region locality in southeast Minnesota and south central Minnesota, respectively (Gibbon 1991; Holley 2008; Johnson 1991; Maxwell 1950; Rodell 1991). The Illinois River also served as a conduit for migration, with Middle Mississippians reaching at least as far north as modern Peoria, Illinois (Conrad 1989, 1991; Farnsworth, et al. 1991; Harn 1980, 1991; McConaughy

1991; McConaughy and Bade 1993). Others traveled east into Central and East-Central Illinois (Claflin 1991; Douglas 1976).

The present study provides a comprehensive, attribute-based analysis of ceramic materials recovered from the WHS northeast mound excavations, accompanied by a portable X-Ray Fluorescence (hereafter pXRF) analysis of a selection of those materials from controlled contexts. The excavations and associated features are detailed to provide insight into the use of the sub-mound landscape prior to, during and following the mound's construction. Results will not only provide a data set to compliment ongoing and future research, but will demonstrate the influences Middle Mississippian immigrants had upon Aztalan-Late Woodland groups at the site. The pXRF analysis highlights the degree of chemical heterogeneity of the ceramics suggesting many of the local and extra local ceramic types were made from diverse clays. These results supplement the ongoing discussion regarding Late Woodland-Middle Mississippian interaction in the Western Great Lakes Region. This thesis elaborates on the social interactions (perceived through both practice and material culture) that occurred at Aztalan during the eleventh and twelfth century and the role in which Middle Mississippian influence reconfigured the physical and social landscape.

HISTORY OF INVESTIGATIONS AT AZTALAN

The Aztalan site was first identified by Euro-American settlers in October 1836. Timothy Johnson of Watertown, Wisconsin is credited as the first to 're-discover' the site (J. D. Butler 1882). However, it is likely early fur trappers and traders who regularly passed through the area several decades prior likely observed the site and its recognizable features (Richards 2007b). In January 1837, Nathaniel Hyer visited the site and prepared one of the first written descriptions and sketch maps of the site (Figure 1.3); subsequently reprinted in the Milwaukee Advertiser in February of 1837. This and similar accounts attracted public interest and prompted calls for the site's preservation. Efforts were made to save Aztalan from public sale; however, these efforts fell short and by 1838 the land was sold for $22.50, relinquishing the landscape to decades of agricultural cultivation (Richards 1992:103; Schnei-

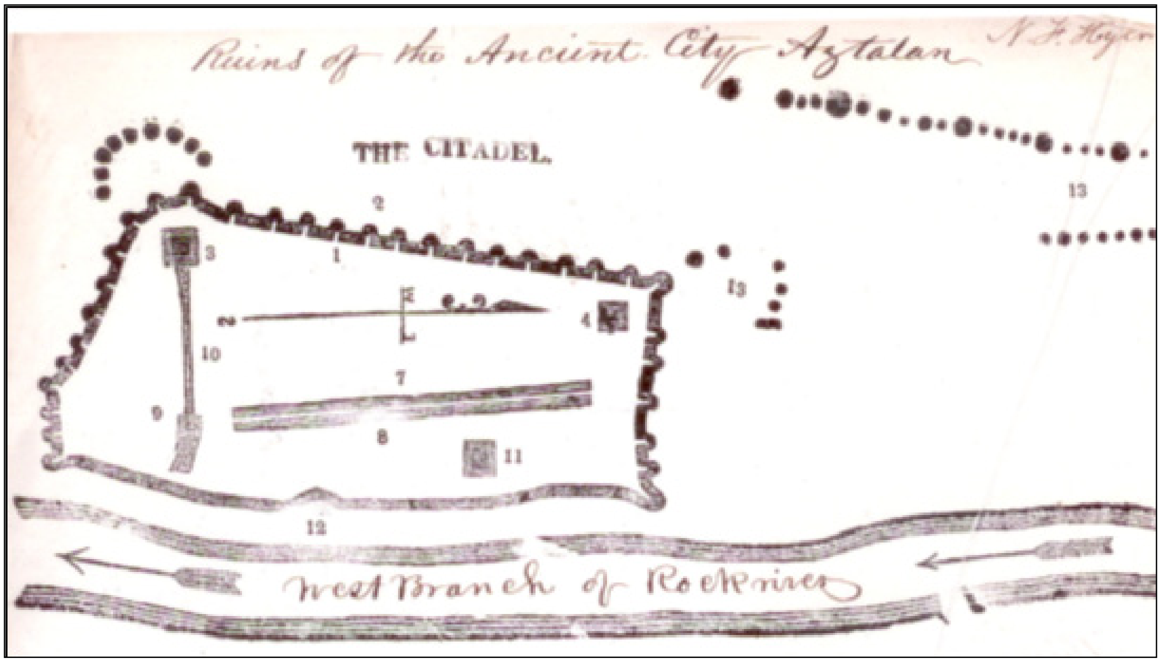


Figure 1.3. Sketch map of Aztalan by Nathaniel Hyer (N.F. Hyer to Edw. Everett, letter 30 April 1838, facsimile on file at the University of Wisconsin-Milwaukee Archaeological Research Laboratory, original on file at the Wisconsin State Historical Society, Madison).

der 1964; Titus 1924:190).

Numerous amateur excavations soon followed. William A. Titus (1924) describes how three gentlemen named William T. Sterling, Judge David Irwin, and John Catlin spent one week excavating into the walls of the site. They encountered fragments of clay 'brick' that covered the palisade walls as well as a large number of human remains, described as fractured and split, leading to the first claims of aboriginal cannibalism at the site. Additional amateur excavations continued during the latter half of the nineteenth century, occasionally mentioned in short articles in regional newspapers (Titus 1924).

In the summer of 1850, the first professional investigations at Aztalan occurred under the direction of Increase A. Lapham. These excavations and a description of the site's surficial features were briefly reported in Lapham's 1855 volume *The Antiquities of Wisconsin*, which included a detailed map of the site (Figure 1.4). At the time of Lapham's visit, only select portions of Aztalan had been subjected to roughly twelve years of agricultural activity. Thus, Lapham's descriptions and associated map are considered the best representation of the site's features prior to more substantial degradation through agricultural and natural

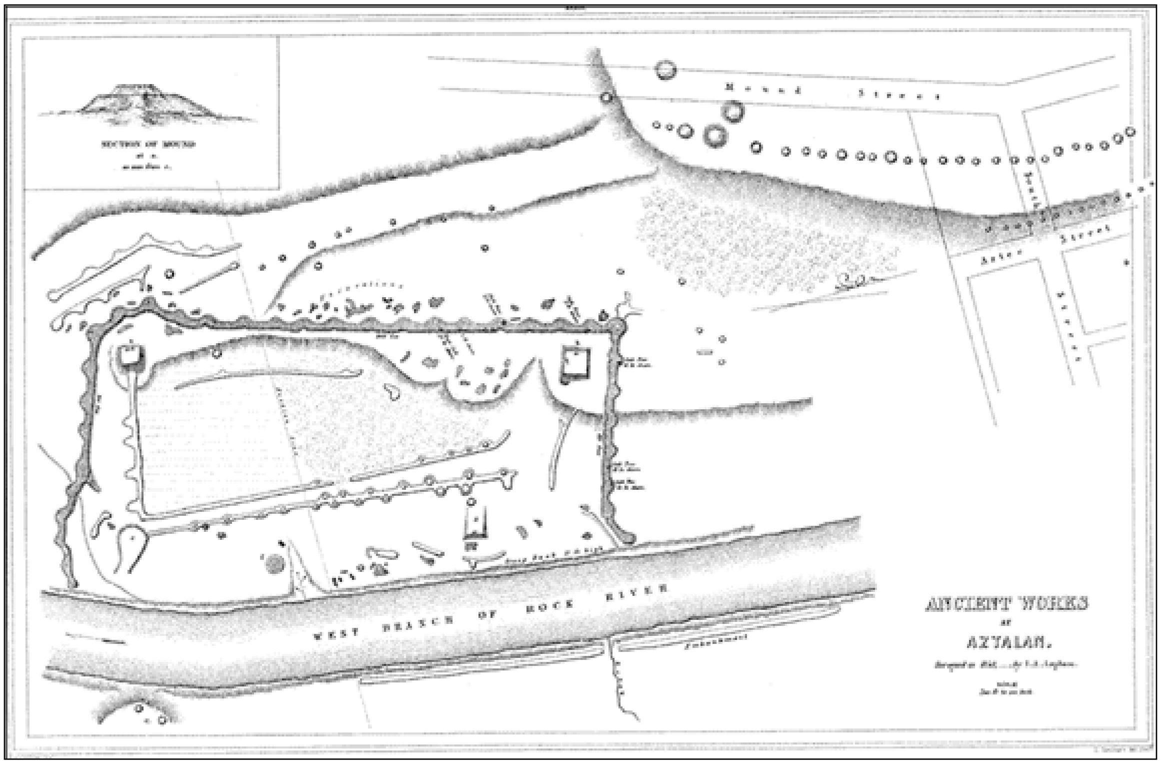


Figure 1.4. Map of Aztalan by Increase A. Lapham (1855:Plate XXXIV).

processes. It was almost seventy years before the next professional excavations, during which time yearly plowing and planting of crops led to severe deterioration of the mounds and the remnant palisade walls (Richards 1992).

In 1919, Samuel A. Barrett of the Milwaukee Public Museum (MPM) initiated a series of excavations that were continued in 1920, and later in 1932. Investigations focused on unearthing and mapping segments of the palisade walls that bounded and traversed the site. Within the riverbank palisade, Barrett unearthed several domestic features including structures and storage pits. Portions of the three pyramidal mounds within the bounding stockade line also were excavated, including the Northeast Mound. A description of Barrett's findings is provided in Chapter 4. The series of excavations carried out by Barrett and the MPM are summarized in his 1933 monograph Ancient Aztalan.

By the end of the 1940's, the Wisconsin Department of Natural Resources developed plans to reconstruct Aztalan's pyramidal mounds (see Figure 1.2). So, between 1949 and 1952 additional excavations were carried out at Aztalan by the Wisconsin Archaeological

Survey (WAS). Efforts focused on the southwest and northwest mounds as well as portions of the internal village area. Results of these excavations are summarized in *The Wisconsin Archeologist* (Baerreis 1958).

Excavations resumed in 1962, 1964, 1967, and 1968 under the auspices of the Wisconsin Historical Society, directed by Dr. Joan Freeman. William Hurley directed the 1962 excavations focused on documenting segments of the palisade walls. Freeman work sought to obtain additional information concerning architectural structure types and to relocate and document the Northeast Mound which too was slated for reconstruction. Excavations identified several structures and associated features along the east edge of the plaza. The Northeast Mound excavations unearthed several structures, storage pits, hearths, and also delineated the extent of the mound. Additional details regarding the Northeast Mound excavations are provided in Chapter 4. To date, the Northeast Mound has never been reconstructed and a comprehensive report of the mound and central village excavations has not been published.

In fact, any published mention of these excavations is minimal at best. Schneider (1964:5) briefly commented on the ongoing excavations in the plaza and the Northeast Mound, noting the relocation of the large mound-top structure first reported by Barrett (1933:173). Manfred Jaehnig (1969, 1971) analyzed a soil profile from the Northeast Mound and provided a summary of the site's paleo-environment. Bleed (1970) detailed an analysis of a selection of the shell-tempered ceramics from both the WAS and WHS excavations. Apart from Schneider's and Jaehnig's works, the first discussions specifically relating to the Northeast Mound excavations and identified features is provided by Freeman in 1986. In the span of half a paragraph, Freeman (1986:345) concludes the mound was constructed in a single stage, references the large mound-top structure, and provides brief mention of a similar sub-mound structure. A similar discussion was also provided just over a decade later (Goldstein and Freeman 1997).

Research at Aztalan and the surrounding region continued in the 1970s and 1980s. These included a soil phosphate study and walkover and shovel test surveys (Goldstein 1980, 1981; Goldstein and Patin 1979; Stuebe 1976; Woods 1972). Dr. Lynne Goldstein led several on-site surveys and test excavations in conjunction with the Crawfish and Rock River Archaeological Projects (Goldstein 1979) and Aztalan State Park management requirements (Goldstein 1983; Goldstein and Patin 1979).

A 1984 University of Wisconsin-Milwaukee (hereafter UWM) field school, again under the direction of Lynne Goldstein, tested along the river embankment and the plaza to investigate site formation processes and occupational chronology (Richards 1985, 1992). Intact feature deposits were discovered beneath the plow zone as well as accumulated alluvial deposits at the edge of the riverbank where materials had washed down from higher elevations to the west. This work identified the initial Late Woodland occupation at Aztalan as early as the 9th century A.D. with a mixed Late Woodland/Middle Mississippian occupation after A.D. 1100 (Richards 1985, 1992). Goldstein led another UWM field school in 1996 to investigate several vegetative anomalies visible on the surface south of Aztalan's northwest mound (Goldstein and Brinkmann 1997) and investigate the possibility of an aboriginally sculpted surface (Goldstein 2010; Goldstein and Gaff 2002).

In 2008, personnel from the UWM Historic Resource Management Services program surveyed Aztalan State Park at the request of the Wisconsin Department of Natural Resources (DNR) for a proposed interpretive center at the site. Therefore, this survey focused on untested portions of the park outside the exterior palisade walls, though few prehistoric artifacts were recovered (Clauter and Richards 2009).

A 2011 UWM field school, under the direction of Dr. John Richards, built upon the work begun in 1984 to reassess the site chronology and riverbank depositional sequences (Richards, et al. 2012). Results demonstrated several areas along the riverbank were likely filled and leveled intentionally following Middle Mississippian contact. Units located just northeast of the Northeast Mound identified concentrations of copper and copper stained

materials. Several charcoal-ash deposits were identified near these copper materials, leading to rudimentary suggestions of copper working in the shadow of the northeast mound, at the top of the riverbank (Richards, et al. 2012).

CURRENT INTERPRETATIONS

Previous research at Aztalan has underlined several baseline facts. Around A.D. 1100 Middle Mississippian people arrived at the site from the American Bottom, likely the city of Cahokia east of modern day St. Louis (Goldstein and Freeman 1997; Goldstein and Richards 1991; Price, et al. 2007; Richards 2007a; Stoltman 2001) and established an occupation coeval with an extant local Late Woodland occupation (Baerreis 1958; Barrett 1933; Goldstein and Freeman 1997; Goldstein and Richards 1991; Richards 1992, 2007a; Stoltman 2001). This is suggested by mixed contexts containing both Late Woodland and Middle Mississippian artifacts (Richards 2007a). Additionally, isotopic analysis of human teeth from the site demonstrated that foreigners who may have spent some length of time in the American Bottom region or the Illinois River Valley were present at the site (Price, et al. 2007). Petrographic and elemental analyses of several ceramic items demonstrate the movement of pottery vessels from the American Bottom to the site (Richards, et al. 2010; Stoltman 1989, 2000). Radiocarbon dates place the major prehistoric occupation between A.D. 1000-1200 (Richards and Jeske 2002).

The ceramic assemblage at the site is comprised of approximately equal quantities of Late Woodland and Middle Mississippian wares (Goldstein and Freeman 1997; Richards 2003). These include Starved Rock Collared (Hall 1987), Aztalan Collared, and Point Sauble Collared (Baerreis and Freeman 1958), and a variety of what are often grouped as Madison Ware vessels (Mason 1966; Wittry 1959). Mississippian ceramics bear close resemblance to American Bottom Stirling phase materials (A.D. 1100-1200), although earlier Lohmann phase (A.D. 1050-1100) vessels are present also (Goldstein and Richards 1991; Richards 1992, 2007a).

Unfortunately, few of the excavated architectural structures at the site have been fully documented, providing little discussion of the diversity of structure forms and functions at the site. Reported structural forms include small and large rectangular single-post structures, circular, and T-shaped buildings made using wall-trench and single-post techniques (Barrett 1933; Wittry and Baerreis 1958). Within Middle Mississippian community organization, circular structures are often interpreted as sweat lodges, T-shaped buildings as elite and perhaps religious structures, and larger single-post structures often serve as temples or charnel structures (Alt 2006; Emerson 1997b; Mehrer 1995; Pauketat 1998, 2004). Many of these identifications are reinforced by ethnographic analogies from southeastern North America (see: Adair 1968:453; Black 1967:493-514; Swanton 1946:388-420).

The majority of the structures at Aztalan have been interpreted as domestic structures, while those atop the platform mounds likely served as temples or public buildings (Freeman 1986; Goldstein and Freeman 1997; Goldstein and Richards 1991; Hurley 1977; Maher 1958; Rowe 1956). The presence of diverse architectural forms during the Middle Mississippian occupation suggests social differentiation among the inhabitants is not simply reflected in the built environment but was perhaps 'constructed' through architectural differences (see: Alt 2006; Emerson 1997a; Moore 1996). At Aztalan it may be suggested that particular architectural forms and certain material goods were associated with varying social and religious practices through which identities in the community were constructed.

THESIS ORGANIZATION

The following chapters explore the series of features and ceramic artifacts from the Northeast Mound to highlight the unique qualities of this Aztalan-ian monument. The resulting effort underscores the transformation of a Late Woodland space into a testament of Aztalan's newly amalgamated community. The second chapter highlights the prehistoric chronology of the region during the Late Woodland and Mississippian periods. Included is a discussion regarding the emergence and dispersal of Middle Mississippian culture out of the American Bottom. Chapter three describes the analytical methods employed. Chapter

four begins with a description of the 1960s WHS excavations into the northeast mound. A description of the identified cultural features and mound follows. Chapter five summarizes the ceramic materials recovered, including the results of the pXRF study. The final chapter, Chapter Six, offers a discussion and final summary regarding the features and ceramic materials as they relate to Aztalan's Late Woodland and Middle Mississippian inhabitants and in the creation of a new earthen monument and new communal identities at Aztalan.

CHAPTER 2: CULTURAL CONTEXT

LATE WOODLAND

The Late Woodland period (A.D. 400 – A.D. 1200) in the Western Great Lakes and eastern Prairie Peninsula comprise a diverse arrangement of social groups with dynamic, permeable social boundaries. Amy Rosebrough's (2010) recent synthesis of the Effigy Mound phenomena underscores an emerging sentiment that the Late Woodland period in this region was home to multiple social groups (Clauter 2012; Kelly 2002; Rosebrough 2010; Salzer 1986; Stoltman and Christiansen 2000), or what Salzer (1986:241) characterized as a "multiplicity of lifestyles."

Previous research has divided these Late Woodland groups into distinct 'phases' (Gillette 1949; Salkin 1987, 2000; Stoltman 1990) of the Late Woodland tradition. In Southeast Wisconsin, Salkin (1987, 2000) identified the Horicon (A.D. 700 – A.D. 1200) and Kekoskee (A.D. 800-1200) phases. Horicon phase people are identified by the use of non-collared ceramics (i.e. Madison ware) and effigy mound ceremonialism. People of the Kekoskee phase utilized collared ceramics (e.g. Aztalan Collared, Point Sauble Collared) and lived in larger (sometimes fortified) villages for the better part of the year. Notably, Kekoskee people also are distinguished from Horicon groups by the lack of effigy mound ceremonialism.

EFFIGY MOUND LATE WOODLAND CULTURE

The Effigy Mound Late Woodland variant, or the 'Horicon Phase' in southeast Wisconsin (Salkin 1987, 2000), is regularly identified by a select series of material traits primarily consisting of zoomorphic effigy mounds and Madison ware ceramics (e.g. Madison Plain, Madison Cord-Impressed). Collared ware ceramics are found also, though often in less frequency (Clauter 2003; Mason 2002; Richards and Jeske 2002; Salkin 1987:78; Salkin 2000; Stoltman and Christiansen 2000:505). Mason (2002:306) notes not all ceramic styles found at these sites are equally distributed geographically or even coeval, citing the occurrence of Aztalan Collared pottery more frequently in the southern part of the region of Madison

ware distribution.

The geographic extent of the Effigy Mound phenomenon is relatively expansive in comparison to the size of other contemporaneous Late Woodland complexes throughout the Great Lakes region (e.g. Heins Creek, Lakes Phase, Clam River, etc.). It extends throughout South-central Wisconsin, Northern Illinois, Northeastern Iowa, and Southeastern Minnesota. Despite the rich corpus of documentation regarding the mounds themselves, a paucity of Effigy Mound habitation sites have been identified, supporting the notion these mound builders were seasonally mobile and established small, ephemeral villages (Christiansen 2001:256; Rosebrough 2010:14; Salkin 1987, 2000). A lack of domesticates from identified sites supports this argument (Salkin 1987, 2000; Stoltman and Christiansen 2000). Identified Effigy Mound sites are often located adjacent to sources of water, often with access to oak savannas opening that served as important subsistence zones (Richards and Jeske 2002; Salkin 1987, 2000). Winter encampments include caves and rock shelters (Emerson 1979; Parmalee 1960; Stoltman and Christiansen 2000; Theler 1987).

Early twentieth century excavations of numerous Effigy Mounds by the Milwaukee Public Museum have greatly supplemented our understanding of the mortuary practices employed by Effigy Mound peoples (Barrett and Hawes 1919; Stoltman and Christiansen 2000:501). Roughly sixty-percent of excavated mounds contained burials, with secondary bundle reburial and primary flexed inhumations as the popular modes of interment (Stoltman and Christiansen 2000:502-503). Grave offerings were scarce in these mounds, sharply contrasted by the abundance of items associated with Middle Woodland burials several centuries earlier. Regardless, the origins Effigy Mound ceremonialism can be traced to the preceding Middle Woodland period. This is evidenced by the continuation of decorated ceramics, now typically restricted to the upper neck of vessels (i.e. Madison Cord Impressed), as well as the strong emphasis on earthwork constructions which incorporate the use of fire and colored soils in the construction of burial mounds (Barrett and Hawes 1919; Christiansen 2001:265).

NON-EFFIGY MOUND LATE WOODLAND CULTURE

Salkin (1987, 2000) juxtaposes the Effigy Mound 'Horicon Phase' with the 'Kekoskee phase,' or Late Woodland groups utilizing collared ware ceramics and residing in more permanent, occasionally fortified villages. The geographic extent of these sites is restricted to Southeastern Wisconsin and Northern Illinois (Salkin 2000). The coeval Late Woodland period in Illinois has been termed the Des Plaines Complex (Gillette 1949:73) where various collared and Madison ceramic varieties often co-occur (Emerson and Titelbaum 2000).

Sites are often situated on terraces adjacent to streams, rivers, or lakes. Ceramic materials recovered from these sites typically consist of grit-tempered collared ceramics including Aztalan Collared, Point Sauble Collared, Hahn Cord Impressed, as well as Starved Rock Collared varieties (Meinholz and Kolb 1997; Salkin 1987, 2000). However, Madison ware ceramic types also occur. Additionally, a vast majority of Kekoskee sites also yield shell-tempered pottery, though only directly attributable to Middle Mississippian types at Weisner III, Bethesda Lutheran Home, and Hamilton Brooks in Dodge, Jefferson, and Green Lake Counties, respectively (Hall 1967; Hendrickson 1996; Salkin 1993; Salkin 2000:529). Lithic assemblages typically contain triangular arrow points, knives, scrapers, drills and retouched flakes; few ground stone tools are present.

Architectural structures include keyhole structures and rectangular single-post buildings; storage and refuse pits also are found. A select series of these sites exhibit fortifications including Weisner III and Weisner IV (Dodge County), Stockbridge Harbor (Calumet County), Hamilton-Brooks (Green Lake County), Camp Indianola (Dane County) and the Aztalan site (Jefferson County). The site of Elmwood Island was not palisaded, but as its name suggests, it is located on an island which suggests defensive concern (Salkin 2000:530).

Subsistence evidence from excavated sites shows wide use of maize horticulture, and a less-frequent use of domesticated plants including squash, sunflower, maygrass, and tobacco. Reliance on deer, elk, and small to medium sized mammals was common also. Aquatic resources too were likely an important part of the subsistence repertoire given the

common proximity of sites to streams, rivers, lakes, and wetlands (Salkin 2000).

DISCUSSION

A series of studies regarding the Late Woodland tradition in South-central Wisconsin have cast doubt on the validity of the 'phase' designations, as referred to above (Clauter 2003; Kelly 2002; Richards and Jeske 2002; Rosebrough 2010; Stoltman and Christiansen 2000). In general, these arguments contend that these taxon are poor heuristic devices to the extent that they fail to represent distinct social realities of 'Effigy mound' and non-Effigy Mound groups. Even Salkin's comparison of the Horicon and Kekoskee phases highlights a great degree of similarities between among the archaeological evidence attributed to each phase (Salkin 2000: Table 20.22).

Instead, Stoltman and Christiansen (2000) proposed the division of the Late Woodland tradition in the region into the Early (A.D. 500-A.D. 700), Mature (A.D. 700-A.D. 1000), and Final (A.D. 1000-A.D. 1200) periods. The Late Woodland tradition of Effigy Mound ceremonialism fluoresced during the "Mature" Late Woodland period between A.D. 700 - A.D. 1000 (Birmingham and Eisenberg 2000; Rosebrough 2010). Traces of it persisted until about A.D. 1300, during which time the region saw the introduction of Mississippian traditions (Rosebrough 2010:14). This includes the movement of Middle Mississippian people from the American Bottom Region to the north, discussed in further detail below.

Effigy Mound contexts containing non-collared ceramic vessels date between A.D. 700 and A.D. 1000 while similar contexts containing collared ceramics date between A.D. 900 and A.D. 1200 (Stoltman and Christiansen 2000:507). These dates highlight roughly a century of overlap between un-collared and collared ceramic styles suggestive of changes coinciding with the final stages of effigy mound building and increased use of maize in the region (Kelly 2002; Richards and Jeske 2002; Stoltman and Christiansen 2000). Some scholars posit that the appearance of collared ware pottery and maize horticulture resulted from an inward migration of Late Woodland people from the Woodfordian region to the south (Kelly 2002; Richards 1992:405).

Southern influences in the later portion of the Mature Late Woodland Period are advocated also in the appearance of particular domestic architecture at select sites in southern Wisconsin. Keyhole-shaped structures have been identified at Late Woodland periods sites in this region including Statz (Meinholz and Kolb 1997), Weisner III (Salkin 1993), and Elmwood Island (Salkin 2000). These distinctly shaped structures also have been identified at sites in Central Illinois in Schuyler and Adams Counties (Green and Nolan 2000; Nolan 1993), in the Kaskaskia (Binford, et al. 1970; Morrell 1965; Rackerby 1966) and Big Muddy River Valleys of Southern Illinois (B. M. Butler and Wagner 2000). More than fifty of these features are found in the American Bottom region at sites dating to the Patrick phase (A.D. 600-800) including Fish Lake (Fortier, et al. 1984; Kruchten, et al. 2007), Range (Kelly, et al. 1987), Sponemann (Fortier, et al. 1991), and several others (Holley, Parker, Scott, Watters, Harper, et al. 2001; Holley, Parker, Scott, Watters, Skele, et al. 2001; Holt 1996; Koldehoff and Galloy 2006; Kruchten, et al. 2007). Rosebrough (2010:98) has previously pointed to the slightly earlier radiocarbon dates from these southern sites suggesting that keyhole architecture likely originated in the American Bottom region during the eighth century A.D., slightly before they are in use in south-central Wisconsin (Meinholz and Kolb 1997). This supports a suggestion for sustained contact among mid-continent Late Woodland groups well after the decline of the previous Middle-Woodland tradition.

MIDDLE MISSISSIPPIAN

Many previous and ongoing deliberations provide a diverse series of interpretations regarding formation of Middle Mississippian society in the American Bottom and its impact on neighboring groups in the Eastern Woodlands (e.g. Alt 2006; D. G. Anderson 1997; Brown and Kelly 2000; Emerson 1991b, 1997a; Emerson, et al. 2000; Fowler 1974; Hall 1962, 1967, 1986, 1991; Kelly 1991; Mehrer 1995; Pauketat 1994, 1997, 2002, 2004, 2009a; Pauketat and Emerson 1997; Pursell 2004; B. D. Smith 1978b, 1990; Stoltman 1991). Below, I survey early Middle Mississippian society as it fluoresced in the American Bottom followed by a discussion regarding the movement of Middle Mississippian lifeways into the Western

Great Lakes during the late tenth through thirteenth centuries. For reference, the American Bottom chronology is provided in Figure 2.1.

The American Bottom is an extensive floodplain hugging the eastern bank of the Mississippi River from Alton, Illinois south to the confluence of the Mississippi and Kaskaskia Rivers. Around A.D. 1050 this river valley became the center of an early and expansive Middle Mississippian society concentrated at the pre-Columbian city of Cahokia and its associated residential populations. The term 'Middle Mississippian' is often used to refer to these people and their associated lifeways.

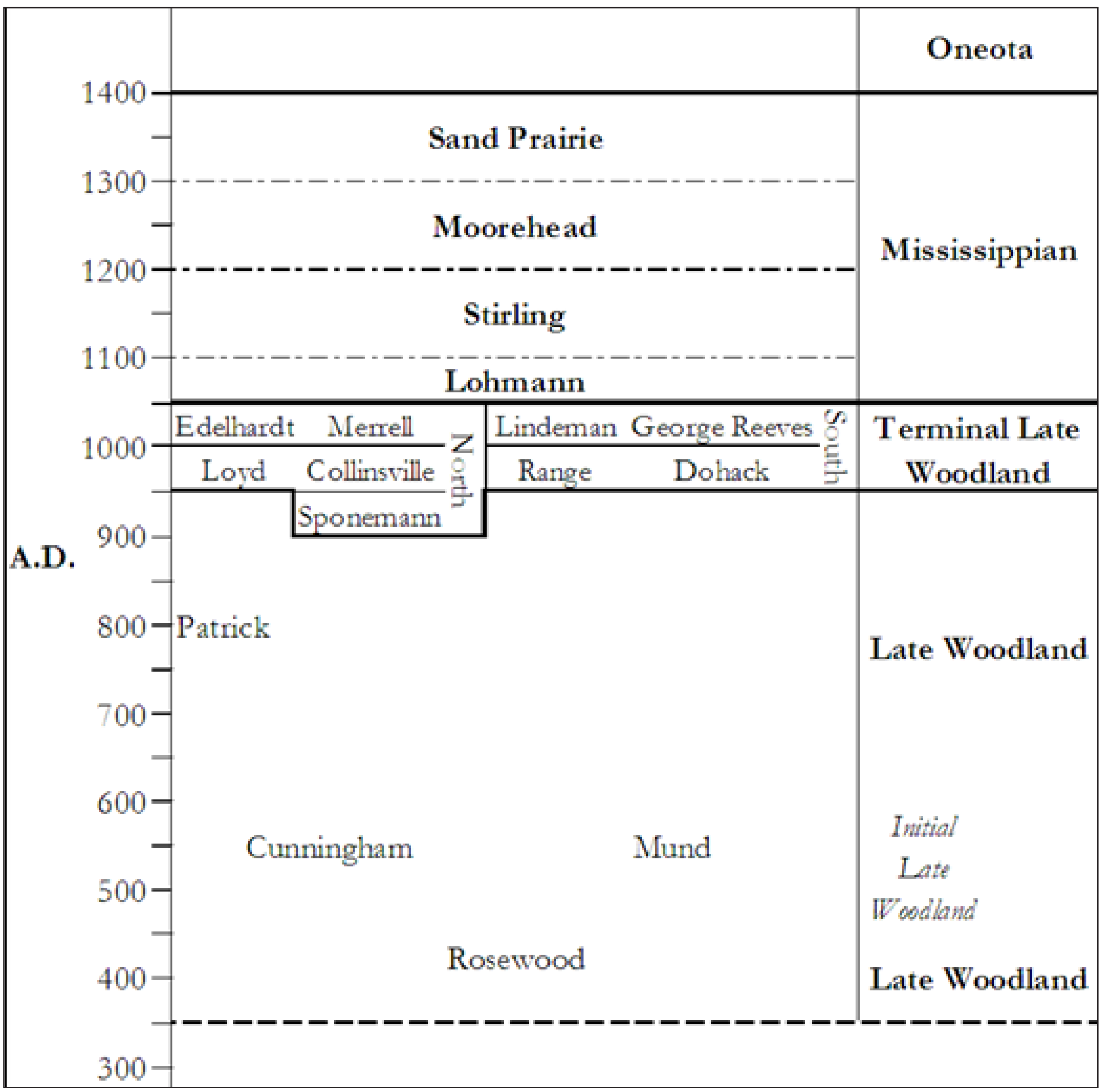


Figure 2.1. American Bottom chronology (after Fortier, et al. 2006).

The period prior to the rise of Middle Mississippian society, between A.D. 900 and A.D. 1000, the "Emergent Mississippian" (Bareis and Porter 1984; Kelly 1982) or "Terminal Late Woodland Period" (Fortier, et al. 2006; Fortier and McElrath 2002). During this period, settlements are typically established along floodplain ridges, providing access to the dynamic environs of in the floodplain, as well as the often timbered bluff tops and uplands a short distance to the east. Subsistence strategies shift from small scale domestic gardening to more intensive agriculture, focused primarily on maize (Kelly 1990; Kelly, et al. 1984). Ceramics shift from earlier forms of grit-tempered jars, cordmarked to the lip, to grog-tempered Late Bluff jars with smoothed necks and cordmarked lower bodies (Holley 1989:3). Decorative elaboration increases over time with interior lip impressions and exterior lugs along the rim margins. By A.D. 1000, vessels often exhibited protruding rims and were occasionally marked with exterior notching. Red-slipped exterior shell or limestone tempered vessels occur also (Holley 1989:3). New vessel forms including pans, bottles, and stumpware also appear at this time (Kelly 1990). By the Edelhardt phase (A.D. 1000-A.D. 1050) exterior vessel surfaces are typically smoothed and often red-slipped while rim elaboration continues to increase.

Architectural forms consist of single-post, rectangular, semi-subterranean structures similar to earlier Late Woodland traditions. Floor surface areas generally increase over time during this period (Emerson and Jackson 1984; Kelly, et al. 1990; McElrath and Finney 1987), a trend that continues during the subsequent Middle Mississippian period. Community plans shift to a centralized community square or plaza area delimited by clusters of structures (Kelly 1990, 2000).

Around A.D. 1050, a major and swift change in the region occurs as a new central political administrative complex forms in the American Bottom, centered at the Cahokia site. Cahokia itself is often considered the center of this new regional polity, consisting of more than 200 mounds and various habitation areas. However, it is perhaps more appropriate to consider the Cahokia, East St. Louis and St. Louis sites as a large metropolitan district, or what Pauketat (1994, 2004) has referred to as the "central political-administrative complex"

(Figure 2.2). In fact, recent investigations at the East St. Louis site (Kruchten and Galloy 2010; Kruchten, et al. 2009) have identified additional densely populated habitation areas which accentuate the perception of a single populated district extending from Cahokia to both shorelines of the Mississippi River.

The Middle Mississippian period in the American Bottom is divided into four successive phases corresponding to radiocarbon dates in combination with artifact seriation (see

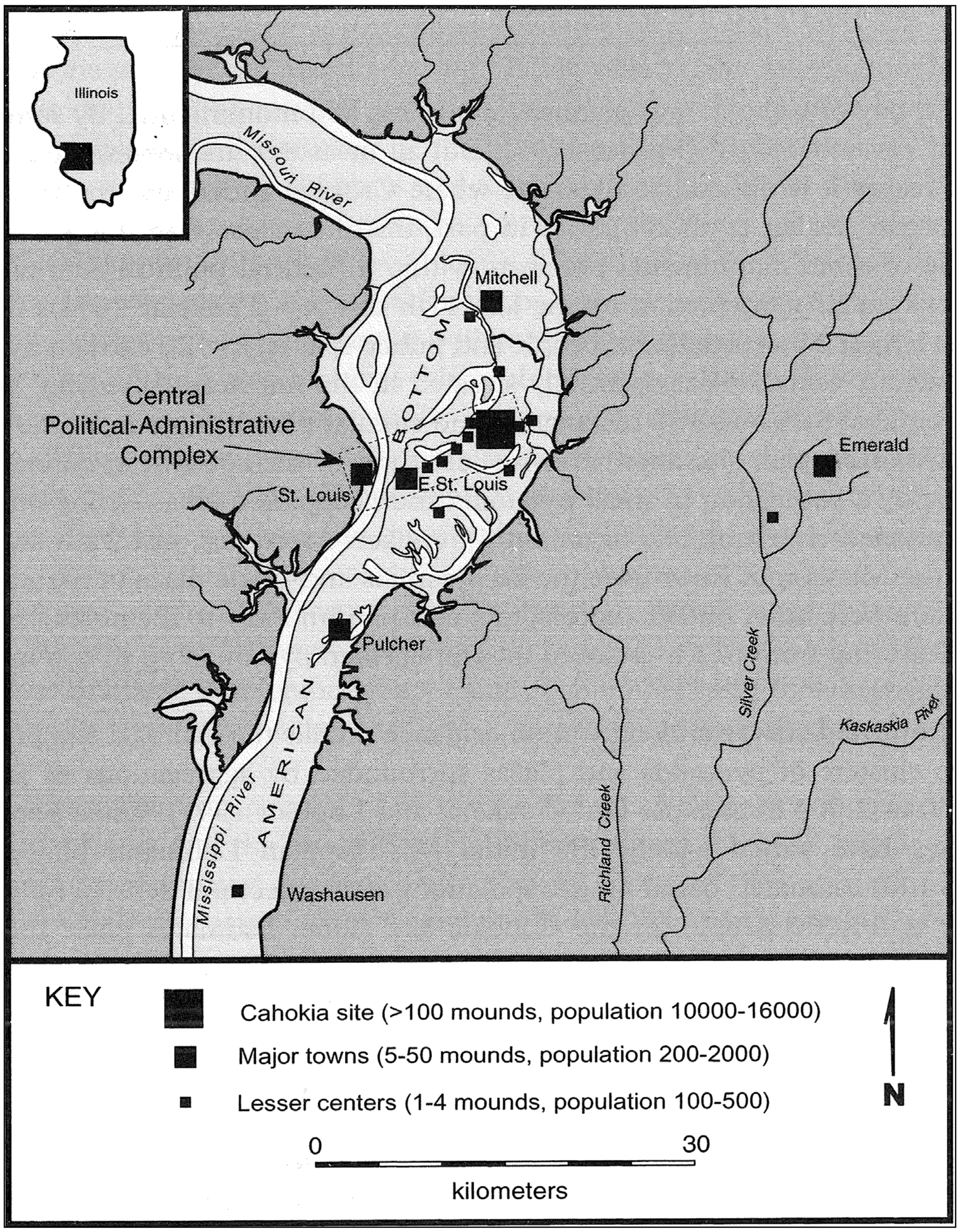


Figure 2.2. American Bottom Mississippian settlements, c.a. A.D. 1100 (Pauketat 2005a:Figure 8.3).

Figure 2.1): the Lohmann phase (A.D. 1050 – 1100), the Stirling phase (A.D. 1100 – 1200), the Moorehead phase (A.D. 1200 – 1300) and the Sand Prairie phase (A.D. 1300 – 1400) (Fortier, et al. 2006).

By the beginning of the Lohmann phase buildings were built using wall-trench construction. Single-post construction, common during earlier periods, was still utilized, though in considerably lower frequency. Many non-local materials began to be introduced into the American Bottom including chert-hoes made from Mill Creek chert from southern Illinois and marine shell beads from the Gulf of Mexico (Brown, et al. 1990; Fowler, et al. 1999; Pauketat 2004). Non-local populations moved into the region as well (Alt 2002, 2006, 2012; Hall 1975; Pauketat 2003; Winters and Streuver 1962).

Fully developed Mississippian ceramic styles appeared during the Lohmann phase (Holley 1989; Milner, et al. 1984; Vogel 1975). Ceramic jars continued the trend of elaborated, protruding rims witnessed during the late Terminal Late Woodland. Shell and limestone tempering became common and vessels often exhibited dark or red-slipped surfaces (Holley 1989). Vessel forms from this period include bowls, seed jars, and jars with extruded rims (Figure 2.3). Stirling phase ceramics are predominately shell-tempered. Jars typically exhibited rolled rim forms and sharper angled shoulders. Vessels surfaces often exhibited dark smudged and/or burnished surfaces. Ramey Incised jars serve as a horizon marker for this phase, most readily identified by various trailed geometric motifs decorating the upper body surface (Griffin 1949; Holley 1989) (Figure 2.4). The Powell Plain variety represents the undecorated companion to Ramey Incised (Griffin 1949:51).

The fluorescence of Middle Mississippian lifestyles in the American Bottom at the onset of the Lohmann phase was coupled with a rapid commencement of monumental construction at and around Cahokia (Dalan, et al. 2003), an influx of immigrants from around the Midwest (Alt 2006, 2012; Pauketat and Lopinot 1997), as well as a reconfiguration of the regional countryside (Emerson 1997a). Moreover, a series of outward movements of Middle Mississippian people form the American Bottom to the north transpired during the

Figure 2.3. Early Mississippian Ceramic Vessel Trends (adapted from Milner, et al. 1984:Figure 57).

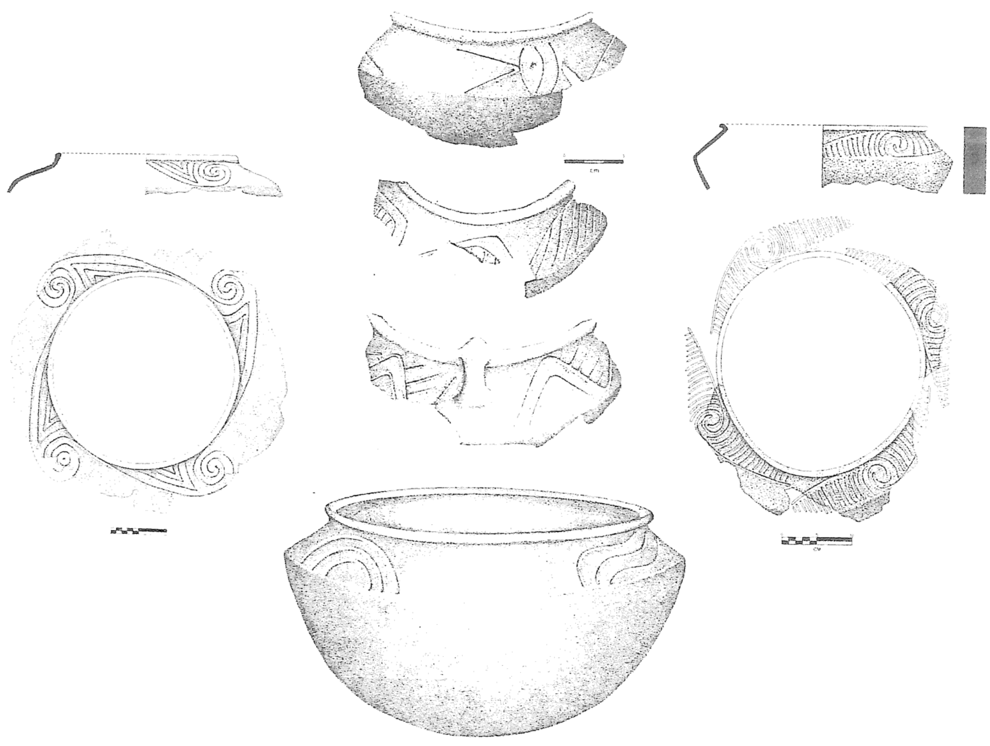


Figure 2.4. Ramey Incised jars (adapted from Emerson and Jackson 1984; Holley 1989; Stroik 2007).

Edelhardt, Lohmann, and Stirling phases. These out-migrations resulted in the establishment of numerous Middle Mississippian contact sites throughout the Midwest possibly serving as frontier trading out-posts (Kelly 1991), military outposts (Griffin 1960; Hall 1962) or perhaps Middle Mississippian missions (Boszhardt, et al. 2012; Riley and Apfelstadt 1978). Given the developing polity at Cahokia during the Lohmann and Stirling phases, these movements may have represented disenfranchised groups wishing to remove themselves from the socio-political scene in and around Cahokia (Emerson 1991b, 1997a; Pauketat 1994; Pauketat and Emerson 1997). Regardless of their specific motivations, the results of the Middle Mississippian influx from Cahokia into the Northern hinterlands had profound social effects on both the extant hinterland populations and the immigrants themselves. Several of these Middle Mississippian contact sites are discussed below; their locations are illustrated above in Figure 1.1.

Harn (1991:129-130) notes that the appearance of Middle Mississippian culture north of the American bottom is not uniform but developed in "pockets," and at locations with an extant indigenous presence. The Central Illinois River Valley (CIRV) exhibits several instances of direct contact with Middle Mississippian populations (Conrad 1991; Delaney-Rivera 2000; Harn 1991:134; McConaughy and Bade 1993). Lohmann phase (and possibly earlier) contact is evident at the Rench Site near modern day Peoria, Illinois (McConaughy 1991; McConaughy and Bade 1993). Evidence includes the presence of Mississippian ceramic vessels. Though in low frequency, they included shell-tempered Powell Plain and Cahokia Red-filmed vessels as well as local grit-tempered replicas. The large size of some of the features at the site led researchers to suggest inhabitants regularly maintained a surplus of maize, which was recovered from the vast majority of few excavated features (McConaughy 1991:108).

A village of Late Woodland and Middle Mississippian inhabitants is evident at the Eveland site in Fulton County, Illinois (Conrad 1991:121). Here, Middle Mississippians introduced new materials and architectural traditions while extant indigenous ones continued

mostly unaltered. This included the introduction of Powell Plain and Ramey Incised pottery and wall-trench and circular structure forms (Conrad 1991:119; Harn 1991:131-133). A truncated pyramidal mound was present on the bluff tops overlooking the Eveland site and the CIRV. Here, the Dickson Mounds site represents the cemetery associated with the Eveland habitation, dating between A.D. 1000- A.D. 1250 (Harn 1980, 1991).

The Shire site in Central Illinois represents a Middle Mississippian-Late Woodland contact site interpreted as a as a trade outpost (Claflin 1991). Evidence for Mississippian contact includes the use of particular structure forms, shared lithic tool forms and the presence of Late Woodland facsimiles of Mississippian pottery (Claflin 1991:174). These materials as well as ceramics from the Lower Wabash River drainage found at the site led investigators to interpret the Sangamon River Valley as a crossroads in Central Illinois.

In Eastern Illinois, the Collins site exhibits platform mounds and particular public architecture suggestive of a small religious center (Douglas 1976; Riley and Apfelstadt 1978). Vessels closely resembling Lohmann phase Middle Mississippian ceramics, gaming stones, and projectile points are present; though they represent a minority of the artifact types present. No hybrid vessels combining Mississippian and Late Woodland ceramic traditions, such as those seen in the CIRV, Apple River region, or at Aztalan, are present. Mortuary practices represent a continuation of Late Woodland traditions, though not necessarily divergent from Middle Mississippian practices (Riley and Apfelstadt 1978). Ceramic vessels exhibiting collared rim forms are present though few in number (Douglas 1976). These compare favorably to the Aztalan Collared (Baerreis and Freeman 1958) and Starved Rock Collared (Hall 1987) varieties of Northeastern Illinois and Southeastern Wisconsin. The nature of the Middle Mississippian presence at the site remains unclear as previous investigations were focused on only the mortuary/ceremonial center of the site.

Middle Mississippian traditions are articulated in the Apple River region of Northwestern Illinois. While some evidence exists for Lohmann phase contact, the majority of Mississippian influence reached the region during the Stirling phase; locally known as the

Bennett phase. This is roughly the same time as other initial Middle Mississippian manifestations at Aztalan, Eveland, Carcajou Point, and the Red Wing Locality in the Upper Mississippi River (Conrad 1991; Emerson 1991a; Hall 1962; Harn 1991; Holley 2008; Richards 1992; Rodell 1991). Sites such as Mills, Lundy, John Chapman and the Savannah Proving Grounds demonstrate coeval Middle Mississippian and Late Woodland occupations (Emerson 1991a; Emerson, et al. 2007; Millhouse 2012). The introduction of Mississippian culture in the region is less an outside intrusion of social-political co-optation, but appears to have developed within the region as a "discrete entity" (Emerson 1991a:175). Recently, Millhouse (2012) has demonstrated the inhabitants at the John Chapman site not only represent a cohabitation of Middle Mississippian and indigenous Late Woodland groups, but these people lived their daily lives emulating aspects of Middle Mississippian life while continuing to draw upon local Late Woodland traditions.

Slightly further north, the Fred-Edwards site in Grant County, Wisconsin represents another Late Woodland occupation with evidence for Stirling phase Middle Mississippian contact (Finney and Stoltman 1991; Green 1997). Mississippian ceramics resembling American Bottom Powell Plain and Ramey Incised materials were recovered as well as Mill Creek and Burlington cherts (lithic materials typically utilized in the American Bottom during this period). Green (1997) has posited that the presence of a palisade wall and the arrangement of the community in a plan resembles that of a Mississippian town. However palisade walls also have been identified at Late Woodland sites as well (Salkin 1993, 2000). The site's location on the Grant River, thirteen kilometers from its confluence with the Mississippi would have provided both a rich environment to sustain the population year-round and also provide excess resources that could possibly be traded for non-local goods (Finney and Stoltman 1991:250).

Recent research has provided new information regarding Middle Mississippian expansion in the Upper Mississippi River Valley. Edelhardt and Lohmann phase occupations have been identified at the Fisher Mounds site (Benden, et al. 2010; Stoltman, et al.

2008) and Trempealeau Mounds, respectively. A series of stepped platform mounds at Trempealeau were constructed atop the Wisconsin Bluffs overlooking the Mississippi River with additional mound(s) and village occupations in the valley below (Boszhardt, et al. 2012; Boszhardt, et al. 2011; Green and Rodell 1994). Investigators have suggested the presence of Middle Mississippians in this region represents a colony of people establishing a "Cahokian mission" (Boszhardt, et al. 2012:88). However, there is little material evidence to suggest regular contact with indigenous groups in the region.

ONEOTA IN THE WESTERN GREAT LAKES

In the Western Great Lakes, it has been posited that Oneota societies developed out of Effigy Mound Late Woodland groups who adopted agriculture and diffusing Mississippian lifeways (Gibbon 1972). Other perspectives suggest Oneota emerged out of Late Woodland groups, as a direct result of contact and acculturation with Middle Mississippian groups from the south (Ford and Willey 1941; Gibbon 1972, 1982). The association between these coeval Mississippian groups remains poorly understood.

Oneota cultures in Wisconsin are conventionally separated into four relative chronological horizons based primarily on ceramic materials; these include Emergent (A.D. 950-1150), Developmental (A.D. 1150-1350), Classic (A.D. 1350-1650), and Historic (post A.D. 1650) (Hall 1962; Overstreet 1997). Ceramic vessels are predominately shell-tempered globular pots with smoothed or cordmarked surfaces. During the Emergent Horizon, vessels often exhibit lip modifications and shoulders are typically undecorated; exceptions include curvilinear designs (i.e. Carcajou curvilinear) and nested chevrons. Other artifacts distinguishing early Oneota groups from contemporary Late Woodland people include fish decoys crafted out of mussel shells, chert end-scraper lithic forms, bison and elk scapula hoes, and copper pendants in the form of birds or serpents (Overstreet 1997:251). Oneota groups were more sedentary than their Late Woodland counterparts, settling in farming villages with accessibility to aquatic resources.

It had been previously suggested that a gap (A.D. 1050 to A.D 1150) in the Oneota chronology of Southeastern Wisconsin existed around Lake Koshkonong, largely attributed to the Middle Mississippian intrusion at Aztalan (Overstreet 2000; Overstreet and Clark 1995; Richards 1985; Richards 1992:420). Recent interpretations of old and new radiocarbon dates have demonstrated such a gap does not exist (Boszhardt 2004; Richards and Jeske 2002). At the time Middle Mississippian peoples emigrated to Aztalan Oneota groups likely inhabited the shores of Lake Koshkonong, through which the Rock River flows. If Middle Mississippian immigrants traveled up the Rock River via canoe, an Oneota presence at Lake Koshkonong might explain why Middle Mississippian groups did not settle in this area (Birmingham and Goldstein 2005; Goldstein 1991; Goldstein and Richards 1991). However, it is just as likely that Middle Mississippians utilized overland trails to arrive at Aztalan. Archaeological evidence suggests Oneota groups around Lake Koshkonong and Middle Mississippian/Late Woodland groups at Aztalan were not in contact. This conclusion is based largely on the lack of Oneota materials at Aztalan, and vice-versa. The association between these coeval 'Mississippian' groups in this region remains poorly understood.

CHAPTER 3: ANALYTICAL METHODS

This chapter lays out the analytical methods used in the examination of the Northeast Mound features and associated ceramic objects. A pragmatic approach to most object-oriented studies aims at describing the form, material, and manufacturing methods an archaeologist identifies to describe what a particular artifact is, or more precisely what its function is. Not only does this study seek to examine a selection of objects and features from Aztalan, but the complimentary analyses provide a discussion regarding the meanings, practices, and histories of those objects and spaces (Meskell 2005).

The ceramics analyzed in the present work are currently curated at the Wisconsin Historical Society (WHS) facility in Madison, Wisconsin, and all analyses were conducted on site. Two vessels were analyzed at the WHS Museum in Madison, where they were on display at the time of this study. These circumstances restricted the use of powered microscopes to adequately investigate the ceramic pastes of the vessels or for comparison to ceramic type collections. All maps illustrated in the present work are compiled from original WHS excavation field maps on file the WHS facility in Madison, maintained my the Museum Archaeology Program (MAP). Wisconsin Historical Society staff permitted reproduction of all available field notes and digital scans of field photos on file. These were subsequently used in the course of the feature analysis. Digital scans of the available field maps were purchased from Wisconsin Historical Images office at the WHS.

WHS FIELD MAPS

Original WHS excavation field maps were digitized using ESRI's ArcMap software, version 10, and georeferenced the 'Aztalan Grid' using the Universal Transverse Mercator (UTM) projection system (Zone 16N, NAD83). The Aztalan Grid is five-foot incremental grid using a North-South and Right-Left directional system established by WAS excavators circa 1950, oriented to magnetic north. Two permanent benchmarks aligned to the grid were utilized by WHS excavators during the 1960s excavations and subsequently used to reference the field maps to their proper location at the site (Figure 3.1). These benchmarks are located

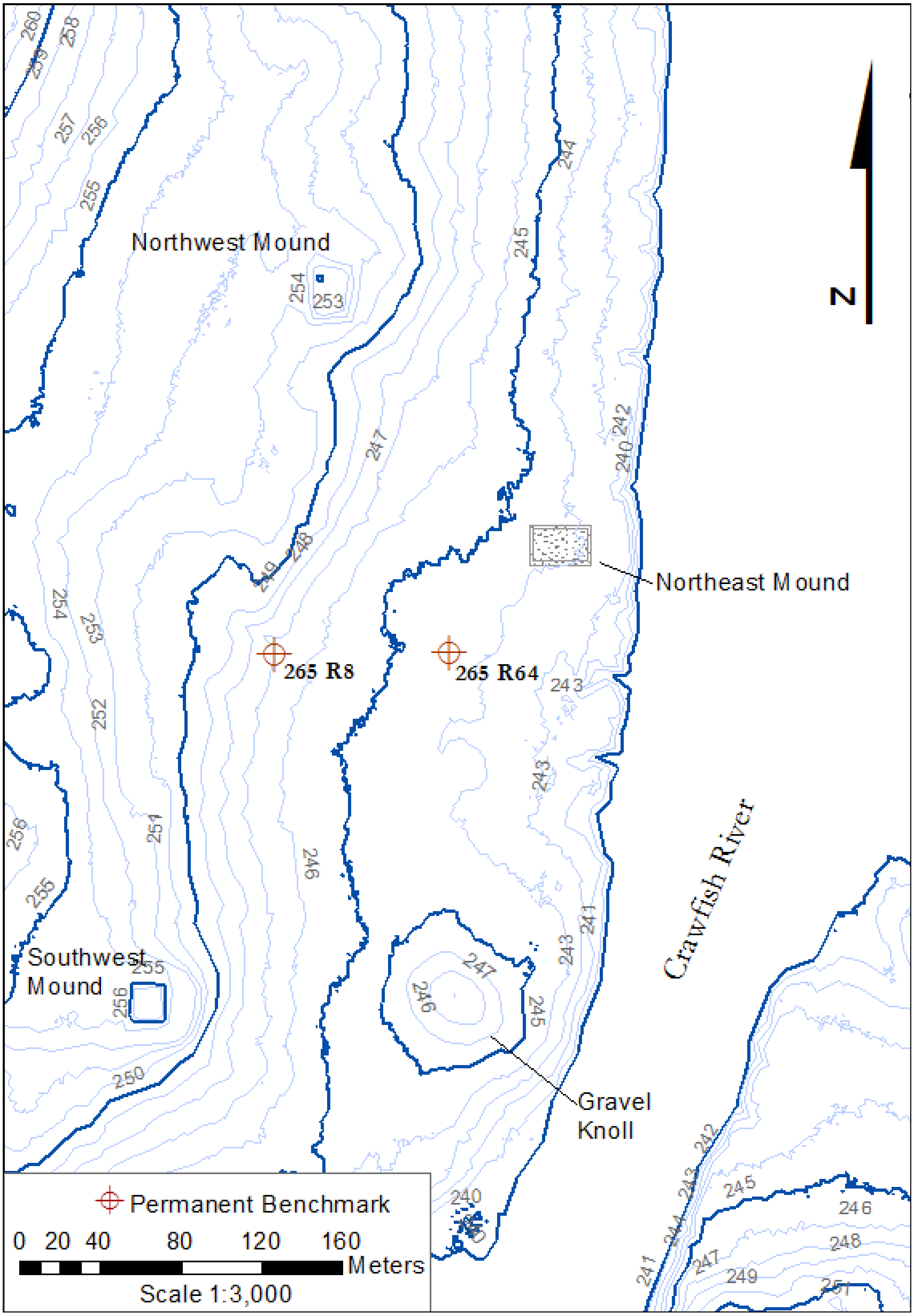


Figure 3.1. Map showing Aztalan Grid benchmark locations.

at grid coordinates N265 R8 and N265 R65. Universe Transverse Mercator coordinates for these benchmarks were provided by Wisconsin Department of Natural Resources personnel and are listed here (UTM Zone 16 N, NAD83):

N265 R8 - N 4769834.98, E 348445.03, Elevation 246.76 masl

N265 R64 - N 4769829.52, E 348530.96, Elevation 244.36 masl

The Aztalan Grid system designates these two benchmarks as 280 feet apart east to west, or left to right [(64-8) x 5=280]. Measurements taken by the author in 2011 using a Sokkia Set 5F Total Station show these points to be actually be 282.4 feet apart, revealing a 2.4 foot east-west discrepancy between these points. To minimize error, WHS maps were first referenced to each other, and then oriented to the grid. Then these maps were tied into grid corner N265 R64, the benchmark closest to the Northeast Mound and often used as a back-sight point by WHS personnel (A.D. Buck Jr. and Jay Brandon 1967-1968 field records notes on file, Wisconsin Historical Society, Madison).

Additional discrepancies were encountered during the course of this study regarding the locations of the 1964 trenches. An original 1964 field map (one of three) records the eastern-most trenches positioned ten feet (3.05 m) further north and five feet (1.52 m) further east of their location as depicted in Figure 4.1 (see Chapter 4). The correct location of the 1964 east-west trench (as illustrated in this thesis) was determined through examination of several 1968 field photos. These examinations led to the placement of this trench in its presently mapped position ten feet south and five feet west of its original plotted location. Subsequently, the other two trenches illustrated on the same map also were shifted proportionately. A 1967 field photo of the western wall of the 1967 excavation confirms the location of the 1964 deep-cut, north-south trench reported here. However, the precise width of this trench is not recorded, and is approximated based on the width of the east-west trench, as mapped.

It was assumed the mapping error described above was applied to all 1964 Northeast Mound field maps. Lapham (1855:Plate XXXIV) records the mound summit at 50 feet, or

15.24 meters (north-south). If the original plotted location of the WHS mound-top structure is combined with the plotted location of the MPM mound-top excavations (Barrett 1933; field map copies on file at UWM-ARL, Milwaukee, Wisconsin), the summit of the mound would need to span an additional 10 feet (3.05 m) beyond Lapham's north-south measurement. I assume Lapham (an accomplished engineer and skilled surveyor) provided an accurate mound-top width. Therefore the entire series of 1964 field maps of the Northeast Mound were corrected for the error noted above. The WHS excavations as illustrated in this thesis represent the best approximation of their actual location. Given the discrepancies in the WHS field maps the lack of detail in recorded mound profiles (see Chapter 4), future archaeological field work would be warranted to confirm the location of these WHS trenches and provide details of the mound's internal structure.

FEATURE ANALYSIS

Buildings, pits, postmolds, wall trenches, hearths, post pits, and anomalous fill areas make up the seven different feature categories identified during the WHS excavations of Aztalan's Northeast Mound. These features are analogous to those previously identified at the site and throughout the Midwest (e.g. Barrett 1933; Birmingham and Goldstein 2005; Collins 1997; Emerson 1997a; Gibbon 1991; Salkin 2000; Wittry and Baerreis 1958). During excavation, separate number series were assigned to different provenience types. One series was assigned to pit features and amorphous fill areas (i.e. 1, 2, 3, etc.) and a separate series to buildings (i.e. Structure 1, Structure 2, Structure 3, etc.). Mound fill contexts were often assigned a separate prefix such as "MD" or "NEMD" as were stratigraphic test pits, or 'strat pits'; designated with the prefix 'SP'. The feature numbering series were renewed each year of excavation, so the last two digits of the calendar year were added as a suffix to all feature numbers to eliminate duplicate numbers (e.g. Feature 1 from 1964 was assigned as '1-64' and '1-67' in 1967, and so on). This numbering convention is maintained throughout this analysis. Gaps in the sequences reflect assignment of feature numbers elsewhere at the site during the 1964 and 1967 seasons.

Feature profiles were recorded in the field following the removal of all feature fill. That is, once all identified feature fill was removed by the excavator, the cross-section profile of the excavated feature was recorded and metric data were collected. Thus, the majority of the features do not have profile maps depicting internal layered deposits or zones. Exceptions include occasions of mapping burned clay lining at the base of hearths and feature cross-sections visible in the excavation trench walls. The extent of the features was based on the excavator's ability to identify the base and sidewalls while excavating and not from the aid of cross-section profiles which could highlight contrasts between the surrounding sterile matrix and any slump zones.

STRUCTURES

Three structure types are present in the Northeast Mound complex: single-post, single-post set into a semi-subterranean basin, and wall-trench/single post structures. The term 'post mold' is used here generically to designate remnants of prehistorically excavated holes into which poles were placed upright, such as for supporting the frame of a building. Excavators did not differentiate any occasion of a post decomposing in place versus a post removed, and the hole subsequently filled in. Therefore, I use of the term 'post mold' as a catchall for this type of feature.

Wall-trench structures are denoted by the use of a linear trench rather than individual post molds that serve as the foundation for structure walls. It has been argued that these trenches allow for the placement of pre-constructed walls to be set into the trench rather than individual post molds, expediting the actual construction of a structure (Pauketat and Alt 2005). However, individual posts could just as easily have been placed into the open trench as well, then summarily backfilled. Occasionally, posts may extend beyond the base of the trench, suggesting individual postholes were dug into the base of the trench following its excavation. These deeper posts may have resulted from posts settling into the ground as they absorbed the weight of the roof.

The term ‘post pit’ is reserved to designate a large upright post, greater than thirty centimeters in diameter. These are typically associated with an insertion and extraction ramp visible in plan and profile. Such posts have been noted to serve as community markers, lightning rods, symbols of authority or unity, and even social beings or persons (Alt 2006:217, 218; Fletcher and Flesche 1972:218-219; Fowler, et al. 1999; Hall 1997:104-118; Pauketat and Alt 2005:217, 228; Skousen 2012:35). Barrett (1933) noted that several of these features were found in association with sub-mound deposits among the ‘marker mounds’ occupying the ridge north and west of the palisaded site.

Metric data collected for the semi-subterranean structure includes basin length, width, depth, and orientation. For all structures, floor length and width also were recorded where possible. Length and width measurements were taken from the approximate midpoint of the long and short axis of the floor, respectively. Measurements were taken from the interior face of the post or wall-trench.

PIT FEATURES

Metric and nominal attributes were recorded for pit features, including orifice length, orifice width, basal length, depth, volume, ceramic artifact density, plan shape, and profile shape. These attributes and close variations have been recorded for other features at the site and throughout the Midwest (e.g. Collins 1997; Meinholz and Kolb 1997; Pauketat 1998; Salkin 2000; Wittry and Baerreis 1958). To eliminate errors introduced during field mapping, measurements for orifice length and width and feature depth are taken from the original dimension recorded by the excavator in the field, rounded to the nearest whole centimeter. For bell-shaped pits, basal length is derived from profile cross-section maps recorded following the excavation of the feature fill, recorded whole centimeters. For plan shape, distinction between ‘circular’ and ‘oval’ plan shapes is made by the feature’s width to length ratio. Values of 0.90 or greater are considered circular and lower values are considered oval. No rectilinear pit features are present in the assemblage.

Pit features were categorized into morphological types based on their morphology and depth. Pit morphology, or shape, is derived from cross-section profiles and excavator's notes. This categorization was created to highlight the various pit morphologies present. The five distinct 'pit type' categories are not intended to represent or define standard, cross-cultural, inter- or intra-regional pit varieties. These varieties are illustrated in Figure 3.2.

Type 1: Shallow basins with incurving/inslanting sidewalls with concave bases; distinction between pit sidewall and base cannot be made. **Type 2: Shallow flat-bottomed pits** with incurving or inslanting sidewalls and a distinguishable flat base. **Type 3: Deep, basins** have sharply insloping sidewalls and with distinct concave bases, and are generally deeper

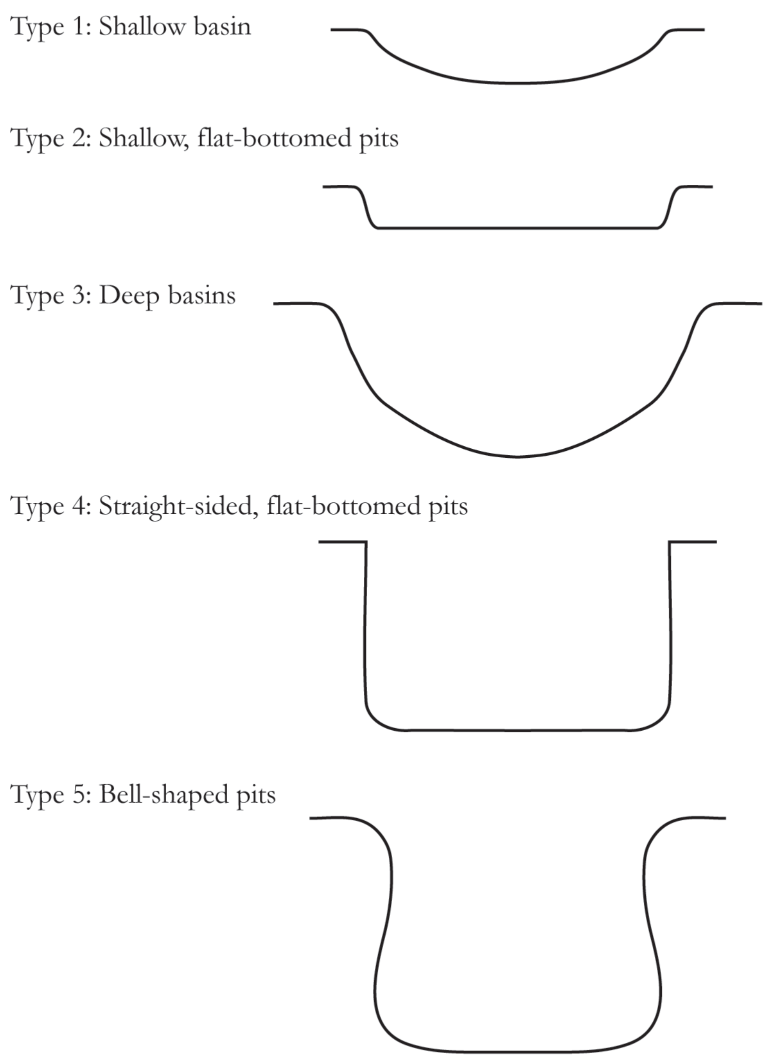


Figure 3.2 Illustrated examples of pit types.

than Type 1 or Type 2 pits which have gently incurving sidewalls. **Type 4: Straight-sided, flat-bottomed deep pits** are generally as deep as type three pits, but with vertical sidewalls. **Type 5: Belled pits** have out-slanting sidewalls with flared bottoms (causing the profile to generally represent the shape of a bell).

CERAMIC ANALYSIS

The WHS 1964, 1967, and 1968 excavations of the Northeast Mound at Aztalan recovered a mixed ceramic assemblage of Late Woodland and Middle Mississippian materials. In addition to a stylistic analysis of these materials, a portable X-ray fluorescence (pXRF) analysis was performed. The pXRF analysis aims to highlight the chemical similarity, or dissimilarity of the Northeast Mound ceramic assemblage to investigate the use of different clay sources used by, presumably different groups of people.

It should be noted that WHS excavators did not screen excavated soils. Thus, only select items were retained; field notes remark that occasional small sherds were observed but not kept. The northeast mound ceramic materials are currently curated at the Wisconsin Historical Society, Madison. The sections below begin with a discussion of the sorting procedures followed by elaboration of morphological criteria used and metric data recorded.

The present analysis incorporates a discussion of ceramic types, but relies on an attribute level approach to ceramic variation in order to provide an analytic dataset broadly comparable to previous research within the Aztalan area as well as other parts of the Midwest. At the time of this study, analytical procedures in Midwest prehistoric ceramic studies have been largely conventionalized and grounded in the fundamentals of ceramic vessel analysis as described by Shepard (1956), Rice (1987), and Sinopoli (1991). Many of the methods used derive from Richards' (1992) analysis of Aztalan ceramics from the Milwaukee Public Museum collections and 1984 UW-Milwaukee Field School at the site. These methods are analogous to ceramic seriation procedures and nomenclature commonly used in the American Bottom region and elsewhere in the Midwest (e.g. Holley 1989; O'Brien 1972; Pauketat 1998; Richards 1992; Vogel 1975). I acknowledge that misconceptions resulting

from conflicting terminology and analytical procedures within the discipline are likely present, and I attempt to clarify such instances below.

SORTING PROCEDURES

All ceramic vessel fragments were first separated into categories representing rim sherds, shoulder sherds, and body sherds. These were subsequently separated by temper type. Rim sherds, the basis for identifying discrete vessels in the collection, were checked for cross-mends between other rims, shoulder sherds, and body sherds within each provenience, and between all proveniences. This provided the minimum number of vessels present in the assemblage. Body sherds not associated with identified vessels were then tabulated. The body sherds, already sorted by temper type, were further sorted by surface treatment and decoration, if present. Late Woodland vessel collar fragments (i.e. those lacking a lip) also were separated into their own subcategory among the body sherds.

Few shoulder sherds were identified during the initial rough sort. One shoulder fragment was included among the vessel count as it did not correspond to any of the vessels represented by rim sherds (or their corresponding body sherds). In this isolated case, portions of the shoulder above and below the 'point of vertical tangency' (see section on vessel form discussed below) were present. This allowed proper orientation of the shoulder with respect to the neck and body segments. In all other cases where this criterion could not be met, the 'apparent' shoulder fragment was tabulated as a body sherd.

Finally, data was tabulated for all the vessels present in the assemblage. The descriptive and metric data recorded for the ceramic assemblage is designed to be comparable to analyses on Late Woodland and Middle Mississippian assemblages elsewhere in the Midwest, and are described in more detail below. The vast majority of the ceramic materials recovered from the WHS excavations were collected at the feature level and not by individual depositional zones within the features. Given the paucity of feature superpositioning, and lack of comprehensive ceramic analyses from controlled feature contexts, it is difficult (at this time) to identify any temporally sensitive variables in the Northeast Mound ceramic assemblage.

VESSEL MORPHOLOGY

Vessel Form

Many terms associated with modern ceramic vessel descriptions have been conventionalized, but use of particular terms may vary. The attributes of vessel form and morphology used in the present analysis parallel Shepard's geometric approach developed from Birkhoff (1933, cited in Shepard 1956). This approach utilizes multiple characteristic points regarding vessel contour to describe the shape and components of a vessel.

Jars and seed jars are the only vessel types identified in the WHS Northeast Mound ceramic assemblage. The lack of bowl forms reflects the basic Late Woodland nature of the assemblage. The term 'jar' is used to describe a vessel with a restricted orifice smaller than the maximum diameter of the vessel. Typically, the neck constricts from the shoulder toward the orifice with a height less than 20% of the total vessel height (following Richards 1992:217). The vessel body shape is globular with distinct shoulders and a rounded to semi-rounded base. Jars are easily distinguished from bowls by the presence of a neck, and from bottles whose neck is tapered or cylindrical in shape. The term 'seed jar' refers to a neck-less jar with a globular body, elsewhere referred to as a 'tecomate'.

The term 'lip' is used to designate the crest of the vessel wall spanning the exterior wall to the interior wall (Holley 1989:20) (Figure 3.3). 'Rim' refers to the margin of the vessel orifice, just inferior to the lip. The 'neck' refers to a segment of vessel wall between the orifice plane and the shoulder at the point of constriction above the shoulder. A 'shoulder' is the point of transition between the upper and lower body, typically at the vessel's maximum diameter below the orifice. The 'base' of a vessel is the underside, the portion on which the vessel rests. 'Body' refers to the portion of a vessel between the orifice and the base, and not part of the above mentioned features of the vessel.

Rim Form

Richards (1992:223) argues, to gain insight into rim morphological variations resulting from stylistic rather than functional differences, descriptions of rim form should be

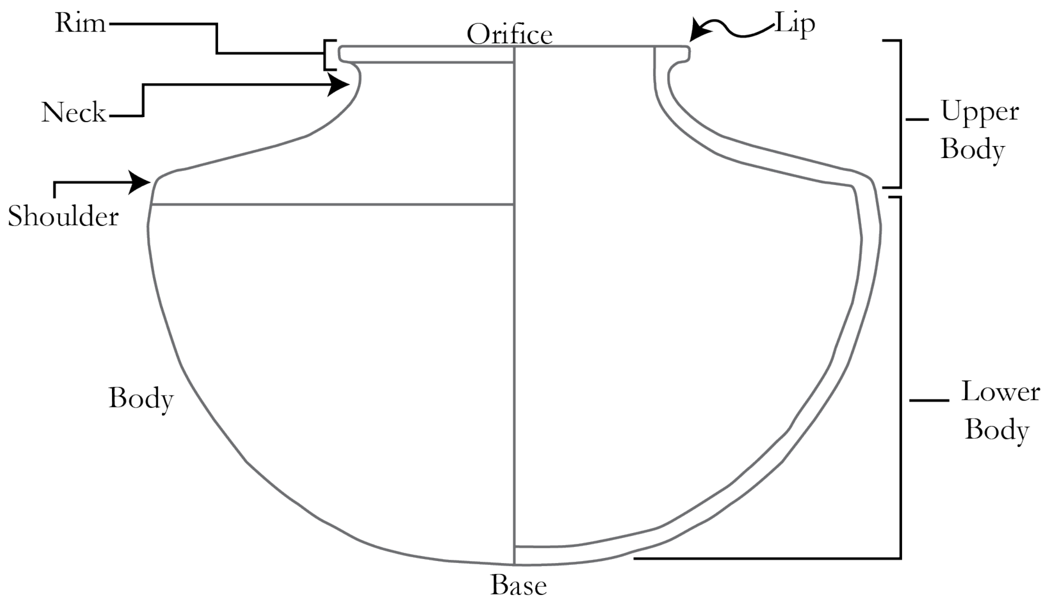


Figure 3.3. Attributes of vessel morphology.

based on manufacturing process; how the components of a vessel are physically formed. This same perspective is applied in this analysis. The margin of a vessel's orifice can be subject to various treatments that include: outward eversion, extrusion, bolstering, folding, rolling (or coiling), angling, thickening, collaring, or no modification (Figure 3.4). The latter form is self-explanatory, but the others may be harder to distinguish.

Everted rims are bent away from the center of the vessel, marked by a distinct break between the lower margin of the rim and the vessel neck. Eversion also may include varieties that are **folded**, or those that are both everted and extruded. For Aztalan ceramics curated at the Milwaukee Public Museum, Richards (1992:228-231) identified eight varieties of everted-folded rims. Effort was made to identify any everted-folded rims with one of these categories whenever possible. **Extruded rims** develop from pinching the upper and lower rim margins, resulting in a tapered effect. A **bolstered rim** refers to a welded strip of clay added to the junction of the exterior rim margin and the lip; this varies from collars, discussed in more detail below. **Rolled rims** do not have a clearly definable lip because upper and lower rim margins have been tightly coiled together producing a round exterior margin. A distinct break is observed on the vessel rim between the exterior of the vessel

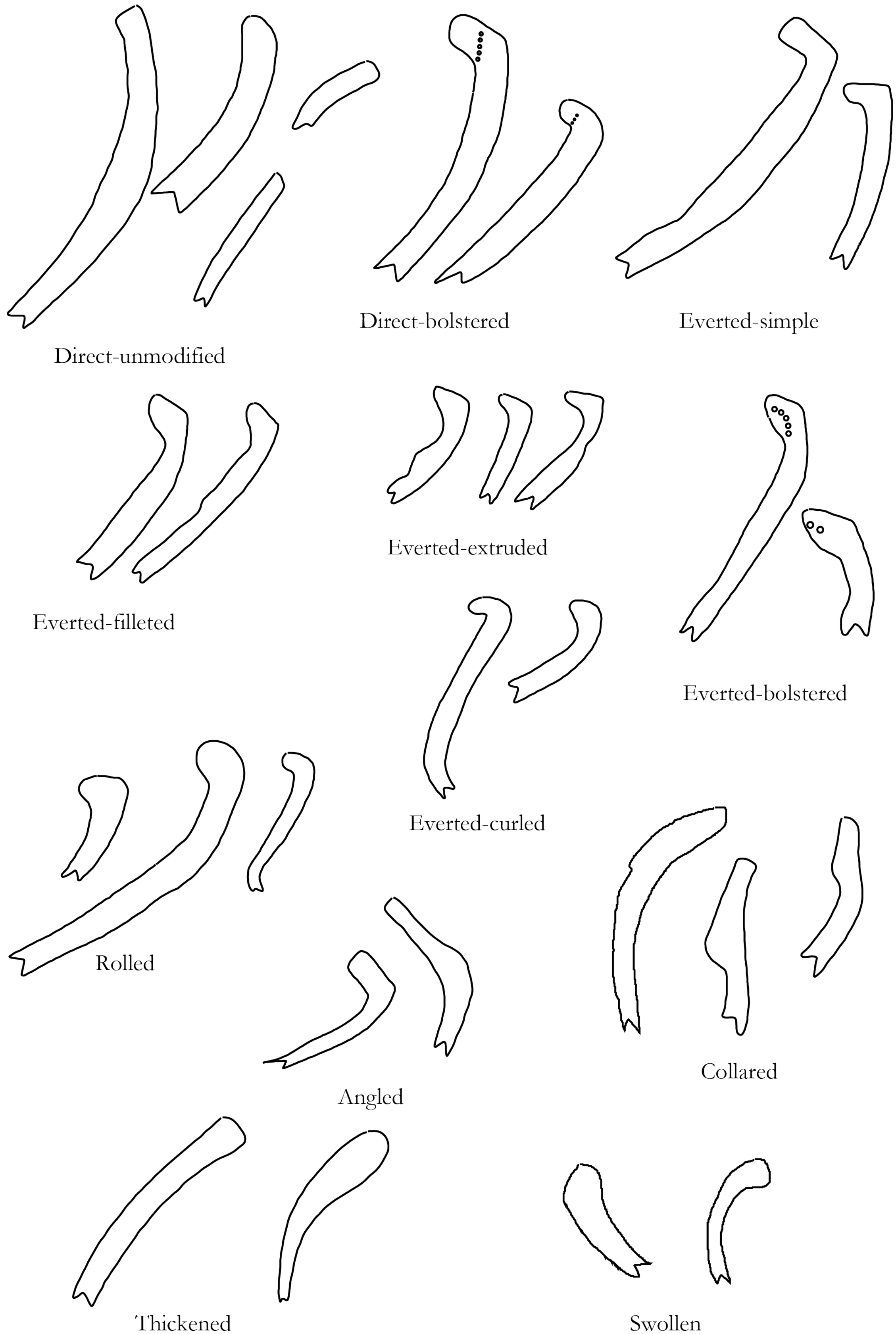


Figure 3.4. Rim form variation (after Richards 1992:Figure 5.5).

and the coils of the lower rim margin. **Angled rims** are basically extremely everted rims coupled with a sharply out-turned, or angled, neck. Richards (1992:232) notes that few such rims were present in the MPM assemblage. Seed jars can exhibit **thickened rims** which have slightly swollen or convex interior rim margins.

Collared rims are a common feature of the Late Woodland vessel assemblage. Collars are a version of folded rims, and given their ubiquity in the assemblage, are treated as a distinct treatment. A collared rim has an additional band of clay 'welded' to the exterior rim margin of a vessel. Viewing these collared rims in profile Richards (1992:233) distinguished several collar types based on the manufacturing process used, including: appliqued, filleted, folded, or folded over fillet. Often it is not possible to distinguish between the mode of manufacture because of the degree of welding between the collar and the pre-collar, exterior rim margin. Appliqued collars refer to those with an added clay strip to the exterior rim margin. Folded collars show evidence of bending the upper half of the rim outward, folding it all the way out and over until it reattaches to the exterior of the exterior vessel wall.

Collar Profile

Collar cross-section profiles and their orientation also were documented in this study. Collar orientation refers to the configuration of the rim margin to the vessel orifice plane. Richards (1992:272-275) systematically documented a variety of profile forms from the MPM Aztalan ceramic assemblage, noting that flat and concave profiles are by far the most common form at 43.8% and 37.5%, respectively. Examples of collared ware cross-section profiles from Aztalan are illustrated in Figure 3.5.

Orifice Type

Orifice shape for non-collared vessels is primarily circular when enough of the orifice is present to make a distinction. Collared ware vessel orifices, however, often vary based on the presence or absence of castellations, or peaks, at the orifice. Peaks almost always result in an orifice that is polygonal in shape, though exceptions exist. Additionally, peak morphology varies between angled peaks or rounded peaks, when viewing the vessel from

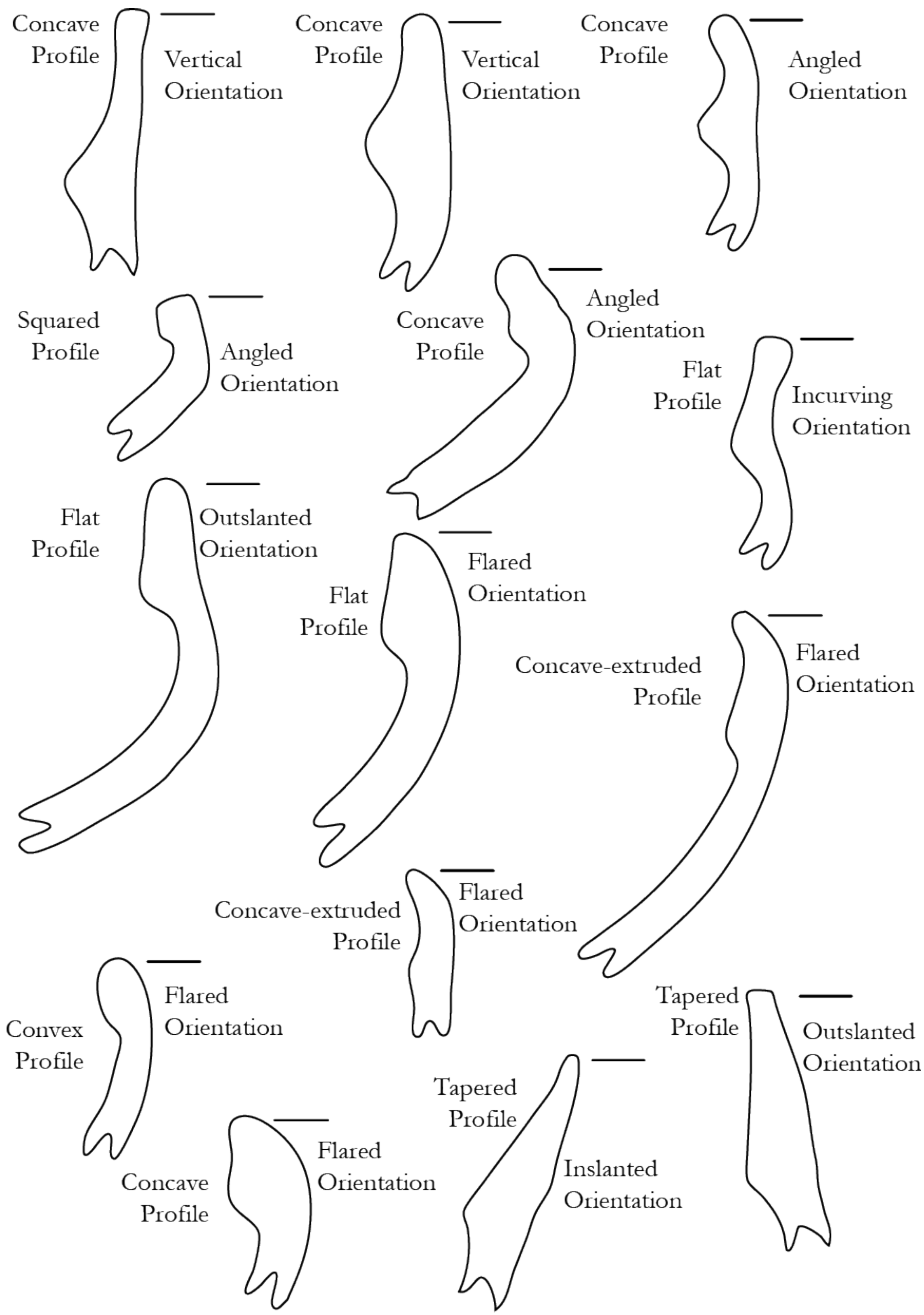


Figure 3.5. Examples of collared rim profile and orientations (after Richards 1992:Figure 5.14).

the plane of the orifice.

Lip Form

The surface separating the exterior and interior rim margin of a vessel, or lip, is subject to a variety of forms. Lips can be squared, rounded, flattened, beveled, folded, pinched, or thickened (Figure 3.6). Squared lips are flattened and perpendicular to the vessel wall, but need not be level with the orifice plane. Flattened lips are specific to vessels whose vessel walls are not perpendicular to the orifice plane, but whose lip surface has is. Beveled lips refer to lip surfaces neither perpendicular to the vessel walls nor level with the orifice plane. Rounded lips form a convex surface between exterior walls. Pinched lips are marked by a distinct point of convergence, typically on the exterior of the vessel where the wet clay was drawn outward from the exterior upper and lower rim margin. Thickened lips exhibit a widening of the vessel wall compared to the lower exterior and interior rim margins just below the lip.

Neck Form

Four neck categories were used, based on the alignment of the upper body of the vessel to the orifice plane. Straight necks are vertically oriented. Inslanted necks angle inward from the shoulder toward the orifice plane. Flared necks are noted when the upper body of the vessel turns away (outward) from the interior of the vessel. Angled necks are sharply out-

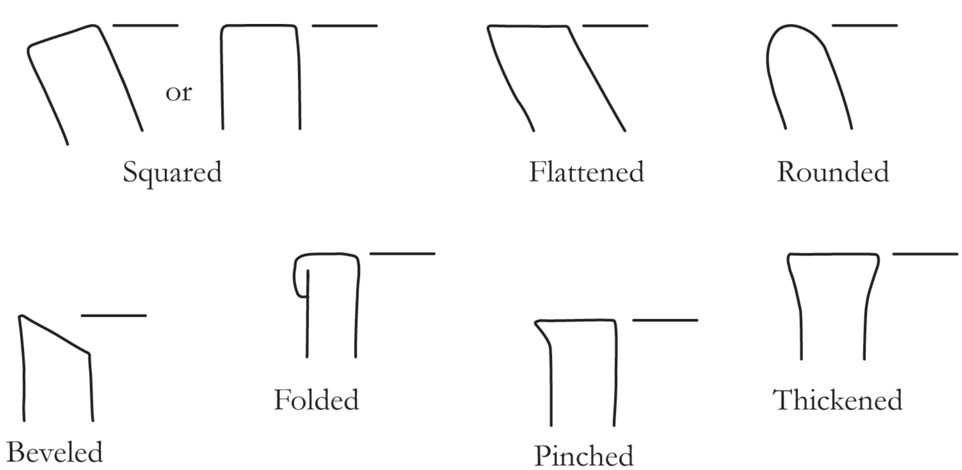


Figure 3.6. Lip form morphology (after Koldehoff and Galloy 2006:Figure5.3).

flared and are often associated with angled rims (Holley 1989:14; Richards 1992:232, 237). Vessels with an insufficient amount of the upper body present below the rim are categorized as having 'indeterminate' necks.

When present, the shoulder type for each vessels was recorded based on previously established criteria (e.g. Holley 1989; Richards 1992). Each category represents a scale of increasing shoulder angle. At the 'least angled' end of the scale, rounded shoulders have an uninterrupted contour where the body of the vessel appears globular in shape. They do not have a distinct corner point. 'Angled' shoulders do demonstrate a distinct corner point, the point at which the upper vessel body slopes inward toward the vessel interior. Next, 'sharp-angled' shoulders show a slightly more acute angle than the 'angled' variety, with an even more distinct corner point. The last category, 'hyper-angular' represents the opposite extreme to rounded shoulders. A sharp corner point is accompanied by a distinctly re-curved upper body, which distinguishes this category from 'sharp angled' and 'angled' shoulders.

SURFACE FINISH

Surface treatment categories used include: smoothed (or plain), slipped, cord-marked, smoothed-over-cord-marked, fabric impressed, decorated, and eroded (i.e. unidentifiable, exfoliated). The surface color of each vessel also was noted using a standard Munsell color book. Effort was made to record the color from portions of the vessel that show the least amount of discoloration due to firing or weathering.

Slipped surfaces are marked by the application of thin liquid clay film to a leather-hard vessel. Slipping often obscures the underlying paste, hiding tempering additives, such as shell and grit, from view. This layer is often apparent in a sherd's profile as a thin layer of a color that typically contrasts with the underlying paste. Slip coloring includes red, tan and white slips. These surfaces are often polished (i.e. burnished) with a smooth stone prior to firing, producing a waxy-like finish on the competed vessel; however polishing is not required to designate a surface as slipped.

Black smudged/slipped vessels also occur. Colors can range also to darker brown and very dark red varieties. These have very dark surfaces with a distinct glossy or reflective surface resulting from polishing. Blacker colors are derived from applying a carbon-based material to the surface of a vessel surface (slipped or unslipped), then firing the vessel (with or without polishing it) in a very reduced environment, creating the dark color on the finished piece (Holley 1989:13).

Smoothed-over-cordmarked surfaces are differentiated from cordmarked surfaces by evidence of intentional flattening of the textured surface. This was noted when the ridges between cord-marked grooves were smeared across an adjacent paralleling cord-marked groove. Upon close inspection this treatment would show up as a distinct overhang of one side of the ridge over the adjacent groove. This treatment would have followed shortly after the application of the cord marking, but before the vessel was leather hard, when the clay was still slightly malleable. These surfaces are different from worn or weathered surfaces which might typically be observed on the basal portions of vessels.

Net-impressed surfaces are identified by the presence of a knot at the juncture of two perpendicular cord impressions. This differs from Fabric impressed pottery, where at the same juncture one cord would pass over a perpendicular cord and pass under the next perpendicular cord in a weave-like pattern.

DECORATIVE TREATMENT

The addition of surficial adornment to a vessel that neither adds or takes away from its most basic physical function as a ‘container’ are considered decoration. A variety of decorative treatments have been documented on the ceramic vessels at Aztalan (Baerreis and Freeman 1958; Birmingham and Goldstein 2005; Mollerud 2005; Richards 1992, 2003, 2007a). These include twisted cord impressions, cord-wrapped stick impressions, fabric impressions, notching, and punctates. The majority of these markings are not found on Middle Mississippian vessels in Aztalan ceramic assemblage, with punctates as the lone exception (see Richards 1992, 2003, 2007a).

Twisted cord impressions denote the imprint of a segment of twisted cord onto the vessel surface before it dried leather hard. Resulting impressions are a mirror image of the actual cord used, visible as parallel twists of cord oriented in an 'S' or 'Z' pattern. Cord-wrapped stick impressions are differentiated by the arrangement of parallel twists running perpendicular to the direction of the impression. These latter impressions are generated by tightly wrapping a dowel with a twisted cord, then pressing this into the vessel surface. Notches and punctates are used also, often made with a smooth, sometimes sharpened dowel or stick. A knotted cord also can be used to produce subtle impressions that resemble punctates into the vessel wall as well.

TEMPER AND PASTE CHARACTERISTICS

Examination of vessel paste was conducted using macroscopic observation in conjunction with a 10x handheld lens. As the entire analysis had to be conducted at the WHS facility in Madison, Wisconsin no microscopic equipment was available at the facility. Thus, microscopic observation was not implemented. Unlike other ceramic studies, including Richard's (1992) previous study of Aztalan materials, fresh brakes along sherd edges could not be attained in order to record paste characteristics, as museum policy restricted damaging the artifacts. Thus many observations were made using uneven sherd edges, sometimes still partially covered with dirt.

Temper

The most common temper agents in the ceramic assemblage are grit and shell. Grit tempering was identified by the presence of crushed angular to rounded crystalline and igneous rock fragments. Shell tempering was evident by the presence of flat, shell platelets, or similar flat voids. Grog aplastics typically appear as crushed fragments of sherds, but can be hard to distinguish from the clay paste. However, given the limited equipment available for observation, it may be likely that grog-tempering is under-represented among the assemblage.

Grain Size and Texture

Paste Grain Size and Texture were recorded for each vessel. Criteria observed include aplastic size, sorting, and shape, inclusion grading, and paste texture. Macroscopic observation and a 10x handheld lens were used. A sand grain sizing folder prepared by the Gamma Zeta Chapter of the Sigma Gamma Epsilon (National Earth Honor Society for the Earth Sciences) at Kent State University was used as a reference standard for these observations. Sorting of temper was differentiated between well sorted and poorly sorted. These are distinguished by the presence of like-sized particles in the former and the inclusion of dissimilar sized particles in the latter. Particle size was differentiated into coarse (over 2 mm diameter), medium (1/16 to 2 mm diameter) and fine (under 1/16 mm diameter). Shape of the temper is described in terms of sphericity and roundness (Figure 3.7) for the reference chart used. A nominal designation also was assigned to the temper grading, including rounded, sub-rounded, sub-angular, and angular. Finally, the past texture was described by quantifying the past grain size. Size category names and measurements are provided in Table 3.1.

Paste Core Cross-section

The relative degree of oxidation or reduction present was determined by observing the paste core cross-section. Cross-section categories outlined by Richards (1992:247) were used, with few modifications. Table 3.2 lists the categories identified.

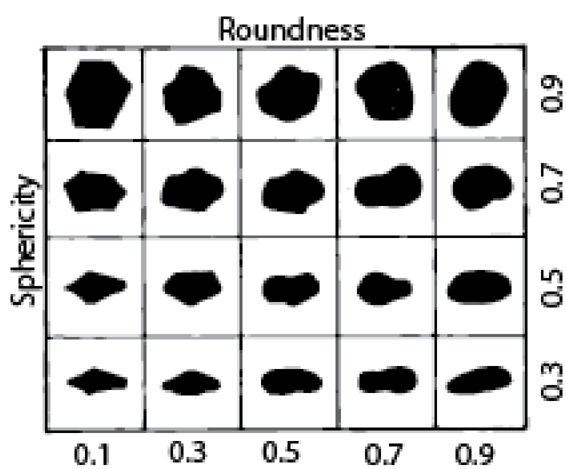


Figure 3.7. Temper shape chart (Gamma Zeta Chapter of the Sigma Gamma Epsilon Kent State University).

Table 3.1. Paste Texture Categories (after Gamma Zeta Chapter of the Sigma Gamma Epsilon Kent State University).

Silt	< 1/16 mm
Very Fine Sand	1/16 - 1/8 mm
Fine Sand	1/8 - 1/4 mm
Medium Sand	1/4 – 1/2 mm
Coarse Sand	1/2 – 1.0 mm
Very Coarse Sand	1.0 – 2.0 mm
Granules	2.0 – 4.0 mm
Pebbles	4.0 – 64.0 mm
Cobbles	64.0 – 256.0 mm
Boulders	>256.0 mm

Table 3.2. Paste Core Cross-Section Categories.

Uniformly Dark
Uniformly Light
Dark margins/light core
Light margins/dark core
Dark Exterior margin/light interior margin
Light exterior margin/dark interior margin
Very light exterior margin/slightly darker interior margin
Very light margins; slightly darker core
Light exterior margin/slightly darker interior margin

METRIC DATA

All sherds were counted and weights recorded to the nearest tenth of a gram. Calipers were used to record several linear measurements for each vessel rim, recorded to the nearest tenth of a millimeter. A cross-section profile of each vessel was detailed using calipers and a contour gauge. All vessel profiles are documented in Appendix B. Angular measurements were made using a protractor in conjunction with the cross-section drawings, recorded to the nearest whole degree. Orientation of these profiles to the orifice was determined using a standard rim board. The following discussion clarifies the terminology used for metric measurements for identified vessels in this analysis. See Figure 3.8 for an illustration highlighting the location of the recorded measurements.

When possible, vessel **orifice diameter** was estimated to the nearest centimeter from rim fragments that represented greater than 5% of the original orifice. Lip thickness describes the distance between the exterior and interior walls of a vessel at the crest, or lip, of the vessel. **Rim length** measures the protrusion of the rim margin from the interior wall of the vessel body. This measurement corresponds to Holley's (1989:20) 'rim width' (also see Richards 1992:Figure 5.10) and Pauketat's (1998) 'lip length'. The term 'length' is used here in lieu of 'width' to distinguish the extension of this portion of the vessel away from the main vessel wall (longer dimension) versus its thickness, what I call 'lip thickness' (shorter dimension) of this extension. **Wall thickness** measurements are taken at the point just inferior to the rim swelling. **Body wall thickness** measurements thus were taken below the juncture of the rim margin and neck of a vessel; the largest value below the neck measurement, or below the shoulder whenever possible.

Collared rims, with their unique rim morphology, prompted a slightly different suite of measurements (see Figure 3.8). **Maximum collar height** is measured from the lip to the junction of the collar to the neck of the vessel. **Maximum collar thickness** measures from the exterior collar to the interior vessel wall. **Wall thickness** on collared vessels is recorded at the juncture of the collar and main body of the vessel; also referred to as the sub-collar.

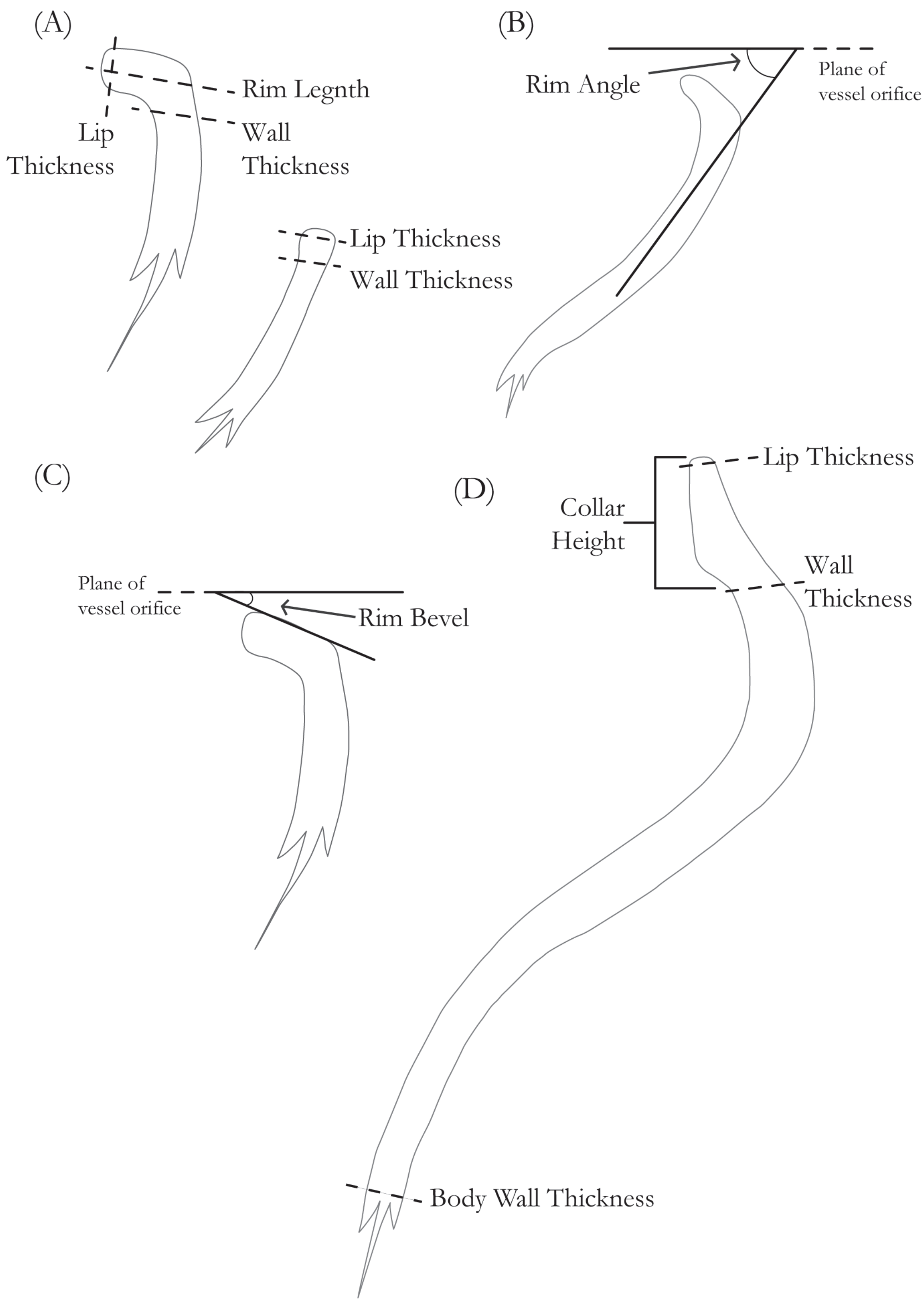


Figure 3.8. Jar metric attributes [(A –C) jars; (B) rim angle for jars with inslanted rims; (C) lip bevel on jars with flattened everted lips; (D) collared vessel attributes].

For these three measurements, if the vessel orifice is polygonal, the first reported measurements refer to the peak collar height at the apex of the castellation, and the second at the minimum collar height, typically between two castellations.

To highlight temporally sensitive features of the analyzed ceramic assemblage, a series of ratio-scale variables were recorded for shell-tempered jars (after: Holley 1989; Pauketat 1998). In his analysis of the ICT-II tract at Cahokia, Holley (1989) successfully calculated the rim-protrusion ration (RPR) to highlight temporally sensitive features of analyzed assemblages. The RPR value provides a crude measurement for the elaboration of jar rim shape as it widens gradually over time, higher values indicating earlier vessel forms and lower values marking later varieties (Holley 1989:21). In this analysis the RPR values are calculated by dividing the wall thicknesses by rim length, respective of Holley's original variables. Pauketat (1998:33-34) has utilized additional indices to quantify morphological vessel attributes which are reported here for the Mississippian jars. The rim bevel angle of the rim, or what Pauketat called the 'lip bevel angle,' is measured only on jars which have flattened, everted rims. The **rim angle** is recorded on jars that have inslanted rims (see Figure 3.8).

DESCRIPTION OF THE NORTHEAST MOUND CERAMIC ASSEMBLAGE

One cannot escape taxonomic systems in the modern archaeological profession. On one hand these tools help to organize and make comparisons between groups. However, typologies perpetuate our need to classify everything, leaving us susceptible to blindly attributing a particular pot to a specific time-frame and a (supposedly) bounded geographic region. Such classificatory systems are fundamentally subjective and assume homogeneity within a category, but culture is more complex than any of these classification schemes (Clauter 2003:9, 13).

Emerson et al. (2007:110) have cautioned of the weaknesses of ceramic types, especially when used outside the region they were first defined, such as the Cahokian Powell Plain or Ramey Incised types. These authors also note that within the American Bottom, the use of ceramic 'types' to classify Cahokian ceramics has been shown to obscure particular

chronological and stylistic variables (e.g. Emerson and Jackson 1984; Holley 1989; Pauketat 1998). The use of Cahokian ceramic types outside of the American Bottom in societies that are directly or indirectly derived from American Bottom Middle Mississippians "only further confuses our understanding of ceramic relationships and should be avoided" (Emerson, et al. 2007:110). Pots do not equal people. That is, 'authentic,' Cahokian ceramics (made in the American Bottom) present at Middle Mississippian hinterland sites do not equate to an emigrant Cahokian population, nor do they equate to an entirely local, indigenous population. As Emerson et al. (2007:110) argue, these materials and other Mississippian influences must be evaluated based upon a suite of attributes, such as the orientation of villages around plaza spaces, the presence or absence of platform mounds, and large populations. Simply adhering to typological classification obscures our understanding of the social mechanisms involved when different groups negotiated social situations and came to adopt or even turn away from outside influences; or perhaps make them their own.

However, given the omnipresent nature of ceramic typologies in the modern field of archaeology, it seems only pertinent to provide a brief review of existing ceramic typologies previously attributed to Aztalan ceramics that serve as shorthand in comparative discussions. Their use here is not intended to be a whole-sale analog for the presence of a particular 'culture' but are intended simply as shorthand to describe the variety of ceramic styles present in the Northeast Mound assemblage. The typological discussion is thus meant to complement the attribute-based comparative analysis of the Northeast Mound ceramics.

LATE WOODLAND VESSELS

Richards (1992:279-287, 294-296) provided the most recent systematic documentation of the wide range of decorative treatments present on collared ceramics at Aztalan, including the types Aztalan Collared (Baerreis and Freeman 1958), Starved Rock Collared (Hall 1987), and Point Sauble Collared (Baerreis and Freeman 1958). Collared wares are marked by the addition of a clay band or thickening of the rim margin of a vessel. These are typically attributed to the Kekoskee phase (c.a. A.D. 800-1300) of the Late Woodland period (Salkin

2000:528).

The most frequent collared vessel found at Aztalan is characterized by varied decorations on the lip, exterior rim margin and collar, interior rim margin and the exterior neck at the juncture of the collar and the exterior vessel wall. This type of collared vessel corresponds to what Baerreis and Freeman (1958) termed **Aztalan Collared**. Similar vessels have decoration exclusively restricted to the interior lip/rim margin in the form of tooled notches, what Hall (1987:65) has termed **Starved Rock Collared**. Less common at the Aztalan site are collared vessels with extensive and elaborate cord or fabric impressed collars in conjunction with similar impressions across the neck of the vessels; corresponding to the **Point Sauble Collared** type (Baerreis and Freeman 1958).

Decorative treatments present on Late Woodland collared vessels include cord-wrapped stick impressions, notching, fabric impressions, twisted-cord impressions and punctates. Specific variations of each treatment present in the Northeast Mound assemblage will be elaborated below in Chapter 5. Richards' (1992:Table 5.17) decorative modes assigned to Aztalan Collared vessels at Aztalan are utilized in this study.

A selection of ceramics recovered from the Northeast Mound excavations correspond to Madison ware typically attributed to the Horicon Phase (c.a. A.D. 700- 1200). The Madison Plain variety, first defined by Keslin (1958), characteristically has a cordmarked exterior surface, straight necks, direct rims, and flattened lips. The type also lacks decoration except for occasional transverse cord-wrapped stick impressions along the lip. Similar vessels marked with horizontal and diagonal bands of twisted cord impressions on the rim exterior margin equate to the Madison Cord Impressed type (Baerreis 1953). Another series of vessels in this ware category exhibit fabric impressions, referred to as the Madison Fabric Impressed type (Benn 1978; Hurley 1975).

MIDDLE MISSISSIPPIAN VESSELS

Middle Mississippian pottery is often marked by the use of crushed mussel shell as a tempering agent in clay pastes, although limestone and grog pastes occur also (e.g. Monks

Mound Red; see Griffin 1949, Holley 1989). Griffin (1949) provided the first thorough descriptions of various Middle Mississippian ceramic types still used today, though subsequent works have provided further discussion as to the definition of these varieties (e.g. Holley 1989; O'Brien 1972; Vogel 1975). Many of the vessels found at Aztalan attributed to Middle Mississippian culture are correlated with these American Bottom types (Barrett 1933; Birmingham and Goldstein 2005; Bleed 1970; Clauter and Richards 2009; Freeman 1986; Goldstein and Freeman 1997; Goldstein and Richards 1991; Mollerud 2005; Richards 1985, 1992, 2003, 2007a).

Shell-tempered jars, bowls, and bottles with plain slipped and burnished surfaces are common among Middle Mississippian ceramic assemblages. In the American Bottom, this variety of vessel equates to the **Powell Plain** type originally described by Griffin (1949:49-51), but has since been restricted to jar and bowl forms (Holley 1989:6; Vogel 1975:37). This vessel variety is typical of Lohmann phase (A.D. 1050-1100) and Stirling phase (A.D. 1100-1200) in the American Bottom. By definition the Powell Plain type is undecorated. When these vessels exhibit decoration, primarily in the form of shallow, bold incised motifs on the vessel upper body, it corresponds to the **Ramey Incised** ceramic type (Griffin 1949), in use widely during the Stirling phase.

The **Cahokia Red-filmed** type, as defined, describes shell tempered jars, bowls, and plates exhibiting red-colored exterior surfaces resulting from an added clay slip(Griffin 1949:57). Shell-tempered, slipped seed jars (neck-less jars with globular bodies) fall under this descriptive category, but have elsewhere been typified as **Merrell Red-filmed** if grog-tempered (Holley 1989:7; Vogel 1975:117-118), or **Monks Mound Red** if limestone tempered (Griffin 1949:52-53). These vessels are attributed to the Terminal Late Woodland II time period, with Cahokia red-filmed vessels used well into the Lohmann phase (Griffin 1949; Holley 1989; Pauketat 1998; Richards 2007a).

LOCAL DERIVATIVES OF MIDDLE MISSISSIPPIAN POTTERY

In his analysis of the MPM Aztalan ceramic collection, Richards (1992:348-352) defined “a grit-tempered variety of companion type to the Aztalan variety of Powell Plain”: **Hyer Plain**. These jars typically have straight-necks, rounded or pinched lips, and rounded or angled shoulders. Vessel exterior surfaces are primarily plain, with occasional dark brown-smudging also present. By definition this type is undecorated. Several others sites in Wisconsin exhibit similar grit-tempered vessels arguably derived from Middle Mississippian forms: Fred Edwards in Grant County (Finney and Stoltman 1991) the Mile Long site in Walworth County (Overstreet and Bruhy 1979; Overstreet and Clark 1995), Bethesda Lutheran Home site (Hendrickson 1996), and Watasa Lake Swamp Site in Shawano County (Barrett and Skinner 1932:429-437). Illinois sites with grit-tempered versions of the Middle Mississippian style vessels variety include the Eveland site in Fulton County (Harn 1991), the Rench site in Peoria County (McConaughy 1991; McConaughy and Bade 1993), the Shire site in Logan County (Claflin 1991), and the Collins site in Vermilion County (Douglas 1976).

PORTABLE X-RAY FLUORESCENCE ANALYSIS

Materials science analysis allows researchers to answer questions of material composition, material sourcing, and manufacture that add solidarity to inferences archaeologists make that go beyond asking questions regarding the form, style, and context of an object (Ehrhardt 2009; Kingery 1996). To gain added insight into possible social interactions encapsulated in Aztalan’s Northeast Mound, a portable X-ray florescence (pXRF) analysis was conducted on a selection of ceramic vessels in this assemblage. Vessels not from specific identified cultural features (i.e. general mound fill) or too fragmentary in nature were not included in this XRF analysis due to both time restraints, and the inability to associate them with a cultural feature besides the mound itself; exceptions include a seed jar (v 87) and a Hyer Plain jar fragment (v 89).

The advantages of conducting portable XRF analysis in archaeology, versus other available methods for elemental analysis, include the fact that (1) it’s a non-destructive meth-

od, (2) it allows the analysis of a wide range of elements, and (3) modern equipment allows for extreme portability. The first and last advantages are crucial when working with museum collections, as the present analysis exemplifies. Museum personnel prefer to maintain the integrity of objects by restricting destructive techniques whenever possible. Additionally, museums may prefer to not loan out 'large' collections of materials, or even permit loans of any kind, even for small collections. Thus, portability of non-destructive analytical equipment is crucial to the researcher. These two advantages proved to be vital in the current study (see the introduction to this Chapter).

X-ray fluorescence exploits the properties of atoms, specifically electrons when exposed to external radiation. Electrons surround the nucleus of an atom in successive shells, or orbits. Each shell of each element requires a specific amount of binding energy to keep the electrons in the shell. Inner shells require less binding energy than shells further from the nucleus. When activated, the XRF analyzer bombards an atom with a specific range of high-energy radiation which overcharges and dislodges electrons in specific orbiting 'shells' around the nucleus of the atom. This causes the atom to become unstable and an electron from an outer orbit moves inward to replace the missing electron. Since the inner shells require less binding energy than the outer shell, the replacement electron fills the void but it first must emit its excess energy. Each natural element has a characteristic disparity of energy between their shells, so the specific amount of energy released, and subsequently detected by the XRF analyzer, can be attributed to a particular element, providing a calculation of the elements within each tested sample.

ANALYZER SETTINGS AND PROCEDURE

The pXRF analysis was implemented using a Bruker Tracer III-V+ portable X-ray fluorescence spectrometer. Hulit (2012a:38-39) has demonstrated that multiple readings at multiple locations on each sample allow for detection of anomalous readings that might construe resulting calculations. Thus, each sample (i.e. vessel) in this analysis was scanned at three different locations and each location was scanned three consecutive times at 180

seconds per reading. Thus, nine readings were recorded from each sample, for a total of 27 minutes each. Reading locations included the interior surface, exterior surface, and broken sherd edges when possible. In cases where the sherd edge was too narrow to cover the entire aperture on the analyzer, an additional series of three readings taken on the interior of the vessel was substituted. Instances where a label or glue obstructed a surface the locus was substituted with an additional location on the opposite surface. Portions of sherds with heavy soot were avoided whenever possible.

S1PXRF software provided by the manufacturer was used with the Tracer III-V+ spectrometer for data collection. The KTI tube on the analyzer was set to 40 kV, 50 uA, Pulse Length: 200 seconds, and Filter set to "1". The readings were taken using a filter composed of 12 mil AL + 1 mil Ti + 6 mil Cu. This filter targets Potassium (K), Calcium (CA), Titanium (Ti), Iron (Fe), Nickel (Ni), Copper (Cu), Zinc (Zn), Rubidium (Rb), Strontium (Sr),Yttrium (Y), Zirconium (Zr), and Niobium (Nb). However, Bruker Elemental documentation accompanying the UWM-ARL XRF analyzer notes that this filter efficiently excites the elements from Fe (Iron) to Mo (Molybdenum) and that there is little or no sensitivity to elements below Fe (Iron) on the periodic table. Inspection of the returned spectra does show that the backscatter curve increases to the left (i.e. lower energy levels) of Fe (Iron). Thus only this range of elements was considered for the statistical processes described below.

During the analysis, the returned 'valid counts' for each sample were compared to ensure a less than one-percent variation existed among them. This calculation helps to ensure any relative error within each analyzed sample remained low, aiding in the subsequent statistical calculations (Alexander Seyfarth, Bruker Elemental, personal communication 2012). Artax software was used to generate the peak areas, or net intensities, for each sample. Among all the samples analyzed, any element between Fe and Mo that exhibited a peak was noted. Subsequently, all identified 'peak' element readings from each sample were then exported as ".txt" files, and converted for use in the statistical analysis described next.

STATISTICAL APPROACH FOR PXRF RESULTS

Statistical analyses were conducted using the R Statistical Analysis Program version 2.15.2 developed by the R Development Core Team (2012). Methods utilized here follow those outlined by Hulit (2012a, b) in her analysis of clay resources in the Crawfish and Rock River drainages in southeast Wisconsin. These methods were subsequently revised to establish standard pXRF statistical methods currently used by the Archaeological Research Laboratory at the University of Wisconsin-Milwaukee (see: Hulit 2012c). Data packages used in the R statistics program include: *compositions* (Boogaart, et al. 2011), *robustbase* (Rousseeuw, et al. 2011), *rdal* (Keitt, et al. 2012), *mvoutlier* (Filzmoser and Gschwandtner 2011), *fpc* (Hennig 2013), *mclust* (Fraley, et al. 2012),and the source code *HulitSourceCodes.R* (Hulit 2012d).

Once data is collected and run through the Artax software (see above), samples are checked for internal consistency using the Mahalanobis distance measure, provided in the *HulitSourceCodes.R* (Hulit 2012d). A reading location may have directly analyzed a fragment of temper or possibly a museum label on the sample which would skew understanding of the actual composition of the sample. The Mahalanobis distance measure provides a measurement of the distance of each reading from the center of all the readings for the artifact (Hulit 2012c:18). If three readings from the same location are scored the furthest from the center, they are considered suspicious. Then each reading is removed one at a time and the Mahalanobis distance is recalculated to see if the pattern changes. If one location is consistently scored the furthest from the center, it is removed from further analyses.

In this study, a principle components analysis (PCA) is used. This is a statistical procedure that reduces the variation among the transformed elements into to select 'principle components' that explain a percentage of the variation within the dataset, respective of the relationships between variables (Hulit 2012a:10, 130; Rogerson 2010:301). After checking for anomalous readings, the compositional data from the XRF results must be transformed for use in PCA using isometric log-ratio (ILR) in order to calculate compositional outliers and initial identification of clustering based on similarity of matrices (Filzmoser, et al.

2012:77; Hulit 2012a:129). Samples whose readings resulted in element net intensities with negative values or zeros were removed from the dataset as the ILR transformations are unable to handle zero values within the raw datasets (Pawlosky-Glahn and Olea 2004, cited in Hulit 2012d). The PCA was run using the *GrayILRv2* function (Hulit 2012d) which both transformed the data using the ILR function and performed the PCA. Analysis of variance (ANOVA) tests and Tukey Post-hoc tests were run on the PCA results against select categorical variables (e.g. pottery type, decorative mode, etc.). A 95% confidence interval is used (α=0.05) for all statistical tests.

Compositional outliers are detected using the *Hulitmvout* function (Hulit 2012d), a modified version of *mvoutlier* (Filzmoser and Gschwandtner 2011). This function compares readings against one another and highlights significant readings that may have been masked by the large 'categorical' during the ANOVA, hiding variations (Hulit 2012c:68). The dataset is further explored through data partitioning, or non-hierarchical cluster analysis. Non-hierarchical clustering methods use a priori decisions to form a set number of groups in the dataset. To determine the best portioning of the data, the *pamk()* function is used, available in the *fpc* package (Hennig 2013) through the R repository. Results indicate the optimum number of clusters for the dataset based on the silhouette widths. Silhouette widths are widest when the clusters are the best fit for the data within that cluster, thus they can be used as a measure of the relative validity of each number of clusters (Hulit 2012c:85).

Non-hierarchical methods vary from hierarchical methods which begin with *n* number of groups (*n*=number of observations), then merges two clusters, and then merges them again, until only one cluster remains. To further explore the data, a model-based hierarchical clustering analysis was conducted on the Northeast mound XRF dataset, utilizing the *mclust()* (Fraley, et al. 2012) command available through the R repository. This function identifies the best model used to fit the dataset.

CHAPTER 4: THE WHS NORTHEAST MOUND EXCAVATIONS

DESCRIPTION OF THE WHS NORTHEAST MOUND EXCAVATIONS

The following details regarding the Wisconsin Historical Society (WHS) excavations into the Northeast Mound at Aztalan are compiled from field notes, feature description, field maps, and field photos. All documentation is on file at the Wisconsin Historical Society in Madison, Wisconsin and at the University of Wisconsin-Milwaukee Archaeological Research Laboratory. In total, the WHS excavations exposed approximately 679 m^2 of mound surface, and 500 m^2 of sub-mound surface. The majority of the excavation was hand-excavated and roughly 150 m^2 were opened by a crawler tractor.

Excavations into the mound commenced in 1964 with six exploratory trenches covering approximately 370 m^2 (Figure 4.1). Two trenches were deep-cut profiles excavated through the mound down to the natural subsoil below, covering an area of approximately 150 m^2. One of these trenches cut across the short-axis of the mound (approximately north-south), while the second cut into the eastern face of the mound (approximately east-west). The other four trenches were only excavated down through the modern A-horizon and historic plowzone, exposing roughly 220 m^2 of intact mound deposits. The three western-most surface-trenches were subsequently connected to form one larger excavation area; the western most excavation block illustrated in Figure 4.1. Several features associated with the original mound-summit were identified (see below). The 'surface' identified here was not at the level of the original mound summit; decades of agricultural activity and natural erosion have destroyed the original 'living surface' on the mound summit.

In 1967, excavators opened a single trench measuring approximately 16 m (east-west) and three meters (north-south) in the northeastern corner of the mound (Figure 4.2). Once the original living surface (buried A-horizon) was encountered, three stratigraphic trenches (or pits) were excavated to expose cross-sections of this original 'village level' surface and associated deposits. First, an 80-100 cm wide trench was excavated along the southern edge of

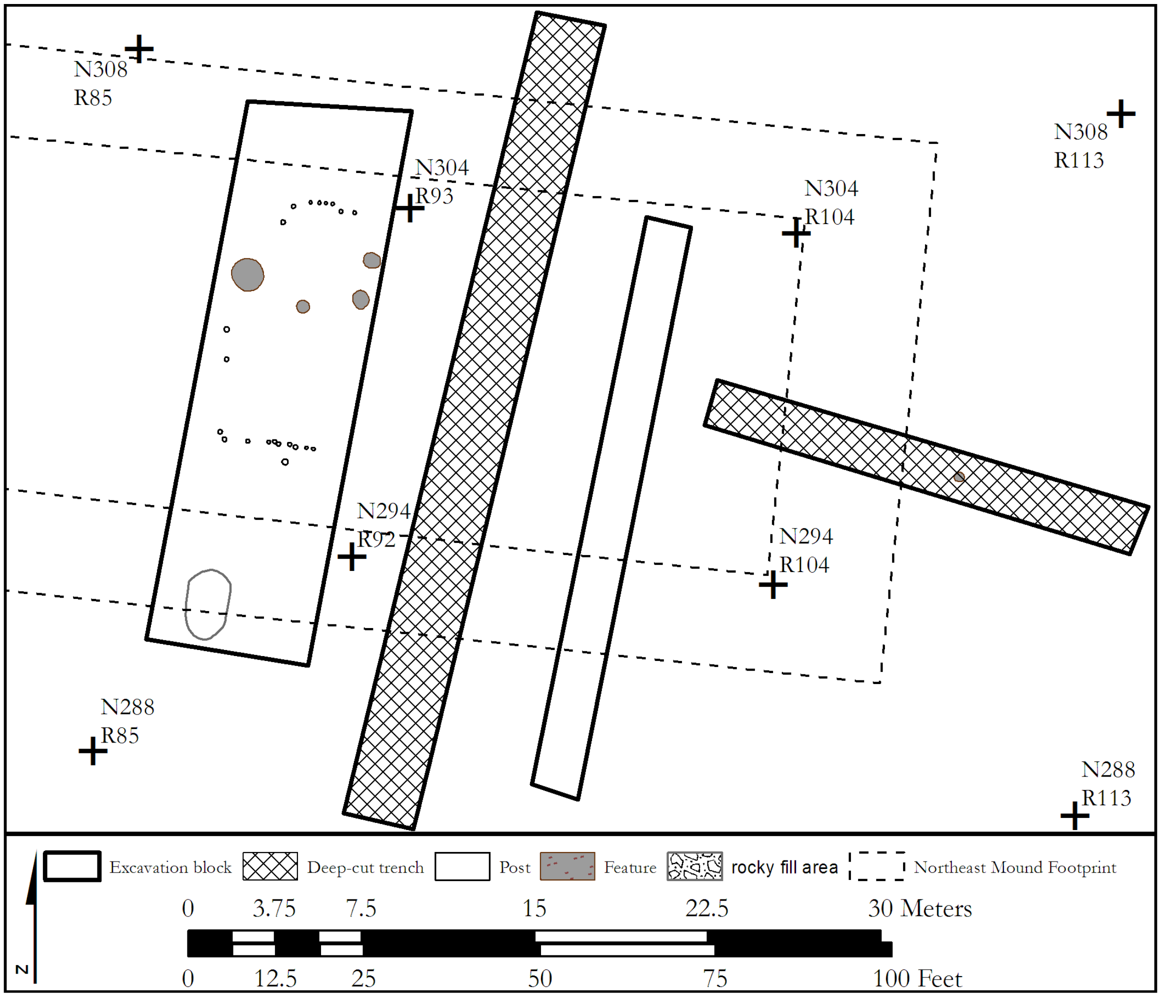


Figure 4.1. Plan map of 1964 WHS excavation trenches (WHS, Aztalan Map # 19, 53, & 54).

the excavation followed by strat-pit (#1) long the north wall of the excavation trench. Subsequently, a second strat-pit (#2) was dug in an area of the strat-trench that had produced a concentration of cultural debris. This was eventually assigned feature number F29-67, subsequently identified as a semi-subterranean structure (Structure 1). Eventually the original trench was expanded south to define the rest of this structure, bringing the total exposed sub-mound area to roughly 67.5 m^2.

A second structure and several pit features were identified in the eastern end of the trench. In the west end, crews encountered a large filled-in "depression" (F40-67) identified in the strat-trench profile walls. In the southern portion of the 1967 excavation area, a portion of the mound surface was exposed, but not excavated through until the following field

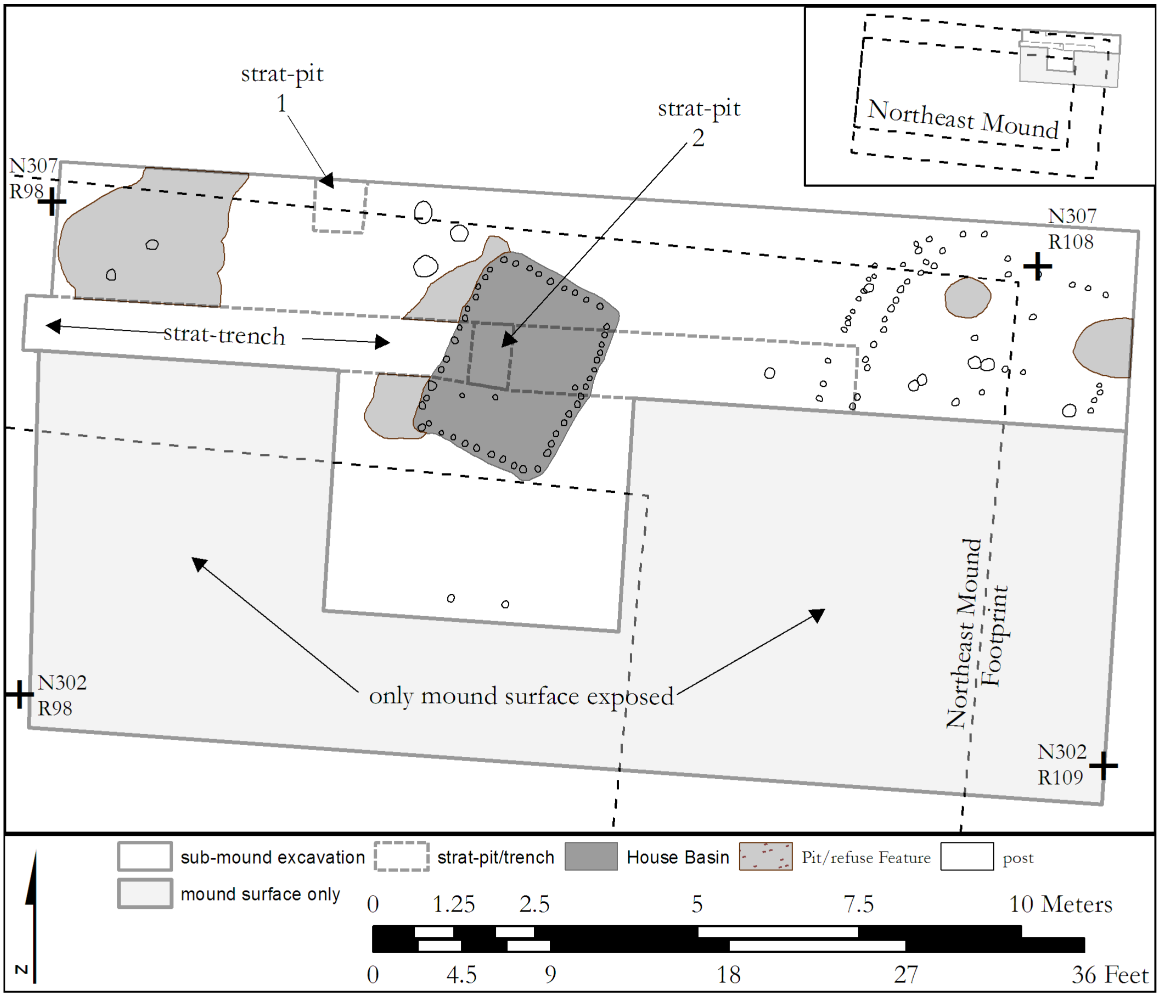


Figure 4.2. Plan map of 1967 excavation trench (WHS, Aztalan Map # 26 & 41).

season (see Figure 4.2). During the 1968 field season, WHS crews extended the 1967 trench south through the southern edge of the mound (Figure 4.3). As excavations began, crews identified four pit features associated with the mound surface as well as a series of buried ceramic vessels. Below the mound, crews unearthed several more remnants of structures, pit features, hearths and isolated post features. The 1968 excavations exposed approximately 280 additional square meters of sub-mound surface.

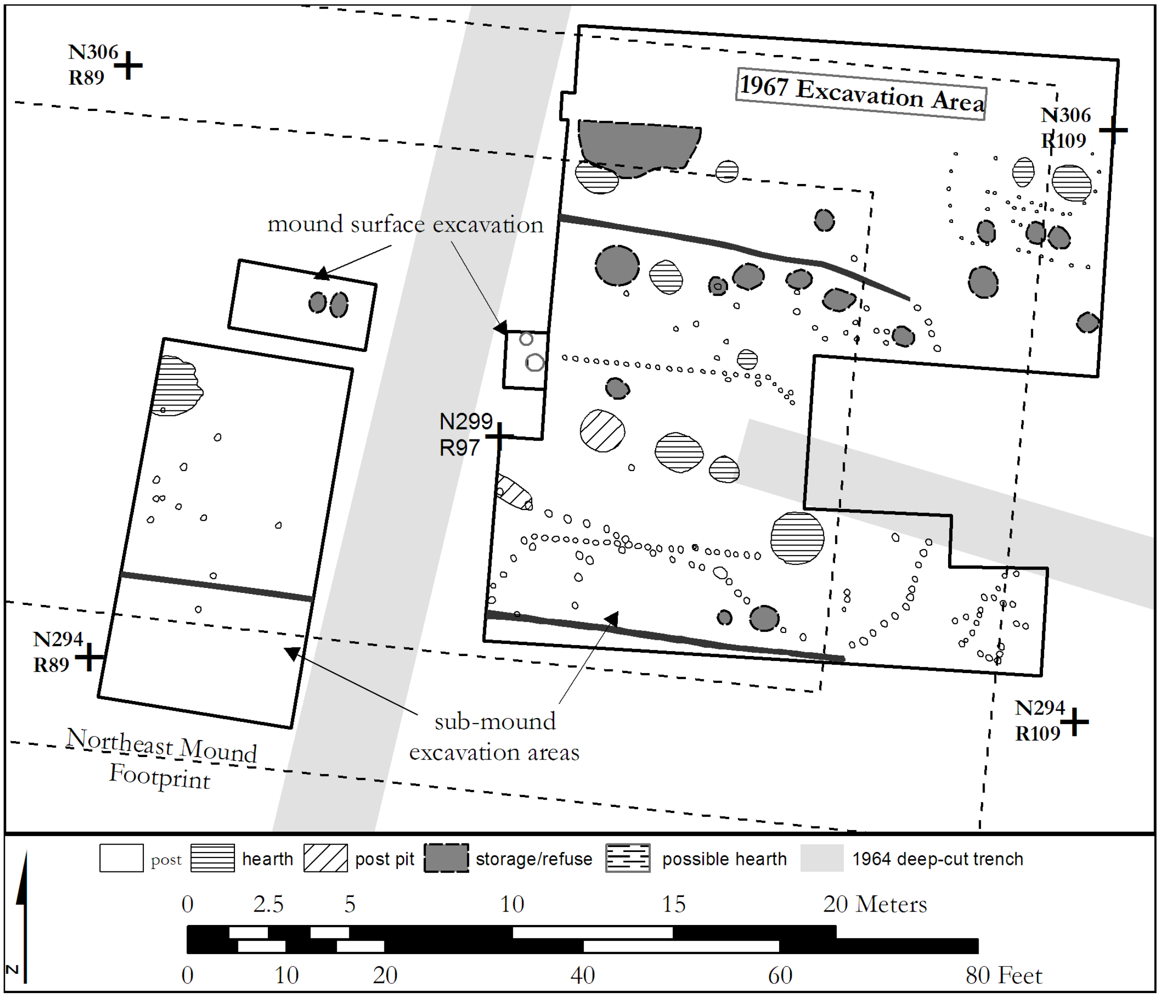


Figure 4.3. Plan map of 1968 excavation trenches (WHS, Aztalan Map # 41, 53 ,& 78).

SUB-MOUND FEATURES

SUB-MOUND STRUCTURES & ASSOCIATED FEATURES

Structure 1 (Feature 29-67)

Structure 1 (F29-67) was identified during the excavation of strat-pit 2 (see above) in 1967, and originally assigned the feature number 29-67 (Figure 4.4). It is a rectangular semi-subterranean single post structure measuring 270 cm (SW-NE) by 197 cm (SE-NW); a floor surface area of 5.3 m^2. The basin measures approximately 61 cm deep from the top of the buried A-horizon. Thus the basin has a volume of 3,244.59 dm^3. Cultural debris within the fill included 2,879.5 g of grit-tempered sherds, 17 (219.1 g) Late Woodland fragmentary vessels, and one (58.2 g) fragmentary Hyer Plain vessel which cross-mended with a rim sherd

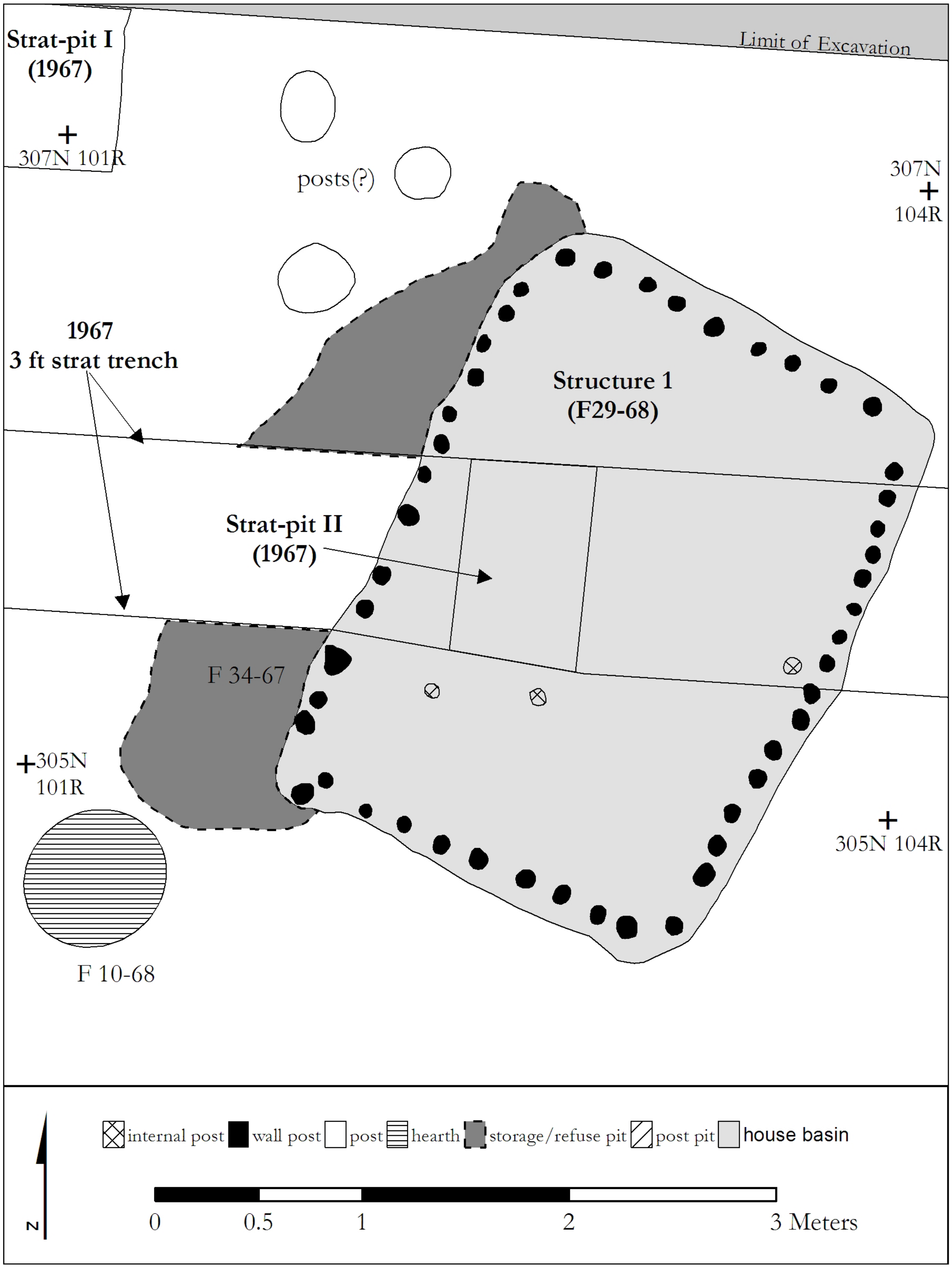


Figure 4.4. Plan map of Structure 1/F29-67 (WHS, Aztalan Map # 26 & 41).

from F34-67 (see below). Excavators noted lithic debris was present (including a fragmentary celt), as well as faunal remains.

Fill was primarily a dark-brown soil with several pink, ashy layers with burned debris present at different levels, including portions of the bottom of the basin. Excavators noted that distinct soil layers were laid down as thin bands atop of one another in restricted areas of the house basin, that is, these layers were not present throughout the basin fill. Layers alternated between grey-brown soils, pink ash, and brown 'organic' soils. Sterile, yellow-mottled sand was observed along the sidewalls of the basin.

Just at the structure floor, excavators identified a thin (<1 cm) yellow sand layer with a thin, discontinuous layer of black sand underneath. It was only when this sand layer was exposed that post molds around the edge of the structure basin were visible. This basal layering suggests a prepared floor was laid down, consisting of yellow and dark colored sands. Few cultural materials were found within this layer, suggesting the structure floor may have been cleaned prior to infilling.

Adjacent to Structure 1 (F29-68), Feature 34-67 is described by excavators as ovoid shape and intrusive into Structure 1. Charcoal flecking, shell, and chipped stone flakes were observed. Ceramic materials included plain and cord-marked grit-tempered body sherds (159.1 g) and fragments of a Starved Rock Collared (26) and Aztalan Collared vessel (v27). Notably, one rim sherd from vessel 27 recovered in F34-67 cross-mends with a rim sherd from Feature 1-68, excavated the following year.

This "intrusive" pit was mapped in plan as superimposed by the basin for Structure 1 (F29-67) (see Figure 4.4). However, profiles of Structure 1 from the 1967 strat-trench profile (Figure 4.5) and the 1967 mound profile (see below) illustrate this feature as intrusive into Structure 1. The fill in F34-67 is described as yellow-grey-black mottled clayey soil that was much more compact than the Structure 1 fill.

Excavators identified Feature 34-67 as a refuse deposit post-dating Structure 1. However, I posit it actually represents the remnants of a second house basin; specifically a

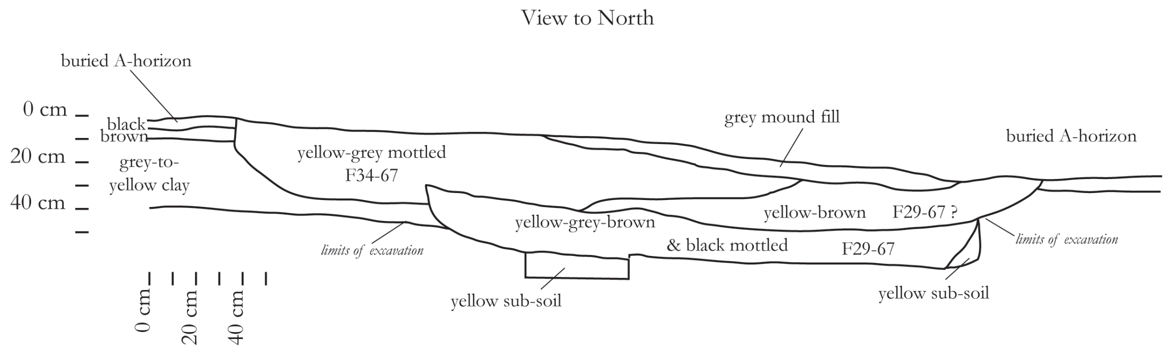


Figure 4.5. Profile map of Structure 1 (F29-67)/F34-67, view to north (notes on file at WHS, Madison, WI).

subsequent rebuild of Structure 1 (vessel 27). The cross-mended rim between F34-67 and F1-68, which is interpreted as containing mound fill deposits (see below). If this is true, then F34-67 was filled at the same time as mound construction began. No post molds are associated with F34-67. This is perhaps expected as the excavators did not interpret this feature as a structure basin and would be less likely to actively search for post molds. Two profiles of F34-67 suggest the feature had a flat-base (see Figure 4.5 above and Figure 4.13 below); further supporting the notion this feature represents the remnants of a house basin. Regardless, some mixing of materials between the two features is noted by the cross-mend of two rims, one from fill excavated as F29-67, and the other from F34-67.

Structure 2

Structure 2 is a rectangular, post mold structure featuring at least one rebuilding episode (Figure 4.6). The smaller construction measures at least 3.85 m (E-W) by 3.78 m (N-S) with a minimum floor area of 14.55 m^2 and the larger construction measures at least 5 m (E-W) by 5.46 m (N-S), a minimum floor area of 27.3 m^2. Complete dimensions for both constructions are indeterminate as the eastern portion of this structure remains unexcavated. Living surfaces were identified at the level of the buried soil (i.e. on the buried soil).

Several pit features are located within the structure. Features 6-68 and 7-68 represent shallow hearths filled with ash, charcoal, and fired clay. Features 4-68, 5-68, and 8-68 are pit features with depths of 21, 30, and 43 cm respectively. Features 4-68 and 5-68 represent

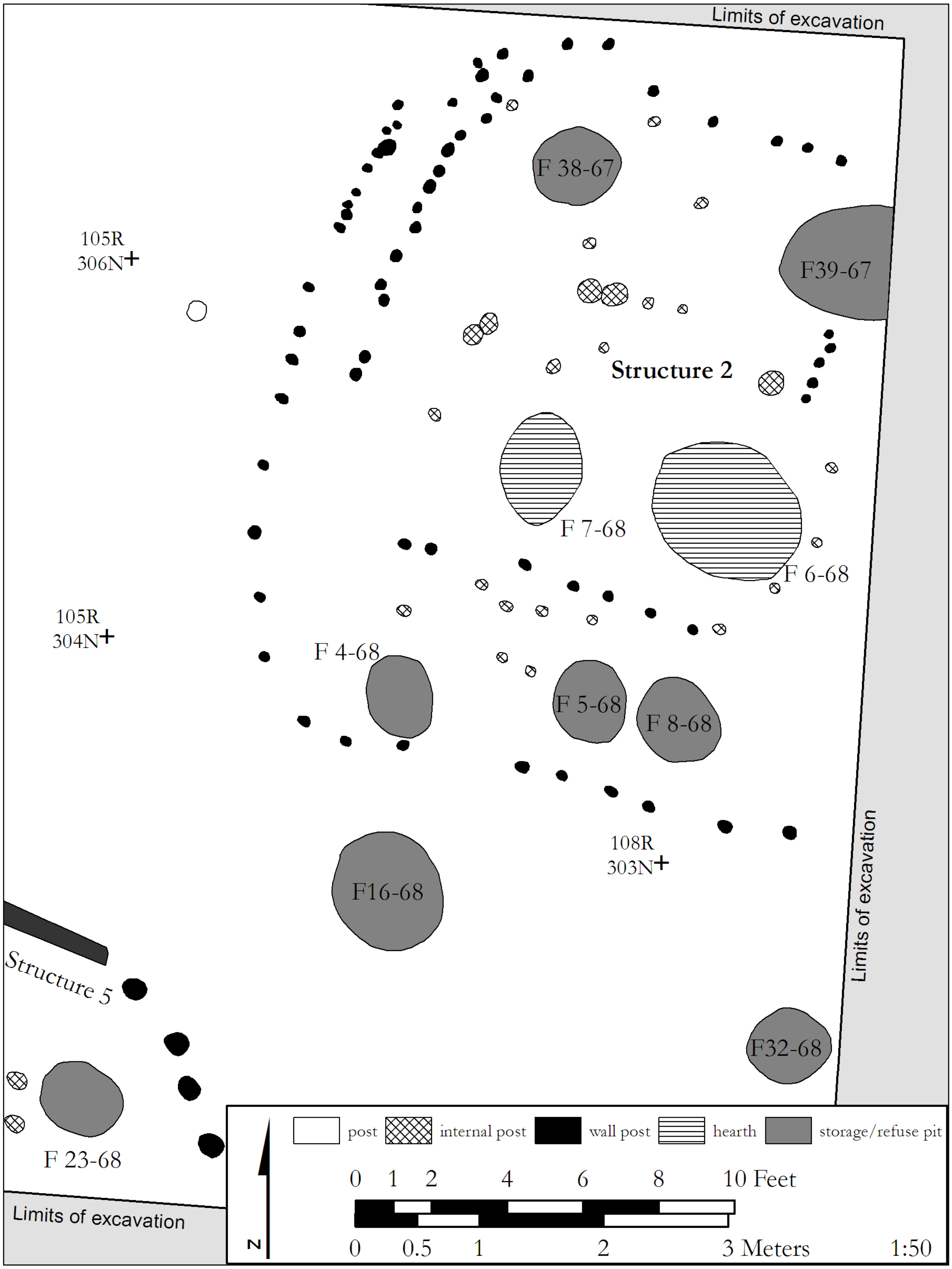


Figure 4.6. Plan map of Structure 2 and associated features (WHS, Aztalan Maps # 26 & 41).

Type III, deep basins in profile while Feature 8-68 represents a Type V, bell-shaped pit. All three likely represent storage pits that are hypothesized to have been contemporary with one of the constructions of Structure 2. The ceramic assemblage in these pits consists of grit tempered ceramics, Late Woodland Collared vessels and a Hyer Plain vessel.

In the northwest corner of the structure, Feature 38-67 is a shallow basin (Type I) filled with an upper central deposit of pink ash material with dark-brown fill surrounding it. The ash layer produced no artifacts while the darker layer produced some cultural debris including grit-tempered ceramic sherds. No diagnostics were recovered. It is likely this feature was contemporaneous with one of the constructions of Structure 2.

Feature 39-67 represents a deeper, cylindrical storage pit (Type IV) containing a sterile, light-colored sand layer on top of a dark brown fill containing cultural debris. A thin layer of sterile, light-colored sand was found at the base of the pit. Recovered ceramics include grit-tempered sherds and fragments of a Hyer Plain vessel (v28) as well as a second fragmentary, indeterminate vessel (v29). Excavators also noted the recovery of charcoal fragments, small animal and fish bones, several unworked chert flakes, and many large stones (non-fired). This feature likely functioned as a storage pit, later filled with refuse. Feature 39-67 appears to interrupt the eastern wall of the smaller construction of Structure 2. It is possible this pit was an internal storage pit for the larger, likely second construction of Structure 2 or it may have post-dated the structure all together.

Several additional posts are located within the area of Structure 2. A series of these posts are arranged in a circular pattern, possibly indicating a third circular-post structure once stood at this location (Figure 4.7). Note the WHS excavators did not identify these posts as a separate structure. Should these posts indeed represent a third structure, it would measure 3.16 m (W-E) by 2.55 m (N-S). The three southern-most posts spur off the main circular outline represented by others, likely representing an entryway typical of other circular structures identified at the site (see Wittry and Baerreis 1958). It is currently impossible to determine whether it pre-dates or post-dates the other constructions of Structure 2. If not

Figure 4.7. Plan map highlighting possible circular structure associated with Structure 2 (WHS, Aztalan Map # 26 & 41).

representing a distinct third structure, these posts likely represent internal support posts for the other stages of Structure 2.

Structure 3

Structure 3 was originally defined as a straight line of postmolds running east to west, turning southwest towards the southwest corner of the 1968 excavation block (Figure 4.8). However, this east-west line of posts parallels a line of posts excavators designated as Structure 7. Given the closely paralleling layout of these two series of posts, they are interpreted here as representing one feature. Unfortunately, hearth Feature 13-68 appears to superimpose the southeast corner of Structure 3 where the southern line of posts presumably would have turned to the northeast. The posts running northeast to southwest in the corner of the excavation block are thus attributed to another isolated wall or structure not clearly identified by the excavators.

Thus, Structure 3 is defined as a large, rectilinear single-post mold structure. Largely rectangular in plan it measures 5.42 m in width (N-S) and at least 9.15 m in length (E-W) with a minimum floor area of 49.59 m^2. The corners of the structure angle inward, in the same fashion as Structure 5 (see below). However as mentioned, the southeast corner posts of the structure were superimposed by Feature 13-68. The eastern wall lies beyond the limits of excavation and was not identified in the 1964 east-west trench.

Structure 3 post-dates Structure 4. This is established by a single post along the southern wall superimposing a post from Structure 4. As mentioned, Structure 3 predates hearth Feature 13-68. Structure 3 also predates Structure 5, identified as the last structure in use prior to mound construction (see below).

Structure 3 may represent an internal enclosure associated with the larger Structure 5, but the superpositioning of F13-68 on the structure makes this association doubtful. Given the similar layout and alignment between Structure 3 and Structure 5, it is not unlikely these two structures served similar purposes. Excavator's notes, in conjunction with mound profiles, indicate the floor of Structure 5 is lower than the surrounding, original ground sur-

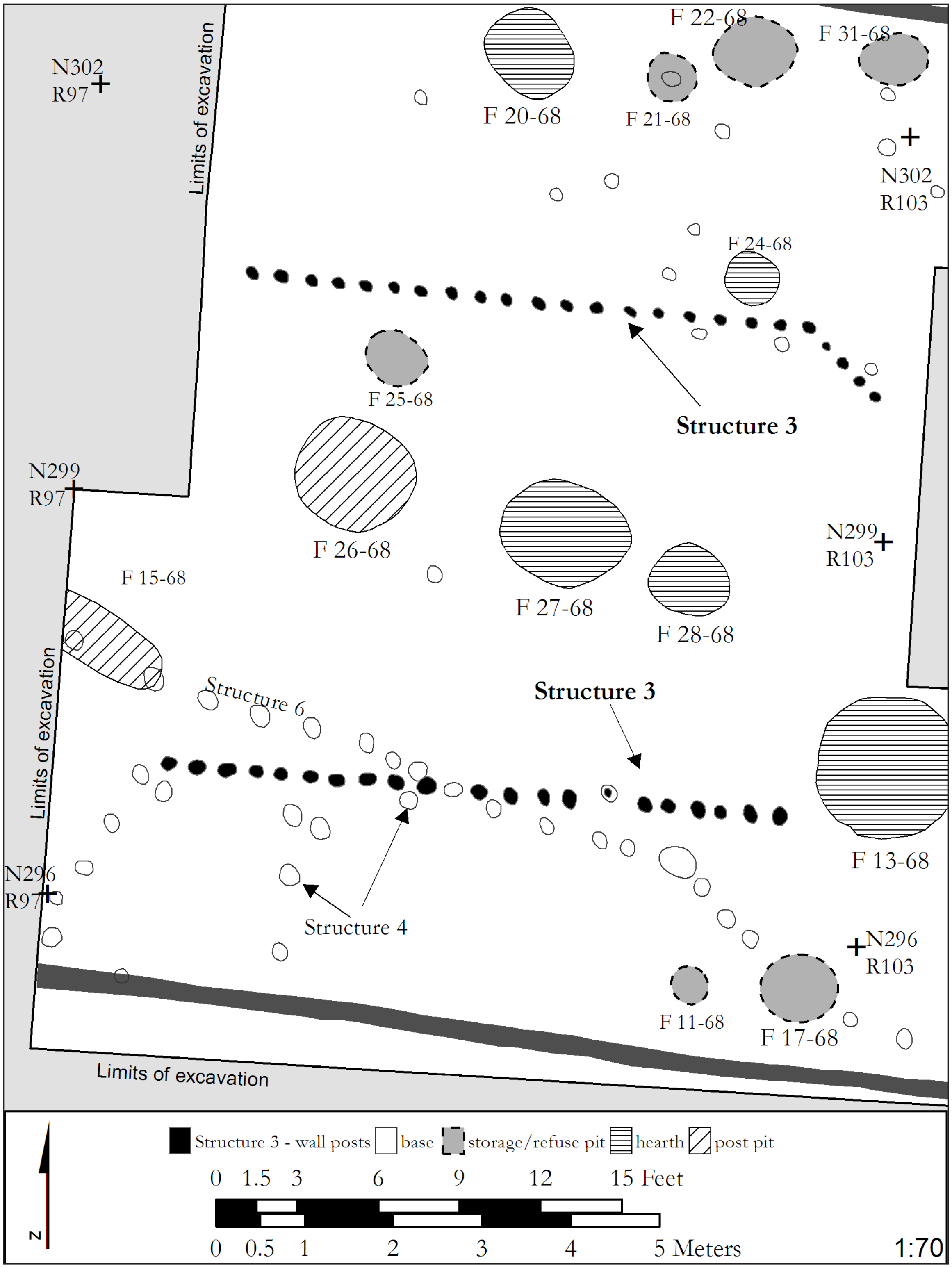


Figure 4.8. Plan map of Structure 3 (WHS Aztalan Map # 41).

face. Thus, the floor of Structure 3 was likely removed during the subsequent construction of Structure 5.

No cultural materials are directly associated with this structure. Several features are located within and adjacent to the structure, but direct association of these features with a particular structure is tenuous. Any possible associations of these features will be discussed below in the description of the Structure 5 Complex.

Structure 4

Structure 4 was identified as a broken series of post molds at the southern end of the 1968 excavation block (Figure 4.9). The western-most series of post molds likely continues south, beyond the limits of excavation. Also, Structure 6, a series of posts trending northwest to southeast at the northern edge of Structure 4, likely obscured the northern

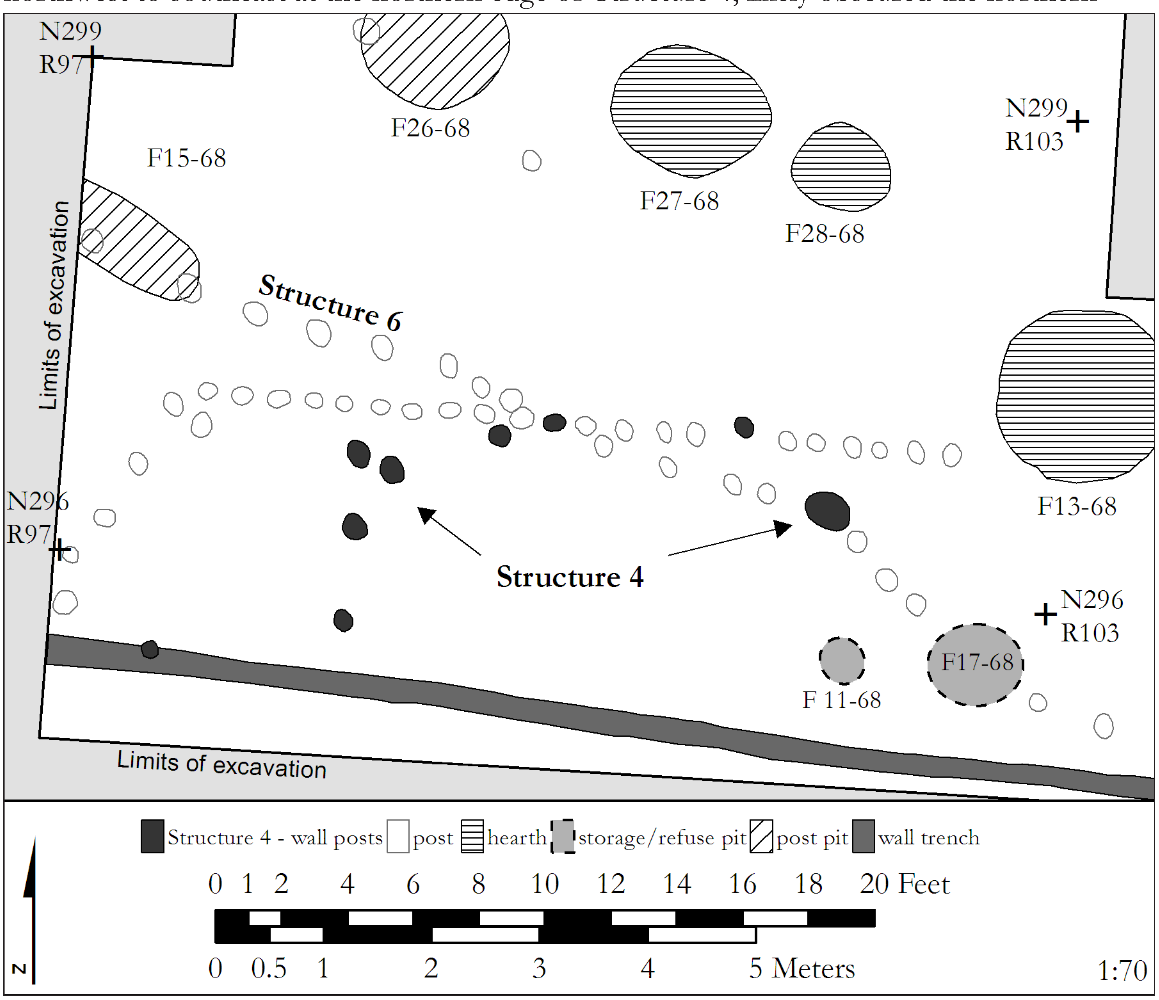


Figure 4.9. Plan map of Structure 4 (WHS, Aztalan Map # 41).

edge of this structure. Given the incomplete pattern of post molds, it remains uncertain if Structure 4 represents a building or possibly a screen attributable to some other unidentified structure(s).

No cultural materials or pit features were found to be associated with Structure 4. As mentioned above, excavators noted that Structure 3 superimposes Structure 4, which likely resulted in the truncation of additional post molds once associated with this structure. Excavators also noted that a single post from Structure 4 superimposes the southern wall trench of Structure 5 (see Figure 4.9). However, given that this single post is located 1.6 m west of the main arrangement of Structure 4 posts, this single post is most likely associated with Structure 5.

STRUCTURE 5 COMPLEX

The most prominent sub-mound feature, Structure 5 is a large rectilinear structure built using both single post and wall trench construction techniques (Figure 4.10). This structure measures 12.24 cm wide (N-S) by at least 25.10 m in length (E-W), with a minimum floor surface area of 307.23 m^2. Thirty-seven posts were identified within the wall trenches, though posts were not mapped in plan view. Posts ranged in diameter between 12 cm and 23 cm. They had rounded and pointed bases, whereas the trench itself was u-shaped in cross-section profile. The wall-trench ranged between 12 cm to 18 cm in width, with an average depth of 18 cm, whereas the posts typically extended beyond the base of the trench, averaging roughly 30 cm in depth. Within the trench the posts were typically spaced no more than 36 cm apart. These walls appear in the 1964 north-south deep cut trench profile (see below). Several additional posts were identified within the structure as well, primarily in the northeast corner, possibly representing internal or even internal screens, walling off portions of the structure. It is just as likely that several posts predate the structure as several were found at the base of the adjoining pits.

Mound profiles show the floor of Structure 5 lower than the surrounding, original ground surface (Figure 4.11). As the natural landscape slopes up toward the west, leveling

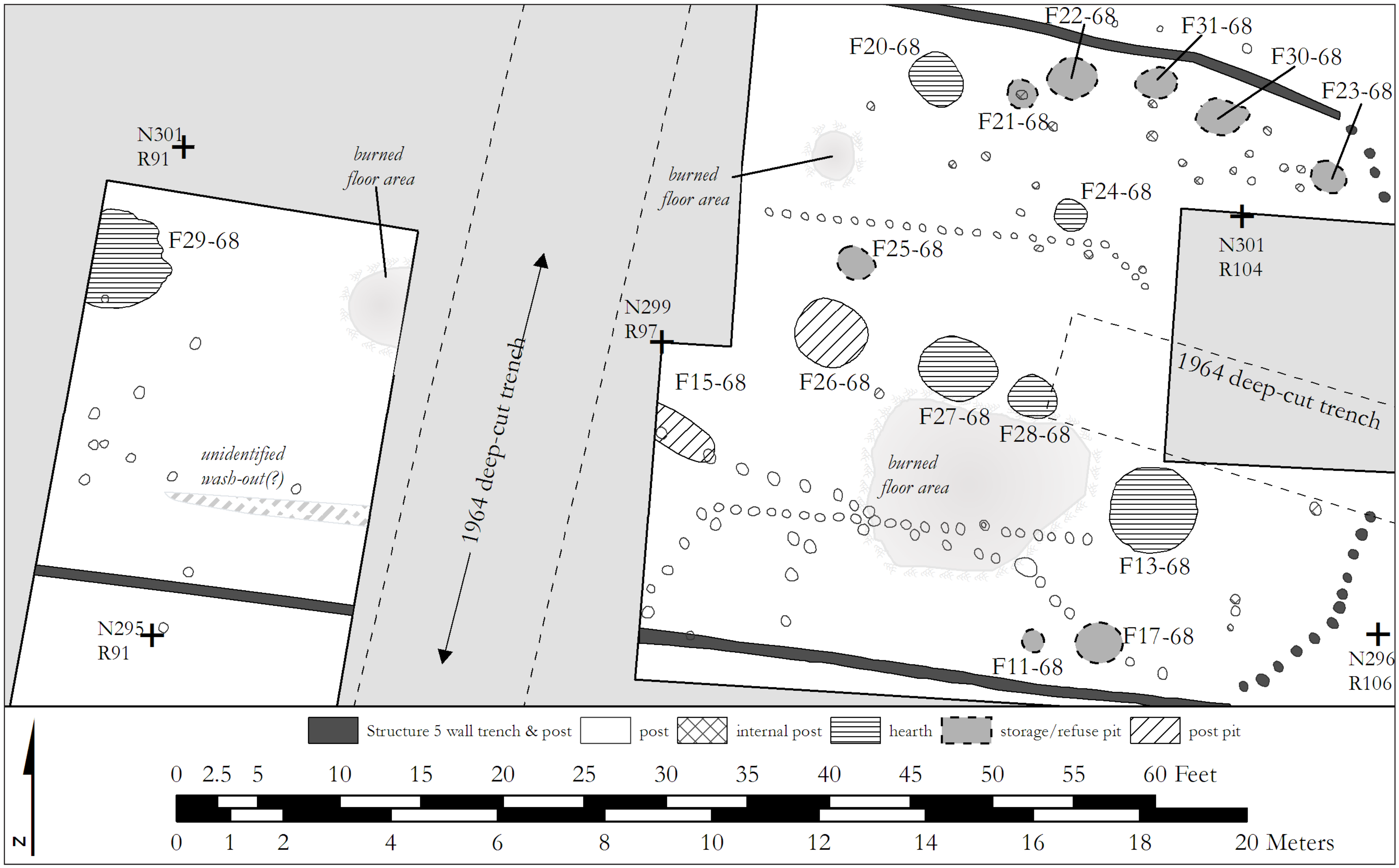


Figure 4.10. Plan map of Structure 5 and associated internal features (WHS, Aztalan Map # 41 &53).

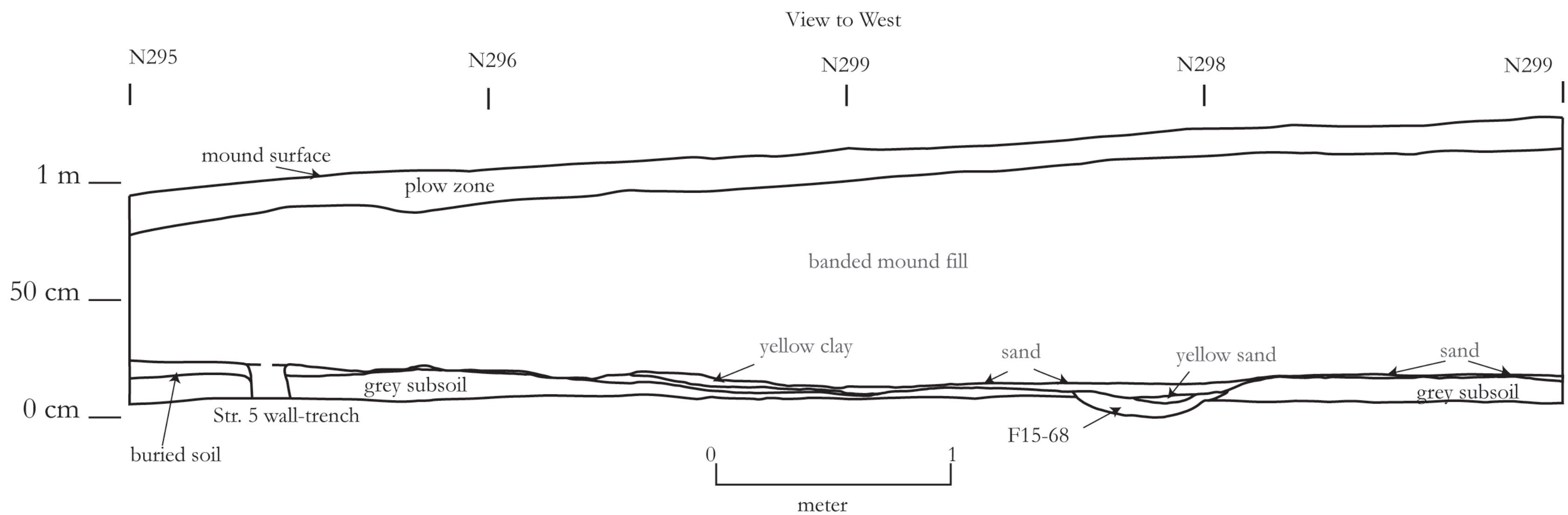


Figure 4.11. Profile of 1968 excavation west wall with Structure 5 and F15-68 (WHS, Aztalan Map # 14).

the ground would be necessary to provide a flat floor surface. Excavators identified a layer of clean yellow sand on the floor itself as well as several burned soil patches in several areas. These patches suggested to the excavators that the structure may have been burned, perhaps intentionally, prior to mound construction (Figure 4.12). However, no burned timbers or logs were identified on the floor or noted in the wall trenches. Several of the pits and hearths within the walls of Structure 5 also produced little cultural debris (see below), and mound-fill deposits were noted in the uppermost fill of several of these features. These circumstances suggest the structure floor and associated pits were intentionally cleaned-out just prior to the construction of the mound.

Structure 5 Storage Pits

Eight storage/processing/refuse pits are identified within Structure 5. Five are clearly identified as 'in-use' just prior to mound construction, based on the presence of mound fill deposits identified within the features themselves, indicating they were open at the onset of

Figure 4.12. Image of Structure 5, view to west. Note burned patches on floor (Wisconsin Historical Society, Museum Archaeology Program, Aztalan Archaeology Images).

mound construction. These five pits (F 11-68, 21-68, 22-68, 23-68, & 31-68) are considered interior features of Structure 5. Of these, one (F22-68) was re-utilized as a hearth. The remaining three features (F17-68, 25-68, and 31-68) did not contain mound fill, nor could their material contents directly associate them with activities of the other pit features, or Structure 5. These three likely pre-date the structure. Table 4.1 summarizes the metric and ceramic attributes of the pit features identified within Structure 5. Cross-section profiles can be found in Appendix A.

Feature 11-68 is a shallow basin-shaped pit (Type 2) located near the southern wall trench of Structure 5. The fill consisted primarily of refuse materials including a hammerstone, fire-cracked rock, bone fragments exhibiting cutting marks, and charcoal. Ceramics included grit tempered body sherds (188.7 g) and two Aztalan Collared vessel fragments (v60 & 61).Yellow-brown mound fill also was observed in the upper portion of the pit fill suggesting this pit was likely used within Structure 5 just prior to mound construction.

Feature 17-68 is a deep pit (Type 3) filled with refuse debris. The basal fill layer consisted of loose dark-colored soil, with a layer of soft ash just above it, then a harder fill layer at the top. Some charcoal was observed in the fill and three grit tempered, cord-marked body sherds (42.8 g) were recovered. No other materials were noted. This pit feature superimposed a line of posts corresponding with Structure 6 (see Figure 4.9). Of the eight pit features identified within the bounds of Structure 5, F17-68 is one of three that did not have evidence of mound-fill in the pit fill. This suggests that F17-68 may have pre-dated Structure 5, and certainly post-dated Structure 6. Its exact association remains unclear, but its final use was that of a refuse pit containing Late Woodland ceramics.

Feature 21-68 is a refuse pit (Type 3) located near the north wall-trench of Structure 5. The fill consisted of a basal layer of black soil, followed by a brown, charcoal-speckled fill layer, and mound fill in the upper-most portions of the pit. A single post mold was identified in the center of the pit, extending through its base. Recovered materials consisted of several grit-tempered body sherds (44.1 g) and a rim sherd from an Aztalan Collared jar (v65).

Table 4.1. Structure 5 Interior Pit Attributes.

Feature No.	Pit Type	Plan Shape	Metrics: Length (cm)	Width (cm)	Basal Length (cm)	Depth (cm)	Volume (dm^3)	Ceramic Materials: Total Ceramic Material (g)	Ceramic Material Density (g/dm^3)	LW Rims (g)	Grit-Tempered Body (g)	Hyer Plain Rims (g)	Ind. Rims (g)
11-68	2	O	44	38	n/a	17	13.7	210.2	15.3	17.4	188.7	0	4.1
17-68*	3	O	88	76	n/a	41	143.7	42.8	0.3	0	42.8	0	0
21-68	3	O	64	55	n/a	32	61.4	66	1.1	21.9	44.1	0	0
22-68	4	C	107	98	n/a	38	313.4	27	0.1	0	24.7	2.3	0
23-68	5	C	79	73	61	38	136.5	106.1	0.8	7.4	68.7	30	0
25-68*	2	O	73	64	n/a	9	16.9	0	0	0	0	0	0
30-68	3	O	104	76	n/a	43	175	175.3	1	0	175.3	0	0
31-68*	5	O	94	82	88	41	234.4	470.4	2	28.9	419.5	22	0

**these pits likely pre-date Structure 5*

Feature 22-68 is a refuse pit (Type 4) that may have been re-utilized at a hearth. Located along the north wall-trench of Structure 5, the basal layer of the pit consisted of a soft, brown soil flecked with charcoal. Above this, a four centimeter thick layer of clay was burned red and eventually covered with a layer of mound fill. This depositional sequence suggests F22-68 served as a storage or processing pit, was partially filled, then re-utilized as a hearth. A lack of charcoal in the upper layers suggests the hearth was cleaned prior to being filled with mound-fill. Besides charcoal, ceramics also were recovered, including seven grit-tempered, cord-marked body sherds (24.7 g) and a fragmentary rim sherd from a Hyer Plain vessel (v66). Based on the depositional sequence, this pit was minimally utilized as a hearth just prior to mound construction.

Feature 23-68 is a deep pit (Type 5) located next to the wall of the northeast corner of Structure 5. The fill at the base of the pit is a soft, loosely packed light-brown soil, capped by yellow mound fill in the upper portion of the feature. A single unidentified bone and charcoal fragments were present in the fill. Ceramic materials include plain and cord-marked grit-tempered body sherds (68.7 g). Rims sherds identify three different vessels, including one Madison Plain (v67) and one Hyer Plain (v68) jar. The rim sherd associated with the third vessel was too small to be compared to any known ceramic types.

Feature 25-68 is a shallow basin shaped pit (Type 2), filled with 'hard clay'. Several "crumbled" pot sherds were encountered by the excavator but were not kept. Some charcoal flecking also was observed. No other materials were noted. Feature 25-68 is the only pit-feature that is neither a hearth or post pit, located in the central portion of Structure 5. This pit is interpreted as predating Structure 5, and possibly Structure 3. Unlike many of the other features associated with Structure 5, this pit did not contain mound-fill, indicating it was 'closed' some time before the majority of the other features in the area ceased to be used. The feature fill, described as "hard" clay, may have been specifically chosen to fill the pit and prepare a clear, flat area for Structure 5. However, the exact association of this pit with pre-Structure 5 activities is tenuous.

Feature 30-68 is an oval-shaped refuse pit (Type 3) located in the northeast corner of Structure 5, along the north wall-trench. The fill consisted of a darker soil at the base, covered with a darker, black soil, topped with a clay layer at the top. No mention of mound fill is made in the upper portion of the pit. Fragments or flecks of charcoal were noted and ceramics recovered included several plain and cord-marked, grit-tempered body sherds (175.3 g). An intrusive post mold was noted on the east end of the pit.

Feature 31-68 is a deep pit (Type 5) located along the north wall trench of Structure 5. This pit was noted as having been "lined" with yellow, sticky clay. The lower fill deposit was a light-brown colored soil, and the upper fill consisted of yellow clay, likely mound fill deposits. Ceramics recovered include several grit-tempered, plain and cord-marked body sherds and a collar fragment (419.5 g), as well as grit-tempered rim sherds representing four distinct vessels, including two Aztalan Collared jars and one Hyer Plain jar. The fourth rim was too small to compare to a known ceramic type. Charcoal flecking too was noted in the pit fill. Likewise, excavators noted the presence of a projectile point that equates favorably to the Madison Triangular Point type. The raw material could not be conclusively identified, though it compares favorably with Burlington chert varieties.

Structure 5 Hearths

A total of six hearth features were identified within Structure 5. Table 4.2 summarizes the metric attributes for these features. Feature 13-68 is a large clay-lined, circular hearth (pit Type1) located near the southeast corner of Structure 5, superimposing the southeast corner of Structure 3. This hearth was lined with a layer of yellow clay that was subsequently subjected to intense burning, turning it reddish-brown. Then, a second layer of yellow clay was laid down and subjected to another episode(s) of intense burning. The pit was then filled in with yellow clay, possibly mound fill. No cultural materials were recovered.

Feature 20-68 is a circular shallow hearth (pit Type 2) located adjacent to the north wall trench of Structure 5. The base of the hearth was a light-grey colored layer of soil, with a grey-black soil laid on top. The upper most fill layer consisted of mound-fill, suggesting

Table 4.2. Structure 5 Interior Hearth Features.

			Metrics				Ceramic Materials			
Feature No.	Pit Type	Plan Shape	Length (cm)	Width (cm)	Depth (cm)	Volume (dm^3)	Total Ceramic Material (g)	Ceramic Material Density (g/dm^3)	LW Rims (g)	Grit-Tempered Body (g)
13-68	1	C	94	88	15	50.5	0	0	0	0
20-68	2	C	113	107	15	73	16.2	0.222	16.2	0
24-68	2	C	58	58	9	12.3	0	0	0	0
27-68	2	O	152	131	24	194.8	18.2	0.093	0	18.2
28-68	2	O	107	82	17	61.1	0	0	0	0
29-68	2	ind.	183	>107	>20	>157.9	0	ind.	0	0

this pit was in use up to and left open at the time of mound construction. A post mold was identified in the southern half of the pit. No cultural materials were recovered.

Feature 24-68 is an isolated hearth (pit Type 2) located in the north eastern portion of Structure 5, just outside the northern wall of posts of Structure 3. The base of this nine centimeter deep pit was filled with a grey-black soil. Yellow fill (presumably mound fill) composed the upper layer of feature fill. No cultural debris was recovered.

Feature 27-68 is a hearth (pit Type 2) located along the central east-west axis of Structure 5. It lies adjacent to a second hearth (F28-68) and post pit (F26-68). The bottom of the pit was lined with clay that was fired red. No ash debris was present in the pit, a layer of "clean" sand was laid down and a second fire was burnt atop the sand layer. Cultural debris consisted of small amounts of charcoal and a few grit-tempered sherds (18.2 g) at the top of the sand layer. Unidentified burnt stone fragments were noted also.

Feature 28-68 is a shallow basin shaped hearth (pit Type 2) containing layers of ash, charcoal, and sandy soil. Like F27-68, it is located along the central east-west axis of Structure 5. Excavators noted the presence of small unidentified bone fragments and pottery sherds. However WHS Museum records do not account for any pottery associated with this feature.

Feature 29-68 is a hearth (pit Type 1) located in the westernmost 1968 excavation trench. Only the eastern half of the pit was excavated, thus the extent of the pit remains unknown. The pit was reportedly lined with sand, covered by various clay, ash, and charcoal deposits. Besides the charcoal and ash, no other cultural debris was observed.

MISCELLANEOUS INTERNAL FEATURES

Feature 26-68 was originally identified in the field as a "kidney bean shaped pit [with] irregular sides and bottom." Flecks of charcoal were observed in the fill which was of "several different colors and kinds." Artifacts identified included fragments of poorly preserved, unidentified bone, and four fragments of grit-tempered pottery (23.9 g). The cross-section profile of this pit (Figure 4.13) closely resembles post-pit features found throughout the Mis-

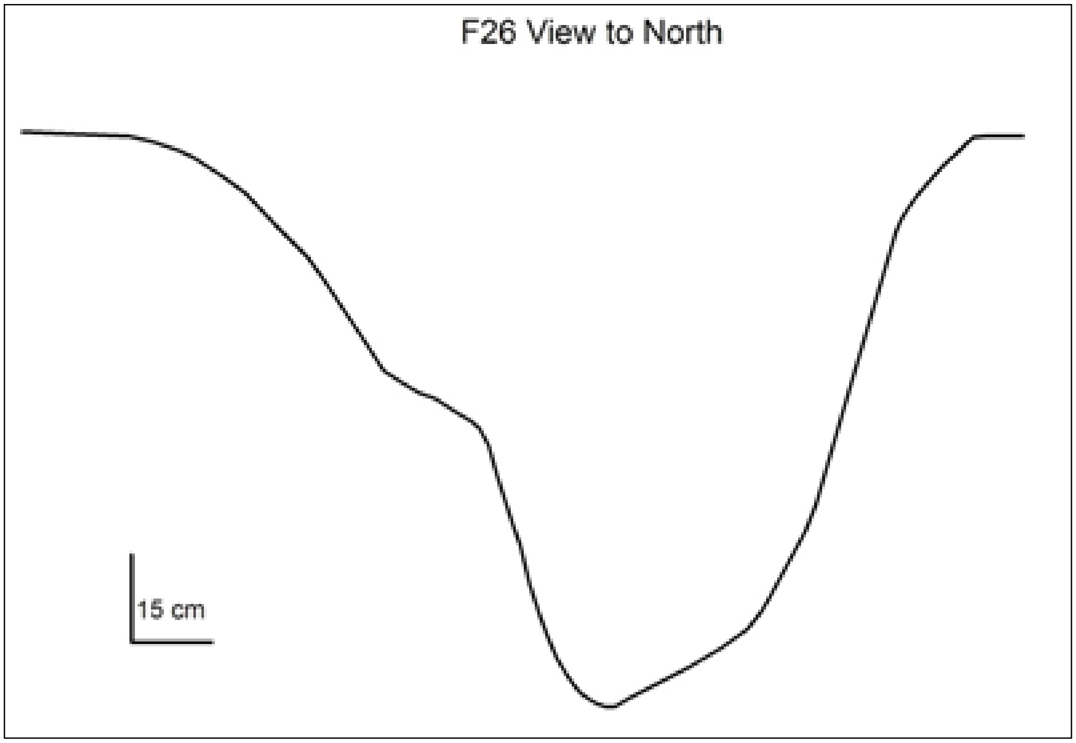


Figure 4.13. F16-68 cross-section profile, view to north (Wisconsin Historical Society Aztalan Excavations, 1968 notes on file at WHS, Madison, WI).

sissippian world (Fowler 2003; Hall 1997; Kelly 2003; Pauketat 1998; Pauketat and Alt 2005; Skousen 2012), including Aztalan (Barrett 1933). The feature is one meter deep and exhibits a stepped or ramp-like profile shape suggestive of an insertion or extraction ramp for a post. The basal width of the pit would easily fit a large post with a diameter ranging between 50 and 60 cm. It is prominently located along the central east-west axis of Structure 5 adjacent to two other hearth features associated with the structure. Feature 26 may have served as a large internal support post for a roof covering Structure 5, or it may have stood as an individual marker-post predating the structure.

Feature 15-68 was identified by excavators as an elongated shallow possible post pit adjacent to the west wall of the eastern excavation area. The feature extends beyond the limits of excavation to the west (see Figure 4.11). Post molds were reportedly identified in the southeast and west end of the feature, but were not plan mapped. The fill is described as a dark grey, charcoal-speckled fill with a pink ash lens. Recovered ceramic materials include grit-tempered body sherds (10.9 g) and four shell tempered body sherds from the base of

one vessel (20.3 g). These latter sherds exhibit a tan colored-slipped surface finish. These four sherds represent the only shell-tempered sherds found below the northeast mound not associated with mound-fill deposits.

The long-axis profile suggests a 'ramp' may extend to the north-west, with a post set into the southeast end. However, the profile, as defined, shows the post-hole was likely too shallow to hold a large, upright post. The presence of the ash lens suggests this may represent a hearth feature, though no in situ burning is evident. Field photos of the 1964 north-south deep profile cut into the mound show a similar feature in the east wall, corresponding closely with the location of F15-68 (Figure 4.14, also see Figure 4.12). The images suggest a thin layer of dark, possibly oxidized fill is present, suggesting F15-68 is actually an elongated trough-like feature spanning more than two and a half meters in length and 68 centimeters in width. The function of F15-68 remains unclear.

Figure 4.14. F15-68 in 1964 north-south profile, view to east. Feature is grey depression at base of image (Wisconsin Historical Society, Museum Archaeology Program, Aztalan Archaeology Images).

Structure 6

Structure 6 is represented by meandering line of post molds, oriented northwest to southeast crossing the south wall of Structure 3 (Figure 4.15). This 10.5 m long series of posts likely extends beyond the western and southern limits of the 1968 excavation block. It is unclear as to whether these post molds represent the wall of a structure, a palisade line, or perhaps an isolated screen. Excavators did not record if this feature superimposed, or was superimposed by any other feature, however they do note that the series of posts do run into the F15-68 area where a gap is noticed. This may suggest that F15-68 superimposes Structure 6. Also, excavators had noted that Structure 5 was the last structure used prior to mound construction, thus suggesting it too superimposes Structure 6. Post diameter ranges between nine and twelve centimeters. The average spacing between posts was 48 cm.

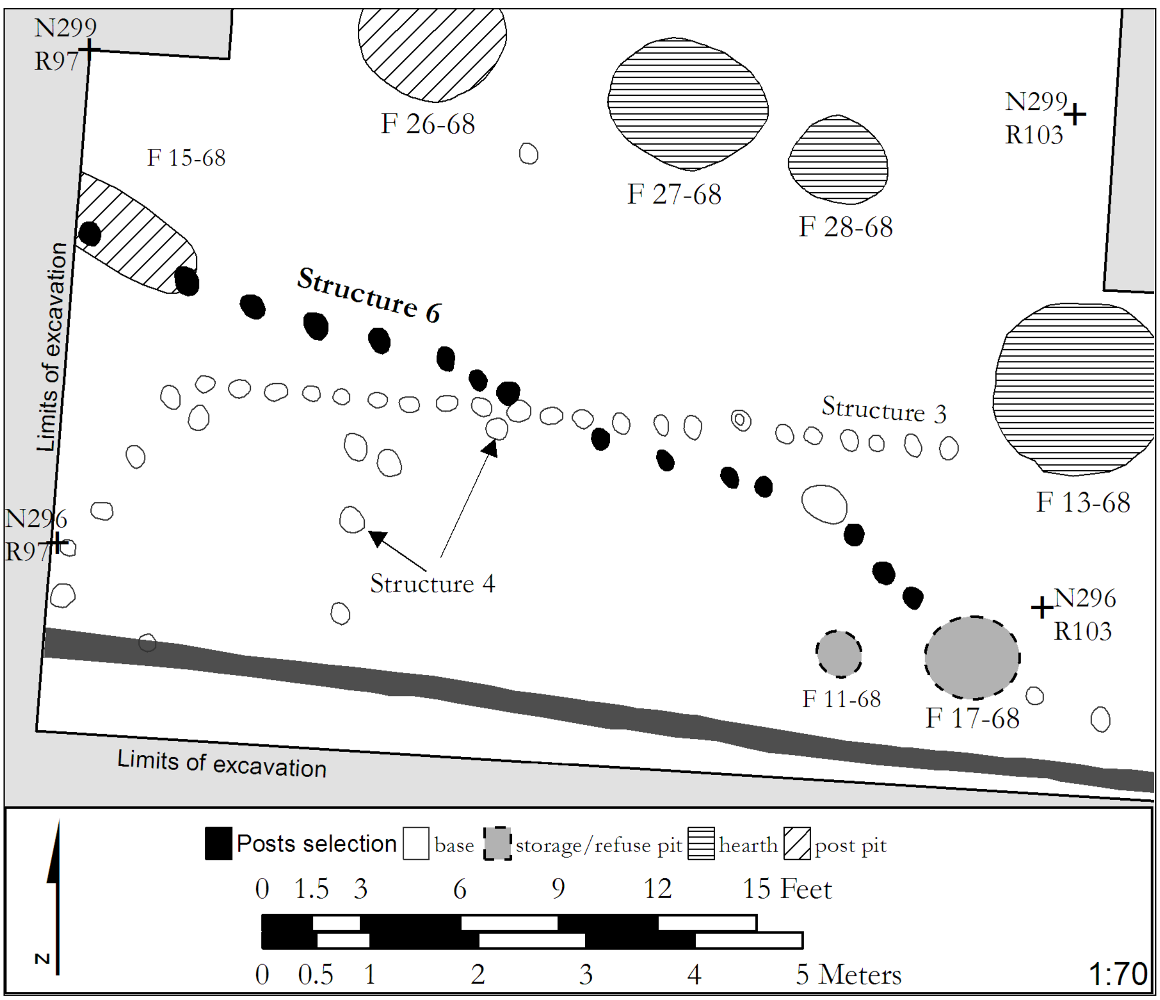


Figure 4.15. Plan map of Structure 6 (WHS, Aztalan Map # 41).

Structure 7

Structure 7 was originally identified by excavators as a single line of post molds in the central portion of the 1968 excavation block. Given their very similar orientation the posts originally defined as Structure 3, these two series of posts have been combined into one feature (see Feature 3 discussion above).

EXTERIOR FEATURES

A total of six features external to all the structures were identified below the mound. Four features are interpreted as storage/refuse pits and two as hearths; Table 4.3 summarizes their specific attributes. All four of the storage/refuse pits contained Late Woodland ceramics. Five of the six features contained Late Woodland ceramic materials.

Feature 2, located between Structure 5 and Structure 1 (Figure 4.16), contained a whole Starved Rock Collared vessel (v50), inverted near the sidewall of the pit (Figure 4.17). No other cultural materials were identified in the pit. Feature 16-68 is located south of Structure 2 and northeast of Structure 5 (see Figure 4.16). Feature fill consisted of a light brown fill, topped with harder yellow clay. Cultural materials included chert debitage, fire-cracked rock, a projectile point, fragmentary faunal remains, and several grit-tempered body sherds and a single grit-tempered rim sherd (v62).

Feature 32, located south of Structure 2 against the eastern wall of the excavation block (see Figure 4.6), was one of four bell-shaped pits identified und the northeast mound. Pit fill consisted of a pink ash layer at the base, topped with a light-grey soil, and another pink layer of ash atop it. The upper-most layer contained a yellow-colored soil (likely mound fill slumping in). Cultural materials reportedly found include several chert flakes, a bone awl, several fish scales and bones, and turtle bones. Likewise, excavators reported "possibly two human bones in [the] dark grey soil" (Wisconsin Historical Society Aztalan Collection, 1968 notes on file Wisconsin Historical Society, Madison Wisconsin).

Feature 49-64 was identified during the excavation of the 1964 East-West profile cut into the eastern face of the mound (see Figure 4.1). The feature lies just over two meters

Table 4.3. Exterior Pit & Hearth Feature Attributes.

			Metrics					Ceramic Materials			
Feature No.	Pit Type	Plan	Length (cm)	Width (cm)	Bottom Length (cm)	Depth (cm)	Volume (dm^3)	Total Ceramic Material (g)	Total Ceramic Density (g/dm^3)	LW Rims (g)	Grit-Tempered Body (g)
2-68	4	O	52	46	ind.	49	92.4	6240	67.6	6240	0
16-68	4	C	91	82	n/a	58	340.7	148.9	0.4	7.3	141.6
32-68	5	C	76	70	64	49	174.9	242.2	1.4	0	242.2
49-64	4	C	44	41	n/a	34	48.2	98.7	2	66.2	32.5
Hearths											
3-68	1	C	98	98	n/a	17	66.7	70.4	1.1	9.8	60.6
10-68	1	C	67	61	n/a	14	23.9	0	0	0	0

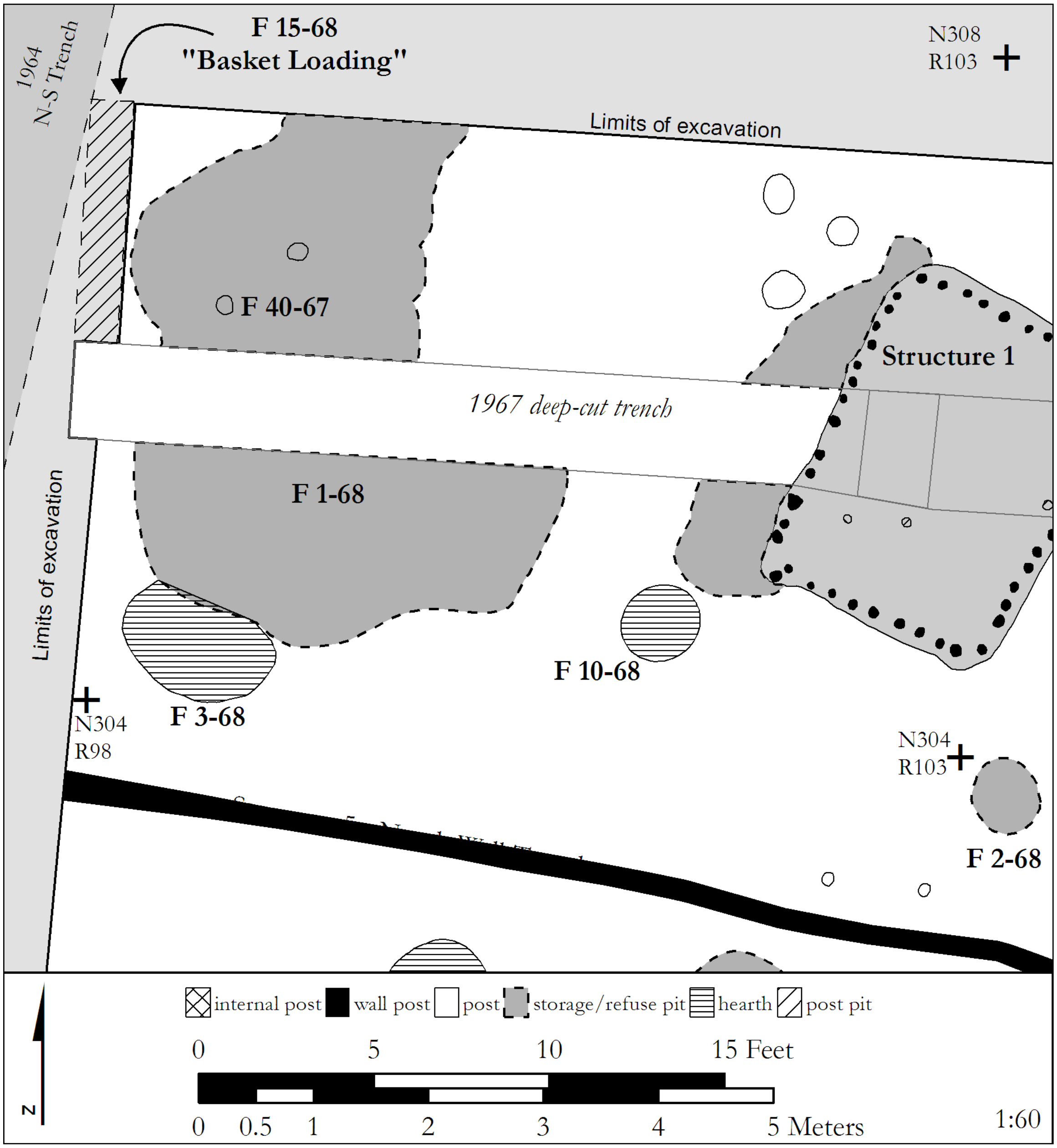


Figure 4.16. Plan Map: F1-68, 2-68, 3-68, 10-68, 15-68, 40-68, & Structure 1 (WHS, Aztalan Map # 26 & 41).

from the eastern foot of the mound. The pit was filled with loose-brown, orange ash and contained fish bone and scales, acorn fragments, and faunal remains. Several grit-tempered body sherds were found, as well as rim sherds attributed to two Aztalan Collared jars (v1, & 2). No shell-tempered ceramics were associated with this pit feature as previously reported (Bender, et al. 1966:527). The absence of oxidized soil suggests the pit was used for storage or processing activities before it was filled with domestic refuse. Charcoal recovered

Figure 4.17. Image of F2-68 with inverted Starved Rock Collard jar (v50) (Wisconsin Historical Society, Muesum Archaeology Program, Aztalan Archaeolgy Images).

from F49-64 was submitted and returned a ^{14}C date of 820±80 B.P. (WIS-73, Bender, et al. 1966:527); cal A.D. 1044-1284 (Calibrated at 2 σ using the program OxCal 4.2, calibration curve IntCal 09). As mentioned, the pit was located just east of the mound, so it is unclear whether the pit predated-or postdated mound construction.

Features 3-68 and 10-68 are interpreted as hearth features (see Figure 4.16). Both are shallow basins (pit Type 1). A brief description of Feature 3-68 noted the presence of ash throughout the fill, as well as several broken ceramics and faunal remains. Recovered ceramics included Late Woodland, grit-tempered body sherds and a rim sherd representing a single Aztalan Collared jar (v51). Feature 3-68 is located adjacent to Feature 1-68/40-67 (see Figure 4.16) and was mapped in plan as seemingly truncated by this feature. However, sketch maps accompanying the field notes illustrate this pit as neither superimposed on or by Feature 1-68/40-67. Feature 10-68 contained no cultural material. Fill consisted of a yellow-white matrix at the base, a layer of hard grey soil, and a layer of brown to rust-colored soil on top.

FEATURE 1-68/40-67

Features 40-67 and 1-68 were excavated during separate field seasons. In 1967, Feature 40-67 was identified as an irregularly shaped feature, noted as somewhat square in plan view (see Figure 4.16). Feature 1-68, identified the following year, was present in the mound profile in the south wall of the 1967 excavation trench. Given the proximity of these two features, their similarity in feature fills, and profile shape (described below), they are posited to represent the same feature.

Profiles illustrate Feature 40-67 has incurving sidewalls and a flat base, or floor (Figure 4.18). The fill is described as containing roughly eight layers, ranging from dark soil at the base, to layers of ash, and again to black soil. Cultural materials include ceramic sherds, nondescript lithic tools and debris, faunal remains (some worked), and shell. Feature 1-68, identified the following year just south of Feature 40-67 contained similar materials and fill layers. Excavators described the fill as:

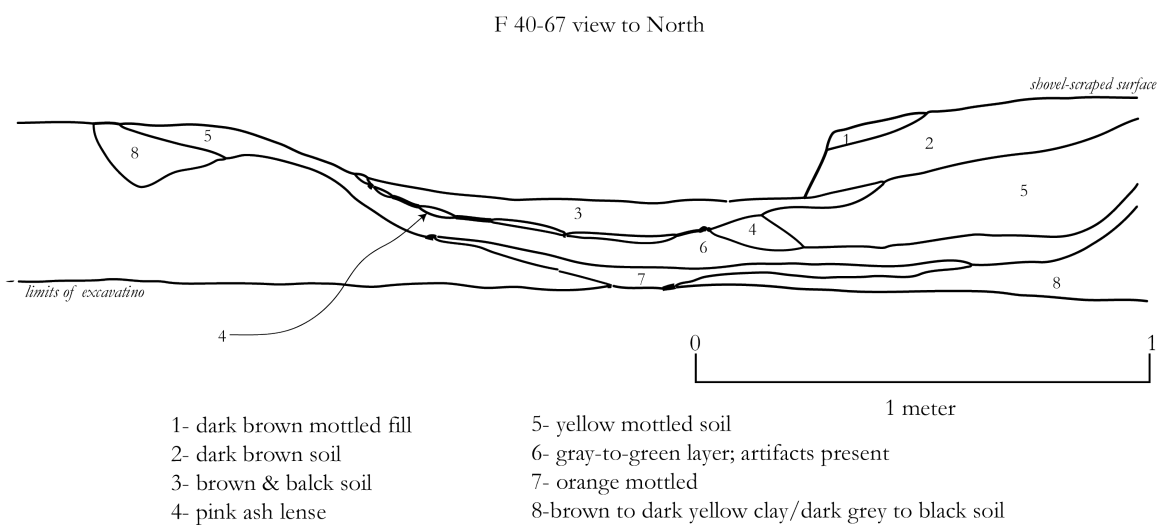


Figure 4.18. Profile map of F40-67/1-68, view to north from deep-cut strat-trench (notes on file at WHS, Madison, WI).

> [A] top layer of brown-yellow with charcoal, pottery [and] bones; followed by [a] yellow layer with a limited amount of bone and fragments of what might be an entire pot [v49?]; 3 lenses of ash and oxidized soil (pink), 2 lenses of brown vegatative [sic] matter with shells followed by a charcoal speckled gray layer with shells, bone, some pottery; bottom of yellow sandy soil [and] walls of light gray soil (Wisconsin Historical Society Aztalan Excavations, 1967 notes on file at Wisconsin Historical Society, Museum Archaeology Program Madison).

Given the morphology of this feature, incurving walls and a flat base, it is posited it represents the remnants of a house basin, much like Structure 1 (see above). Two post molds were identified in the floor of F40-67; though not along any potential sidewalls (see Figure 4.16). Like the Structure 1/F34-67 complex, Feature 40-67/1-68, may represent two basins, or a single rebuilt structure. This likely explains its irregular shape as mapped in plan view. Though the arrangement of structures at Aztalan is not well understood, this feature is situated due west of Structure 1 and Structure 2 (see Figure 4.2), suggesting a possible linear arrangement of structures at the site. Both are described as having a yellow layer of sand on their floors and each has a hearth located just outside their southern walls. Given these similarities, the proposition that Feature 40-67/1-68 represents another semi-subterranean structure remains plausible.

ISOLATED POSTS

An area of post molds was defined in the southeast corner of the excavation area (see Figure 4.3). A possible contiguous line of posts, running roughly north to south, may be present, and may represent the remnants of an additional structure or screen which continues just beyond this excavation area. No cultural materials were associated with these features.

MOUND CONSTRUCTION

Wisconsin Historical Society crews recorded five mound profiles during the course of the Northeast Mound excavations. Profiles from the 1964 deep-cut trenches (see Figure 4.1) illustrate the extent of the mound fill (note “Northeast Mound Footprint” illustrated in

Figures 4.1-4.3). The basal dimensions of the northeast mound measure 23.5 m north-south. East-west dimensions are unclear, though are estimated at around 30 m (Richards 1992). Uncertainty derives from the lack of excavations along the western edge of the mound, reported as grading directly into the natural terrain rising to the west (Lapham 1855).

The summit of the mound was recorded in 1850, measuring 50 feet wide, north to south (1855:Plate XXXIV). However the east-west extent of the top of this platform mound is unknown. The mound rose at least 1.68 m above the original ground surface at the mound's east end. This is evident from a profile recorded by Barrett (1933:179-180), who excavated a narrow trench into the eastern edge of the slope to determine if the mound located in the area on Lapham's map was natural or artificial. Though he states, correctly I believe, "there is every probability that it was somewhat higher originally" (Barrett 1933:180). Interestingly, the profile suggests a series of ash layers were laid down in the course of mound construction, though no instance of such deposition is noted during the WHS excavations.

The WHS mound profiles identified the presence of several series of basket loads and elongated lenses of light and dark fills; specifically thin, 'paired' mantles of alternating light (yellow) and dark (brown-black) soils (Figure 4.19). Middle Mississippian mound construction practices, especially at Cahokia and around the American Bottom, frequently incorporated alternate layers of light and dark soils and other 'engineered' soils (Pauketat 1993, 2000; Pauketat and Alt 2003:165; Pauketat, et al. 1998; Porter 1974; Reed, et al. 1968; Skousen and Pauketat 2013; H. M. Smith 1969). In the North, alternating colored mantles within mound fill has been documented within the large Mississippian mounds at Trempealeau, Wisconsin (Timothy Pauketat, personal communication 2012). These practices are exhibited at Mississippian sites in the Southern Mississippi River Valley as well (see:Knight 1989; Pauketat and Alt 2003; Pursell 2004). Late Woodland Effigy Mound construction also has exhibited the use of sequential layering of colored soils at the Kratz Creek mounds, in Pierce County, Wisconsin (Barrett and Hawes 1919:15-16). However, not all Late Woodland

Figure 4.19. Photo of 1964 mound profile (North-South deep cut) illustrating alternating layers of light and dark fill (Wisconsin Historical Society, Museum Archaeology Program, Aztalan Archaeology Images).

mounds are known to have exhibited such intentional stratification (e.g. McKern 1928; McKern 1930).

It is unclear how many paired mantles were laid down in the course of constructing the Northeast Mound, but the lack of distinct 'living surfaces' between the layers suggests they were likely laid down as one set, supporting Freeman's (1986:345) conclusion that the mound was built in a single "stage". However, careful inspection of the mound profiles suggests a series of early small 'sub-mounds' may have been incorporated into the construction process. The 1964 mound profile into the east face of the mound shows a small, but conspicuous 'mounding' of fill beginning at grid line R105 (Figure 4.20). The 1967 south wall profile depicts a similar 'mounding' feature at Grid Corner N305 R106 which also may represent an initial, smaller platform construction (Figure 4.21). No features (i.e. pits, posts, structures) were identified within these layers. The lack of identified living surfaces suggests these sub-mound constructions were likely built and quickly covered with additional mound construction deposits. Closer inspection of the 1964 north-south trench profile also shows

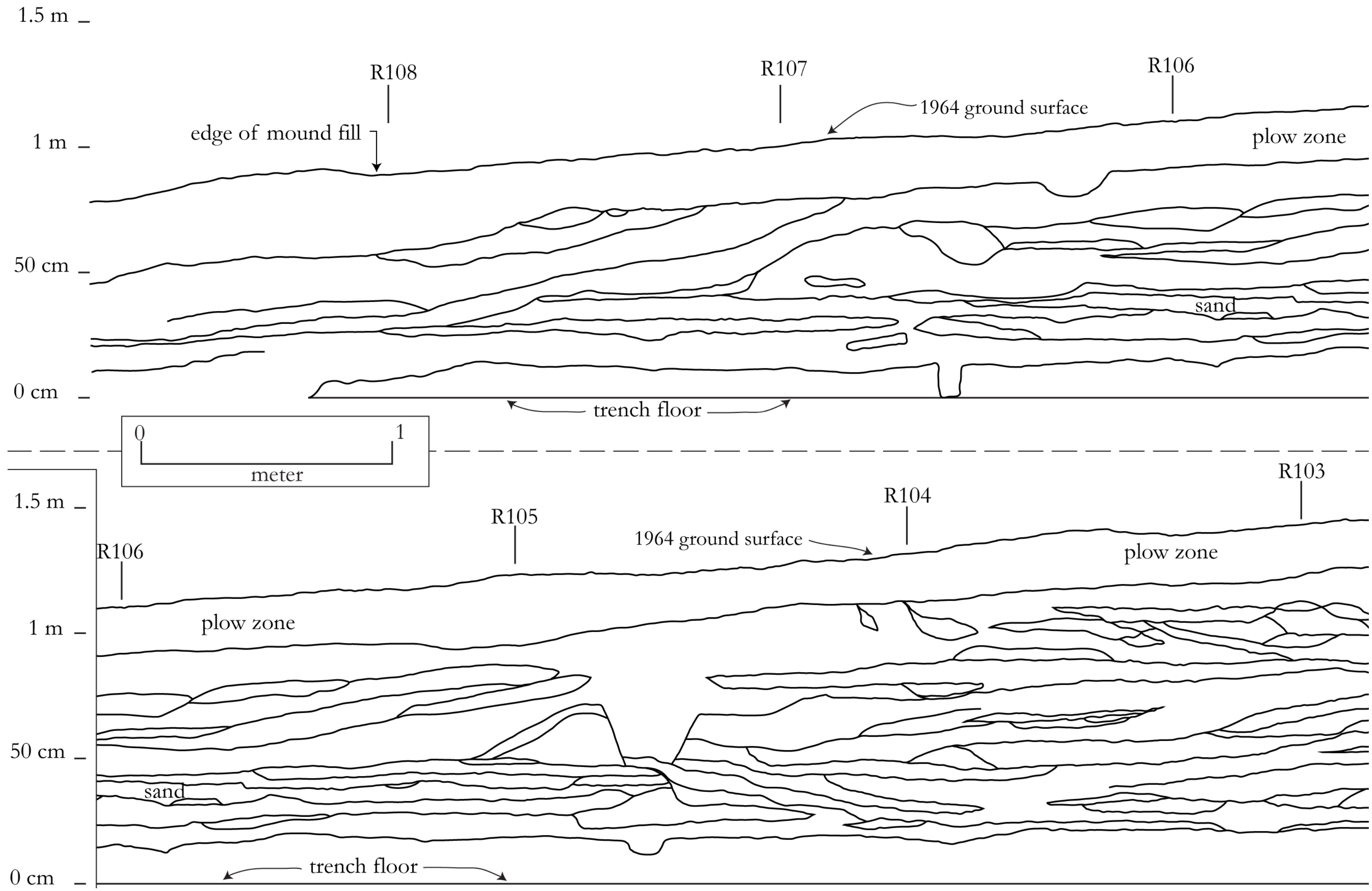
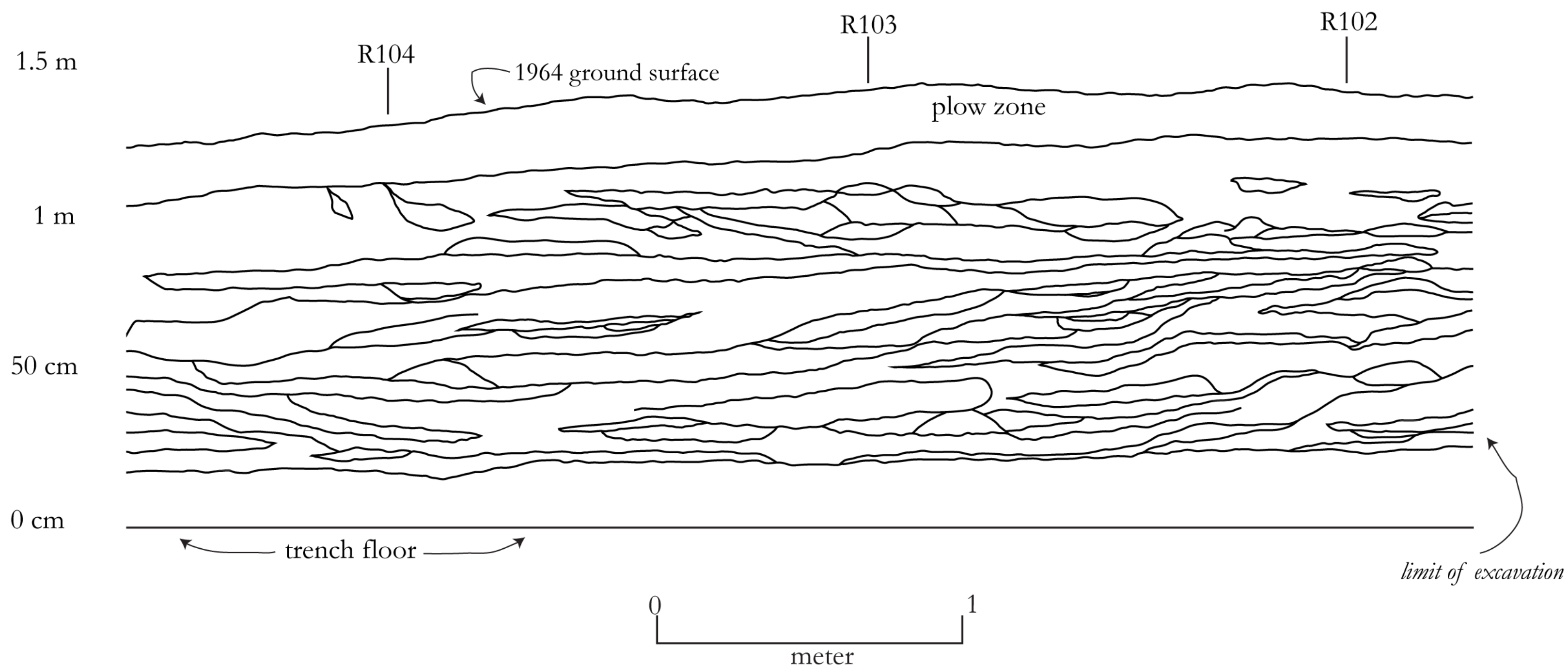


Figure 4.20. 1964 East profile cut view to south (WHS, Aztalan Map # 31).



Notations provided are as originally mapped by WHS excavators
author's notations indicated by italicized text

Figure 4.20. 1964 East profile cut view to south, continued (WHS, Aztalan Map # 31).

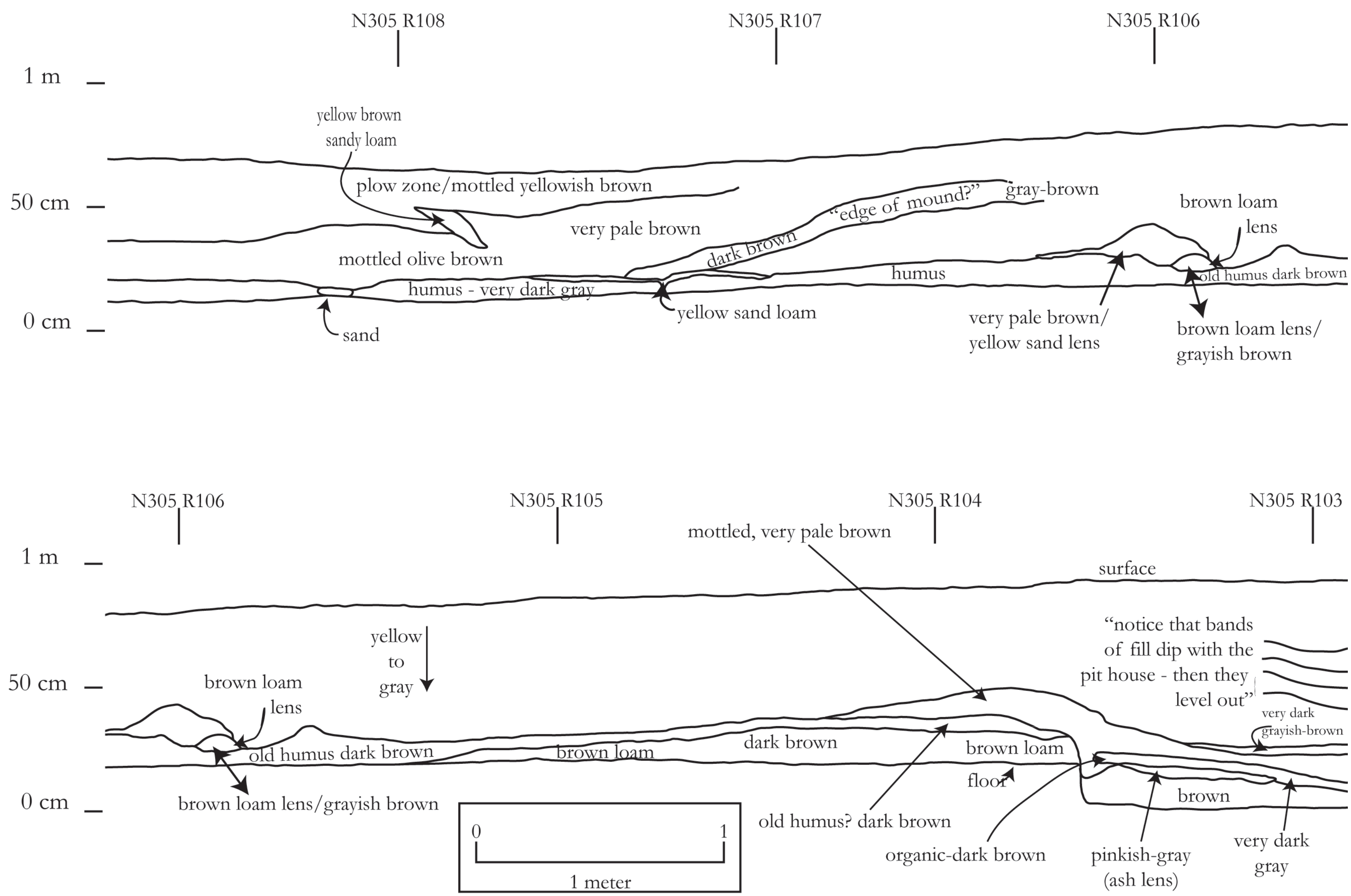


Figure 4.21. 1967 Mound profile, view to south (WHS, Aztalan Map # 29).

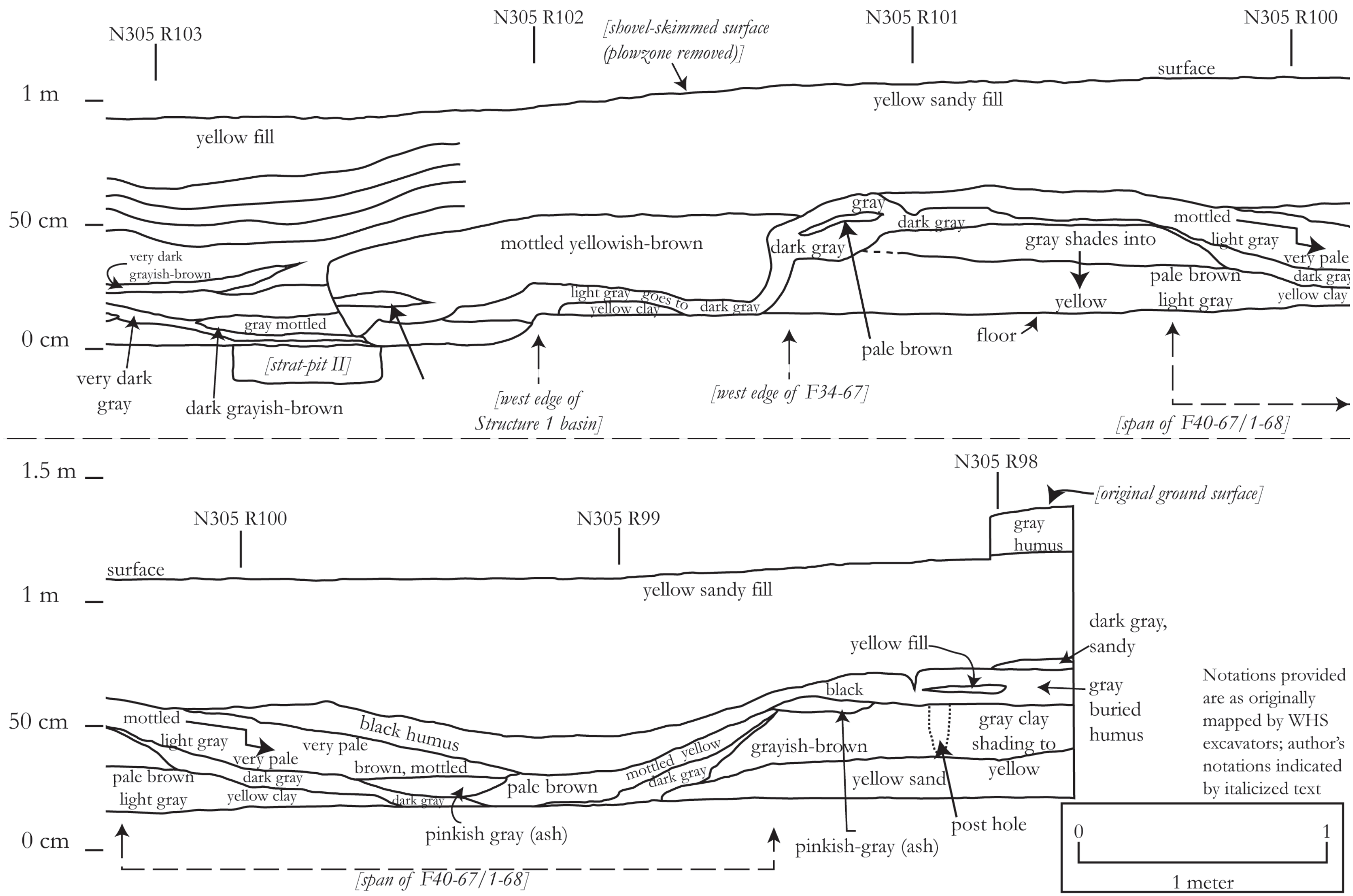


Figure 4.21. 1967 Mound profile, view to south, continued (WHS, Aztalan Map # 29).

an earlier sub-mound platform visible in profile between grid lines N293 and N294. Profile maps of the 1964 North-South profile cut through the mound viewed to the east and west are illustrated in Figures 4.22 and 4.23, respectively. Images of these profilesare illustrated in Figure 4.24 and 4.25, respectively.

Basket-load deposits also are evident in the mound fill. Feature 15-67 was identified as a series of basket loads identified in the western wall of the 1967 excavation trench (see Figure 4.16). Excavators noted the basket loads consisted of various colored fills including brown, grey, grey-brown, light grey, pink, and yellow clays. Several soil samples were collected (not reported on here) as were several grit tempered body sherds (109.2 g). Rim sherds representing three Aztalan Collared jars (vessels 6, 7, 8) were recovered as well. Two of the rim sherds from F15-67 cross-mended with rim sherds from F40-67, suggesting the latter feature was filled in at the time of mound construction.

Construction of the Northeast Mound can be considered a single event, but evidence for possible separate sub-mounds (one of which is a flat-topped pyramid form) suggests construction began as multiple deposits serving as foundational episodes of construction. Length of time necessary to construct the mound is unclear, but the 'event' of constructing the mound appears to have included multiple construction episodes evidenced through the apparent 'sub-mounds' and the intentional layering of light and dark mantles.

Episodic mound construction, as seen at Aztalan is documented in numerous Mississippian mounds, including: Mound 72 (Fowler, et al. 1999), Monk's Mound (Reed, et al. 1968), Mound 49 (Pauketat, et al. 2010), Powell Mound (Ahler and DePuydt 1987) and several others at Cahokia (Moorehead, et al. 1929), East St. Louis (French 2012), and Emerald Mound (Koldehoff, et al. 1993; Skousen and Pauketat 2013; Winters and Streuver 1962). The other two platform mounds at Aztalan were constructed in at least three stages, with structures erected on each stage of the Southwest Mound, and at least the second stage of the Northwest Mound (Birmingham and Eisenberg 2000; Freeman 1986; Maher 1958; Rowe 1956). Recently, excavations at the Trempealeau site near La Crosse, Wisconsin concluded

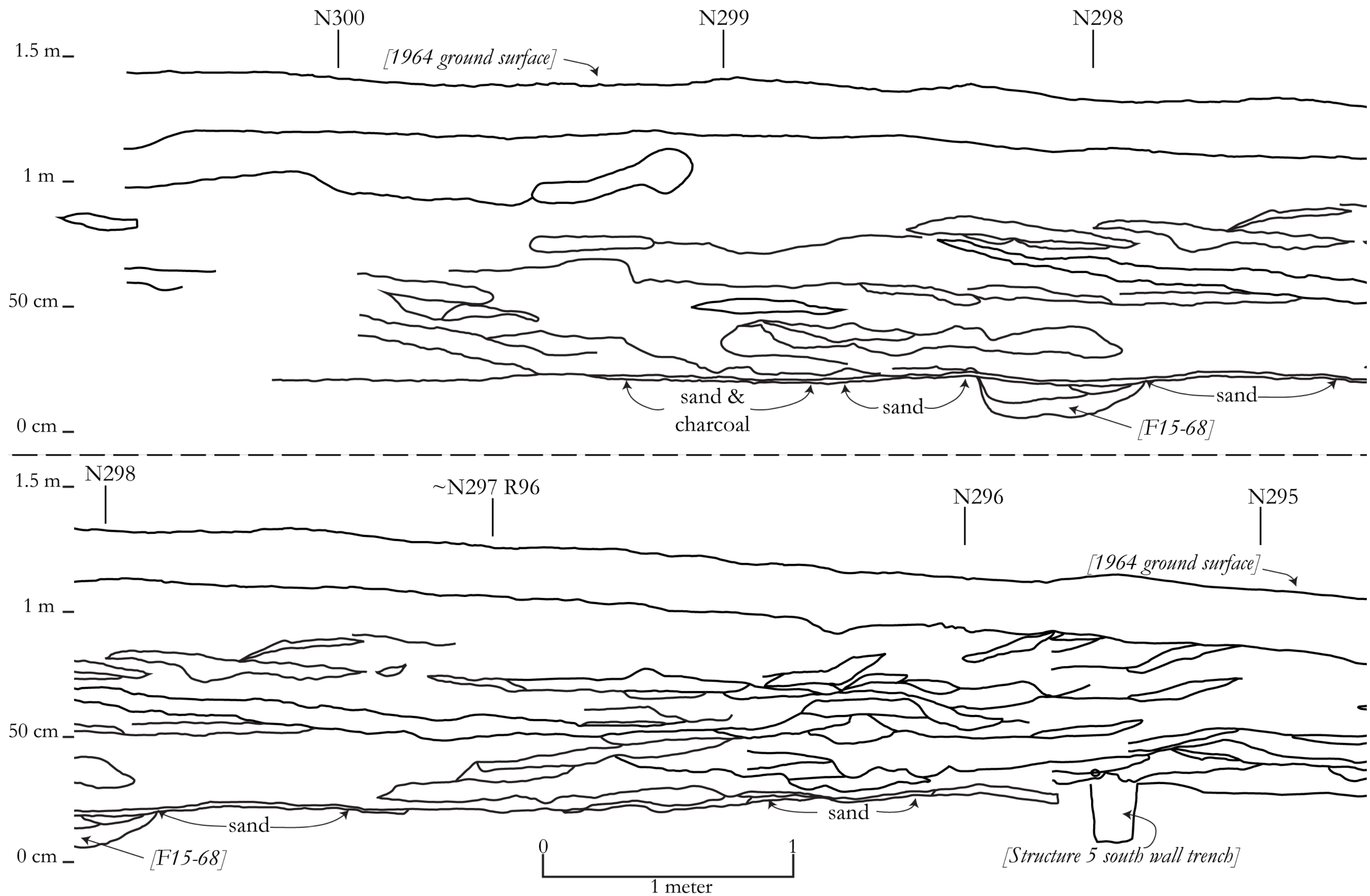


Figure 4.22. 1964 North-South profile cut view to east (WHS, Aztalan Map #13).

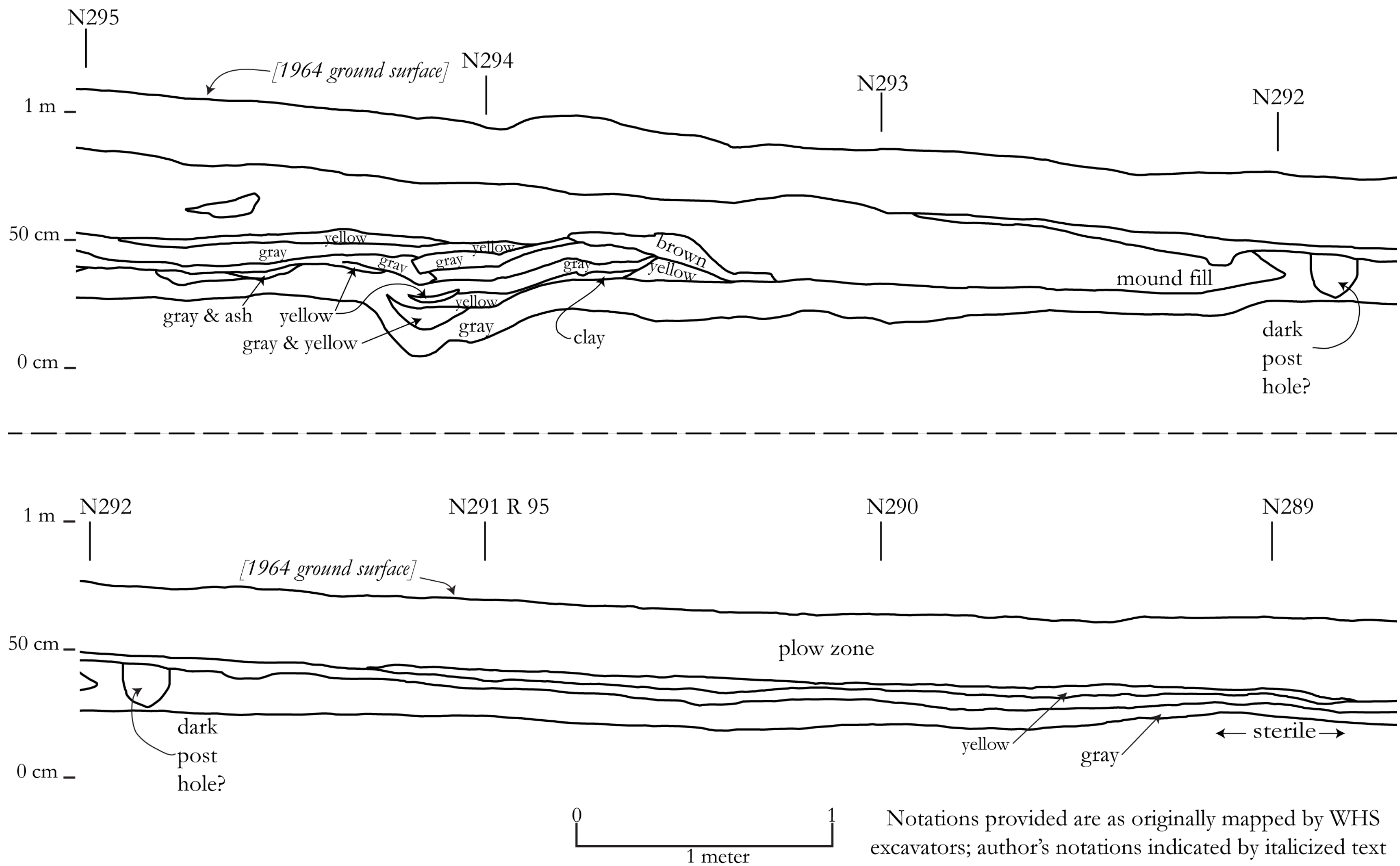


Figure 4.22. 1964 North-South profile cut view to east, continued (WHS, Aztalan Map #13).

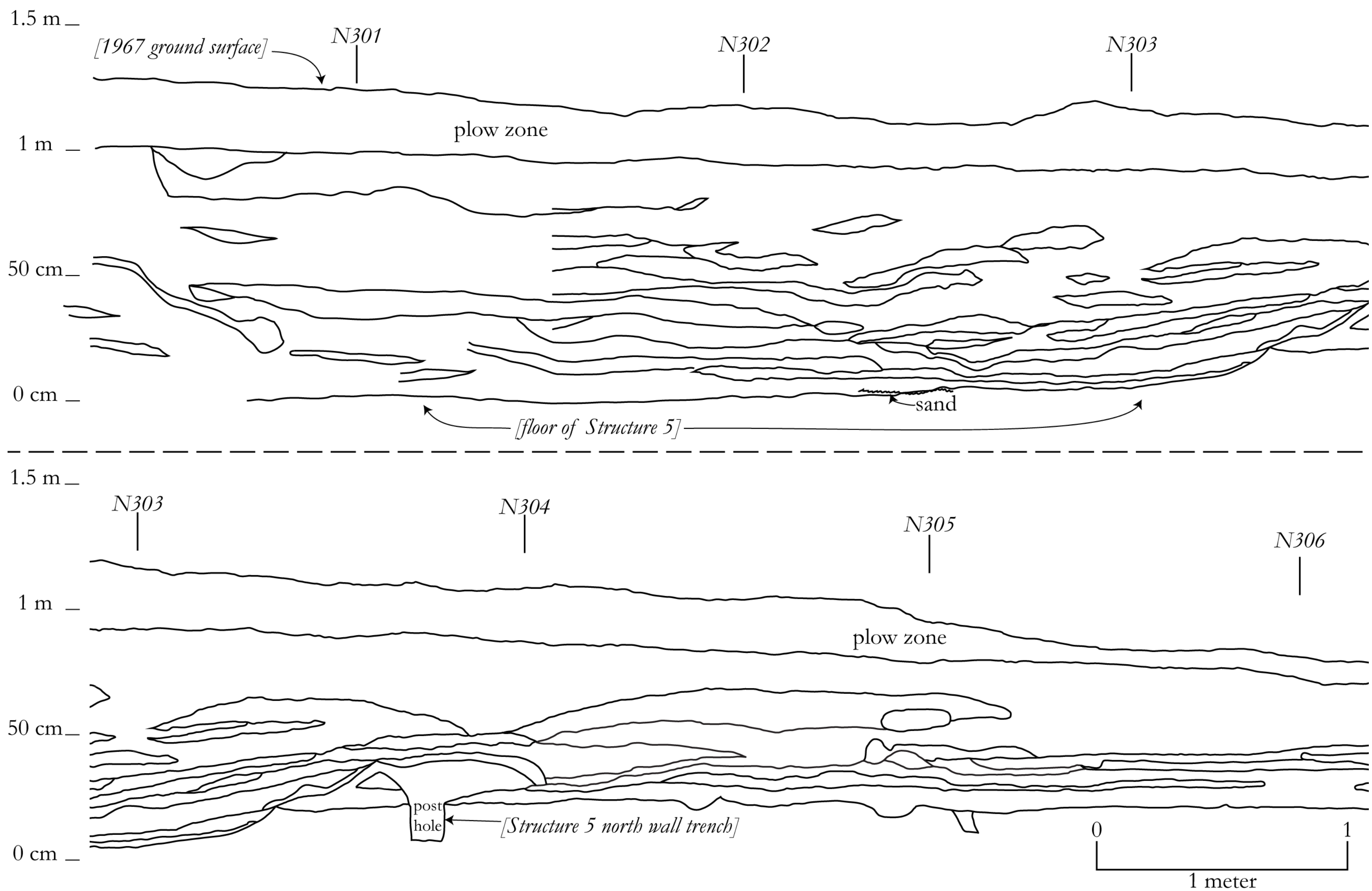


Figure 4.23. 1964 North-South profile cut view to east (WHS, Aztalan Map # 30).

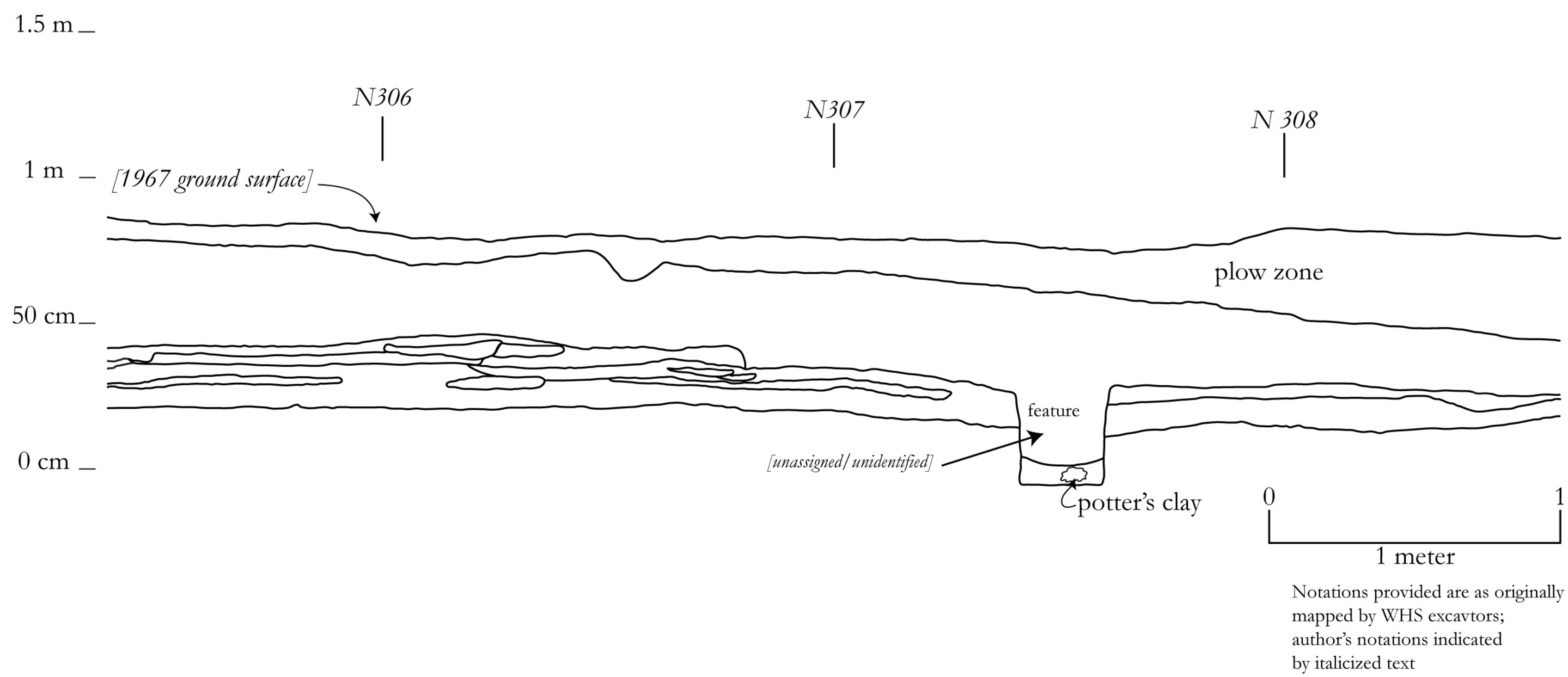


Figure 4.23. 1964 North-South profile cut view to east, continued (WHS, Aztalan Map # 30).

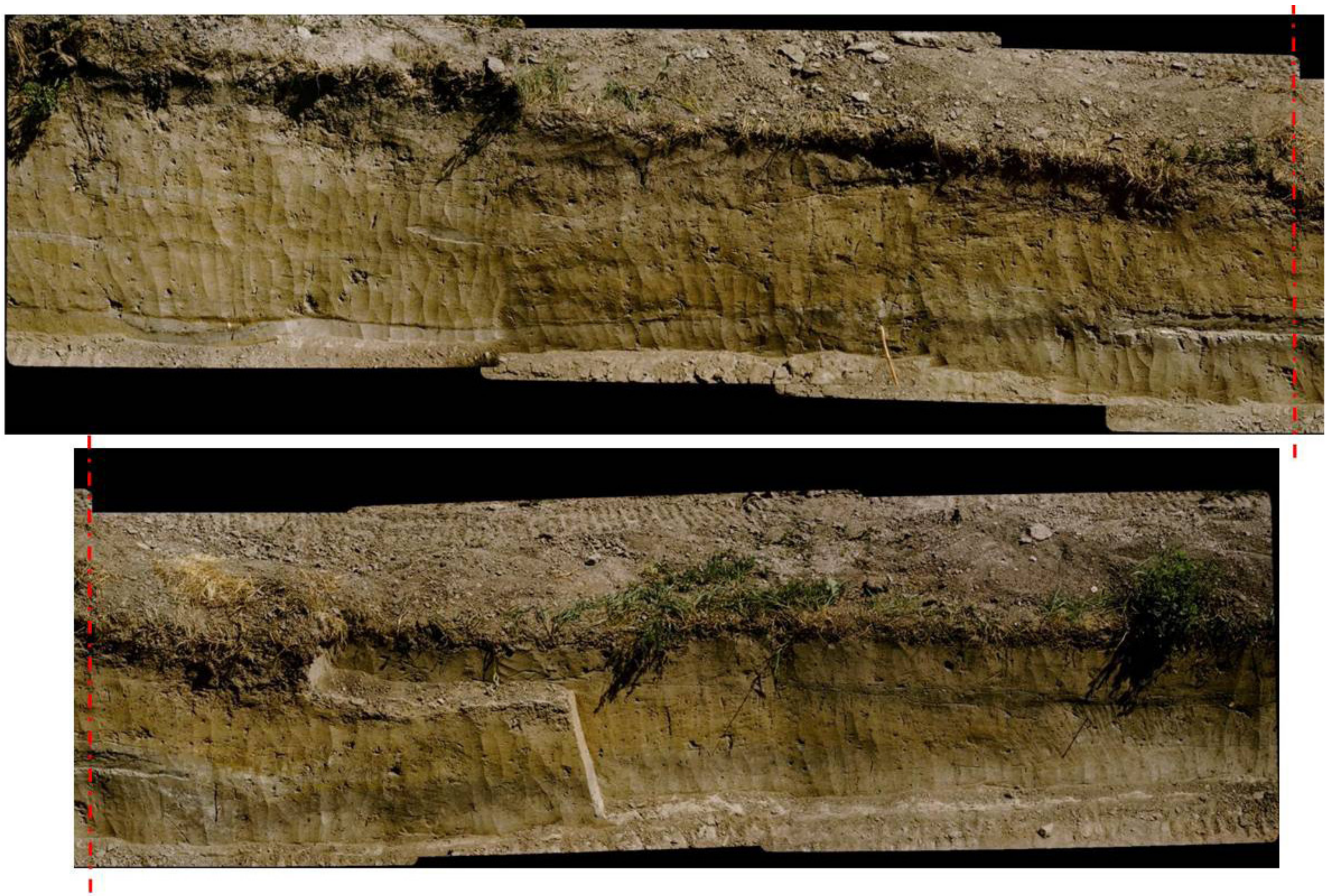


Figure 4.24. Image of North-South trench profile, view to east. Dashed line indicates photo match line (Wisconsin Historical Society, Museum Archaeology Program, Aztalan Archaeology Images).

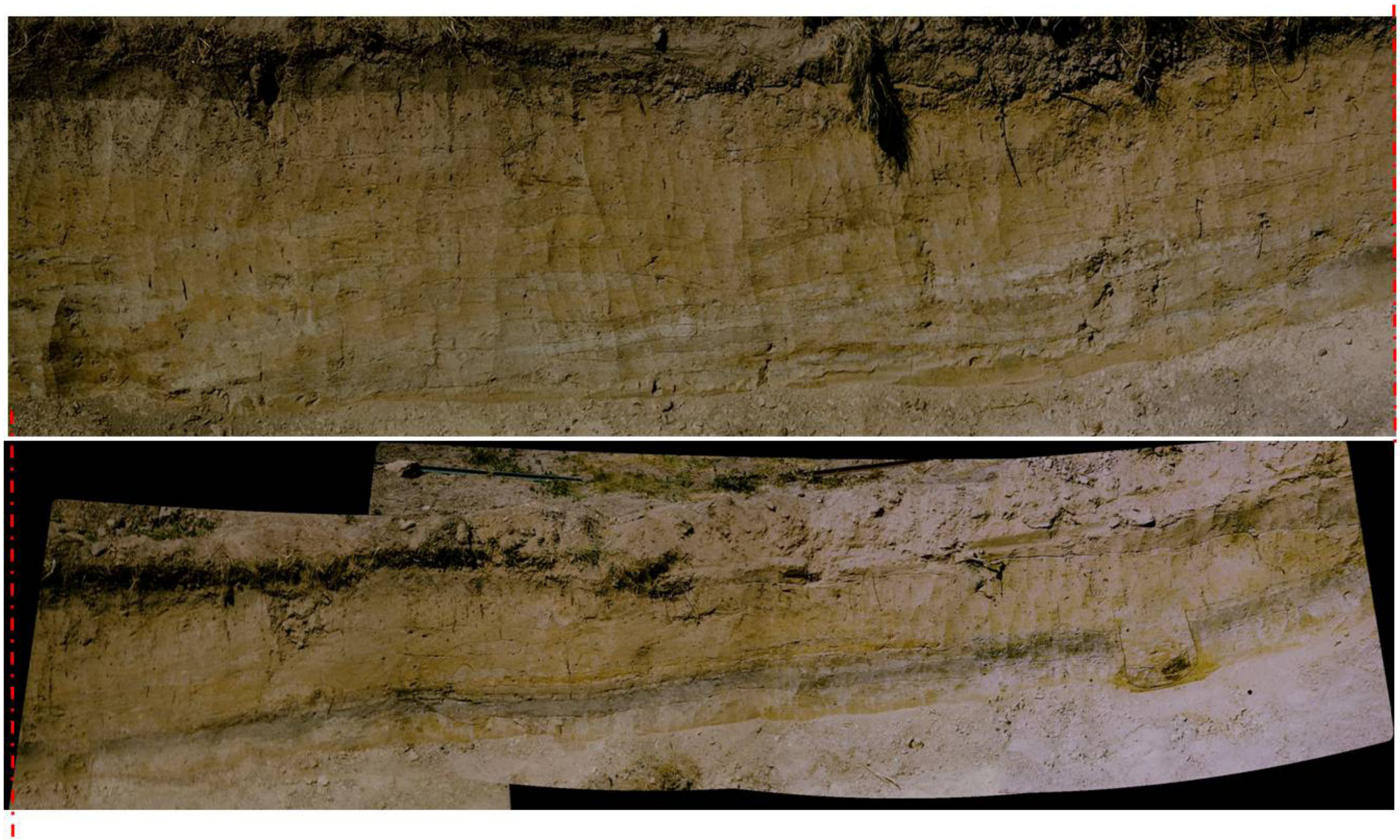


Figure 4.25. Image of North-South trench profile, view to west. Dashed line indicates photo match line (Wisconsin Historical Society, Museum Archaeology Program, Aztalan Archaeology Images).

that the largest of the bluff top mounds had been constructed in a single event, but utilized three distinct construction fills (Boszhardt, et al. 2012).

Pauketat and Alt (2003:165) have stressed that mound construction and the addition of progressive mound stages were not intended to simply 'build a mound' or bury the dead, but rather the impetus for mound construction was the "act of construction itself," (emphasis added). Mound construction established communal building projects, unifying people in the construction of the mounds and constructing a locus for community identity and memory (Pauketat and Alt 2003). Thus, in the case of Aztalan, these activities may have served as integrative practices for a mixed population of various indigenous groups and immigrant Middle Mississippians. Given the wide spread distribution of this kind of mound construction (i.e. alternating mantles, successive mound stages, engineered soils etc.), this practice in the Middle Mississippian world may have been non-negotiable. Mississippian mounds throughout the Mississippi River Valley have exhibited the use of colored, stratified fills as part of the construction practice (e.g. Boszhardt, et al. 2012; Boszhardt, et al. 2011; Knight 1989; Pauketat 1993, 2000; Pauketat and Alt 2003:165; Pauketat, et al. 1998; Porter 1974; Pursell 2004; Reed, et al. 1968; Skousen and Pauketat 2013; H. M. Smith 1969). In other words, these particular depositional features almost always appear as part of the mound construction process, and are seemingly not as susceptible to local interpretations in the same way pottery manufacture (collared vs. non-collared pots or shell vs. grit temper), architectural forms (wall trench vs. single post construction), or lithic tool forms (notched vs. un-notched triangular points) become regionally diversified. At Aztalan the lone exception to the standard Mississippian mound construction regimen may be the incorporation of specific vessels directly into the mound during construction, further identifying it as a locus of shared new social memories and identities.

MOUND TOP FEATURES

In 1964, Wisconsin Historical Society (WHS) excavations into the top of the Northeast Mound uncovered portions of a large, single-post structure similar to the structure delineated by the MPM excavations 30 years prior (Barrett 1933; see Chapter 1). For clarity in the discussion below, these two structures will be differe¬ntiated below as the 'WHS Structure' and the 'MPM Structure' (Figure 4.26). Additionally, WHS crews unearthed nine pit feature and five, mostly whole, vessels interred in the mound fill just below the surface (Figure 4.27 & Figure 4.28).

MOUND TOP STRUCTURES

The rectangular, single-post, mound-top structure identified by WHS excavators measures 10.26 m wide (N-S); the exact length (E-W) of the structure remains unknown, it is unlikely it extended much more than 23 m in length. This latter estimate is based on the known extent of the larger structure identified by the MPM excavations (Barrett 1933:179), as well as approximation of the location of the eastern edge of the mound summit. This would provide a floor area of no larger than 236 m^2, approximately. This would make the WHS Structure smaller in size than the MPM Structure, which measures 30 m (E-W) by 12.5 m in length, a floor area of 375 m^2.

Barrett concluded that the larger MPM Structure was likely not roofed, concluding the posts circumscribing the mound top served as a large standing wall, or "stockade" atop the mound (Barrett 1933:180). The two mound-top structures do not appear to be contemporaneous. Extrapolation of the incomplete north wall of the MPM Structure suggests it would overlap with the WHS Structure. It remains unclear which structure was constructed first; however, WHS excavators did not identify any posts corresponding to the MPM Structure, suggesting the construction of the smaller WHS structure may have obscured any evidence for posts that may have been associated with the MPM Structure. Excavators suggested that the posts they identified belonged to Barrett's MPM structure (Freeman 1986:345), but alignment of their respective plan maps do not correspond, nor do the dimensions for

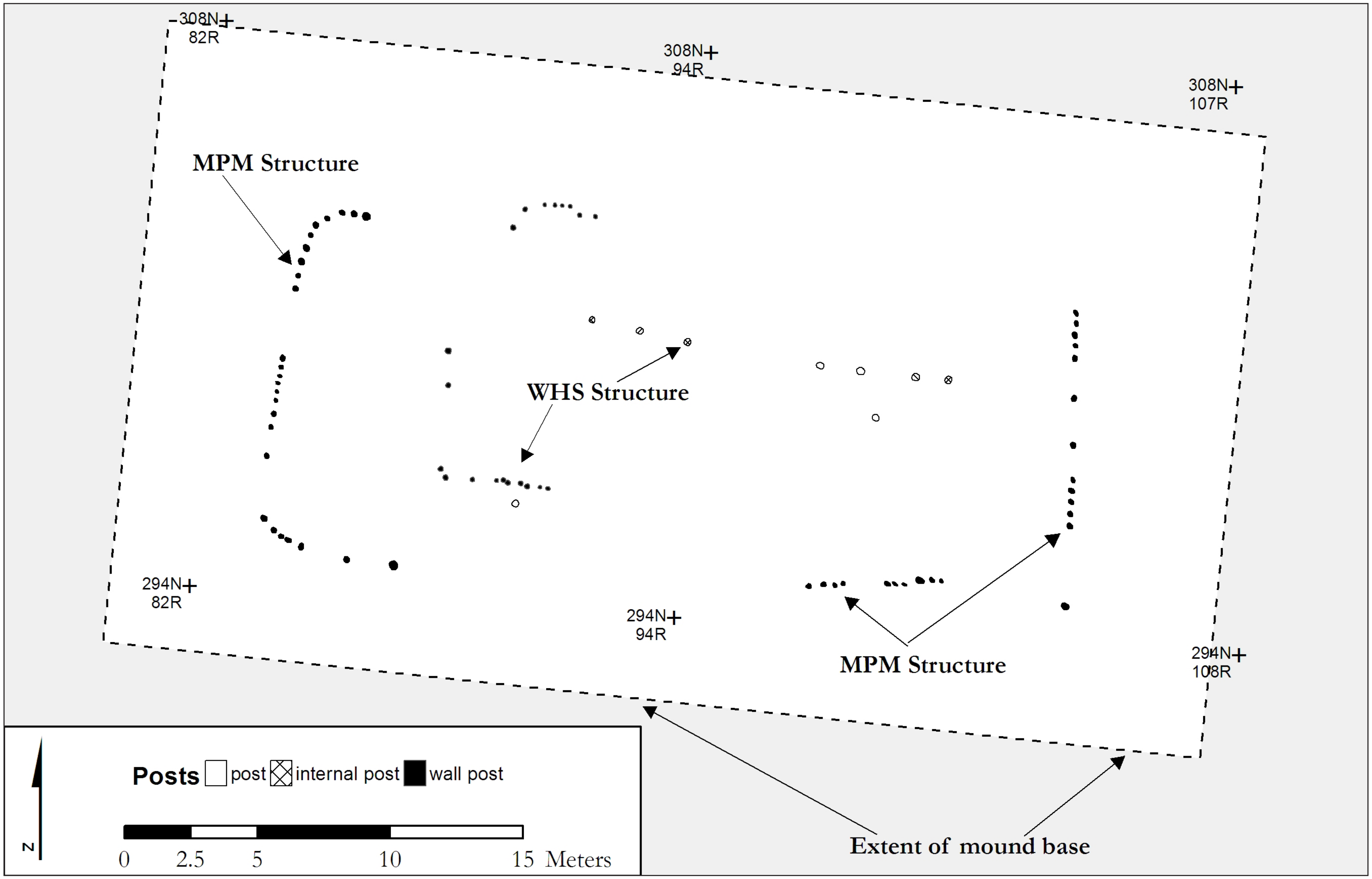


Figure 4.26. Plan map of Northeast Mound summit WHS and MPM structures (WHS, Aztalan Map # 53; Barrett excavation map facsimile on file at UWM-ARL, original on file at the Milwaukee Public Museum).

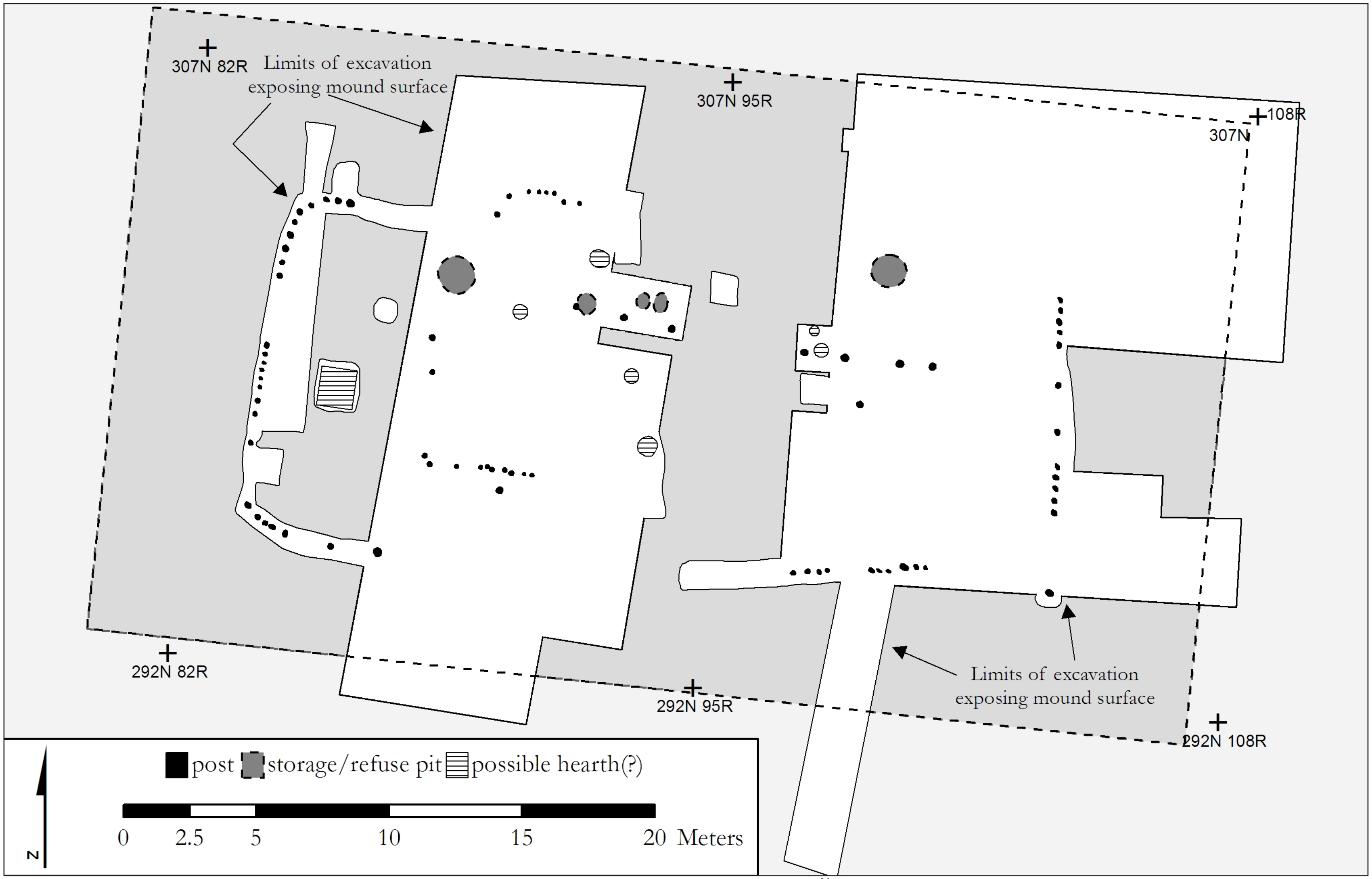


Figure 4.27. Plan Map of Northeast Mound summit features (WHS, Aztalan Map # 41, 55. & 78; Barrett excavation map facsimile on file at UWM-ARL, original on file at the Milwaukee Public Museum).

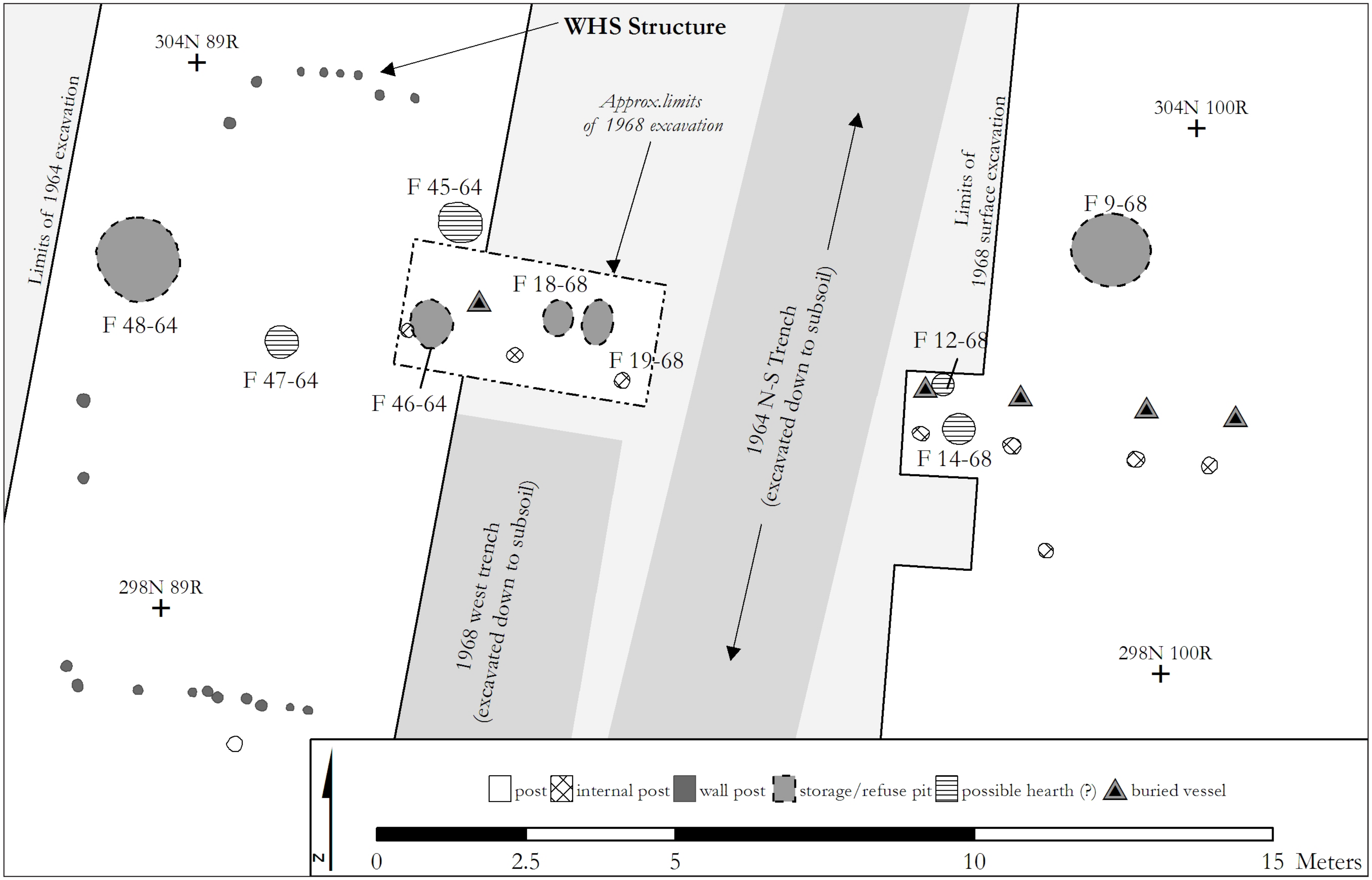


Figure 4.28. Plan map of Northeast Mound-top internal features and vessel deposits (WHS, Aztalan Map # 41, 55 & 78).

their respective structures. Given the extent of damage suffered by the mound due to historic agricultural practices (see Chapter 1), the original surface of the mound is lost and any case for the construction sequence of the structures remains inconclusive.

POSSIBLE HEARTH FEATURES

Features 12-68, 14-68, 45-64, & 47-64 represent possible hearths on the summit of the mound (see Figure 4.28). See Table 4.4 for all mound-top pit/hearth attributes. All the possible hearths are located within the bounds of both the WHS Structure and MPM Structure, thus it is unclear which construction they may be associated with. Likewise, it is possible these hearths were used during a time that no structure stood on the mound. Excavators cited no direct evidence for in situ burning in any of these pits, so it remains possible they were used as storage or processing pits. Only F14-68 contained cultural debris that clearly associates it with the prehistoric occupation discussed in this study. These materials included a handful of grit-tempered, eroded body sherds. Some charcoal flecking and unidentified charred bone was noted as well. The possible hearths were devoid of cultural artifacts but contained fill deposits associated with burning activities including gray-colored ash (F12-68), reddish clay (F45-64), and red-grey ash (F47-64).

MOUND TOP STORAGE/REFUSE FEATURES

Five features (F9-68, F18-68, F19-68, F46-64, and F48-64) are interpreted as storage/refuse pits. See Table 4.4 for a summary of their metric attributes. Feature 9-68 is a circular, shallow refuse pit with charcoal flecking present in the lowest fill layer and a thin ash lens in the northeast corner of the pit. The upper most layers consisted of yellow mound fill. Grit-tempered and shell-tempered (n=1, red-slipped) body sherds were present as well as rim fragments from four vessels (v 56, 57, 58 & 59). These rim fragments included a red-slipped seed jar (v56), two Aztalan collared jars (v58 & 59) and a Madison Plain jar (v57).

Feature 18-68 contained two fragments of a shell-tempered Ramey Incised vessel (v63). No other materials were noted and no description of the feature fill is provided. Similarly, Feature 19-68 contained a fragment of a shell-tempered Powell Plain vessel (v64).

Table 4.4. Mound-top Feature Attributes.

			Metrics				Ceramic Materials					
Feature No.	**Pit Type**	**Plan Shape**	**Length (cm)**	**Width (cm)**	**Depth (cm)**	**Volume (dm^3)**	**Total Ceramic Material (g)**	**Total Ceramic Material Density (g/dm^3)**	**LW Rims (g)**	**Grit-Tempered Body (g)**	**Shell-Tempered Body (g)**	**Miss Rims (g)**
9-68	2	C	134	122	21	139.6	336.2	2.4	52.4	274.5	8.4	0.9
12-68	2	C	55	52	15	18.6	0	0	0	0	0	0
14-68	2	C	34	34	12	6.3	14	2.2	0	14	0	0
18-68	3	O	76	54	54	169.4	14.7	0.1	0	0	0	14.7
19-68	1	O	61	52	21	31	31.2	1	0	0	5	26.2
45-64	1	O	76	64	13	26	0	0	0	0	0	0
46-64	3	O	52	46	36	58.2	0	0	0	0	0	0
47-64	3	O	79	70	27	68.9	0	0	0	0	0	0
48-64	1	C	128	122	32	213.3	0	0	0	0	0	0

No other materials were noted and no description of the feature fill was provided. Notably, these two features fall in line with the buried vessels atop the mound.

Features 46-64 and 48-67 were devoid of cultural debris, thus their association with the prehistoric occupation described in this study is tenuous. Both are similar in depth, though F48-64 is more than three times the volume of F46-64. The fill of Feature 46-64 is described as a soft, black soil, whereas the feature fill of F48-64 contained what excavators describe as "powdery red sand" and "brown clay-like sand" (Wisconsin Historical Society Aztalan Excavations, 1964 notes on file at Wisconsin Historical Society, Madison). Both of these pit features are located along the same east-west axis of the running line of buried vessels atop the mound (see Figure 4.28).

INTENTIONAL VESSEL DEPOSITS

Excavators identified a linear deposit of five mostly whole, but broken vessels placed upside-down in the mound (Figure 4.29). These vessels are identified here by their vessel ID numbers: 76, 77, 78, and 133. Unfortunately, the fifth vessel could not be found by staff at the Wisconsin Historical Society. At the time of completion of this thesis, its whereabouts remain unknown. These vessels were deposited in a linear series, oriented along the central east-west axis of the mound. They also are associated with a line of post molds excavators attributed to the large structure initially identified by Samuel Barrett (excavation notes on file at the Wisconsin Historical Society, Madison, WI). However, it is just as likely these posts are associated with the structure identified by the WHS excavators. The specific morphologies of these vessels are discussed in Chapter 5.

Of these vessels, only one is noted as being interred in an actual 'pit' (v133). No mention is made of the other four vessels being placed within an actual pit, and inspection of field photos shows no evidence of pit fill around these pots. These four vessels (v76, 77, 78, and an unidentified vessel) appear to have been found directly in the mound-fill, indicating they were positioned in the mound during construction. These pots are noted as resting at approximately the same elevation as the adjacent series of paralleling posts, located

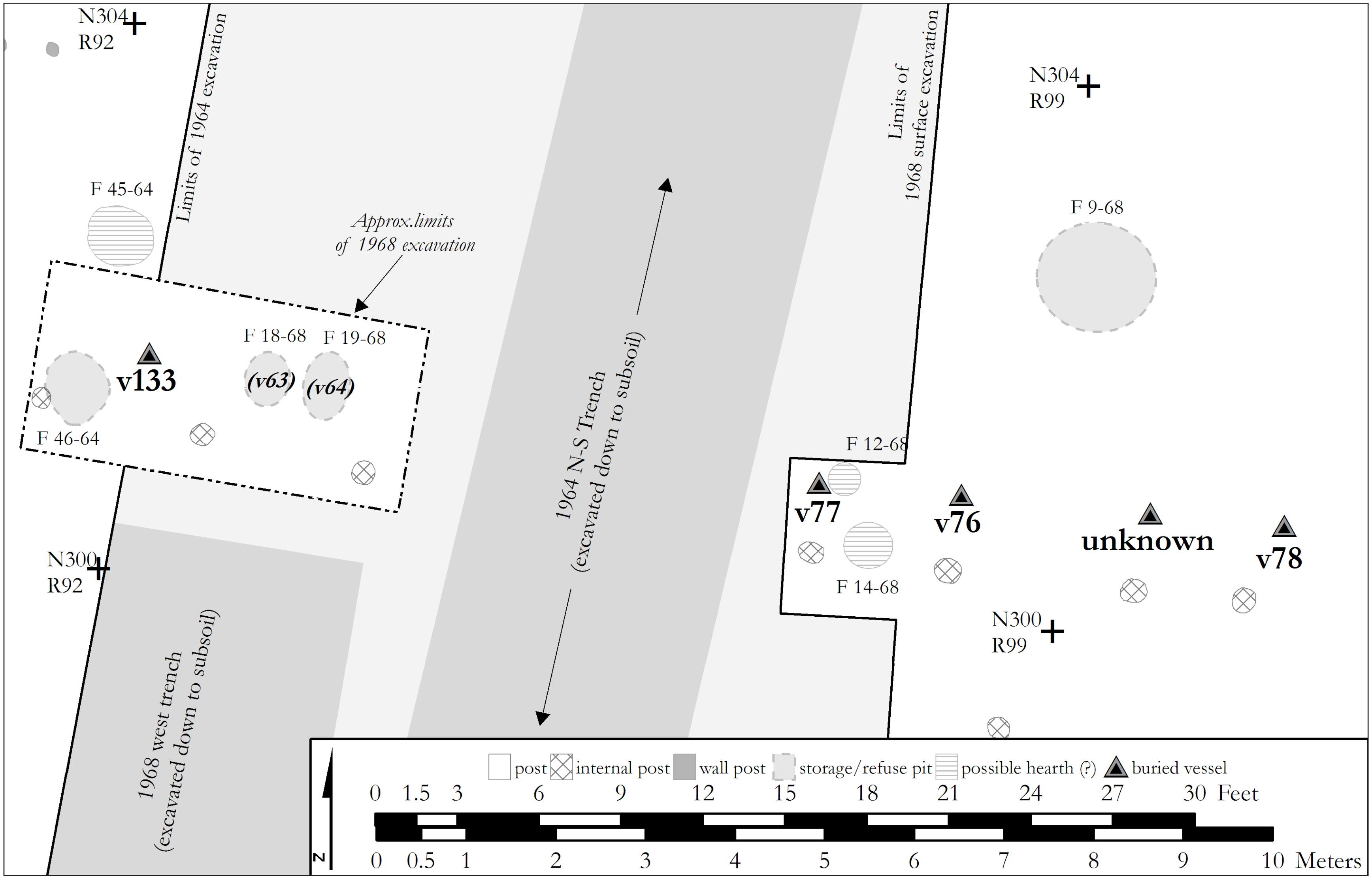


Figure 4.29. Plan map of Mound-top vessel deposits (WHS, Aztalan Map # 41, 53, & 78).

roughly 60 cm to 80 cm south of the pots.

Vessel 76 was located in grid square N300 R99 just below the modern plow level, surrounded by mound fill. The vessel was noted as being in very poor condition, most of it being crushed (Figure 4.30). Vessel 77 was located in grid square N300 R98 and found in a broken condition (Figure 4.31). It was described as being in poor condition with a "weak paste" and the temper leached out. Vessel 78 was located in grid square N300 R101-102, found in the mound fill just below the historic plow zone. It was described as being in a whole condition but severely cracked and badly decayed.

Figure 4.30. Vessel 76 (foreground) and unidentified vessel (background) under excavation (Wisconsin Historical Society, Museum Archaeology Program, Aztalan Archaeology Images).

Figure 4.31. Vessel 77 in situ, grid square N300 R 98 (Wisconsin Historical Society, Museum Archaeology Program, Aztalan Archaeology Images).

Vessel 133 was the western-most vessel of the buried series located near grid corner N301 R 93 (Figure 4.32). This was the only vessel noted as being found within a 'pit.' Field records on file at the WHS describe one of the recovered vessels as "a polychrome vessel decorated with figures achieved by the resist painting technique." Unfortunately, none of the vessels analyzed in this study fit this exact description. The exterior surface was plain, but exhibited several fire clouds. It was very well cleaned following excavation; any possible red-slipping present on the exterior may have been lost in the process of cleaning the vessel. A fifth vessel also was associated with these deposits. Located in grid square N300 R100, excavators described this vessel as a leached shell-tempered pot with a weak paste (Figure 4.33). It too was placed in an inverted position in the mound fill. Unfortunately this vessel was not found in the WHS collection.

Figure 4.32. Vessel 133 in situ, in grid square N301 R93 (Wisconsin Historical Society, Museum Archaeology Program, Aztalan Archaeology Images).

Figure 4.33. Unidentified vessel in situ, grid square N300 R100 (Wisconsin Historical Society, Museum Archaeology Program, Aztalan Archaeology Images).

DISCUSSION

Unfortunately, the narrow scope of the excavation area below the Northeast Mound at Aztalan curbs discussion of feature layout and patterning as compared to elsewhere at the site. In fact, the majority of the previous excavations by the Wisconsin Historical Society in the 1960s have not been reported; this includes more than ten structures and 100 pit features excavated in 1964 and 1967 alone (Wisconsin Historical Society Aztalan Collection, notes on file, Wisconsin State Historical Society, Madison, Wisconsin). However, the presence of supra-domestic features such as Structure 5 and intensely utilized and cleaned out hearths provides means to contextualize the Northeast Mound feature complex.

The relationship and contemporaneity of the sub-mound features is largely unknown due to little to no superpositioning of the features and the chronological ubiquity of the ceramics. The only feature in which Mississippian shell tempered sherds are present is Feature 15-68 within Structure 5 (see Figure 4.11). Other instances of shell-tempered sherds below the mound are associated with mound-fill deposited into open features. Several other features did yield Hyer Plain vessel fragments that suggest, a Middle Mississippian influence had reached the site by the time of their infilling with refuse.

At least one structure (Structure 2) demonstrates re-building while others were removed and replaced by Structure 5 (e.g. Structure 3, 4, & 6) indicating the space had previously been utilized for some duration. Additionally, F25-68 which seemingly predates Structure 5 was cleaned out and capped with a thick upper layer of clay. This suggests the space occupied by Structure 5 was 'cleaned' prior to its construction. The presence of mound fill within other features denotes that many were in use up to the time mound construction began, and were likely contemporaneous (Figure 4.34). This includes Structure 1/F34-67, F40-67/1-68, and the two hearths within Structure 2, suggesting it too was in use up to the time of mound construction. Unfortunately, among all the radiocarbon assays retrieved from Aztalan, only one originated from these excavations (WIS-73), but the sample was from a feature not directly associated with the mound itself (see above, F49-64).

Figure 4.34. Plan Map of sub-mound features containing mound fill (WHS, Aztalan Map # 26 & 41).

Mound and sub-mound features clearly identified as hearths are morphologically similar, corresponding with pit Type 1 and Type 2: shallow pits, with incurving or insloping sidewalls and a flat or concave base. Among the 'possible' hearths identified atop the mound, Feature 47-64 corresponds with pit Type 3, deeper pits with insloping and distinct sidewalls and concave bases. Features likely used for storage (and eventually refuse deposits) span the variety of pit types identified in the Northeast Mound feature assemblage. Ceramic material density is highest in Type 4 pits, though this is biased by the presence of a complete Starved Rock Collared jar (v50). Disregarding this jar, these pit types exhibit similar quantities of ceramic density. Further analyses of the lithic, faunal and floral materials present within these pits could provide a better understanding of the daily activities the feature fill represents.

Sub-mound Structure 5 represents a unique feature on the Aztalan landscape. Whether or not this structure was roofed is uncertain. Areas of intense burning on the floor suggest the structure may have burned. However, no burned timbers were present in the wall trenches, post molds, or on the floor. The structure may have been intentionally dismantled, and portions of the walls may have been reused for the subsequent mound top structure(s).

A post pit, F26-68 (and possibly F15-68), in the middle of Structure 5 suggests an internal support post may have been raised to support a roof. However, no mound-fill is noted within the feature, suggesting it predates the structure (Note: little detail is provided regarding the fill of this feature). Still, the post's positioning along the central axis of Structure 5 suggests some association between these two features. Minimally, the association between the mound itself and the post parallels the series of large posts buried beneath the line of conical mounds north and east of the palisaded area at Aztalan (Barrett 1933).

Intentional cleaning of the sub-mound space is evidenced by the lack of materials on the structure floor itself, as well as the presence of a thin layer of sand laid on the floor at the time of mound construction. Additionally, several of the hearths within the structure, though intensely used, were devoid of ash and charcoal. The majority of the hearths were lined with clay and intensely utilized. They also exhibit evidence of regular cleaning of the

hearths. This cleaning or renewal practice also was accompanied by the addition of a layer of sterile (i.e. clean) sand followed by additional clay lining before firing again. Similar treatment and re-establishment of hearth features associated with mound contexts has been documented for the Kunnemann and Murdock mounds at Cahokia (Pauketat 1993; H. M. Smith 1969) as well as several mounds at Mitchell (Porter 1974).

The practice of cleaning out the hearths seems to have involved the laying down of clean, light-colored sand before re-lining the hearth with a new layer of clay prior to successive firing (e.g. F13-68, F27-6, and F29-68). The intense use, regular maintenance and relining of the hearths with sterile sands and clays suggests these features served more formal, supra-domestic purposes. Fire has been shown to have played an integral role in Middle Mississippian ritual-political practices (Baltus and Baires 2012; Emerson 1997a; Hall 1997, 2000; Pauketat 2008), but is also evident within the context of Effigy Mound ceremonialism as well (Barrett and Hawes 1919; Birmingham and Eisenberg 2000; McKern 1928, 1930; Rosebrough 2010).

The recorded (somewhat incomplete) profiles of the Northeast Mound suggest it was constructed as a series of episodes, including the formation of small internal-mound constructions; possibly an early platform. There is no evidence of sequential living surfaces, only a series of paired yellow and dark-colored mantles of soil, corroborating the excavator's final conclusion that the mound was constructed as a single 'stage' (Freeman 1986:345). However, rather than perceiving the mound as a single 'event,' evidence from profiles and field photos, suggests the construction of the Northeast Mound is more appropriately viewed as a continuous series of 'episodes' of construction, or multiple events. This includes the construction, use, and removal of the sub-mound structure space (Structure 5), the cleaning of the sub-mound surface and several pit features, the episodic construction of the mound, incorporation of ceramic vessels into the mound, and eventual construction of the mound-top structures.

The process of incorporating vessels into the mound construction process was re-experienced by the addition of more pots and/or pot fragments within pits after construction was completed. These vessels, all Middle Mississippian in form, represent both non-local shell-tempered vessels and local grit-tempered hybrid forms (see Chapter 5). The placement of most of these vessels in an inverted position recalls the placement of a Starved Rock Collared vessel in Feature 2-68 below the mound. These practices create strong ties between pre-mound and post-mound construction practices at the Northeast Mound. The subsequent addition of more pots and apparent reconstruction of the mound-top structure signifies these practices and their associated meanings were reconstituted over time. The presence of mound-top hearth features also suggests the formal hearths below the mound were reestablished atop the mound, likely maintaining a similar function.

CHAPTER 5: THE NORTHEAST MOUND CERAMIC ASSEMBLAGE

CERAMIC ASSEMBLAGE DESCRIBED

The ceramic assemblage described here was recovered from the 1964, 1967, and 1968 WHS excavations into the Northeast Mound at the Aztalan site. All vessel profiles and plan view illustrations are provided in Appendix B. Appendix C provides a list of WHS lot numbers analyzed as well as other ceramic body sherd and vessel data tables. Artifact recovery methods from these excavations did not include the use of mesh screens to sift excavated soils. Thus the results below are biased toward artifacts identified by hand and it is likely some items were missed during the course of excavation. Additionally, some proveniences noted as having ceramic materials present, were not identified in the WHS Museum archive, including a mostly complete vessel recovered from the mound summit. In the following summaries, percentage calculations are derived from an object's or objects' weight in grams.

The WHS Northeast Mound assemblage consists of 2,189 tempered ceramic objects weighing 29,080.7 g. Ceramic vessel body sherds make up 43% (n=2056, 12,494.3 g) of the assemblage. Rim and shoulder sherds, representing individual vessels, make up the majority of the assemblage by weight (n=133, 16,586.4 g; 57%). A single fragment of un-tempered, amorphous clay (1.3 g) from the mound fill represents the only non-container ceramic object.

The following description begins with some general trends of the ceramic assemblage as a whole, then each ceramic ware is discussed by ceramic types found both at the site and throughout the region (e.g. Starved Rock Collared, Aztalan Collared, Madison Plain, etc.), highlighting trends among the three main recovered contexts: mound-top, mound fill, and sub-mound.

GENERAL TRENDS

TEMPER

The predominant tempering agent in the recovered ceramics is grit-temper, accounting for 61% (17,725.1 g) of the assemblage. Shell temper represents 17.5 % (5,101.5 g), while a single grit-grog rim sherd and single un-tempered body sherd each represents <1% of the assemblage (8.5 g, 5.6 g, respectively) (Figure 5.1).Vessel 50, a whole, reconstructed vessel, represents the entire indeterminate category at 21.5% (6,240 g) of the assemblage. A lack of broken sherd edges to view the cross-section of this vessel prohibited adequate determination of temper type. However, surface inspection of the vessel suggests the tempering agent is likely solely grit, indicating grit tempering would actually represent 82.4% (23,965.1 g) of the assemblage.

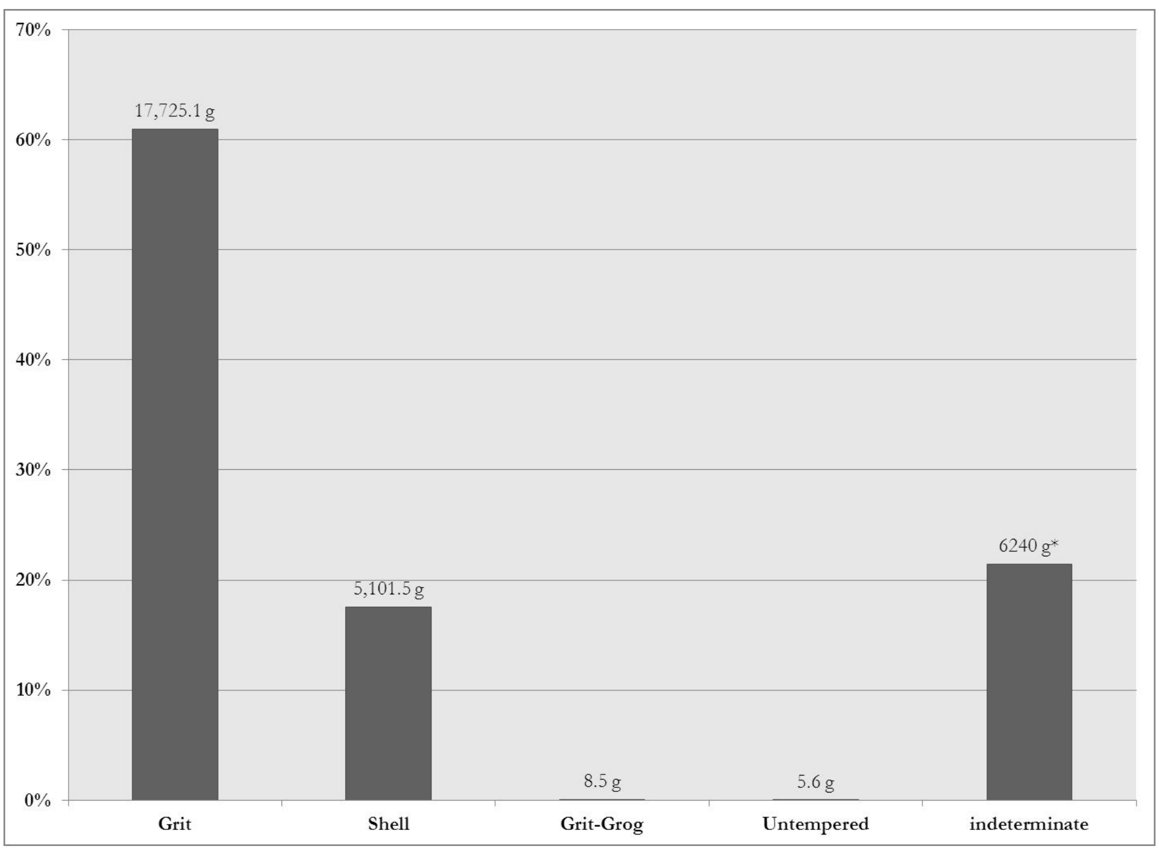


Figure 5.1. Northeast mound ceramic assemblage percent of temper type by weight (*indeterminate class consists of a single whole vessel).

SURFACE TREATMENT

Surface treatments for grit tempered ceramics include cordmarking (64.5%), smoothed-over-cordmarking (7.1%), smoothed surfaces (26.0%), fabric-impressed surfaces (<1%), fabric impressed and cordmarked surfaces (<1%) (Table 5.1). Surfaces of several items were too eroded to classify (1.7%) and four non-collared rim sherds were classified as indeterminate (<1%) due to the lack of sufficient exterior sub-rim surface. One collared rim sherd represents the only grit-grog tempered material (v43, 8.5 g, < 1%), exhibiting a smoothed collar surface. Shell tempered materials all exhibit smooth surfaces though slipping and smudging do occur (Table 5.2). The majority of the shell-tempered materials exhibit a plain exterior surface (86.4%); this category is largely represented by a complete vessel (v133). Black slip/smudged surfaces are the second most frequent finishes present (12.1%).

ASSEMBLAGE TOTALS

A total of 133 vessels were identified in the ceramic assemblage 16,584.4 g; 57.0%). Shoulder sherds (n=4, 106.0 g; 0.2% of vessels) were included in the vessel count when cross mending attempts and comparative observations could not attribute them to any other identified vessel. Many of the vessels compare favorably with ceramic type-varieties previously identified at the site. The frequency of these type varieties is summarized in Table 5.3. Eighty-three grit-tempered vessels exhibit collared rim forms (62.4% of vessels by count). The remaining grit-tempered vessels include four Madison Ware (3.0% of vessels by count), 18 Hyer Plain (13.5% of vessels by count), and 22 unclassified and indeterminate vessels (16.5% of vessels by count; the 'indeterminate category' includes two collared vessels). Furthermore, six vessels tempered with crushed mussel shell were identified, including two Cahokia Red-filmed seed jars, a Cahokia Red-filmed jar, two Powell Plain jars, and one Ramey incised jar. A total of 2,055 body sherds (12,499.3 g; 43.0% of assemblage) were identified. A single fragment of amorphous burned clay (1.3 g; <1% of assemblage) represents the only non-container ceramic object.

Table 5.1. Grit-tempered Ceramic Exterior Surface Treatments.

	Body sherds			Collared Vessels*			Non-Collared Vessels**			Total		
Surface Treatment	**ct**	**wt. (g)**	**%**	**ct**	**wt. (g)**	**%**	**ct**	**wt. (g)**	**%**	**ct**	**wt. (g)**	**%**
Cordmarked	1,382	9,093.60	*74.00%*	57	2,262.10	*83.70%*	6	80.9	*3.00%*	1445	11,436.60	64.50%
Smoothed Over Cordmarked	140	993.8	*8.10%*	13	256	*9.50%*	2	12.7	*0.50%*	155	1,262.50	7.10%
Smoothed/Plain	349	1,898.30	*15.50%*	10	170.1	*6.30%*	31	2,535.50	*92.60%*	390	4,603.90	26.00%
Fabric Impressed	1	4.3	*0.04%*	-	-	-	-	-		1	4.3	0.02%
Fabric Impressed & Cordmarked	1	8.1	*0.07%*	-	-	-	-	-		1	8.1	0.05%
Eroded	150	287.5	*2.30%*	1	14.4	*0.50%*	1	1.8	*0.10%*	152	303.7	1.70%
indeterminate	-	-	-			-	4	106	*3.90%*	4	106	0.60%
Total	2,023	12,285.60		81	2,702.60		44	2,736.90		2148	17,725.10	

**based on collar surface*

***based on exterior, sub-rim surface*

Table 5.2. Shell Tempered Exterior Surface Finish.

Surface Finish	Body sherds			Vessels			Total		
	ct	wt. (g)	%	ct	wt. (g)	%	ct	wt. (g)	%
Plain	13	117.9	58.00%	1	4,290.00	87.60%	*14*	*4,407.90*	*86.40%*
Black slip/ smudged	7	36.5	18.00%	2	579.7	11.80%	*9*	*616.2*	*12.10%*
Red slipped	3	11.7	5.80%	2	2.5	0.10%	*5*	*14.2*	*0.30%*
Tan slipped	6	27.8	13.70%	-	-		*6*	*27.8*	*0.50%*
Eroded	3	9.2	4.50%	1	26.2	0.50%	*4*	*35.4*	*0.70%*
Total	32	203.1		6	4,898.40		38	5,101.50	

Table 5.3. Ceramic Types Present in Assemblage.

Ceramic Type	f	%
Aztalan Collared	65	48.90%
Starved Rock Collared	16	12.00%
Madison Plain	2	1.50%
Madison Cord-impressed	2	1.50%
Cahokia Red-filmed seed jar	2	1.50%
Powell Plain, interior red-slipped jar	1	0.80%
Powell Plain	2	1.50%
Ramey Incised	1	0.80%
Hyer Plain	18	13.50%
unclassified	7	5.30%
indeterminate	17	12.80%
Total	133	

Two vessel forms are present in the assemblage including 116 jars and two seed jars. Vessel form could not be determined for 15 vessels due to their small size. A few of these may represent bowl forms, but inability to accurately orient the rims to the orifice plane impedes determination. No pinch pot or miniature vessels were identified. The next section provides a summary of the vessel varieties present in the assemblage.

CERAMIC VESSELS

COLLARED VESSELS

A total of 83 vessels in the Northeast Mound assemblage represent jars with globular bodies, constricted orifices and a collared rim form (see Chapter 3). Previous research has divided these collared jars into various types, based on the decorative treatment applied to the vessel during manufacture. In the Northeast Mound assemblage, 65 vessels compare favorably with the type-variety termed Aztalan Collared (Baerreis and Freeman 1958; Hurley 1977) and 16 equate to the type description of Starved Rock Collared (Hall 1987). Starved Rock Collared, by definition, is distinguished from other collared vessel types by the presence of tooled notching on the lip and/or interior rim margin (Hall 1987). That is, when a collared rim exhibits interior tooled (non-cord-impressed) notching, no other decoration is present. Conversely, lip and/or interior rim margin decoration on Aztalan Collared vessels is accomplished through the application of cord-impressions. 'Tooled' interior notches do not occur. As the collared vessels in this assemblage adhere to this distinction, the following discussion preserves this distinction between the two types. Undecorated collared vessels are included in the Aztalan Collared category, as the original definition included this as well (see Baerreis and Freeman 1958).

Aztalan Collared Morphology

Orifice form is primarily circular (53.8%), with no observable variation between mound fill and sub-mound contexts (Table 5.4). Polygonal forms represent 29.2% of the Aztalan Collared assemblage; 16.9% could not be determined. While the majority of collar

Table 5.4. Aztalan Collared Orifice Forms.

	Mound Top		Mound Fill		Sub-mound		Unknown Provenience			
Orifice form	**f**	**%**	**f**	**%**	**f**	**%**	**f**	**%**	**Total**	**%**
Circular	1	50%	11	57.90%	22	51.20%	1	100%	*35*	53.80%
Polygonal-angled peak					2	4.70%			*2*	3.10%
Polygonal-rounded peak			1	5.30%	6	14.00%			*7*	10.80%
Polygonal-indeterminate peak	1	50%	2	10.50%	7	16.30%			*10*	15.40%
indeterminate			5	26.30%	6	14.00%			*11*	16.90%
Total	2		19		43		1		65	

types could not be determined (44.6%), applique forms are the most frequently identified (41.5%). Few folded and filleted types were identified (Table 5.5). Proportions between sub-mound and mound top contexts are constant. Collar profile form is summarized in Table 5.6. Flat varieties are the most common in both mound fill (73.7%) and sub-mound (62.8%) contexts. Concave forms are the second most frequent in the assemblage (29.2%). Collar orientations are primarily vertical (47.7%) with out-slanted forms (13.8%) as the second most frequently identified. Table 5.7 highlights the collar orientations for each identified provenience, noting slightly more variety among sub-mound deposits; however the sub-mound sample size is substantially larger. Neck form could only be determined for 55.4% of the Aztalan Collared vessels (Table 5.8). Among the identified, neck form is often straight (24.6 %) and flared (16.9%). Flared forms are more frequent among the mound fill vessels than among those from sub-mound contexts. These neck forms are most frequently associated with vertical and flared collar orientations. Lip forms are typically squared (56.9%) followed by rounded (18.5%) and flattened (15.4%) varieties. Notably only rounded and squared forms are present in the mound fill assemblage, but sub-mound varieties are much more diverse (Table 5.9).

Table 5.5. Mound Fill Aztalan Collared - Collar Types.

	Mound Top		Mound Fill		Sub-mound		Unknown Provenience			
Collar Type	**f**	**%**	**f**	**%**	**f**	**%**	**f**	**%**	**Total**	**%**
Applique	1	50%	7	36.80%	18	41.90%	1	100%	27	41.50%
Fillet			1	5.30%	1	2.30%			2	3.10%
Folded			2	10.50%	5	11.60%			7	10.80%
indeterminate	1	50%	9	47.40%	19	44.20%			29	44.60%
Total	2		19		43		1		65	

Table 5.6. Aztalan Collared Collar Profile by Mound Level.

	Mound Top		Mound Fill		Sub-mound		Unknown Provenience			
Collar Profile	**f**	**%**	**f**	**%**	**f**	**%**	**f**	**%**	**Total**	**%**
Concave	1	50%	5	26.30%	13	30.20%			19	29.20%
Concave-extruded					2	4.70%			2	3.10%
Convex					1	2.30%			1	1.50%
Flat	1	50%	14	73.70%	27	62.80%	1	100%	43	66.20%
Total	2		19		43		1		65	

Table 5.7. Aztalan Collared Collar Orientation By Mound Level.

	Mound Top		Mound Fill		Sub-mound		Unknown Provenience			
Orientation	**f**	**%**	**f**	**%**	**f**	**%**	**f**	**%**	**Total**	**%**
Angled					3	7.00%			3	4.60%
Flared			1	5.30%	6	14.00%			7	10.80%
In-curving			1	5.30%					1	1.50%
Inslanted					2	4.70%			*2*	*3.10%*
Out-slanted	1	50%	2	10.50%	5	11.60%	1	100%	9	13.80%
Vertical	1	50%	11	57.90%	19	44.20%			31	47.70%
indeterminate			4	21.10%	8	18.60%			12	18.50%
Total	2		19		43		1		65	

Table 5.8. Aztalan Collared Neck Forms By Mound Level.

	Mound Top		Mound Fill		Sub-mound		Unknown Provenience			
Neck form	**f**	**%**	**f**	**%**	**f**	**%**	**f**	**%**	**Total**	**%**
Angled	1	50%			2	4.70%			3	4.60%
Flared			5	26.30%	6	14.00%			11	16.90%
Inslanted	1	50%	1	5.30%	4	9.30%			6	9.20%
Straight			4	21.10%	12	27.90%			16	24.60%
indeterminate			9	47.40%	19	44.20%	1	100%	29	44.60%
Total	2		19		43		1		65	

Table 5.9. Aztalan Collared Lip Form By Mound Level.

	Mound Top		Mound Fill		Sub-mound		Unknown Provenience			
Lip Form	**f**	**%**	**f**	**%**	**f**	**%**	**f**	**%**	**Total**	**%**
Beveled					4	9.30%			4	6.20%
Flattened					10	23.30%			10	15.40%
Rounded			5	26.30%	6	14.00%	1	100%	12	18.50%
Squared	2	100%	14	73.70%	21	48.80%			37	56.90%
Thickened					1	2.30%			1	1.50%
indeterminate					1	2.30%			1	1.50%
Total	2		19		43		1		65	

Exterior surface treatments for Aztalan Collared vessels recovered from the mound fill and below the mound are summarized in Table 5.10. Lip surface treatment is primarily smoothed, while exterior collar margins and neck surfaces are cordmarked. Surface treatments between mound fill and sub-mound contexts are relatively similar. The two Aztalan Collared vessels from mound top contexts have smoothed lip and exterior collared surfaces and both exhibit smoothed-over-cordmarked necks. Shoulder and lower body exterior surface treatments could not be determined for the majority of these vessels. All interior Aztalan Collared surfaces were smoothed.

Aztalan Collared decorative treatments from mound fill are summarized in Tables 5.11, and sub-mound deposits are listed in Table 5.12. Decorations are typically located on the interior rim margins and the sub-collar, that is, the exterior junction of the collar and neck (c.f. Baerreis and Freeman 1958). Decorations primarily involve twisted cord and cord-wrapped stick impressions.

Decorative modes were ascribed to the Aztalan Collared vessels following Richard's (1992) previously identified varieties for Aztalan. Most of the Northeast Mound Aztalan Collared vessels corresponded with these previously defined modes, with the exception of

Table 5.10. Mound Fill Aztalan Collared – Exterior Surface Treatments.

Mound Fill Surface Treatments

Surface Treatment	Lip		Exterior Collar Margin		Neck	
	f	%	f	%	f	%
Cordmarked	3	15.80%	12	63.20%	13	68.40%
Smoothed	15	78.90%	2	10.50%	3	15.80%
Smoothed-over-cordmarked	1	5.30%	5	26.30%		
indeterminate					3	15.80%
Total	19		19		19	

Sub-Mound Surface Treatments

Surface Treatment	Lip		Exterior Collar Margin		Neck	
	f	%	f	%	f	%
Cordmarked	8	18.60%	36	83.70%	22	51.20%
Smoothed	33	76.70%	4	9.30%	5	11.60%
Smoothed-over-cordmarked	1	2.30%	3	7.00%	6	14.00%
indeterminate	1	2.30%			10	23.30%
Total	43		43		43	

Table 5.11. Mound Fill Aztalan Collared - Decorative Treatments.

Decorative Treatment	Lip		Exterior Collar/Rim Margin		Interior Rim Margin		Exterior Neck/Sub-collar	
	f	%	f	%	f	%	f	%
TWISTED CORD IMPRESSIONS	1	5.30%			1	5.30%	1	5.30%
vertically oriented twisted cord impressions							1	5.30%
diagonally oriented (right to left) twisted cord impressions	1	5.30%			1	5.30%		
CORD-WRAPPED STICK					2	10.50%		
vertically oriented cord-wrapped stick impressions					1	5.30%		
diagonally oriented (right to left) cord-wrapped stick impressions					1	5.30%		
KNOTTED PUNCTATES	1	5.30%	1	5.30%				
UNDECORATED	17	89.50%	18	94.70%	16	84.20%	14	73.70%
Indeterminate							3	15.80%
TOTAL	19		19		19		19	

Table 5.12. Sub-mound Aztalan Collared - Decorative Treatments.

Decorative Treatment	Lip		Exterior Collar/Rim Margin		Interior Rim Margin		Exterior Neck/Sub-collar	
	f	%	f	%	f	%	f	%
TWISTED CORD IMPRESSIONS	7	16.30%			**8**	**18.60%**	**2**	**4.70%**
vertically oriented twisted cord impressions					3	7.00%	2	4.70%
diagonally oriented twisted cord impressions	3	7.00%			3	7.00%		
(diagonal left to right)					*(2)*			
(diagonal right to left)	*(3)*				*(1)*			
horizontal band(s) of twisted cord impressions	2	4.70%			2	4.70%		
transverse oriented twisted cord impressions	2	4.70%						
CORD-WRAPPED STICK	1	2.30%			**7**	**16.30%**	**4**	**9.30%**
vertically oriented cord-wrapped stick impressions					5	11.60%	4	9.30%
diagonally oriented (right to left) cord-wrapped stick impressions					2	4.70%		
transverse oriented cord-wrapped stick impressions	1	2.30%						
NOTCHING			1	2.30%				
Round-bottom notches			*(1)*	*(2.30%)*				
KNOTTED PUNCTATES							4	9.30%
UNDECORATED	34	79.10%	42	97.70%	28	65.10%	23	53.50%
Indeterminate	1	2.30%					10	23.30%
TOTAL	43		43		43		43	

two new decorative modes not previously identified (Table 5.13). Decorative mode frequencies are highlighted in Figure 5.2, which shows that undecorated vessels (Modes A & B) compose 38.5% of the Aztalan Collared assemblage. The most frequent 'decorated' mode is Mode F (13.8%); vessels with cord-marked exterior collared surfaces and cord-impressed interior margins. This is followed by Mode P (7.7%), the same as Mode F, only with the addition of external punctates. The stylistic and morphological trends of the Aztalan Collared assemblage from the Northeast Mound differ little from the same varieties found elsewhere at the site (see: Baerreis and Freeman 1958; Hurley 1977; Richards 1992).

Richards' (1992:Figure 5.15) analysis of the Aztalan Collection at the Milwaukee Public Museum (MPM) showed the undecorated collared wares (Mode a & B) represented a slightly smaller portion of the Aztalan Collared assemblage, 23.7%, compared to the northeast mound. Mode B alone was the most frequent (18%), followed by Mode F (14.8%). Mode P is present in similar proportions in the MPM collection at 9.46%, but Mode H occurs with slightly more frequency (11.4%). No Mode H Aztalan Collared vessels were identified in the Northeast Mound Aztalan Collared assemblage. This may be due to the total number of analyzed Aztalan Collared vessels: 317 in the MPM collection versus 65 in the Northeast Mound assemblage. Differential identification on the part of the analyst may also explain the lack of Mode H vessels in the present study. However, further studies of the occurrence of these various modes at the site and within the region, together with tighter chronological controls, may show that particular decorative modes may not co-occur, but are expressed at different times during the sites occupation.

Aztalan Collared Metric Attributes

The Aztalan Collared sample in the assemblage consists of 65 vessels. A general summary is provided below regarding the metric attributes between circular (n=35) and polygonal (n=19) orifice vessels (Tables 5.14 & 5.15). The orifice of 11 vessels could not be classified in either category and are therefore not included in the following discussion. All vessel attributes are provided in Appendix C.

Table 5.13. Aztalan Collared Decorative Modes Described (after Richards 1992).

Mode	Description	Mode	Description
A	Smoothed collar	H	Cordmarked collar
	Undecorated lip		Cord impressed lip
	No cord impressions		Cord impressed interior rim margin
	No exterior or interior punctates		No exterior or interior punctates
B	Cordmarked collar	I	Cordmarked collar
	Undecorated lip		Cord impressed lip
	No cord impressions		Cord impressed exterior rim margin
	No exterior or interior punctates		Cord impressed interior rim margin
			No exterior or interior punctates
C	Smoothed collar	J	Cordmarked collar
	Cord impressed lip only		Notched lip
	No exterior or interior punctates		No cord impressions
			No exterior or interior punctates
D	Cordmarked collared	K	Cordmarked collar
	Cord impressed lip only		Undecorated lip
	No exterior or interior punctates		No cord impressions
			Exterior punctates only
E	Smoothed collar	L	Cordmarked collar
	Undecorated lip		Notched lip
	Cord impressed interior rim margin		No cord impressions
	No exterior or interior punctates		Exterior punctates only
F	Cordmarked collar	M	Smoothed collar
	Undecorated lip		Cord Impressed lip
	Cord impressed interior rim margin		Exterior punctates only
	No exterior or interior punctates		
G	Smoothed collar	N	Cordmarked collar
	Cord impressed lip		Cord impressed lip
	Cord impressed interior rim margin		Exterior punctates only
	No exterior or interior punctates		

Table 5.13. Aztalan Collared Decorative Modes Described, continued (after Richards 1992).

Mode	Description	Mode	Description
O	Smoothed collar	S	Cord impressed collar
	Undecorated lip		No exterior or interior punctates
	Cord impressed interior rim margin		
	Exterior punctates only		
P	Cordmarked collar	T	Cord impressed collar
	Undecorated lip		Exterior punctates
	Cord impressed interior rim margin		
	Exterior punctates only		
Q	Smoothed collar	U	Various singular combinations of
	Cord impressed lip		cord impressions and punctated rims
	Cord impressed interior rim margin		
	Exterior punctates only		
		New Decorative Modes identified in the Northeast Mound assemblage	
R	Cordmarked collar		
	Cord impressed lip	V	Cordmarked Collar
	Cord impressed interior rim margin		Punctated Lip
	Exterior punctates only		Exterior Punctates
		W	Cordmarked Collar
			Cord impressed Lip
			Exterior Tooled Notch
			Exterior punctates only
		XX	indeterminate

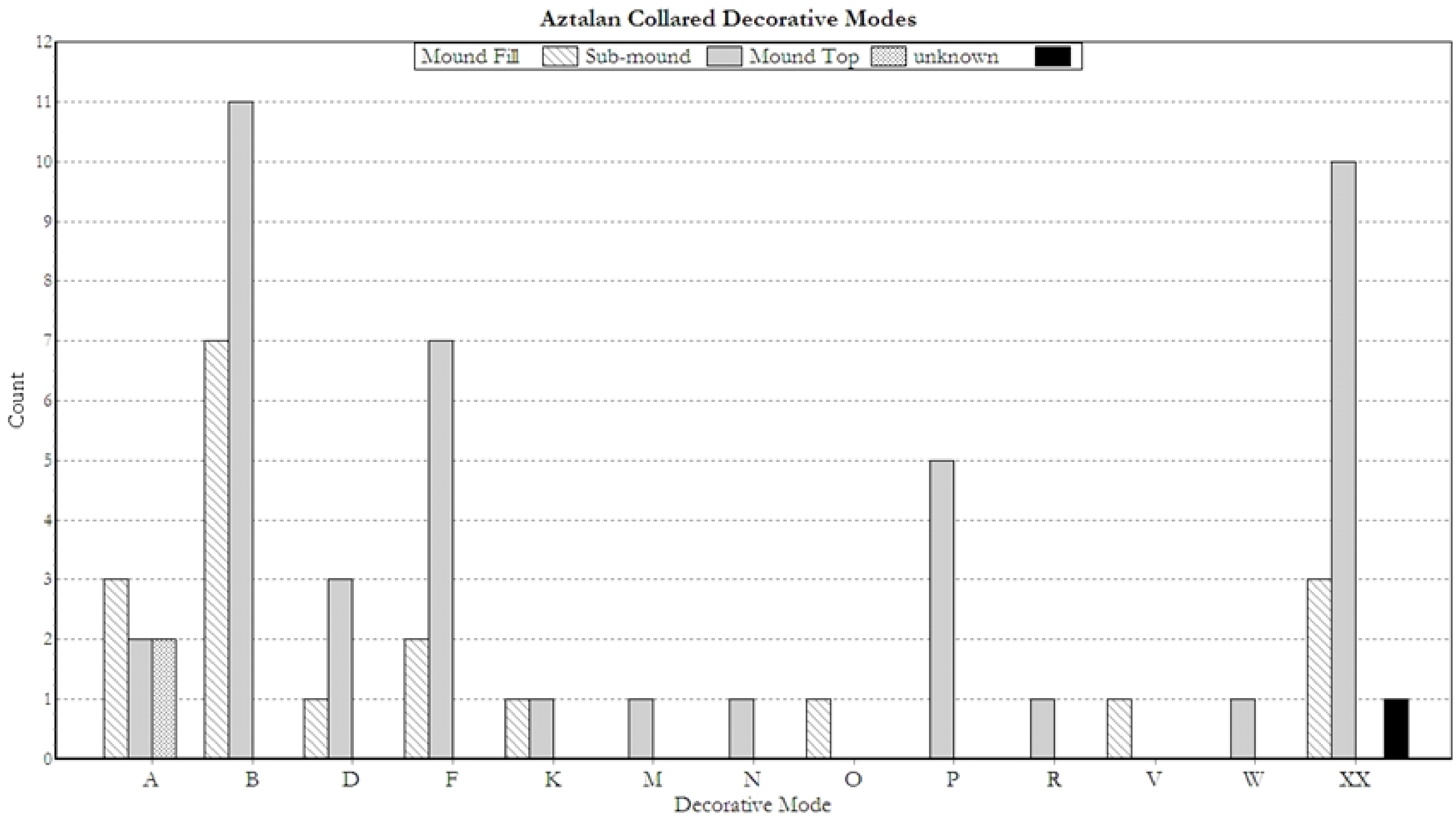


Figure 5.2. Aztalan Collared decorative mode frequencies.

Table 5.14. Aztalan Collared Circular Orifice Jar Metric Summaries.

Measurement	n*	mean	std. dev.	median	IQR**
Orifice Diameter	*17*	22.4 cm	7.4 cm	22.4 cm	13.5 cm
Collar Height	*29*	22.1 mm	7.3 mm	21.3 mm	9.5 cm
Maximum Collar Thickness	*32*	8.7 mm	1.6 mm	8.7 mm	2.4 mm
Wall Thickness	*28*	5.9 mm	1.2 mm	6.0 mm	1.8 mm
Lip Thickness	*35*	5.0 mm	1.1 mm	5.0 mm	1.7 mm
Body Wall Thickness	*19*	5.9 mm	1.2 mm	5.9 mm	2.0 mm

** total 'measurable' observations*

*** inter-quartile range*

Table 5.15. Aztalan Collared Polygonal Orifice Jar Metric Summaries.

Measurement	n*	mean	std. dev.	median	IQR**
Orifice Diameter	*7*	21.6 cm	4.8 mm	24.0 cm	9 cm
Collar Height (@ peak)	*15*	31.7 mm	8.7 mm	29.2 mm	13.1 mm
Collar Height (between peaks)	*15*	24.9 mm	7.8 mm	23.3 mm	11.5 mm
Max. Collar Thickness(@ peak)	*15*	11.5 mm	3.8 mm	10.5 mm	4.4 mm
Max. Collar Thickness (between peaks)	*15*	9.5 mm	4.2 mm	8.0 mm	3.8 mm
Wall Thickness (@ peak)	*16*	6.8 mm	2.1 mm	6.2 mm	2.0 mm
Wall Thickness (between peaks)	*10*	6.7 mm	1.6 mm	6.7 mm	3.1 mm
Lip Thickness (@ peak)	*15*	7.3 mm	2.6 mm	7.0 mm	3.6 mm
Lip Thickness (between peaks)	*15*	5.2 mm	1.3 mm	5.8 mm	2.1 mm
Body Wall Thickness	*6*	5.8 mm	1.7 mm	5.7 mm	2.5 mm

** total 'measurable' observations*

*** inter-quartile range*

Orifice diameter among the measurable Aztalan Collared vessels averages 22.4 cm for circular orifices, and 21.5 cm for polygonal shaped orifices. Collar height for vessels with circular orifices averages 22.1 mm. For polygonal orifices, peak collar heights average 31.7 mm while the average collar height between peaks is 25.0 mm. Collar thicknesses on circular orifice vessels average 8.7 mm. The maximum collar thickness on polygonal orifice vessels is 11.4 mm at the peak locations and 9.5 mm in between. Circular orifice vessels have an average neck thickness of 5.9 mm while polygonal orifices average 6.8 mm below peak locations and 6.7 in between. Lip thickness for circular orifice vessels averages 5.0 mm, while polygonal orifice vessels average 6.9 mm at the peak and 6.3 mm in between peaks. As Figure 5.3 illustrates, Aztalan Collared vessels with polygonal orifices tend to have larger metric values than circular vessels; except possibly for the orifice diameter, as noted above. Body wall thickness between the two vessel orifice forms is relatively similar (see Table 5.14 & Table 5.15).

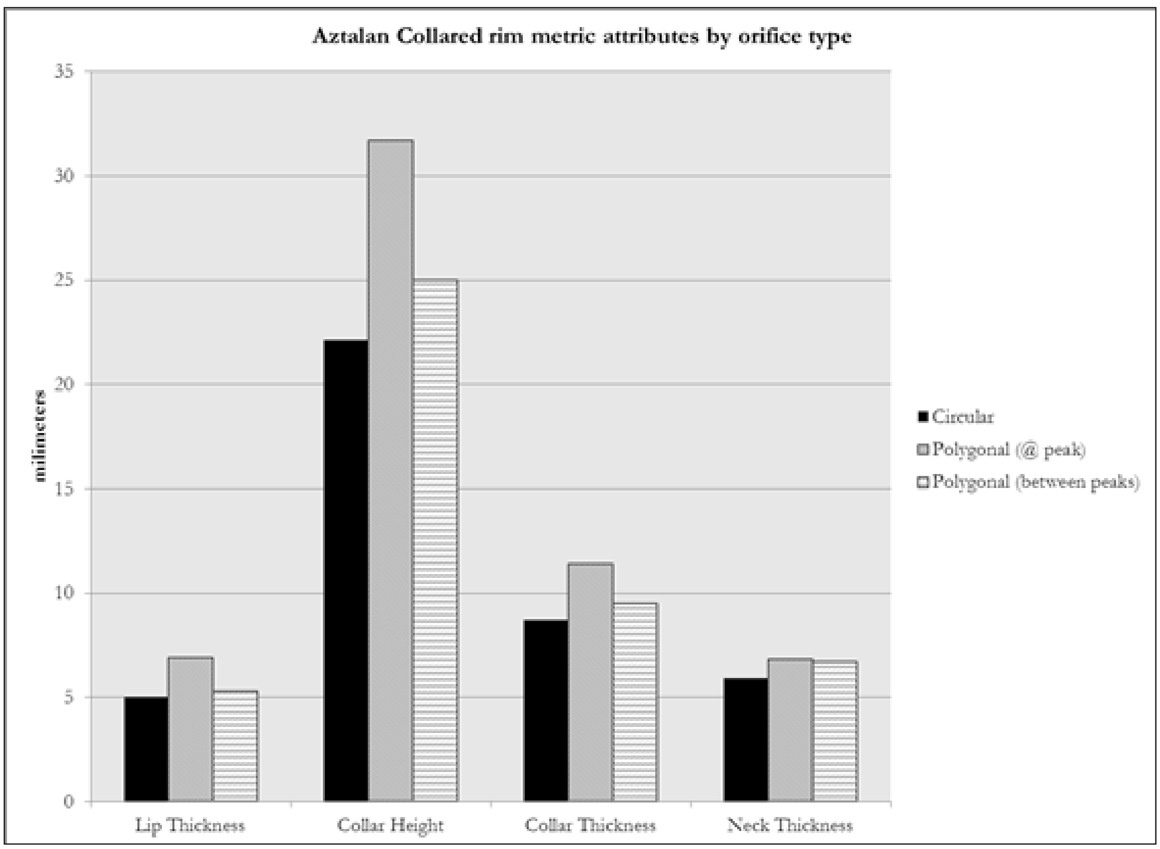


Figure 5.3. Aztalan Collared average rim metric attribute trends.

Starved Rock Collared Morphology

Starved Rock Collared orifice forms are primarily circular (56.3%), though this number may be overestimated as it is possible that several of these cases actually represent portions of the vessel rim between castellated peaks (Table 5.16). Most collar types could not be determined, though like Aztalan Collared vessels, applique types are the most frequently identified (Table 5.17). Collar profiles (Table 5.18) are typically concave (68.8) or flat (25%). While orientation for most (43.8%) collars could not be determined, vertical (n=3), inslanted (n=2) and flared (n=2) are the most frequent (Table 5.19). The majority of neck forms for the Starved Rock Collared vessels could not be determined but are summarized in Table 5.20. Lip forms are primarily flattened (25%) or squared (66.7%) (Table 5.21). The

Table 5.16. Starved Rock Collared Orifice Forms.

	Mound Top		Mound Fill		Sub-mound			
Orifice form	**f**	**%**	**f**	**%**	**f**	**%**	**Total**	**%**
Circular	1	100%	5	71.40%	3	37.50%	9	56.30%
Polygonal-angled peak			1	14.30%	2	25.00%	3	18.80%
Polygonal-rounded peak					1	12.50%	1	6.30%
indeterminate			1	14.30%	2	25.00%	3	18.80%
Total	1		7		8		16	

Table 5.17. Starved Rock Collared Collar Types.

	Mound Top		Mound Fill		Sub-mound			
Collar Type	**f**	**%**	**f**	**%**	**f**	**%**	**Total**	**%**
Applique			2	28.60%	3	37.50%	*5*	*31.30%*
Folded			1	14.30%			1	6.30%
indeterminate	1	100%	4	57.10%	5	62.50%	*10*	*62.50%*
Total	1		7		8		16	

Table 5.18. Starved Rock Collared Collar Profiles.

	Mound Top		Mound Fill		Sub-mound			
Collar Profile	**f**	**%**	**f**	**%**	**f**	**%**	**Total**	**%**
Concave	1	100%	6	85.70%	4	50.00%	*11*	*68.80%*
Flat					4	50.00%	*4*	*25.00%*
indeterminate			1	14.30%			1	6.30%
Total	1		7		8		16	

Table 5.19. Starved Rock Collared Collar Orientations.

	Mound Top		Mound Fill		Sub-mound			
Orientation	**f**	**%**	**f**	**%**	**f**	**%**	**Total**	**%**
Flared					2	25.00%	*2*	*12.50%*
In-curving			1	14.30%			1	6.30%
Inslanted			1	14.30%	1	12.50%	*2*	*12.50%*
Out-slanted			1	14.30%			1	6.30%
Vertical			1	14.30%	2	25.00%	*3*	*18.80%*
indeterminate	1	100%	3	42.90%	3	37.50%	*7*	*43.80%*
Total	1		7		8		16	

Table 5.20. Starved Rock Collared Neck Forms.

	Mound Top		Mound Fill		Sub-mound			
Neck form	**f**	**%**	**f**	**%**	**f**	**%**	**Total**	**%**
Flared					1	12.50%	*1*	*6.30%*
Inslanted			2	28.60%			2	12.50%
Straight								
indeterminate	1	100%	5	71.40%	7	87.50%	*13*	*15.90%*
Total	1		7		8		16	

Table 5.21. Starved Rock Collared Lip Forms.

	Mound Top		Mound Fill		Sub-mound			
Lip Form	**f**	**%**	**f**	**%**	**f**	**%**	**Total**	**%**
Beveled	1	100%	1	14.30%			2	12.50%
Flattened			2	28.60%	2	25.00%	*4*	*25.00%*
Squared			3	42.90%	5	62.50%	*8*	*66.70%*
indeterminate			1	14.30%	1	12.50%	*2*	*12.50%*
Total	1		7		8		16	

single Starved Rock Collared vessel associated with mound-top deposits (v79) exhibited a smoothed lip and smoothed-over-cordmarked collar surface. Among the mound fill and sub-mound contexts (Table 5.22), exterior collar surface treatments are frequently represented as either cordmarked or smoothed and smoothed-over cordmarked. Most neck surface treatments could not be determined.

Brief mention should be made of vessel 50, recovered whole from Feature 2-68 (Figure 5.4 & 5.5). It was found in an inverted position against the side of the pit. This is a polygonal orifice jar with angled peaks. The exterior surface, including the collar is smoothed-over-cordmarked (z-twist). The interior rim margin is decorated with v-shaped notches. The neck is flared outward and shoulder is rounded. Additional vessel attributes are provided in Appendix C.

Starved Rock Collared Metric Attributes

A total of 16 Starved Rock Collared vessels were identified in the assemblage. This small frequency inhibits the ability to identify predominant trends in the assemblage. Seven vessels were recovered from mound fill, eight from sub-mound contexts, and one from the mound-top (plowzone). Starved Rock Collared vessel attributes are provided in Appendix C. The following discussion provides a very general overview of these materials. Numeric summaries for the metric attributes of both circular orifice vessels and polygonal orifice vessels

Table 5.22. Starved Rock Collared Surface Treatments.

Mound Fill Surface Treatments

Surface Treatment	**Lip**		**Exterior Collar Margin**		**Neck**	
	f	**%**	**f**	**%**	**f**	**%**
Cordmarked	1	14.30%	3	42.90%	1	14.30%
Smoothed	5	71.40%	3	42.90%	3	42.90%
indeterminate	1	14.30%	1	14.30%	3	42.90%
Total	7		7		7	

Sub-Mound Surface Treatments

Surface Treatment	**Lip**		**Exterior Collar Margin**		**Neck**	
	f	**%**	**f**	**%**	**f**	**%**
Cordmarked	2	25.00%	4	50.00%	1	12.50%
Smoothed	5	62.50%	1	12.50%	1	12.50%
Smoothed-over-cordmarked			3	37.50%	2	25.00%
indeterminate	1	12.50%			4	50.00%
Total	8		8		8	

Figure 5.4. Starved Rock Collared jar (v50) recovered from F2-68.

Figure 5.5. Vessel 50 interior and exterior rim margins.

are summarized in Table 5.23 and 5.24, respectively.

Of the nine Starved Rock Collared vessels with a circular orifice, only two had a sufficient amount of rim margin present to provide an accurate orifice diameter measurement of 19 cm and 22 cm. Only two of three vessels with a polygonal orifice, could provide an adequate orifice diameter, and these measure 19.5 cm and 17 cm. Collar heights on circular orifice vessels average 24.7 cm, while polygonal orifice collar heights average 35.9 cm at peak locations and 28.2 cm in between. Maximum collar thickness averages 9.0 mm on circular orifice vessels while polygonal vessels average 12.7 mm thick at the peak and 9.7 mm thick in between. The neck thickness of circular orifice vessels averages 6.9 mm and polygonal orifice vessels have an average neck thickness of 6.5 mm below the peak and 6.6 mm between peaks. Lip thickness on circular orifice vessels averages 6.3 mm while polygonal orifice vessels average 8.2 mm at peaks and 6.3 mm in between. As Table 5.23 and 5.24 illustrate, Starved Rock Collared vessels with polygonal orifices tend to have larger metric values for rim features than circular orifice vessels; except possibly for the orifice diameter.

Table 5.23. Starved Rock Collared - Circular Orifice Vessel Metric Summaries.

Measurement	n*	mean	std. dev.	median	IQR**
Orifice Diameter	2	value = 19 cm & 22 cm			
Collar Height	4	24.7 mm	5.9 mm	26.3 mm	10.9 mm
Maximum Collar Thickness	6	9.0 mm	1.1 mm	9.0 mm	2.1 mm
Wall Thickness	5	6.9 mm	1.6 mm	6.7 mm	2.4 mm
Lip Thickness	9	6.3 mm	2.2 mm	6.3 mm	3.3 mm
Body Wall Thickness	3	7.0 mm	3.3 mm	6.1 mm	6.4 mm

** total 'measurable' observations*
*** inter-quartile range*

Table 5.24. Starved Rock Collared - Polygonal Orifice Vessel Metric Summaries.

Measurement	n*	mean	std. dev.	median	IQR**
Orifice Diameter	1	value = 19.5 cm & 17 cm			
Collar Height (@ peak)	4	35.9 mm	4.9 mm	34.0 mm	9.2 mm
Collar Height (between peaks)	2	28.2 mm	8.2 mm	28.2 mm	11.6 mm
Max. Collar Thickness(@ peak)	3	12.7 mm	0.8 mm	12.5 mm	0.5 mm
Max. Collar Thickness (between peaks)	2	9.6 mm	2.5 mm	9.6 mm	3.5 mm
Wall Thickness (@ peak)	3	6.1 mm	0.3 mm	6.0 mm	0.6 mm
Wall Thickness (between peaks)	3	6.6 mm	1.5 mm	6.8 mm	2.9 mm
Lip Thickness (@ peak)	3	8.2 mm	1.3 mm	8.5 mm	2.6 mm
Lip Thickness (between peaks)	3	6.3 mm	0.7 mm	6.0 mm	1.2 mm
Body Wall Thickness	2	6.8 mm	0.8 mm	6.8 mm	1.2 mm

** total 'measurable' observations*
*** inter-quartile range*

MADISON WARE

Four vessels have been attributed to ceramic types comparable to the established Madison Ware categories. Two vessels compare favorably with the Madison Plain type, including vessel 57, a grit-tempered jar recovered from Feature 9-68 atop the mound, and vessel 67, likely a jar with an indeterminate form, recovered from Feature 23-68 below the mound. Both are decorated with diagonal twisted cord impressions on the superior lip surface, continuing down the interior rim margin. Diagonal twisted cord impressions are present on the exterior rim margin of vessel 57 as well; but no other decoration extends further down the vessel body. The remaining two vessels correspond with the Madison Cord-impressed variety. Vessels 5 & 62 both exhibit twisted cord impressions on their exterior rim margins in diagonal configurations. Unfortunately, vessel 5 is rather fragmentary, thus specific decorative arrangements of cord impressions are unknown. For detailed vessel attributes see Appendix C.

POWELL PLAIN

Based on morphological attributes, three shell-tempered vessels (v64, v77, v133) compare favorably to the Powell Plain variety of the American Bottom Region (Griffin 1949; Holley 1989; O'Brien 1972). Vessels 64 and 77 are shell-tempered jars with flattened lips and everted-simple (RPR=0.7) and everted-extruded (RPR=0.49) rims, respectively (Table 5.25). Both exhibit flared necks, and have smoothed interior and exterior surfaces. Vessel 77 exhibits a sharp-angled shoulder; an exterior black-smudged surface finish is evident. The shoulder form for vessel 64 is unknown and its exterior surface is too is heavily eroded to discern the external surface finish. Both vessels were recovered from mound surface contexts. Vessel 64 was recovered from feature 19-68, a shallow pit adjacent to a series of post molds near the center of the mound. Vessel 77, though badly broken was buried whole, interred directly in the mound fill in an inverted position (see Figure 4.30). Comparing the values of the rim-protrusion ratio (RPR; see Chapter 3) vessel 64 (RPR= 0.7) compares with later Lohmann/ Early Stirling phase ratios recorded for the ICT-II tract and the Tract 15A at Cahokia (Holley 1989; Pauketat 1998); vessel 77's RPR value of 0.49 compares favorably with ranges for the Stirling phase.

Vessel 133 is a shell tempered jar with a flattened lip, everted-folded rim, straight neck, and hyper-angular shoulder. Interior and exterior surfaces are smoothed and red-slipping is present on the superior lip and interior rim margin, continuing down the interior rim surface to the interior shoulder point. Areas of the external surface show signs of possible red-slipping as well though the vessel appears primarily plain with several fire-clouds present (Figure 5.6). Vessel 133 is a whole (reconstructed) vessel, so the specific paste characteristics could only be determined based on interior and exterior surface observations. Exterior surface inspection suggests it tempered with only crushed mussel shell. A RPR value of 0.31 suggests the vessel corresponds to later Stirling phase values; however Lohmann and Stirling values reported from Cahokia's ICT-II show a wide range of RPR values (1989:Figure 13, Figure 25). Also, the jar's morphology and stylistic attributes are more akin to late Lohmann

Table 5.25. Powell Plain Jar Attributes.

Vessel ID	Feature No.	Orifice Dia. (cm)	%	Wall Thickness (mm)	Lip Thickness (mm)	Rim Length (mm)	Body Wall Thickness (mm)	Wt. (g)	RPR	Lip Bevel (degrees)	Rim Angle (degrees)
64	19-68	32	7	9.2	7.4	13.2	7.4	26.2	0.7	35	63
77	N300 R98	ind.	100	4.8	4.6	9.8	3.8	565	0.49	41	51
133	N301 R93	29.5	100	3.8	6.2	12.1	7.1	4290	0.31	n/a	n/a

Table 5.25. Powell Plain Jar Attributes, continued.

Vessel ID	Feature No.	Lip Form	Rim Form	Neck Form	Shoulder Form	Ext.	Int	Shoulder exterior	Body Surface	Surface Finish	Munsell Color
64	19-68	Flattened	Everted-simple	Flared	ind.	Sm	Sm	ind.	ind.	Eroded	7.5yr 4/2
77	N300 R98	Flattened	Everted-extruded	Flared	Sharp-angled	Sm	Sm	Sm	Sm	Black-smudge/ slip	7.5yr 2/1
133	N301 R93	Flattened	Everted-folded Type 1	Straight	Hyper-angular	Sm	Sm	Sm	Sm	Plain/ Red-slipped	*not recorded

Figure 5.6. Powell Plain jar with red-filmed interior; Vessel 133.

or early Stirling phase materials. However, vessel 133 is the only whole mound top vessel buried within a pit and not directly in the mound fill as the other four whole jars. This suggests it was incorporated into the mound at a later date. The unique features of this vessel and its later placement among the mound-top vessel deposits suggest it may have been a specialized or unique vessel.

Vessel 133 represents a pertinent example of the concerns Emerson, et al. (2007:110-111) have recently expressed regarding the use of American Bottom ceramic types outside the American Bottom, discussed in Chapter 3. The red-slipping of this vessel would suggest it coincides with Griffin's (1949) Cahokia Red-filmed type from the American Bottom. However, morphologically vessel 133 compares favorably with Powell Plain varieties. Though, Powell Plain vessels are infrequently red-slipped (only referred to as such in cases where the slip grades from red-to-black in color) I would maintain that vessel 133 is most akin this American Bottom type.

SEED JARS

Vessels 56 and 87 correspond to the seed jar vessel form. Both have red slipped interior and exterior surfaces, rounded lips, constricted circular orifices, and inslanting or incurving rim forms (Table 5.26). Temper consists of fine, well sorted crushed mussel shell. Vessel 56 was recovered from pit Feature 9-68 from the mound summit, and vessel 87 was recovered from mound fill. Red-slipped, shell-tempered seed jars such as these are often in Late Terminal Late Woodland contexts in the American Bottom and carry on through the Lohmann phase, appearing with less frequency by the mid-Stirling phase. Based on temper and surface treatment, these vessels correspond with the type Griffin (1949) termed Cahokia Red-filmed.

RAMEY INCISED

Vessel 63 is the only vessel attributed to the Ramey Incised variety. The representative shell-tempered rim sherd was recovered from a shallow pit, F18-68, atop the mound. This jar has a circular orifice (>20 cm, 4), flattened lip, everted-extruded rim (RPR = 0.67),

Table 5.26 Seed Jar Attributes.

ID	Feature No.	Vessel Form	Orifice Dia. (cm)	%	Wall Thickness (mm)	Lip Thickness (mm)	Body Wall Thickness (mm)	Wt. (g)	RPR	Lip Bevel (degrees)	Rim Angle (degrees)
87	MF	Seed Jar	ind.	<5	ind.	ind.	ind.	1.6	n/a	n/a	n/a
56	9-68	Seed Jar	ind.	<5	3.9	2.8	3.1	0.9	n/a	n/a	n/a

Table 5.26. Seed Jar Attributes, continued.

ID	Feature No.	Vessel Form	Lip Form	Rim Form	Ext.	Int.	Neck-Form	Shoulder Form	Body Surface-Treatment	Surface Finish	Munsell Color
87	MF	Seed Jar	ind.	ind.	Sm	Sm	ind.	ind.	ind.	Red-slipped	10yr 4/6
56	Sep-68	Seed Jar	Rounded	Direct-unmodified	Sm	Sm	Inslanted	ind.	ind.	Red-slipped	10yr 4/6

straight neck, and angled shoulder. Surfaces are smoothed, with black smudging (7.5yr 2/1) present on the exterior surface. The upper vessel body is decorated with a bold-trailed, curvilinear, clockwise spiral motif, recurring at least one other time on the vessel. Trailing width ranges between 2.5 mm and 3.5 mm and depth does not exceed 1.8 mm. This vessel correlates to the Ramey Incised variety in the American Bottom. The RPR value of 0.67 corresponds well with Stirling phase values recorded at Cahokia (Holley 1989; Pauketat 1998). All vessel attributes can be found in Appendix C.

This motif compares with Emerson's (1989:Chart I) motif type VIIa, but more specifically to 'combination categories' IXa and XIa given the clockwise direction of the spiral. The spiral motif is associated water and water serpents attributed to Under World symbolism (Emerson 1989:72; Emerson 1997a, b; Mollerud 2005:171). This design is present on 14 other Ramey Incised vessels at Aztalan (Mollerud 2005:170). This motif, both alone and in combination with others, is noted at Cahokia and several sites in the American Bottom (1989:Chart I). In her study on Ramey Incised motifs at Aztalan, Mollerud (2005:171) notes this motif style is absent from sites in the Apple River Valley region of northwest Illinois that have produced Ramey Incised bearing motifs.

HYER PLAIN

A total of 18 vessels are assigned to the Hyer Plain type, originally defined from the Aztalan Collection at the Milwaukee Public Museum (Richards 1992). Table 5.27 provides metric summaries for select observations; attributes can be found in Appendix C. Two vessels were recovered from the mound top, five from mound fill, and ten from sub-mound deposits; one Hyer Plain vessel could not be attributed a provenience. Hyer Plain vessels in the Northeast Mound assemblage have orifice diameters that are, on average, smaller than their Powell Plain counterparts in the assemblage. The mean RPR ratio compares favorably to late Lohmann early Stirling phase jars in the American Bottom (Holley 1989; Pauketat 1998), though a wide range of values are present.

Table 5.27. Hyer Plain Jar Metric Summaries.

Measurement	n*	mean	std. dev.	median	IQR**
Orifice Diameter	9	16.1 cm	5.9 cm	16 cm	9.5 cm
Wall Thickness	17	5.6 mm	1.2 mm	5.5 mm	1.3 mm
Lip Thickness	18	5.4 mm	1.4 mm	5.6 mm	1.8 mm
Rim Length	12	9.2 mm	2.6 mm	8.5 mm	3.4 mm
Body Wall Thickness	17	5.7 mm	1.4 mm	5.9 mm	1.5 mm
RPR	5	0.6	0.3	0.5	0.5

** total 'measurable' observations*

*** inter-quartile range*

UNCLASSIFIED VESSELS

A total of seven vessels are placed in the unclassified category, meaning their morphological and/or decorative attributes could not associate them with a particular ceramic type. These differ from the "indeterminate" vessels that are too fragmentary to determine an associated type. All vessels in this category are grit-tempered, and the five vessels exhibit smoothed or smoothed-over-cordmarked exterior surface just below the exterior rim margin. For the most part they are akin to local Late Woodland varieties in the region and all are likely attributable to Madison Ware, but specific type-varieties could not be identified. Given the wide morphologic and decorative variety of Late Woodland ceramics during this period (e.g. Clauter 2012) these objects are not considered extra-local or exotic for the region. See Appendix C for vessel profiles, images, and attributes.

INDETERMINATE VESSELS

A total of 15 vessels are considered indeterminate due to their small size. Proveniences for these include one from the mound top, five from mound fill, eight from submound deposits, and one from an indeterminate provenience. None appear to be extra-local or exotic items for the area. See Appendix C for vessel profiles, images, and attributes.

DISCUSSION

The Northeast Mound ceramic assemblage includes an array of Late Woodland ceramic forms previously documented at the site (Baerreis and Freeman 1958; Barrett 1933; Birmingham and Goldstein 2005; Freeman 1986; Hurley 1977; Richards 1992; Richards, et al. 2012; Wittry and Baerreis 1958). Previous literature has minimally explored the distributions of these materials at the site and falls short of associating them with domestic or non-domestic spaces and associated activities. However, these Late Woodland ceramic forms are commonly associated with villages/domestic contexts elsewhere in the region (Clauter 2012; Meinholz and Kolb 1997; Overstreet and Clark 1995; Salkin 1993, 2000). Additionally, many of these material types also can be associated with supra-domestic contexts as well, including occasional association with burials in effigy mound contexts (Birmingham and Eisenberg 2000; Clauter 2011; McKern 1930; Rosebrough 2010). The Late Woodland vessel assemblage exhibited little evidence for sooting or use, though some fire clouding was noted on several body and rim sherds indicating their possible association with cooking or general heating activities.

Decorations on the collared ware forms correspond with those previously identified at the site. The wide variety of decorative modes as well as a large frequency of undecorated jars is demonstrated. Also, the distinction between Aztalan Collared and Starved Rock Collared type-varieties is supported, and tangible differences between the types may exist. However, these differences are complicated by the XRF analysis described below, which finds no chemical difference between these types within the assemblage.

The presence of Mississippian forms such as the Hyer Plain vessels in the mound fill and sub-mound contexts suggests Mississippian influence prior to activities associated with mound construction. The shell-tempered Middle Mississippian materials correlate favorably with American Bottom assemblages, specifically from the Late Lohmann and Stirling phases. The inclusion of a Cahokia Red-filmed seed jar rim in the mound fill suggests that a Middle Mississippian presence existed at the site prior to the construction of the mound.

PORTABLE X-RAY FLORESCENCE RESULTS

NORTHEAST MOUND ASSEMBLAGE WITH CAHOKIAN SAMPLES

A pXRF analysis was run on a selection of Northeast Mound vessels, Aztalan daub samples and three sub-mound 51 vessels from the Cahokia Site (see Appendix D for sample inventories). The analyzed sample is a subset of the Northeast Mound assemblage including vessels from feature contexts and the buried A-horizon. Mound fill materials were excluded due to time restraints; exceptions include a seed jar rim sherd and collared rim. Samples of Aztalan daub and Cahokian vessels were incorporated to serve as proxies for their respective geographical locations (i.e. Aztalan and the American Bottom/Cahokia). The daub samples were selected from excavations along the riverbank adjacent to the eastern palisade wall. To determine if any materials were imported from the American Bottom, vessels associated with sub-mound 51 contexts at Cahokia (Pauketat, et al. 2002) were incorporated into the statistical analysis. Data for three vessels from the sub-mound 51 sample were used, provided by Dr. John Richards (UWM-ARL), Dr. Timothy Pauketat (UIUC), and Seth Schneider (UWM-ARL), all currently engaged in an ongoing study of those materials (see Richards, et al. 2010). The sub-mound 51 materials were analyzed using the same protocol as the Northeast mound materials.

The pXRF analysis produced a dataset containing a total of 882 individual readings. The Mahalanobis distance measurements highlighted four anomalous reading locations that were subsequently removed from the dataset, including: v07 location 3, v32 location 1, v43 location 1, v47 location 3, and v127 location 1 (a total of 15 individual readings). Readings with raw net intensity values of zero or less than zero cannot be used in Principle Components Analysis (PCA), so an additional 66 readings were removed from the dataset, leaving a total of 801 readings. Many of the removed readings were from the Aztalan daub samples (n=19). Unfortunately, these methods left only two reliable readings for v06, three for v07, and four for v05. Several other vessels lost one or two readings as well.

PRINCIPLE COMPONENTS ANALYSIS

A line-plot of the principle component variation illustrates that the 'explained' variation in the dataset begins to level off after the second principle component which likely still contains valuable information in the study (Figure 5.7). Collectively, the first two principle components explain 33.21% of the variation in the dataset; the first principle component explains 19.86%, and the second explains 13.35%. Note, a separate PCA run on only the Northeast Mound vessels (i.e. without the daub or Cahokia samples) identified similar results where the first principle component explains 19.95% of the variation and the second explains 13.46%; cumulatively 33.41%. Overall this suggests a weak structure to the dataset, thus the results identified below are interpreted cautiously.

Principle component analysis indicates the main source of variation in the Northeast Mound dataset comes from the opposition of bromine (Br) and rubidium (Rb). When controlling for relative proportions of these two elements, the next most significant source of variation is the relative proportions of zinc (Zn) and zirconium (Zr). These oppositions are illustrated in a bi-plot in Figure 5.8; the magnitude of each element is proportional to the

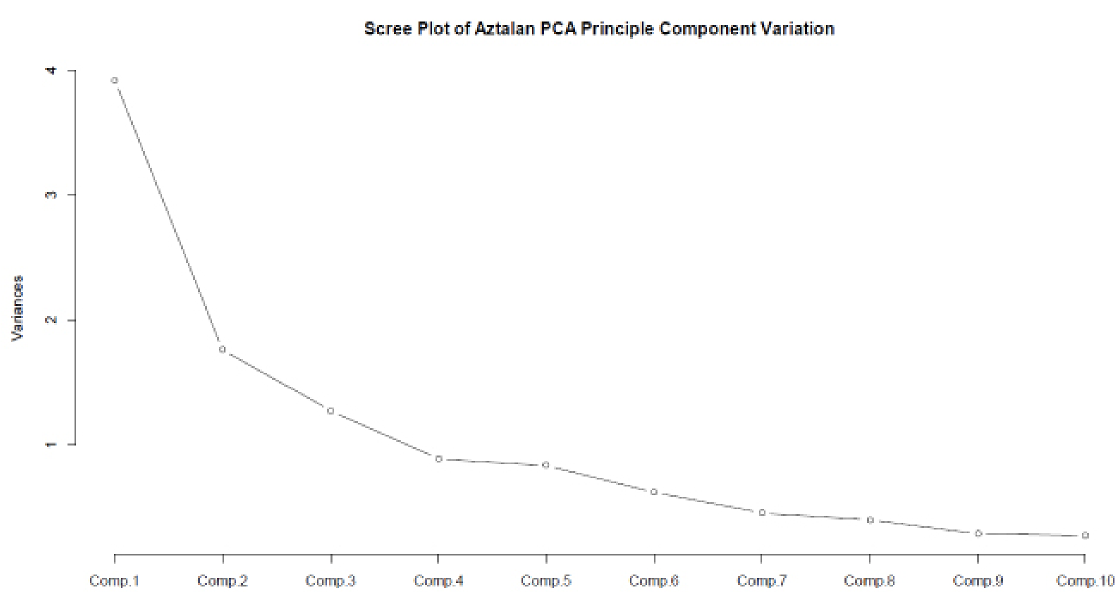


Figure 5.7. Scree Plot of Aztalan PCA principle component variation.

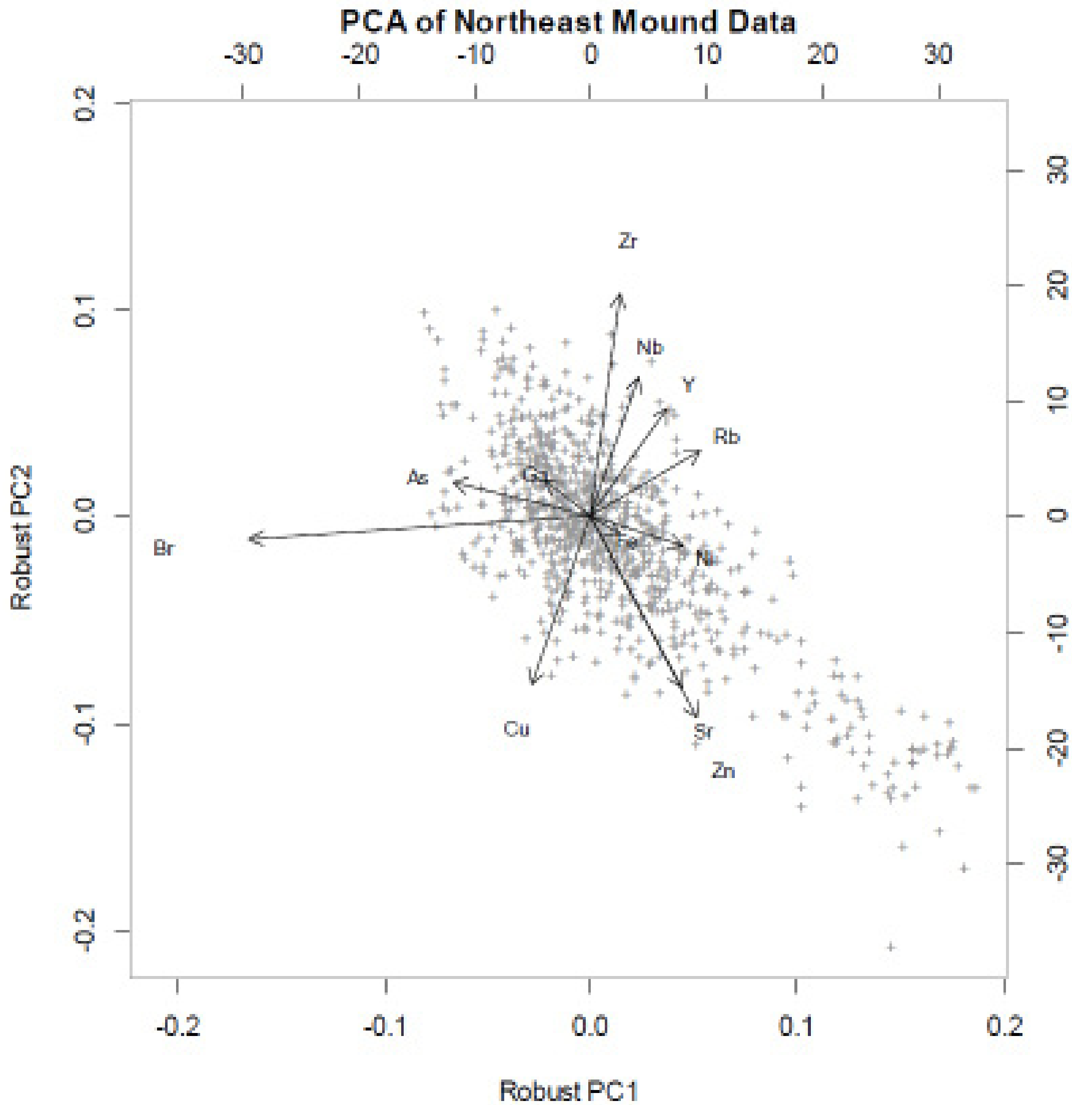


Figure 5.8. Northeast Mound PCA bi-plot of net intensities.

length of the arrows respective to each element. Each of the 801 readings are denoted by a '+' sign.

Next, the mean compositions for each artifact were calculated. A comparison of the loadings between the net intensities (i.e. all 801 readings) and the mean composition value for each artifact shows the same elements oppose one another in the first and second principle components, suggesting that there is no loss of detail in using the mean compositions for analysis. A bi-plot of the artifact mean compositions is illustrated in Figure 5.9 labeled by

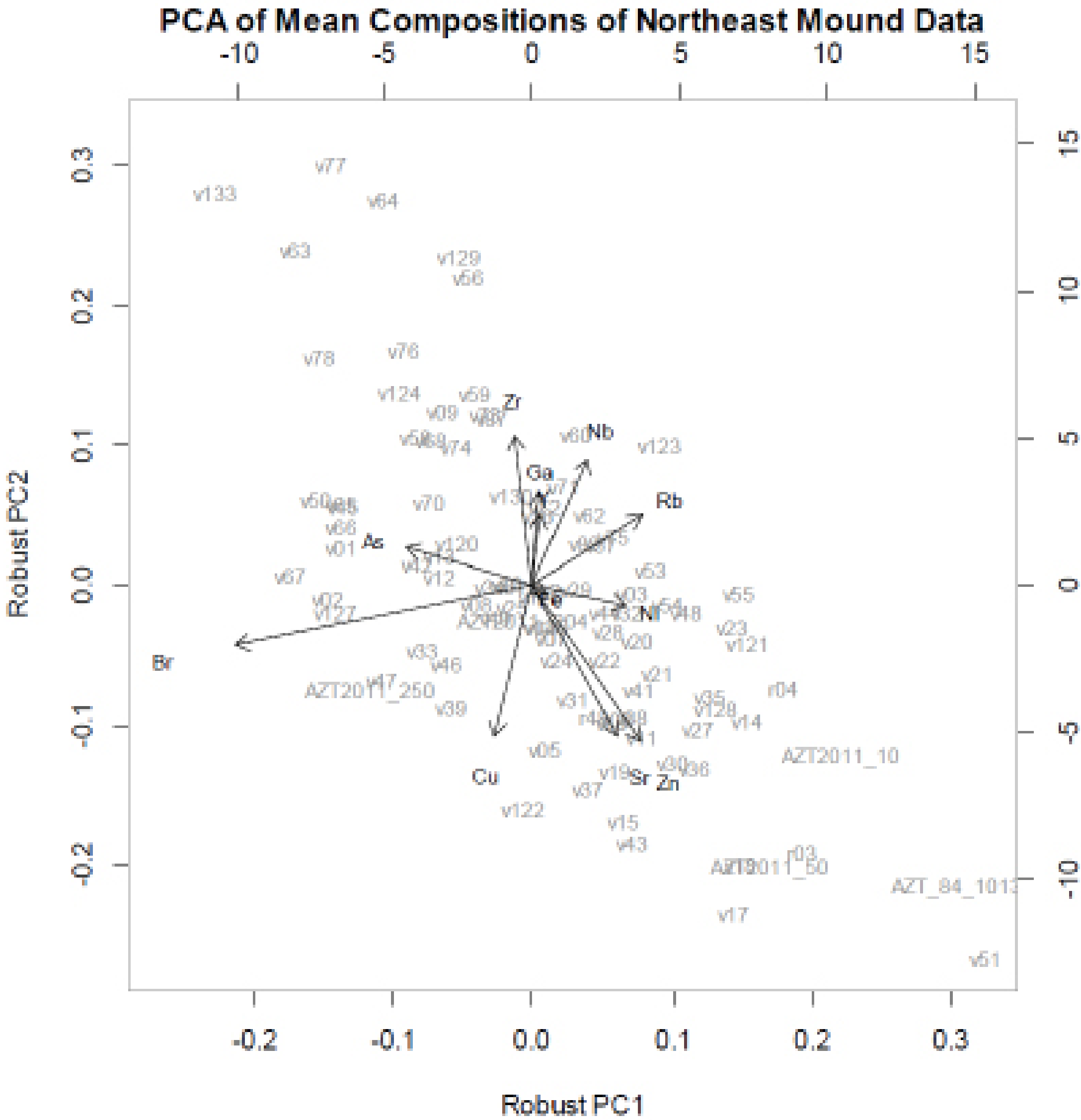


Figure 5.9. Northeast Mound PCA bi-plot of Mean Compositions.

each vessel/artifact ID. This plot highlights a series of vessels that appear isolated from the main body of items, including six mound top vessels (v63, v64, v76, v77, v78, v133). Figure 5.10 illustrates a scatter plot of the assemblage based on generalized ceramic varieties.

PCA ANOVA TESTS

Analysis of variance (ANOVA) tests were run on the first and second principle components to identify any difference between the Aztalan and Cahokia materials. A 95% confidence interval is used (α=0.05) throughout these analyses. Results for the first principle

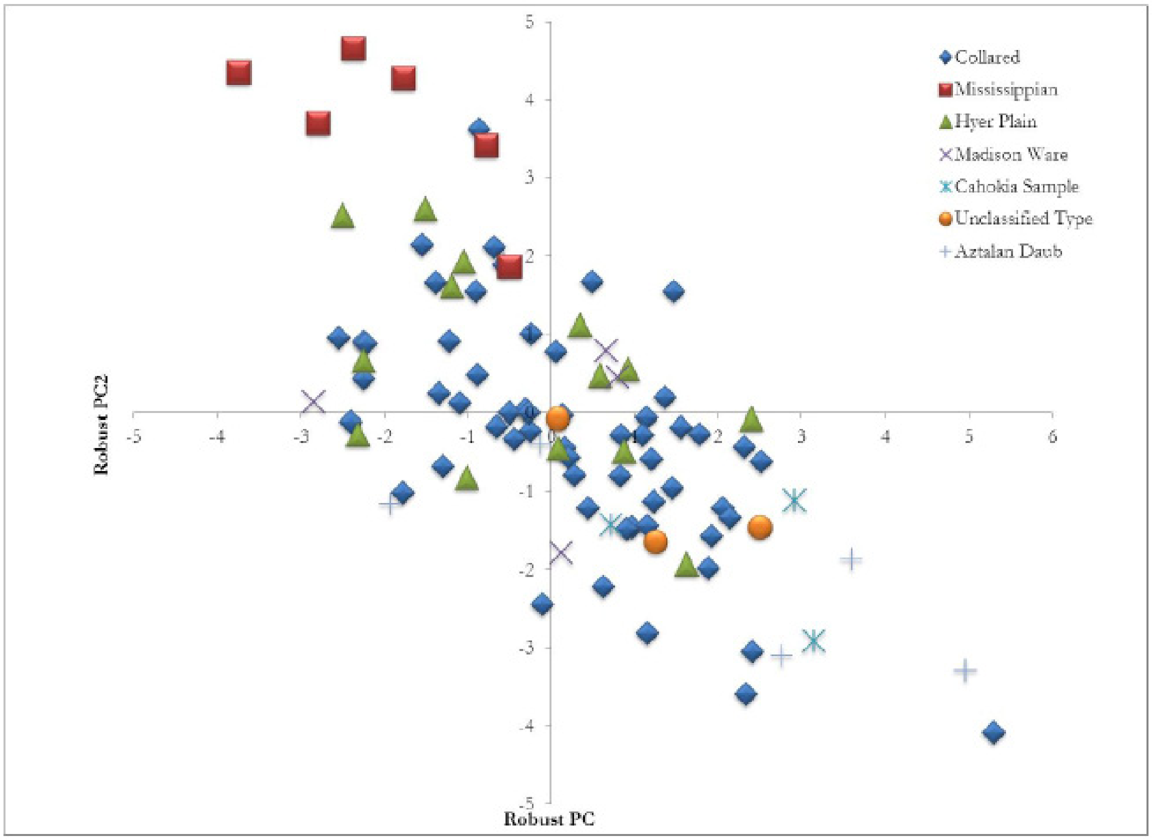


Figure 5.10. PCA scatter plot of Northeast Mound ceramic varieties.

component show a significant difference between the two sites ($F_{1,799}$=5.06, *p*=0.0248). The second principle component also shows a significant difference ($F_{1,799}$=47.88, *p*=9.3e-12).

Next, ANOVA tests, concerning the first principle component, show at least one 'pottery type' is significantly different from at least one other 'pottery type' ($F_{13,787}$=6.362, *p*=1.57e-11). Subsequent post-hoc tests identify 22 significant differences among the pottery types, summarized in Table 5.28. ANOVA tests on the second principle component scores also suggests at least one 'pottery type' group is significantly different from at least one other 'pottery type' ($F_{13,787}$=25.44, *p*=<2e-16). The post-hoc tests for the second principle component identified 59 significant differences among the pottery types. These are summarized in Table 5.29.

To summarize, the post-hoc tests on the first and second principle component highlight several significant differences among the chemical compositions for the clays used

Table 5.28. Tukey Post-hoc Test: Significant Differences in Mean Scores of 1st principle Component, Factored for Pottery Type.

Pottery Type Ordered Pairing	*p* (adj)
Aztalan Collared - Powell Plain (v133)	1.56E-4
Aztalan Collared - Powell Plain	5.14E-3
Aztalan daub - Powell Plain (v133)	2.00E-7
Aztalan daub - Powell Plain	5.70E-6
Aztalan daub - Ramey Incised	3.04E-4
Aztalan daub - Hyer Plain	3.44E-3
Aztalan daub - Aztalan collared	0.033
Aztalan daub - Madison Plain	0.038
Aztalan daub - Unidentified Collared	0.045
Cahokia - Powell Plain (v133)	1.70E-5
Cahokia - Powell Plain	6.86E-4
Cahokia - Ramey Incised	7.86E-3
Cahokia Red Filmed seed jar - Powell Plain (v133)	0.016
Hyer Plain - Powell Plain (v133)	2.76E-3
indeterminate type - Powell Plain (v133)	1.70E-3
Madison Cord-impressed - Powell Plain (v133)	0.010
Starved Rock Collared - Powell Plain (v133)	1.22E-4
Starved Rock Collared - Powell Plain	4.72E-3
Starved Rock Collared - Ramey Incised	0.046
Unclassified - Powell Plain (v133)	7.90E-6
Unclassified - Powell Plain	2.99E-4
Unclassified - Ramey Incised	4.48E-3

Table 5.29. Tukey Post-hoc Test: Significant Differences in Mean Scores of 2nd Principle Component, Factored for Pottery type.

Pottery Type Ordered Pairs	*p* (adj)
Aztalan Collared - Cahokia	0.00E+00
Hyer Plain - Cahokia	0.00E+00
Unidentified Collared - Cahokia	0.00E+00
Cahokia Red-filmed seed jar - Cahokia	0.00E+00
Ramey Incised - Cahokia	0.00E+00
Powell Plain (v133) - Cahokia	0.00E+00
Powell Plain - Cahokia	0.00E+00
Hyer Plain - Aztalan daub	0.00E+00
Unidentified Collared - Aztalan daub	0.00E+00
Cahokia Red-filmed seed jar - Aztalan daub	0.00E+00
Ramey Incised - Aztalan daub	0.00E+00
Powell Plain (v133) - Aztalan daub	0.00E+00
Powell Plain - Aztalan daub	0.00E+00
Cahokia Red-filmed seed jar - Unclassified	0.00E+00
Ramey Incised - Unclassified	0.00E+00
Powell Plain (v133) - Unclassified	0.00E+00
Powell Plain - Unclassified	0.00E+00
Cahokia Red-filmed seed jar - indeterminate type	0.00E+00
Ramey Incised - indeterminate type	0.00E+00
Powell Plain (v133) - indeterminate type	0.00E+00
Powell Plain - indeterminate type	0.00E+00
Cahokia Red-filmed seed jar - Starved Rock Collared	0.00E+00
Powell Plain (v133) - Starved Rock Collared	0.00E+00
Powell Plain - Starved Rock Collared	0.00E+00
Cahokia Red-filmed seed jar - Aztalan Collared	0.00E+00
Powell Plain (v133) - Aztalan Collared	0.00E+00

Table 5.29. Tukey Post-hoc Test: Significant Differences in Mean Scores of 2nd Principle Component, Factored for Pottery type, continued.

Pottery Type Ordered Pairs	*p* (adj)
Powell Plain - Aztalan Collared	0.00E+00
Powell Plain - Hyer Plain	0.00E+00
Ramey Incised - Starved Rock Collared	1.00E-07
Ramey Incised - Aztalan Collared	1.00E-07
Madison Plain - Cahokia	4.00E-07
Starved Rock Collared - Cahokia	2.40E-06
Powell Plain - Madison Cord-impressed	5.20E-06
Powell Plain - Madison Plain	2.09E-05
Hyer Plain - indeterminate type	3.26E-05
Madison Cord-impressed - Cahokia	7.47E-05
Powell Plain (v133) - Hyer Plain	7.86E-05
Aztalan Collared - Aztalan daub	8.32E-05
Unidentified Collared - indeterminate type	9.41E-05
Cahokia Red-filmed seed jar - Hyer Plain	1.66E-04
Ramey Incised - Hyer Plain	4.14E-04
Hyer Plain - Aztalan Collared	4.40E-04
Madison Plain - Aztalan daub	4.56E-04
Powell Plain (v133) - Madison Cord-impressed	7.34E-04
Unidentified Collared - Unclassified	7.54E-04
indeterminate type - Cahokia	9.35E-04
Ramey Incised - Madison Cord-impressed	2.43E-03
Powell Plain (v133) - Madison Plain	2.67E-03
Unidentified Collared - Starved Rock Collared	3.07E-03
Hyer Plain - Unclassified	4.25E-03
Unidentified Collared - Aztalan Collared	4.66E-03
Cahokia Red-filmed seed jar - Madison Cord-impressed	6.21E-03

Table 5.29. Tukey Post-hoc Test: Significant Differences in Mean Scores of 2nd Principle Component, Factored for Pottery type, continued.

Pottery Type Ordered Pairs	*p* (adj)
Hyer Plain - Starved Rock Collared	6.27E-03
Ramey Incised - Madison Plain	8.40E-03
Powell Plain - Unidentified Collared	0.010581
Starved Rock Collared - Aztalan daub	0.013392
Unclassified - Cahokia	0.014496
Madison Cord-impressed - Aztalan daub	0.016908
Cahokia Red-filmed seed jar - Madison Plain	0.022504

in vessel manufacture. The first principle component scores show the chemical composition between the Late Woodland collared wares differ from the (Mississippian) Powell Plain (v64, v67, & v133) and Ramey Incised (v63) from atop the mound (see Table 5.28 & 5.29 for significant pairings and p values from the post-hoc tests). This suggests the Late Woodland and Middle Mississippian vessel forms are not fabricated from similar clays. Additionally, the Powell Plain jar with interior red-slipping from atop the mound (v133) scores significantly lower than the red-slipped seed jars (p=0.0158). However, no significant difference is observe among the shell-tempered Mississippian jars buried atop the mound.

The sub-mound 51 vessels from Cahokia also were significantly different than vessel 133 (p=1.70e-05), the Powell Plain jars (p=6.86e-04), and Ramey Incised jar (p=7.86e-03) from Aztalan indicating they are likely made from different clays. However, no significant difference is observed between the samples from Cahokia (n=3) and the Late Woodland wares at Aztalan. This peculiarity suggests the three samples from Cahokia were likely too small in number to highlight significant differences in the chemical composition of the vessels, and thus serves as a limited comparison for American Bottom materials. Given the association of the three Cahokia vessels in the 'ritual' deposits of sub-mound 51 (Pauketat, et al. 2002; Richards, et al. 2010), they may represent extra-local goods brought to Cahokia from

elsewhere in the American Bottom region or beyond. Regardless of their specific origin, this Cahokia sample appears to be a poor proxy for the American Bottom and additional analyses will be needed to substantiate direct associations with the American Bottom.

Outlier Detection

Composition outlier detection tests were conducted using the *Hulitmvouts* function in the *HulitSourceCode.R* source code. Analysis of the artifact mean composition identified 21 significant compositional outliers, all listed in Table 5.30. The furthest outliers (measured using the Mahalanobis distance) include the three Cahokia samples and four of the five Aztalan daub samples. Three of the mound top vessels (v77, v78, v133) buried in a row in the center of the mound-top structure also are identified as outliers. Several Late Woodland ceramic vessels are singled out as well, including six Aztalan Collared, one Starved Rock Collared, and two Hyer Plain vessels. A bi-plot of the outliers in Figure 5.11 shows the selection of the furthest measured cases are positioned near the Rubidium (Rb) axis, but are largely oriented across the short axis of the initial PCA bi-plot. These largely trend along the Iron (Fe) axis while others trend with Nickel (Ni). However, no one element accounts for all the outliers identified. The outliers are highlighted in the original PCA bi-plot in Figure 5.12. This suggests a diverse compositional base for a portion of the Late Woodland assemblage, indicating multiple clay sources or combinations of clays were used in vessel manufacture; or possibly these vessels were brought to the site by immigrant individuals or groups.

Cluster Analysis

A cluster analysis was employed to explore potential groupings of similar observations. The PCA scores from the mean compositions calculated for each object (see above) were used in these analyses as they represented a standardized score for each artifact. To better assess the appropriate number of clusters to consider, a plot was created illustrating the trending of sum of squares error with each additional cluster grouping (Figure 5.13). An appropriate cluster solution would be defined where the plot slows dramatically, typically at a prominent 'elbow' in the plot, much like the scree plot test in the PCA above. Error seems to

Table 5.30. Northeast Mound XRF Compositional Outliers.

Artifact ID	Artifact/Pottery Type	Provenience	Mound Level
v06	Aztalan Collared	F15-67	Mound Fill
v122	Aztalan Collared	Ab-Horizon	Sub-mound
v23	Aztalan Collared	F29-67	Sub-mound
v48	Aztalan Collared	F1-68	Sub-mound
v51	Aztalan Collared	F3-68	Sub-mound
v70	Aztalan Collared	F31-68	Sub-mound
Azt_84_1013	Aztalan daub	1984 Unit N2-4 E16-16, Str. 2	n/a
Azt2011_10	Aztalan daub	2011 TU2, Level 1, 0-50 cmbs	n/a
Azt2011_50	Aztalan daub	2011 TU6, Level 2, 30-40 cmbs	n/a
Azt2011_250	Aztalan daub	2011 TU9, Level 4B, 57-80 cmbs	n/a-
v133	Powell Plain (v133)	Row of Mound-Top vessels	Mound Top
v56	Cahokia Red-filmed Seed Jar	F9-68	Mound Top
v87	Cahokia Red-filmed Seed Jar	Mound Fill	Mound Fill
r03	Cahokia sub-mound 51 vessel	Cahokia Site	n/a
r04	Cahokia sub-mound 51 vessel	Cahokia Site	n/a
r48	Cahokia sub-mound 51 vessel	Cahokia Site	n/a
v78	Hyer Plain	Row of Mound-Top vessels	Mound Top
v127	Hyer Plain	Ab-Horizon	Sub-mound
v77	Powell Plain	Row of Mound-Top vessels	Mound Top
v17	Starved Rock Collared	F29-67	Sub-mound
v11	Unclassified type	F29-67	Sub-mound

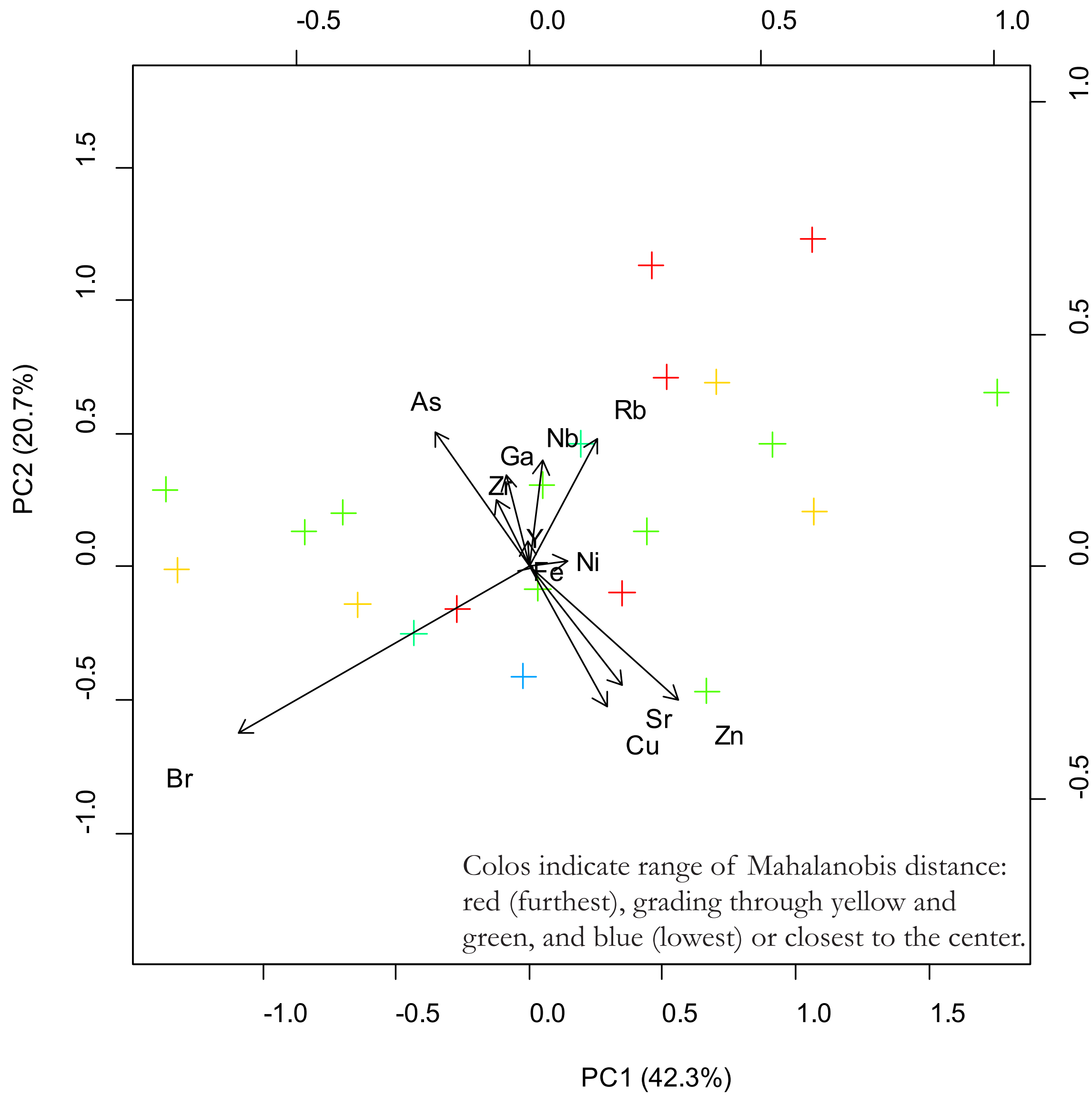


Figure 5.11. Bi-plot of artifact mean composition of identified.

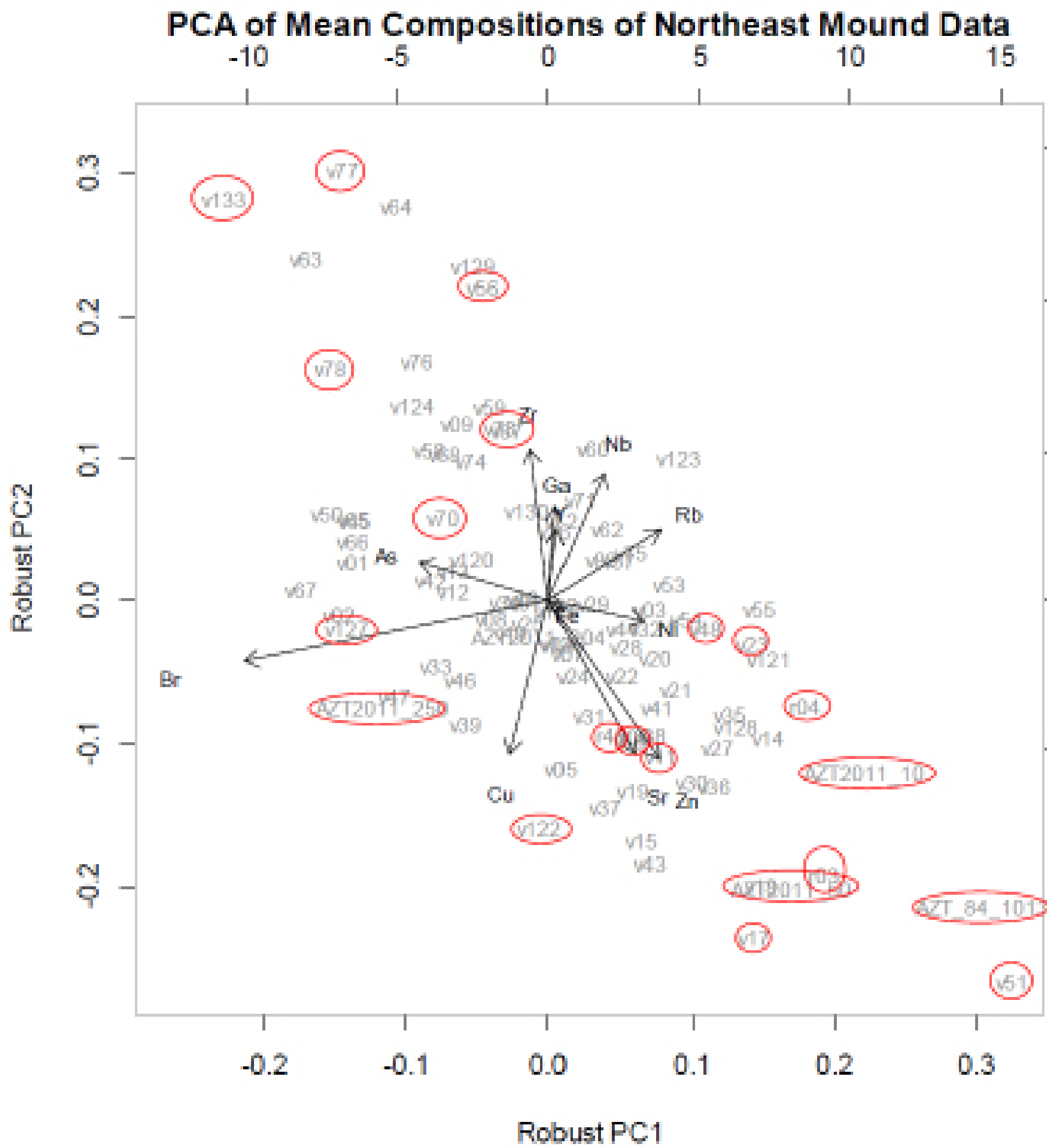


Figure 5.12. Northeast Mound PCA bi-plot of mean compositions with outliers (circled in red).

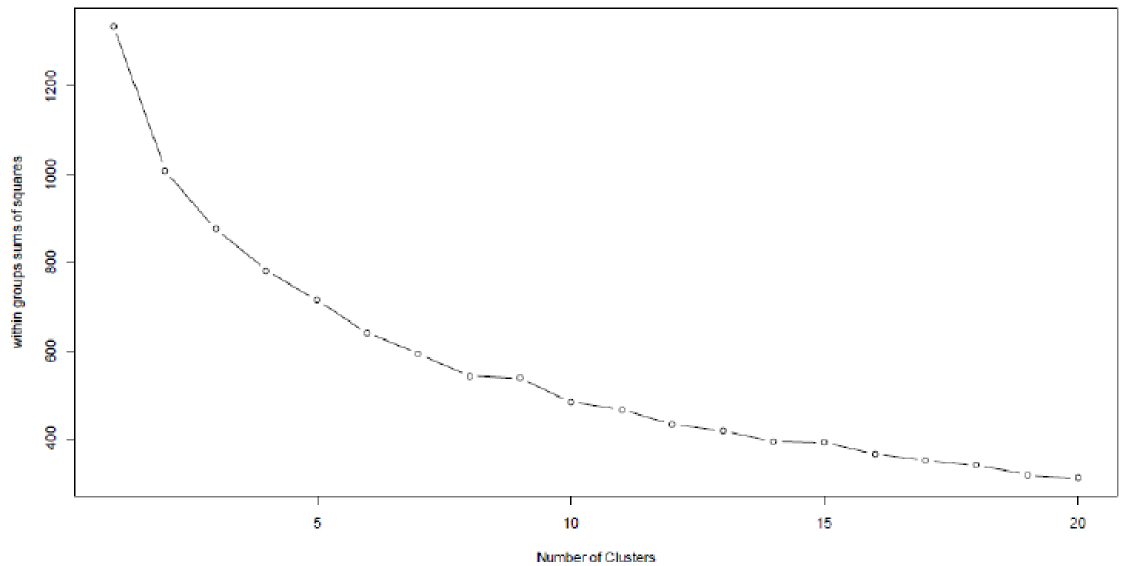


Figure 5.13. Sum of squares error plot.

trend gradually at a constant rate; no distinct 'elbow' is identified in the plot.

The dataset was then subjected to partitioning implementing the *pamk()* available in the *fpc* package (Hennig 2013) available in R. Based on the comparison of the average silhouette widths for several cluster arrangements, results indicated the optimum number of clusters for this dataset is two. The two clusters are plotted in Figure 5.14. Notably there is a large area of overlap between the two groups depicted in the plot. ANOVA tests using the first and second components shows a significant difference between the two clusters (PC1: $F_{1,96}$=7.7, p=0.006; PC2: $F_{1,96}$=7.0, p=0.009). No particular trend is apparent between the two clusters and the ceramic styles.

A model-based hierarchical clustering analysis was conducted next, utilizing the *mclust()* software command available through the R repository (Fraley, et al. 2012). This function identifies the best model used to fit the dataset, which in this case was an ellipsoidal multivariate normal model, made of one component. This suggests no particular sets of clusters can be defined to appropriately describe the dataset in terms of separate groups. This result corresponds with the sum of squares error plot which shows no visible 'elbow' in the graph (see Figure 5.13 above).

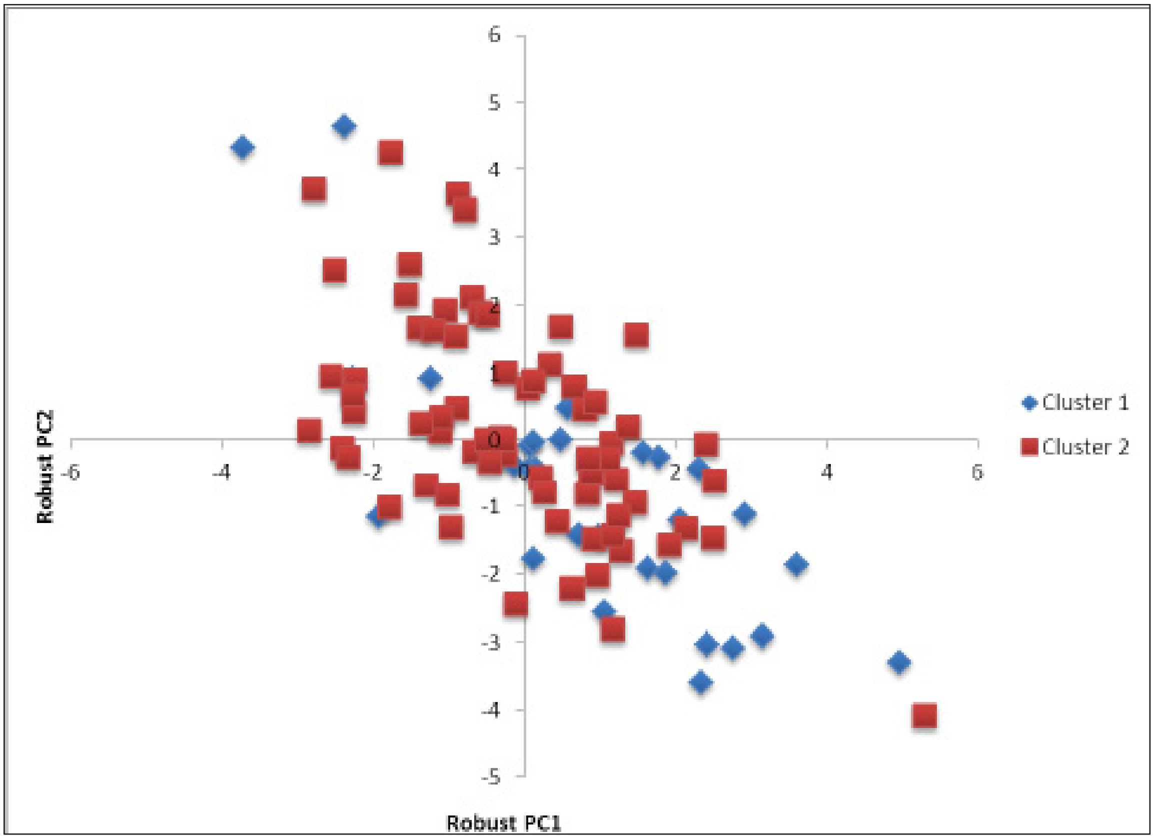


Figure 5.14. PCA Scatter plot with cluster assignments.

LATE WOODLAND PCA

Further exploration was conducted to underline any significant differences among the Late Woodland materials, based upon decorative treatment. Accordingly, a second PCA analysis was performed on only the grit-tempered Late Woodland ceramics in the Northeast mound assemblage. A scree plot of the principle component variation shows that variation begins to level off after the second principle component (Figure 5.15). The first principle component accounts for 19.12% of the variation, and the second 13.06%; cumulatively 32.18%. These results compare favorably with variation present in the entire Northeast Mound assemblage discussed above.

Like the previous PCA, the main source of variation in this dataset comes from the opposition of bromine (Br) to rubidium (Rb). Controlling for relative proportions of these two elements, the next most significant source of variation is the relative proportions of zinc

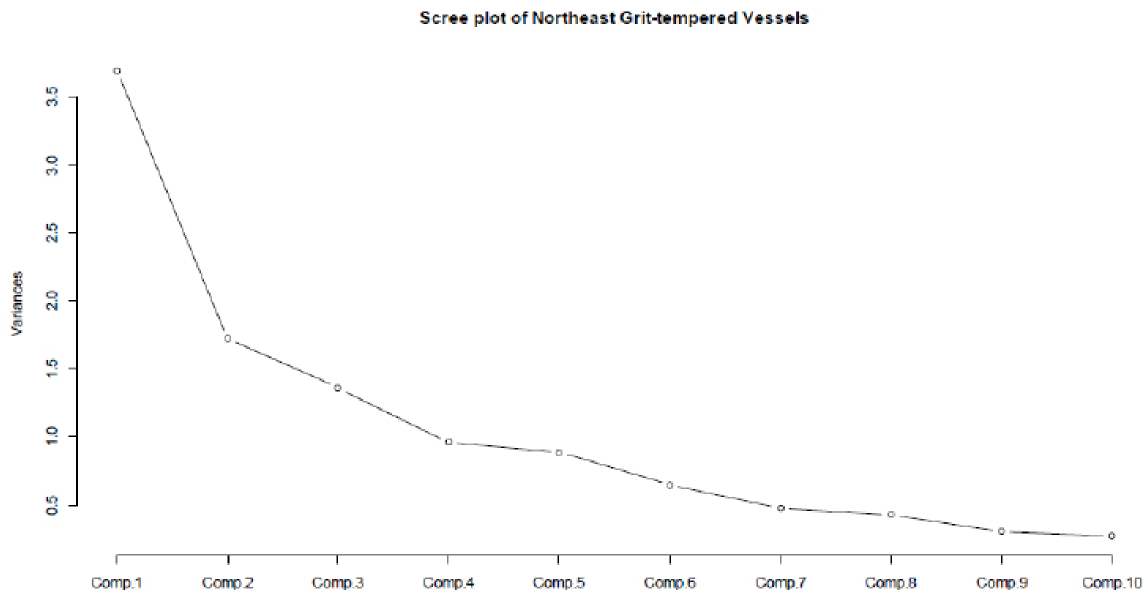


Figure 5.15. Scree Plot of Aztalan PCA principle component variations for grit-tempered vessels.

(Zn) and zirconium (Zr). These oppositions within the first and second principle components are the same as the overall dataset discussed above. Figure 5.16 illustrates the oppositions of the elements and the mean composition of each vessel.

PCA ANOVA TESTS – Late Woodland Vessels

ANOVA tests were performed respective to the decorative modes on Aztalan Collared vessels. Non-Aztalan Collared vessels were coded simply as their respective pottery type (e.g. Starved Rock Collared, Madison Cord Impressed, Madison Plain, Hyer Plain, & Unclassified). The non-collared vessels are included in order to identify significant differences between the specific collared decorative modes and non-collared wares. ANOVA results on the first principle component identify at least one decorative mode is significantly different than at least one other decorative mode ($F_{15,627}$=2.531, p=0.00117). However, post-hoc tests on the first principle component highlight no significant differences among the decorative modes ($p>0.05$).

ANOVA tests on the second principle component also identifies at least one decorative mode to be significantly different than at least one other decorative mode ($F_{22,627}$=3.7961, p=1.74e-06). Post-hoc tests identified five significant differences summarized

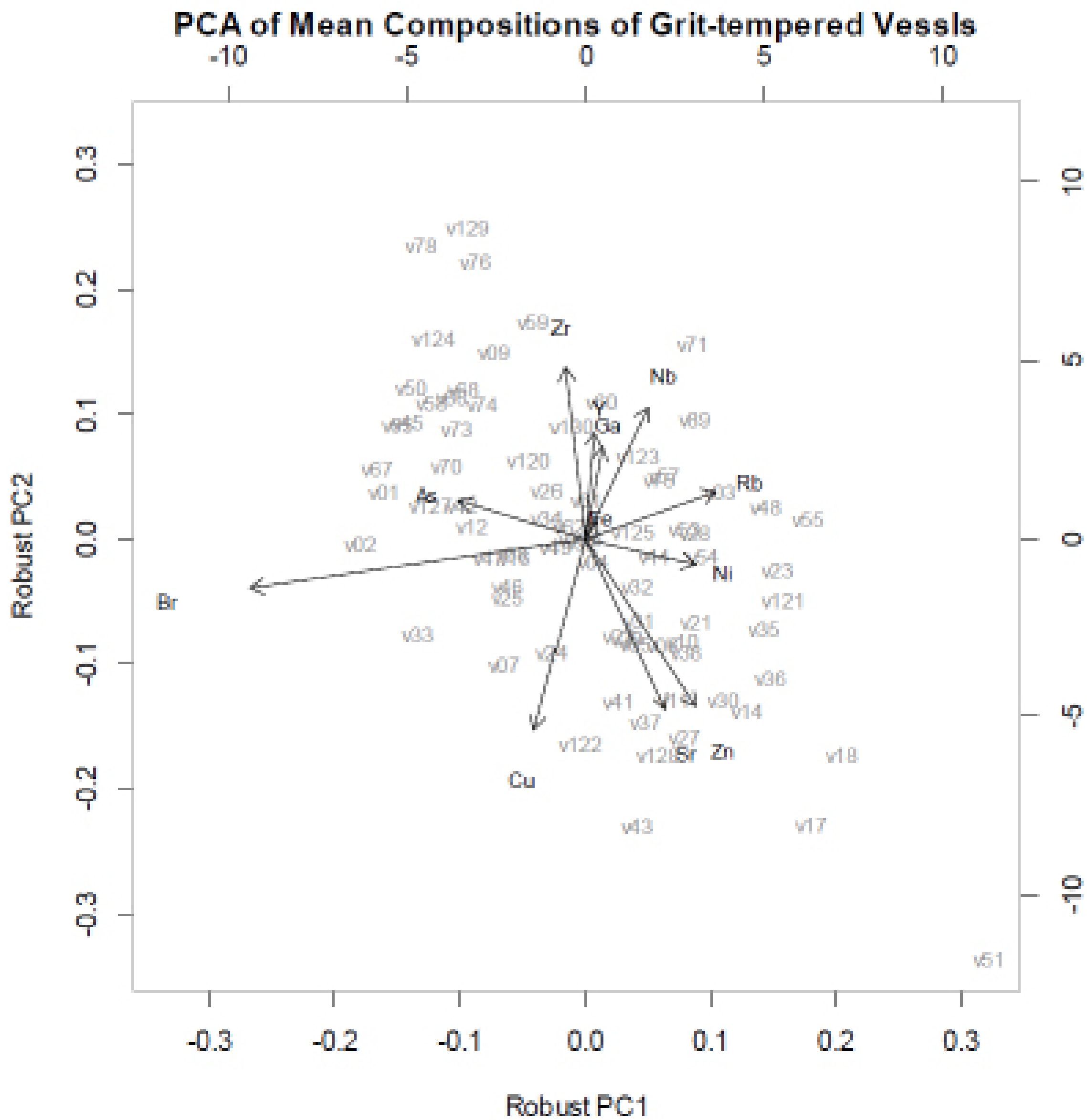


Figure 5.16. Northeast Mound Mean compositions of grit-tempered vessels only.

in Table 5.31. Concerning the decorative modes themselves, results suggests the chemical composition of mode F vessels differ significantly from mode B vessels (p=0.002). As mentioned earlier, undecorated jars (Mode A & B) are the most frequent Aztalan Collared mode, followed by Mode F (interior cord notched rims with exterior punctates). Hyer Plain vessels also are significantly different than mode B (p=4.2e-06), Starved Rock Collared (p=0.02985), and the unclassified (p=0.002872) vessels. Notably Starved Rock Collared vessels do not differ from any of the Aztalan Collared vessels when considering first and second principle

Table 5.31. Tukey Post-hoc Test: Significant Differences in Mean Scores of 2nd Principle Component, for Grit-tempered Vessels Factored For Decorative Modes.

Decorative Mode Ordered Pairs			*p* **adj**
Hyer Plain	-	Dec. Mode B	4.20E-6
Dec. Mode F	-	Dec. Mode B	0.002
Hyer Plain	-	Unclassified	0.003
Dec. Mode F	-	Unclassified	0.028
Hyer Plain	-	Starved Rock Collared	0.030

components.

DISCUSSION

As an exploratory tool, XRF analysis provides a complimentary approach to traditional ceramics analyses allowing for more nuanced characterization of objects and creating opportunities for further exploration of the meanings, practices, and histories surrounding those objects (Meskell 2005). Given the small amount of variability explained by the first two principle components characterizing this ceramic assemblage, it would be naïve to consider the results of this XRF analysis as anything but tenuous. Any conclusions must be contextualized and reaffirmed through supplementary studies such as petrography, X-ray diffraction, or the like. Still, the results highlight differences (beyond morphological attributes) between and among the Mississippian and Late Woodland ceramics at Aztalan that can be explored further.

Results suggest that the shell-tempered Mississippian vessels are generally chemically different than the local Late Woodland varieties. Also, some degree of diversity is present within the grit-tempered Late Woodland assemblage itself. The variable clay chemical signatures of the pottery identified through ANOVA and outlier tests suggest diverse Mississippian and diverse Late Woodland groups were associated with these materials. If we accept, based on morphological and stylistic attributes as well as chemical signatures, that these vari-

ous pots are indicative of different groups of people, it is possible these groups participated both in the activities associated with the sub-mound structure and likely the subsequent construction of the Northeast mound, while simultaneously retaining and redefining their Late Woodland and Mississippian identities.

CHAPTER 6: SUMMARY AND CONCLUSIONS

Culture contact situations are significant moments that reshape the manner in which individuals and communities negotiate and redefine their identities. Archaeologists typically recognize cultural contact through divergent material expressions of social identity embodied in lithic tools, architecture, pottery, and so on. The social interactions and practices different cultural groups experience and share are at the epicenter of culture creation and re-creation (Geertz 1975; Lightfoot and Martinez 1995; Lightfoot, et al. 1998). The consequent social interactions and associated practices are integral to how different groups negotiate their own individual and shared identities as well as their external relationships with these other groups. These negotiations, in conjunction with their associated practices and the groups' perceived identities, embody how these relationships create communities (B. R. Anderson 1991; Canuto and Yaeger 2000).

In this thesis, I have used cultural features and ceramic material remains associated with an earthen monument at the site of Aztalan to argue that the interaction of Late Woodland and Middle Mississippian peoples led to the creation of a new shared communal identity at Aztalan. The construction of the Northeast Mound, together with associated practices, were a means by which local inhabitants and non-local visitors actively constructed a history and created a sense of community, "making it a resource and repository of meaning, and a referent of their identity" (Cohen 1985:118).

ARCHITECTURAL EXPRESSIONS

Pyramidal earthen mounds are considered a hallmark of Mississippian society (Griffin 1983; Peebles and Kus 1977; B. D. Smith 1978a), and as such, their manifestation at sites inhabited by Late Woodland groups provide opportunities to explore the practices associated with Mississippian and Late Woodland group interaction and community construction. Between the 11th and 12th century A.D., as Middle Mississippian society was flourishing in the American Bottom, Mississippian lifeways were emerging outward through Mississippian immigrants, and possibly non-Mississippian visitors traveling through the American Bottom

(Alt 2006, 2012; Pauketat and Lopinot 1997), into the northern woodlands. Eventually these movements reached the Aztalan site in Southeastern Wisconsin, an extant Late Woodland village. The introduction of these Middle Mississippian lifeways resulted in the eventual construction of pyramidal mounds, new architectural forms, and specialized buildings.

Wisconsin Historical Society excavations during the 1960s into the Northeast mound identified several sub-mound pit features, structures, and a series of intensely utilized hearths. This included a large non-domestic structure built using a combination of single post and wall trench construction techniques (Structure 5). Additionally, the remnants of what appear to be three single-post structures were found beneath the north slope of the mound.

At least one of the structure floors (Structure 1) was lined with a yellow and dark clay coating. Pit Feature 31-68 within Structure 5 also was lined with yellow-colored clay. Additionally, the uppermost zone of Feature 31-68 contained mound fill, indicating the pit was in use up to the time construction of the mound began. Additionally the floor of Structure 5 was covered with a thin layer of yellow-colored sand. These specialized depositional treatments also have been identified in Middle Mississippian features (including temple structures) at the Pfeffer site, east of the American Bottom (Otten, et al. 2007). At Pfeffer, excavators posited that the practice of adding yellow and dark linings may have been part of a renewal or harmonizing practice performed prior to the deposition of certain materials within the features. In the Aztalan case, those 'certain materials' appear to have been mound fill.

The easternmost structure under the northern slope of the mound exhibits at least one episode of reconstruction. Similar practices have been argued above for the other structures as well. This indicates that this line of structures was utilized for some duration, and the presence of mound fill within their basins and internal pit features (see Figure 4.32) demonstrates these structures were used up to the time of mound construction. Refuse deposits associated with these structures and associated pit features produced local varieties

of ceramics including the hybrid, grit-tempered Hyer Plain ceramic vessel fragments which derive from the Middle Mississippian Powell Plain form (Richards 1992). Additionally, prior to mound construction, a larger Starved Rock Collared pot (v50) was placed, in an inverted position, in a pit feature (F2-68) located between a series of apparent Late Woodland structures and a Middle Mississippian edifice. The results of the XRF analysis described in Chapter 5 suggest these vessels were manufactured locally; representing a local population. The scarcity of Middle Mississippian ceramic materials contrasted with the abundance of Late Woodland materials in sub-mound contexts advocates a local Late Woodland presence under the mound, just north of the large sub-mound building (Structure 5). Still, the use of Hyer Plain ceramics and intentional lining of features suggests incorporation of Middle Mississippian styles and practices.

The sub-mound and mound-top structures associated with the Northeast Mound are among the largest recorded structures in the Mississippian world. Below the mound, Structure 5 covers an area greater than 300 m^2; likely similar in size to the MPM structure identified atop the mound measuring 375 m^2. Both of these structures show evidence for internal posts that likely supported a roof. The large structure atop Monks Mound at the Cahokia site remains the largest reported Middle Mississippian structure with a floor area of 427 m^2, and also exhibited large internal support posts (Fischer 1972:57); Reed (2009:Table 2) reports this structure spanned 413 m^2. A wall-trench structure at the Etowah site in Georgia (also numbered Structure 5) adjacent to Mound C covers an area of approximately 405 m^2 (King 2003). At the Orendorf site in the Central Illinois River Valley, Structure 8-4 spans an area of 309 m^2 (Esarey and Conrad 1981:281). Slightly down river, excavations at the Myer-Dickson site (the bluff-top occupation above the Eveland Site) identified a large rectangular wall-trench structure with several large internal support posts covering an area of 350 m^2 (Conner 2009). In the Upper Midwest, similar sized structures are unknown until the 15th Century A.D. at the Oneota site of Tremaine near La Crosse, Wisconsin (Hollinger 1993:Table 3).

Within Structure 5 at Aztalan, excavators noted the presence of several burned areas on the floor, but no associated burned debris was present and none of the neighboring structures show evidence for burning. In fact, the floor of Structure 5 was completely devoid of artifacts. Internal hearths were cleaned of ash and charcoal debris. A sterile layer of yellow sand was laid down on the floor just prior to mound construction. The structure and its associated hearth features were apparently cleaned just prior to mound construction. If Structure 5 had burned, this practice can be interpreted as a deconsecration or termination of the structure (Baltus and Baires 2012). Similar termination practices are noted at Middle Mississippian sites with special-use structures, including charnel structures, associated with mound and non-mound contexts and occasionally including ritual paraphernalia left inside (Baltus and Baires 2012; Douglas 1976; Emerson 1997a; Fowler 1997; Fowler, et al. 1999; Jackson, et al. 1992; Pauketat 1993, 2004, 2005a; Pauketat and Alt 2003; Pauketat and Bernard 2004; Pauketat and Emerson 1997; Pauketat and Woods 1986; Pursell 2004; H. M. Smith 1969; Welch 2006). Large scale, orchestrated burning events of architecture or objects transmitted messages to members of the community who witnessed the conflagration, creating new memories and meanings shared by all (Jones 2010).

The regular practice of cleaning and relining of the hearth features below the mound suggests that the element of fire was an important and likely powerful agent in the lives of Aztalanians. These sub-mound fires were eventually recreated atop the mound, following its construction. Fire has been shown to have played an integral role in Middle Mississippian ritual-political practices (Baltus and Baires 2012; Emerson 1997a; Hall 1997, 2000; Pauketat 1993, 2008). It possess a transformative power, undoubtedly recognized all members of the community given its regular use for cooking, home heating, and the manufacture of clay into ceramic vessels (Hall 1997). Ethnohistoric accounts have documented the importance of fire in Native American ceremonialism, including the Osage, Cherokee, Natchez, and Creek groups who often maintained fires in council houses, or a chief's house atop an earthen platform mound (Bailey 1995; Hough 1926).

The post pit, Feature 26-68, located along the central axis of Structure 5 may have functioned as an internal post supporting a roof. The post's location along the central axis of Structure 5 advocates some association between these two features. The large structures at Myer-Dickson and atop Monk's Mound, mentioned above, also exhibited large internal posts with insertion and extraction ramps (Conner 2009; Fischer 1972). The association of large marker posts (i.e. non-architectural support posts) with structures also has been documented at several sites in the American Bottom (see Skousen 2012:Table 2). Investigations at the Middle Mississippian center at East St. Louis identified more than 30 instances of post pits associated with structures (Kruchten and Galloy 2010; Skousen 2012:Table 2). These posts were raised, stood for an unknown length of time, and eventually were removed and replaced by the construction of individual structures centered over the location of the former post (Fortier and Finney 2007; Kruchten and Galloy 2010; Skousen 2012). A prominent example of this practice was identified at Cahokia. The winter solstice sunrise post at the Woodhenge west of Monk's Mound was recalled by the construction of a Moorehead phase structure over that space. A central pit within the structure (later reutilized as a hearth) was dug over the spot of the former post (Pauketat 1998:Figure 6.8) (Pauketat 1998; Skousen 2012; Wittry 1980).

However, it is probable the Aztalan post pre-dates Structure 5, as suggested by the lack of mound fill noted within the feature. If the post predated the structure, it may have stood as a solitary marker post demarcating an inner village space such as a courtyard or plaza area. The association of a standing post, removed and eventually replaced with a mound also evokes the series of large posts buried beneath a line of conical mounds just north and east of the palisaded area at Aztalan. Milwaukee Public Museum excavations identified large marker posts had stood atop the ridge overlooking the site; each eventually removed and covered by a conical mound (Barrett 1933). The association of large posts and Middle Mississippian mounds is well documented (Fortier and Finney 2007; Fowler 2003; Fowler, et al. 1999; Pauketat 1993, 2005a; Reed 2009). Specific covering of a former post beneath a coni-

cal mound also has been documented in the Kruchten Mound at the Pfeffer site, just east of the American Bottom in Lebanon, Illinois (Pauketat 2009b).

RECONFIGURING THE LANDSCAPE

Profiles of the Northeast Mound illustrate it was constructed in a series of short-term episodes, including the formation of small internal-mound constructions; possibly early platforms. Evidence for sequential living surfaces is lacking, though paired yellow and dark-colored mantles are present at the base of the mounds. The lack of living surfaces corroborates Freeman's assertion that the mound was constructed as a single stage (1986:345). However, rather than perceiving mound construction as a single 'event,' evidence from profiles and field photos suggests the construction of the Northeast Mound is more appropriately viewed as continuous, short-term 'episodes' of mound construction, likely incorporating multiple mound stages. This includes the construction, use, and removal of the sub-mound structure (Structure 5), the cleaning of the sub-mound surface and several pit features, the construction of the mound, incorporation of ceramic vessels into the mound, and eventual construction of the mound-top structures.

Mound construction practices incorporating paired colored layers of soil have been documented in the Southern Mississippi River Valley as well as at Cahokia and other American Bottom sites (Knight 1989; Pauketat 1993, 2000; Pauketat and Alt 2003:165; Pauketat, et al. 1998; Porter 1974; Pursell 2004; Reed, et al. 1968; Skousen and Pauketat 2013; H. M. Smith 1969). Late Woodland Effigy Mound construction also incorporated the use of sequential layering of colored soils at the Kratz Creek mounds, in Marquette County, Wisconsin (Barrett and Hawes 1919:15-16),though, these depositional practices are not ubiquitous for all Late Woodland mounds (e.g. McKern 1928; McKern 1930). Still, it is apparent that Late Woodland groups in the region and Middle Mississippian immigrants both likely possessed knowledge, or had access to knowledge pertaining to the construction of earthen monuments.

The majority of the ceramic materials recovered from the mound fill represent local Late Woodland ceramic styles, though a few Middle Mississippian sherds are present indicating cohabitation by both groups by the time of mound construction. Results of the XRF analysis suggest the vessels intentionally buried in the mound during the construction process included jars of extra-local origin. Shell-tempered, Middle Mississippian jar forms dominate, but include two Hyer Plain vessels. The latter are posited as hybrid forms of Powell Plain jars by Late Woodland potters (Richards 1992). These vessels, or other localized versions are found across southern Wisconsin (Barrett and Skinner 1932:429-437; Finney and Stoltman 1991; Hendrickson 1996; Overstreet and Bruhy 1979; Overstreet and Clark 1995). Similar localized renditions likewise have been recovered at Middle Mississippian contact sites in Illinois (Claflin 1991; Douglas 1976; Harn 1991; McConaughy 1991; McConaughy and Bade 1993).

Construction of the mound-top structure(s) and utilization of associated pit and hearth features re-establishes the sub-mound Structure 5 complex buried beneath the mound. When considering the linear deposit, or cache, of Late Woodland and Middle Mississippian vessels into the mound during construction, these practices are a citation of the past, sub-mound space. These practices both promoted and reinforced a local Late Woodland identity, while simultaneously incorporating a multitude of regional identities embodied within the interred Middle Mississippian, Late Woodland, and Hyer Plain vessels. These citations would be re-visited and re-lived by the addition of more pots (v133) and/or pot fragments within pits (F18-68 & F19-68) after mound construction was completed. This mode of vessel deposition parallels episodes of multi-group artifact caches in the American Bottom region, including celt caches at the East St. Louis, Lohmann, Horseshoe Lake, and Grossman sites (Esarey and Pauketat 1992; Pauketat 2005b; Pauketat and Alt 2004), the projectile points, chunkey stones, and mica caches in Mound 72 at Cahokia (Fowler, et al. 1999), and a cache of whelk shells at the Janey B. Goode site. As has been argued for these other caches, the specialized depositions of pots in the Northeast Mound at Aztalan reflects an

attempt to integrate local and Middle Mississippian practices and identities (c.f. Bradley 2000; Pauketat and Alt 2004).

A NEW COMMUNITY

At the Aztalan site, three earthen pyramids and a natural gravel knoll dominate the landscape. Prior to the introduction of Mississippian lifeways and the construction of these mounds, earlier inhabitants of the region had constructed earthworks along the eastern bank of the Crawfish River, directly opposite a series of natural springs that flowed into the river. How the construction of the line of conical mounds northeast of the palisaded area fits into the chronology of the Aztalan site remains uncertain, but it is possible they too predate the Mississippian influences. Many of the effigy mounds found in southern Wisconsin were constructed in prominent locations on the landscape, reflecting communal construction practices that were repeated over time (Birmingham and Eisenberg 2000). Earthen mounds undoubtedly connected people with the past by serving as mnemonic devices that linked particular events, objects, and ancestors to a particular place and time.

Landscapes are often reused though time, demonstrating the motivation of people to recycle memories and harness the 'power of a place' (Basso 1996). Discussing Middle Woodland sites in Southeastern Wisconsin, Goldstein (1992:158) has noted that a vast majority are multi-component sites. The Alberts site, several miles east of Aztalan along the banks of the Rock River, is one example. Here excavations into conical mound revealed a long chronology of repeated indigenous practices (Jeske 2006). Jeske and Kaufmann report (Jeske 2006; Jeske and Kaufmann 2000) the mound was built over a Late Archaic/Early Woodland fire pit. Within the mound itself, a Middle Woodland vessel was intensely burned, then crushed beneath a large rock weighing 19 kg. During the Late Woodland period, a linear effigy mound was constructed adjacent to this conical, while the surrounding area produced materials dating from the Archaic through Late Woodland and Mississippian periods. The Aztalan site similarly shares a long chronology of use from the Archaic through the Woodland and Mississippian periods (Richards 1992; Sampson 2008). An 18th century occupation by Wiscon-

sin Indians has been documented at the site and the Ho-Chunk were known to have moved in and out of the area during the same time (Barrett 1933; Birmingham and Goldstein 2005). Jeske (2006:303) posits, correctly I believe, that places demonstrating reuse by human actors can exhibit long-standing sets of practices that are repeated or (perhaps more appropriately) revitalized by subsequent groups, forcing us to re-conceptualize definitions of archaeological 'cultures,' or communities. Reuse or re-appropriation of earlier landscapes with established histories is an explicit way in which people engage and are connected with the past (Williams 2003:3).

Places and objects are made meaningful in relation to particular actions by (or in the presence of) particular actors at particular times and in particular places(Meskell 2005). As people engage with history-imbued landscapes and objects, social memories, or collective notions of how things once 'were' in the past, are created and recreated (Van Dyke and Alcock 2003). Group histories are continually constructed, deconstructed, and reconstructed, and the biographies of objects are grounded in the movement of people and ideas through meaningful landscapes. Physical places can be viewed as citations of past events that, when seen or spoken, recreate a communal history (Pauketat and Alt 2003:162).

It is at the juncture of people, place, and similar (and sometimes dissimilar) ideas where communities are actively and continuously constructed (Canuto and Yaeger 2000). 'Community' simultaneously implies 'difference' and 'sameness;' that is, people have something in common with one another, which distinguishes them from other groups (Cohen 1985:12). It is where "people acquire their most fundamental and most substantial experience of social life outside the confines of the home" (Cohen 1985:15). As social beings, people construct their (individual and communal) identities from the relationships they perceive as 'close to them' (Cohen 1985; Geertz 1975). The introduction of Middle Mississippian peoples and practices to the existing Late Woodland community at Aztalan, a landscape rich with previous histories, undoubtedly established new relationships that served to construct a shared community, evidenced by the coeval occupation of both groups (Birmingham and

Goldstein 2005; Goldstein 1991; 2010; Goldstein and Freeman 1997; Goldstein and Richards 1991). Meaning-laden landscapes such as Aztalan, with its natural springs, flowing river, and existing man-made monuments, attract various groups to them. In turn, people then remake those landscapes meaningful through their own practices.

The practices associated with the construction of the Northeast Mound included the termination of a supra-domestic sub-mound structure, deposition of layered soils by the basket-full, the caching of ceramic vessels into the mound during and after construction, and the re-establishment of the sub-mound structure atop the mound. These practices simultaneously integrated local Late Woodland and immigrant Middle Mississippian practices and identities, resulting in the construction of a new community (B. R. Anderson 1991; Bradley 2000; Canuto and Yaeger 2000; Cohen 1985; Pauketat and Alt 2004).

This linked the past to the present in the manner that the mound-top structure is linked to the sub-mound structure; as the buried Late Woodland jar below the mound is recited in the burial of mound-top vessels. These traditions are thus remembered, and relived. Continual mound construction is witnessed at Aztalan in the other platform mounds, each subject to at least three construction episodes over time (Maher 1958; Rowe 1956).The practices associated with the Northeast Mound, occupying a prominent space adjacent to the village area at Aztalan (Birmingham and Goldstein 2005; Freeman 1986; Goldstein and Freeman 1997; Goldstein and Richards 1991), would serve as symbolic devices through which social identities, memories, and community boundaries were reaffirmed (Cohen 1985).

This thesis offers a fresh perspective for conceptualizing Middle Mississippian and Late Woodland social interactions at Aztalan, and perhaps throughout the region. These exchanges, as represented by the deposits of the Northeast Mound at Aztalan, demonstrate shared participation in the activities associated with the sub-mound structure and the subsequent construction of the mound while simultaneously retaining and redefining Late Woodland and Middle Mississippian identities. Simultaneously, the construction of these structures and the mound itself did not alter the significance of the Aztalan landscape, but rather

added to it (Thomas 1996:89). Concurrently, these practices fashioned new social-religious meanings, memories, and relationships that became encapsulated below and within each basket-load of earth, surviving as prominent material expressions of the past and a perceived present. These practices represent a social negotiation that brought changes in meanings, dispositions, identities, and traditions for both the Late Woodland and Middle Mississippian residents resulting in the construction of a new community at Aztalan (Bourdieu 1977; Giddens 1979; Pauketat 2001a, b; Pauketat and Alt 2005).

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APPENDIX A: PIT AND HEARTH PROFILE ILLUSTRATIONS

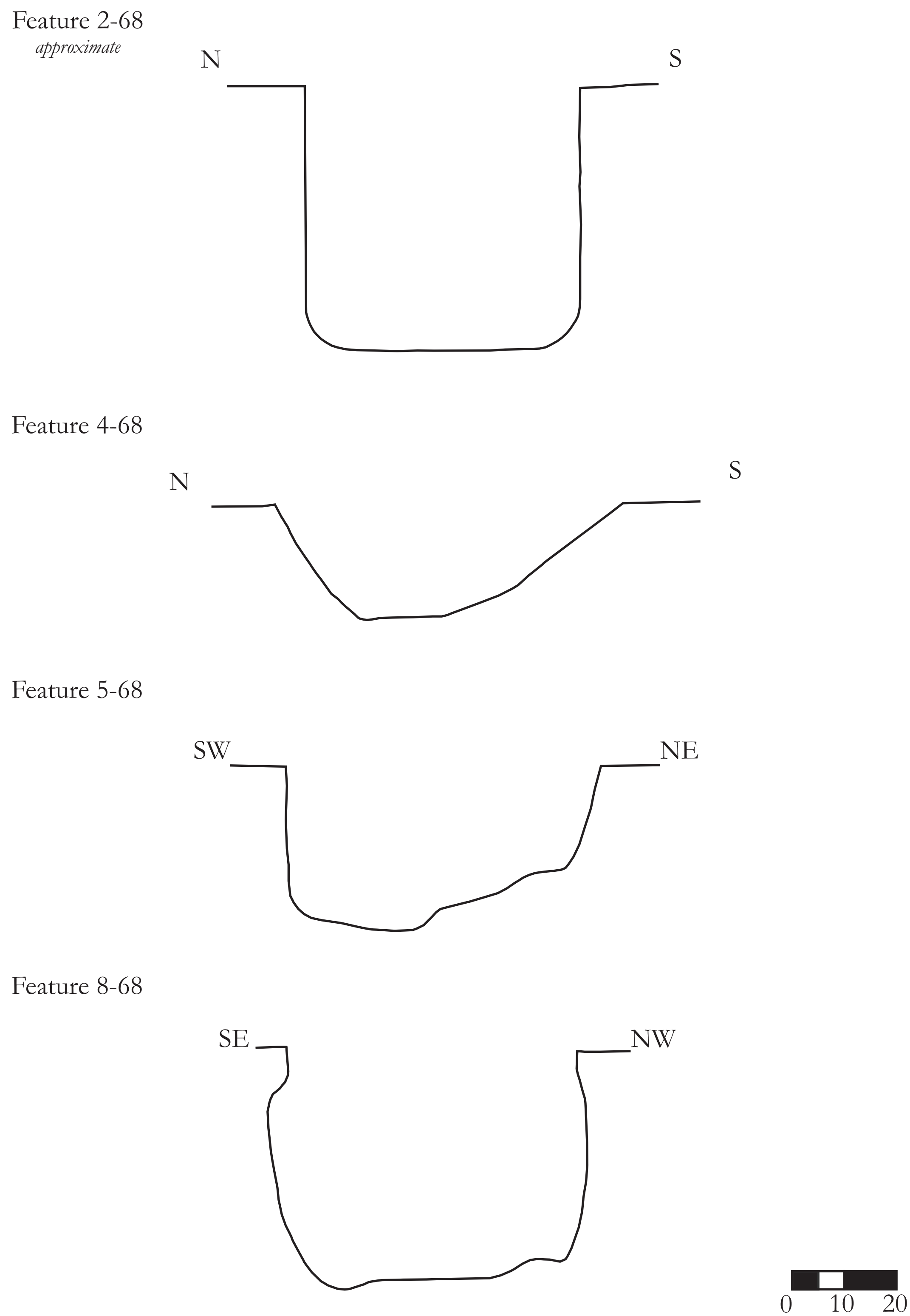


Figure A.1. Pit feature profiles: 2-68, 4-68, 5-68, & 8-68.

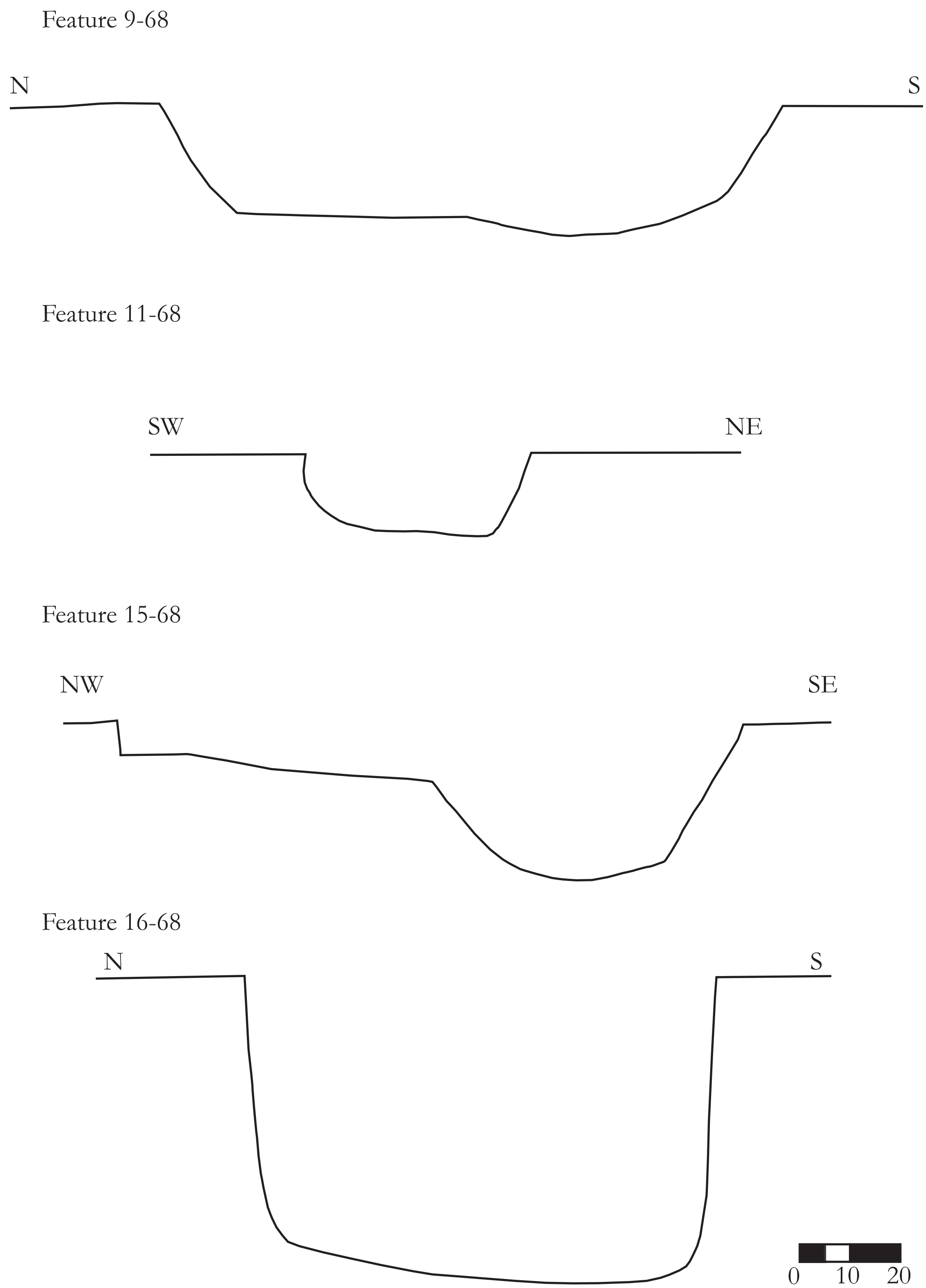
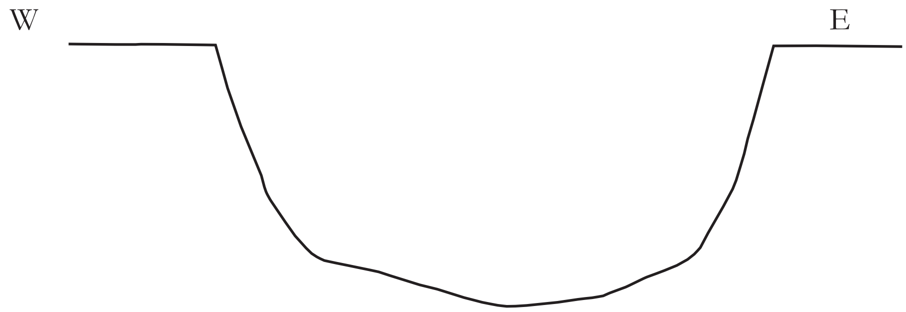


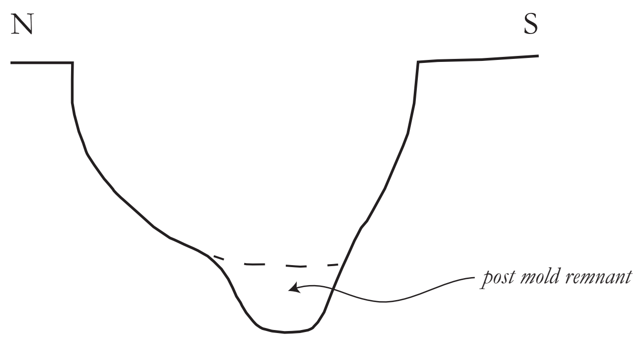
Figure A.2. Pit feature profiles: 9-68, 11-68, 15-68, & 16-68.

Feature 17-68



[No cross-section profile available for 18-68 or 19-68]

Feature 21-68



Feature 22-68

Feature 23-68

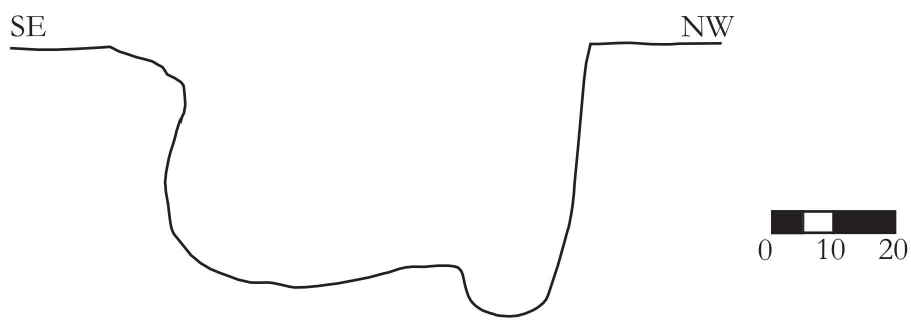


Figure A.3. Pit feature profiles: 17-68, 21-68, 22-68, & 23-68.

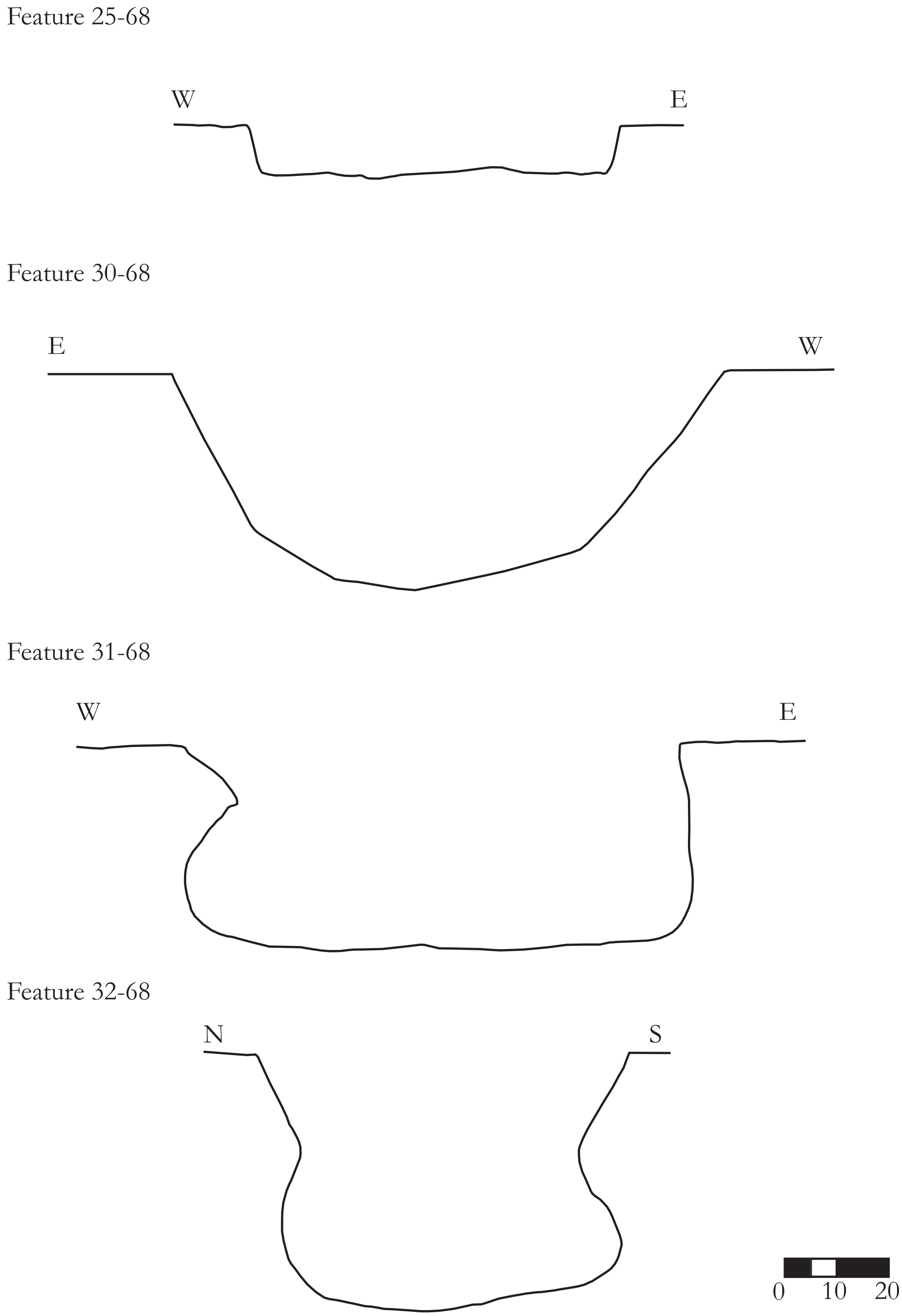
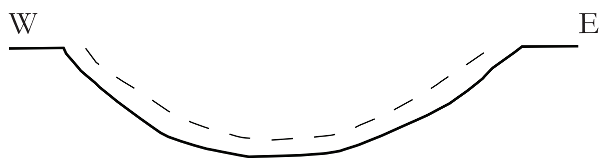
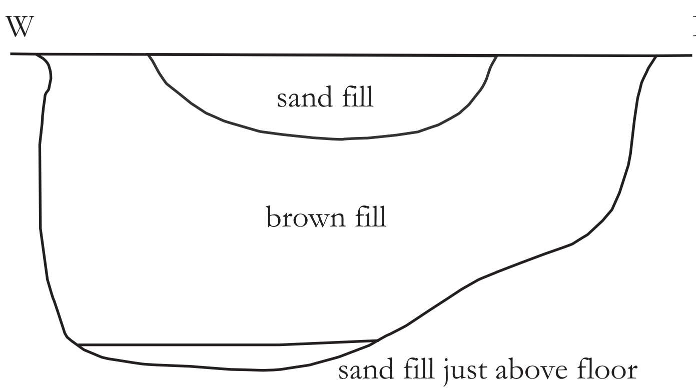


Figure A.4. Pit feature profiles: 25-68, 30-68, 31-68, & 32-68.

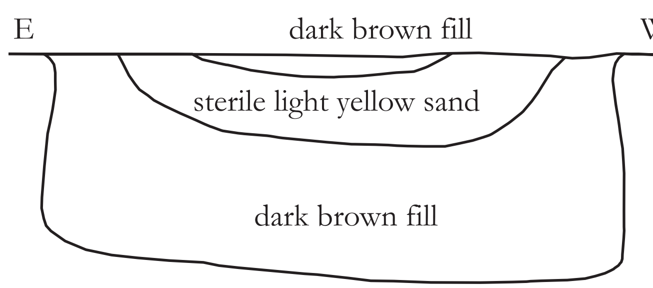
Feature 38-67



Feature 39-67



Feature 39-67 (cont'd)



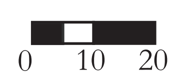


Figure A.5. Pit feature profiles: 38-67 & 39-67.

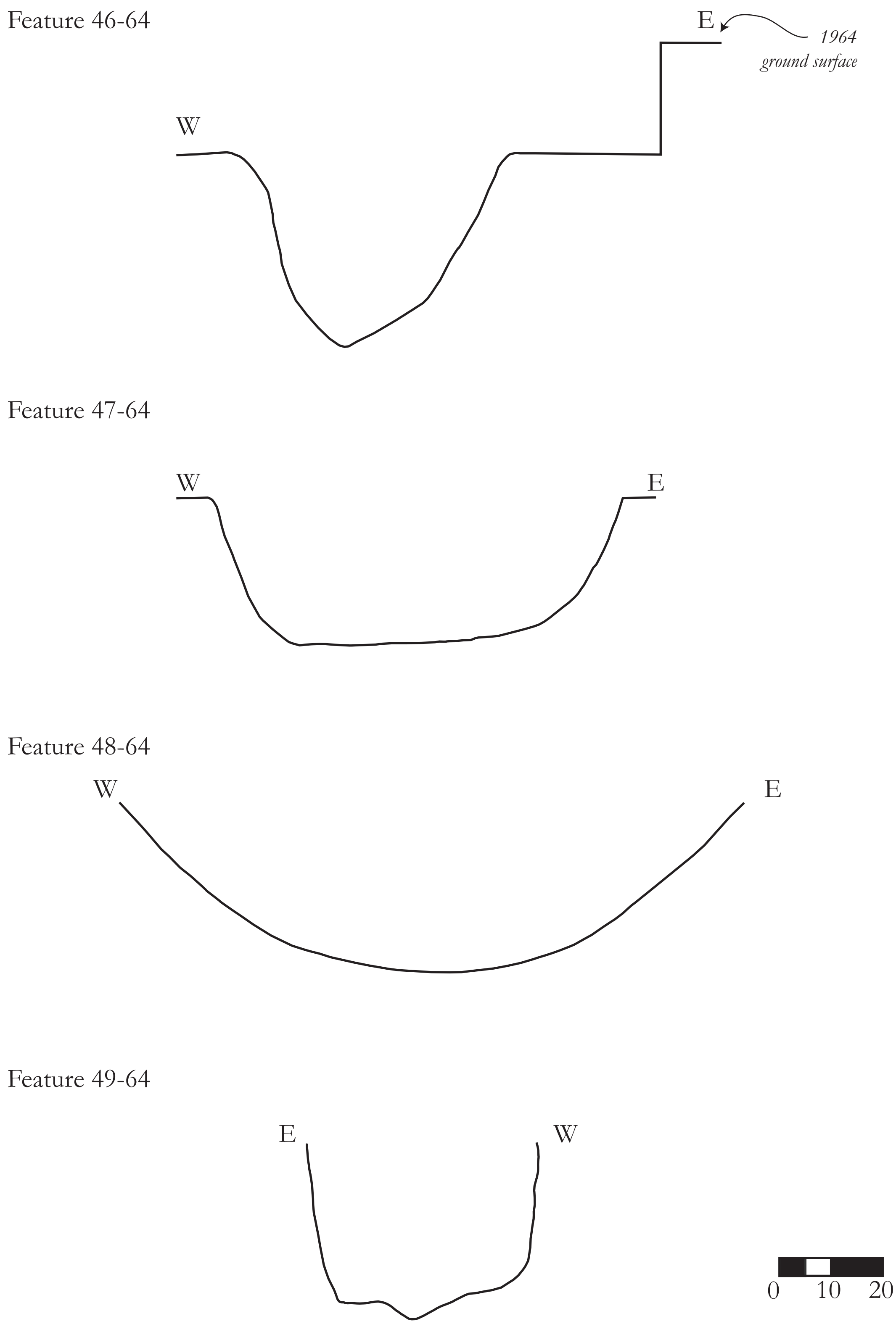


Figure A.6. Pit feature profiles: 46-64, 47-64, 48-64, & 49-64.

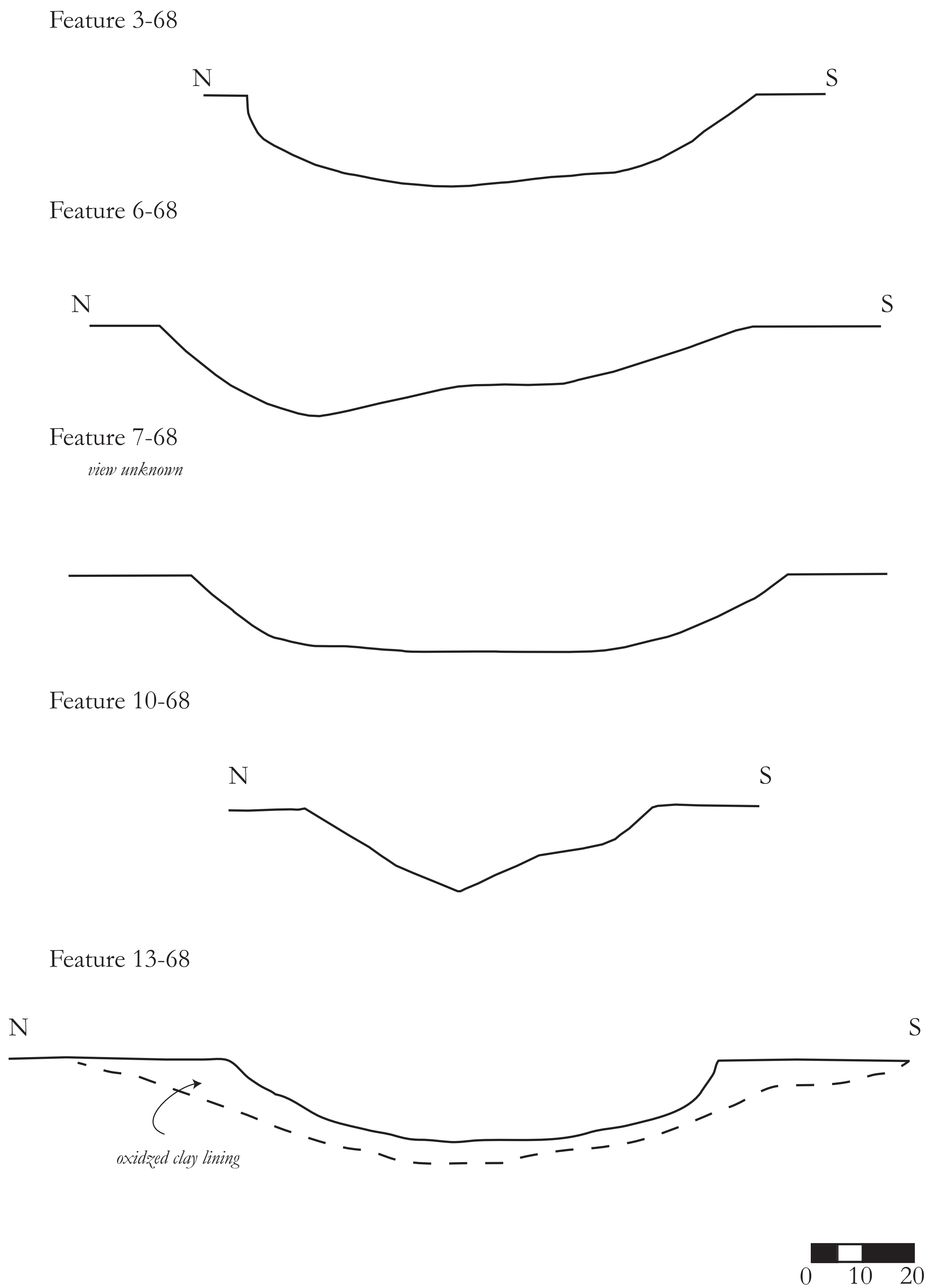


Figure A.7. Hearth feature profiles: 3-68, 6-68, 7-68, 10-68, & 13-68.

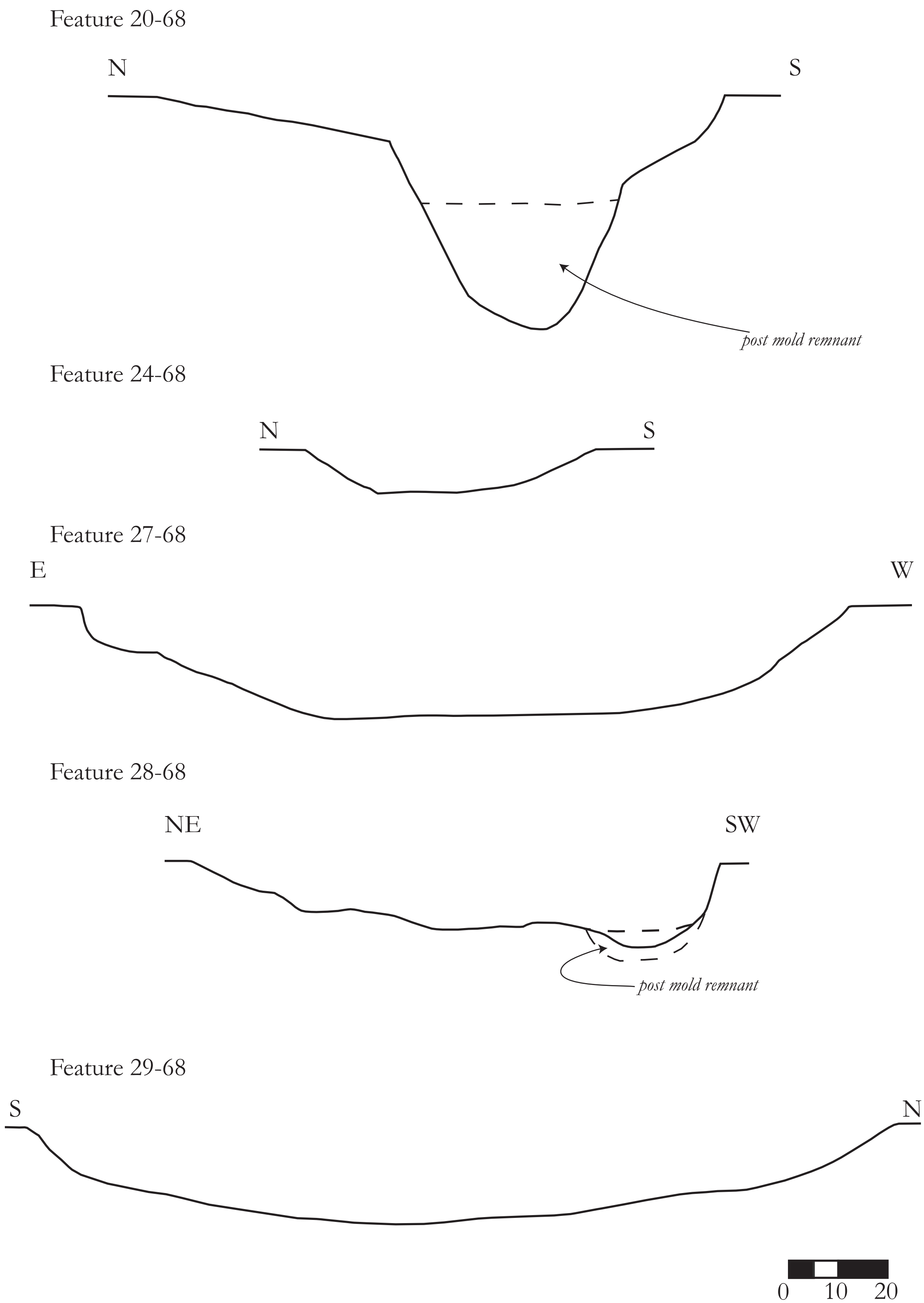


Figure A.8. Hearth feature profiles: 20-68, 24-68, 27-68, 28-68, & 29-68.

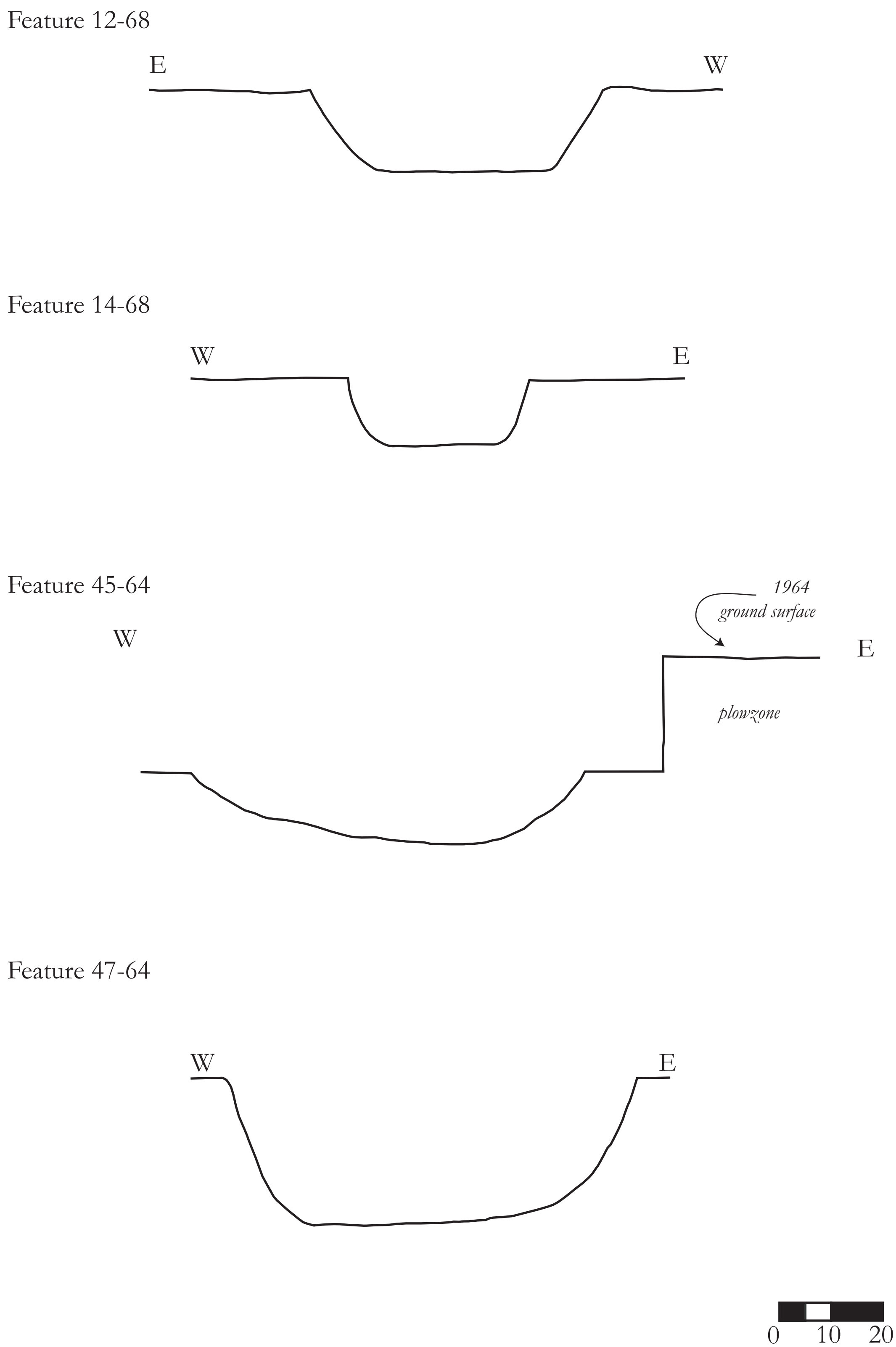
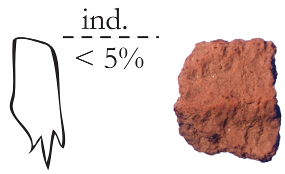


Figure A.9. Possible hearth feature profiles: 12-68, 14-68, 45-64, & 47-64.

APPENDIX B: VESSEL PLAN AND PROFILE ILLUSTRATIONS

V 1

V 2

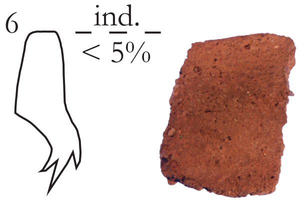


V 3

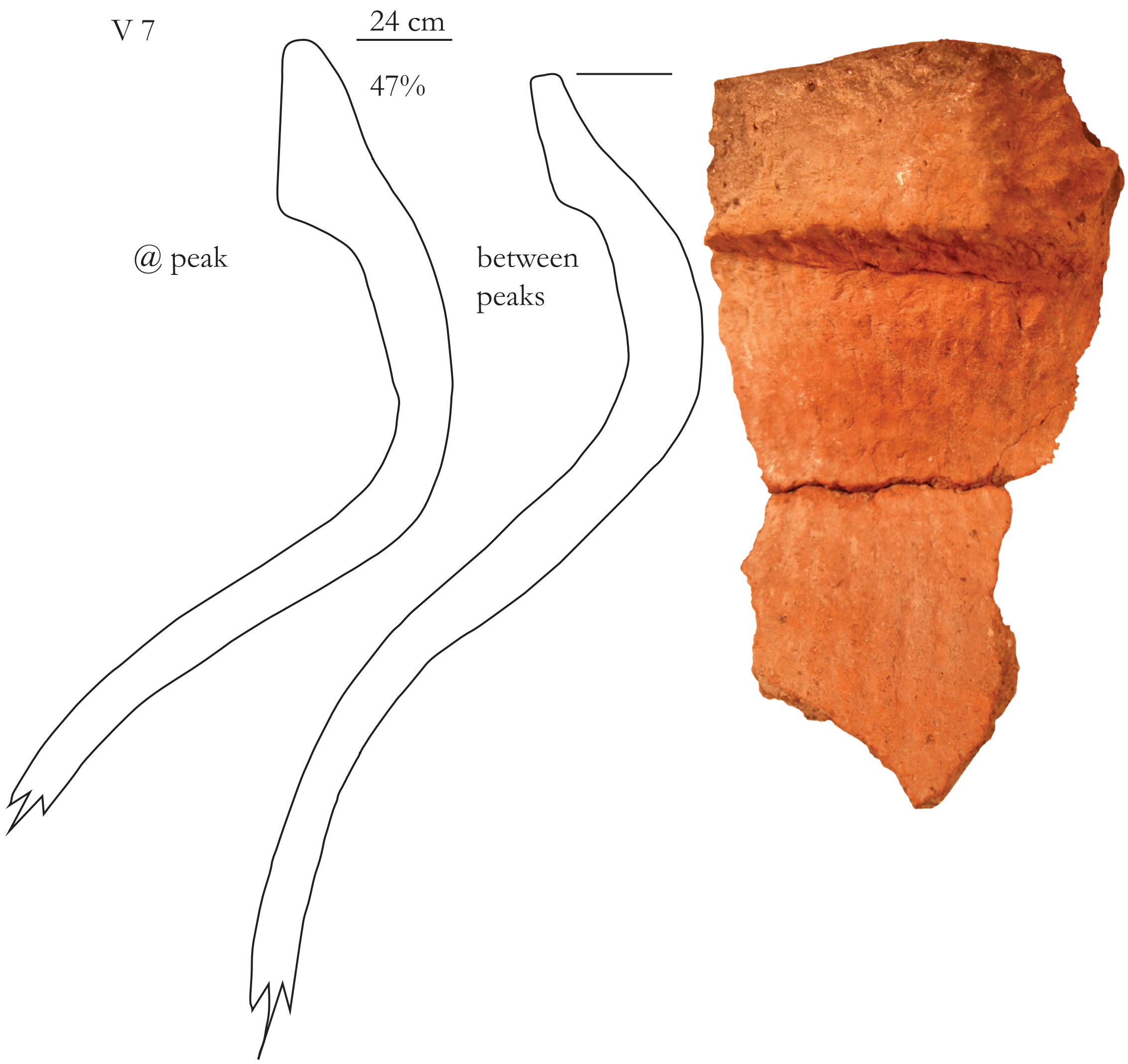
V 4

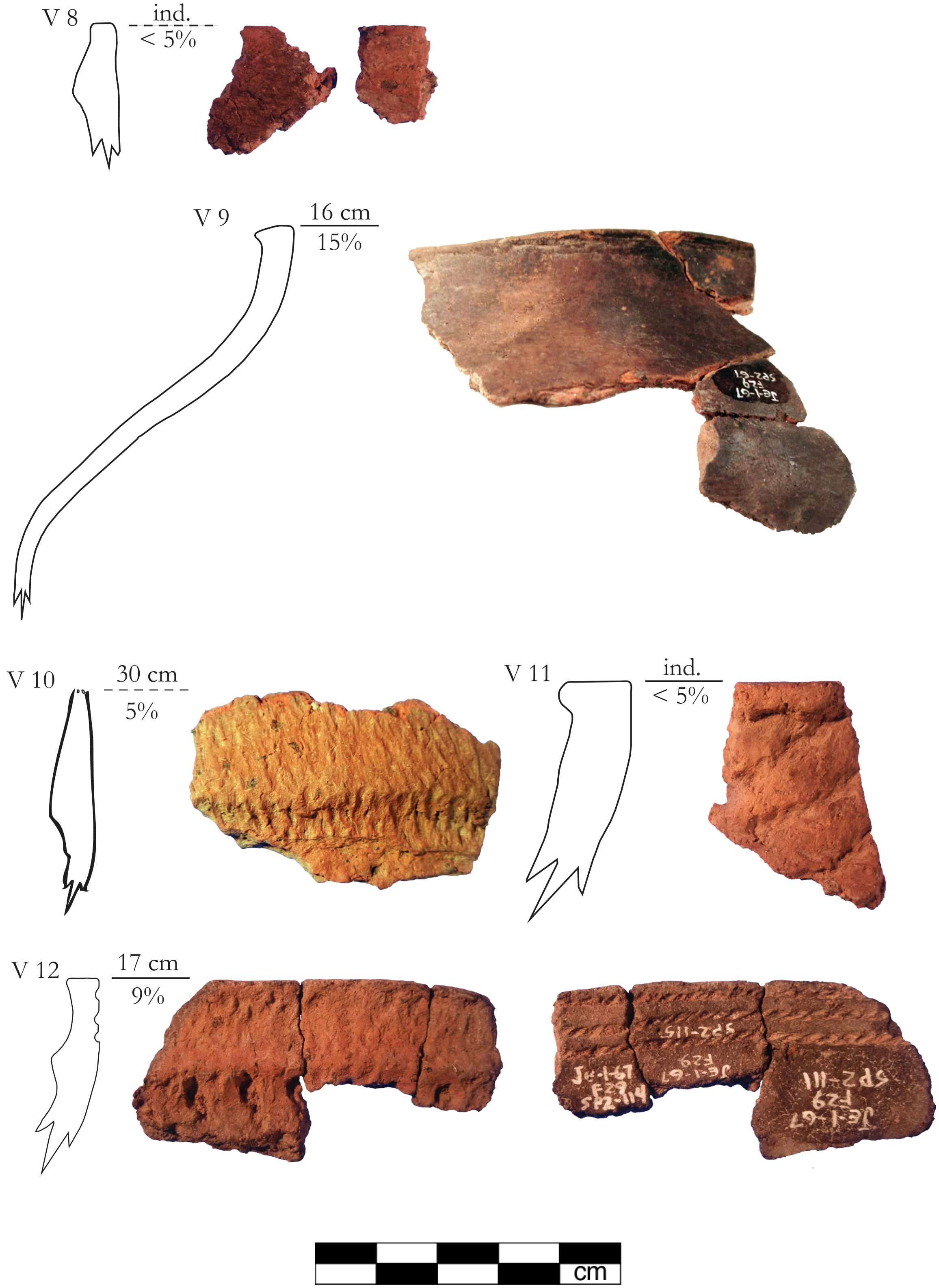
V 5

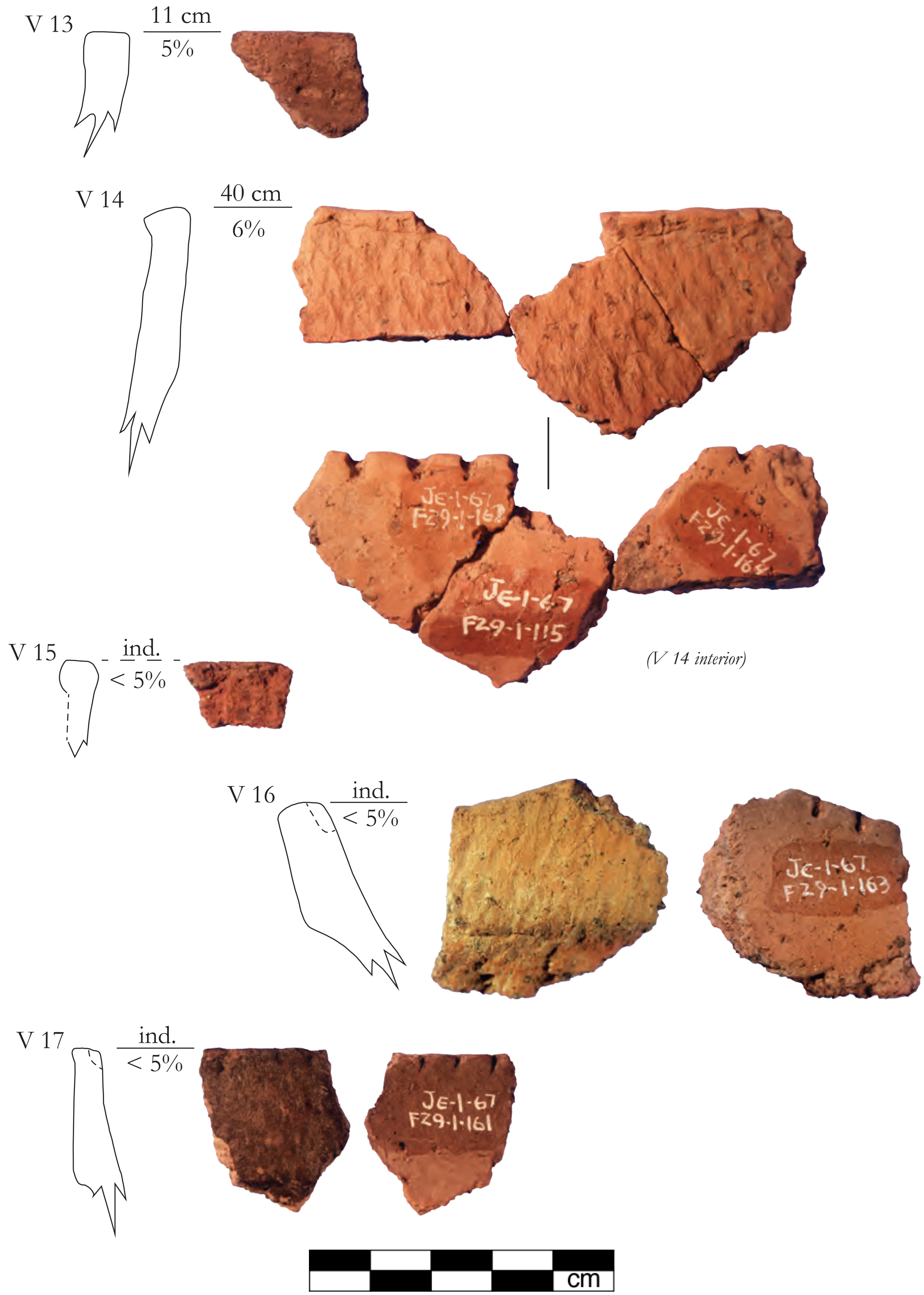
V 6



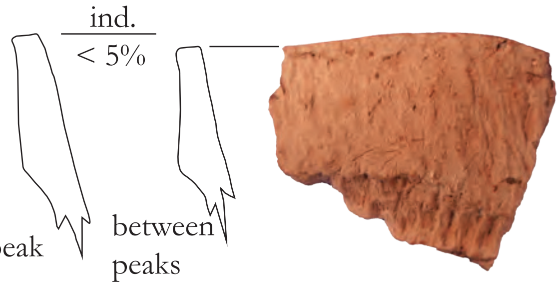
V 7



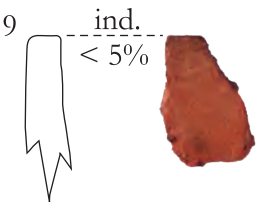

V 8
ind.
< 5%
V 9
16 cm
15%
V 10
30 cm
5%
V 11
ind.
< 5%
V 12
17 cm
9%
cm


V 13
11 cm
5%
V 14
40 cm
6%
JE-1-67
F29-1-162
JE-1-67
F29-1-115
JE-1-67
F29-1-164
(V 14 interior)
V 15
ind.
< 5%
V 16
ind.
< 5%
JE-1-67
F29-1-163
V 17
ind.
< 5%
JE-1-67
F29-1-161
cm

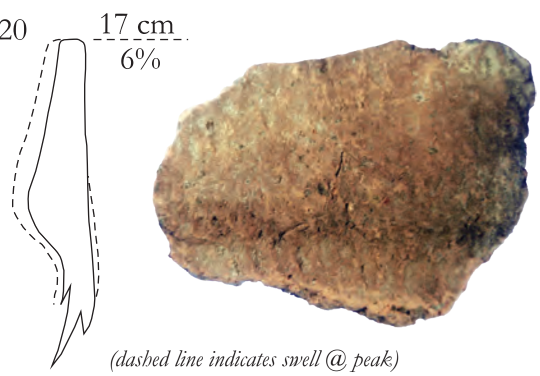
V 18



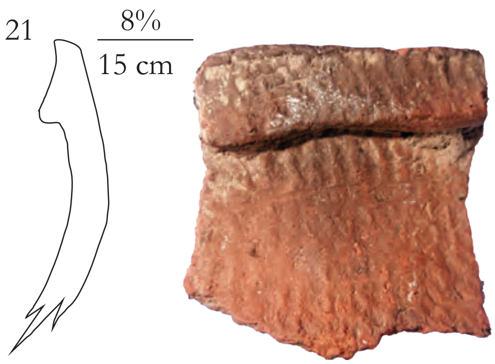
V 19



V20



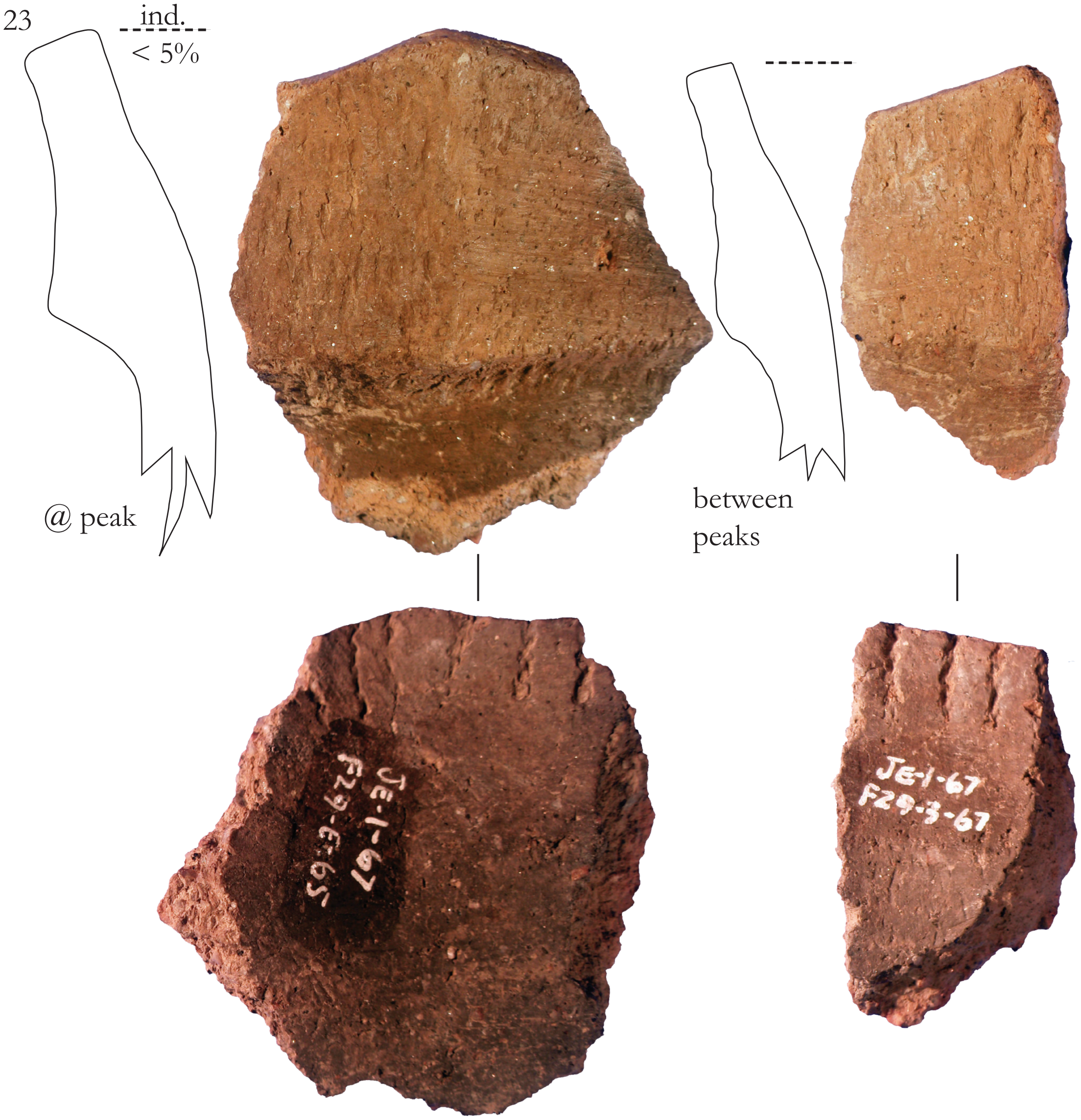
V 21



V 22

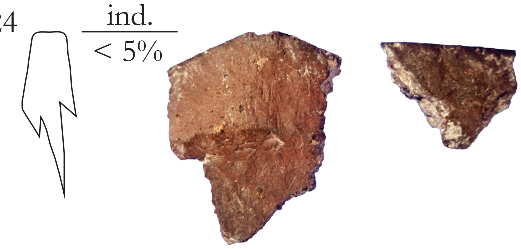
V 23

ind.
< 5%



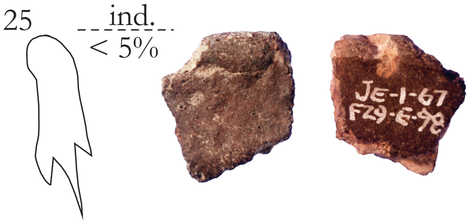
V 24

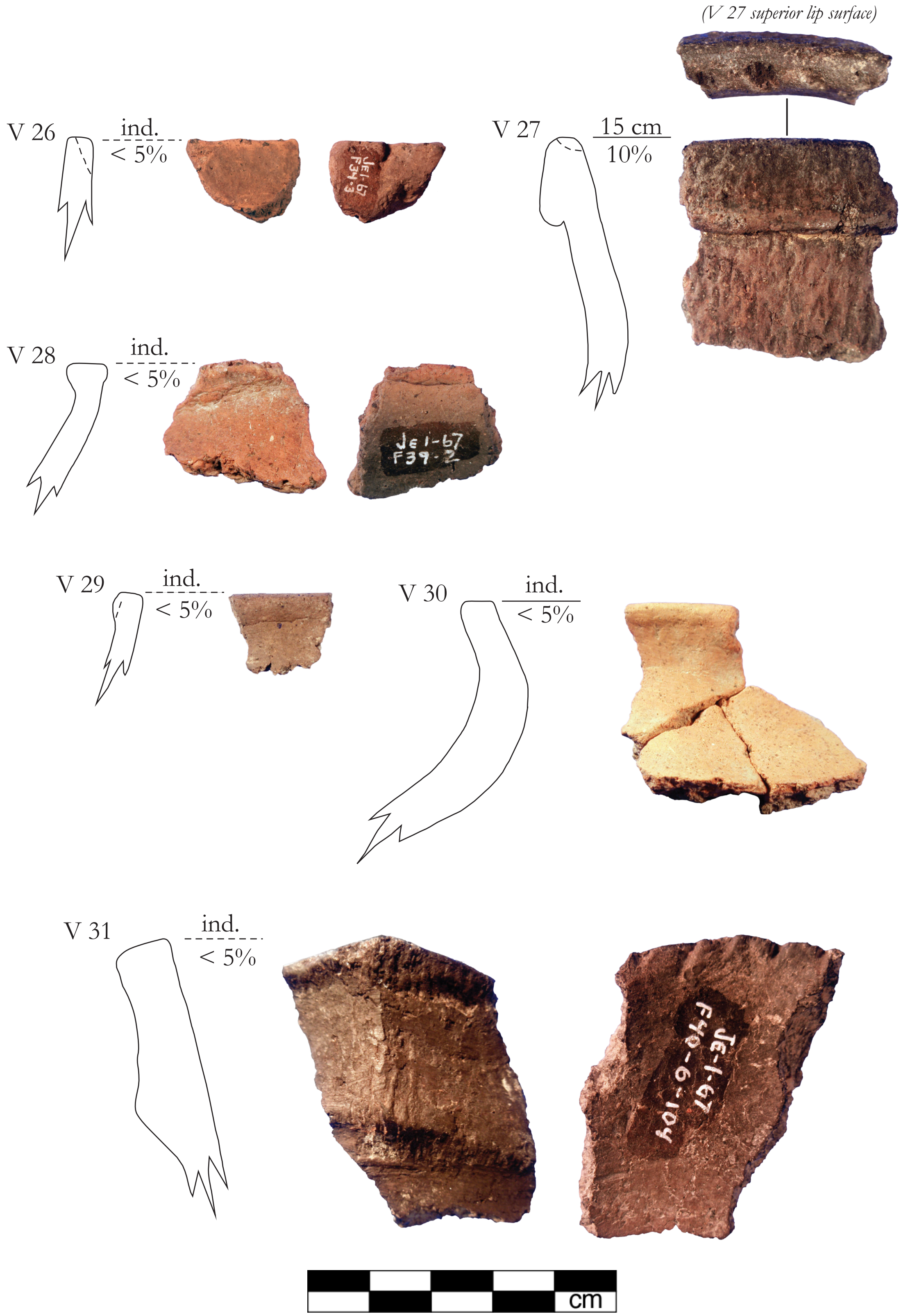
ind.
< 5%



V 25

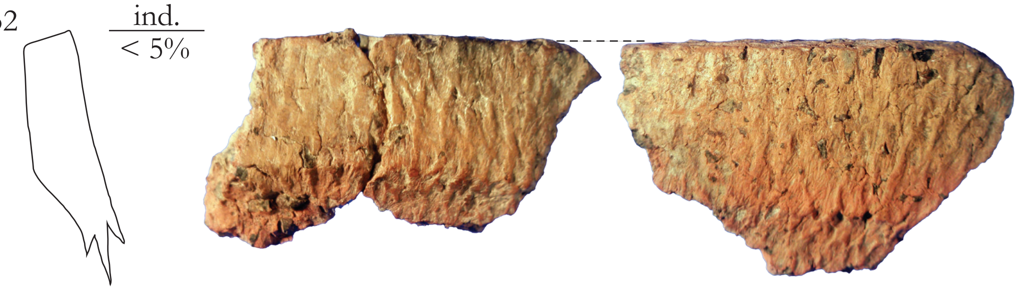
ind.
< 5%




(V 27 superior lip surface)
V 26
ind.
< 5%
V 27
15 cm
10%
V 28
ind.
< 5%
V 29
ind.
< 5%
V 30
ind.
< 5%
V 31
ind.
< 5%
cm

V 32

ind.
< 5%

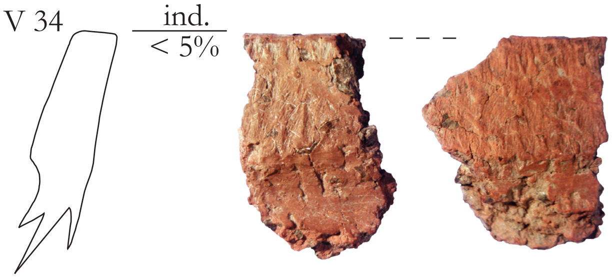


V 33

ind.
< 5%

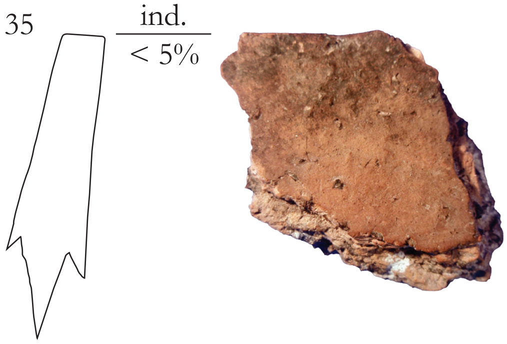
V 34

ind.
< 5%



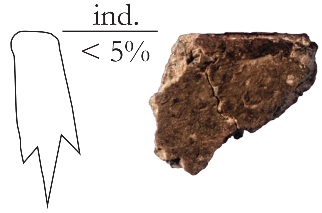
V 35

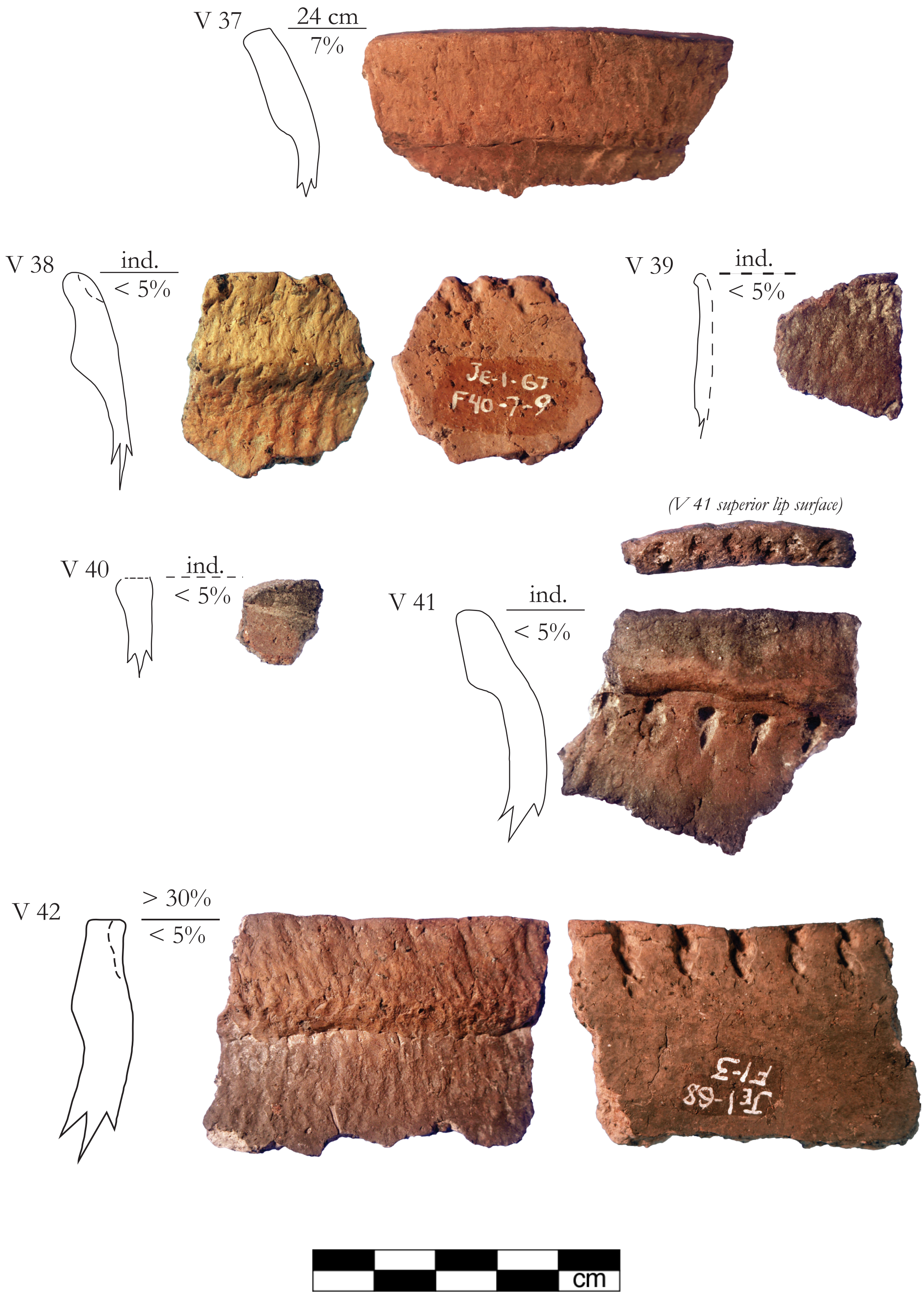
ind.
< 5%



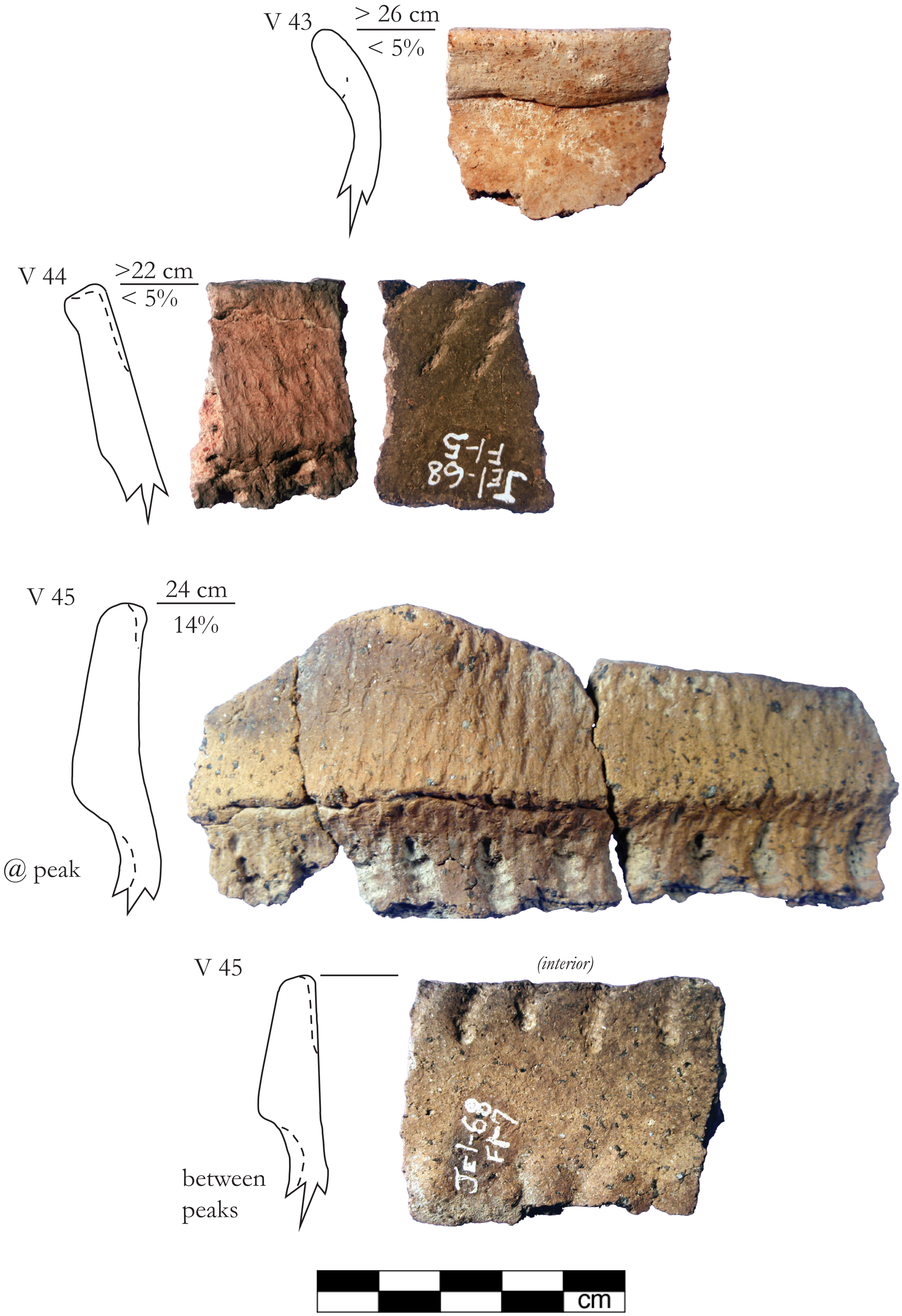
V 36

ind.
< 5%

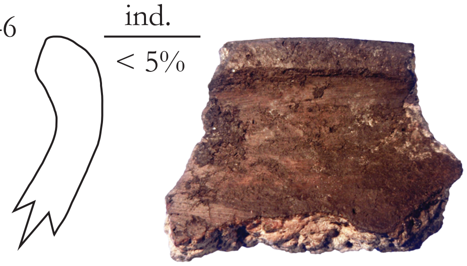




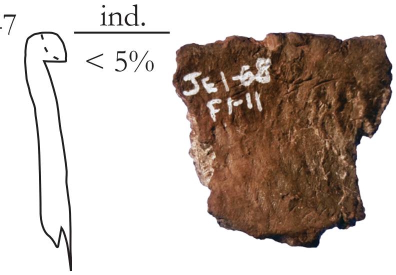
V 37
24 cm
7%
V 38
ind.
< 5%
JE-1-67
F40-7-9
V 39
ind.
< 5%
(V 41 superior lip surface)
V 40
ind.
< 5%
V 41
ind.
< 5%
V 42
> 30%
< 5%
JE1-68
F1-3
cm


V 43
> 26 cm
< 5%
V 44
>22 cm
< 5%
V 45
24 cm
14%
@ peak
V 45
(interior)
between peaks
cm

V 46



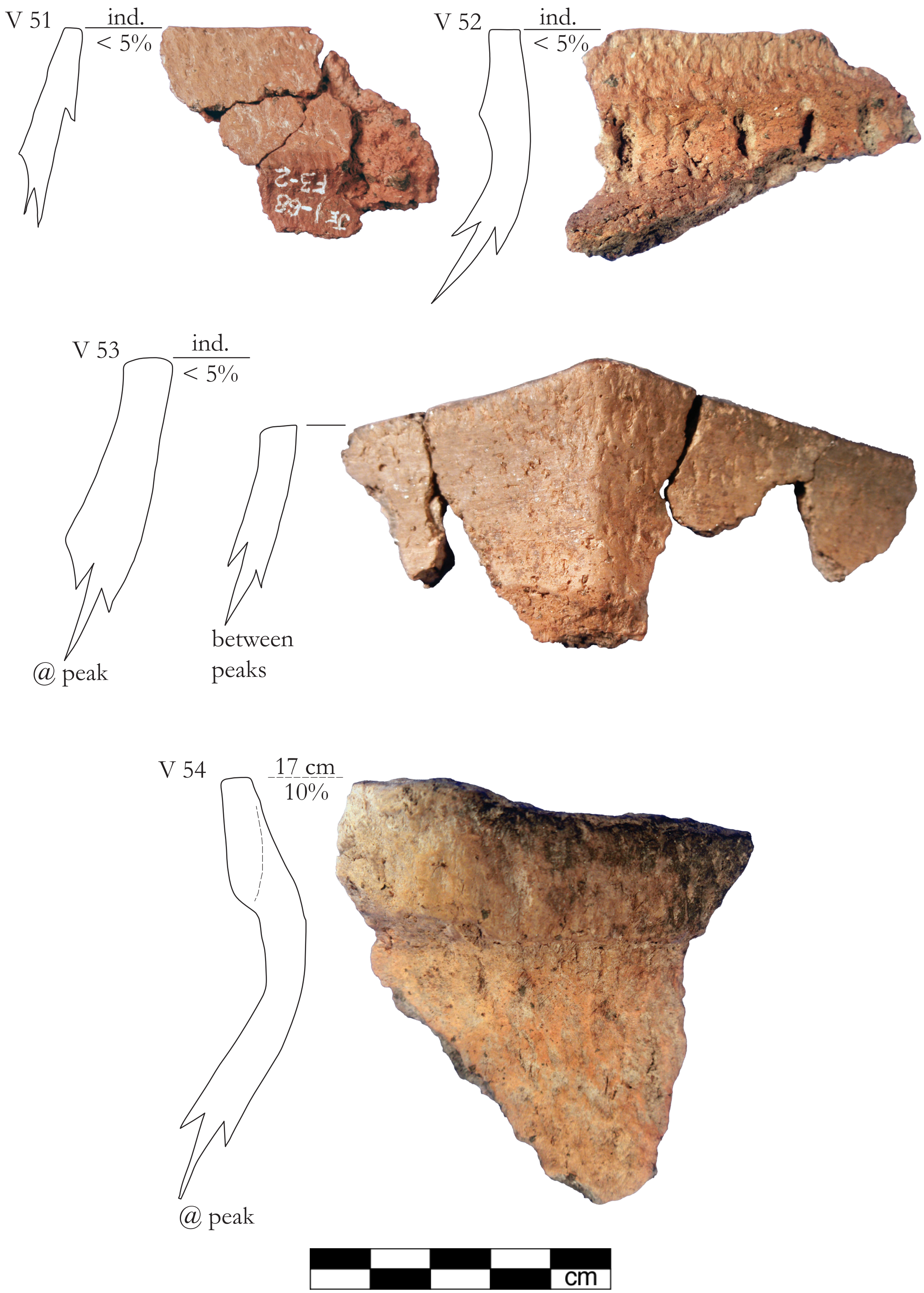
V 47



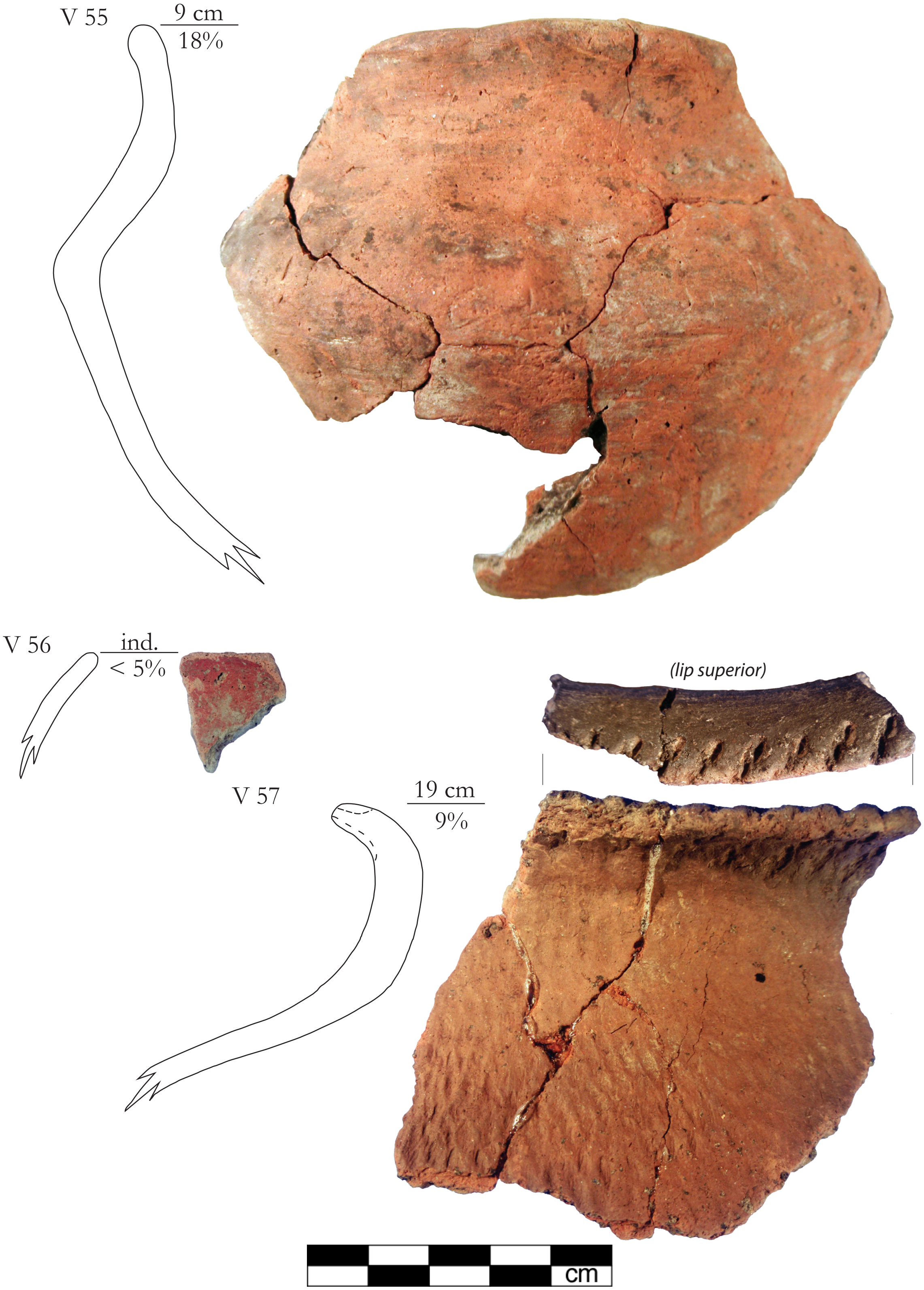
V 48

V 49


V 50
between
peaks
19.5 cm
100%
@ peak
cm

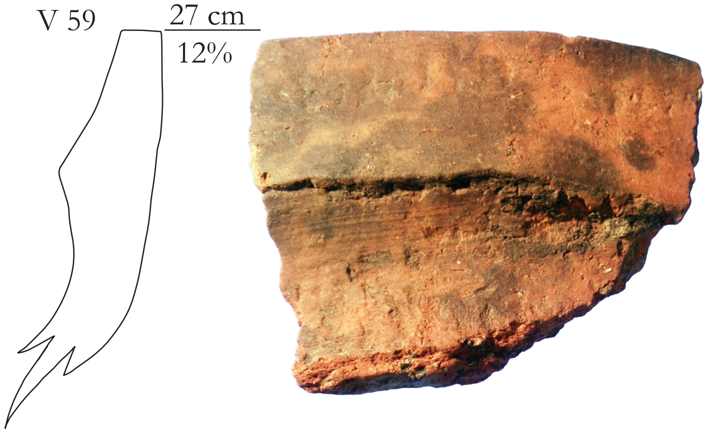


V 51
ind.
< 5%
V 52
ind.
< 5%
V 53
ind.
< 5%
@ peak
between peaks
V 54
17 cm
10%
@ peak
cm

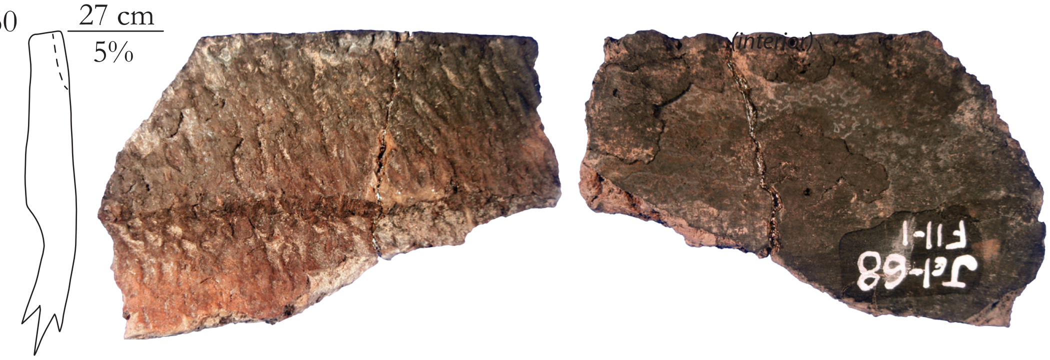

V 55
9 cm
18%
V 56
ind.
< 5%
V 57
19 cm
9%
(lip superior)
cm

V 58 29 cm / 5%

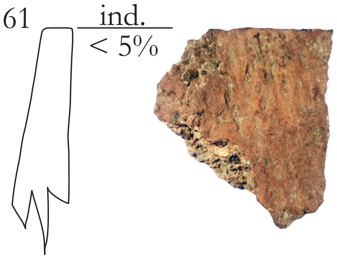
V 59 27 cm / 12%



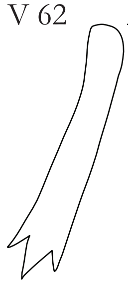
V 60 27 cm / 5%

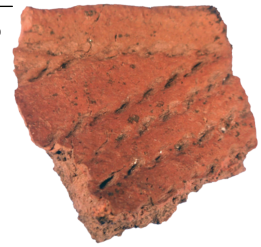


V 61 ind. / < 5%

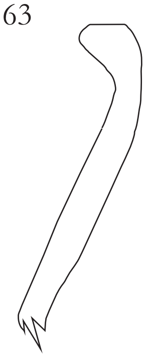


V 62 ind. / < 5%

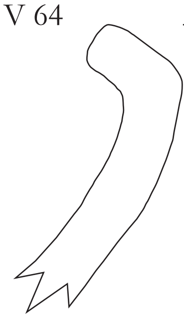




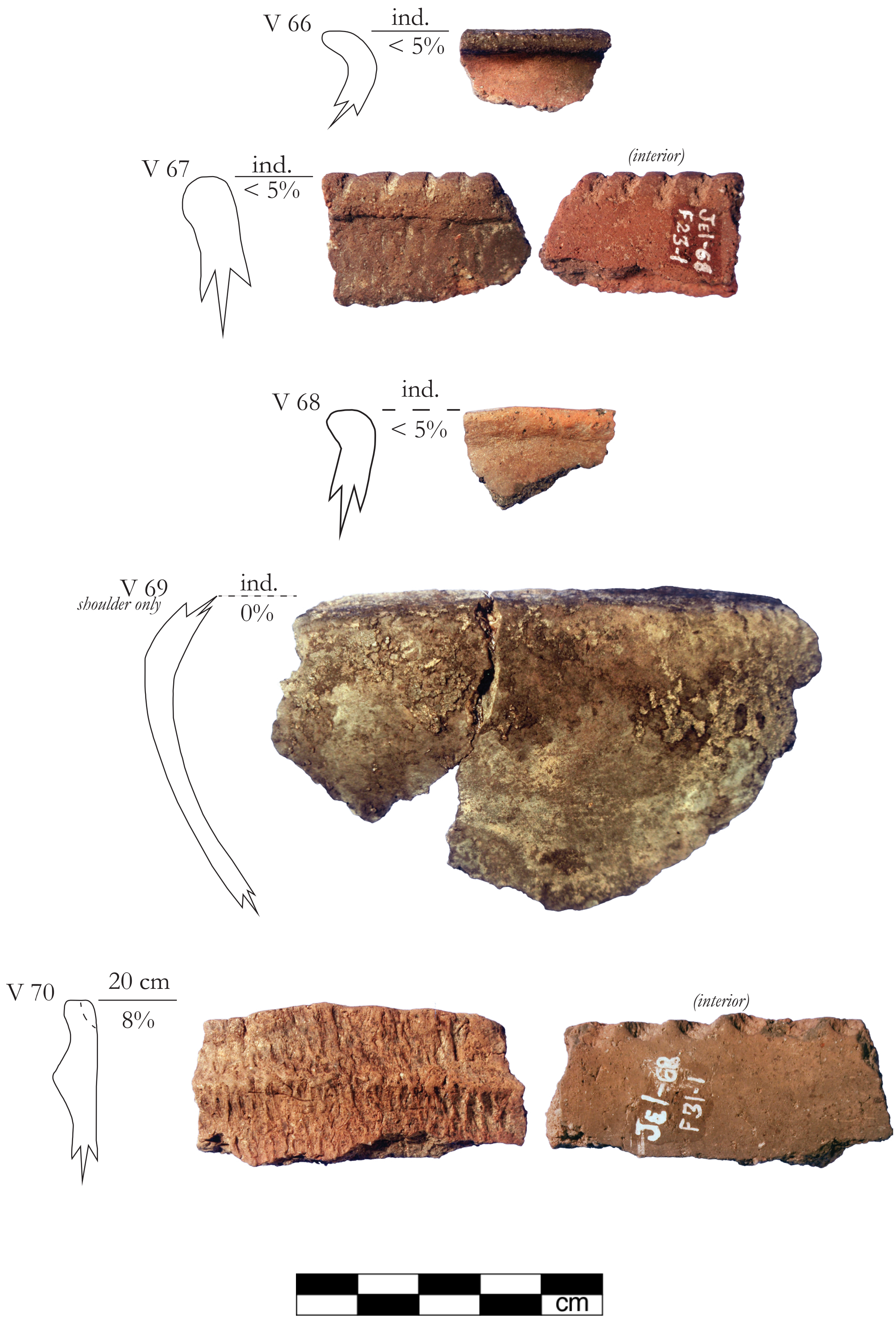
V 63 > 20 cm / < 5%



V 64 32 cm / 7%

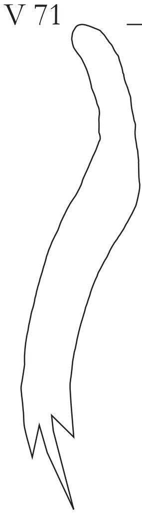


V 65 > 30 cm / < 5%



V 66
ind.
< 5%
V 67
ind.
< 5%
(interior)
JE1-68
F23-1
V 68
ind.
< 5%
V 69
shoulder only
ind.
0%
V 70
20 cm
8%
(interior)
JE1-68
F31-1
cm

V 71

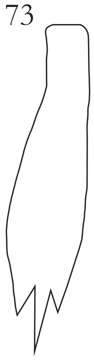


9 cm
11%

V 72

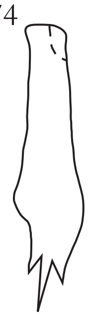
ind.
< 5%

V 73



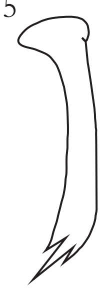
ind.
< 5%

V 74



ind.
< 5%

V 75



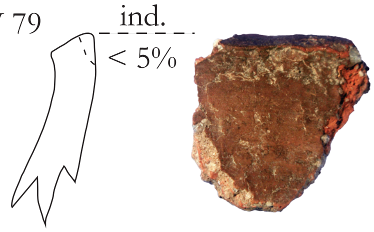
17 cm
5 %


superior lip surface
23 cm
100%
cm
V 77

17 cm
47%

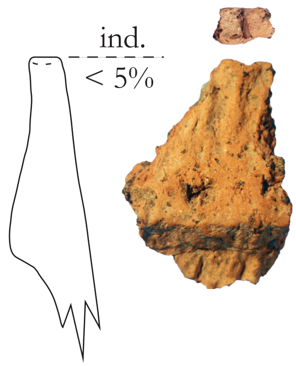
V 78

V 79



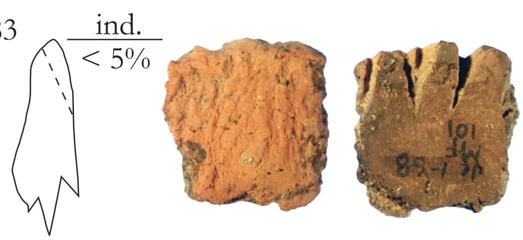
V 80

V 81

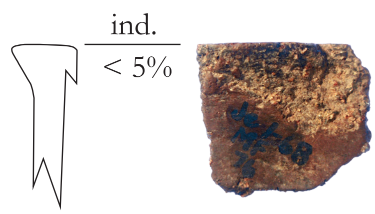


V 82

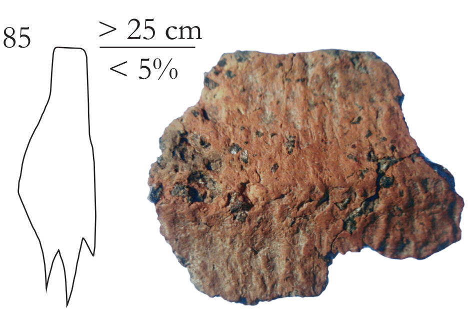
V 83

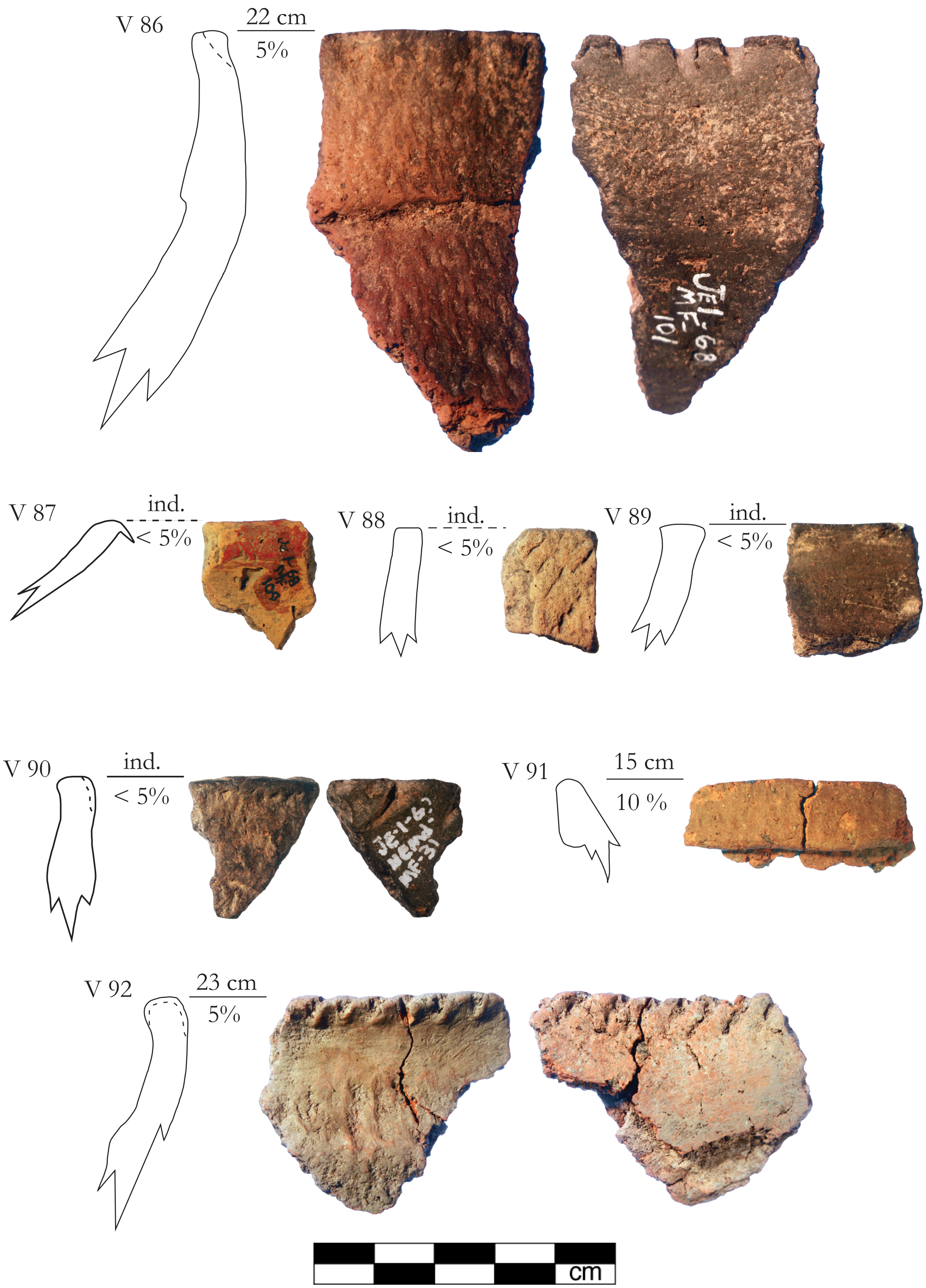


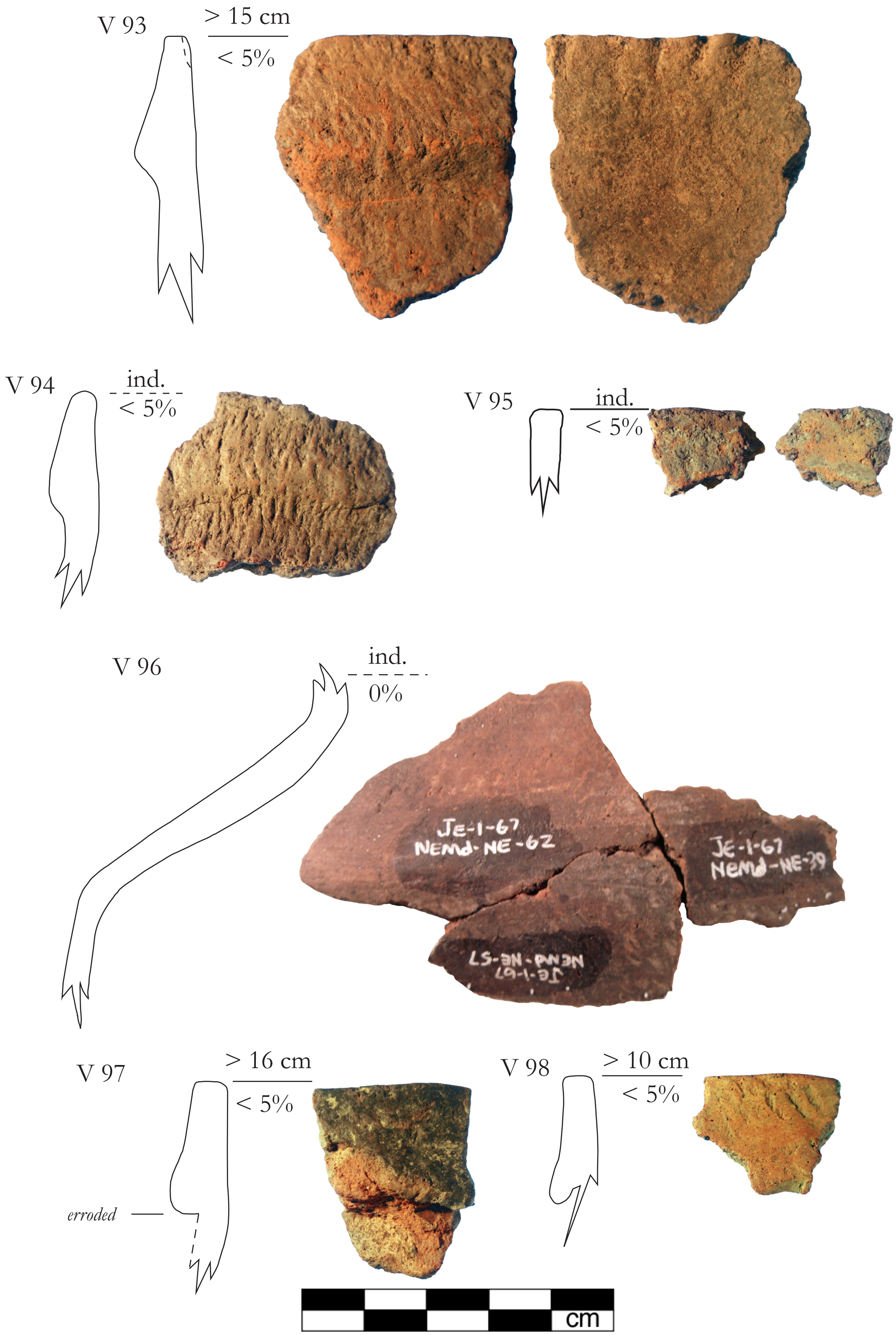
V 84



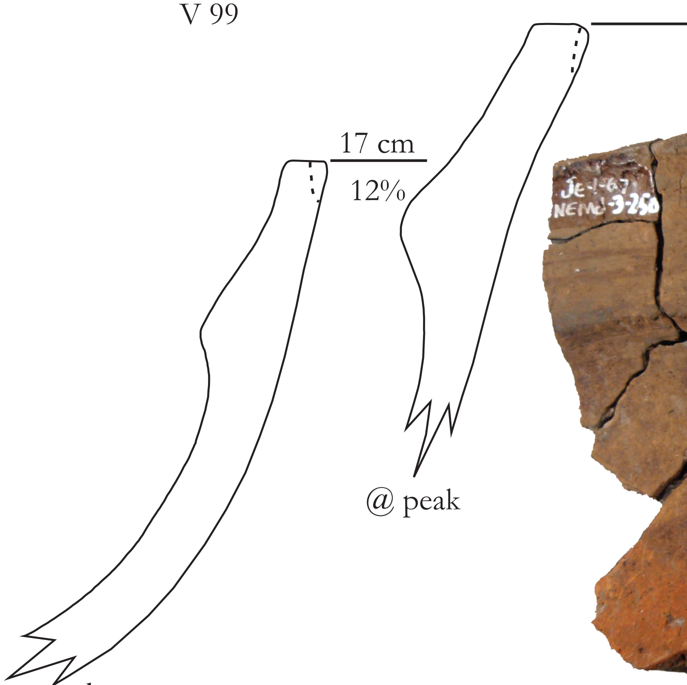
V 85




V 86
22 cm
5%
V 87
ind.
< 5%
V 88
ind.
< 5%
V 89
ind.
< 5%
V 90
ind.
< 5%
V 91
15 cm
10 %
V 92
23 cm
5%
cm

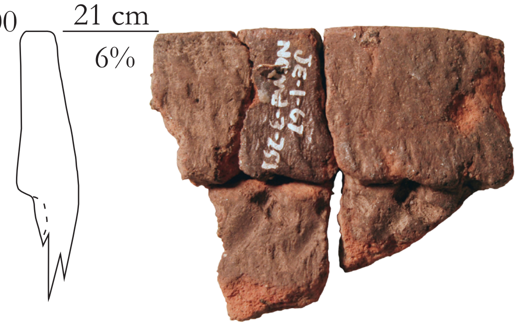

V 93
> 15 cm
< 5%
V 94
ind.
< 5%
V 95
ind.
< 5%
V 96
ind.
0%
JE-1-67
NEMd-NE-62
JE-1-67
NEMd-NE-39
JE-1-67
NEMd-NE-57
V 97
> 16 cm
< 5%
erroded
V 98
> 10 cm
< 5%
cm

V 99

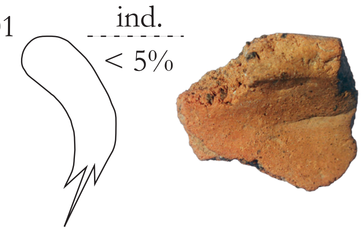


(V 99 interior)

V 100



V 101



V 102

V 103

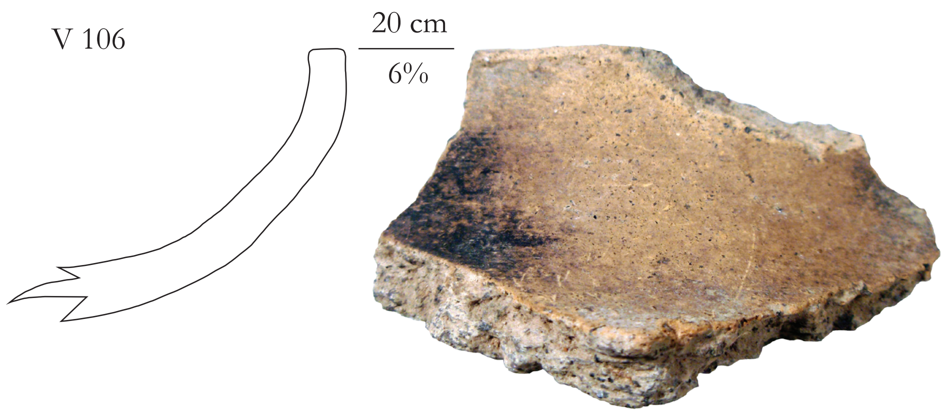
v104

erroded

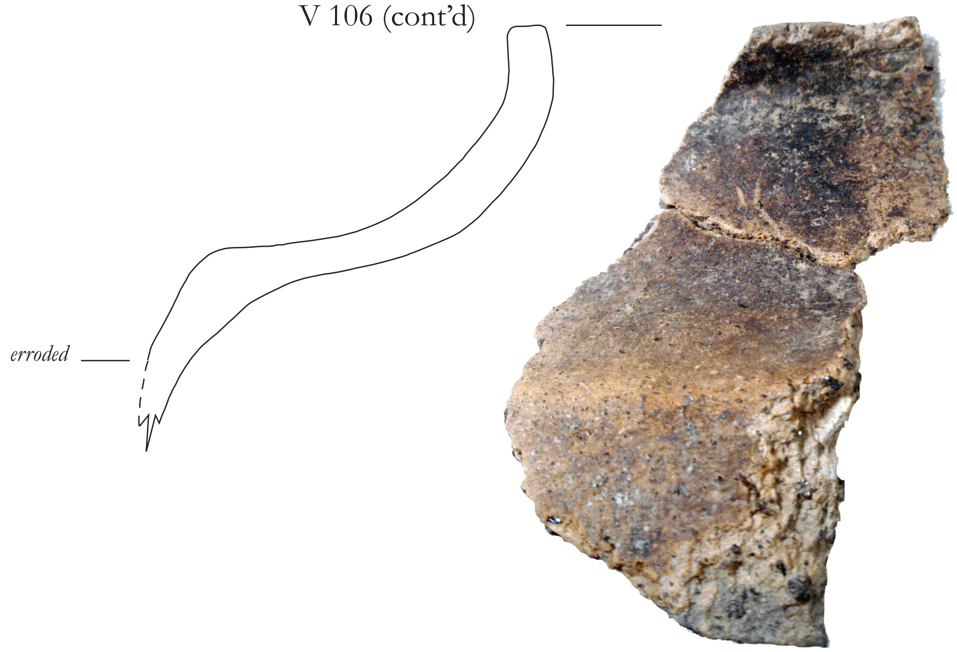
smooth

V 105

V 106



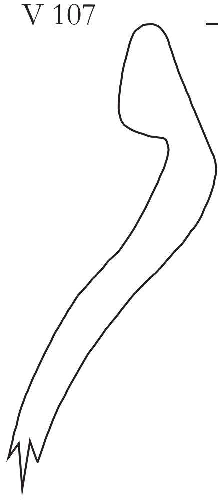
V 106 (cont'd)



V 107

10 cm

5%



V 108

30 cm

7%

V 109

ind.

< 5%

V 110

ind.

< 5%

V 111

> 30 cm

< 5%

V 112

16-20 cm

6%

V 113

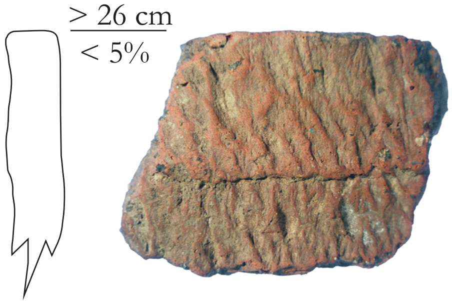
ind.

< 5%

V 114

> 26 cm

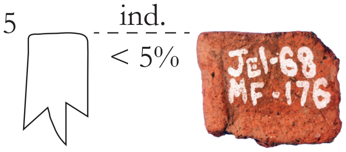
< 5%



V 115

ind.

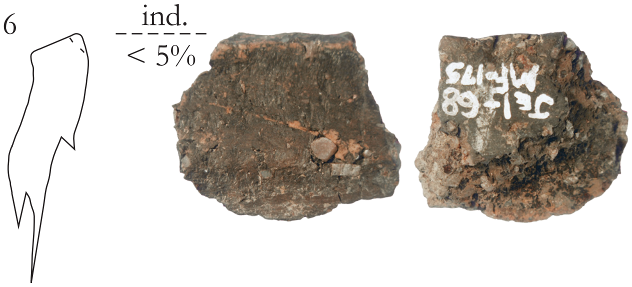
< 5%



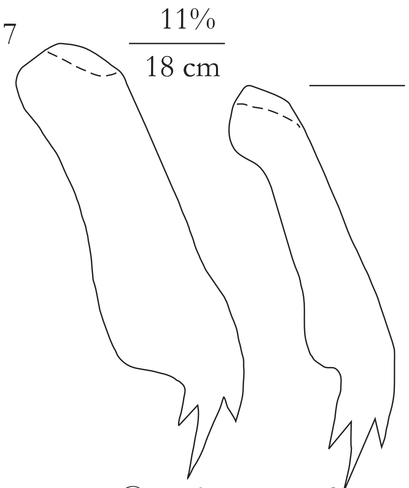
V 116

ind.

< 5%



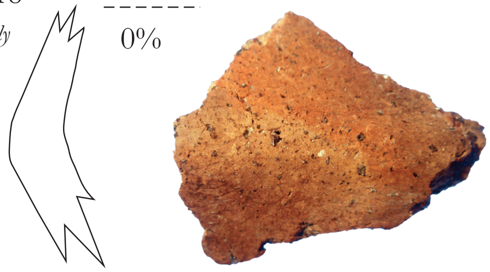
V 117



(interior)

V 118
shoulder only

ind.
0%

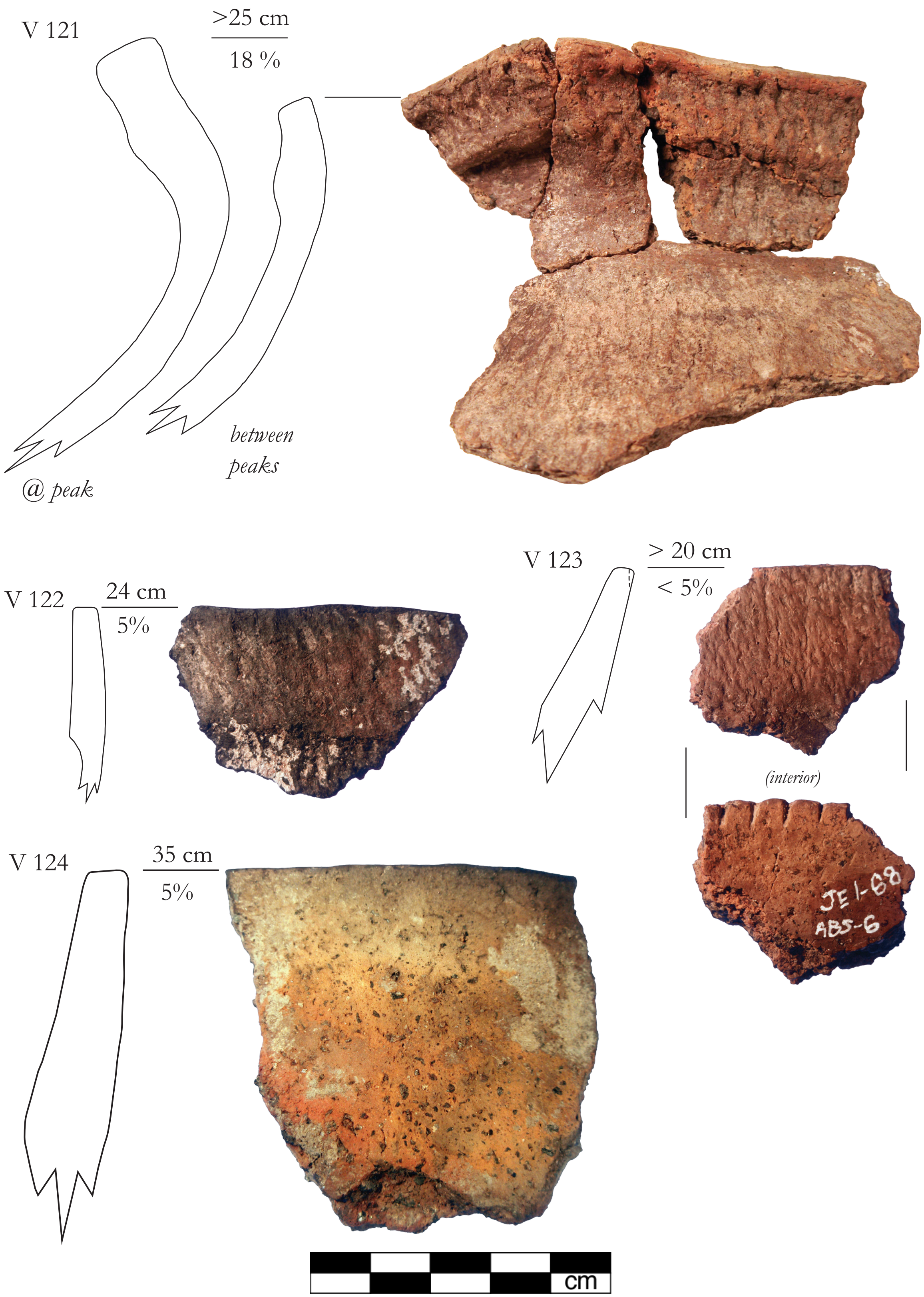


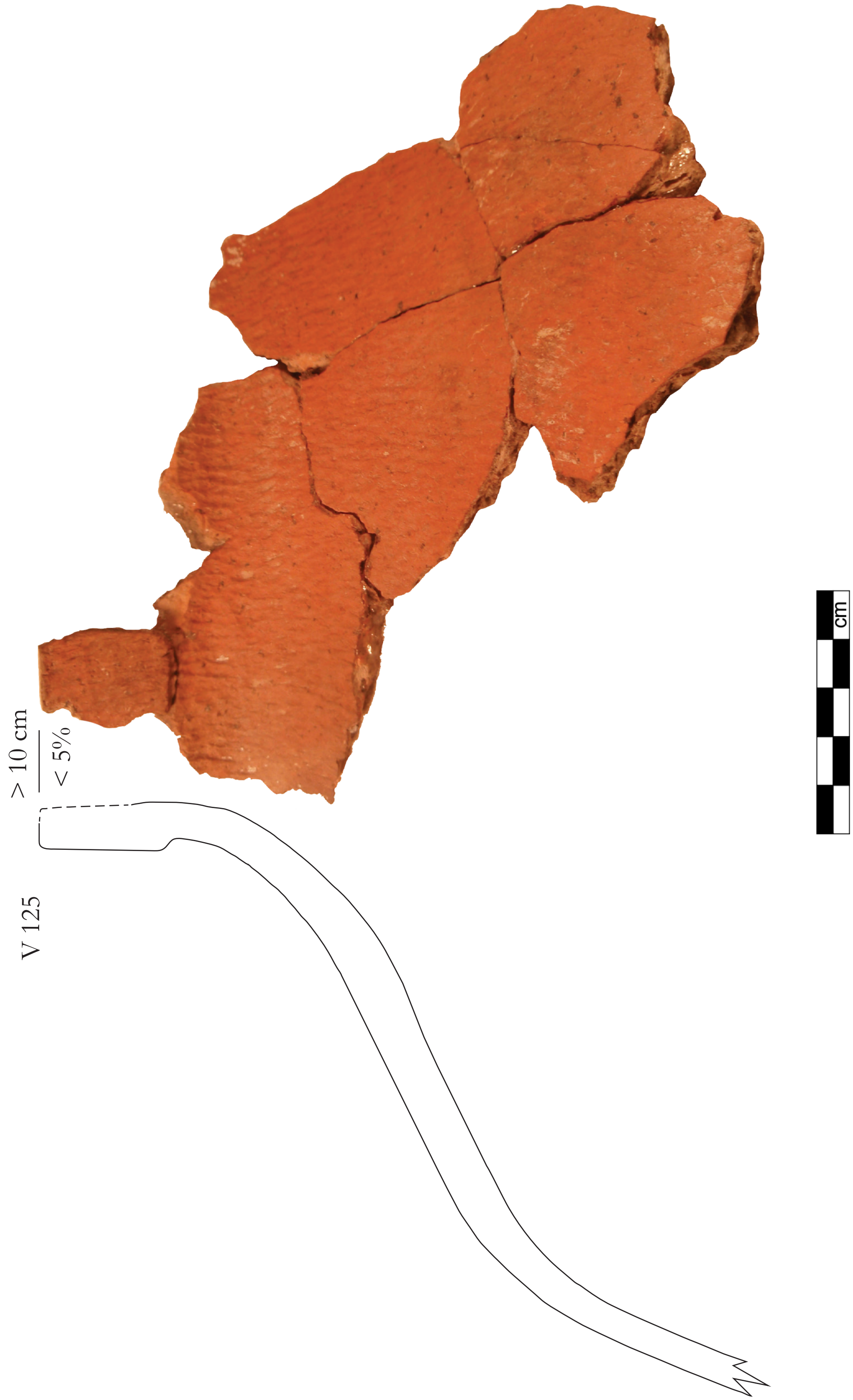
V 119
shoulder only

ind.
0%

V 120

> 20 cm
< 5%

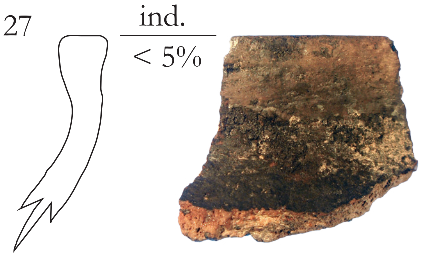

V 121
>25 cm
18 %
@ peak
between
peaks
V 122
24 cm
5%
V 123
> 20 cm
< 5%
(interior)
JE1-68
ABS-6
V 124
35 cm
5%
cm



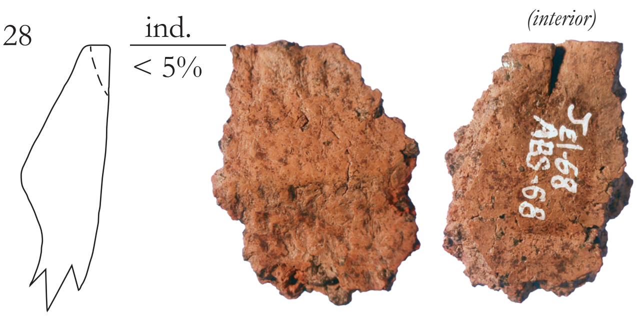
cm
> 10 cm
< 5%
V 125

V 126

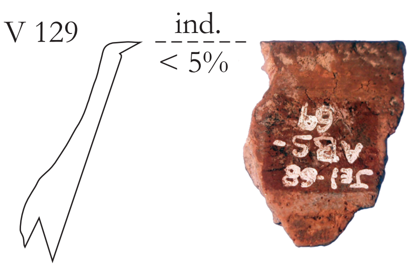
V 127



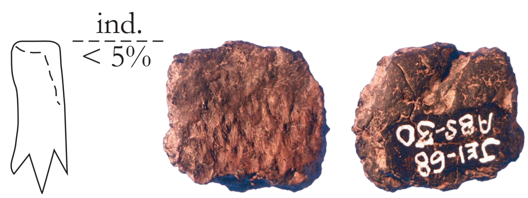
V 128



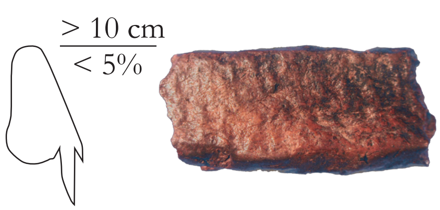
V 129



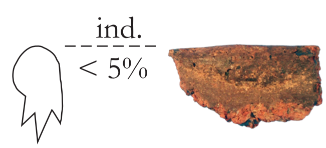
V 130



V 131



V 132



29.5 cm
100%

V 133

APPENDIX C: CERAMIC MATERIAL INVENTORY

Key to abbreviations used in Appendix C tables:

Temper: g-grit, gg-grit-grog

Orifice Type: Cir-Circular, pol ind-Polygonal indeterminate, pol rnd-Polygonal Rounded peak, pol ang-Polygonal Angled peak

Collar Profile: fl-Flat, cv-Concave, cx-Convex, cvx-concave-extruded

Collar Orientation: flr-Flared, osl-out-slanted, vrt-vertical, ang-angled, isl-inslanted, icvincurving, ind-indeterminate

Collar Type: fld-Folded, apl-Applique, flt-Fillet, ind.-indeterminate

Pottery Type- Variety: AzCol-Aztalan Collared, SR-Starved Rock Collared, MP-Madison Plain, MCI-Madison Cord-impressed, Hp-Hyer Plain, PP-Powell Plain, CRF-Cahokia Redfilmed, RI-Ramey Incised, Unid-Unidentified

Lip Form: rnd-Rounded, flt-Flattened, sq-Squared, bvl-beveled, thk-thickened

Neck Form: flr-Flared, osl-out-slanted, str-straight, ang-angled, isl-inslanted, icv-incurving, ind-indeterminate

Surface Treatment: sm-smoothed, cm-cordmarked, sm/cm-Smoothed-over-cordmarked

Decoration: tw-Twisted cord impression, cws-Cord-wrapped stick impression, pct-Punctate, rnd nch-Round-bottom notch, knt imp-Knotted impression, v-nch-Vee-shaped notch, wdg nch-Wedge-shaped notch, incs-Incised

Decoration Direction: trv-Transverse, hrz-Horizontal, dg RL-Diagonal R-L, dg-LRDiagonal L-R, vrt-Vertical, obl-Oblique

Table C.1. Northeast Mound WHS Vessel Inventory.

Vessel ID	WHS Accession #	WHS Specimen #	Mound Level	Provenience/ Feature	Type-Variety
1	1978.265.JE1-64	49-2, 12, 14	Base	49-64	Aztalan Collared
2	1978.265.JE1-64	49-8	Base	49-64	Aztalan Collared
3	1978.266.JE1-67	H2-F-34	Base	H2	Aztalan Collared
4	1978.266.JE1-67	H2-F-33	Base	H2	Hyer Plain
5	1978.266.JE1-67	NEMD-H2-F-32	Base	H2	Madison Cord-Impressed
6	1978.266.JE1-67	F15-1-8	Mound Fill	15-67	Aztalan Collared
7	1978.266.JE1-67	15-4-8, 9, 11, 12, 13, 14, 20; 15-1-7; 40-6-73; 40-7-8; 40-8-12, 14, 18, 19, 22, 27, 28	Mound Fill	15-67 & 40-67	Aztalan Collared
8	1978.266.JE1-67	15-4-18; 40-6-103	Mound Fill	15-67 & 40-67	Aztalan Collared
9	1978.266.JE1-67	29 SP2-55, 67, 113, 116; 29-1-117, 120, 169; 34-2	Base	29-67 & 34-67	Hyer Plain
10	1978.266.JE1-67	29-SP2-108	Base	29-67	Aztalan Collared
11	1978.266.JE1-67	29-SP2-112	Base	29-67	Unclassified
12	1978.266.JE1-67	29-SP2-111, 114, 115	Base	29-67	Aztalan Collared
13	1978.266.JE1-67	29-SP2-117	Base	29-67	indeterminate
14	1978.266.JE1-67	29-1-115, 162, 164	Base	29-67	Unclassified
15	1978.266.JE1-67	29-1-165	Base	29-67	indeterminate
16	1978.266.JE1-67	29-1-163	Base	29-67	Aztalan Collared
17	1978.266.JE1-67	29-1-161	Base	29-67	Starved Rock Collared
18	1978.266.JE1-67	29-2-21	Base	29-67	Aztalan Collared
19	1978.266.JE1-67	29-3-7	Base	29-67	indeterminate
20	1978.266.JE1-67	29-3-68	Base	20-68	Aztalan Collared
21	1978.266.JE1-67	29-3-66	Base	29-67	Aztalan Collared

Table C.1. Northeast Mound WHS Vessel Inventory, continued.

Vessel ID	WHS Accession #	WHS Specimen #	Mound Level	Provenience/ Feature	Type-Variety
22	1978.266.JE1-67	29-3-65	Base	29-67	Starved Rock Collared
23	1978.266.JE1-67	29-3-67; 29-E-65	Base	29-67	Aztalan Collared
24	1978.266.JE1-67	29-E-66, 67	Base	29-67	Aztalan Collared
25	1978.266.JE1-67	29-E-98	Base	29-67	Aztalan Collared
26	1978.266.JE1-67	34-3	Base	34-67	Starved Rock Collared
27	1978.266.JE1-67, 1978.372.JE1-68	34-1; 1-6	Base	34-67	Aztalan Collared
28	1978.266.JE1-67	39-2	Base	39-67	Hyer Plain
29	1978.266.JE1-67	39-1	Base	39-67	indeterminate
30	1978.266.JE1-67	39-3, 5, 6, 7	Base	39-67	Hyer Plain
31	1978.266.JE1-67	40-6-104	Base	40-67	Starved Rock Collared
32	1978.266.JE1-67	40-6-99, 100	Base	40-67	Aztalan Collared
33	1978.266.JE1-67	40-6-105	Base	40-67	Aztalan Collared
34	1978.266.JE1-67	40-6-101, 102	Base	40-67	Aztalan Collared
35	1978.266.JE1-67	40-8-26	Base	40-67	Aztalan Collared
36	1978.266.JE1-67	40-7-10	Base	40-67	Aztalan Collared
37	1978.266.JE1-67	40-7-11	Base	40-67	Aztalan Collared
38	1978.266.JE1-67	40-7-9	Base	40-67	Aztalan Collared
39	1978.266.JE1-67	40-6-43	Base	40-67	indeterminate
40	1978.266.JE1-67	40-6-19	Base	40-67	indeterminate
41	1978.372.JE1-68	F1-2	Base	1-68	Aztalan Collared
42	1978.372.JE1-68	3-Jan	Base	1-68	Aztalan Collared
43	1978.372.JE1-68	F1-4	Base	1-68	Aztalan Collared
44	1978.372.JE1-68	5-Jan	Base	1-68	Aztalan Collared
45	1978.372.JE1-68	F1-7, 9, 10	Base	1-68	Aztalan Collared
46	1978.372.JE1-68	F1-8	Base	1-68	Hyer Plain

Table C.1. Northeast Mound WHS Vessel Inventory, continued.

Vessel ID	WHS Accession #	WHS Specimen #	Mound Level	Provenience/ Feature	Type-Variety
47	1978.372.JE1-68	F1-11	Base	1-68	Starved Rock Collared
48	1978.372.JE1-68	F1-14	Base	1-68	Aztalan Collared
49	1978.372.JE1-68	F1-1, 15, 16, 17, 18	Base	1-68	Aztalan Collared
50	1978.372.JE1-68	F2-1	Base	2-68	Starved Rock Collared
51	1978.372.JE1-68	F3-1, 2	Base	3-68	Aztalan Collared
52	1978.372.JE1-68	F4-1	Base	4-68	Aztalan Collared
53	1978.372.JE1-68	5-1, 2, 4	Base	5-68	Aztalan Collared
54	1978.372.JE1-68	F5-3	Base	5-68	Aztalan Collared
55	1978.372.JE1-68	F8-1	Base	8-68	Hyer Plain
56	1978.372.JE1-68	Sep-57	Top	9-68	Cahokia Red Filmed
57	1978.372.JE1-68	1-Sep	Top	9-68	Madison Plain
58	1978.372.JE1-68	5-Sep	Top	9-68	Aztalan Collared
59	1978.372.JE1-68	9-2, 3, 4	Top	9-68	Aztalan Collared
60	1978.372.JE1-68	F11-1	Base	11-68	Aztalan Collared
61	1978.372.JE1-68	F11-7	Base	11-68	Aztalan Collared
62	1978.372.JE1-68	F16-1	Base	16-68	Madison Cord-Impressed
63	1978.372.JE1-68	18-1, 2	Top	18-68	Ramey Incised
64	1978.372.JE1-68	19-1	Top	19-68	Powell Plain
65	1978.372.JE1-68	21-1	Base	21-68	Aztalan Collared
66	1978.372.JE1-68	F22-1	Base	22-68	Hyer Plain
67	1978.372.JE1-68	F23-1	Base	23-68	Madison Plain
68	1978.372.JE1-68	F23-2	Base	23-68	Hyer Plain
69	1978.372.JE1-68	F23-5	Base	23-68	indeterminate
70	1978.372.JE1-68	31-1, 3	Base	31-68	Aztalan Collared
71	1978.372.JE1-68	F31-2	Base	31-68	Hyer Plain

Table C.1. Northeast Mound WHS Vessel Inventory, continued.

Vessel ID	WHS Accession #	WHS Specimen #	Mound Level	Provenience/ Feature	Type-Variety
72	1978.372.JE1-68	31-4	Base	31-68	indeterminate
73	1978.372.JE1-68	31-5	Base	31-68	Aztalan Collared
74	1978.372.JE1-68	PHNT-1	Base	PH NT	Aztalan Collared
75	1978.372.JE1-68	S-1	ind.	S	Hyer Plain
76	1978.372.JE1-68	300 R99	Top	N300 R99	Hyer Plain
77	1978.372.JE1-68	1978.372.JE1-68.6, 7, 8	Top	N300 R98	Powell Plain
78	1978.372.JE1-68	68.1	Top	N300 R101-102	Hyer Plain
79	1978.372.JE1-68	PZ-1	Top	PZ	Starved Rock Collared
80	1978.372.JE1-68	PZ-2	Top	PZ	indeterminate
81	1978.372.JE1-68	MF-60	Mound Fill	MF	Aztalan Collared
82	1978.372.JE1-68	MF-75	Mound Fill	MF	Aztalan Collared
83	1978.372.JE1-68	MF-101	Mound Fill	MF	Starved Rock Collared
84	1978.372.JE1-68	MF-76	Mound Fill	MF	Hyer Plain
85	1978.372.JE1-68	MF-100	Mound Fill	MF	Aztalan Collared
86	1978.372.JE1-68	MF-101	Mound Fill	MF	Starved Rock Collared
87	1978.372.JE1-68	MF-109	Mound Fill	MF	Cahokia Red Filmed
88	1978.372.JE1-68	295 R98.132 MF	Mound Fill	MF	Unclassified
89	1978.266.JE1-67	NeMd-MF-33	Mound Fill	MF	Hyer Plain
90	1978.266.JE1-67	NEMD-MF-31	Mound Fill	MF	Starved Rock Collared
91	1978.266.JE1-67	NEMD-MF-30&32	Mound Fill	MF	Aztalan Collared
92	1978.372.JE1-68	0.2	Mound Fill	MF	Unclassified
93	1978.372.JE1-68	0.2	Mound Fill	MF	Aztalan Collared
94	1978.372.JE1-68	0.2	Mound Fill	MF	Aztalan Collared
95	1978.372.JE1-68	0.2	Mound Fill	MF	indeterminate

Table C.1. Northeast Mound WHS Vessel Inventory, continued.

Vessel ID	WHS Accession #	WHS Specimen #	Mound Level	Provenience/ Feature	Type-Variety
96	1978.266.JE1-67	NEMD-MF-9, 12, 39, 45, 55, 57, 62	Mound Fill	MF	indeterminate
97	1978.266.JE1-67	NEMD-NE-66	Mound Fill	MF	Aztalan Collared
98	1978.266.JE1-67	NEMD-NE-65	Mound Fill	MF	Aztalan Collared
99	1978.266.JE1-67	NEMD3-250, 257, 175, 1, 245, 141, 258, 261, 239, 124	Mound Fill	MF	Starved Rock Collared
100	1978.266.JE1-67	NEMD-3-251, 252, 255, 264	Mound Fill	MF	Aztalan Collared
101	1978.266.JE1-67	NEMD-3-253	Mound Fill	MF	Hyer Plain
102	1978.266.JE1-67	NEMD-3-254	Mound Fill	MF	Unclassified
103	1978.266.JE1-67	NEMD-3-259 & 265	Mound Fill	MF	Aztalan Collared
104	1978.266.JE1-67	NEMD-3-260	Mound Fill	MF	Starved Rock Collared
105	1978.266.JE1-67	NEMD-3-262	Mound Fill	MF	Aztalan Collared
106	1978.266.JE1-67	NEMD-3-268, 215, 263	Mound Fill	MF	Hyer Plain
107	1978.266.JE1-67	NEMD-3-269	Mound Fill	MF	Aztalan Collared
108	1978.266.JE1-67	NEMD-3-269	Mound Fill	MF	Aztalan Collared
109	1978.266.JE1-67	NEMD-3-238 & 267	Mound Fill	MF	Aztalan Collared
110	1978.266.JE1-67	NEMD-3-85	Mound Fill	MF	Aztalan Collared
111	1978.372.JE1-68	MF-127	Mound Fill	MF	Starved Rock Collared
112	1978.372.JE1-68	MF-170	Mound Fill	MF	Hyer Plain
113	1978.372.JE1-68	MF-139	Mound Fill	MF	Unclassified
114	1978.372.JE1-68	MF-138	Mound Fill	MF	Aztalan Collared
115	1978.372.JE1-68	MF-176	Mound Fill	MF	indeterminate
116	1978.372.JE1-68	MF-175	Mound Fill	MF	Starved Rock Collared
117	1978.266.JE1-67	NEMD-B-3 & 14	Base	Ab Horizon	Aztalan Collared

Table C.1. Northeast Mound WHS Vessel Inventory, continued.

Vessel ID	WHS Accession #	WHS Specimen #	Mound Level	Provenience/ Feature	Type-Variety
118	1978.266.JE1-67	NEMD-3-217	Mound Fill	MF	indeterminate
119	1978.372.JE1-68	MF-164	Mound Fill	MF	indeterminate
120	1978.372.JE1-68	ABS-1, 46, 52	Base	Ab Horizon	Aztalan Collared
121	1978.372.JE1-68	ABS-2-3-5-7, 21	Base	Ab Horizon	Aztalan Collared
122	1978.372.JE1-68	ABS-4	Base	Ab Horizon	Aztalan Collared
123	1978.372.JE1-68	ABS-6	Base	Ab Horizon	Starved Rock Collared
124	1978.372.JE1-68	ABS-64	Base	Ab Horizon	Aztalan Collared
125	1978.372.JE1-68	ABS-65	Base	Ab Horizon	Unidentified Collared
126	1978.372.JE1-68	ABS-66	Base	Ab Horizon	Unclassified
127	1978.372.JE1-68	ABS-67	Base	Ab Horizon	Hyer Plain
128	1978.372.JE1-68	ABS-68	Base	Ab Horizon	Starved Rock Collared
129	1978.372.JE1-68	ABS-69	Base	Ab Horizon	Unidentified Collared
130	1978.372.JE1-68	ABS-30	Base	Ab Horizon	Aztalan Collared
131	1978.372.JE1-68	0.5	ind.	unknown	Aztalan Collared
132	1978.372.JE1-68	0.9	ind.	unknown	indeterminate
133	1978.372.JE1-68	PH3-F1	Top	N301 R93	Powell Plain

Table C.2. Collared Vessel Morphological Attributes: Collar, Lip, and Rim Margin.

							Collar					Lip				Rim Margin			
ID	Temp	Md Level	Prov/ F#	Type Var.	Dec Mode	Orif.	Ex Surf	Int Surf	Prof.	Orient	Type	Form	Dec	Dec Dir	Surf Treat	Ext Dec	Ext Dec Dir	Int Dec	Rim Int Dec Dir
1	g	sub-md.	49-64	AzCol	B	cir	cm	sm	fl	vrt	fld	sq	Ø	n/a	sm	Ø	n/a	Ø	n/a
2	g	sub-md.	49-64	AzCol	D	ind.	cm	sm	fl	ind.	ind.	bvl	tw	trv	sm	Ø	n/a	Ø	n/a
3	g	sub-md.	H2	AzCol	P	cir	cm	sm	fl	vrt	fld	sq	Ø	n/a	cm	Ø	n/a	tw	dg RL
6	g	md. fill	15-67	AzCol	XX	ind.	sm	sm	fl	ind.	apl	sq	Ø	n/a	sm	Ø	n/a	Ø	n/a
7	g	md. fill	15-67 & 40-67	AzCol	B	pol-Rnd	cm	sm	fl	osl	apl	sq	Ø	n/a	sm	Ø	n/a	Ø	n/a
8	g	md. fill	15-67 & 40-67	AzCol	A	ind.	sm	sm	cv	ind.	ind.	sq	Ø	n/a	sm	Ø	n/a	Ø	n/a
10	g	sub-md.	29-67	AzCol	XX	cir	cm	sm	fl	ind.	apl	ind.	ind.	n/a	ind.	Ø	n/a	Ø	n/a
12	g	sub-md.	29-67	AzCol	P	cir	cm	sm	cv	vrt	apl	flt	Ø	n/a	sm	Ø	n/a	tw	hrz
16	g	sub-md.	29-67	AzCol	P	pol-ind	cm	sm	fl	ang	apl	flt	Ø	n/a	sm	Ø	n/a	cws	vrt
17	g	sub-md.	29-67	SR	-	ind.	cm	sm	fl	vrt	apl	flt	Ø	n/a	sm	Ø	n/a	v-nch	dg LR
18	g	sub-md.	29-67	AzCol	B	pol-Rnd	cm	sm	fl	osl	apl	flt	Ø	n/a	sm	Ø	n/a	Ø	n/a
20	g	sub-md.	20-68	AzCol	B	pol-ind	cm	sm	fl	vrt	ind.	flt	Ø	n/a	sm	Ø	n/a	Ø	n/a
21	g	sub-md.	29-67	AzCol	B	cir	cm	sm	cv	flr	ind.	bvl	Ø	n/a	sm	Ø	n/a	Ø	n/a

Table C.2. Collared Vessel Morphological Attributes: Collar, Lip, and Rim Margin, continued.

							Collar						Lip				Rim Margin			
ID	Temp	Md Level	Prov/ F#	Type Var.	Dec Mode	Orif.	Ex Surf	Int Surf	Prof.	Orient	Type	Form	Dec	Dec Dir	Surf Treat	Ext Dec	Ext Dec Dir	Int Dec	Rim Int Dec Dir
22	g	sub-md.	29-67	SR	n/a	cir	sm	sm	cv	flr	apl	sq	Ø	n/a	sm	Ø	n/a	v-nch	vrt
23	g	sub-md.	29-67	AzCol	F	pol-Rnd	cm	sm	cv	osl	ind.	sq	Ø	n/a	sm	Ø	n/a	tw	vrt
24	g	sub-md.	29-67	AzCol	A	pol-Ang	sm/cm	sm	fl	vrt	apl	flt	Ø	n/a	sm	Ø	n/a	Ø	n/a
25	g	sub-md.	29-67	AzCol	XX	ind.	cm	sm	cv	ind.	ind.	rnd	Ø	n/a	sm	Ø	n/a	tw	dg LR
26	g	sub-md.	34-67	SR	n/a	ind.	cm	sm	fl	ind.	ind.	sq	Ø	n/a	sm	Ø	n/a	wdg nch	vrt
27	g	sub-md.	34-67	AzCol	D	cir	cm	sm	fl	osl	fld	rnd	cws	trv	sm	Ø	n/a	Ø	n/a
31	g	sub-md.	40-67	SR	-	pol-Ang	sm/cm	sm	cv	ind.	apl	sq	Ø	n/a	cm	Ø	n/a	rnd nch	dg RL
32	g	sub-md.	40-67	AzCol	B	pol-ind	cm	sm	fl	ang	apl	sq	Ø	n/a	cm	Ø	n/a	Ø	n/a
33	g	sub-md.	40-67	AzCol	R	pol-Rnd	cm	sm	cvx	ind.	ind.	rnd	tw	hrz	sm	Ø	n/a	tw	hrz
34	g	sub-md.	40-67	AzCol	B	cir	cm	sm	fl	insl	apl	flt	Ø	n/a	cm	Ø	n/a	Ø	n/a
35	g	sub-md.	40-67	AzCol	XX	ind.	sm	sm	fl	vrt	apl	sq	Ø	n/a	sm	Ø	n/a	Ø	n/a
36	g	sub-md.	40-67	AzCol	XX	ind.	sm	sm	fl	ang	apl	flt	Ø	n/a	sm	Ø	n/a	Ø	n/a
37	g	sub-md.	40-67	AzCol	B	cir	cm	sm	fl	flr	apl	sq	Ø	n/a	sm	Ø	n/a	Ø	n/a

Table C.2. Collared Vessel Morphological Attributes: Collar, Lip, and Rim Margin, continued.

							Collar					Lip				Rim Margin			
ID	Temp	Md Level	Prov/ F#	Type Var.	Dec Mode	Orif.	Ex Surf	Int Surf	Prof.	Orient	Type	Form	Dec	Dec Dir	Surf Treat	Ext Dec	Ext Dec Dir	Int Dec	Rim Int Dec Dir
38	g	sub-md.	40-67	AzCol	F	cir	cm	sm	cv	flr	flt	rnd	Ø	n/a	sm	Ø	n/a	tw	dg LR
41	g	sub-md.	1-68	AzCol	M	pol-ind	sm/cm	sm	fl	osl	fld	flt	tw	trv	sm	Ø	n/a	Ø	n/a
42	g	sub-md.	1-68	AzCol	F	cir	cm	sm	fl	vrt	apl	sq	Ø	n/a	sm	Ø	n/a	tw	vrt
43	gg	sub-md.	1-68	AzCol	A	cir	sm	sm	fl	flr	fld	rnd	Ø	n/a	sm	Ø	n/a	Ø	n/a
44	g	sub-md.	1-68	AzCol	N	cir	cm	sm	cv	osl	ind.	sq	tw	diag. RL	sm	Ø	n/a	Ø	n/a
45	g	sub-md.	1-68	AzCol	P	pol-Rnd	cm	sm	fl	vrt	apl	bvl	Ø	n/a	cm	Ø	n/a	cws	dg RL
47	g	sub-md.	1-68	SR	n/a	ind.	cm	ind.	cv	ind.	ind.	ind.	Ø	n/a	ind.	Ø	n/a	rnd nch	dg RL
48	g	sub-md.	1-68	AzCol	P	pol-ind	cm	sm	fl	ind.	apl	sq	Ø	n/a	cm	Ø	n/a	cws	vrt
49	g	sub-md.	1-68	AzCol	W	pol-ind	cm	sm	cvx	vrt	apl	rnd	tw	hrz	sm	rnd nch	vrt	Ø	n/a
50	g	sub-md.	2-68	SR	-	pol-Ang	sm/cm	sm	cv	flr	ind.	sq	Ø	n/a	sm	Ø	n/a	v-nch	dg RL
51	g	sub-md.	3-68	AzCol	XX	cir	cm	sm	fl	vrt	ind.	sq	Ø	n/a	sm	Ø	n/a	Ø	n/a
52	g	sub-md.	4-68	AzCol	K	pol-ind	cm	sm	cv	flr	ind.	sq	Ø	n/a	sm	Ø	n/a	Ø	n/a

Table C.2. Collared Vessel Morphological Attributes: Collar, Lip, and Rim Margin, continued.

							Collar					Lip				Rim Margin			
ID	Temp	Md Level	Prov/ F#	Type Var.	Dec Mode	Orif.	Ex Surf	Int Surf	Prof.	Orient	Type	Form	Dec	Dec Dir	Surf Treat	Ext Dec	Ext Dec Dir	Int Dec	Rim Int Dec Dir
53	g	sub-md.	5-68	AzCol	XX	pol-Ang	sm/cm	sm	cv	vrt	ind.	flt	Ø	n/a	sm/cm	Ø	n/a	Ø	n/a
54	g	sub-md.	5-68	AzCol	B	cir	cm	sm	fl	ind.	apl	sq	Ø	n/a	cm	Ø	n/a	Ø	n/a
58	g	top	9-68	AzCol	A	cir	sm	sm	fl	osl	ind.	sq	Ø	n/a	sm	Ø	n/a	Ø	n/a
59	g	top	9-68	AzCol	A	pol-ind	sm	sm	cv	vrt	apl	sq	Ø	n/a	sm	Ø	n/a	Ø	n/a
60	g	sub-md.	11-68	AzCol	F	cir	cm	sm	fl	vrt	ind.	sq	Ø	n/a	sm	Ø	n/a	cws	vrt
61	g	sub-md.	11-68	AzCol	XX	cir	cm	sm	fl	vrt	ind.	sq	Ø	n/a	sm	Ø	n/a	Ø	n/a
65	g	sub-md.	21-68	AzCol	B	cir	cm	sm	fl	vrt	ind.	sq	Ø	n/a	cm	Ø	n/a	Ø	n/a
70	g	sub-md.	31-68	AzCol	F	cir	cm	sm	cv	vrt	ind.	sq	Ø	n/a	sm	Ø	n/a	cws	dg RL
73	g	sub-md.	31-68	AzCol	XX	cir	cm	sm	cx	ind.	apl	sq	Ø	n/a	sm	Ø	n/a	tw	vrt
74	g	sub-md.	PH NT	AzCol	F	ind.	cm	sm	cv	vrt	apl	sq	Ø	n/a	sm	Ø	n/a	cws	vrt
79	g	top	PZ	SR	n/a	cir	sm/cm	sm	cv	ind.	ind.	bvl	Ø	n/a	sm	Ø	n/a	wdg nch	vrt
81	g	md. fill	md. fill	AzCol	V	ind.	cm	sm	cv	ind.	apl	sq	pct	n/a	sm	knt imp	n/a	Ø	n/a
82	g	md. fill	md. fill	AzCol	D	cir	cm	sm	cv	vrt	apl	sq	tw	diag. RL	sm	Ø	n/a	Ø	n/a

Table C.2. Collared Vessel Morphological Attributes: Collar, Lip, and Rim Margin, continued.

							Collar						Lip				Rim Margin			
ID	Temp	Md Level	Prov/ F#	Type Var.	Dec Mode	Orif.	Ex Surf	Int Surf	Prof.	Orient	Type	Form	Dec	Dec Dir	Surf Treat	Ext Dec	Ext Dec Dir	Int Dec	Rim Int Dec Dir
83	g	md. fill	md. fill	SR	n/a	cir	cm	sm	cv	ind.	ind.	bvl	Ø	n/a	sm	Ø	n/a	v-nch	vrt
85	g	md. fill	md. fill	AzCol	B	cir	cm	sm	cv	vrt	flt	sq	Ø	n/a	sm/ cm	Ø	n/a	Ø	n/a
86	g	md. fill	md. fill	SR	n/a	cir	cm	sm	cv	osl	apl	sq	Ø	n/a	sm	Ø	n/a	rnd nch	vrt
90	g	md. fill	md. fill	SR	n/a	cir	cm	sm	cv	vrt	ind.	sq	Ø	n/a	cm	Ø	n/a	wdg nch	dg RL
91	g	md. fill	md. fill	AzCol	B	cir	cm	sm	fl	flr	fld	rnd	Ø	n/a	sm	Ø	n/a	Ø	n/a
93	g	md. fill	md. fill	AzCol	F	cir	cm	sm	fl	vrt	ind.	rnd	Ø	n/a	sm	Ø	n/a	cws	dg RL
94	g	md. fill	md. fill	AzCol	B	ind.	cm	sm	fl	vrt	ind.	rnd	Ø	n/a	sm	Ø	n/a	Ø	n/a
97	g	md. fill	md. fill	AzCol	XX	cir	sm/ cm	sm	fl	vrt	ind.	sq	Ø	n/a	sm	Ø	n/a	Ø	n/a
98	g	md. fill	md. fill	AzCol	XX	cir	sm/ cm	sm	cv	vrt	fld	sq	Ø	n/a	sm	Ø	n/a	Ø	n/a
99	g	md. fill	md. fill	SR	n/a	pol-Ang	sm/ cm	sm	cv	insl	ind.	flt	Ø	n/a	sm	Ø	n/a	rnd nch	vrt
100	g	md. fill	md. fill	AzCol	K	cir	cm	sm	fl	vrt	ind.	sq	Ø	n/a	sm	Ø	n/a	Ø	n/a
103	g	md. fill	md. fill	AzCol	B	pol-ind	cm	sm	fl	vrt	apl	sq	Ø	n/a	cm	Ø	n/a	Ø	n/a
104	g	md. fill	md. fill	SR	n/a	ind.	err.	sm	ind.	icv	ind.	ind.	ind.	n/a	ind.	ind.	n/a	v-nch	vrt
105	g	md. fill	md. fill	AzCol	A	pol-ind	sm/ cm	sm	fl	ind.	ind.	rnd	Ø	n/a	sm	Ø	n/a	Ø	n/a

Table C.2. Collared Vessel Morphological Attributes: Collar, Lip, and Rim Margin, continued.

							Collar					Lip				Rim Margin			
ID	Temp	Md Level	Prov/ F#	Type Var.	Dec Mode	Orif.	Ex Surf	Int Surf	Prof.	Orient	Type	Form	Dec	Dec Dir	Surf Treat	Ext Dec	Ext Dec Dir	Int Dec	Rim Int Dec Dir
107	g	md. fill	md. fill	AzCol	B	cir	cm	sm	fl	osl	apl	rnd	Ø	n/a	sm	Ø	n/a	Ø	n/a
108	g	md. fill	md. fill	AzCol	A	cir	sm/ cm	sm	fl	vrt	apl	sq	Ø	n/a	cm	Ø	n/a	Ø	n/a
109	g	md. fill	md. fill	AzCol	F	cir	cm	sm	fl	vrt	ind.	sq	Ø	n/a	sm	Ø	n/a	cws	vrt
110	g	md. fill	md. fill	AzCol	O	ind.	sm/ cm	sm	fl	icv	ind.	sq	Ø	n/a	sm	Ø	n/a	tw	dg LR
111	g	md. fill	md. fill	SR	n/a	cir	sm/ cm	sm	cv	ind.	fld	sq	Ø	n/a	sm	Ø	n/a	wdg nch	vrt
114	g	md. fill	md. fill	AzCol	B	cir	cm	sm	fl	vrt	ind.	sq	Ø	n/a	cm	Ø	n/a	Ø	n/a
116	g	md. fill	md. fill	SR	n/a	cir	sm	sm	cv	ind.	apl	flt	Ø	n/a	sm	Ø	n/a	v-nch	dg RL
117	g	sub-md.	Ab Horiz.	AzCol	D	pol-Rnd	cm	sm	cv	flr	ind.	bvl	tw	diag. RL	cm	Ø	n/a	Ø	n/a
120	g	sub-md.	Ab Horiz.	AzCol	F	cir	cm	sm	fl	vrt	ind.	sq	Ø	n/a	sm	Ø	n/a	cws	vrt
121	g	sub-md.	Ab Horiz.	AzCol	B	pol-Rnd	cm	sm	cv	vrt	ind.	thk	Ø	n/a	sm	Ø	n/a	Ø	n/a
122	g	sub-md.	Ab Horiz.	AzCol	B	cir	cm	sm	fl	vrt	apl	flt	Ø	n/a	sm	Ø	n/a	Ø	n/a
123	g	sub-md.	Ab Horiz.	SR	n/a	cir	cm	sm	fl	insl	ind.	flt	Ø	n/a	cm	Ø	n/a	wdg nch	vrt
124	g	sub-md.	Ab Horiz.	AzCol	XX	cir	sm	sm	fl	insl	ind.	sq	Ø	n/a	sm	Ø	n/a	Ø	n/a

Table C.2. Collared Vessel Morphological Attributes: Collar, Lip, and Rim Margin, continued.

							Collar					Lip				Rim Margin			
ID	Temp	Md Level	Prov/ F#	Type Var.	Dec Mode	Orif.	Ex Surf	Int Surf	Prof.	Orient	Type	Form	Dec	Dec Dir	Surf Treat	Ext Dec	Ext Dec Dir	Int Dec	Rim Int Dec Dir
125	g	sub-md.	Ab Horiz.	Unid	XX	cir	cm	ind.	fl	ind.	ind.	ind.	Ø	n/a	sm	Ø	n/a	ind.	n/a
128	g	sub-md.	Ab Horiz.	SR	-	cir	sm/ cm	sm	fl	vrt	ind.	sq	Ø	n/a	sm	Ø	n/a	v-nch	vrt
129	g	sub-md.	Ab Horiz.	Unid	XX	ind.	sm	sm	cv	ind.	ind.	ind.	Ø	n/a	sm	Ø	n/a	ind.	n/a
130	g	sub-md.	Ab Horiz.	AzCol	XX	ind.	cm	sm	cv	ind.	ind.	sq	tw	diag. RL	sm	Ø	n/a	Ø	n/a
131	g	ind.	unk.	AzCol	XX	cir	cm	sm	fl	osl	apl	rnd	Ø	n/a	sm	Ø	n/a	Ø	n/a

Table C.3. Collared Vessel Metric Attributes: Neck, Shoulder, and Body.

						Neck				Shoulder					
ID	Temp	Md Level	Prov/ F #	Type Var.	Dec Mode	Form	Surf Ext Dec	Surf Ext Dec Dir	Surface Treat.	Form	Surf Ext	Surf Int	Body Surf Treat.	CM Orient	Cord Twist
1	g	sub-md.	49-64	AzCol	B	flr	Ø	n/a	cm	ind.	ind.	ind.	ind.	dg LR	Z
2	g	sub-md.	49-64	AzCol	D	ind.	Ø	n/a	cm	ind.	ind.	ind.	ind.	n/a	ind.
3	g	sub-md.	H2	AzCol	P	flr	knt imp	vrt	cm	ind.	ind.	ind.	ind.	vrt	Z
6	g	md. fill	15-67	AzCol	XX	ind.	ind.	n/a	ind.	ind.	ind.	ind.	ind.	n/a	n/a
7	g	md. fill	15-67 & 40-67	AzCol	B	flr	Ø	n/a	cm	rnd	cm	sm	cm	dg LR	Z
8	g	md. fill	15-67 & 40-67	AzCol	A	ind.	Ø	n/a	sm	ind.	ind.	ind.	ind.	n/a	n/a
10	g	sub-md.	29-67	AzCol	XX	str	ind.	n/a	ind.	ind.	ind.	ind.	ind.	dg LR	Z
12	g	sub-md.	29-67	AzCol	P	ind.	knt imp	vrt	cm	ind.	ind.	ind.	ind.	vrt	Z
16	g	sub-md.	29-67	AzCol	P	ind.	cws	vrt	cm	ind.	ind.	ind.	ind.	dg RL	Z
17	g	sub-md.	29-67	SR	-	ind.	ind.	n/a	ind.	ind.	ind.	ind.	ind.	dg LR	S
18	g	sub-md.	29-67	AzCol	B	ind.	Ø	n/a	cm	ind.	ind.	ind.	ind.	dg LR	S
20	g	sub-md.	20-68	AzCol	B	str	Ø	n/a	cm	ind.	ind.	ind.	ind.	vrt	Z
21	g	sub-md.	29-67	AzCol	B	flr	Ø	n/a	cm	ind.	ind.	ind.	ind.	vrt	ind.
22	g	sub-md.	29-67	SR	n/a	ind.	Ø	n/a	sm	ind.	ind.	ind.	ind.	n/a	n/a

Table C.3. Collared Vessel Metric Attributes: Neck, Shoulder, and Body, continued.

						Neck				Shoulder					
ID	Temp	Md Level	Prov/ F #	Type Var.	Dec Mode	Form	Surf Ext Dec	Surf Ext Dec Dir	Surface Treat.	Form	Surf Ext	Surf Int	Body Surf Treat.	CM Orient	Cord Twist
23	g	sub-md.	29-67	AzCol	F	ind.	Ø	n/a	sm/cm	ind.	ind.	ind.	ind.	vrt	S
24	g	sub-md.	29-67	AzCol	A	str	Ø	n/a	sm/cm	ind.	ind.	ind.	ind.	dg LR	ind.
25	g	sub-md.	29-67	AzCol	XX	ind.	ind.	n/a	ind.	ind.	ind.	ind.	ind.	dg RL	ind.
26	g	sub-md.	34-67	SR	n/a	ind.	ind.	n/a	ind.	ind.	ind.	ind.	ind.	n/a	n/a
27	g	sub-md.	34-67	AzCol	D	ang	Ø	n/a	cm	ind.	ind.	ind.	ind.	dg RL	S
31	g	sub-md.	40-67	SR	-	ind.	Ø		sm/cm	ind.	ind.	ind.	ind.	vrt	Z
32	g	sub-md.	40-67	AzCol	B	ind.	Ø	n/a	cm	ind.	ind.	ind.	ind.	dg RL	Z
33	g	sub-md.	40-67	AzCol	R	ind.	knt imp	vrt	sm	ind.	ind.	ind.	ind.	dg LR	Z
34	g	sub-md.	40-67	AzCol	B	ind.	Ø	n/a	sm/cm	ind.	ind.	ind.	ind.	vrt	ind.
35	g	sub-md.	40-67	AzCol	XX	ind.	ind.	n/a	ind.	ind.	ind.	ind.	ind.	n/a	n/a
36	g	sub-md.	40-67	AzCol	XX	ind.	ind.	n/a	ind.	ind.	ind.	ind.	ind.	n/a	n/a
37	g	sub-md.	40-67	AzCol	B	str	Ø	n/a	sm/cm	ind.	ind.	ind.	ind.	vrt	Z
38	g	sub-md.	40-67	AzCol	F	ang	Ø	n/a	cm	ind.	ind.	ind.	ind.	vrt	Z
41	g	sub-md.	1-68	AzCol	M	str	knt imp	vrt	sm/cm	ind.	sm/ cm	ind.	ind.	vrt	ind.
42	g	sub-md.	1-68	AzCol	F	insl	Ø	n/a	cm	ind.	ind.	ind.	ind.	dg LR	Z

Table C.3. Collared Vessel Metric Attributes: Neck, Shoulder, and Body, continued.

						Neck				Shoulder					
ID	Temp	Md Level	Prov/ F #	Type Var.	Dec Mode	Form	Surf Ext Dec	Surf Ext Dec Dir	Surface Treat.	Form	Surf Ext	Surf Int	Body Surf Treat.	CM Orient	Cord Twist
43	gg	sub-md.	1-68	AzCol	A	flr	Ø	n/a	sm	ind.	ind.	ind.	ind.	n/a	n/a
44	g	sub-md.	1-68	AzCol	N	ind.	cws	vrt	sm	ind.	ind.	ind.	ind.	vrt	S
45	g	sub-md.	1-68	AzCol	P	str	cws	vrt	cm	ind.	ind.	ind.	ind.	dg RL	S
47	g	sub-md.	1-68	SR	n/a	ind.	ind.	n/a	ind.	ind.	ind.	ind.	ind.	vrt	S
48	g	sub-md.	1-68	AzCol	P	ind.	cws	vrt	cm	ind.	ind.	ind.	ind.	dg LR	ind.
49	g	sub-md.	1-68	AzCol	W	insl	tw	vrt	cm	ang	cm	sm	cm	vrt	Z
50	g	sub-md.	2-68	SR	-	flr	Ø	n/a	cm	rnd	cm	sm	cm	vrt	Z
51	g	sub-md.	3-68	AzCol	XX	ind.	ind.	n/a	ind.	ind.	ind.	ind.	ind.	dg RL	Z
52	g	sub-md.	4-68	AzCol	K	str	tw	vrt	sm	ind.	ind.	ind.	ind.	vrt	S
53	g	sub-md.	5-68	AzCol	XX	ind.	ind.	n/a	ind.	ind.	ind.	ind.	ind.	vrt	ind.
54	g	sub-md.	5-68	AzCol	B	str	Ø	n/a	cm	ind.	ind.	ind.	ind.	vrt	Z
58	g	top	9-68	AzCol	A	ang	Ø	n/a	sm/cm	ind.	ind.	ind.	ind.	vrt	ind.
59	g	top	9-68	AzCol	A	insl	Ø	n/a	sm/cm	ind.	ind.	ind.	ind.	vrt	Z
60	g	sub-md.	11-68	AzCol	F	insl	Ø	n/a	cm	ind.	ind.	ind.	ind.	dg RL	Z
61	g	sub-md.	11-68	AzCol	XX	ind.	ind.	n/a	ind.	ind.	ind.	ind.	ind.	dg RL	S

Table C.3. Collared Vessel Metric Attributes: Neck, Shoulder, and Body, continued.

						Neck				Shoulder					
ID	Temp	Md Level	Prov/ F #	Type Var.	Dec Mode	Form	Surf Ext Dec	Surf Ext Dec Dir	Surface Treat.	Form	Surf Ext	Surf Int	Body Surf Treat.	CM Orient	Cord Twist
65	g	sub-md.	21-68	AzCol	B	str	Ø	n/a	cm	ind.	ind.	ind.	ind.	vrt	S
70	g	sub-md.	31-68	AzCol	F	str	Ø	n/a	cm	ind.	ind.	ind.	ind.	vrt	S
73	g	sub-md.	31-68	AzCol	XX	ind.	ind.	n/a	ind.	ind.	ind.	ind.	ind.	dg RL	ind.
74	g	sub-md.	PH NT	AzCol	F	insl	Ø	n/a	sm	ind.	ind.	ind.	ind.	vrt	Z
79	g	top	PZ	SR	n/a	ind.	ind.	n/a	ind.	ind.	ind.	ind.	ind.	dg LR	ind.
81	g	md. fill	md. fill	AzCol	V	ind.	Ø	n/a	cm	ind.	ind.	ind.	ind.	vrt	Z
82	g	md. fill	md. fill	AzCol	D	ind.	Ø	n/a	cm	ind.	ind.	ind.	ind.	dg LR	ind.
83	g	md. fill	md. fill	SR	n/a	ind.	ind.	n/a	ind.	ind.	ind.	ind.	ind.	dg LR	ind.
85	g	md. fill	md. fill	AzCol	B	ind.	Ø	n/a	cm	ind.	ind.	ind.	ind.	vrt	ind.
86	g	md. fill	md. fill	SR	n/a	insl	Ø	n/a	cm	ind.	ind.	ind.	ind.	vrt	ind.
90	g	md. fill	md. fill	SR	n/a	ind.	ind.	n/a	ind.	ind.	ind.	ind.	ind.	dg RL	ind.
91	g	md. fill	md. fill	AzCol	B	ind.	Ø	n/a	sm	ind.	ind.	ind.	ind.	dg RL	ind.
93	g	md. fill	md. fill	AzCol	F	str	Ø	n/a	cm	ind.	ind.	ind.	ind.	dg LR	ind.
94	g	md. fill	md. fill	AzCol	B	str	Ø	n/a	cm	ind.	ind.	ind.	ind.	vrt	ind.
97	g	md. fill	md. fill	AzCol	XX	flr	ind.	n/a	ind.	ind.	ind.	ind.	ind.	vrt	ind.

Table C.3. Collared Vessel Metric Attributes: Neck, Shoulder, and Body, continued.

						Neck				Shoulder					
ID	Temp	Md Level	Prov/ F #	Type Var.	Dec Mode	Form	Surf Ext Dec	Surf Ext Dec Dir	Surface Treat.	Form	Surf Ext	Surf Int	Body Surf Treat.	CM Orient	Cord Twist
98	g	md. fill	md. fill	AzCol	XX	ind.	ind.	n/a	ind.	ind.	ind.	ind.	ind.	dg LR	S
99	g	md. fill	md. fill	SR	n/a	insl	Ø	n/a	sm/cm	ind.	ind.	ind.	ind.	vrt	ind.
100	g	md. fill	md. fill	AzCol	K	insl	knt imp	obl	cm	ind.	ind.	ind.	ind.	dg LR	ind.
103	g	md. fill	md. fill	AzCol	B	ind.	Ø	n/a	cm	ind.	ind.	ind.	ind.	vrt	ind.
104	g	md. fill	md. fill	SR	n/a	ind.	Ø	n/a	sm	ind.	ind.	ind.	ind.	n/a	n/a
105	g	md. fill	md. fill	AzCol	A	str	Ø	n/a	cm	ind.	ind.	ind.	ind.	vrt	ind.
107	g	md. fill	md. fill	AzCol	B	flr	Ø	n/a	cm	ind.	ind.	ind.	ind.	vrt	Z
108	g	md. fill	md. fill	AzCol	A	flr	Ø	n/a	cm	ind.	ind.	ind.	ind.	vrt	Z
109	g	md. fill	md. fill	AzCol	F	flr	Ø	n/a	cm	ind.	ind.	ind.	ind.	dg LR	Z
110	g	md. fill	md. fill	AzCol	O	ind.	tw	vrt	sm	ind.	ind.	ind.	ind.	dg RL	ind.
111	g	md. fill	md. fill	SR	n/a	ind.	Ø	n/a	sm/cm	ind.	ind.	ind.	ind.	dg LR	Z
114	g	md. fill	md. fill	AzCol	B	str	Ø	n/a	cm	ind.	ind.	ind.	ind.	dg RL	Z
116	g	md. fill	md. fill	SR	n/a	ind.	ind.	n/a	ind.	ind.	ind.	ind.	ind.	n/a	n/a
117	g	sub-md.	Ab Horiz.	AzCol	D	flr	Ø	n/a	cm	ind.	ind.	ind.	ind.	vrt	ind.
120	g	sub-md.	Ab Horiz.	AzCol	F	str	Ø	n/a	cm	ind.	ind.	ind.	ind.	dg RL	Z

Table C.3. Collared Vessel Metric Attributes: Neck, Shoulder, and Body, continued.

						Neck				Shoulder					
ID	Temp	Md Level	Prov/ F #	Type Var.	Dec Mode	Form	Surf Ext Dec	Surf Ext Dec Dir	Surface Treat.	Form	Surf Ext	Surf Int	Body Surf Treat.	CM Orient	Cord Twist
121	g	sub-md.	Ab Horiz.	AzCol	B	flr	Ø	n/a	sm/cm	ind.	ind.	ind.	ind.	vrt	Z
122	g	sub-md.	Ab Horiz.	AzCol	B	str	Ø	n/a	cm	ind.	ind.	ind.	ind.	dg RL	Z
123	g	sub-md.	Ab Horiz.	SR	n/a	ind.	ind.	n/a	ind.	ind.	ind.	ind.	ind.	vrt	Z
124	g	sub-md.	Ab Horiz.	AzCol	XX	ind.	ind.	n/a	ind.	ind.	ind.	ind.	ind.	n/a	n/a
125	g	sub-md.	Ab Horiz.	Unid	XX	str	Ø	n/a	cm	rnd	cm	sm	ind.	dg RL	S
128	g	sub-md.	Ab Horiz.	SR	-	ind.	Ø	n/a	sm/cm	ind.	ind.	ind.	ind.	vrt	ind.
129	g	sub-md.	Ab Horiz.	Unid	XX	ind.	ind.	n/a	ind.	ind.	ind.	ind.	ind.	n/a	n/a
130	g	sub-md.	Ab Horiz.	AzCol	XX	ind.	ind.	n/a	ind.	ind.	ind.	ind.	ind.	vrt	S
131	g	ind.	unk.	AzCol	XX	ind.	ind.	n/a	ind.	ind.	ind.	ind.	ind.	vrt	ind.

Table C.4. Collared Vessel Metric Attributes.

ID	Md Level	Prov/ F #	Type	Orifice Dia. (cm)	%	Collar Height 1 (mm)	Collar Height 2 (mm)	Collar Max. Thick 1 (mm)	Collar Max. Thick 2 (mm)	Neck Thick 1 (mm)	Neck Thick 2 (mm)	Lip Thick 1 (mm)	Lip Thick 2 (mm)	Body Wall Thick (mm)	Wt. (g)
1	sub-md	49-64	AzCol	34	14	18.1	n/a	8.6	n/a	6.8	n/a	3.8	n/a	4.9	64.5
2	sub-md	49-64	AzCol	ind.	< 5	15.5	n/a	7	n/a	ind.	n/a	5.2	n/a	ind.	1.7
3	sub-md	H2	AzCol	15	7	22.6	n/a	7.1	n/a	4.3	n/a	4.6	n/a	4.9	12.5
6	md fill	15-67	AzCol	ind.	< 5	15.44	n/a	7	n/a	4.7	n/a	3.9	n/a	ind.	3.1
7	md fill	15-67 & 40-67	AzCol	24	47	29.2	20.9	15.3	8	12.3	9	5.5	4.2	4.8	375.4
8	md fill	15-67 & 40-67	AzCol	ind.	< 5	17.9	n/a	7.24	n/a	4.3	n/a	4.9	n/a	ind.	4
10	sub-md	29-67	AzCol	30	5	26.1	n/a	6.6	n/a	4.7	n/a	3	n/a	ind.	12.3
12	sub-md	29-67	AzCol	17	9	18	n/a	8	n/a	5.9	n/a	5.6	n/a	6.1	12.7
16	sub-md	29-67	AzCol	ind.	< 5	34.3	27.9	10.5	9.9	6.4	ind.	7	7.3	ind.	12.8
17	sub-md	29-67	SR	ind.	< 5	24.6	n/a	8.5	n/a	ind.	n/a	4.7	n/a	ind.	5
18	sub-md	29-67	AzCol	ind.	< 5	25.8	23.1	6.8	23.1	4.3	ind.	3.6	3.3	ind.	6.8
20	sub-md	20-68	AzCol	17	6	34.6	29.6	10.5	7.4	6.2	4.6	4.9	3.4	ind.	16.2
21	sub-md	29-67	AzCol	15	8	12.7	n/a	7.3	n/a	5.2	n/a	3	n/a	4.3	14.1
22	sub-md	29-67	SR	19	6	16.3	n/a	9.1	n/a	6.8	n/a	7.5	n/a	6.1	11.4

Table C.4. Collared Vessel Metric Attributes, continued.

ID	Md Level	Prov/ F #	Type	Orifice Dia. (cm)	%	Collar Height 1 (mm)	Collar Height 2 (mm)	Collar Max. Thick 1 (mm)	Collar Max. Thick 2 (mm)	Neck Thick 1 (mm)	Neck Thick 2 (mm)	Lip Thick 1 (mm)	Lip Thick 2 (mm)	Body Wall Thick (mm)	Wt. (g)
23	sub-md	29-67	AzCol	ind.	< 5	49.1	40	20.9	11.9	10	8.4	11.2	6.2	ind.	82.5
24	sub-md	29-67	AzCol	ind.	< 5	19.6	14.4	7.8	6.9	4.6	ind.	6.4	4.6	ind.	6.4
25	sub-md	29-67	AzCol	ind.	< 5	18.8	n/a	7.5	n/a	ind.	n/a	6.2	n/a	ind.	2.8
26	sub-md	34-67	SR	ind.	< 5	ind.	n/a	ind.	n/a	ind.	n/a	4.2	n/a	ind.	1.5
27	sub-md	34-67	AzCol	15	10	13.7	n/a	10.8	n/a	6.6	n/a	6.9	n/a	6	29.3
31	sub-md	40-67	SR	ind.	< 5	34	n/a	12	n/a	6	5	8.5	6	ind.	18.5
32	sub-md	40-67	AzCol	ind.	< 5	25	ind.	9.7	ind.	5.6	ind.	7.2	6.7	ind.	27
33	sub-md	40-67	AzCol	ind.	< 5	25.2	20.38	7.2	6.2	5.6	ind.	5.1	4.2	ind.	7.5
34	sub-md	40-67	AzCol	ind.	< 5	21.3	n/a	9.5	n/a	7.1	n/a	5.9	n/a	ind.	11.4
35	sub-md	40-67	AzCol	ind.	< 5	ind.	n/a	ind.	n/a	ind.	n/a	5.9	n/a	ind.	12
36	sub-md	40-67	AzCol	ind.	< 5	ind.	n/a	ind.	n/a	ind.	n/a	7.8	n/a	ind.	2.8
37	sub-md	40-67	AzCol	24	7	20.2	n/a	7.9	n/a	ind.	n/a	5.1	n/a	ind.	14.5
38	sub-md	40-67	AzCol	ind.	< 5	22.3	n/a	8.7	n/a	5.3	n/a	4.1	n/a	5.3	8.2
41	sub-md	1-68	AzCol	ind.	< 5	>17.9	14.1	>9.5	8	>6.5	4.9	>6.6	5.8	6.3	14.2

Table C.4. Collared Vessel Metric Attributes, continued.

ID	Md Level	Prov/ F #	Type	Orifice Dia. (cm)	%	Collar				Neck		Lip		Body Wall Thick (mm)	Wt. (g)
						Height 1 (mm)	Height 2 (mm)	Max. Thick 1 (mm)	Max. Thick 2 (mm)	Thick 1 (mm)	Thick 2 (mm)	Thick 1 (mm)	Thick 2 (mm)		
42	sub-md	1-68	AzCol	>30	< 5	19	n/a	9.8	n/a	6.8	n/a	5.6	n/a	8.1	24.3
43	sub-md	1-68	AzCol	>26	< 5	11.3	n/a	5.7	n/a	4.5	n/a	4.7	n/a	4.4	8.5
44	sub-md	1-68	AzCol	>22	< 5	ind.	n/a	9	n/a	ind.	n/a	5.9	n/a	ind.	10.3
45	sub-md	1-68	AzCol	24	14	38.3	30.7	10.8	10.7	5.6	6.2	7.3	6.3	ind.	64.2
47	sub-md	1-68	SR	ind.	< 5	ind.	n/a	ind.	n/a	ind.	n/a	ind.	n/a	ind.	3.3
48	sub-md	1-68	AzCol	ind.	< 5	ind.	30.6	ind.	10.3	ind.	8.2	ind.	6	ind.	12.8
49	sub-md	1-68	AzCol	26	15	ind.	16.5	ind.	5.9	ind.	5.3	ind.	3.9	3.5	525.1
50	sub-md	2-68	SR	19.5	100	32.2	22.4	12.5	7.9	6.5	6.8	9.3	7.1	7.4	6240
51	sub-md	3-68	AzCol	ind.	< 5	ind.	n/a	ind.	n/a	ind.	n/a	3.7	n/a	ind.	9.8
52	sub-md	4-68	AzCol	ind.	< 5	23	n/a	8.9	n/a	6.7	n/a	5.1	n/a	8.3	18.5
53	sub-md	5-68	AzCol	ind.	< 5	40.8	n/a	13.3	n/a	7.3	n/a	8.7	6.1	ind.	30.2
54	sub-md	5-68	AzCol	17	10	25.4	n/a	10.2	8.4	7.4	7.2	6.4	4.6	7	32.1
58	Top	9-68	AzCol	29	5	16.4	n/a	8.5	n/a	5.8	n/a	5.8	n/a	7.3	20
59	Top	9-68	AzCol	27	12	32.1	ind.	12.8	ind.	5.3	ind.	6.3	ind.	ind.	52.4

Table C.4. Collared Vessel Metric Attributes, continued.

						Collar				Neck		Lip			
ID	Md Level	Prov/ F #	Type	Orifice Dia. (cm)	%	Height 1 (mm)	Height 2 (mm)	Max. Thick 1 (mm)	Max. Thick 2 (mm)	Thick 1 (mm)	Thick 2 (mm)	Thick 1 (mm)	Thick 2 (mm)	Body Wall Thick (mm)	Wt. (g)
60	sub-md	11-68	AzCol	27	5	27	n/a	6.6	n/a	4.9	n/a	4.1	n/a	5.3	17.4
61	sub-md	11-68	AzCol	ind.	< 5	> 26.8	n/a	8.8	n/a	ind.	n/a	4.4	n/a	ind.	4.1
65	sub-md	21-68	AzCol	> 30	< 5	24.7	n/a	8.7	n/a	5.6	n/a	6	n/a	6.2	21.9
70	sub-md	31-68	AzCol	20	8	17.8	n/a	7.5	n/a	5	n/a	5	n/a	5	14.1
73	sub-md	31-68	AzCol	ind.	< 5	37.6	n/a	11.1	n/a	6	n/a	6.5	n/a	ind.	14.8
74	sub-md	PH NT	AzCol	ind.	< 5	26	n/a	9.5	n/a	6.7	n/a	5.4	n/a	5	6.9
79	Top	PZ	SR	ind.	< 5	ind.	n/a	> 7.3	n/a	ind.	n/a	6.6	n/a	ind.	4.7
81	md fill	MF	AzCol	ind.	< 5	35.3	n/a	11	n/a	5.2	n/a	4.4	n/a	ind.	8.7
82	md fill	MF	AzCol	ind.	< 5	29.4	n/a	8.6	n/a	6.9	n/a	5.6	n/a	ind.	4.8
83	md fill	MF	SR	ind.	< 5	ind.	n/a	8.9	n/a	ind.	n/a	10.7	n/a	ind.	4.9
85	md fill	MF	AzCol	> 25	< 5	27.3	n/a	10	n/a	6.6	n/a	4.8	n/a	ind.	12.3
86	md fill	MF	SR	22	5	29.8	n/a	10.3	n/a	9.4	n/a	5.4	n/a	10.6	26.8
90	md fill	MF	SR	ind.	< 5	ind.	n/a	8.2	n/a	6.7	n/a	6.3	n/a	ind.	3.1
91	md fill	MF	AzCol	18	10	10.6	n/a	7.5	n/a	5.2	n/a	4.3	n/a	ind.	4.3

Table C.4. Collared Vessel Metric Attributes, continued.

ID	Md Level	Prov/ F #	Type	Orifice Dia. (cm)	%	Collar Height 1 (mm)	Collar Height 2 (mm)	Collar Max. Thick 1 (mm)	Collar Max. Thick 2 (mm)	Neck Thick 1 (mm)	Neck Thick 2 (mm)	Lip Thick 1 (mm)	Lip Thick 2 (mm)	Body Wall Thick (mm)	Wt. (g)
93	md fill	MF	AzCol	>15	< 5	27	n/a	9.6	n/a	6.7	n/a	4	n/a	6.9	17.5
94	md fill	MF	AzCol	ind.	< 5	21.3	n/a	8.6	n/a	5.6	n/a	3.7	n/a	5.3	10.7
97	md fill	MF	AzCol	>16	< 5	ind.	n/a	9.3	n/a	ind.	n/a	5.3	n/a	ind.	7
98	md fill	MF	AzCol	. 10	< 5	ind.	n/a	ind.	n/a	ind.	n/a	5	n/a	ind.	3.7
99	md fill	MF	SR	17	12	41.4	34	13.5	11.4	5.9	7.9	6.7	5.9	6.2	100.9
100	md fill	MF	AzCol	21	6	21.1	n/a	8.6	n/a	6.7	n/a	4.8	n/a	5.9	13.8
103	md fill	MF	AzCol	15	8	26.9	23.3	9.9	8.9	6	5.9	7.8	n/a	ind.	21
104	md fill	MF	SR	ind.	< 5	ind.	n/a	ind.	n/a	7.4	n/a	ind.	n/a	ind.	14.4
105	md fill	MF	AzCol	ind.	< 5	>29.5	25.6	>11,9	6.5	6.2	ind.	>4.4	4.1	ind.	11
107	md fill	MF	AzCol	10	5	13.9	n/a	10.5	n/a	6.3	n/a	5.2	n/a	4.4	28.8
108	md fill	MF	AzCol	30	7	20.7	n/a	8.7	n/a	5.7	n/a	5.3	n/a	5.6	37
109	md fill	MF	AzCol	ind.	< 5	41.3	n/a	12.2	n/a	8	n/a	5	n/a	8.2	48.5
110	md fill	MF	AzCol	ind.	< 5	18.6	n/a	7.1	n/a	6.2	n/a	3.7	n/a	ind.	3.6
111	md fill	MF	SR	> 30	< 5	27.8	n/a	7.4	n/a	5	n/a	4.9	n/a	4.2	10.2

Table C.4. Collared Vessel Metric Attributes, continued.

ID	Md Level	Prov/ F #	Type	Orifice Dia. (cm)	%	Collar Height 1 (mm)	Collar Height 2 (mm)	Collar Max. Thick 1 (mm)	Collar Max. Thick 2 (mm)	Neck Thick 1 (mm)	Neck Thick 2 (mm)	Lip Thick 1 (mm)	Lip Thick 2 (mm)	Body Wall Thick (mm)	Wt. (g)
114	md fill	MF	AzCol	>26	< 5	22.8	n/a	7.8	n/a	6.9	n/a	6.6	n/a	ind.	13
116	md fill	MF	SR	ind.	< 5	ind.	n/a	ind.	n/a	ind.	n/a	7.8	n/a	ind.	5.1
117	sub-md	Ab Horiz.	AzCol	18	11	45.9	37.7	16.4	10.8	7.7	7.2	12.9	n/a	6.6	93
120	sub-md	Ab Horiz.	AzCol	> 20	< 5	31.7	n/a	10.3	n/a	7.3	n/a	5.6	n/a	6.4	46.4
121	sub-md	Ab Horiz.	AzCol	> 25	18	25.6	19.1	12.4	7.9	9.4	7.7	10.2	6	5	85.6
122	sub-md	Ab Horiz.	AzCol	24	5	25.1	n/a	5.5	n/a	2.7	n/a	3.6	n/a	ind.	9.3
123	sub-md	Ab Horiz.	SR	>20	< 5	ind.	n/a	ind.	n/a	ind.	n/a	3.8	n/a	ind.	9.1
124	sub-md	Ab Horiz.	AzCol	35	5	ind.	n/a	ind.	n/a	ind.	n/a	7.6	n/a	ind.	55.4
125	sub-md	Ab Horiz.	Unid.	> 10	< 5	6.9	n/a	9.3	n/a	6.9	n/a	ind.	n/a	6.5	291.7
128	sub-md	Ab Horiz.	SR	ind.	< 5	24.7	n/a	10	n/a	6.4	n/a	3.6	n/a	ind.	8.6
129	sub-md	Ab Horiz.	Unid.	ind.	< 5	ind.	n/a	ind.	n/a	ind.	n/a	ind.	n/a	ind.	3.9

Table C.4. Collared Vessel Metric Attributes, continued.

						Collar				Neck		Lip			
ID	Md Level	Prov/ F #	Type	Orifice Dia. (cm)	%	Height 1 (mm)	Height 2 (mm)	Max. Thick 1 (mm)	Max. Thick 2 (mm)	Thick 1 (mm)	Thick 2 (mm)	Thick 1 (mm)	Thick 2 (mm)	Body Wall Thick (mm)	Wt. (g)
130	sub-md	Ab Horiz.	AzCol	ind.	< 5	ind.	n/a	ind.	n/a	ind.	n/a	6.3	n/a	ind.	4.2
131	ind	Unk.	AzCol	> 10	< 5	16.2	n/a	10.5	n/a	4.8	n/a	3.7	n/a	ind.	6.3

Table C.5. Collared Vessel Temper/Paste Description.

ID	Md Level	Prov/ F #	Type	Temp	Size & Sorting	Temper Sphericity	Temper Roundness	Temper Grading	Paste Texture	Paste Core Cross-section
1	sub-md	49-64	AzCol	g	Med. - Poorly Sorted	0.7	0.4	sub-angular	Med. Sand	Light ext. margin/ dark int. margin
2	sub-md	49-64	AzCol	g	Med. - Well Sorted	0.7	0.2	sub-angular	Med. Sand	Uniformly light
3	sub-md	H2	AzCol	g	Med. - Well Sorted	0.7	0.4	sub-rounded	Med. Sand	Uniformly dark
6	md fill	15-67	AzCol	g	Med. - Poorly Sorted	0.7	0.5	sub-angular	Coarse Sand	Uniformly light
7	md fill	15-67 & 40-67	AzCol	g	Med. - Poorly Sorted	0.9	0.5	sub-rounded	Coarse Sand	Light ext. margin/ dark int. margin
8	md fill	15-67 & 40-67	AzCol	g	Coarse - Poorly Sorted	0.6	0.3	angular	Very Coarse Sand	Uniformly light
10	sub-md	29-67	AzCol	g	Coarse - Poorly Sorted	0.7	0.3	angular	Very Coarse Sand	Light ext. margin/ slightly darker int. margin
12	sub-md	29-67	AzCol	g	Med. - Well Sorted	0.7	0.5	sub-rounded	Med. Sand	Uniformly dark
16	sub-md	29-67	AzCol	g	Med. - Well Sorted	0.6	0.3	sub-angular	Very Coarse Sand	Uniformly light
17	sub-md	29-67	SR	g	Med. - Well Sorted	0.8	0.5	sub-rounded	Coarse Sand	Uniformly light
18	sub-md	29-67	AzCol	g	Fine - Poorly Sorted	0.7	0.5	sub-angular	Fine Sand	Uniformly light
20	sub-md	20-68	AzCol	g	Med. - Well Sorted	0.7	0.3	sub-angular	Med. Sand	Light margins/dark core
21	sub-md	29-67	AzCol	g	Coarse - Poorly Sorted	0.4	0.5	sub-angular	Coarse Sand	Dark margins/light core
22	sub-md	29-67	SR	g	Med. - Well Sorted	0.7	0.4	sub-angular	Med. Sand	Uniformly light

Table C.5. Collared Vessel Temper/Paste Description, continued.

ID	Md Level	Prov/ F #	Type	Temp	Size & Sorting	Temper Sphericity	Temper Roundness	Temper Grading	Paste Texture	Paste Core Cross-section
23	sub-md	29-67	AzCol	g	Coarse - Poorly Sorted	0.5	0.3	sub-angular	Very Coarse Sand	Light ext. margin/ dark int. margin
24	sub-md	29-67	AzCol	g	Med. - Well Sorted	0.8	0.5	sub-angular	Coarse Sand	Uniformly dark
25	sub-md	29-67	AzCol	g	Med. - Well Sorted	0.8	0.7	sub-rounded	Med. Sand	Dark margins/light core
26	sub-md	34-67	SR	g	Med. - Well Sorted	0.7	0.3	sub-angular	Med. Sand	Light ext. margin/ slightly darker int. margin
27	sub-md	34-67	AzCol	g	Med. - Poorly Sorted	0.7	0.5	sub-angular	Coarse Sand	Light ext. margin/ dark int. margin
31	sub-md	40-67	SR	g	Med. - Well Sorted	0.7	0.3	sub-angular	Coarse Sand	Uniformly light
32	sub-md	40-67	AzCol	g	Coarse - Poorly Sorted	0.5	0.2	angular	Very Coarse Sand	Uniformly light
33	sub-md	40-67	AzCol	g	Med. - Well Sorted	0.6	0.5	sub-angular	Coarse Sand	Light ext. margin/ dark int. margin
34	sub-md	40-67	AzCol	g	Coarse - Poorly Sorted	0.2	0.3	angular	Granules	Light margins/dark core
35	sub-md	40-67	AzCol	g	Coarse - Well Sorted	0.6	0.3	angular	Very Coarse Sand	Very light margins;slightly darker core
36	sub-md	40-67	AzCol	g	Med. - Well Sorted	0.7	0.3	sub-angular	Coarse Sand	Light ext. margin/ dark int. margin
37	sub-md	40-67	AzCol	g	Med. - Poorly Sorted	0.6	0.2	sub-angular	Coarse Sand	Uniformly light

Table C.5. Collared Vessel Temper/Paste Description, continued.

ID	Md Level	Prov/ F #	Type	Temp	Size & Sorting	Temper Sphericity	Temper Roundness	Temper Grading	Paste Texture	Paste Core Cross-section
38	sub-md	40-67	AzCol	g	Med. - Poorly Sorted	0.7	0.2	angular	Very Coarse Sand	Uniformly light
41	sub-md	1-68	AzCol	g	Med. - Well Sorted	0.7	0.3	sub-angular	Coarse Sand	Uniformly dark
42	sub-md	1-68	AzCol	g	Med. - Well Sorted	0.8	0.3	sub-angular	Coarse Sand	Dark margins/light core
43	sub-md	1-68	AzCol	gg	Coarse - Well Sorted	0.8	0.2	angular	Coarse Sand	Uniformly light
44	sub-md	1-68	AzCol	g	Med. - Well Sorted	0.7	0.4	sub-angular	Coarse Sand	Light ext. margin/ dark int. margin
45	sub-md	1-68	AzCol	g	Coarse - Poorly Sorted	0.8	0.3	sub-angular	Coarse Sand	Light ext. margin/ slightly darker int. margin
47	sub-md	1-68	SR	g	Med. - Well Sorted	0.8	0.2	sub-angular	Coarse Sand	ind.
48	sub-md	1-68	AzCol	g	Coarse - Poorly Sorted	0.7	0.2	sub-angular	Very Coarse Sand	Light ext. margin/ slightly darker int. margin
49	sub-md	1-68	AzCol	g	Med. - Poorly Sorted	0.7	0.2	sub-angular	Coarse Sand	Light margins/dark core
50	sub-md	2-68	SR	ind.		0	0			
51	sub-md	3-68	AzCol	g	Coarse - Well Sorted	0.8	0.1	angular	Coarse Sand	Uniformly light
52	sub-md	4-68	AzCol	g	Coarse - Poorly Sorted	0.7	0.3	sub-angular	Coarse Sand	Uniformly light
53	sub-md	5-68	AzCol	g	Med. - Well Sorted	0.7	0.2	sub-angular	Med. Sand	Uniformly dark

Table C.5. Collared Vessel Temper/Paste Description, continued.

ID	Md Level	Prov/ F #	Type	Temp	Size & Sorting	Temper Sphericity	Temper Roundness	Temper Grading	Paste Texture	Paste Core Cross-section
54	sub-md	5-68	AzCol	g	Med. - Well Sorted	0.6	0.3	sub-angular	Med. Sand	Light ext. margin/ slightly darker int. margin
58	Top	9-68	AzCol	g	Med. - Poorly Sorted	0.7	0.4	sub-angular	Coarse Sand	Uniformly light
59	Top	9-68	AzCol	g	Coarse - Poorly Sorted	0.8	0.2	angular	Very Coarse Sand	Uniformly light
60	sub-md	11-68	AzCol	g	Med. - Well Sorted	0.5	0.2	angular	Coarse Sand	Uniformly dark
61	sub-md	11-68	AzCol	g	Med. - Well Sorted	0.7	0.1	angular	Med. Sand	Uniformly light
65	sub-md	21-68	AzCol	g	Coarse - Well Sorted	0.7	0.3	sub-angular	Med. Sand	Uniformly dark
70	sub-md	31-68	AzCol	g	Med. - Well Sorted	0.7	0.3	sub-angular	Coarse Sand	Light ext. margin/ dark int. margin
73	sub-md	31-68	AzCol	g	Coarse - Well Sorted	0.5	0.1	angular	Very Coarse Sand	Light margins/dark core
74	sub-md	PH NT	AzCol	g	Coarse - Well Sorted	0.8	0.2	angular	Granules	Light ext. margin/ dark int. margin
79	Top	PZ	SR	g	Med. - Poorly Sorted	0.8	0.2	sub-angular	Coarse Sand	Uniformly light
81	md fill	MF	AzCol	g	Med. - Poorly Sorted	0.8	0.3	sub-angular	Coarse Sand	Uniformly light
82	md fill	MF	AzCol	g	Fine - Poorly Sorted	0.7	0.3	sub-angular	Med. Sand	Light ext. margin/ slightly darker int. margin
83	md fill	MF	SR	g	Med. - Well Sorted	0.6	0.2	angular	Coarse Sand	Light ext. margin/ dark int. margin

Table C.5. Collared Vessel Temper/Paste Description, continued.

ID	Md Level	Prov/ F #	Type	Temp	Size & Sorting	Temper Sphericity	Temper Roundness	Temper Grading	Paste Texture	Paste Core Cross-section
85	md fill	MF	AzCol	g	Coarse - Well Sorted	0.8	0.3	sub-angular	Very Coarse Sand	Light margins/dark core
86	md fill	MF	SR	g	Med. - Well Sorted	0.7	0.3	sub-angular	Coarse Sand	Light ext. margin/ dark int. margin
90	md fill	MF	SR	g	Med. - Well Sorted	0.8	0.5	sub-angular	Coarse Sand	Uniformly dark
91	md fill	MF	AzCol	g	Med. - Poorly Sorted	0.8	0.4	sub-angular	Coarse Sand	Light margins/dark core
93	md fill	MF	AzCol	g	Coarse - Well Sorted	0.8	0.5	sub-rounded	Coarse Sand	Light ext. margin/ dark int. margin
94	md fill	MF	AzCol	g	Med. - Well Sorted	0.7	0.4	sub-angular	Med. Sand	Uniformly light
97	md fill	MF	AzCol	g	Med. - Well Sorted	0.8	0.3	sub-angular	Med. Sand	Dark margins/light core
98	md fill	MF	AzCol	g	Fine - Poorly Sorted	0.8	0.3	sub-angular	Med. Sand	Uniformly light
99	md fill	MF	SR	g	Coarse - Poorly Sorted	0.7	0.3	sub-angular	Coarse Sand	Uniformly light
100	md fill	MF	AzCol	g	Fine - Poorly Sorted	0.7	0.3	sub-angular	Med. Sand	Light margins/dark core
103	md fill	MF	AzCol	g	Coarse - Poorly Sorted	0.7	0.4	sub-angular	Granules	Light ext. margin/ dark int. margin
104	md fill	MF	SR	g	Med. - Well Sorted	0.8	0.3	sub-angular	Med. Sand	Light margins/dark core
105	md fill	MF	AzCol	g	Med. - Poorly Sorted	0.7	0.3	sub-angular	Coarse Sand	Uniformly light
107	md fill	MF	AzCol	g	Fine - Well Sorted	0.7	0.5	sub-rounded	Med. Sand	Uniformly dark

Table C.5. Collared Vessel Temper/Paste Description, continued.

ID	Md Level	Prov/ F #	Type	Temp	Size & Sorting	Temper Sphericity	Temper Roundness	Temper Grading	Paste Texture	Paste Core Cross-section
108	md fill	MF	AzCol	g	Med. - Poorly Sorted	0.7	0.3	sub-angular	Coarse Sand	Light ext. margin/ dark int. margin
109	md fill	MF	AzCol	g	Med. - Poorly Sorted	0.7	0.3	sub-angular	Coarse Sand	Uniformly dark
110	md fill	MF	AzCol	g	Med. - Poorly Sorted	0.7	0.3	sub-angular	Coarse Sand	Uniformly light
111	md fill	MF	SR	g	Coarse - Poorly Sorted	0.7	0.2	angular	Very Coarse Sand	Uniformly light
114	md fill	MF	AzCol	g	Med. - Poorly Sorted	0.6	0.3	sub-angular	Coarse Sand	Light ext. margin/ dark int. margin
116	md fill	MF	SR	g	Coarse - Well Sorted	0.6	0.2	angular	Very Coarse Sand	Light ext. margin/ dark int. margin
117	sub-md	Ab Horiz.	AzCol	g	Coarse - Well Sorted	0.8	0.3	sub-angular	Very Coarse Sand	Light ext. margin/ dark int. margin
120	sub-md	Ab Horiz.	AzCol	g	Med. - Well Sorted	0.7	0.2	sub-angular	Very Coarse Sand	Uniformly dark
121	sub-md	Ab Horiz.	AzCol	g	Coarse - Poorly Sorted	0.8	0.3	sub-angular	Very Coarse Sand	Light ext. margin/ dark int. margin
122	sub-md	Ab Horiz.	AzCol	g	Med. - Poorly Sorted	0.9	0.4	sub-rounded	Coarse Sand	Uniformly dark
123	sub-md	Ab Horiz.	SR	g	Med. - Poorly Sorted	0.7	0.2	angular	Very Coarse Sand	Light margins/dark core
124	sub-md	Ab Horiz.	AzCol	g	Med. - Poorly Sorted	0.8	0.3	sub-angular	Coarse Sand	Light ext. margin/ dark int. margin
125	sub-md	Ab Horiz.	Unid	g	Fine - Poorly Sorted	0.7	0.3	sub-angular	Med. Sand	ind.

Table C.5. Collared Vessel Temper/Paste Description, continued.

ID	Md Level	Prov/ F #	Type	Temp	Size & Sorting	Temper Sphericity	Temper Roundness	Temper Grading	Paste Texture	Paste Core Cross-section
128	sub-md	Ab Horiz.	SR	g	Coarse - Poorly Sorted	0.8	0.1	angular	Very Coarse Sand	Uniformly light
129	sub-md	Ab Horiz.	Unid	g	Med. - Poorly Sorted	0.7	0.3	sub-angular	Coarse Sand	ind.
130	sub-md	Ab Horiz.	AzCol	g	Med. - Well Sorted	0.7	0.3	sub-angular	Coarse Sand	Uniformly dark
131	ind	unk.	AzCol	g	Coarse - Well Sorted	0.8	0.3	angular	Very Coarse Sand	Uniformly light

Table C.6. Uncollared Vessel Morphology: Lip & Rim Margins.

							Lip				Exterior Rim Margin			Interior Rim Margin		
ID	Md Level	Prov/ F #	Type	Vessel Form	Orifice	Rim Form	Form	Surf Dec.	Dec. Dir.	Surf Treat	Surf Treat	Dec.	Dec Dir.	Surf Treat	Dec.	Dec Dir.
5	sub-md	H2	MCI	ind.	ind.	Direct-unmodified	sq	Ø	n/a	sm	sm	tw	dg RL	sm	tw	dg RL
11	sub-md	29-67	Uncl	Jar	cir	Everted-simple	sq	Ø	n/a	sm	sm	Ø	n/a	sm	Ø	n/a
13	sub-md	29-67	ind.	ind.	cir	Direct-unmodified	sq	Ø	n/a	sm	sm	Ø	n/a	sm	Ø	n/a
14	sub-md	29-67	Uncl	Jar	cir	Everted-simple	pnch	Ø	n/a	sm	cm	Ø	n/a	sm	tw	vrt
15	sub-md	29-67	ind.	ind.	ind.	Direct-unmodified	sq	Ø	n/a	sm	err	ind.	n/a	sm	Ø	n/a
19	sub-md	29-67	ind.	ind.	ind.	Direct	flt	Ø	n/a	sm	sm	Ø	n/a	sm	Ø	n/a
29	sub-md	39-67	ind.	Jar	ind.	direct, folded	flt	Ø	n/a	sm	sm	Ø	n/a	sm	Ø	n/a
39	sub-md	40-67	ind.	ind.	ind.	ind.	rnd	ind.	n/a	ind.	cm	Ø	n/a	ind.	ind.	n/a
40	sub-md	40-67	ind.	ind.	ind.	ind.	ind.	ind.	n/a	ind.	sm	incs	hrz	sm	Ø	n/a
57	top	9-68	MP	Jar	cir	Everted-simple	rnd	tw	dg RL	sm	cm	tw	dg RL	n/a	Ø	n/a
62	sub-md	16-68	MCI	Jar	cir	Direct-unmodified	sq	Ø	n/a	sm	sm	Ø	n/a	sm	Ø	n/a
67	sub-md	23-68	MP	ind.	cir	Swollen	rnd	tw	dg RL	sm	cm	Ø	n/a	sm	Ø	n/a
69	sub-md	23-68	ind.	Jar	ind.	ind.	ind.	ind.	n/a	ind.	ind.	ind.	n/a	ind.	ind.	n/a
72	sub-md	31-68	ind.	Jar	cir	Direct-unmodified	sq	Ø	n/a	sm	sm	Ø	n/a	sm	Ø	n/a
80	top	PZ	ind.	ind.	ind.	Direct-unmodified	flt	Ø	n/a	sm	sm	Ø	n/a	sm	cws	vrt

Table C.6.1. Uncollared Vessel Morphology: Lip & Rin Margins, continued.

							Lip				Exterior Rim Margin			Interior Rim Margin		
ID	Md Level	Prov/ F #	Type	Vessel Form	Orifice	Rim Form	Form	Surf Dec.	Dec. Dir.	Surf Treat	Surf Treat	Dec.	Dec Dir.	Surf Treat	Dec.	Dec Dir.
88	md fill	MF	Uncl	ind.	ind.	Direct-unmodified	sq	Ø	n/a	sm	cm	Ø	n/a	sm	Ø	n/a
92	md fill	MF	Uncl	Jar	cir	Direct-unmodified	sq	tw	dg RL	sm	sm	Ø	n/a	sm	Ø	n/a
95	md fill	MF	ind.	ind.	ind.	Direct-unmodified	sq	Ø	n/a	sm	cm	Ø	n/a	n/a	wdg nch	vrt
96	md fill	MF	ind.	Jar	ind.	ind.	ind.	ind.	n/a	ind.	ind.	n/a	n/a	ind.	ind.	n/a
102	md fill	MF	Uncl	ind.	cir	Thickened	thk	Ø	n/a	sm	sm	Ø	n/a	sm	rnd nch	vrt
113	md fill	MF	Uncl	Jar	cir	Direct-unmodified	sq	tw	dg RL	sm	sm/ cm	Ø	n/a	sm	Ø	n/a
115	md fill	MF	ind.	ind.	ind.	Direct-unmodified	sq	Ø	n/a	sm	sm	Ø	n/a	n/a	Ø	n/a
118	md fill	MF	ind.	Jar	ind.	ind.	ind.	ind.	n/a	ind.	ind.	ind.	n/a	ind.	ind.	n/a
119	md fill	MF	ind.	Jar	ind.	ind.	ind.	ind.	n/a	ind.	ind.	ind.	n/a	ind.	n/a	n/a
126	sub-md	Ab Horiz.	Uncl	Jar	cir	Direct-unmodified	sq	Ø	n/a	sm	sm/ cm	tw	hrz	sm	Ø	n/a
132	ind.	unk.	ind.	ind.	cir	Thickened	rnd	Ø	n/a	sm	sm	Ø	n/a	sm	Ø	n/a

Table C.6.2. Uncollared Vessel Morphology:Neck & Shoulder.

					Neck						Shoulder					
ID	Md Level	Prov/ F #	Type	Vessel Form	Form	Ext. Dec.	Ext Dec Dir.	Int. Dec.	Int Dec Dir.	Surf Treat	Form	Ext. Surf	Int. Surf	Body Surface	CM Orient.	Cord Twist
5	sub-md	H2	MCI	ind.	ind.	ind.	n/a	ind.	n/a	ind.	ind.	ind.	ind.	ind.	n/a	n/a
11	sub-md	29-67	Uncl	Jar	str	tw	dg RL	Ø	n/a	sm	ind.	ind.	ind.	ind.	n/a	n/a
13	sub-md	29-67	ind.	ind.	str	Ø	n/a	Ø	n/a	sm	ind.	ind.	ind.	ind.	n/a	n/a
14	sub-md	29-67	Uncl	Jar	ind.	Ø	n/a	Ø	n/a	cm	ind.	ind.	ind.	cm	dg LR	ind.
15	sub-md	29-67	ind.	ind.	ind.	ind.	n/a	ind.	n/a	ind.	ind.	ind.	ind.	ind.	n/a	n/a
19	sub-md	29-67	ind.	ind.	ind.	ind.	n/a	ind.	n/a	ind.	ind.	ind.	ind.	ind.	n/a	n/a
29	sub-md	39-67	ind.	Jar	ind.	Ø	n/a	Ø	n/a	sm	ind.	ind.	ind.	ind.	n/a	n/a
39	sub-md	40-67	ind.	ind.	ind.	ind.	n/a	ind.	n/a	ind.	ind.	ind.	ind.	ind.	vrt	Z
40	sub-md	40-67	ind.	ind.	ind.	ind.	n/a	ind.	n/a	sm	ind.	ind.	ind.	ind.	n/a	n/a
57	top	9-68	MP	Jar	flr	Ø	n/a	Ø	n/a	cm	ind.	ind.	ind.	ind.	vrt	Z
62	sub-md	16-68	MCI	Jar	flr	tw	obl	Ø	n/a	sm	ind.	ind.	ind.	ind.	n/a	n/a
67	sub-md	23-68	MP	ind.	ind.	Ø	n/a	Ø	n/a	cm	ind.	ind.	ind.	ind.	vrt	Z
69	sub-md	23-68	ind.	Jar	ind.	ind.	n/a	ind.	n/a	ind.	ang	sm	sm	sm	n/a	n/a
72	sub-md	31-68	ind.	Jar	flr	Ø	n/a	Ø	n/a	sm	ind.	ind.	ind.	ind.	n/a	n/a
80	top	PZ	ind.	ind.	ind.	ind.	n/a	ind.	n/a	ind.	ind.	ind.	ind.	ind.	n/a	n/a
88	md fill	MF	Uncl	ind.	str	Ø	n/a	Ø	n/a	cm	ind.	ind.	sm/cm	ind.	dg RL	Z

Table C.6.2. Uncollared Vessel Morphology:Neck & Shoulder, continued.

					Neck						Shoulder					
ID	Md Level	Prov/ F #	Type	Vessel Form	Form	Ext. Dec.	Ext Dec Dir.	Int. Dec.	Int Dec Dir.	Surf Treat	Form	Ext. Surf	Int. Surf	Body Surface	CM Orient.	Cord Twist
92	md fill	MF	Uncl	Jar	ind.	ind.	n/a	ind.	n/a	ind.	ind.	ind.	sm/cm	ind.	vrt	ind.
95	md fill	MF	ind.	ind.	ind.	ind.	n/a	ind.	n/a	ind.	ind.	ind.	ind.	ind.	vrt	ind.
96	md fill	MF	ind.	Jar	ind.	Ø	n/a	Ø	n/a	sm	ang	sm	sm	cm	vrt	ind.
102	md fill	MF	Uncl	ind.	ang	Ø	n/a	Ø	n/a	cm	ind.	ind.	ind.	ind.	dg RL	Z
113	md fill	MF	Uncl	Jar	flr	Ø	n/a	Ø	n/a	sm/cm	ind.	ind.	ind.	ind.	dg LR	ind.
115	md fill	MF	ind.	ind.	ind.	ind.	n/a	ind.	n/a	ind.	ind.	ind.	ind.	ind.	n/a	n/a
118	md fill	MF	ind.	Jar	ind.	ind.	n/a	ind.	n/a	sm	ang	sm	sm	sm	n/a	n/a
119	md fill	MF	ind.	Jar	ind.	ind.	n/a	ind.	n/a	sm	sharp-ang	sm	sm	sm	n/a	n/a
126	sub-md	Ab Horiz.	Uncl	Jar	ind.	Ø	n/a	Ø	n/a	sm	ind.	ind.	ind.	ind.	dg RL	ind.
132	ind.	unk.	ind.	ind.	ind.	ind.	n/a	ind.	n/a	ind.	ind.	ind.	ind.	ind.	n/a	n/a

Table C.7. Uncollared Vessel Metric Attributes.

ID	Md. Level	Prov/ F #	Type	Vessel Form	Orifice Dia. (cm)	%	Lip Thickness (mm)	Rim Length (mm)	Wall Thickness (mm)	Body Wall Thickness (mm)	Wt. (g)	Twisted Cord width (mm)	CWS width (mm)	Twisted-Cord Twist	Munsell Color
5	sub-md	H2	MCI	ind.	ind.	< 5	4.7	n/a	4.9	ind.	7.4	2.9	n/a	Z	7.5yr 5/4
11	sub-md	29-67	Uncl	Jar	ind.	< 5	5.6	11.8	10.1	9.3	9.9	3.4	n/a	Z	7.5yr 5/3-6/4
13	sub-md	29-67	ind.	ind.	11	5	7.6	n/a	7.2	6.5	3.5	n/a	n/a	n/a	7.5yr 3/1
14	sub-md	29-67	Uncl	Jar	40	6	7.7	n/a	6.2	5.3	19.5	3.8	n/a	ind.	7.5yr 5/3
15	sub-md	29-67	ind.	ind.	ind.	< 5	6.2	ind.	ind.	ind.	1.8	n/a	n/a	n/a	ind.
19	sub-md	29-67	ind.	ind.	ind.	< 5	4.9	n/a	4.7	5.8	1.4	n/a	n/a	n/a	7.5yr 2.0
29	sub-md	39-67	ind.	Jar	> 10	< 5	5	n/a	3.9	4.1	1.2	n/a	n/a	n/a	7.5yr 4/2
39	sub-md	40-67	ind.	ind.	ind.	< 5	ind.	n/a	ind.	ind.	1.8	n/a	n/a	n/a	7.5yr 2.5/1
40	sub-md	40-67	ind.	ind.	ind.	< 5	6.3	n/a	4.5	4.5	1.2	n/a	n/a	n/a	7.5 yr 5/2
57	top	9-68	MP	Jar	19	9	4.8	n/a	6.4	3.4	48.2	n/a	n/a	Z	5yr 4/2
62	sub-md	16-68	MCI	Jar	ind.	< 5	5.6	n/a	5.1	7.4	7.3	1.9	n/a	Z	5yr 4/3
67	sub-md	23-68	MP	ind.	ind.	< 5	8.5	n/a	7.8	7.1	7.4	2.6	n/a	Z	7.5yr 3/2
69	sub-md	23-68	ind.	Jar	ind.	ind.	ind.	n/a	ind.	2.7	27	n/a	n/a	n/a	10yr 5/2-2/1
72	sub-md	31-68	ind.	Jar	>13 cm	< 5	5.7	n/a	5.3	5.1	3.8	n/a	n/a	n/a	7.5yr 2.5/2

Table C.7. Uncollared Vessel Metric Attributes, continued.

ID	Md. Level	Prov/ F #	Type	Vessel Form	Orifice Dia. (cm)	%	Lip Thickness (mm)	Rim Length (mm)	Wall Thickness (mm)	Body Wall Thickness (mm)	Wt. (g)	Twisted Cord width (mm)	CWS width (mm)	Twisted-Cord Twist	Munsell Color
80	top	PZ	ind.	ind.	ind.	< 5	6.4	n/a	ind.	ind.	2.7	n/a	5.1	n/a	7.5 yr 5/2
88	md fill	md fill	Uncl	ind.	ind.	< 5	4.6	n/a	4.3	6.3	2.2	n/a	n/a	n/a	7.5yr 5/4
92	md fill	md fill	Uncl	Jar	23	5	6.7	n/a	6.6	ind.	10.8	1.9	n/a	Z	5yr 5/3
95	md fill	md fill	ind.	ind.	ind.	< 5	5.9	n/a	5.3	ind.	1.8	n/a	n/a	n/a	7.5yr 5/2
96	md fill	md fill	ind.	Jar	ind.	ind.	ind.	n/a	ind.	6.1	62.4	n/a	n/a	n/a	10yr 3/2
102	md fill	md fill	Uncl	ind.	ind.	< 5	7.9	n/a	5.1	5.1	3.4	n/a	n/a	n/a	7.5yr 5/2
113	md fill	md fill	Uncl	Jar	>20	< 5	5.9	n/a	6.4	7.4	5.9	2.2	n/a	Z	10yr 5/3
115	md fill	md fill	ind.	ind.	ind.	< 5	8	n/a	8.8	ind.	2.5	n/a	n/a	n/a	7.5yr 5/4
118	md fill	md fill	ind.	Jar	ind.	0	ind.	n/a	ind.	7.3	9.4	n/a	n/a	ind.	7.5yr 4/2.5
119	md fill	md fill	ind.	Jar	ind.	0	ind.	n/a	ind.	3.8	7.2	n/a	n/a	n/a	7.5yr 2.5/1
126	sub-md	Ab Horiz.	Uncl	Jar	> 22	< 5	5.4	n/a	5.1	ind.	6.8		n/a	Z	7.5yr 5/4
132	ind.	unk.	ind.	ind.	ind.	< 5	6.4	6.5	5.1	ind.	1.7	n/a	n/a	n/a	7.5yr 5/3

Table C.8. Uncollared Vessel Temper/Paste Attributes.

ID	Type	Temp	Size & Sorting	Temper Sphericity	Temper Roundness	Temper grading	Paste Texture	Paste Core Cross-section
5	MCI	g	Fine - Poorly Sorted	0.9	0.6	sub-rounded	Med. Sand	Uniformly light
11	Uncl	g	Coarse - Poorly Sorted	0.9	0.3	sub-angular	Coarse Sand	Uniformly light
13	ind.	g	Med. - Well Sorted	0.9	0.5	sub-rounded	Med. Sand	Light exterior margin/slightly darker interior margin
14	Uncl	g	Coarse - Well Sorted	0.7	0.1	angular	Very Coarse Sand	Light margins/dark core
15	ind.	g	Fine - Well Sorted	0.7	0.5	sub-angular	Med. Sand	Uniformly light
19	ind.	g	Med. - Poorly Sorted	0.9	0.7	sub-rounded	Med. Sand	Uniformly light
29	ind.	g	Med. - Well Sorted	0.5	0.6	sub-angular	Coarse Sand	Uniformly light
39	ind.	g	Fine - Well Sorted	0.8	0.7	sub-rounded	Fine Sand	ind.
40	ind.	g	Med. - Poorly Sorted	0.8	0.3	sub-rounded	Med. Sand	Dark Exterior margin/light interior margin
57	MP	g	Med. - Well Sorted	0.8	0.2	sub-angular	Coarse Sand	Uniformly light
62	MCI	g	Med. - Well Sorted	0.9	0.5	sub-rounded	Med. Sand	Light exterior margin/dark interior margin
67	MP	g	Med. - Poorly Sorted	0.6	0.3	sub-angular	Med. Sand	Light exterior margin/dark interior margin
69	ind.	g	Med. - Well Sorted	0.7	0.2	angular	Coarse Sand	Uniformly dark

Table C.8. Uncollared Vessel Temper/Paste Attributes.

ID	Type	Temp	Size & Sorting	Temper Sphericity	Temper Roundness	Temper grading	Paste Texture	Paste Core Cross-section
72	ind.	g	Med. - Poorly Sorted	0.6	0.5	sub-angular	Med. Sand	Dark Exterior margin/light interior margin
80	ind.	g	Med. - Poorly Sorted	0.7	0.5	sub-rounded	Med. Sand	Uniformly light
88	Uncl	g	Fine - Well Sorted	0.9	0.8	rounded	Fine Sand	Uniformly light
92	Uncl	g	Coarse - Well Sorted	0.7	0.3	angular	Very Coarse Sand	Uniformly light
95	ind.	g	Coarse - Poorly Sorted	0.7	0.3	sub-angular	Coarse Sand	Uniformly light
96	ind.	g	Med. - Poorly Sorted	0.7	0.3	sub-angular	Coarse Sand	Light exterior margin/slightly darker interior margin
102	Uncl	g	Fine - Poorly Sorted	0.8	0.3	sub-angular	Med. Sand	Uniformly light
113	Uncl	g	Med. - Poorly Sorted	0.7	0.3	sub-angular	Coarse Sand	Light margins/dark core
115	ind.	g	Med. - Well Sorted	0.7	0.2	sub-angular	Coarse Sand	Uniformly light
118	ind.	g	Med. - Well Sorted	0.8	0.2	angular	Coarse Sand	Light margins/dark core
119	ind.	g	Coarse - Poorly Sorted	0.7	0.2	angular	Coarse Sand	Uniformly dark
126	Uncl	g	Med. - Well Sorted	0.7	0.3	sub-angular	Med. Sand	Light exterior margin/dark interior margin
132	ind.	g	Coarse - Well Sorted	0.8	0.5	sub-angular	Coarse Sand	Uniformly light

Table C.9. Hyer Plain Jar Morphologic Attributes.

					Lip		Rim Margin		Neck		Shoulder			
ID	Md Level	Prov/ F #	Orifice	Rim Form	Form	Surface	Ext. Surface	Int. Surface	Form	Surface	Form	Ext. Surface	Int. Surface	Body Surface
4	sub-md	H2	cir	evert.-extrud.	rnd	sm	sm	sm	flr	sm	ind.	ind.	ind.	ind.
9	sub-md	29-67 & 34-67	cir	Direct-unmod	pnch	sm	sm	sm	str	sm	rnd	sm	sm	sm
28	sub-md	39-67	cir	evert.-extrud., swollen?	flt	sm	sm	sm	str	sm	ind.	ind.	ind.	ind.
30	sub-md	39-67	cir	Direct-unmod	flt	sm	sm	sm	ang	sm	ind.	ind.	ind.	ind.
46	sub-md	1-68	cir	evert.-extrud.	flt	sm	sm	sm	isl	sm	ind.	ind.	ind.	ind.
55	sub-md	8-68	cir	Swollen	rnd	sm	sm	sm	str	sm	ang	sm	sm	sm
66	sub-md	22-68	cir	evert.-curled	flt	sm	sm	sm	isl	sm	ind.	ind.	ind.	ind.
68	sub-md	23-68	cir	evert.-extrud.	pnch	sm	sm	sm	ind.	sm	ind.	ind.	ind.	ind.
71	sub-md	31-68	cir	Direct-unmod	rnd	sm	sm	sm	ang	sm	rnd	sm	sm	sm
75	ind.	S	cir	evert.-extrud.	pnch	sm	sm	sm	str	sm	ind.	ind.	ind.	ind.
76	Top	300 R99	cir	evert.-extrud.	flt	sm	sm	sm	str	sm	rnd	sm	sm	sm

Table C.9. Hyer Plain Jar Morphologic Attributes, continued.

					Lip		Rim Margin		Neck		Shoulder			
ID	Md Level	Prov/ F #	Orifice	Rim Form	Form	Surface	Ext. Surface	Int. Surface	Form	Surface	Form	Ext. Surface	Int. Surface	Body Surface
78	Top	300 R101-102	cir	Direct-unmod	sq	sm	sm	sm	str	sm	ang	sm	sm	sm
84	md Fill	MF	cir	evert.-extrud.	pnch	sm	sm	sm	str	sm	ind.	ind.	ind.	ind.
89	md Fill	MF	cir	evert.-extrud.	pnch	sm	sm	sm	isl	sm	ind.	ind.	ind.	ind.
101	md Fill	MF	cir	evert.-simple	rnd	sm	sm	sm	ind.	sm	ind.	ind.	ind.	ind.
106	md Fill	MF	cir	Direct-unmod	sq	sm	sm	sm	str	sm	hyp-ang	sm	sm	sm
112	md Fill	MF	cir	thk	pnch	sm	sm	sm	ang	sm	ind.	ind.	ind.	ind.
127	sub-md	Ab Horiz.	cir	thk	thk	sm	sm	sm	str	sm	ind.	ind.	ind.	ind.

Table C.10. Hyer Plain Metric Attributes.

ID	Md Level	Prov/ F #	Orifice Dia. (cm)	%	Rim Form	Lip Form	Lip Thickness (mm)	Rim Legnth (mm)	Wall Thickness (mm)	Body Wall Thickness (mm)	RPR	Lip Bevel	Rim Angle	Wt. (g)	Munsell Color
4	sub-md	H2	ind.	< 5	evert.-extrud.	rnd	3.5	15.3	5.3	6.3	0.35	n/a	61	6.8	7.5yr 4/3
9	sub-md	29-67 & 34-67	16	30	Direct-unmod.	pnch	3.4	6.7	5	2.2	0.746	n/a	41	58.2	7.5yr 4/2
28	sub-md	39-67	ind.	< 5	evert.-extrud., swollen?	flt	6	6.6	4.7	5.24	0.71	n/a	63	3.5	5yr 5/4
30	sub-md	39-67	16	6	Direct, unmod.	flt	5.6	n/a	5.5	6.4	n/a	n/a	113.5	12.9	7.5yr 6/4
46	sub-md	1-68	ind.	< 5	evert.-extrud.	flt	5.2	12.1	6.5	6.1	0.54	28	64	9.3	7.5yr 2.5/1
55	sub-md	8-68	9	18	Swollen	rnd	6.1	n/a	5.2	5	0.85	n/a	55	82.3	7.5yr 4/4
66	sub-md	22-68	ind.	< 5	evert.-curled	flt	2.6	10.5	4.6	4	0.44	n/a	63	2.3	5yr 4/3
68	sub-md	23-68	ind.	< 5	evert.-extrud.	pnch	5.3	8	5.7	5.5	0.71	ind.	ind.	3	7.5yr 4/2
71	sub-md	31-68	9	11	Direct-unmod.	rnd	4.2	n/a	4.8	6.3	n/a	n/a	n/a	18.2	7.5yr 4/3
75	ind.	S	17	5	evert.-extrud.	pnch	5.6	9.5	4.4	5.9	0.46	n/a	n/a	7.3	10yr 4/2
76	Top	N300 R99	26-30	37	evert.-extrud.	flt	4.1	10.3	8.9	7.9	0.86	n/a	54	1319	5yr 4/6

Table C.10. Hyer Plain Metric Attributes, continued.

ID	Md Level	Prov/ F #	Orifice Dia. (cm)	%	Rim Form	Lip Form	Lip Thickness (mm)	Rim Legnth (mm)	Wall Thickness (mm)	Body Wall Thickness (mm)	RPR	Lip Bevel	Rim Angle	Wt. (g)	Munsell Color
78	Top	N300 R101-102	12	47	Direct-unmod.	sq	5.8	n/a	6.3	8	n/a	n/a	38	868.9	7.5yr 4.5/2
84	md Fill	MF	ind.	< 5	evert.-extrud.	pnch	6.8	9	ind.	ind.	ind.	n/a	n/a	3.7	7.5yr 3/2
89	md Fill	MF	ind.	< 5	evert.-extrud.	pnch	5.3	7.8	7.1	5.9	0.91	n/a	70	5	10yr 3/1
101	md Fill	MF	ind.	< 5	evert.-simple	rnd	5.9	n/a	5.6	4	n/a	ind.	ind.	3.6	7.5yr 5/4
106	md Fill	MF	20	6	Direct-unmod.	sq	5.5	n/a	5.8	5.6	n/a	n/a	n/a	60	7.5yr 5/3
112	md Fill	MF	20-16	6	thk	pnch	7.6	7.7	5.6	7.2	0.72	22	n/a	8.1	10yr 5/3
127	sub-md	Ab horiz.	ind.	< 5	thk	thk	8	6.9	4	4.7	0.58	n/a	58	6.4	10yr 3/1

Table C.11. Hyer Plain Temper/Paste Attributes.

ID	Temp	Size & Sorting	Temper Sphericity	Temper Roundness	Temper Grading	Paste Texture	Paste Core Cross-section
4	g	Med. - Well Sorted	0.7	0.6	sub-angular	Coarse Sand	Light exterior margin/slightly darker interior margin
9	g	Med. - Poorly Sorted	0.7	0.3	sub-angular	Med. Sand	Uniformly light
28	v	Med. - Well Sorted	0.5	0.3	sub-angular	Coarse Sand	Light exterior margin/dark interior margin
30	g	Fine - Well Sorted	0.9	0.6	sub-rounded	Med. Sand	Very light margins; slightly darker core
46	g	Med. - Well Sorted	0.8	0.3	sub-angular	Coarse Sand	Uniformly dark
55	g	Fine - Well Sorted	0.7	0.6	sub-rounded	Fine Sand	Dark margins/light core
66	g	Fine - Poorly Sorted	0.7	0.3	sub-angular	Med. Sand	Uniformly light
68	g	Med. - Well Sorted	0.5	0.4	sub-angular	Coarse Sand	Uniformly dark
71	g	Med. - Well Sorted	0.7	0.6	sub-rounded	Med. Sand	Light margins/dark core
75	g	Med. - Poorly Sorted	0.7	0.2	sub-angular	Coarse Sand	Uniformly dark
76	g	Med. - Well Sorted	0.7	0.3	sub-angular	Med. Sand	Light margins/dark core
78	g	Coarse - Well Sorted	0	0	sub-angular	Coarse Sand	Light exterior margin/slightly darker interior margin
84	g	Fine - Well Sorted	0.5	0.2	rounded	Med. Sand	Uniformly dark
89	g	Med. - Well Sorted	0.7	0.5	sub-angular	Coarse Sand	Uniformly light
101	g	Med. - Well Sorted	0.8	0.3	sub-angular	Coarse Sand	Uniformly light

Table C.11. Hyer Plain Temper/Paste Attributes, continued.

ID	Temp	Size & Sorting	Temper Sphericity	Temper Roundness	Temper Grading	Paste Texture	Paste Core Cross-section
106	g	Med. - Poorly Sorted	0.7	0.3	sub-angular	Med. Sand	Uniformly light
112	g	Coarse - Well Sorted	0.7	0.2	sub-angular	Very Coarse Sand	Light margins/dark core
127	g	Med. - Well Sorted	0.8	0.4	sub-angular	Med. Sand	Uniformly dark

Table C.12. Mississippian Jar Morphologic Attributes.

						Lip		Rim Margin		Neck			Shoulder				
ID	Md Level	Prov/ F #	Type	Form	Rim Form	Form	Surf Treat	Ext. Surf	Int. Surf	Form	Ext. Dec.	Surf Treat	Form	Ext. Surf	Int. Surf	Body Surface	Surface Finish
56	top	9-68	CRF	Seed Jar	Direct-unmod.	rnd	sm	sm	n/a	isl	ind.	ind.	ind.	ind.	ind.	ind.	Red-slipped
63	top	18-68	RI	Jar	evert.-extrud.	flt	sm	sm	sm	str	trl	sm	ang	sm	sm	sm	Black-smudged
64	top	19-68	PP	Jar	evert.-simple	flt	sm	sm	sm	flr	Ø	sm	ind.	ind.	ind.	ind.	Eroded
77	top	N300 R98	PP	Jar	evert.-extrud.	flt	sm	sm	sm	flr	Ø	sm	sharp-ang	sm	sm	sm	Black-smudge/ slip
87	md fill	md fill	CRF	Seed Jar	ind.	ind.	ind.	sm	ind.	ind.	ind.	ind.	ind.	ind.	ind.	ind.	Red-slipped
133	top	N301 R93	PP	Jar	evert.-folded Type 1	flt	sm	sm	sm	str	Ø	sm	hyp-ang	sm	sm	sm	Red-slipped

Table C.13. Mississippian Jar Metric Attributes.

ID	Md Level	Prov/ F #	Type	Vessel Form	Orifice Dia. (cm)	%	Rim From	Lip Form	Rim Length (mm)	Lip Thickness (mm)	Wall Thickness (mm)	Body Wall Thickness (mm)	RPR	Lip Bevel	Rim Angle	Wt. (g)	Munsell Color
56	top	9-68	CRF	Seed Jar	ind.	< 5	Direct-unmod.	rnd	n/a	2.8	3.9	3.1	n/a	n/a	n/a	0.9	10yr 4/6
63	top	18-68	RI	Jar	>20	< 5	evert.-extrud.	flt	7.7	6.8	4.6	4	0.6	0	67	14.7	7.5yr 2/1
64	top	19-68	PP	Jar	32	7	evert.-simple	flt	13.2	7.4	9.2	7.4	0.7	35	63	26.2	7.5yr 4/2
77	top	N300 R98	PP	Jar	23	100	evert.-extrud.	flt	9.8	4.6	4.8	3.8	0.49	41	41-61	565	7.5yr 2/1
87	md fill	mf fill	CRF	Seed Jar	ind.	< 5	ind.	ind.	n/a	ind.	ind.	ind.	n/a	n/a	ind.	1.6	10yr 4/6
133	top	N301 R93	PP	Jar	29.5	100	evert.-folded Type 1	flt	12.1	6.2	3.8	7.1	0.31	n/a	n/a	4290	not recorded

Table C.14. Mississippian Jar Temper/Paste Attributes.

ID	Type	Vessel Form	Temper	Size & Sorting	Temper Sphericity	Temper Roundness	Temper Grading	Paste Texture	Paste Core Crossection
56	CRF	Seed Jar	shell	Fine - Well Sorted	0.2	0.1	angular	Fine Sand	Light margins/dark core
63	RI	Jar	shell	Fine - Well Sorted	0.1	0.2	angular	Fine Sand	Uniformly light
64	PP	Jar	shell	Fine - Poorly Sorted	0.1	0.2	angular	Fine Sand	Light margins/dark core
77	PP	Jar	shell	Medium - Well Sorted	0.2	0.1	angular	Fine Sand	Light margins/dark core
87	CRF	Seed Jar	shell	Fine - Well Sorted	0.1	0.1	angular	Fine Sand	ind.
133	PP	Jar	shell	ind.	ind.	ind.	ind.	ind.	ind.

Table C.15 Grit-Tempered Collar Fragments

				Undecorated		Decorated	
Prov/ F #	Bag No.	WHS Accession No.	Zone/ Level	ct.	wt.(g)	ct.	wt.(g)
3-68	3-1-2	1978.372.JE1-68	-	1	1.9	-	-
15-67	15-6(1-10)	1978.266.JE1-67	6	1	14.4	-	-
29-67	29-1(100-159)	1978.266.JE1-67	1	1	20.4	-	-
29-67	29-3(1-43)	1978.266.JE1-67	3	2	8.9	-	-
29-67	29-3(46-64)	1978.266.JE1-67	3	-	-	1	6.1
31-68	31-6.1, 7.1	1978.372.JE1-68	-	1	10.5	-	-
40-67	40-6(50-98)	1978.266.JE1-67	6	1	66.8	-	-
40-67	40-8(23-25)	1978.266.JE1-67	8	1	23.3	-	-
ABS	ABS 109	1978.372.JE1-68	-	1	5.1	-	-
ABS	ABS 73	1978.372.JE1-68	-	1	44.2	-	-
ABS	ABS 85	1978.372.JE1-68	-	1	5.4	-	-
MF	MF 140	1978.372.JE1-68	-	-	-	1	7.1
MF	MF 141-154	1978.372.JE1-68	-	-	-	1	7
MF	MF 75, 78-104	1978.372.JE1-68	-	1	7.7	-	-

Table C.16. Grit-Tempered Body Sherds.

				Plain Surface				Cordmarked				Smoothed -over- Cordmarked		Fabric Impressed		Fabric Impressed/ Cordmarked		Erroded	
				Undecorated		Decorated		Undecorated		Decorated									
Prov/ F #	Bag No.	WHS Accession No.	Zone/ Level	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)
1-68	1-11,39,53	1978.372. JE1-68	-	-	-	-	-	5	151.5	-	-	-	-	-	-	-	-	-	-
1-68	1-12-13	1978.372. JE1-68	-	-	-	-	-	2	7.9	-	-	-	-	-	-	-	-	-	-
1-68	1-19	1978.372. JE1-68	-	-	-	-	-	5	69.7	-	-	-	-	-	-	-	-	-	-
1-68	1-20-32	1978.372. JE1-68	-	-	-	-	-	17	179.5	-	-	-	-	-	-	-	-	-	-
1-68	1-25	1978.372. JE1-68	-	-	-	-	-	9	43.6	-	-	-	-	-	-	-	-	-	-
1-68	1-33-49	1978.372. JE1-68	-	-	-	-	-	18	80.2	-	-	-	-	-	-	-	-	-	-
1-68	1-50-101	1978.372. JE1-68	-	6	59.2	-	-	41	375.4	-	-	5	62.3	-	-	-	-	2	1
3-68	3-10-16	1978.372. JE1-68	-	6	30.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-68	3-3-9	1978.372. JE1-68	-	-	-	-	-	6	28.6	-	-	-	-	-	-	-	-	-	-
4-68	4-2-5	1978.372. JE1-68	-	-	-	-	-	4	67.2	-	-	-	-	-	-	-	-	-	-
4-68	4-6-7	1978.372. JE1-68	-	2	9.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table C.16. Grit-Tempered Body Sherds, continued.

				Plain Surface				Cordmarked				Smoothed -over- Cordmarked		Fabric Impressed		Fabric Impressed/ Cordmarked		Erroded	
				Undecorated		Decorated		Undecorated		Decorated									
Prov/ F #	Bag No.	WHS Accession No.	Zone/ Level	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)
5-68	5-5-14	1978.372. JE1-68	-	1	2.1	-	-	9	38.9	-	-	-	-	-	-	-	-	-	-
8-68	8-2-11	1978.372. JE1-68	-	1	7.7	-	-	9	138.3	-	-	-	-	-	-	-	-	-	-
9-68	9-22-55	1978.372. JE1-68	-	-	-	-	-	35	176.6	-	-	-	-	-	-	-	-	-	-
9-68	9-6-20	1978.372. JE1-68	-	-	-	-	-	15	97.9	-	-	-	-	-	-	-	-	-	-
11-68	11-10	1978.372. JE1-68	-	1	3.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-68	11-3-9	1978.372. JE1-68	-	-	-	-	-	6	183.1	-	-	1	2.1	-	-	-	-	-	-
14-68	14-1-5	1978.372. JE1-68	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	14
15-67	15-1(1-7)	1978.266. JE1-67	1	1	1.2	-	-	3	5.1	-	-	-	-	-	-	-	-	2	2.2
15-67	15-2(1-3)	1978.266. JE1-67	2	-	-	-	-	3	9.8	-	-	-	-	-	-	-	-	-	-
15-67	15-3(1-2)	1978.266. JE1-67	3	-	-	-	-	1	3.8	-	-	-	-	-	-	-	-	1	3.8
15-67	15-4(1-17)	1978.266. JE1-67	4	5	10.9	-	-	6	23.8	-	-	-	-	-	-	-	-	-	-

Table C.16. Grit-Tempered Body Sherds, continued.

				Plain Surface				Cordmarked				Smoothed -over- Cordmarked		Fabric Impressed		Fabric Impressed/ Cordmarked		Erroded	
				Undecorated		Decorated		Undecorated		Decorated									
Prov/ F #	Bag No.	WHS Accession No.	Zone/ Level	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)
15-67	15-6(1-10)	1978.266. JE1-67	6	-	-	-	-	8	34.2	-	-	-	-	-	-	-	-	-	-
15-68	15-1-2	1978.372. JE1-68	-	1	8.4	-	-	1	2.5	-	-	-	-	-	-	-	-	-	-
16-68	16-22	1978.372. JE1-68	-	1	3.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16-68	16-2-21	1978.372. JE1-68	-	-	-	-	-	20	138.1	-	-	-	-	-	-	-	-	-	-
17-68	17-1-3	1978.372. JE1-68	-	-	-	-	-	3	42.8	-	-	-	-	-	-	-	-	-	-
21-68	21-2-7	1978.372. JE1-68	-	2	6.1	-	-	-	-	-	-	4	27.9	-	-	-	-	-	-
21-68	21-8	1978.372. JE1-68	-	-	-	-	-	1	10.1	-	-	-	-	-	-	-	-	-	-
22-68	22-2-8	1978.372. JE1-68	-	-	-	-	-	7	24.7	-	-	-	-	-	-	-	-	-	-
23-88	23-3-15	1978.372. JE1-68	-	7	49.6	-	-	6	19.1	-	-	-	-	-	-	-	-	-	-
26-68	26-2-5	1978.372. JE1-68	-	2	14.4	1	4.5	-	-	-	-	-	-	-	-	-	-	1	5
27-68	27-2-4	1978.372. JE1-68	-	2	14.2	-	-	1	4	-	-	-	-	-	-	-	-	-	-

Table C.16. Grit-Tempered Body Sherds, continued.

				Plain Surface				Cordmarked				Smoothed -over- Cordmarked		Fabric Impressed		Fabric Impressed/ Cordmarked		Erroded	
				Undecorated		Decorated		Undecorated		Decorated									
Prov/ F #	Bag No.	WHS Accession No.	Zone/ Level	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)
29-67	29-1(100-159)	1978.266. JE1-67	1	12	149.8	-	-	42	566.8	-	-	2	7.8	-	-	-	-	-	-
29-67	29-1(1-49)	1978.266. JE1-67	1	10	23.6	-	-	28	83.5	2	7.7	6	18.8	-	-	-	-	4	8
29-67	29-1(50-79)	1978.266. JE1-67	1	9	42.8	-	-	19	73.6	-	-	1	2.3	-	-	-	-	1	4.1
29-67	29-1(80-99)	1978.266. JE1-67	1	2	14.8	-	-	18	140.7	-	-	2	6.5	-	-	-	-	-	-
29-67	29-2(1-20)	1978.266. JE1-67	2	-	-	1	2.5	10	63	-	-	6	49.8	-	-	-	-	3	6
29-67	29-3(1-43)	1978.266. JE1-67	3	6	18.6	-	-	28	76.9	-	-	4	20.2	-	-	-	-	1	1.1
29-67	29-3(45)	1978.266. JE1-67	3	-	-	-	-	1	10.7	-	-	-	-	-	-	-	-	-	-
29-67	29-3(46-64)	1978.266. JE1-67	3	-	-	-	-	17	188.4	-	-	1	10.7	-	-	-	-	-	-
29-67	29-E(1-64)	1978.266. JE1-67	E	5	35.2	-	-	56	508.2	-	-	-	-	-	-	-	-	2	3.9
29-67	29-E(68-97)	1978.266. JE1-67	E	2	5.1	-	-	25	151.6	-	-	2	17.6	-	-	-	-	1	1.4
29-67	29-SP2-2-49	1978.266. JE1-67	SP2	16	40.9	-	-	28	62.8	-	-	2	6.7	-	-	-	-	3	5.7

Table C.16. Grit-Tempered Body Sherds, continued.

				Plain Surface				Cordmarked				Smoothed -over- Cordmarked		Fabric Impressed		Fabric Impressed/ Cordmarked		Erroded	
				Undecorated		Decorated		Undecorated		Decorated									
Prov/ F #	Bag No.	WHS Accession No.	Zone/ Level	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)
29-67	29-SP2-50-100	1978.266. JE1-67	SP2	23	151.9	-	-	31	240.2	-	-	2	14.2	-	-	-	-	-	-
30-68	30-1-25	1978.372. JE1-68	-	1	4.7	-	-	25	161.3	-	-	-	-	-	-	-	-	-	-
30-68	30-26	1978.372. JE1-68	-	1	9.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31-68	31-6, 8-10, 12-33, 35-52, 54-60	1978.372. JE1-68	-	4	42.5	-	-	46	330.9	-	-	-	-	-	-	-	-	-	-
31-68	31-6.1, 7.1	1978.372. JE1-68	-	-	-	-	-	1	18	-	-	-	-	-	-	-	-	-	-
31-68	31-61-66	1978.372. JE1-68	-	5	17.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
32-68	32-2-34	1978.372. JE1-68	-	1	3.3	-	-	32	238.9	-	-	-	-	-	-	-	-	-	-
34-67	34-4-34	1978.266. JE1-67	-	7	21.1	-	-	24	138	-	-	-	-	-	-	-	-	-	-
38-67	38-1	1978.266. JE1-67	-	1	9.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
39-67	39-27-40	1978.266. JE1-67	-	-	-	-	-	14	34.4	-	-	-	-	-	-	-	-	-	-

Table C.16. Grit-Tempered Body Sherds, continued.

				Plain Surface				Cordmarked				Smoothed -over- Cordmarked		Fabric Impressed		Fabric Impressed/ Cordmarked		Erroded	
				Undecorated		Decorated		Undecorated		Decorated									
Prov/ F #	Bag No.	WHS Accession No.	Zone/ Level	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)
39-67	39-4-25	1978.266. JE1-67	-	-	-	-	-	19	11.2	-	-	-	-	-	-	-	-	-	-
40-67	40-1&2(1-16)	1978.266. JE1-67	1&2	1	4.3	-	-	1	4.1	-	-	2	5.1	-	-	-	-	5	3.4
40-67	40-3(1-57)	1978.266. JE1-67	3	7	34.5	-	-	38	143.2	-	-	1	3.6	1	4.3	1	8.1	10	33.9
40-67	40-3(58-67	1978.266. JE1-67	3	-	-	-	-	1	1.6	-	-	-	-	-	-	-	-	9	27.8
40-67	40-4(1-42)	1978.266. JE1-67	4	4	12.4	-	-	19	82.9	-	-	3	43.7	-	-	-	-	16	13.6
40-67	40-5(10-11)	1978.266. JE1-67	5	-	-	1	5	1	6.6	-	-	-	-	-	-	-	-	-	-
40-67	40-5(1-9)	1978.266. JE1-67	5	-	-	-	-	8	61	-	-	-	-	-	-	-	-	1	1.2
40-67	40-6(106)	1978.266. JE1-67	6	1	5.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40-67	40-6(107)	1978.266. JE1-67	6	-	-	-	-	1	1.8	-	-	-	-	-	-	-	-	-	-
40-67	40-6(1-49)	1978.266. JE1-67	6	6	12.5	-	-	28	48.5	-	-	1	3.5	-	-	-	-	12	11.6
40-67	40-6(50-98)	1978.266. JE1-67	6	9	115.1	1	6.8	26	171.4	2	41.4	2	8.5	-	-	-	-	-	-

Table C.16. Grit-Tempered Body Sherds, continued.

				Plain Surface				Cordmarked				Smoothed -over- Cordmarked		Fabric Impressed		Fabric Impressed/ Cordmarked		Erroded	
				Undecorated		Decorated		Undecorated		Decorated									
Prov/ F #	Bag No.	WHS Accession No.	Zone/ Level	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)
40-67	40-7(1-7)	1978.266. JE1-67	7	1	3.4	-	-	6	72.2	-	-	-	-	-	-	-	-	-	-
40-67	40-8(1-22)	1978.266. JE1-67	8	-	-	-	-	12	97.4	-	-	-	-	-	-	-	-	3	6.5
40-67	40-8(23-25)	1978.266. JE1-67	8	1	23.3	-	-	1	1.5	-	-	-	-	-	-	-	-	-	-
49-64	49-10	1978.265. JE1-64	-	-	-	-	-	4	8.8	-	-	4	12	-	-	-	-	-	-
49-64	49-11-13	1978.265. JE1-64	-	1	7.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
49-64	49-15	1978.265. JE1-64	-	-	-	-	-	-	-	-	-	1	3.9	-	-	-	-	-	-
ABS	ABS 70-72, 74-106, 107-108	1978.372. JE1-68	-	5	39.3	-	-	26	312.3	-	-	9	77.7	-	-	-	-	-	-
ABS	ABS 8-61	1978.372. JE1-68	-	5	28.7	-	-	40	328.7	-	-	5	103.5	-	-	-	-	-	-
H2	H2-F(1-31)	1978.266. JE1-67	F	5	44.8	2	5.5	22	55.8	-	-	-	-	-	-	-	-	2	10.1
H2	PH-H2(1-7)	1978.372. JE1-68	PH	-	-	-	-	7	52.7	-	-	-	-	-	-	-	-	-	-

Table C.16. Grit-Tempered Body Sherds, continued.

				Plain Surface				Cordmarked				Smoothed -over- Cordmarked		Fabric Impressed		Fabric Impressed/ Cordmarked		Erroded	
				Undecorated		Decorated		Undecorated		Decorated									
Prov/ F #	Bag No.	WHS Accession No.	Zone/ Level	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)
MF	68.2	1978.372. JE1-68	-	8	42.8	-	-	24	155.7	-	-	2	25.2	-	-	-	-	7	9
MF	MF 1-15, 17-22, 24	1978.372. JE1-68	-	-	-	-	-	22	127.1	-	-	-	-	-	-	-	-	-	-
MF	MF 118-126	1978.372. JE1-68	-	1	20.6	-	-	8	30.6	-	-	-	-	-	-	-	-	-	-
MF	MF 131-136	1978.372. JE1-68	-	-	-	-	-	6	60.5	-	-	1	24.5	-	-	-	-	-	-
MF	MF 141-154	1978.372. JE1-68	-	-	-	-	-	13	72.8	-	-	-	-	-	-	-	-	-	-
MF	MF 155-169	1978.372. JE1-68	-	9	64.8	-	-	1	8.2	-	-	5	49	-	-	-	-	-	-
MF	MF 177-181	1978.372. JE1-68	-	-	-	-	-	3	7.1	-	-	2	8.6	-	-	-	-	-	-
MF	MF 27-42, 44-63, 65-73	1978.372. JE1-68	-	4	49.4	-	-	28	177.6	-	-	7	46.8	-	-	-	-	6	19.6
MF	MF 75, 78-104	1978.372. JE1-68	-	6	42.4	-	-	15	80.5	-	-	-	-	-	-	-	-	-	-
MF	NEMD 2(11)	1978.266. JE1-67	2	-	-	-	-	2	10.3	-	-	-	-	-	-	-	-	-	-

Table C.16. Grit-Tempered Body Sherds, continued.

				Plain Surface				Cordmarked				Smoothed -over- Cordmarked		Fabric Impressed		Fabric Impressed/ Cordmarked		Erroded	
				Undecorated		Decorated		Undecorated		Decorated									
Prov/ F #	Bag No.	WHS Accession No.	Zone/ Level	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)
MF	NEMD 2(1-10)	1978.266. JE1-67	2	2	7.7	-	-	8	16	-	-	-	-	-	-	-	-	-	-
MF	NEMD 2(12)	1978.266. JE1-67	2	1	4.2	-	-	1	10.8	-	-	-	-	-	-	-	-	-	-
MF	NEMD 2(13)	1978.266. JE1-67	2	-	-	-	-	2	7.7	-	-	-	-	-	-	-	-	-	-
MF	NEMD 2(14)	1978.266. JE1-67	2	1	24.6	-	-	1	2.3	-	-	-	-	-	-	-	-	-	-
MF	NEMD 2(15)	1978.266. JE1-67	2	-	-	-	-	2	17.9	-	-	-	-	-	-	-	-	-	-
MF	NEMD 2(16)	1978.266. JE1-67	2	-	-	-	-	2	20.8	-	-	-	-	-	-	-	-	-	-
MF	NEMD 2(17)	1978.266. JE1-67	2	-	-	-	-	2	16.9	-	-	-	-	-	-	-	-	-	-
MF	NEMD 2(18-19)	1978.266. JE1-67	2	1	3.2	-	-	1	9	-	-	-	-	-	-	-	-	-	-
MF	NEMD 3(100-149)	1978.266. JE1-67	3	8	42.2	-	-	25	147.5	1	6.5	8	60.1	-	-	-	-	6	13.2
MF	NEMD 3(1-49)	1978.266. JE1-67	3	12	32.5	-	-	25	57	-	-	3	8.4	-	-	-	-	9	17.5
MF	NEMD 3(150-199)	1978.266. JE1-67	3	5	35.2	-	-	31	190.1	-	-	10	57.6	-	-	-	-	4	13.6

Table C.16. Grit-Tempered Body Sherds, continued.

				Plain Surface				Cordmarked				Smoothed -over- Cordmarked		Fabric Impressed		Fabric Impressed/ Cordmarked		Erroded	
				Undecorated		Decorated		Undecorated		Decorated									
Prov/ F #	Bag No.	WHS Accession No.	Zone/ Level	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)
MF	NEMD 3(200-249)	1978.266. JE1-67	3	3	35.2	-	-	31	355.2	-	-	8	87.8	-	-	-	-	2	12.5
MF	NEMD 3(270-271)	1978.266. JE1-67	3	-	-	-	-	1	0.6	-	-	-	-	-	-	-	-	-	-
MF	NEMD 3(50-99)	1978.266. JE1-67	3	10	27.6	-	-	31	59.5	-	-	-	-	-	-	-	-	8	9.8
MF	NEMD B(1-12)	1978.266. JE1-67	B?	-	-	-	-	9	32.3	-	-	-	-	-	-	-	-	4	9.3
MF	NEMD MF-1-29	1978.266. JE1-67	-	5	38.1	-	-	29	105.3	-	-	-	-	-	-	-	-	2	2.9
MF	NEMD NE-1-64	1978.266. JE1-67	-	8	45.9	-	-	52	328.2	-	-	-	-	-	-	-	-	-	-
MF	NEMD NE-67-71	1978.266. JE1-67	-	1	4	-	-	4	10.9	-	-	-	-	-	-	-	-	-	-
MF	unknown	1978.372. JE1-68	-	-	-	-	-	2	2.6	-	-	-	-	-	-	-	-	-	-
N295 R100	295 R100 1-1-4	1978.372. JE1-68	1	1	7.6	-	-	1	3.2	-	-	-	-	-	-	-	-	2	4
N300 R99	300 R 99 [all]	1978.372. JE1-68	-	-	-	-	-	2	9.4	-	-	-	-	-	-	-	-	-	-
PH NT	PH NT-2-9	1978.372. JE1-68	-	2	6.2	-	-	3	28	-	-	3	16.6	-	-	-	-	-	-

Table C.16. Grit-Tempered Body Sherds, continued.

				Plain Surface				Cordmarked				Smoothed -over- Cordmarked		Fabric Impressed		Fabric Impressed/ Cordmarked		Erroded	
				Undecorated		Decorated		Undecorated		Decorated									
Prov/ F #	Bag No.	WHS Accession No.	Zone/ Level	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)	ct.	wt.(g)
PH S6	PH S6-1	1978.372. JE1-68	-	-	-	-	-	1	12.5	-	-	-	-	-	-	-	-	-	-
PH ST	PH ST-1-6	1978.372. JE1-68	-	6	27.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PZ	PZ 1-14	1978.372. JE1-68	-	2	8	-	-	9	38.2	-	-	1	5.6	-	-	-	-	-	-
S	S-2-5, 9-12	1978.372. JE1-68	-	5	114.1	-	-	2	12.5	-	-	1	3.2	-	-	-	-	-	-
S5 WT	S5 WT-1-11	1978.372. JE1-68	-	-	3	35	-	8	55	-	-	-	-	-	-	-	-	-	-
unk.	68.10	1978.372. JE1-68	-	-	-	-	-	1	7.6	-	-	-	-	-	-	-	-	-	-
unk.	68.12	1978.372. JE1-68	-	1	4.8	-	-	7	18.4	-	-	-	-	-	-	-	-	-	-
unk.	68.5	1978.372. JE1-68	-	2	3.3	-	-	3	10.2	-	-	23	92	-	-	-	-	9	6.6
unk.	68.9	1978.372. JE1-68	-	13	23.5	-	-	-	-	-	-	-	-	-	-	-	-	7	5.2

APPENDIX D: XRF DATA

Table D.1. Northeast Mound Vessels Utilized in pXRF Analysis.

Mound-Top Vessels	Mound-Fill Vessels	Sub-mound Vessels				Indeterminate Provenience Vessels
v56	v6	v1	v23	v43	v68	v75
v57	v7	v2	v24	v44	v70	
v58	v8	v3	v25	v45	v71	
v59	v87	v4	v26	v46	v72	
v63	v89	v5	v27	v47	v73	
v64		v9	v28	v48	v74	
v76		v10	v29	v49	v117	
v77		v11	v30	v50	v120	
v78		v12	v31	v51	v121	
v133		v13	v32	v52	v122	
		v14	v33	v53	v123	
		v15	v34	v54	v124	
		v16	v35	v55	v125	
		v17	v36	v60	v126	
		v18	v37	v61	v127	
		v19	v38	v62	v128	
		v20	v39	v65	v129	
		v21	v41	v66	v130	
		v22	v42	v67		

Table D.2. Sub-mound 51 Vessels utilized in pXRF Analysis; Illinois State Museum Collection

UWM Rim #	Vessel #	Field Bag #
r03	v146	50
r04	v?	152
r48	v?	12

Table D.3. Aztalan Daub Utilized in pXRF Analysis; UWM-ARL Aztalan Collection

Lot/Bag #	Provenience	Excavation Year
2011-20.0010	TU2, Level 1, 0-50 cmbs	2011
2011-20.0050	TU 6, Level 2, 30-40 cmbs	2011
2011-20.0204	TU 12, Level 2 15-25 cmbs	2011
2011-20.0250	TU 9, Level 4B, 57-80 cmbs	2011
M84-1013	N 2-4, E 14-16, str. 2	1984

Table D.4. Artifact Mean Compositions.

Object ID	As	Br	Cu	Fe	Ga	Nb	Ni	Rb	Sr	Y	Zn	Zr
AZT_84_1013	0.19%	0.02%	0.24%	56.55%	0.11%	0.85%	1.57%	4.18%	7.19%	0.98%	0.65%	27.47%
AZT2011_10	0.23%	0.03%	0.19%	54.75%	0.10%	1.01%	1.53%	4.17%	7.29%	1.20%	0.66%	28.83%
AZT2011_204	0.24%	0.09%	0.35%	67.36%	0.10%	0.71%	1.53%	3.76%	7.13%	1.15%	0.72%	16.86%
AZT2011_250	0.20%	0.13%	0.40%	62.11%	0.09%	0.76%	1.88%	3.49%	8.58%	1.08%	0.76%	20.51%
AZT2011_50	0.13%	0.04%	0.25%	52.98%	0.10%	1.11%	1.60%	4.39%	7.80%	1.26%	0.67%	29.67%
r03	0.29%	0.03%	0.28%	68.97%	0.11%	0.73%	2.17%	2.89%	10.83%	1.05%	1.05%	11.60%
r04	0.54%	0.04%	0.31%	66.73%	0.12%	0.91%	1.65%	4.46%	10.40%	1.25%	1.38%	12.21%
r48	0.37%	0.08%	0.33%	71.52%	0.13%	0.70%	2.36%	3.09%	11.50%	0.97%	1.44%	7.51%
v01	0.22%	0.12%	0.54%	75.76%	0.10%	0.50%	1.22%	2.63%	6.67%	1.33%	0.92%	9.98%
v02	0.14%	0.12%	0.45%	80.28%	0.07%	0.48%	0.93%	2.06%	5.87%	1.16%	1.08%	7.37%
v03	0.16%	0.06%	0.29%	79.72%	0.09%	0.63%	1.03%	3.81%	4.62%	1.09%	0.53%	7.96%
v04	0.16%	0.08%	0.32%	73.67%	0.10%	0.61%	1.25%	2.74%	5.93%	1.21%	0.72%	13.23%
v05	0.12%	0.08%	0.42%	73.04%	0.11%	0.70%	1.35%	3.38%	5.39%	1.14%	1.04%	13.23%
v06	0.18%	0.09%	0.16%	67.40%	0.09%	0.63%	1.48%	3.43%	13.09%	0.78%	0.92%	11.75%
v07	0.10%	0.07%	0.20%	80.10%	0.09%	0.35%	0.89%	1.94%	6.55%	0.81%	0.76%	8.14%
v08	0.13%	0.06%	0.40%	83.41%	0.06%	0.40%	0.65%	2.05%	3.90%	1.14%	0.83%	6.97%
v09	0.20%	0.10%	0.33%	81.14%	0.11%	0.54%	1.04%	2.46%	3.80%	1.20%	0.49%	8.57%

Table D.4. Artifact Mean Compositions, continued.

Object ID	As	Br	Cu	Fe	Ga	Nb	Ni	Rb	Sr	Y	Zn	Zr
v10	0.20%	0.05%	0.40%	77.11%	0.08%	0.56%	1.19%	3.37%	5.67%	1.16%	1.11%	9.10%
v11	0.12%	0.04%	0.33%	76.92%	0.10%	0.41%	1.24%	2.43%	4.95%	0.97%	0.62%	11.88%
v12	0.18%	0.12%	0.36%	75.02%	0.11%	0.63%	1.31%	2.77%	6.13%	1.43%	0.97%	10.95%
v120	0.23%	0.09%	0.45%	78.26%	0.09%	0.62%	1.14%	3.05%	4.90%	1.42%	0.86%	8.88%
v121	0.20%	0.04%	0.28%	79.31%	0.10%	0.61%	1.02%	3.68%	4.97%	1.04%	0.85%	7.91%
v122	0.16%	0.07%	0.54%	74.79%	0.09%	0.58%	1.45%	3.38%	4.97%	1.41%	2.38%	10.18%
v123	0.26%	0.07%	0.23%	81.24%	0.12%	0.50%	0.91%	3.37%	4.77%	1.04%	0.76%	6.74%
v124	0.22%	0.11%	0.29%	78.00%	0.09%	0.51%	0.87%	2.09%	4.87%	1.31%	0.50%	11.14%
v125	0.22%	0.07%	0.44%	73.96%	0.09%	0.70%	1.25%	3.49%	5.65%	1.59%	0.81%	11.73%
v126	0.16%	0.10%	0.30%	74.23%	0.11%	0.67%	1.19%	3.05%	5.24%	1.24%	0.96%	12.76%
v127	0.17%	0.08%	0.74%	78.09%	0.08%	0.56%	1.12%	2.10%	5.40%	1.60%	0.58%	9.48%
v128	0.13%	0.04%	0.28%	81.70%	0.10%	0.41%	0.96%	2.20%	5.42%	1.02%	0.90%	6.84%
v129	0.26%	0.14%	0.19%	80.03%	0.11%	0.50%	0.81%	2.58%	4.78%	1.02%	0.43%	9.14%
v13	0.20%	0.09%	0.32%	81.25%	0.08%	0.45%	1.08%	2.26%	5.17%	0.95%	0.98%	7.17%
v130	0.30%	0.09%	0.34%	77.61%	0.10%	0.52%	1.06%	3.90%	4.69%	1.22%	1.02%	9.16%
v133	0.61%	0.27%	0.30%	71.38%	0.12%	0.67%	1.14%	2.65%	5.86%	1.07%	0.86%	15.05%
v14	0.17%	0.04%	0.30%	75.04%	0.11%	0.65%	1.12%	3.31%	5.66%	1.41%	1.12%	11.07%

Table D.4. Artifact Mean Compositions, continued.

Object ID	As	Br	Cu	Fe	Ga	Nb	Ni	Rb	Sr	Y	Zn	Zr
v15	0.17%	0.05%	0.43%	72.66%	0.09%	0.61%	1.40%	3.23%	8.71%	1.13%	1.23%	10.28%
v16	0.17%	0.08%	0.28%	77.69%	0.09%	0.49%	1.04%	2.10%	5.80%	1.12%	0.82%	10.33%
v17	0.16%	0.03%	0.45%	66.28%	0.10%	0.85%	1.51%	3.10%	7.96%	1.27%	1.24%	17.07%
v18	0.19%	0.04%	0.39%	71.68%	0.08%	0.71%	1.49%	4.77%	7.22%	1.41%	1.09%	10.93%
v19	0.18%	0.04%	0.41%	75.33%	0.07%	0.56%	1.23%	3.21%	6.40%	1.20%	0.89%	10.48%
v20	0.14%	0.05%	0.31%	76.26%	0.13%	0.52%	1.11%	2.57%	5.65%	1.04%	0.78%	11.42%
v21	0.18%	0.06%	0.31%	77.20%	0.10%	0.61%	1.10%	3.82%	5.16%	1.21%	1.20%	9.04%
v22	0.16%	0.06%	0.37%	78.33%	0.11%	0.57%	1.13%	2.97%	5.95%	1.14%	0.95%	8.26%
v23	0.20%	0.07%	0.24%	72.58%	0.14%	0.61%	1.26%	6.56%	6.53%	1.00%	0.90%	9.92%
v24	0.16%	0.08%	0.35%	77.34%	0.12%	0.49%	1.30%	3.05%	7.04%	1.12%	0.92%	8.04%
v25	0.18%	0.09%	0.34%	77.06%	0._11%	0.53%	1.27%	2.69%	7.43%	1.18%	0.90%	8.21%
v26	0.19%	0.10%	0.27%	76.78%	0.12%	0.59%	1.05%	3.02%	4.56%	1.27%	1.07%	10.98%
v27	0.17%	0.03%	0.32%	77.66%	0.10%	0.44%	1.17%	2.41%	5.89%	1.13%	0.90%	9.78%
v28	0.18%	0.06%	0.30%	77.12%	0.09%	0.64%	1.18%	3.41%	4.96%	1.24%	0.68%	10.14%
v29	0.18%	0.11%	0.22%	71.65%	0.13%	0.62%	1.44%	2.94%	8.68%	1.35%	0.77%	11.91%
v30	0.11%	0.05%	0.29%	75.01%	0.10%	0.59%	1.28%	2.88%	5.81%	1.06%	0.74%	12.08%
v31	0.17%	0.07%	0.43%	76.25%	0.10%	0.59%	1.24%	3.98%	6.61%	1.21%	0.90%	8.45%

Table D.4. Artifact Mean Compositions, continued.

Object ID	As	Br	Cu	Fe	Ga	Nb	Ni	Rb	Sr	Y	Zn	Zr
v32	0.18%	0.05%	0.26%	79.97%	0.07%	0.50%	0.87%	2.54%	5.46%	1.22%	0.80%	8.07%
v33	0.15%	0.10%	0.30%	76.59%	0.08%	0.40%	1.21%	2.25%	7.78%	1.17%	1.03%	8.93%
v34	0.16%	0.06%	0.38%	79.25%	0.07%	0.46%	0.87%	2.57%	5.33%	1.29%	0.56%	9.01%
v35	0.21%	0.04%	0.29%	72.09%	0.09%	0.76%	1.08%	3.44%	6.77%	1.45%	0.89%	12.89%
v36	0.18%	0.05%	0.39%	70.36%	0.10%	0.87%	1.26%	3.68%	7.36%	1.39%	0.99%	13.37%
v37	0.13%	0.05%	0.42%	78.16%	0.08%	0.44%	1.16%	3.54%	6.64%	0.99%	0.95%	7.45%
v38	0.16%	0.05%	0.37%	78.81%	0.08%	0.52%	0.97%	3.48%	5.97%	1.13%	0.95%	7.52%
v39	0.17%	0.08%	0.47%	76.49%	0.08%	0.46%	1.15%	2.60%	8.46%	1.05%	1.22%	7.76%
v41	0.17%	0.04%	0.39%	77.61%	0.10%	0.45%	1.03%	2.59%	7.20%	1.15%	0.77%	8.50%
v42	0.24%	0.10%	0.44%	76.69%	0.08%	0.56%	1.18%	2.68%	6.57%	1.60%	0.86%	9.00%
v43	0.13%	0.05%	0.43%	75.87%	0.09%	0.51%	1.29%	3.17%	7.50%	1.28%	1.39%	8.29%
v44	0.22%	0.05%	0.36%	80.43%	0.09%	0.47%	1.02%	3.20%	4.78%	0.96%	0.94%	7.48%
v45	0.22%	0.12%	0.32%	75.83%	0.07%	0.46%	1.05%	2.28%	6.21%	1.26%	0.71%	11.47%
v46	0.15%	0.07%	0.48%	77.77%	0.08%	0.54%	1.09%	2.33%	6.12%	1.27%	0.76%	9.33%
v47	0.18%	0.11%	0.67%	75.23%	0.09%	0.56%	1.10%	4.02%	6.89%	1.12%	1.36%	8.67%
v48	0.20%	0.10%	0.26%	70.52%	0.13%	1.51%	1.17%	4.90%	7.01%	1.22%	1.32%	11.66%
v49	0.18%	0.08%	0.36%	76.85%	0.10%	0.52%	1.33%	2.89%	5.57%	1.06%	0.83%	10.22%

Table D.4. Artifact Mean Compositions, continued.

Object ID	As	Br	Cu	Fe	Ga	Nb	Ni	Rb	Sr	Y	Zn	Zr
v50	0.24%	0.14%	0.53%	76.11%	0.10%	0.60%	1.10%	3.05%	5.35%	1.17%	1.05%	10.56%
v51	0.14%	0.01%	0.41%	76.77%	0.09%	0.53%	1.10%	3.32%	6.26%	1.21%	0.88%	9.27%
v52	0.16%	0.08%	0.30%	74.95%	0.11%	0.54%	1.19%	2.82%	4.92%	1.36%	0.69%	12.89%
v53	0.21%	0.05%	0.34%	81.86%	0.11%	0.55%	1.01%	3.02%	4.15%	1.06%	0.73%	6.92%
v54	0.16%	0.08%	0.26%	74.28%	0.14%	0.71%	1.36%	4.12%	5.16%	1.27%	0.76%	11.69%
v55	0.23%	0.04%	0.30%	76.79%	0.11%	0.68%	1.11%	3.75%	4.11%	1.31%	0.62%	10.96%
v56	0.25%	0.12%	0.16%	82.71%	0.08%	0.50%	0.65%	2.01%	3.19%	1.18%	0.76%	8.40%
v57	0.19%	0.06%	0.33%	79.43%	0.10%	0.62%	1.06%	2.87%	3.86%	1.34%	0.58%	9.57%
v58	0.21%	0.13%	0.26%	76.52%	0.11%	0.53%	1.30%	2.27%	5.96%	1.43%	0.50%	10.77%
v59	0.24%	0.09%	0.29%	76.37%	0.10%	0.56%	0.93%	2.69%	4.51%	1.21%	0.49%	12.51%
v60	0.25%	0.07%	0.30%	79.82%	0.12%	0.55%	0.96%	3.07%	4.01%	1.19%	0.63%	9.03%
v61	0.22%	0.08%	0.41%	77.06%	0.10%	0.61%	1.21%	3.37%	5.40%	1.31%	0.81%	9.43%
v62	0.19%	0.07%	0.28%	80.69%	0.12%	0.50%	0.99%	2.62%	4.44%	1.23%	0.83%	8.03%
v63	0.27%	0.21%	0.27%	78.44%	0.11%	0.56%	1.04%	2.43%	3.64%	1.27%	0.50%	11.28%
v64	0.54%	0.17%	0.27%	75.30%	0.13%	0.67%	1.13%	3.11%	4.31%	1.35%	0.57%	12.45%
v65	0.17%	0.17%	0.33%	73.32%	0.10%	0.60%	1.09%	2.45%	5.65%	1.18%	0.93%	14.02%
v66	0.17%	0.14%	0.40%	78.07%	0.09%	0.57%	1.18%	2.77%	5.20%	0.97%	0.69%	9.74%

Table D.4. Artifact Mean Compositions, continued.

Object ID	As	Br	Cu	Fe	Ga	Nb	Ni	Rb	Sr	Y	Zn	Zr
v67	0.15%	0.14%	0.40%	77.66%	0.07%	0.45%	1.17%	2.21%	6.55%	1.13%	0.58%	9.49%
v68	0.18%	0.12%	0.30%	81.16%	0.09%	0.55%	0.86%	2.48%	3.70%	1.30%	0.81%	8.46%
v70	0.20%	0.13%	0.30%	73.80%	0.10%	0.51%	1.07%	2.91%	9.51%	1.12%	0.58%	9.78%
v71	0.20%	0.10%	0.25%	78.19%	0.10%	0.72%	1.22%	4.05%	3.27%	1.09%	0.57%	10.25%
v72	0.22%	0.07%	0.37%	79.54%	0.11%	0.53%	0.97%	3.04%	4.69%	0.97%	0.60%	8.90%
v73	0.15%	0.07%	0.23%	84.02%	0.08%	0.35%	0.65%	1.58%	3.49%	1.13%	0.50%	7.75%
v74	0.19%	0.12%	0.30%	77.45%	0.11%	0.57%	1.02%	2.76%	4.34%	1.48%	0.69%	10.98%
v75	0.16%	0.07%	0.27%	79.68%	0.09%	0.58%	0.94%	3.37%	3.98%	1.31%	0.63%	8.91%
v76	0.32%	0.13%	0.29%	76.28%	0.11%	0.57%	1.11%	2.98%	4.76%	1.15%	0.61%	11.68%
v77	0.58%	0.29%	0.25%	73.47%	0.14%	0.85%	1.18%	3.58%	4.65%	1.30%	0.90%	12.81%
v78	0.23%	0.12%	0.46%	83.07%	0.10%	0.43%	0.88%	2.66%	3.71%	0.76%	0.51%	7.06%
v87	0.18%	0.11%	0.18%	80.70%	0.08%	0.58%	0.93%	2.25%	3.28%	1.14%	0.60%	9.98%
v89	0.25%	0.09%	0.24%	72.43%	0.10%	0.62%	1.33%	4.47%	5.38%	1.08%	0.66%	13.35%

Table D.5. Northeast Mound PCA Loadings.

Element	Component										
	Comp.1	Comp.2	Comp.3	Comp.4	Comp.5	Comp.6	Comp.7	Comp.8	Comp.9	Comp.10	Comp.11
As	-0.315	0.080	0.217	0.329	0.076	-0.305	0.634	-0.147	-0.286	0.227	0.022
Br	-0.781	-0.053	-0.261	-0.059	-0.217	0.313	-0.195	-0.189	0.058	-0.105	-0.009
Cu	-0.136	-0.385	-0.030	0.240	0.146	-0.499	-0.316	0.521	0.058	-0.152	-0.153
Fe	0.067	-0.042	0.199	0.039	0.311	-0.091	-0.126	-0.317	0.404	-0.143	0.682
Ga	-0.103	0.083	0.644	-0.555	0.228	0.178	-0.064	0.192	-0.080	0.037	-0.21
Nb	0.110	0.323	0.021	0.217	-0.279	0.110	-0.282	0.246	0.146	0.696	0.131
Ni	0.211	-0.069	-0.173	-0.312	-0.242	-0.229	-0.226	-0.157	-0.686	-0.026	0.287
Rb	0.251	0.152	0.322	0.291	-0.467	-0.044	-0.114	-0.315	0.121	-0.403	-0.364
Sr	0.208	-0.394	-0.273	-0.317	0.043	-0.137	0.158	-0.352	0.331	0.364	-0.363
Y	0.176	0.250	-0.283	0.286	0.626	0.304	-0.167	-0.129	-0.251	-0.062	-0.258
Zn	0.245	-0.463	-0.007	0.142	-0.157	0.562	0.354	0.316	-0.058	-0.131	0.186
Zr	0.066	0.518	-0.377	-0.301	-0.068	-0.162	0.344	0.329	0.242	-0.304	0.049