# FROM BITTER SEEDS:

# A HISTORICAL ANTHROPOLOGICAL APPROACH

# TO MOUNDVILLE'S ORIGINS


by

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# ABSTRACT

Archaeologists have long been aware of the synergistic relationship between maize (or corn) and the development of Mississippian societies (A.D. 1000) within the Southeastern United States. It seems that decades after maize appeared within a given region, Mississippian societies formed, characterized by social stratification, the construction of large earthworks, and a reliance on maize agriculture. For many of these societies, maize even reached the status of a true dietary staple, providing over 40 percent of the daily caloric intake. Researchers have traditionally modeled this phenomenon within a political-economic lens, arguing that maize was an essential resource manipulated by aspiring individuals seeking to attract followers and amass political capital. However, studies indicate that maize, by itself, is not a viable dietary staple, but must either be supplemented by other foodstuffs or prepared using alkaline cooking techniques.

In this dissertation, I propose that during the Mississippian period, maize was disseminated as a part of a nixtamalizing, hominy foodway which included the Mississippian standard jar, the most prolific artifact found throughout the Mississippian cultural world. Hominy is a dish of boiled maize kernels that have either been ground or are whole and has been cooked until it has a porridge-like texture. Using the Mississippian ritual-ceremonial center of Moundville, located in the Black Warrior Valley of west-central Alabama, as a case study, I demonstrate that before maize could be used as a resource by aspiring elites, residents of the valley first had to like hominy, then learn to make it. The dissemination of a foodway, including specific materials and culinary knowledge, as opposed to the maize plant alone, required a different set of social events and networks than those afforded by political-economic models. Therefore, I develop a new model that focuses on people first being introduced to hominy, then women learning to make it. Ultimately, I propose that the synergistic relationship between maize and Mississippian societies be revised to that between the hominy foodway and Mississippian societies.

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When Jim Knight first proposed I focus my research on Moundville, I fought him, suggesting several other possibilities that I believed were just as appropriate for the research questions I wanted to pursue. Moundville, I felt, was too big to tackle—so many remarkable scholars had already conducted so much research, written so many volumes on the site (Jim Knight included). Ultimately, what could I really say about Moundville that hadn't already said? In the end, Jim was right, as he is right about most things archaeology. I'm proud to say, though, that wasn't the last time I fought him on a point or the last time I questioned his reasoning. I like to think this research grew out of my stubbornness, his patience, and the countless conversations we had in his office/over lunch/while feeding his chickens.

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# CHAPTER 1:
# INTRODUCTION

“Tell me what you eat and I’ll tell you who you are.”

–Jean Anthelme Brillat-Savarin (1864)

Food plays a central role in our lives. It is not simply that we eat every day, up to several times a day. Food is more than nourishment—enveloping it are a number of activities, ones that involve procurement, preparation, serving, and disposal. As such, food is surrounded by a number of cultural rules and guidelines that facilitate this process, telling us what is good to eat and what is not, when it is good to eat and when it is not, how we should eat, where we should eat, and even, at times, why we should eat (Douglas 1971, 1984; Lévi-Strauss 1969; Rappaport 1967; Weismantel 1988). These rules are constantly reinforced on a daily basis, cementing them as “the original social glue that forms the bonds of family and society while creating the individual” (Atalay and Hastorf 2006:284; see also Bourdieu 1977). Thus, food is also shrouded in meaning, and we use this meaning to construct and interpret our lives and experiences.

At this point, though, we are no longer simply talking about food. We are talking about foodways, or the activities, rules, and meaning that shroud food and the manner in which it is prepared, which is cuisine (Welch and Scarry 1995). In contrast to studies of food, foodways studies provide a way to discuss the shared, common culinary and social practices related to specific foods and dishes. Thus, the distinct advantage of foodways studies is that they are holistic, broadening the focus from the plant or animal consumed to the totality of materials, cultural knowledge, and social practices involving food.

An example of the important difference between these two approaches is the study of maize versus the study of maize-based foodways. Studies of the maize plant (Zea mays) have long stressed its versatility as a food product and its productivity as a dietary staple. Maize, ubiquitous throughout many parts of the New World at the time of European contact, is heralded as a plant full of possibilities, serving as the backbone for the rise of complex societies in the Americas, as a dietary staple of European peasants from the seventeenth century on, and now, as the third most utilized human food source in the world (the first for ruminant fodder). Historical, archaeological, and biological studies of maize explore the importance of the plant in each of these contexts first and foremost as an economic resource. After centuries of artificial selection, maize is a high-yield crop, one that can easily be extensified (meaning that more of the plant can be brought under cultivation within a given area) in order to produce a surplus. Additionally, maize is one of a handful of dietary staple foods throughout the world, or foods from which more than 40 percent of a person's daily caloric intake can derive without resulting in chronic malnutrition.

Archaeologists have long understood that the origins of many Mississippian societies (ca. A.D. 1000-1600) in the Southeastern United States are rooted in a synergistic relationship between the adoption of maize and social complexity (Anderson and Sassaman 2012:159). Mississippian societies are characterized by hereditary social inequality, a religious expression centered on the construction of temple and mortuary mounds arranged around central plazas, and a reliance on maize agriculture (Anderson and Sassaman 2012:155). Defined as much by history as by a constellation of material and ideological traits, there is a large amount of variation expressed among Mississippian societies. However, despite their differences, the spread and adoption of maize agriculture has seemed to play a formative role in their appearance throughout the region.

Again, focusing on the economic properties of the plant, researchers have modeled this synergy through a political-economic lens: maize was the primary foodstuff used by aspiring elites to sponsor feasting events designed to attract followers, events which simultaneously introduced the plant to new populations (Cobb 2003:76; Fritz 1998). Following similar economic reasoning, it is further suggested that local peoples then adopted and began growing maize as a strategy against crop failure, which included contributions to a communal surplus. Adopting maize also increased the carrying capacity of a region, making it possible for smaller areas of land to support larger populations, resulting in the congregation of thousands of people at Mississippian centers like Cahokia and Moundville. Within these communities, maize was frequently consumed in high enough quantities to qualify it as a true dietary staple.

However, as noted above, oftentimes how a food is prepared is more important than the food itself. This is a particularly important consideration when discussing maize because, ironically, what nutritional studies indicate that maize alone is actually *not* a biologically life-sustaining food. Unless properly prepared or supplemented, a diet high in maize will lead to rampant malnutrition that is fatal if left untreated. Consequently, and contrary to popular thought, maize itself is *not* a true dietary staple; instead, it is the *foodways* associated with maize that are capable of serving as dietary staples, especially those foodways that incorporate alkaline cooking, or nixtamalization. Nixtamalization is an alkaline cooking technique that has a profound effect on dried, mature maize kernels. In addition to altering the flavor and texture of maize, nixtamalization also alters the chemistry of maize kernels by increasing the available amount of essential amino acids and B vitamins that are otherwise inaccessible to humans.

Despite this important relationship between maize and nixtamalization, few researchers have considered that the crucial relationship often modeled between the maize plant and social complexity should, in fact, be modeled between a nixtamalizing maize foodway and social complexity. Indeed, virtually no studies on the emergence of Mississippian societies explore whether or not these people were practicing nixtamalizing maize-based foodways, let alone the potential relationship between these foodways and the emergence of Mississippian societies (for two notable exceptions, see Myers 2006 and Osborn 1988). If maize was disseminated throughout the Southeastern United States as part of a nixtamalizing foodway and not simply as an economic resource, this leads to a series of important questions: what were these nixtamalizing foodways? What were the steps and materials involved? Do the same social contexts and motivations marshaled to model the dissemination of maize work when discussing nixtamalizing maize-based foodways? Finally, because foodways involve more than just culinary procedures, how then do we understand the relationship between maize-based foodways and the emergence of social complexity in the Southeastern United States?

This book addresses each of these questions by using the Mississippian ritual-ceremonial center of Moundville, located in west-central Alabama, as a case study.

## Maize, Mississippian Societies, and History

Maize was not endemic to the Southeastern United States, but was instead introduced through human activity. The earliest known, clearly domesticated maize cobs were recovered from southwest Mexico, and date to approximately 7000 B.C., or 9,000 years before the present (Blake 2015). It is unclear how long after the domestication of maize that nixtamalizing practices were developed; in the absence of any conclusive chemical test, researchers have relied on the tools and materials associated with nixtamalizing maize-based foodways in Mesoamerica as signatures for the practice. The earliest conclusive evidence for the practice dates to approximately 1000 B.C. in Belize with the recovery of a set of ceramic colanders known to be central to preparing masa (or maize dough) using an alkaline solution (Cheetham 2010). However, if grinding implements, such as those central to the tortilla foodway which involves nixtamalizing steps, are used as a proxy, then the practice could easily date as early as 1500 B.C., if not older (Staller and Carrasco 2009:317).

By approximately 2000 B.C., maize had entered the American Southwest, likely through interaction networks and not the migration of people moving north into the region (Blake 2015:203). While Beck (2001) highlights a number of different ways maize was prepared across the American Southwest, at least two foodways involved alkaline cooking: the first is the tortilla foodway, while the second is a general category for boiled, alkali-processed maize and includes food items like whole kernel *posole* as well as maize gruel (Beck 2001:188-189).

There is a considerable time lag between the appearance of maize in the American Southwest and its appearance in the Eastern Woodlands. Researchers once thought suggested that the earliest traces of the plant in the Eastern United States came from the American Bottom and eastern Tennessee, and dated to the Middle Woodland period (300 B.C. to A.D. 400) (Fritz 1990). However, after reexamining many of these early specimens and subjecting them to isotope analysis, Mary Simon (2016, 2017) has refuted many of these early specimens, demonstrating through carbon isotope and carbon ratio assessment either these early specimens were misidentified as maize, or those there that were correctly identified were younger than previously dated. As such, there is now little evidence supporting the presence of the plant in the American Bottom prior to A.D. 900.

Conversely, while the dates for maize in the American Bottom are progressively being pushed forward in time, dates for the presence of maize in the Northeast are progressively being pushed back. Microremains from pot residue (in the form of phytoliths and starch grains) from a handful of sites in New York, Michigan, and Ontario now suggest that maize may have been present in the Great Lakes region as early as 200-300 B.C. (Hart 2008; Hart and Lovis 2013; Simon 2017:147). The transmission route for this maize is unclear, but it most likely originated in the American Southwest and may ultimately entered the Midwest and Southeastern United States through the Northeast after the plant was adapted to thrive in northern climes (Hart and Lovis 2013; Simon 2017). Though this route is still being debated, what is clear is that the evidence for maize remains in the American Bottom and subsequently the Southeastern United States is sporadic and inconsistent until approximately A.D. 900 when extensive maize agriculture was first practiced (Hutchinson et al. 1998).

As noted, there is an apparent synergistic relationship between maize and Mississippian societies, with the spread and adoption of maize agriculture either coeval or occurring slightly before the spread of other Mississippian cultural hallmarks (Anderson and Sassaman 2012:159). First, there is maize, then, the appearance of a variety of characteristics that generally define Mississippian societies: shell-tempered ceramics, shell gorgets, wall-trench architecture, specific artistic styles, iconographic themes and motifs, social activities such as the game of chunkey, ritual practices, and hereditary social stratification. Large earthworks also characterize many Mississippian sites, including platform mounds, mortuary mounds, and central plazas, as well as, in some cases, other public works such as defensive ditches and log palisades. However, regardless of the constituent parts of this Mississippian cultural constellation, the pattern holds: first maize, then Mississippian.

The Mississippian cultural expression reached an early fluorescence in the American Bottom of the Central Mississippi River valley at a series of mound centers located near modern-day St. Louis, Missouri, the largest and perhaps most important of which was the site of Cahokia (Anderson and Sassaman 2012:161). Around A.D. 1050, a cultural explosion termed the "Big Bang" took place in the American Bottom, spawning many of the cultural traits associated with Mississippian (Pauketat 1997). Over the next three hundred years, researchers propose that Mississippian culture spread from this epicenter north, east and south through various networks, including trade and migration (Anderson 1999:226). However, instead of replacing endemic, local practices, various components of Mississippian culture were differentially adopted, modified, and even rejected. Some Mississippian societies built dozens of earthen mounds situated around one or more plazas, while others constructed only one mound. Some exclusively used and manufactured shell-tempered ceramics while others used shell in addition to other tempers or never adopted shell-tempering at all. For some, maize was elevated to the status of a true dietary staple, while for others it was never more than a dietary supplement. Iconographic and stylistic traditions vary, as does the degree of social stratification.

Recognizing the important role that local traditions played in the "Mississippianization" of the Southeastern United States has privileged theoretical perspectives that prioritize history. Undoubtedly, the perspective called historical processualism, championed by Timothy Pauketat (2001), has received the most attention from Mississippian scholars. For historical processualism, history is constantly being negotiated in the present through the practice of traditions, meaning that individuals, either by intention or accident, alter traditions by introducing new elements when enacting (Pauketat 2001:8). Agency thus becomes the vehicle for change. Indeed, agency is the vehicle for change in most historical theories currently employed by Mississippian scholars, as the means of introducing novel deviations into traditions (Gilmore and O'Donoughue 2015; Wilson 2008).

However, operationalizing this conception of agency means not only that the negotiation between history and practice is unpredictable, but that any self-correcting mechanisms in society must be weak. As such, historical perspectives that favor agency as a vehicle for change are ill equipped to investigate foodways. Foodways, by definition, include the rules, meanings, materials, and activities that surround a dish. These components are interconnected—practice generates meaning while meaning reinforces practice. Further, meaning becomes inscribed in the materials associated with the practice, while the practices themselves become embodied in the practitioner, conditioning, among other things, muscle memory. While practice also has the potential to introduce change into a foodway, such changes are largely idiosyncratic and ephemeral owing to the widespread, shared nature of foodways, making them conservative and resistant to change (Bourdieu 1984). For this reason, Chapter 2 provides a framework for a historical theory of change that emphasizes structural forces over agency by using Marshall Sahlins's (1981) historical anthropology as a foundation.

## Moundville

The Mississippian ceremonial center of Moundville, located in the Black Warrior River valley of west-central Alabama, provides an excellent case study for exploring the questions at hand. As one of the largest Mississippian centers (second only to Cahokia), Moundville and its hinterlands have been the focus of a considerable amount of archaeological research, a great deal of which has focused on the transitional Late Woodland West Jefferson (A.D. 1070-1120) and the Early Mississippian Moundville I phases (A.D. 1120-1250).

During the Late Woodland West Jefferson phase, groups within the Black Warrior Valley practiced a semi-sedentary, largely egalitarian, hunter-gatherer lifeway (Jenkins and Nielsen 1974). Regionally, there is evidence that the Late Woodland period was marked by warfare and resource stress, and in neighboring river valleys, these stresses drove groups to congregate. Within the Black Warrior Valley, only a small number of Late Woodland sites have been excavated, but these were relatively large villages (Knight and Steponaitis 2007:10-11). Groups gathered for part of the year in floodplain villages, and spent the other parts of the year in extractive camps (Welch 1981). West Jefferson peoples replied heavily on wild resources, including nuts, and crafted predominately plain, grog-tempered ceramics (Knight and Steponaitis 2007:7; Scarry 1986). Importantly, during this Late Woodland phase, maize was first introduced and grown in small quantities.

Beginning around A.D. 1120, a Mississippian lifeway began to crystallize within the region. Compared to the West Jefferson lifeway, the Mississippian lifeway was defined by sedentary, year-round living within the Valley, as well as a heavy reliance on maize agriculture. These people crafted shell-tempered ceramics that came in a variety of forms, including globular cooking pots, and began engaging in various new forms of crafting using nonlocal raw materials (Knight and Steponaitis 2007:12-17). With the exception of Moundville, the large, nucleated communities that had earlier defined the West Jefferson phase gave way to smaller farmsteads. High on the Hemphill Bend of the Black Warrior River, the ritual-ceremonial center, however,

Figure 1.1: Aerial view of Moundville, located in the Black Warrior River valley of west-central Alabama. (Google Earth 2009)

attracted a large, dense population. People also began constructing and living in houses with wall-trench foundations, a style that originated in Mississippian communities to the north.

The earliest known monumental earthworks constructed during this time were two earth mounds: Mound X at Moundville and a single mound at the Asphalt Plant site, located 500 meters north of Moundville. Both were abandoned during the late Moundville I phase (A.D. 1190-1250), yielding to a formal, imposed design, which required decommissioning Mound X in order to make way for a wooden palisade. This formal layout included a large, artificially leveled, quadrilateral plaza surrounded on all four sides by earthen mounds, the largest of which are located on the north end of the site close to the Black Warrior River. In addition to decommission of Mound X, house groups formerly residing in the central area of the site were required to relocate to the margins of the plaza (Davis 2014; Steponaitis and Scarry 2016:1-2).

Signaled by these extensive public constructions, the late Moundville I phase (A.D. 1190-1250) saw the rise of a stratified, chiefdom-level society with Moundville at the center. By this time, residents within the chiefdom no longer shared equal access to crafted or exotic materials, and there is strong evidence those living at the center were provisioned with foods, including maize, by those living in the surrounding farmsteads and minor mound centers (Scarry and Steponaitis 1997). Recently, Scarry and Steponaitis (2016) have argued that Moundville was not a town in the traditional sense, but instead a ceremonial ground, organized along lines of corporate kin groups, and governed by priests or kin group leaders.

## The Study Herein

This work is divided into eight chapters. Chapter 2 develops the framework for a historical anthropology of cognition by augmenting the work of Marshall Sahlins (1981) and William Sewell (2005) with findings from cognitive linguistics, neuroscience, and cognitive anthropology. Unlike previous archaeologists interested in historical anthropology, I believe there should be less focus on "events," or series of moments that culminate in a radical structural reorganization, and instead on what Sahlins called the "structure of the conjuncture," what Sewell refers to as "occurrences," and what I propose we call "encounters." While events are rare and idiosyncratic, encounters are regular and predictable.

After establishing the theoretical framework that shapes this research in Chapter 2, Chapter 3 addresses the first question central to this research: beginning around A.D. 1000, was maize disseminated throughout the Southeastern United States as part of a nixtamalizing foodway? If so, what was this foodway and what were the material, ideational, and social components that comprised it? To begin answering these questions, I conducted an extensive review of ethnohistoric and ethnographic materials on maize based foodways practiced throughout the historic Native Eastern Woodlands (an area that includes not only the Southeastern United States but also the Northeast and Great Lakes regions as well). Based on the prevalence and conservation of the hominy foodway throughout the historic Eastern Woodlands, I propose that an ancestral hominy foodway, which included nixtamalizing steps, was the primary maize-based foodway disseminated during the Mississippian period.

Relying on the detailed characterization of the historic Native hominy foodway presented in Chapter 3, Chapters 4 and 5 bring the reader back to Moundville, first making a case for the presence of the hominy foodway at the Mississippian ritual-ceremonial center of Moundville in Chapter 4 based on biological data establishing the presence of a nixtamalizing practice. Next, Chapter 5 articulates our current understanding of the social and ethnic landscape of the Black Warrior Valley during the Late Woodland West Jefferson and the Early Mississippian Moundville phases (A.D. 1070-1250).

In addition to maize, a second early Mississippian hallmark present during the Late Woodland West Jefferson phase were shell-tempered, globular cooking jars, or "Mississippian standard jars." In Chapter 6, I propose that the Mississippian standard jar was not simply a generalized cooking pot, but instead was a specific tool adapted for nixtamalizing maize, one that, within the subject area, was primarily suspended over a bed of hot coals. As an essential tool of the foodway, women in the Black Warrior Valley interested in learning the practices of the hominy foodway also had to learn to craft Mississippian standard jars, a skill that required practicing with someone proficient in their production. By examining landmarks on the rims and bodies of Mississippian standard jars recovered from Moundville I phase sites within the valley, I argue for a constellation of practice of the Mississippian standard jar that was socially inclusive and fluid, unifying the multi-ethnic groups that populated the area.

Returning to the proposition that Mississippian standard jars were primarily suspended over a hot bed of coals in order to cook hominy, Chapter 7 presents the findings from experimental archaeology designed to test this hypothesis. By comparing the two cooking strategies presented in Chapter 6, that of a West Jefferson ovaloid jar placed directly in a fire and a Mississippian standard jar suspended over a bed of hot coals, I demonstrate that the latter is particularly well suited for long-term boiling, an essential step in the hominy foodway.

In Chapter 8, I draw on the conclusions presented in each of the preceding chapters to develop a new model for the origins of Moundville that centers on the dissemination of the hominy foodway and not maize alone. This model proposes that the hominy foodway was the first trace of a Mississippian lifeway within the Black Warrior Valley, and that it was likely first introduced by non-local, Mississippian women who were brought to the area through exogamous marriage networks during the Late Woodland West Jefferson phase. I propose that the motivation for adopting the foodway was not driven by either economy or nutrition, but instead by taste, with the nixtamalizing practices integral to hominy fitting well within the endemic taste profile defined by the slightly bitter Late Woodland nut foodway. Based on available archaeological evidence as well as the demands of the foodway, I suggest that residents of the valley were primary introduced to dish through small, domestic meals and not large, communal feasts. These more intimate interactions helped foster the requisite social network women needed in order to learn the crafts and practices of the foodway. Adopting and practicing the hominy foodway not only restructured the concept of femininity within the area, but also the concept of community, generating a new shared identity among residents of the valley. Ultimately, the genesis of this new identity provided the foundation for Moundville's society.

# CHAPTER 2:
# DEVELOPING A HISTORICAL ANTHROPOLOGY OF COGNITION

At the heart of this dissertation is a historical anthropological approach as articulated by Marshall Sahlins (1981), augmented by William Sewell (2005), and informed by findings from neuroscience, cognitive anthropology, and cognitive linguistics. In recent years, Sahlins's historical anthropological approach has come into vogue, first thanks to Sewell (2005) who adapted his approach for sociology, then by Robin Beck, James Brown, Douglas Bolender, and Timothy Earle, who adapted Sewell's augmented approach for archaeology (Beck et al. 2007; Bolender 2010; Gilmore and O'Donoghue 2015). However, while these adaptations have clarified Sahlins's approach in important ways, they have also narrowed the scope of his original conception to focus nearly exclusively on the "event," an important but rare source of structural change. In doing so, they have neglected another valuable tool for studying structural change, what Sahlins called the "structure of the conjuncture," what Sewell more succinctly refers to as "occurrences," or what I will propose we refer to as *encounters*. Encounters, and not events, comprise the majority of both history and prehistory; events represent punctuated moments that are far scarcer.

This chapter begins with a review of structuralism, the direct theoretical antecedent to historical anthropology, then reviews Marshall Sahlins's theoretical framework, focusing in particular on his case study drawn from the eighteenth-century interaction between the Native

Hawaiians and Captain James Cook. Next, I look at other historical structural approaches to anthropology, arriving at Williams Sewell's eventful analysis and its recent popularity in Southeastern United States archaeology. However, following Callinicos (1995), I contend that while popular, the theory still lacks essential qualities that would make it a successful theory of history. I propose it is possible to ameliorate these shortcomings by informing the approach with basic ideas of how the human mind works, derived from neuroscience, cognitive linguistics, and cognitive anthropology. In the final sections of this chapter, I propose several principles and precepts that can be used to guide a historical anthropology of cognition.

## Linguistic and Anthropological Structuralism

In the roots of historical anthropology are found in both linguistic and anthropological structuralism, which posit that culture is a force largely unknown to its participants, one that functions not only to maintain itself but also to regulate human behavior (Lévi-Strauss 1963; Sahlins 1987). In the structuralist view, culture is mental and stored in the human mind. By exploring language as well as human behavior, structuralists believe it is possible to reveal the hidden logic of cultural phenomena, a methodology known as structural analysis. Heavily informed by linguistics, structural analysis was developed as a method for understanding the underpinnings of culture. Ferdinand de Saussure (1966), a late nineteenth-century linguist, maintained that every language was composed of arbitrary, non-discursive rules locked away in the minds of its practitioners (*langue*). To discover these rules, researchers need to look at the meaning of words as they are used in practice (*parole* or *speech*), and in particular, the composition of phonemes, which are based on relational oppositions. Thus, meaning is the product of comparisons and contrasts to other arbitrary meanings housed within a particular language, all of which are locked within the mind of practitioners. While Saussure may have maintained that all meaning was arbitrary, Charles Peirce argued that some meaning was derived from the natural, real world. Peirce introduced the idea that meaning can be based on the object, or the real-world counterpart to the sign, though usually this relationship was in very simplistic and direct ways (such as onomatopoeia) (Buchler 1955).

In the early 1940s, Roman Jakobson, building on Saussure's work, delivered a series of six highly influential lectures on sound, meaning, and their relationship (Jakobson 1981). In the first three of these, Jakobson stated that phonemes, the minimal units within language, are composed of features that create sound contrasts within a language and serve to create differences in meaning. Jakobson then deviated and stated that sound meaning may derive from contrast in sensate values between words—certain associated sounds may thus elicit associated sensations. Thus, not only may sounds have a real-world counterpart, they may also have a cognitive, emotional basis. Unabashedly influenced by Jakobson's lectures, Claude Lévi-Strauss used language as a metaphor for culture (1980)—if their opposition to each other defines phonemes and if they potentially convey sensate meaning, then Lévi-Strauss surmised that is should be possible to employ structural analysis to ascertain the smallest units of cultural information. Importantly, Lévi-Strauss believed that culture was an adaptation to the universal underpinnings of how the human mind works, and that structural analysis was the key to determining these universal underpinnings. This led Lévi-Strauss to explore kin relations (Lévi-Strauss 1962), categories of food (Lévi-Strauss 1969), and mythical content (Lévi-Strauss 1972), all the while searching for the hidden logic that underwrites the way that we think.

This is the foundation of structuralism. First, the name itself refers to a method of investigation, and not to a conception of "structures" as cultural phenomena. Structuralists were interested in how culture is constituted, but determining that depended first on understanding the underpinnings of cognition. Second, structuralism maintains that culture is lodged within the mind and is composed of symbols, signs, and meanings, all of which guide human behavior. Finally, culture is non-discursive, but can be revealed through the careful observation of, and the analysis of, human affairs—this is structural analysis. As such, structuralists held that although specific categories are not universal, the propensity to categorize is. By looking closely at cultural categories, further universals may be discovered.

**Historical Anthropology in the Sandwich Islands**

Historical anthropology is a deliberate attempt on the part of Marshall Sahlins to transform Claude Lévi-Strauss's synchronic study of meanings into a diachronic study of practice (Sahlins 1981:7). For Sahlins, history took precedence over unlocking the underpinnings of the human mind, and as such, the origin of the structural signs and meanings that comprise culture were products of history, and not universal workings of the human mind. While Sahlins still employed a structural analysis, he used this method not to look at static cultural categories, but instead to explore historical occurrences and events as a means to ascertain the ways traditions and history inform the actions of a group of people at any given time. Sahlins further deviated from Lévi-Strauss on the subject of culture. While Lévi-Strauss did not contend that there were such things as "structures," only structural analysis, Sahlins chose to forego a discussion of "culture" as an analytic tool fearing it carried too much baggage. Following in the footsteps of other French structural thinkers, such as Pierre Bourdieu, Sahlins instead adopted the term "structures," which, he proposed became the building blocks of "structural systems."

By focusing on history and not the universal underpinnings of human cognition, Sahlins attempted to introduce both a theory of transformation and directionality to structuralism. Within historical anthropology, structures were the product of history, and as such, historical processes became the primary source for structural change. More specifically, Sahlins argued that structural change occurs when a structural system either comes into contact with a dissonant structural system (such as two otherwise isolated groups of people interacting for the first time) or when an unfamiliar situation or natural occurrence takes place (such as the unexpected eruption of a volcano or a solar flare). In each situation, the result is the same: a person non-discursively interprets the action using the structure generated by a particular system's history. As such, the unknown is made "familiar," and through this interpretation, a person determines the "correct" action necessitated by the situation. In other words, when two strangers from different parts of the world meet for the first time, they immediately draw upon their own structural systems to understand the other. Importantly, the process of making the unknown familiar is neither intentional nor negotiable—instead, it is non-discursive and immediate based on similarities between the unknown and the receiving structural system.

Structural change results from the dissonance that occurs within a structural system as a result of the incorporation of something foreign. Because structural systems are idiosyncratic products of a particular history, they never perfectly account for the new dissonances that are not products of the same history. However, through the encounter, the new structural system in both interpreted and absorbed, changing the system in the process. The impact of the change is dependent on how persistent the dissonance is: if it ends, then each system may remain virtually unchanged. Conversely, if the stress persists, the structures invoked may end up failing entirely, resulting in momentous change cascading throughout the entire shared structural system.

Building on this conception, Sahlins outlines two general ways that structural change proceeds. First, the structures themselves are transformed through the “structure of the conjuncture” (Sahlins 1981), or the process by which a person, through an encounter with something new, non-discursively interprets it by relying on already held historically constructed experience and knowledge, or structures. Sometimes, the interaction of such encounters results in slightly new functions and prescriptions, altering the original structure by “stretching” it. In this way, structural systems are always in a dialogue with practice (Sahlins 1981:33), with encounters, either great or small, taking place frequently, creating a cyclical, recursive relationship between encounters and the structures used to interpret them. (In fact, an easier way to refer to the “structure of the conjuncture” may be the “interpretation of an encounter; ” thus I use the shorthand *encounter* herein.) Through practice, the shortcomings of structural systems are highlighted. However, because these systems are conservative, shortcomings are rarely troubling or even felt as cause for change; as such, they are often overlooked.

If the disruption caused by one or more dissonances continues, and if structures are “stretched” too far, they may reach the limits of what they can successfully explain, and ultimately, they may fail. When structural systems fail, moments of social and cultural chaos ensue, the outcome of which, while predicated on the history, is still unpredictable; the outcome of these events is based on emotion and true creative agency, resulting in a novel solution to realign the structural system, once again restoring order and meaning to the structural system.

Sahlins’s primary case study came from the events surrounding Captain James Cook’s visits to the Sandwich Islands in A.D. 1778-1779, and particularly on his second return to the islands during the Makahiki festival (Sahlins 1981, 1985). Through the careful examination of historical documents, Sahlins argued that based on the timing of Cook's arrival, as well as on Hawaiian mythology, Captain Cook was treated as the god Lono. Annually, the people of the Sandwich Islands celebrated the return of the god Lono through a number of festivities and rituals, all of which culminated in the departure of the god from the islands. Not only did Captain Cook fit the part, as a foreigner arriving on the sea at the right time of the year, but for the most part, during Cook's first two trips to the islands, he and his crew played the part expected of Lono and his retinue—they received offerings, toured the islands following the ritual path enforced by the native Hawaiians, and, importantly, they left when it was time. This is not to say the visits were without some hiccups and even a few social failures. As expected, the presence of Cook and his men created new practices and actions that resulted in several clumsy social encounters on the parts of both parties.

An excellent example of such a clumsy encounter comes from the following anecdote, which took place on January 21, 1778 after the ship the *Discovery* was left alone in Waimea Bay:

> The next morning found [the *Discovery*] surrounded by a great many Hawaiian canoes, occupied by ordinary people engaged in a traffic of provisions for British iron, when abruptly a large double canoe of a chief appeared and ordered the others away. But "without ceremony" or "regard" for the smaller vessels that could not move off quickly enough, the chief's canoe "ran against, or over them, without endeavoring in the least, to avoid them" (Sahlins 1981:33-34).

The chief was Kaneoneo, a sacred chief born of the highest of tabus, a sister-brother union. As such, people were required to fall prostrate at his feet when he passed, an interaction that almost always occurred only on land. In this instance, triggered by the sea trade prompted by the *Discovery*, the action occurred on water, leaving a number of commoners prostrate in their boats while his plowed through them, capsizing four canoes, which left the occupants treading water. These commoners "were caught in a Hawaiian double-bind: prostrating face down in their canoes for the passage of the sacred chief, they could not also get out of his way" (Sahlins 1981:34). The dissonance was valuable trade at seas—before trade with the British, commoners did not amass around large trade ships, nor did sacred chiefs ride out to also engage with the ships.

Despite handfuls of clumsy interactions, both structural systems (the system of the English and the system of the Hawaiians) were able to absorb these encounters, stretching their composite structures in the process, but never breaking. That is, until Captain Cook unexpectedly returned after the conclusion of the Lono festival in 1779 due to a sprung foremast on the *Resolution*, and thus when he violated the tradition of the festival which necessitates his departure for at least a year (Sahlins 1981:22-23). According to the English, the Hawaiian Natives, who were once amiable and respectful, were this time irreverent and committed rampant theft, while the chiefs, once so accommodating, refused to repatriate the stolen losses, including the valuable loss of the ship's cutter. As Sahlins explains, for the Hawaiians, Lono had returned, breaking the social contract they had made for his departure. This made void the obligations of the contract. Captain Cook, suddenly faced with an incomprehensibly hostile situation, relied on his own structural system to dictate his actions, and chose to take King Kalaniopuu hostage until the cutter was returned. At first, King Kalaniopuu went peacefully, but after a quick consult with his chiefs, he began to resist, sitting down on the beach and refusing to move. This led to a riot. As chaos ensued, and as a crowd of enraged Hawaiians swarmed Cook, the captain was killed with an iron dagger. Cook's death brought a novel solution to an escalating social crisis: while the action was predicated on mythical stories from the islands, it was also a response to a direct political threat to the Hawaiian structural system. The Hawaiian system was both saved and changed in this single action, leading to a complete restructuring of the Hawaiian system for over fifty years (Sahlins 1981:55-65).

Sahlins's historical anthropology builds on structuralism in several important ways. First, he establishes that structural systems are historically constructed—the systems used by all parties involved in the murder of Captain Cook were drawn from their respective histories. Within their generative historical landscapes, these systems were more than sufficient for explaining and bringing order to the world; however, when they came into contact with one another, they were forced to account for new ideas, materials, and actions which those systems were only barely capable of processing. Despite clumsy and awkward encounters, the conservative, self-replicating nature of these systems allowed their composite structures to absorb new encounters without breaking. Thus, even before Cook's murder, both structural systems were changed in that they were "stretched." However, both systems continued to absorb more and more until the Hawaiian system was brought to a breaking point—Cook's murder was an action predicated on history, yet unprecedented, resulting in long-term changes in the Hawaiian system.

Importantly, historical anthropology does not necessitate that all Hawaiians at the time of Cook's arrival believed he was the god Lono. Structures prescribe actions based on the interpretation of an encounter, while the structures invoked rely on similarities between structures and encounters. In this sense, there are no coincidences, and further, not all actions are results of belief. In the case of Captain Cook, owing to a number of temporal coincidences, he was interpreted using the category of the returned god Lono. Cook may not have behaved like Lono at times, and there were certainly skeptics among the Hawaiians; regardless, there were prescriptions about how to treat Lono, and until another, perhaps more congruent structure either presented itself or was created, one that may have fit the circumstances better, this was the clearest interpretation available.

### Historical Perspectives and Eventful Analysis in Eastern North America

Very few anthropologists have followed in Sahlins's footsteps, and virtually no archaeologists. Instead, among American archaeologists, the shift to "archaeology as history" was largely triggered by two prominent thinkers—Pierre Bourdieu (1973, 1977) and Anthony Giddens (1984). Both maintained that structures are the guiding hand behind human thought and behavior, which are ultimately products of history. Both Bourdieu and Sahlins believed that structures are conservative, self-replicating, non-discursive, and largely dependent upon one's social class. However, Bourdieu differed from Sahlins in that he believed structures were not only mental, but also physical, being replicated within the material world. Additionally, Bourdieu maintained that structural change, while rare, takes place on the level of the individual. While habitus, or a person's internalized, non-discursive disposition, is stored within the mind, the structures that shape habitus are both virtual and material, written in the artificial world (Bourdieu 1990:108). Though people are largely unaware of their habitus, both practices and encounters may alter it. However, through self-replication and the inscription of structures in the material world, change is rare, leaving those who experience and even live with dissonance in an impotent state to enact change.

While Giddens agreed with many of Bourdieu's points, he contested that instead of being constraining, structures are renegotiated every day through the deliberate and knowledgeable actions of individuals (known as agency, or the power to act); these individual negotiations enter into a perpetual dialogue with structure called structuration (Giddens 1984:14, 26). In other words, while Bourdieu imagined that most people do not understand why they do what they do, Giddens believed that people are aware of most of the structures that compose structural systems, and tactfully negotiate them every day. However, like Bourdieu, Giddens believed mental structures (or what he called rules) exist in a perpetual dialogue with the material world, transforming the materials of the world into resources. As such, resources become important areas through which power is exerted, but also areas of dialogue, because those meant to be subordinated can also influence resources through structuration (Giddens 1984:16).

While Bourdieu, Giddens, and Sahlins each crafted historical structural theories, both Bourdieu and Giddens provided archaeologists with an important leverage that Sahlins did not: a conception of structural systems that are in constant dialogue with the material world. For Sahlins, the material world was inconsequential—structural systems are *only* lodged within the minds of people. However, both Bourdieu and Giddens argued that the constructed, artificial world was crafted as a direct reflection of mental structures, and indeed, was a primary medium through which the self-replication process took place.

Following Bourdieu and Giddens, historical processualism, as championed by Timothy Pauketat, became the dominant school of "archaeology as history" practiced in the Southeastern United States over a decade. Historical processualism does not investigate culture; instead, this school maintains that history is composed of tradition-making (the process of building traditions) and constraints (forces that prevent people from acting freely) (Pauketat 2001:4-5), clearly invoking Giddens's conceptions of agency and structuration. Thus, systems change thanks to variations in action, or practice. Like Giddens, historical processualists maintain that structures are ultimately weak forces, negotiated and even changed on a daily basis.

Despite the dominance of historical processual approaches, over the past few years, historical anthropological approaches have gained in popularity. A great deal of this is due to the work of William Sewell, a sociologist at the University of Chicago, and to Robin Beck, Douglas Bolender, Timothy Earle, and James Brown, who adopted Sewell's work for archaeology. Noting that Sahlins (1991) himself seemed hesitant to suggest his theory was anything more than a "possible theory," Sewell (2005) works to ameliorate some of the less fleshed-out areas of historical anthropology, hoping that in the process, he will demonstrate the utility of this theory to history and historical approaches. Unlike Sahlins, who proposed that individuals have a single structural system, Sewell alternatively proposes structural plurality—instead of a singular structural system, what has been perceived as a bounded whole should instead be recognized as a multiple, overlapping structures (Sewell 2005:131, 211). Unlike Sahlins, Sewell does not suggest that all structures are shared—structures exist on all scales of social interaction, from those shared by a large group of people to those that exist simply between two people. What appears to be a homogenous, bounded culture or structural system are instead a number of widely shared, overlapping structures.

Further, structures still have a mental component, a component Sewell calls schemas, but following Bourdieu and Giddens, structures are also composed of resources. Schemas are transposable, virtual procedures that dictate social and cultural practice; resources are actual, polysemic, and unpredictable media, which include not only material items, but also energetic items, like labor. Resources and schemas exist in a cyclical, recursive relationship in which they each generate the other. However, resources also have physical properties that are dictated by the natural world; in this way, the physical properties of resources shape schemas (Sewell 2005:216). Thus, the built world becomes a reflection of ideational schemas, but importantly, these media also shape schemas in return. Schemas may come to take on metaphoric properties of the media integral to their perpetuation, creating the recursive dialogue between the two that defines structures.

This last contribution is integral to what has come to be known as *eventful analysis*. Following Sahlins, Sewell adheres to a gradual notion of structural change, driven largely by the interaction that takes place in encounters and punctuated perhaps once a generation by events, or a series of moments that culminate in a radical structural reorganization. However, Sahlins had a difficult time outlining how researchers, without the aid of historical texts or clear cases of contact with other people, could identify events. Sewell's reconceptualization problematizes this in a useful way. First, gradual structural change again stems from the interaction of an encounter, or what Sewell refers to as "occurrences." That change, though, may be reflected in a particular schema, resource, or both. Further, the structure used for the encounter will be predicated on similarities, seemingly reinforcing the structure; thus, change is not creative. Events, on the other hand, necessitate not only changes in multiple, shared schemas and resources, but also culminate in creative actions that are not predicated on history, but instead on emotion, making them moments of agent-driven change.

Sewell's amelioration of historical anthropology helped make the theory more palatable to a number of researchers interested in historical perspectives, including archaeologists. In 2007, Robin Beck, Douglas Bolender, James Brown, and Timothy Earle published an article that outlined how Sewell's eventful analysis could be useful to archaeologists. They stressed that because resources and schemas exist in a perpetual dialogue, events should be readily recognizable to archaeologists, who many times are concerned with *longue duree* (2007:835).

Thus, archaeologists should look for relatively quick, drastic, coterminous disjunctions in multiple classes of material in order to identify events within the material record.

In the last decade, archaeological investigations focused on the event have become popular among archaeologists in the Southeastern United States (see contributions in Gilmore and O'Donoghue 2015). Eventful analysis has clear parallels to historical processualism, but also offers a conservative conception not only of culture but also of structural change, demoting the role that agency plays within this process. Like Beck and colleagues (2007), however, most of eventful research has focused on identifying the apex of events, or moments of structural rearticulation, within the archaeological record, loosely applying not only the tenets of eventful analysis, but also those of Sahlins's historical anthropology (Beck 2014a, 2014b; Beck et al. 2007; Bolender 2010; Davis 2014; Gilmore and O'Donoghue 2015) (Figure 2.1). The appeal of eventful analysis, for many, has been how researchers believe it problematizes agency, while creating a rather large temporal scale over which structural change can occur (Davis 2014; Gilmore and O'Donoghue 2015). In other words, it seemingly provides a framework to discuss rapid changes in the archaeological record, yet does not mandate that acts of agency are singular or momentary; instead, events can last days, years, even centuries. While this is certainly an accurate representation of the event, it inaccurately portrays agency as a force in constant dialogue with structure, a relationship neither Sahlins nor Sewell contend.

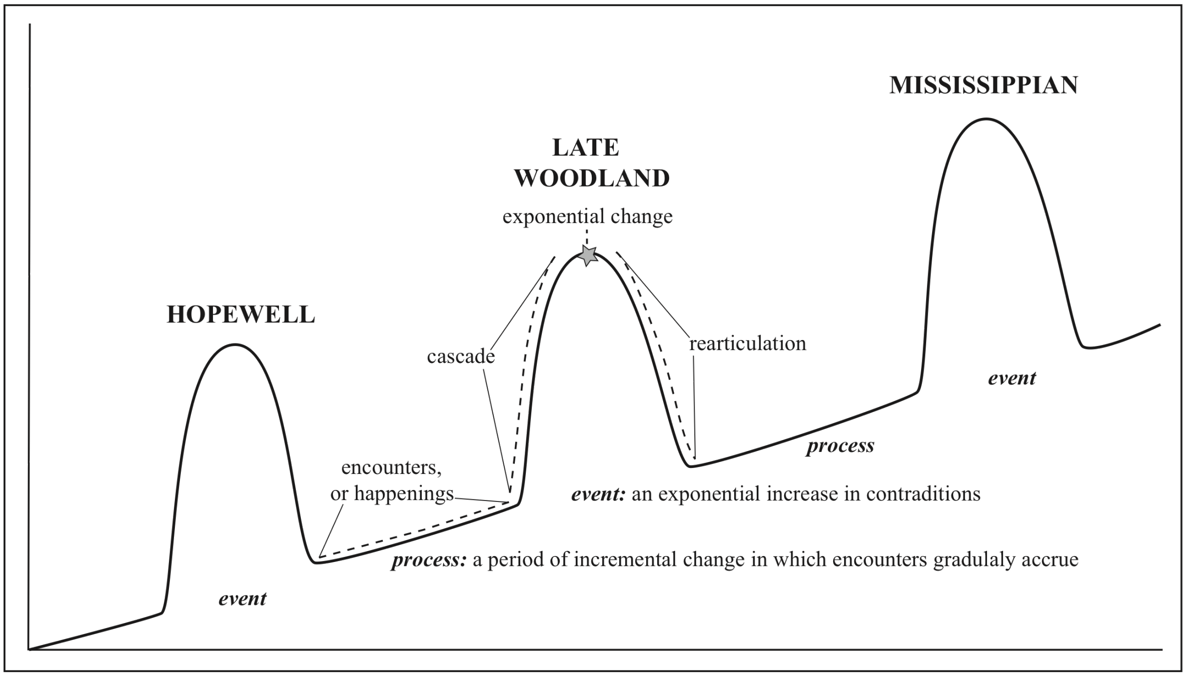


Figure 2.1: Diagram of eventful analysis using Southeastern archaeological periods as an example. (After Beck 2014:211-212.)

## Developing a Historical Anthropology of Cognition

As noted, while Sewell certainly helped make historical anthropology a more robust theoretical perspective, many archaeologists have foregone Sahlins's foundation in favor of a stripped-down eventful analysis, which not only focuses too narrowly on events but, arguably, is an incomplete theoretical perspective. Callinicos (1995) states that a successful theory of history must have three components: (1) a theory of structure; (2) a theory of transformation; and (3) a theory of directionality. Both historical processualism and eventful archaeology lack theories of directionality. In each, agency becomes the primary mechanism for structural change, with agency conceptualized as spontaneous, unpredictable, and creative action—while there may be a historical precedent, the outcome of agency-inspired action is nevertheless unpredictable. Each is also poorly equipped to handle causation. Again, this can be attributed to an over-reliance on the concept of agency. For too many researchers, anything can trigger an agency-inspired action.

While historical anthropology and especially eventful analysis are far better at handling both directionality and causation, both are largely descriptive and are not very useful as analytical tools. In other words, detecting structural change in the past, whether occurrences or events, is subjective and is based largely on the interpretation of the investigator. While ruptures in the material record may be indicative of an event, these ruptures are not indicative of its scale or magnitude. Because events occur at variable scales, and because both resources and schemas may be generated and used in different manners at all scales, distinguishing between an occurrence and an event, or even a moment of structural homeostasis, is left to the researcher.

I would like to propose the following. While neither Marshall Sahlins nor William Sewell ever say as much, I believe it is possible to develop historical anthropological principles which will provide the theoretical perspective with directionality, causation, and clear guidelines for its application by informing the framework with findings from the cognitive sciences, and particularly those that deal directly with how the human mind works. Building on Lévi-Strauss's proposal, I offer that structures are adapted to the hardwiring of the human mind, and as such, understanding some of the basic cognitive principles of how the mind works will help demonstrate which structures are triggered during encounters, why some structures are more generally shared than others, and why structures are resistant to change.

*The (Early) Workings of the Human Brain*

For over a century, social science has broadly understood how the human brain functions. First, we are metaphorical creatures, and much of the way we understand the world comes from drawing metaphors between what we know and what we are experiencing. However, metaphor has a very broad definition, and understanding the nature of our metaphorical thinking has taken quite some time.

Psychologist F. C. Bartlett's (1932) precocious studies on human memory established an early foundation for studies on metaphoric thinking. In his most famous study, Bartlett asked his study participants, who were all British and white, to read a First Nations myth, *The War of the Ghosts.* Participants were then asked to remember the myth at various intervals over numerous later visits. What Bartlett found was that the myth, specifically chosen because it possessed a different narrative structure than those stories his participants were accustomed to hearing, was frequently reworked—some elements of the story were omitted while others were completely transformed. In each instance, the elements that were changed were those that violated the schemas of the participant, and were thus reworked in a way that made them more compatible with their understanding of narrative structure. Importantly, Bartlett (1932:90) also found that when participants were asked to recount the story months, even years later, retellings became highly visual, drawing on sensory clues that were not detailed in the story. Thus, his study not only demonstrated the human tendency to think metaphorically, but that metaphoric thinking is also likely tied to visual, even sensate experiences.

In addition to the importance of metaphor, linguistic researchers were attuned to many of the underlying mechanisms of cultural transmission by around the mid-twentieth century.

Edward Sapir (1921), for example, noted that structures that dictate human behavior could be, and many times were, transmitted through social interactions, stressing the importance of non-discursive learning; Roman Jakobson (1960) commented that traditionally poetic features that are similar but not exclusively metaphoric, like metonym and synecdoche, were at the heart of human language; and Jean Piaget (1970) demonstrated that humans underwent universal stages of biological and cognitive development. Indeed, by the latter half of the twentieth century, philosophers of human behavior and language understood the important dialogue between not only the human mind and structure, but also how the human body both shapes and is also shaped by this dialogue (Bourdieu 1981; Lakoff and Johnson 1980).

Such findings have directed our current understanding of how the human mind works. Once, the mind was thought to be comparable to a blank computer, non-differentially primed to absorb any form of information. We now know not only that do we absorb and understand the world differently at various life stages, but also that there is (to continue the metaphor) mental hardware that physically structures how we absorb, interpret, and process the world. We do not impartially take the world in, but instead, we are born better adapted to certain experiences and knowledge than others.

### *Dispelling a Myth: The Logical Brain*

A common, colloquial conception of the human brain is there are two, independent facets to the brain, a "logical" portion and an "emotional/creative" portion. We envision that we have the ability to make decisions divorced of emotion, that humans have the ability to be purely rational beings. However, neuroscience has demonstrated that the two systems of the brain, the neocortical and limbic systems, which respectively represent the logical and emotional functions of the brain, are intimately entangled, mediating one another and working in tandem (Pinker 2009:371). In fact, while rationalization or logic is frequently thought of as a precursor to human thought, helping us formulate, first, a particular, objective response, then second, feelings about the response, the order is actually reversed: emotion precedes reason. This is not to say that we cannot be logical, but it is to say that emotion, which we frequently believe can be removed from a decision, is persistent and ever-present. Emotion leads us to logic, suggesting it is neither chaotic nor unpredictable.

Owing to this highly developed relationship we have with our emotions, the human mind is keenly adapted for storing and remembering sensate experiences. Through our senses, our emotions are often heightened and stimulated, but the converse is also true: our emotions may often times heighten, even stimulate, our senses. Therefore, important moments may have strong, sensate memories attached to them in which we may remember the most brilliant colors or smells or sounds. Imagery, though, is not only important to memory: studies in cognitive linguistics as well as psychology have confirmed that language and thought are also firmly grounded in imagery formed through the immediate, perceptual experiences of the senses. In this way, we begin to understand part of the entanglement that exists between emotion, logic, memory, and the senses, and thus the resulting tacit relationship this entanglement has with structures.

*Metaphors and Mental Mapping*

As mentioned above, metaphorical thinking is a reflexive activity of the human brain that is key to how we mentally map and categorize our memories. Indeed, not only do we think metaphorically, but we also communicate metaphorically. This permeation is so deep that is it difficult to find examples of non-metaphoric thinking and communication. Take the following sentences as example, based on the work of Ray Jackendoff (1987), that document the use of a single spatial metaphor:

> The student *went from* Montreal *to* the Canary Islands.
> The inheritance finally *went to* Kristen.
> The light *went from* red *to* green.
> The doctoral defense *went from* 2:30 *to* 5:00.

Only in the first example do we have actual, physical movement—the student actually travelled from one location on the planet to another. The rest simply rely on a metaphor of movement and space to convey more abstract meanings (Pinker 2009:354). The inheritance, for example, likely didn't move at all; ownership over the materials in question instead is what changed, yet all of this is conveyed by saying *went to*. Metaphors, in this way, help us understand abstract concepts by mapping actions and ideas in terms and concepts with which we are more familiar. We do not need to know all the machinations at work behind Kristen's inheritance, simply that it is now hers.

George Lakoff and Mark Johnson (1980, 2003) noted that the most common mapping mechanism we use is the conceptual metaphor, which includes the example given above. Conceptual metaphors are image-based, figurative metaphors that are commonly reflected linguistically through broad, internalized idioms such as *life is a journey, argument is war*, or *ideas are food*. These are all idioms that many English speakers in America are familiar with, which is why when someone says, for example, "Here's a thought to chew on," regarding a novel or even controversial notion, we understand that the speaker does not literally mean she is offering a virtual idea that should be masticated, but instead that the idea is something the speaker would like the listener to consider.

Conceptual metaphors help us understand and communicate abstract concepts by mapping qualities of the source domain onto the target. Thus, when we say *ideas are like food*, we are giving the target, *ideas*, qualities of the source, *food*, a mapping that allows us to understand the more abstract concept of *ideas* in relation to the broader and more physical concepts of *food* and the associated physical actions related to food such as *eating*. In this way, experiences associated with thinking are understood through a further relation to the physical act of eating, suggesting that some ideas must be pondered, even "digested" before they can be understood. Important to the theoretical discussion at hand, conceptual metaphors are not only found in spoken language; instead, because they are image-based and figurative, conceptual metaphors are as readily reflected in materials as they are in ideas (Ortman 2000).

For the purposes of informing historical anthropology, there are several important takeaways. First, metaphorical thinking is a hardwired function of the human brain—we should acknowledge this as one of the universals that Lévi-Strauss sought through structural analysis. Second, conceptual metaphorical thinking is key to understanding more of what happens during encounters. The encounter is processed metaphorically, meaning that already held structures are used as source material to map new targets, or any dissonance that arises from an encounter. Importantly, conceptual metaphors support the relationship between schemas and resources that Sewell proposed, but even more so, they provide a valuable avenue for archaeological investigations. Indeed, the implication here is that new resources or materials will be mapped using conceptual metaphors, rendering the new and seemingly inchoate resource familiar by mapping it using a familiar resource.

*Mirror Neurons*

In the late 1990s, Giacomo Rizzollati and his colleagues published the groundbreaking results from a series of tests they had conducted, in which they mapped the neurological activities of macaque monkeys (Rizzollati and Craighero 2004). What they discovered have come to be called mirror neurons, or a series of neurons that fire when an action is observed, producing a sympathetic, reflexive response that triggers a mental simulation of the action in the observer (Lewis et al. 2000). Unfortunately, there is only indirect evidence, although it is compelling, to suggest that this same neural system is also present in humans. While it is difficult to study singular neurons, various brain imaging techniques have shown similar sympathetic activity within humans. Additionally, this indirect evidence has not prevented at least one leading neuroscientist from positing that the mirror neural system is the basis for human cultural transmission (Ramachandran 2004:38).

Despite the specificities of this system, for our purposes, a mirror neural system in humans has important implications for how we conceptualize learning. To begin with, it supports the belief long present in anthropology and archaeology that there are at least two forms of learning, one that is communicated through practice (non-discursive) and another that can be communicated through verbal language (discursive) (Knight 1980; Leroi-Gourhan 1943). Importantly, it also stresses that these two avenues of learning can be completely independent of one another—it is possible to learn a new skill or movement simply by watching, even if the teacher and student do not speak the same language. In fact, some knowledge may best be transmitted non-discursively, particularly knowledge that is almost entirely rooted in practice and performance.

*Cultural Consonance and Cultural Consensus*

Finally, cultural consensus theory is based on the premise that culture is purely ideational, encoded in schemas and cognitive models, and is differentially disseminated throughout communities (Romney et al. 1986). Individuals are deemed more or less culturally competent in relation to one another, based on how well they know a particular shared cultural model. Cultural consonance is a measure of the degree to which individuals are able to practice their knowledge of a model (Dressler 2012). While the field of cognitive anthropology does not inherently stress a dialogue between system and practice, there have been several studies that have demonstrated a biocultural relationship between cultural consonance and cultural competence. Individuals with at least modest cultural competence who are inhibited from acting on their knowledge may suffer from symptoms of chronic stress, such as high blood pressure, higher body mass, lower immune function, or lower subjective well-being (Dressler 2007). Usually, these inhibitions are imposed upon the individual by social forces outside of their control. Thus, participants may know a particular model and want to practice it, but are left without the ability to act upon it. Such inhibitions, then, may stem from a lack of resources, from a marginalized or incongruent history compared to others, or perhaps from a physical limitation.

As such, cultural consonance and cultural consensus may have very real implications for both directionality and conservation. Indeed, they stress that there may be a biocultural feedback between a system and its participants, perhaps explaining why people are not only reticent to change, but some structures may exhibit exceptional longevity over great expanses of time.

### *Application*

Despite their promise, each of these findings have, so far, found no home in historical anthropology or archaeology. Even some of the most general findings, such as the significance of metaphor and practice in learning, have largely been marginalized to post-processual studies of ritual, myth, and religion. The application of such principles in these subjects is tolerated because such realms are perceived to be highly conservative, heavily structured, restricted knowledge with access based on membership, and are usually filled with sensory materials and experiences (Boivin 2008; Kyriakidis 2006). In contrast, more public and everyday realms, such as domestic activities, subsistence strategies, and economic affairs are considered less structured, more nebulous, and far more likely to be stages for agent-based changes. However, neither a historical anthropological nor an eventful analytical lens suggests that there should be any structural difference between esoteric and familiar realms—each are products of the dialogue between structure and practice, where structures are multiple, and transposable, composed of schemas that are intersecting, and resources that are unpredictable and polysemic (Sewell 2005:140-143).

## Historical Anthropology of Cognition

With the help of the above research from cognitive linguistics, neuroscience, and cognitive anthropology it is now possible to develop a historical anthropology of cognition. First, let me begin by redefining the concepts central to historical anthropology and eventful analysis with consideration for the above. Culture, while an essential concept in structural anthropology, is now defined as a misnomer. Following Sewell, what we see as culture, or cultures, are in fact general, overlapping, and largely shared structures. Structures are a product of the dialogue between virtual schemas and actual resources, the composition of both being subject to the way the human mind functions. In fact, schemas, while containing rule-like information, must also be redefined as composed of metaphoric thinking as well, especially conceptual metaphors. Even rule-like information may have metaphoric qualities. Because conceptual metaphors are figurative and image-based, schemas are non-discursively ascribed sensory, often image-based qualities, while resources are understood within their relationship to virtual schemas.

That structures are transposable, generalizable, overlapping, and polysemic derives not only from their metaphoric nature, but also from the interaction between structures and the bodily experience. However, it would be inappropriate to assume that both the body and mind only shape structures; structures, in turn, shape the body and mind. Thus, while metaphorical thinking is certainly a hard-wired facet of the human mind, which metaphors are constructed and which are employed in various encounters is a product of history. Further, various mechanical and sensory functions of the human body are shaped by our experiences. In a sense, all humans are generally capable of the same range of motions and movement, yet through practice and extensive repetition, some people become better at certain activities than others, even to the point that others believe they are incapable of the same movements. Our senses are equally trained by our experiences, indicating that while all humans generally have the same ability to hear, see, taste, smell, and feel the world, our reactions to and our sensitivities to the stimuli that trigger these sensations are constructed by our experiences (Hamilakis 2011; Sutton 2010). Thus, what one person thinks tastes good will not necessarily taste good to someone else. This is how the human body and the mind ultimately construct structures, and thus precede both schemas and resources. It is also how structures construct our mechanical abilities and even our senses, making our lived experience a product of the dialogue between schemas and resources.

It is possible to think of the human body and mind as akin to Sewell's resources—like resources, the body and mind can be categorized as unpredictable in that there are qualities to both that are not structurally, and thus historically, constructed, being instead subject to biology and nature. The body and mind are also polysemic, in that they may have different meanings to different people. However, this conceptualization of the mind and body undermines the omnipresence of our lived experience and thus its impact on the construction of structures. For this reason, it may be most prudent to consider the human body and mind as a third component of structures, thus contributing to the constant dialogue between schemas and resources.

With this new conception of structures in mind, I would now like to redefine both occurrences and events. What Sahlins referred to as the "structure of the conjuncture" or "happenings," or what Sewell referred to as "occurrences," I would like to instead refer to as the interaction of an encounter, or simply "encounters" for short. For Sahlins, encounters were conceptualized as moments of interaction between a person's structural system and either a discordant idea, action, or material, in which the discordance is naturalized by processing the discordance through the virtual, or mental, structural system. Sewell changed the terminology and added resources to the equation, stating that encounters are interpreted through the various structures a person possesses, which are composed of both virtual schemas and actual resources. Neither conception, however, offers any indication of directionality or transformation. Yet, if we discuss encounters as instances of metaphorical thinking and metaphorical incorporation, encounters now have both. Specifically, people map new targets using familiar source material. These metaphoric conceptions are tacit; people do not pick their source material. The mapping source, instead, is a product of perceived similarities between the source and the target. In this way, something new is made familiar. Importantly, like structures, conceptual metaphors are also overlapping—discordances are likely to require more than one metaphoric mapping in order to satisfactorily categorize them. Structures, in this way, are stretched to accommodate not only discordance, but also other structures that now share similar qualities. Thus, every time structures must account for something new, they are not only stretched, but they are also forced to further overlap one another.

Following Sewell, the event still represents moments of radical reorganization of a number of generally shared, overlapping structures, but cultural consensus adds an important element to this process. Structures are generated and thus exist on a number of different scales, from those that operate on the individual scale, between two people, to those that operate on a much larger social scale and may be shared by large numbers of people. However, by definition, events *must* primarily involve those structures that exist on the larger social scale and are widely shared. Through the radical reorganization of these structures, smaller structures will likely also be affected, but it is not possible for events to only include small-scale structures.

Finally, it is important to note that if the event marks a moment of radical reorganization driven by an agent-based action, it is inappropriate to define agency simply as an "emotional" response. Emotion, after all, is not chaotic or spontaneous, but part of the schemas-resource-body/mind dialogue that produce structures. Instead, "moments of agency" may be better conceptualized as moments in which those people involved are each relying on a variety of conceptual metaphors to navigate what has become a structurally untenable situation, engaging in what will almost certainly appear to be erratic behavior to others relying on different metaphors. Societies and cultures give the appearance of being bounded because they are held together by a number of widely-shared structures that are based on conceptual metaphors. We are never without metaphoric thinking or our conceptual metaphors; in less disruptive times, it is simply that most people who share a number of the same structures, being products of a similar history and inculcated through similar experiences, will non-discursively invoke similar structures to reconcile discordance. However, as encounters mount, and thus as more and more structures are stretched and forced to overlap to accommodate discordance, greater variability is introduced. Moments of agency, then, may actually seem quite logical to that person or those who produce the action, but unprecedented to others observing it. However, through this action, one or more new structures may be generated, ones that through their genesis help mend those structures broken through the encounters leading up to the event, but also potentially rendering others obsolete. In both the genesis and the death of structures, time is required to either "instill" or to "forget," giving the appearance that the duration of an event may last generations.

## The Principles of a Historical Anthropology of Cognition

Relying on these new definitions, it is now possible to outline several principles of a historical anthropology of cognition, derived from the relationship between metaphor, practice, and learning (Figure 2.2). First, structures are inherently conservative and, all other factors being equal, will only change incrementally through their encounters. For one, structures are conservative because they exist in various forms, in schemas, resources, and the human body and mind. That they are also overlapping further strengthens this conservation because structures

**FIVE PRINCIPLES OF A HISTORICAL ANTHROPOLOGY OF COGNITION**

1. Structures are inherently conservative and, all other factors being equal, will only change incrementally through encounters.
2. When large-scale, structural change is imminent, people will non-discursively rely on their own structures, which in some instances will give the appearance of agency to observers.
3. Practice-based (non-discursive) knowledge is acquired through observation or practice, and thus differentially than spoken language-based (discursive) knowledge. As such, non-discursive knowledge will not necessarily be disseminated in the same social realms as discursive knowledge.
4. Structures are products of schemas, resources, and the human body and mind, a relationship that many times is expressed through conceptual metaphors, which are both derived from historical circumstances as well as the embodied experience of living.
5. Structural change proceeds metaphorically. In other words, as researchers, when we identify changes in various structures, we are seeing either the results of encounters that are metaphorically driven, or the outcomes of events that again the results of the uncommon use of a particular structure or structures.

Figure 2.2: The five principles of a historical anthropology of cognition.

ultimately reinforce other structures. Additionally, as cognitive anthropology demonstrates, structural conservation also stems from the biocultural relationship between cultural consonance and cultural competence (Dressler 2007).

The second guiding principle for a historical anthropology of cognition is even when large-scale, structural change is imminent, people will non-discursively rely on their own structures, which in some instances will give the appearance of agency to observers.

The third principle of a historical anthropology of cognition is practice-based (non-discursive) knowledge is acquired through observation or practice, and thus differently than spoken language-based (discursive) knowledge. As such, non-discursive knowledge will not necessarily be disseminated in the same social realms as discursive knowledge. In other words, while practice-based knowledge can either be transmitted through observation (through the sympathetic neural response invoked in the observer) or through practice, spoken language-based knowledge is transmitted through spoken communication. The implicit suggestion here is that first, it is possible to disseminate knowledge across linguistic boundaries, but also, that different forms of knowledge are better disseminated in different social settings than others. Some knowledge must be *observed* or *performed* in order to be learned, while some knowledge must be *spoken* in order to be learned. For researchers, it thus becomes important to identify what kind of knowledge is being disseminated or learned, and then what social contexts would best facilitate this process.

The fourth principle of a historical anthropology of cognition stresses the importance of metaphorical thinking: structures are products of schemas, resources, and the human body and mind, a relationship that many times is expressed through conceptual metaphors, which are both derived from historical circumstances as well as the embodied experiences of living. As such, conceptual metaphors may be expressed in all facets of structures, from schemas and resources to the lived human experience. The foundation for this principle is the non-discursive relationship that exists between schemas, resources, and the human body and mind, stressing that conceptual metaphors can also be made manifest in a variety of media. This particular principle has already been successfully demonstrated by Scott Ortman (2000), who explored conceptual metaphors expressed in Tewa pottery and weaving. Ortman demonstrated that underlying these two technologies was the conceptual metaphor *pottery is textile*, expressed through the application of textile designs on pottery (indicating mapping of the source material onto the target), but not vice versa (Ortman 2000:637).

The fifth and final principle of a historical anthropology of cognition builds directly on the fourth: structural change proceeds metaphorically. In other words, as researchers, when we identify changes in various structures, what we are seeing are either the results of encounters, which are metaphorically driven, or the outcomes of events, again the results of the uncommon use of a particular structure or structures. In each case, what appears to be "new" is in fact metaphorically similar to an already held structure or structures, which of course are historic products. In other words, if something truly is foreign and completely unrecognizable to the structures a person holds, then it cannot be understood or incorporated. The unpredictable, polysemic nature of resources as well as the human body and mind ensure that incorporation into a structure or structures does not mean that every quality or attribute of an encounter is completely understood or even accounted for, just that the nature of the interaction is fundamentally metaphoric.

## Applying a Historical Anthropology of Cognition

Throughout the rest of this dissertation, but particularly in the concluding chapter, I intend to demonstrate the utility of a historical anthropology of cognition as articulated here. Good theories do more than just help us understand the data we collect; they also shape our process, crafting expectations for what we *should* find while guiding our methodological choices. Theories, as much as methods, should guide our research pursuits. In this spirit, Chapter 3 begins by picking up on a key question central to understanding the dissemination and adoption of maize throughout the Southeastern United States: how was maize likely prepared by prehistoric populations, and was maize originally disseminated as part of one particular foodway? If so, are there common, general culinary and social practices within this foodway that can be outlined? Before arriving in Chapter 4 to the prehistoric, Mississippian ritual-ceremonial center of Moundville, it is necessary to first address these broader questions by exploring maize-based foodways throughout the historic Native Eastern Woodlands.

# CHAPTER 3:
# THE HOMINY FOODWAY OF THE
# HISTORIC NATIVE EASTERN WOODLANDS

*As long as the Indian can eat and drink* osafki*, he will not go dead.*

–Creek saying (Wright 1958:163).

There is no question that maize was a staple among the indigenous peoples of the Eastern Woodlands. From the chroniclers of Hernando de Soto's entrada to the letters of Jesuit missionaries to the journals of the naturalist William Bartram, the prevalence of maize was noted throughout the region. In addition, explorers and colonists commented on the numerous, diverse ways Natives prepared the plant (e.g., Waugh 1916:235). Dumont de Montigny is often cited to the effect that among the Natchez there were at least 42 different ways of preparing maize, each with a different name (Dumont 1747 [2012]:32-34). From a food studies perspective, this statement is understood to indicate that there were that many unique and varied dishes that could be made with maize. However, from a foodways perspective, we begin to understand that this statement may have another meaning. Instead of 42 wholly separate dishes, this statement more likely indicates that there were 42 dishes stemming from a far smaller number of common, basic foodways that incorporate specific materials, follow similar rules, and hold similar meanings among those who practiced it.

This chapter provides support for the proposal that the hominy *foodway*, not the maize plant per se, was the dietary life-sustaining staple of the historic indigenous groups of the Eastern Woodlands, a geographic region that stretches from the Atlantic to the Mississippi River and up to the Great Lakes region, including the Southeastern United States. Hominy is a dish of boiled maize kernels, either ground or whole, that have been nixtamalized. As Jesuit missionary Father Paul du Poisson noted, "[T]he most ordinary food of this country—almost the only one for many people, and especially for travelers—is *gru* [hominy]" (du Poisson 1727 [1901]:291-293). This sentiment is echoed when Pierre Francois Xavier de Charlevoix referred to *sagamité* (the French term for hominy) as, "the most common food of the Indians" (de Charlevoix 1761 [1901]:122-123). However, while regarded as the principal Native food dish throughout the Eastern Woodlands, even as the primary cuisine, few researchers have referred to the dish as a foodway, missing the important distinction between maize-based versus hominy-based subsistence (Fenton 1978:213-239; Hally 1983:267-295; Hudson 1976; Myers 2006:511-520; Swanton 1946:352). This oversight is perhaps best demonstrated by the Smithsonian Institution publication series *Handbook of North American Indians*, for which both the Southeast and the Northeast editions lack indexical entries for hominy (Fogelson 2004; Trigger 2004).

Instead of acting only as a stand-alone dish, this chapter proposes that the hominy foodway was a practice akin to the tortilla foodway of Mesoamerica, in which the first few steps for making tortillas involve nixtamalizing dried, mature maize kernels, then grinding them. From this base, numerous dishes can be made, leading to a plethora of related but separate foodstuffs, much like the way pastas are the basis for a number of resulting Italian dishes. In the case of the hominy foodway, the result is a collection of dishes stemming from a common, life-sustaining culinary practice that was inseparable from the social and cultural contexts enveloping it, resulting in a surprisingly conservative tradition perpetuated throughout the historic Eastern Woodlands.

This chapter draws exclusively on ethnohistoric and ethnographic accounts of maize production in the Eastern Woodlands, and begins by outlining the practices and materials central to this foodway. Owing to the prevalence and conservation of this foodway throughout the historic Eastern Woodlands, I propose that the hominy foodway, and not maize alone, was disseminated at the beginning of the Mississippian period (approximately A.D. 1000). The second half of the chapter details the sociality that enveloped this foodway. As noted, the study of foodways is highly amenable to structural theories of culture change because unlike studies of food alone, foodways address the social and cultural realms with which they share a dialectic.

## Practices of the Hominy Foodway: Materials and Culinary Steps

While hominy is referenced far less than the maize plant itself within the ethnohistorical record, there are still a sizeable number of references that discuss the steps involved in its preparation as well as the history, tradition, and sociality surrounding the dish (Table 3.1). In addition to providing the basic outline of steps and ingredients of the foodway (discussed below), these references span a considerable geographic and temporal range, encompassing most of the historic Native Eastern Woodlands while expressing an equally impressive amount of consistency. These factors indicate a broadly shared and practiced hominy foodway (Table 3.2).

Table 3.1: Historic terms for hominy in the historic Native Eastern Woodlands.

| Group | Common Names for Hominy and Hominy-Related Dishes | Sample Description | Additional Citations |
|---|---|---|---|
| Algonquin (general) | *rockahominy*<br>*nocake*<br>*ûse˘kutehéme¯n/ uskatahomen* (from which the English *hominy* is derived) | …this is *Indian* Corn soaked, broken in a Mortar, husked, and then boil'd in Water over a gentle Fire, for ten or twelve Hours, to the Confidence of Furmity: The Thin of this is what my Lord *Bacon* called Cream of Maise, and highly commends for an excellent Sort of Nutriment (Beverly, *The History of Virginia*, 150). | Gerard 1905, Pargellis 1959, Strachey 1953 [1612] |
| Catawba | *kusimeyü*<br>*kuspi seratere* | Recipe for Lye Hominy. Husked corn is corn with the skin or shell removed. We put it in ashes and boil it well. The corn skin is good. So we shell the corn, pour it out and eat it (Speck, *Catawba Texts,* 80). | Lawson 1860, Swanton 1918 |
| Cherokee | *conihani*<br>*ganohe•ni* | The women and girls prepared the food as is customary with other nations. The principal dish, "Con-nau-ha-nah,"(a hominy prepared with lye leached from green hardwood ash) made of Corn…(Keys and Kilpatrick 1966:192). | Anonymous 2000 [1941], Walker 1957, Wright 1958 |
| Chickasaw | *pashofa,*<br>*pishofa, picofa*<br>"tomfuller," *tafala* | I have eaten *tom-fulla* (hominy, beat and boiled, a little lye dropped in it, and turned a little sour) with Tishomingo. Tom-fulla was a common diet among the Indians (Barry Hodges in Warren 1904). | Adair 1775, Speck 2004, Wright 1958 |
| Choctaw | *holhponi*<br>*tafala/tanfola/ tafula*<br>*ta$^{n}$fula*<br>*tanlubo* | Most everybody knows how to skin corn and make what we used to call bighead hominy. What people use canned lye to make this hominy, but Mother used lye made from wood ashes. One kind of *Tafulla* was made by placing corn in a mortar, sprinkle water on the corn a little at a time and beat with a pestle lightly, until the husk is off the grains; then take out, put into a riddle basket and shake the husk out; place grains back into mortar, then pound with pestle until grains are broken to desired size…(Christian 1931:163-164). | Adair 1775, Brightman and Wallace 2004, Byington 1915, Foreman 1933, Hudson 1939 |
| Creek & Seminole (Musk-ogee) | *sofki/sofkey*<br>*apaski, oafka* | The common food of the Creek is Indian corn, pounded and boiled, with which they mix a small quantity of strong lees of the ashes of hickory wood. It is boiled until the corn is tender, and the liquor becomes as thick as rich soup. The lees give it a tart taste, and preserve it from souring by the heat of the climate (Schoolcraft 1860:274). | Innes 2004, May 2004, Watson 1950, Wright 1958 |
| Delaware | *nasaump*<br>*pxi•skté•yc*<br>*set•é•yo* | Then there were set upon the floor, in the great hall, two large kettles, and many other vessels filled with *Sappaun*, which is a kind of hasty pudding made of maize or Indian corn, which grows there in abundance (Holm 1834:78). | Ives 1978, Penn 1912 |
| Iroquois | *ganondagan/*<br>*onondagan*<br>*onondäät* | Hominy, Onon'däät. Hominy is prepared from flint corns. For a family of five persons, a quart of corn was thrown in a mortar and moistened with a ladleful (four tablespoons) of water. To make the pounding easier a teaspoonful of white ashes or soda is thrown in also (Parker 1981:73). | Fenton 1953, Morgan and Lloyd 1901, Shimony 1961, Tooker 1970 |
| Natchez | *gru* | The most ordinary food of this country—almost the only one for many people, and especially for travelers—is *gru*. Corn is pounded, in order to remove the outer skin, and then is boiled a long time in water, but the Frenchmen sometimes season it with oil; and this is *gru* (Du Poisson 1901 [1727]:291-293). | Dumont 2012 [1747] |
| Yuchi | *tso'ci*<br>*sofkee* | One of the chief articles of diet was the tso'ci, a kind of corn soup. To make this the grains of corn, when dry, are removed from the cob and pounded in the mortar until they are broken up. These grits and the corn powder are then scooped out of the mortar and boiled in a pot with water. Wood ashes from the fire are usually added to it to give a peculiar flavor much to the native taste (Speck 2004:44). | Speck 1904 [2004] |
| Other Names | *sagamité* (French and Mobilian)<br>*sapean, suppawn* (Dutch)<br>thin drink, hulled corn (English) | …for the women beat in mortars their flinty corn, till all the husks are taken off, which having well sifted and fanned, they boil in large earthen pots; then straining off the thinnest part into a pot, they mix it with cold water, till it is sufficiently liquid for drinking: and when cold, it is both pleasant and very nourishing; and is much liked even by the general strangers (Adair 1775:416). | Carr 1895:178-179, Swanton 1946:353; Will and Hyde 1964 |

| | 1500-1599 AD | 1600-1699 AD | 1700-1799 AD | 1800-1899 AD | 1900-1950 AD | 1950-2000 AD |
|---|---|---|---|---|---|---|
| Northeast, general | | | *Charlevoix 1761* | | | |
| Algonkian groups (Northern and Southern) | *Hariot 2007 [1590]* | *Beverly 1722, Pargellis 1959, Smith 1617, Stratchey 1953 [1612]* | *Beverly 1722* | | | *Speck 1940* |
| Delaware | | | *Brickell 1844* | *Heckewelder 1876, Warren 1912* | *Tantaquid-geon 1942* | |
| Iroquois | | | *Lafitau 1974 [1724]* | | *Speck 1937* | *Fenton 1978, Parker 1968, Shimony 1961* |
| | | | | | | |
| Southeast, general | *Garcilasco de la Vega 1723* | | | *Adair 1775, Brackenridge 1814, Catesby 1754* | | |
| Catawba | | | *Lawson 1860* | *Brickell 1911* | *Speck 1934* | |
| Cherokee | | | *Bartram 1853* | *Keys and Kilpatrick 1966* | *Anonymous 2001 [1941], Mooney 1982* | *Wright 1958* |
| Chickasaw | | | *Catesby 1754* | *Warren 1904* | | *Speck 2004, Wright 1958* |
| Choctaw | | | *Campbell 1959, Romans 2009 (1775), Swanton 1993* | *Campbell 1959* | *Christian 1931, Crossett 1926, Foreman 1933, Hudson 1939* | *Wright 1958* |
| Creek (including Seminole & Yuchi) | | | *Bartram 1853, Romans 2009 (1775)* | *Schoolcraft 1860; Speck 1911, 2004* | *Speck 1911, 2004; Watson 1950* | *Wright 1958* |
| Natchez | | | *Dumont 2012 [1747], du Poisson 1901 [1727], du Pratz 1774* | | | |
| | | | | | | |

Table 3.2: Temporal and geographic distribution of sources by group.

However, before proceeding to outline the basic culinary steps and materials of this foodway, I would first like to discuss nixtamalization, which is the key culinary practice that transforms maize into a life-sustaining staple food. Despite the importance of this practice, nixtamalization, at least colloquially, is poorly understood, and the significance of this process undervalued.

*Chemical Alteration: Nixtamalization*

Nixtamalization (/**nēsh'**tä-mäl-ĭ-zā-shən/) is a word derived from the Nahuatl *nixtamalli*, formed from *nextli* meaning “ashes,” and *tamalli* meaning “unformed corn dough” or “*tamal*.” In modern-day Mexico, *nixtamal* specifically refers to maize foods that have been either by either soaked or boiled in an alkaline solution, while *nixtamalization* refers to the process of alkaline cooking. This culinary practice was first recorded among the Aztecs by Spanish chroniclers such as Bernardino de Sahagún (Coe 1994; Sahagún 1982), but it has much deeper historical roots, and was likely developed at least eight millenia ago in close temporal proximity with the domestication of maize.

Nixtamalized dishes are those that follow procedures that utilize alkaline substrates in order to nutritionally enhance maize kernels, transforming them into a complete dietary staple. In order to increase the nutritional quality of the product, two basic steps must be performed either in succession or combination: first, maize kernels must be exposed to an alkaline solution, and second, they must be boiled (Bressani and Scrimshaw 1958:774-778). The chemistry behind this is twofold: while all variants of maize have kernels that are naturally high in several B vitamins and essential amino acids, including lysine and tryptophan (the latter of which is converted into niacin), these essential compounds are tightly locked within the kernel's endosperm, making them indigestible for non-ruminants such as humans (Katz et al. 1974:765-773). Ricardo Bressani and Nevin Scrimshaw (1958:777) demonstrated that the combination of heat- and alkaline-treatment decreases the solubility of the zein portion of the seed, which is the nutritionally poorest of the maize proteins, while simultaneously increasing the relative release rate through enzymatic action (i.e., digestion) of most of the essential amino acids (Bressani et al. 1958:770-774). The result is an overall improvement in the nutritional quality of nixtamalized maize compared to non-nixtamalized maize.

Nixtamalization, or at the very least the supplementation of a non-nixtamalized maize diet, is essential for populations that rely on maize as a dietary staple (Katz et al. 1974:766; Waterson 1990:1276). At least two diseases are thought to directly relate to the reliance on untreated maize as a dietary staple, kwashiorkor and pellagra. Kwashiorkor, from the Ga language and roughly translated as "the sickness a baby gets when another baby comes along," was first diagnosed during the early half of the twentieth century and develops in children shortly after they are weaned off their mothers. While the etiology of the disease is still unknown, it is no longer thought to be related to a high carbohydrate/low protein diet (Waterson 1990). Though there is some correlation between consuming a high level of non-nixtamalized, non-supplemented maize and kwashiorkor, the nature of this relationship is unknown.

The etiology of pellagra, on the other hand, is far better understood, and so too is the relationship between this disease and untreated maize. Pellagra, an Italian word derived from *pelle,* "skin," and *agra*, "rough," is a chronic wasting disorder brought on by severe niacin deficiency. Although noteworthy for the rough, thickened skin developing late in the course of the disease, pellagra has other severe symptoms, such as chronic diarrhea and dementia; if left untreated, it can be fatal (Chacko 2005:197-212). The disease was first recognized in 1762 in the Asturias region of northern Spain where it had been rampant for nearly 30 years prior. With the extensive exploitation of maize among peasant populations, pellagra was soon diagnosed in other areas of southern Europe, punctuated by a few key outbreaks, such as that of "corn sickness" in late eighteenth-century northern Italy when the staple wheat crop failed and untreated maize became the primary foodstuff. Historical evidence indicates that when maize was first transported to the Old World shortly after Columbus's voyages, it was divorced of the life-sustaining nixtamalized practices of the Aztec as well as other Mesoamerican and even Central American groups (Chacko 2005; Fussell 1999:51). As a result, as maize was diffused throughout Europe, so too were outbreaks of pellagra, eventually leading to pellagra coming full-circle back to the Western Hemisphere in the early twentieth century. While there were still Native groups throughout North America engaging in nixtamalizing practices, many European-descended populations were not. This had catastrophic consequences when, during the Great Depression, numerous populations in the Southeastern United States increased their consumption of untreated, non-supplemented maize, elevating it to a staple food. As a result, pellagra was rampant for nearly 30 years, resulting in over three million documented cases and 100,000 attributed deaths (Chacko 2005; Fussell 1999; Osborn 1988).

As suggested, an alternative to nixtamalization is to complement a maize diet with either one or several other foodstuffs high in protein. While animal protein, such as deer and fish, is also an excellent complementary foodstuff for diets high in non-nixtamalized maize, it is extremely difficult to intensify the exploitation of wild taxa to levels that would adequately nourish large populations. Instead, historically, the most common complementary items have been legumes, especially varieties of the common bean (*Phaseolus vulgaris*). In the New World, some of the earliest observations by European explorers among Native groups in the Eastern Woodlands include those of intercropping maize, beans, and squash, a pairing commonly referred to as the Three Sisters. Additionally, beans were often added to maize dishes in general, and hominy dishes in particular (Anonymous 2000:190-191; Bartram 1853:47-48; Cushman 1899:231; Hudson 1975:307).

While this might suggest that maize was consumed in a largely non-nixtamalized state in the Eastern Woodlands, this is far from conclusive. It is a historical curiosity that despite this biological and historical relationship between beans and maize, they were, in fact, separately disseminated into most parts of the Eastern Woodlands. Archaeological evidence demonstrates that maize was first intensified and elevated to the status of a dietary staple beginning around A.D. 1000 (Riley et al. 1994), while the common bean was not introduced into the region until sometime around A.D. 1300 (Hart and Scarry 1999; Yarnell 1993). Indeed, maize may have, instead, been disseminated into the Eastern Woodlands as part of a nixtamalizing foodway. If so, the most likely candidate foodway would be an ancestor of the historic Native hominy foodway.

### *The Hominy Foodway*

In order to delineate the shared elements of the hominy foodway, I reviewed over one hundred ethnohistoric records from the Eastern Woodlands, spanning from initial European contact (in the case of the Soto entrada [Garcilasco de la Vega 1993]) to well into the late nineteenth century. I also drew, when possible, on ethnographic sources, such as the early twentieth century anthropological research conducted by Frank Speck (1934, 1937, 1940, 2004) and James Mooney (1982), as well as historical Native accounts, such as those published in the *Chronicles of Oklahoma* (made available online by the Oklahoma Historical Society and Oklahoma State University). This extensive geographic and temporal review revealed a surprising amount of uniformity in the hominy foodway, including the prolific practice of a basic set of nixtamalizing steps. The steps and materials of the Native historic hominy foodway can be articulated as follows:

1. Dried flint maize kernels are soaked, usually overnight but for at least several hours, in a solution made from either (a) hardwood ashes, or (b) lye, which is made by leaching water through ash, and is thus chemically the same as a wood ash solution (Figure 3.1). The kernels are ready when their hulls are either noticeably loosened or when the kernels begin to change color, turning either light yellow or white.
2. Next, the kernels are processed by any combination of rinsing, rubbing, and grinding to remove the hulls as well as any excess lye or wood ash through the use of a wooden mortar and pestle, as well as a set of woven baskets (Figure 3.2).
3. After, the kernels are boiled in an earthenware pot, a step that lasts anywhere from one to ten hours.

The resulting product can be eaten hot, at room temperature, or used as the base for other dishes including a kind of nourishing meal (known to the French as *farine froide* and a popular meal eaten on journeys), various porridges, stews, and certain breads. Some of the more common ingredients used in the foodway include hickory nuts, beans, dried fish, bear oil, and other animal fats.

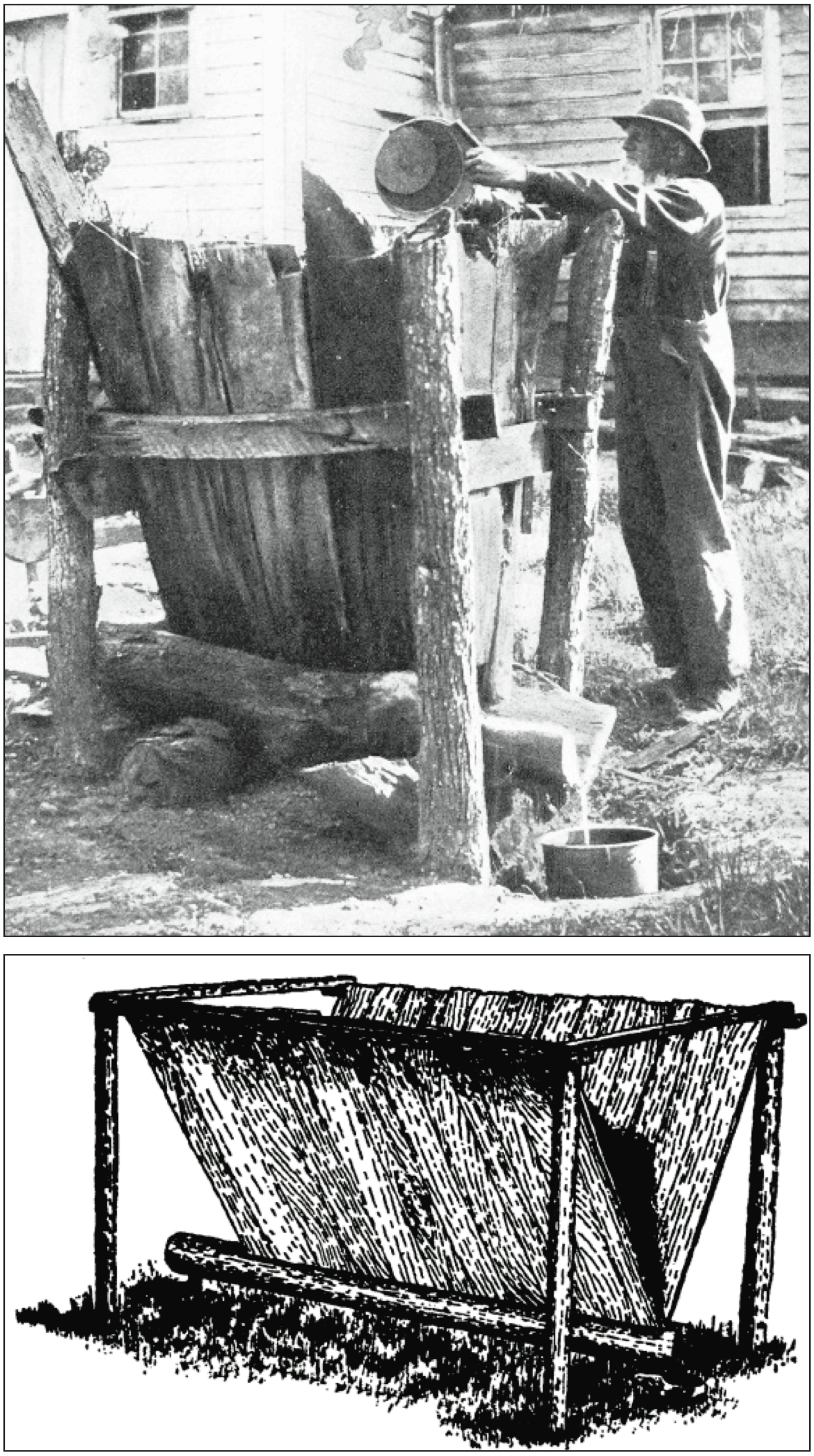

Figure 3.1. One method for making lye was to use an ash lye hopper. Ash was packed into the hopper, then water passed through, with the lye collected at the bottom. Top: historic ash hopper, 1913, Mississippi, taken from Johnson 1913; bottom: sketch of ash hopper taken from Wright 1958.


Figure 3.2. Native women grinding maize using wooden mortars and pestles: top, a group of Seminole women grinding maize in preparation for hominy; bottom, two Koasati women living in Oklahoma preparing maize for sofkey. (Top image is from the American Philosophical Society 2013; bottom image is from Baird 2009.)

As mentioned above, dishes fitting this general description are referenced profusely in ethnohistoric, ethnographic, and historical sources for the Eastern Woodlands. Such references that describe this process include those called a variety of names, including boiled maize, hulled maize, maize porridge, samp, *sagamité*, hominy (and various spellings of the word), and other maize dishes described as boiled with ash or lye but not named (Table 3.1).

Of course, while there are considerable similarities, there are distinct, signature differences that identify various group traditions (Table 3.1). Ethnographic sources indicate that Creeks and Seminoles still make *sofki* by soaking kernels for a day in a solution made from hardwood lye, which is then rinsed and boiled. The Choctaws make *ta*$^{n}$*fula* by following a similar set of steps: soaking dried kernels in an alkaline solution, removing the hulls by gently beating the kernels, and finally boiling the product. The Eastern Cherokees skip the soaking step altogether and boil their kernels in a lye solution for several hours. One way the Iroquois make *onondäät* is by moistening dried kernels with a small amount of water and soda or wood ash, then pounding the kernels until the hulls are easily removed. Among the Yuchis, *tso'ci* is made by first pounding dried maize kernels in a mortar, then boiling them with wood ashes. While it is the variation between each tradition that makes them idiosyncratic and makers of group identity, underlying each are the basic steps of nixtamalization that enable the transformation of maize into a nutritionally complete dietary staple, enveloped within shared aspects of sociality that, together, define the regional foodway.

*Alkaline Solutions and Hardwood Ashes*

Throughout the Eastern Woodlands, there is a surplus of available organic and inorganic material that can be used as a substrate to make an alkaline solution (Benchley 2003:127-128). For one, there are natural limestone deposits and salt brines in many parts of the Eastern Woodlands, both lime and salt being superb alkalizing agents. Ashes, as a general class of material, are also great for alkalizing agents, and plant ashes in particular can be used to make rather strong alkaline solutions. While the ashes of some plants have higher concentrations of potassium and sodium, and thus can be used to make more caustic solutions, the ashes of virtually all plants, from water lilies to shrubs to both hard and soft woods, can be used as alkaline substrates. For this reason, it is surprising that throughout the Eastern Woodlands, there is one particular material class that practitioners prefer as the alkaline agent essential to nixtamalization: hardwood ash, while the most frequently mentioned hardwood ash is hickory (Anonymous 2000:190; Beverley 1722 [2010]:152; Lawson 1860:361; Schoolcraft 1860, 5:274).

While hickory stands out as the common preference, other hardwood species identified much less regularly include locust and poplar, as well as green hardwoods in general (Anonymous 2000:190; Keys and Kilpatrick 1966:192). However, more often than not, unless hickory is singled out, then no particular tree is singled out, and sources simply indicate that hardwood ashes were used (Table 3.3). Not only is it surprising that hardwoods in general but hickory in particular was preferred, but that the most numerous family of hardwoods in the Eastern Woodlands, *Querícus* or oak, is almost never mentioned (Preston and Braham 2002). I found only one reference to *Querícus* ashes used to cook hominy, recorded among the eighteenth century Choctaw:

Table 3.3: Steps, ingredients, and sociality of the hominy foodway indicated by sources used in this research.

| | Lye | Hardwood Ash | Extended Boiling | Soaking | Flint Maize | Health Sociality | Green Corn Ceremony |
|---|---|---|---|---|---|---|---|
| Algonquin (Northern and Southern) | *Beverly 1722:155* | *Beverly 1722:152; Hariot 2007 [1590]* | *Beverly 1722:150; Strachey 1953 [1612]:73* | *Smith 1612:17* | | | *Beverly 1722:34; Speck 1940; Witthoft 1949* |
| Catawba | *Speck 1934:80* | *Brickell 1911, Lawson 1860, Swanton 1918* | *Speck 1934:80* | | | | |
| Cherokee | *Walker 1957:202; Key and Kilpatrick 1966:192; Mooney 1982:610* | *Anonymous 2000 (1941); Walker 1957:202; Key and Kilpatrick 1966:192* | *Anonymous 2000 (1941): 190; Walker 1957* | *Anonymous 2000 (1941):190* | | *Bartram 1853:43; Mooney 1982:610* | *Bartram 1853:74; Mooney 1982:146; Schoolcraft 1860:531* |
| Chickasaw | *Adair 1775:116; Warren 1904* | | *Warren 1904* | | *Adair 1775:416* | *Schoolcraft 1883; Swanton 1938:86* | *Adair 1775:105; Brightman and Wallace 2004:490* |
| Choctaw | *Christian 1931:163-164; Foreman 1933:309-310* | *Christian 1931:163; Hudson 1939:333; Swanton 1993:38* | *Campbell 1959:17* | *Swanton 1946:353-354* | *Hudson 1939* | *Swanton 1946:353-354; 1993:38* | *Mooney 1982; Swanton 1931:21* |
| Creek (includes Seminole and Yuchi) | *Schoolcraft 1860:274; Watson 1950:99* | *Cory 1896:18; Schoolcraft 1860:274* | *Schoolcraft 1860:274* | *Speck 2004:44; Wright 1958:163* | *Speck 2004:44; Walker 2004:375; Wright 1958:163* | *Bartram 1853:43; Romans 1775:92; Witthoft 1949:57* | *Gatschet 1884:73; Schoolcraft 1860; Speck 2004; Witthoft 1949:57* |
| Delaware | | *Penn 1912:232; Tantaquid-geon 1942:49* | *Penn 1912:232; Tantaquid-geon 1942:49; Williams 1643:34* | | *Bierhorst 1995 :92* | *Brickell 1884:49; Speck 1937; Tantaquid-geon 1942:49* | *Brickell 1884:49; Heckwelder 1876:208-214; Speck 1937* |
| Iroquois | *Parker 1968:30* | *Morgan and Lloyd 1901:28; Parker 1968:73* | *Morgan and Lloyd 1901:28* | *Tooker 1970:37* | *Heidenreich 1971; Parker 1981:73; Waugh 1916:82* | *Fenton 1953:30, 1978:301; Morgan and Lloyd 1901:247* | *Fenton 1953; Parker 1981; Shimony 1961* |
| Natchez | *Dumont 2012 [1747]:382-383* | | *Du Poisson 1901 [1718]:290* | *Dumont 2012 [1747]:382* | *Du Pratz 1774:224* | *Du Pratz 1774:12-13, 227* | *Swanton 1911:110; 1922:315* |
| Southeast, general | | | | | *Swanton 1946:296; Wright 1958:158* | *Walker 1957:203* | *Witthoft 1949* |

> When this stew is almost done they throw into it the finest of the corn which they have reserved for thickening, and by way of seasoning they have a pot hung aloft in which are the ashes of corn silk, beanpods, or finally oak ashes, and having thrown water upon this they take the lye collected in a vessel underneath, and with it season their stew, which is called *sagamite*. This serves as their principal food…(Swanton 1993:38; Usner 1992).

Despite this conspicuous absence as a nixtamalizing substrate, oak does play a role in several twentieth-century practices, serving as the preferred wood to make the large wooden mortar used to grind maize, with hickory used to make the pestle (Shimony 1961:146; Wright 1958:156).

In addition to the natural alkaline mediums available, baking soda, or sodium bicarbonate, is also a viable substrate and was introduced to the Eastern Woodlands as a modern alternative for using wood ash and lye (Fussell 1999:50). However, by the time baking soda was widely available to Native practitioners, it was only sparingly used in the hominy foodway. Soda was and is more commonly used when cooking corn meal or corn flour (Anonymous 2000:163-164, 166). Likely, soda was first incorporated by many as part of the more specific flour or cornbread foodway, functioning not only as an alkaline substrate, but also as a leavening agent (McGee 2004). It appears never to have gained a strong hold in the hominy foodway with many groups prior to the twentieth century, opting instead to use ash.

The cornbread foodway is likely a descendent of the hominy foodway, indicated by the fact that traditions for making cornbread tend to specify a similar set of preparatory nixtamalizing steps early in the process. However, despite this shared practice, these two foodways also have distinct culinary differences. Not only is the historic Native cornbread traditionally made from a separate variant of maize (a flour variant), but additionally practitioners consistently ground the maize kernels to a much finer texture. Though cornbreads were sometimes boiled (Tooker 1970:36), more frequently, they were baked in warm hearth basins, the dough either wrapped or placed directly in the ashes (Beverley 2010 [1722]:151-152; Heckewelder 1876:235; Holm 1834:121; Parker 1968:31; Romans 2009 [1775]:92).

In addition to culinary differences, the sociality of cornbread is different from that of hominy, the latter strongly associated with general ideas of health, hospitality, and the prolific Green Corn ceremonies. (This is discussed at length below).

### *Extended Boiling and Soaking*

While wood ash or lye alkaline solutions are essential to nixtamalization, heat-treatment is an equally critical element. Thus, while it is possible to combine alkaline treatment and boiling, it is not possible to skip boiling altogether or precede alkaline treatment with boiling and still achieve the same nutritional benefit. Many traditions separate these two steps: kernels are first soaked in lye, rinsed, then boiled (Table 3.3). Though heat is needed to nutritionally enhance kernels, alone, soaking in an alkaline solution *only* facilitates hull removal. Soaking tends to last anywhere from a couple of hours to overnight, even longer. In most accounts, soaking tends toward the side of longer periods.

Similarly, boiling accounts are highly variable, and indicate this step could last anywhere from an hour to upwards of twelve, although these longer periods are usually intermixed with prolonged periods of simmering. One of the factors that affected the period of boiling time is the type of vessel: when an earthenware pot was used, more time was needed, but when an iron kettle was used, far less time was employed since iron kettles conduct heat better than earthenwares (Campbell 1959; Crossett 1926:106). With an earthenware pot, cooking time would last anywhere from two to twelve hours, with most cases falling on the longer side of that continuum. Using an iron kettle cuts boiling time down to an hour or two, maybe less, although overall cooking time may still be considerable. As noted, while not as frequent as the separation of these two steps, several groups combined both alkaline treatment and boiling. This combination typically reduced total cooking time to one to two hours (Anonymous 2000:190; Wright 1958:162). In many cases, this expedited cooking time was also partially achieved thanks to the aid of an iron kettle (Parker 1968:31).

Ricardo Bressani and Nevin Scrimshaw (1958) indicate that in order to achieve a nixtamalized product, maize need only boil for upwards of half an hour. Accounts indicate, however, that one of the primary goals of boiling and soaking was to make the product "eatable" (Will and Hyde 1964:149-151), a condition met when kernel texture had changed, having softened (James 1823:303). Thus, kernels were soaked or boiled until, first, the hulls could easily be removed, and second, until the kernels were soft and the porridge had set. One twentieth century Oklahoma Choctaw account indicates that, "This slow boiling continued from twelve to eighteen hours, or until all the grains of corn were swollen, turned inside out, and quite soft. By this time the *tan fula* [sic] had acquired the consistency of a 'thick soup'" (Campbell 1959:17).

*Tools of the Trade: Fanners, Trays, and Sieves*

In addition to an earthenware pot, alkaline-soaked maize kernels were ground using a wooden mortar and pestle, frequently referred to as the hominy block (Figure 3.2). Kernels were pounded for several minutes, then placed in a woven fanner. Fanners are winnowing tools made from woven river cane and designed to help remove loosened hulls by separating the hulls from the kernels. Based on the design, this is accomplished by gently tossing the grain until the hulls

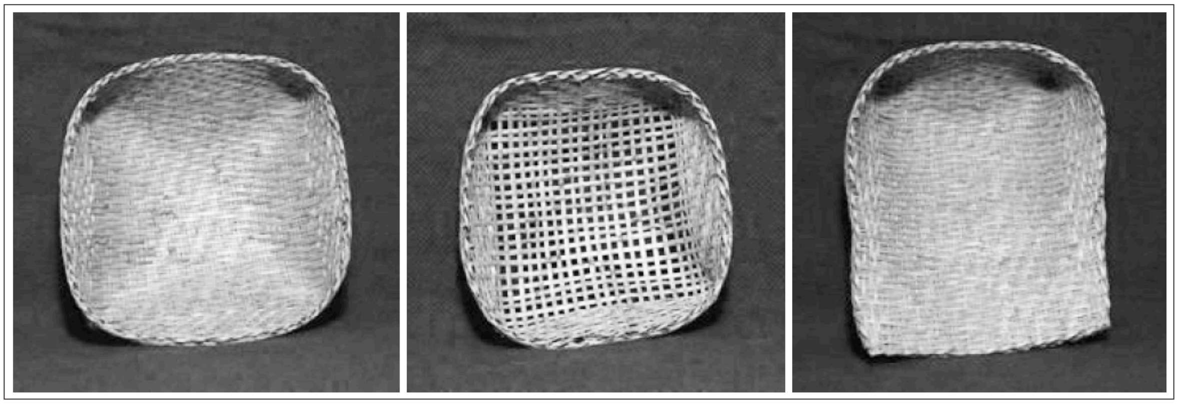

Figure 3.3. A set of twentieth century Choctaw "Tom Fuller" baskets: left, a shallow basket; center, a sieve or sifter; and right, a winnowing basket or fanner. (Images from Jordan 2004.)

rise to the top of the fanner and the grain settles in the bottom (Figure 3.3). After winnowing, the grain was placed in a woven sieve with a much wider weft to separate the grain based on size, with the smaller pieces collected in a shallow woven container or tray while the larger pieces were reserved for either further grinding or even for a separate culinary task. Among those historic Choctaws relocated to Oklahoma in the nineteenth century, these three woven tools were sometimes collectively referred as "Tom Fuller," after the anglicized name for *ta$^{n}$fula* (Edwards 1932).

While many practices and materials of the hominy foodway demonstrate great resistance to change during the historic period, the design of historic period fanners bears a striking resemblance to those produced by indigenous groups in West Africa (Figure 3.4). The important dialogue between historic Native and African foodways is well documented in the culinary traditions of both Creole (Usner 1992) and Soul food (Hudson 1976:498-499). While basketry is poorly preserved in the archaeological record, Horton (2010:470) proposed that two forms of

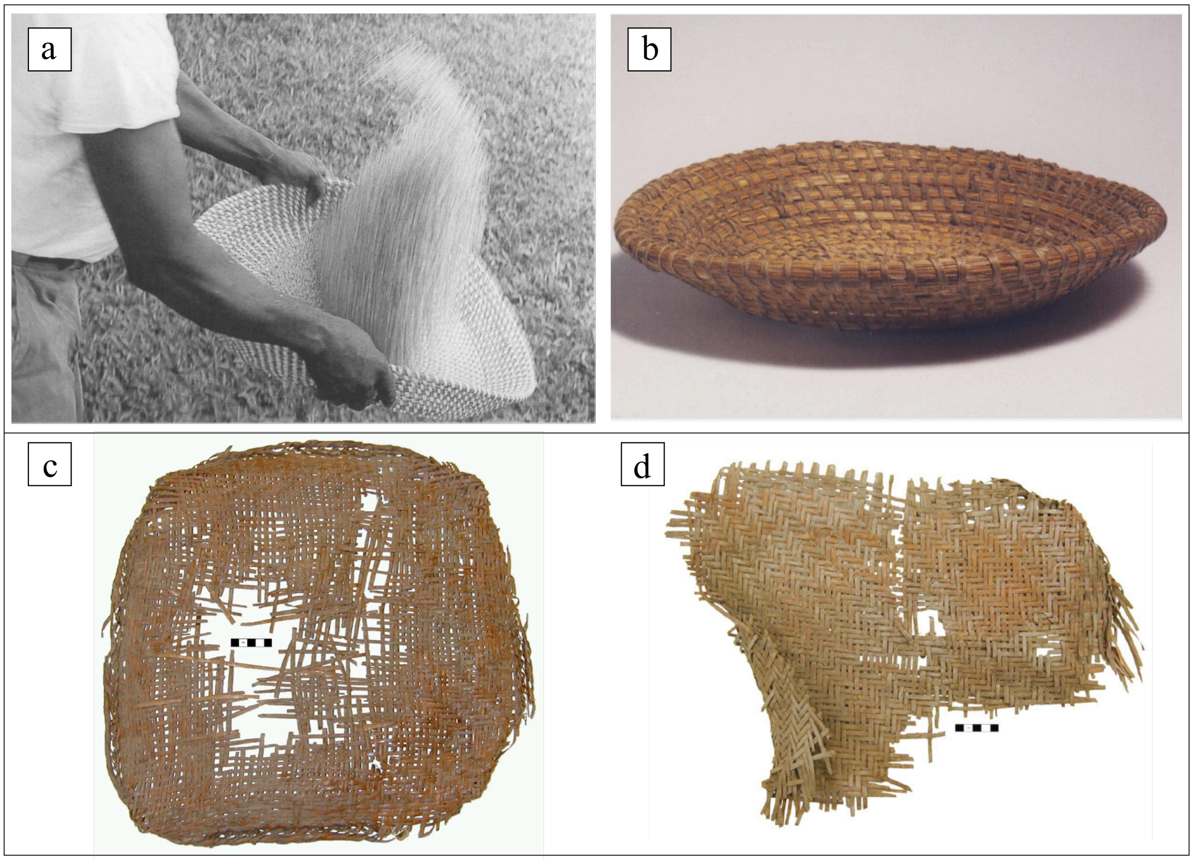


Figure 3.4. Winnowing baskets: (a), cane basket in West African tradition being used to winnow rice (taken in Mount Pleasant, South Carolina in 1974); (b), Santee River winnowing basket from 1890 woven from white oak; (c), low-walled woven cane tray (subclass IB2) recovered from the Ozark Plateau and dating IB2; (d), another subclass (IB3) of low-walled cane tray recovered from the Ozark Plateau region. Horton (2010) proposed that both IB2 and IB3 trays might have been used to help winnow or sift maize. (Images on the top row taken from Schlidkrout et al. 2009:48; bottom images taken from Horton 2010:220, 226.)

low-walled woven cane trays (IB2 and IB3) identified from archaeological collections from the Ozarks region may have been used in processing maize during the Early Mississippian period (Figure 3.3). The weave of these baskets may have helped separate the hulls from thegrain by creating a frictional surface that works in tandem with the motion employed in winnowing. Not only does the overall design of these trays differ from Native historic fanners, but the weave is also strikingly different. This suggests that during the historic period, Native practitioners incorporated West African basketry techniques and even forms into their own traditions.

### *A Fundamental Ingredient: Flinty Maize*

Generally, there are five recognized maize variants: sweet, flour, dent, pop, and flint, each having characteristics that make them more or less suitable for particular cuisines. Of the five, pops and flints, while separate variants, share many of the same characteristics—they have the toughest mature kernels and also the highest relative protein content (Coe 1994:14; McGee 2004). While poorly known today by most maize eaters, both historically and prehistorically, these variants were intensively used for food, undoubtedly thanks to their high protein content (Staller et al. 2006).

As Francis King proposed, among many Native groups, flints were the preferred variant for making hominy (Table 3.3) (King 1994). There are several sources where this connection is unequivocally made. For example, James Adair goes as far as to call flint *hominy corn* (1775:407), while Anne Shimony indicates that among the Six Nations, the way to prepare flint-corn soup is to "boil the corn in wood ashes and water until the hulls come off" (Shimony 1961:146). Among eighteenth-century groups in the Lower Mississippi Valley, du Pratz describes two varieties of maize grown: "Flour-maiz, which is white, with a flat and shriveled surface, and is the softest of all the kinds; Homony corn, which is round, hard, and shining; of this there are four sorts, the white, the yellow, the red, and the blue" (du Pratz 1774 [1975]:226).

The longstanding cultural preference for flint maize in the hominy foodway is at least partly related to observations King made regarding the differences in kernel quality and texture after being nixtamalized, during which flour maize "tends to become soft and mushy," whereas flints remain firmer (1994:38). Pops, like flints, also remain firm after being nixtamalized (Boutard 2012:53-60), yet are never explicitly referenced in historic sources for the Eastern Woodlands. Soaking flint kernels in an alkaline solution not only facilitates the removal of their hulls, but the final boiled product maintains a surprising amount of body. It is possible that nixtamalization was historically amalgamated to flinty variants in the Eastern Woodlands, and was thus disseminated in tandem beginning in the Early Mississippian period of late prehistory as part of a cohesive ancestral hominy foodway (Briggs 2014).

## Practices of the Hominy Foodway: Domesticity, Taste, and Ceremonialism

While the culinary steps facilitating nixtamalization are critical elements, divorcing the practice from the rest of the foodway highlights it as the *a priori* purpose behind its perpetuation. The intent of this chapter, however, is not to simply to highlight how the hominy foodway produced a biologically, life-sustaining food product, but also how the sociality of the foodway created a second and equally important *social*-sustaining quality. Because of the deep connection food has with group identity, foodways are some of the most persistent social aspects of systems that have experienced upheaval from migration, warfare, diasporas, or contact with a new structural system (Atalay and Hastorf 1984). With European contact and subsequent colonization of Eastern North America, indigenous groups not only underwent dramatic population losses related to disease and warfare, but many also relocated, coalescing with other groups either to ensure strength in numbers or to increase access to new European trade items. With contact also came a number of new plants and cooking technologies, including the watermelon, the peach, rice, and the iron kettle (Ethridge 2010; Hudson 1976; Smith 2002).

However, despite the potential for change, as late as the twentieth century, many Native practitioners still followed the traditional guidelines for the hominy foodway outlined here (Anonymous 2000; Hudson 1939:333-335; Parker 1968; Wright 1958). Technological innovations like the iron kettle were only slowly incorporated into the foodway, while the overall exploitation of maize itself only slightly waned with the introduction of European domesticates like wheat and rice (Fairbanks 1962; Wright 1958). The ways in which the foodway changed, instead, was through incorporation: those plants and animals that could be mapped onto already held cultural categories of food were folded into dishes built on the hominy foodway. Pork, for example, became a popular addition to soups, stews, and porridges partially as a replacement for bear and other endemic animal oils. As discussed, on the other hand, commercial baking soda was dismissed as an appropriate alkaline agent for decades after its introduction, despite the fact that baking soda is a viable, less bitter substitute for wood ash and lye.

Explaining this conservatism, and indeed the importance of the hominy foodway in the Native historic Eastern Woodlands, as a sole product of nixtamalization misses an important point: the hominy foodway was part of a widely held structural system of Native foodways. As such, hominy foodway can also be conceptualized as a particular structure, one that was widely shared and practiced throughout the Native historic Eastern Woodlands, that encompassed a number of shared schema, resources, and cognitive experiences. Indeed, we have already seen some of the conceptual metaphors that relate to this structural system of foods. The incorporation of pork, for example, as either a replacement or supplement for bear meat and fat gives us the following: *pork is bear*. This is not to say that pigs and bears were thought of in similar terms, but in their culinary application, this new food, *pork*, was understood as having many of the same applications as the more familiar *bear*. Iron kettles and baking soda, on the other hand, were not understood as viable replacements for earthenware pots and woodash, respectively. While they may, from a purely materialist perspective, seem like viable substitutes for both, they clearly lacked other culturally and socially valuable attributes that both earthenware pots and woodash both held. Thus, understanding the conservatism of the hominy foodway requires understanding the social and cultural meanings that were also amalgamated to the practice, and those that were thus fulfilled and even generated by the daily practice of this foodway. Just as sociality was imposed *on* the foodway, specific elements *of* the foodway, on the other hand, shaped the social lives of the people who practiced it.

*Health and Hospitality*

Much broader than the biological enhancement of maize kernels, lye and ash appear to have cultural connotations with the idea of health, and were even used in various medicinal roles. There are several references to the use of beanstalk ash in maize dishes, usually not as a nixtamalizing agent (du Pratz 1774:227; Wright 1958:166). In these accounts, beanstalk ash is added in the final preparatory stages, indicating that it is used more for seasoning than an active, chemically altering ingredient. According to William Bartram, the Creek and the Cherokee had a very specific reason for adding these ashes to their dishes:

> But (besides their well-known remedy, *spigelia anthelmintica*), to prevent the troublesome and fatal effects of this disease [whooping cough], they use a strong *lixivium* prepared from ashes of bean-stalks and other vegetables, in all their food prepared from corn (*zea*), which otherwise, they say, breeds worms in their stomachs (Bartram 1853:43).

While this addition may in fact have a preventative, even curative effect for a person plagued with worms, the relationship between ashes and maize dishes explicitly made here indicates a general conception that adding ashes to food made it healthier (Tantaquidgeon 1942:47). The specific association between maize and worms is also echoed by James Adair, who noted that before the *busk*, Creeks were charged not to eat any "unsanctified, or impure food, otherwise they will get full of worms, and be devoured by famine and disease" (Adair 1775:166; see also Witthoft 1946:45).

The association between maize, ash, and health is also apparent in the sociality of the hominy foodway, specifically to the status of hominy as a sick food:

> When the natives are sick they eat no fish and very little meat, and they even abstain from that entirely if the nature of the malady demands it. Then they take only hominy or meal cooked in meat broth. If the sick person is worse they have a small quantity of coarse meal cooked in the same rich broth, and give of this broth [itself] only to one who is doing well (du Pratz 1774:12-13).

The only biomedical function associated with hominy in this sense would be as an easy to digest, high-energy food. More likely, the significance of hominy in this context is to provide comfort (e.g., Locher et al. 2005). As the dietary staple of the Native Eastern Woodlands, hominy would have been one of the first consumed and also the most prevalent foodways throughout the lives of most Natives. As such, the dish likely developed a strong association with both childhood and the idea of home (Bartram 1791:454).

While we can see the use of hominy as a comfort food on the individual level, we also see it on a social level as well in the Pishofa Ceremony practiced by the Chickasaw and Choctaw. While pishofa (hominy prepared with meat) is not used as a food to nourish a patient (instead, the patient must follow a strict set of food and lifestyle prescriptions), it is the primary dish prepared and eaten by the attending doctor, friends, and family who maintain a multi-day vigil to provide rally and support for the patient (Swanton 2006 [1938]:86).

Perhaps because of its strong associations with the home, or perhaps simply because it was such a prolific dish, hominy was also broadly recognized as a hospitality food, one served to any and all visitors. Romans (1957:203) notes that when a stranger arrived among the Creek, he was quickly offered the pipe, "while the good women are employed to prepare a dish of venison and homany." This association was and still is so entrenched among the Northern Iroquois that the iron kettle used by women to make hominy beginning in the twentieth century is generally viewed among the community as a sign and symbol of hospitality (Fenton 1978:301).

*A Taste for Ash and Lye*

A common observation made by Europeans was that Natives frequently salted their dishes with wood ash or lye. However, rarely were observers actually witnessing the addition of salt (Bigot 1791 [1901]:307; Brickell 1844:410; du Pratz 1774:12-13; Walker 1957:202). For example, James Adair noted that domestic salt was made from "a saltish kind of grass, one that grows on rocks," which was also used to make lye (Adair 1775:116). John Lawson stated, "The Salts that the Indians in these parts make use of in their Meat, Bread, and Soup, to give them a grateful relish are Alkalies, viz, Ashes made of the Wood of Hickery and calcin'd Bones of Deers and other Animals" (Lawson 1960:361).

These observations represent the common interpretation that Natives were adding substances to their dishes in order, first and foremost, to make them taste saltier (Catesby 1754:173-174; Chauchetière 1901; Hariot 2007 [1590]:39-40; Mooney 1982:610). However, as James Mooney stated, "Lye enters into almost all the food preparations of the Cherokees, the alkaline potash taking the place of salt, which is seldom used among them, having been introduced by the whites" (1982:610). Thus, while adding wood ash to a dish may make it a little saltier, even more so it will make it more bitter. While many of these observers consider adding ash a means of salting a dish, it seems more likely that ash and lye were added as condiments to make the dish "much to the native taste" (Speck 2004:44).

As already mentioned, perceptions of food are largely social products, a process that in turn culturally constructs taste (Bourdieu 1984). While Europeans and Euro-Americans favored salty dishes, Natives in the Eastern Woodlands demonstrated a distinct proclivity for bitter and sour dishes. Though some observers grew accustomed to the taste, the common sentiment is that adding ash was distasteful. One Jesuit missionary considered the addition of ashes to *sagamité* as a way Natives engaged in ceremonial penance:

> These fasting women toiled strenuously all day—in summer, working in the fields; in winter, cutting wood. These austerities were almost continual. They mingled ashes in their portion of Sagamite; they put glowing coals between their toes, where the fire burned a hole in the flesh…(Chauchetière 1901:218-219).

Regardless of whether the hominy foodway added to or established a taste for bitter foods in the broader realm of Eastern Woodland Native foodways, it is clear that the pervasiveness of ash and lye in this indigenous cuisine perpetuated a distinct taste for bitterness, one that in turn contributed to the conservatism of the hominy foodway as well as other foodways built on this taste profile.

### *Green Corn Ceremonialism and World Renewal*

While the acts of sociality described above were practices engaged in or experienced daily, if not weekly, both ash and maize also play key roles in annual renewal ceremonies, including the widely celebrated Green Corn ceremonies of the Eastern Woodlands (Swanton

1946; Witthoft 1949:5). These are first foods observances celebrated when the first crop of maize begins to ripen (generally sometime between July and September). Researchers have identified some variations in the ceremony; among the Iroquois, for example, the Green Corn Ceremony is a solemn event centered on giving thanks, while among Creeks, Cherokees, and Delawares, the ceremony focuses more on celebration and world renewal (Witthoft 1949). In all groups, however, the ceremony is a community-wide event, occupying multiple days during which that year's maize crop is used to support a number of ritual observances, events, and feasts. Among the foods and drinks connected with this ceremony are the famous black drink (a tea made from the plant *Ilex vomitoria*), roasted maize ears (which were only prepared before maize had fully ripened and was in its milk stage), and hominy (May 2004:410; Schoolcraft 1860:268; Speck 1937).

To highlight one particular tradition among this widespread practice, Benjamin Hawkins (1848 [1971]:75-77) noted that during the Creek *busk* held in the town of Kasihta in the 1790s, on the first, second, and eighth days, men would rub ashes from the new fire over their chins, necks, and abdomens, then head to the river. Ceremonial ash was specific, and only certain classes of ash were used during the busk. Hawkins notes that on the first and eight days, the ash comes from the new fires started at the beginning of the ceremony, while on the last day, ash is prepared from old maize cobs and pine cones (1848 [1971]:77). Maize-ash ceremonialism is further echoed in the Creek rite of passage into adulthood during which only "boiled grits" are eaten, and near the end of the ritual, the initiate covers himself with maize cob ash (Hawkins 1848 [1971]:79).

Not only was specific ash used during the busk, but at its annual conclusion, all ash generated during the ceremony was curated in a small corner of the town's square grounds, a collection that was carefully added to each year (Witthoft 1949:64). Ash curation dates back at least to the late prehistoric Mississippian period, during which it was an important material class in the world renewal ceremonies underpinning the construction and maintenance of earthen platform mounds (Coe 1995:17; Knight 1986:680-681).

Perhaps wittingly, world renewal is also a central theme in the broadly shared Eastern Woodland maize origin oral traditions. Maize is a gift given to humans to keep them from starving, transformed from the body of the Corn Mother (Urban and Jackson 2004:710; Witthoft 1949:77). In the traditions of the Iroquois, Narranganset, and Delaware, maize is delivered to humanity from the south by a crow (Curtin and Hewitt 1918:642-648). However, among many Eastern Woodland groups, maize comes from the body of the Corn Mother, who is killed, burned, sometimes banished after her children come to believe that what she feeds them comes from her excrement. She consequently leaves after delivering instructions that they must now grow, care for, and prepare maize themselves (Mooney 1982:244-245; Swanton 1929:230-231). In many versions, hominy is featured as the principal maize dish that Corn Mother made for her children (Swanton 1929).

There are notable deviations from this general outline. The Yuchi, for instance, have an origin story that bears closer resemblance to the Shawnee tradition: maize was discovered one day by a man out in the wilderness who heard a whining voice similar to that of a baby. As he grew closer, he found a small, little stalk of corn behind a bush that asked for his help:

> He gave him instructions what to do
> Clean up and cultivate that…
> Cultivate that corn
> And that little corn said:
>> "I'm here to help your people."
>> "I am going to help you all through your life."
>> "You must remember and never forget."

> "I am going to help a l l o f y o u r people" (Jackson 2004:209-210. Formatting expresses the momentousness of this segment of the story.).

Of interest, the Yuchi also have a second, separate origin story for hominy:

> It is commonly believed, as regards the origin of this favorite dish, that a woman in the mythical ages cut a rent in the sky through which a peculiar liquid flowed which was found to be good to eat. The Sun then explained its preparation and use, from which fact it was called tso'ci, inferably 'sun fluid' (Speck 2004:44).

While the Yuchi are distinctive in having a hominy origin myth, other deviations include having at least two separate maize origin stories corresponding to different maize variants. Among the Seneca, there is one myth in which maize is given to humans by the Corn Mother, while a second details the origin of white corn, first given to the Tuscarora and then passed to the Seneca (Curtin and Hewitt 1918:642-648, 652-653). In this instance, both stories follow the general guidelines Witthoft outlines for Corn Mother stories, making it unclear if they are, in fact, two entirely separate traditions. However, there is a clear separation among the Koasati. In one story, maize is a gift, again, from Corn Mother, while in the second, maize kernels are transformed from the blood of a hunted bear and collected by a young man who has spent several nights camping with two supernatural beings (Swanton 1929:167-168).

### *Women and Hominy*

A common thread running through each of the above elements of sociality is the link between the hominy foodway and female-gendered roles and responsibilities. Part of this relationship is derived from the simple fact that among Native societies in the Eastern Woodlands, women were not only primarily involved in food preparation, but were also the primary caretakers of both agricultural fields as well as household gardens (Scarry and Scarry

2005). While men assisted to varying degrees in clearing fields, numerous accounts indicate that women were the planters, the weeders, the care-takers, and the harvesters of agricultural foods, roles that ran contrary to the English perception of gender division (Smith 1608; see also Rountree and Turner 2002). After harvesting, women then dried and stored maize for food preparation as well as for the next year's crop. Finally, those kernels reserved for consumption were then treated as detailed above, feeding a nearly constantly simmering pot of food found in most native houses, kept warm and plentiful by the women of a household (Rountree and Turner 2002:92-99).

After European contact, maize became even more valuable to Native women in the Eastern Woodlands as food became one of the primary goods for trade with early European explorers and colonists. Several accounts indicate that women were able to directly trade with Europeans by bartering with surplus food materials from their household supplies (Clayton et al. 1993; LeMaster 2012). By doing so, women were not only granted greater individual access to materials, but were also provided a new avenue through which they could provide for their households (LeMaster 2012:129; Usner 1992).

Clearly, the conservatism and perpetuation of the hominy foodway throughout the historic period is closely tied to this intimate relationship between food, identity, and womanhood. Maize and maize products were the primary medium through which women were able to fulfill their social duty to their family and their community. Thus, while warfare and the hunt were essential activities that defined Native manhood, maize agriculture and food preparation were those essential activities that bolstered Native womanhood (Braund 1993; Rountree and Turner 2002:92-105). Among the historic Cherokee of Eastern North Carolina, Sarah Hill notes that the important relationship between women and hominy is even typified at birth, when the sex of newborns is either described as “bows” for males or “sifters” for females, stressing the metaphoric connection between these important activities and conceptions of gender (Hill 1997:49). For the region as a whole, the corn origin stories perhaps best encapsulate this metaphoric relationship between maize and womanhood—through the fruits of her body, Corn Mother is able to provide for and nourish her children until the day they become skeptical and unappreciative of her work. This conception of hominy as life-giving certainly helped perpetuate the various meanings associated with hominy, as healthful, nourishing, and as a comfort food, while establishing and reinforcing several of the defining characteristics of Native womanhood.

### *The Conservatism of the Hominy Foodway*

Having articulated the commonly shared practices, materials, and sociality involved in the Native historic hominy foodway, I would now like to categorize each of these elements using the theoretical framework presented in Chapter 2. If resources are the manifestation of schemas, and thus are either materials or physical forces reflecting ideational elements, then the resources of the hominy foodway would have included the tools of the trade (such as basketry, earthenware pots, and wooden mortars and pestles), maize, hominy, and woodash and lye. This also included the work space where these activities took place (usually near or in the home) as well as the labor (which was overwhelmingly women’s labor) involved in the entire process, such as the time and energy involved in preparing, grinding, soaking, cooking, serving, and even disposing of hominy. The schemas of the foodway would have included the culinary knowledge for preparing and cooking hominy, for distilling woodash lye, and for crafting the tools of the trade, as well as the social rules for who prepares hominy, when hominy is prepared, how it is prepared, and to whom it should be given. As both Sahlins and Sewell pointed out, resources and schemas are in constant dialogue generated by practice. By performing the steps and utilizing the resources of the hominy foodway, practitioners physically engaged with the foodway, an engagement that, for any new practitioner, would have initially involved learning new movements and experiencing new sensations. As these movements and experiences were repeated through everyday repetition, a muscle memory specifically shaped by these tasks was engrained. Importantly, conceptual metaphors were generated through this practice—the hominy foodway became inexorably entangled with conceptions of home and of womanhood, reinforced through the daily practice of this foodway by women and usually within close proximity to or within the home. Resources of the hominy foodway became symbols for larger, more complex ideas, and in this way, *hominy* was used to conceptually map abstract concepts like *home*, *comfort*, and *womanhood*. While there is evidence for these conceptual metaphors strewn throughout the ethnohistoric literature, one of the clearest places that best indicated many of these conceptual metaphors are the widely shared Corn Mother stories—maize is conceptualized as a mother who both nourishes and cares for her children.

I would like to take a moment to stress how the conceptual metaphors attached to the hominy foodway were generated. Unlike the proposal in Chapter 2, these metaphors were not products of the encounter, but instead products of everyday practice. Hominy was certainly introduced and adopted by many of these groups long after the target concepts were established. Hominy, after all, could not have been around before A.D. 1000, while womanhood, home, and comfort were certainly not alien concepts to the groups of the Eastern Woodlands prior to A.D. 1000. Likely, prior to hominy being used as the target, there were others, perhaps even a single other target, that through its daily practice was instead used as the target for understanding these abstract concepts.

Further, based on the above discussion, we see that through the practice of eating hominy, the bitterness that characterized the taste profile for the Native historic Eastern Woodlands was perpetually reinforced. Taste as a constructed sense, then, becomes an important schema, one generated through the dialogue between the resources and practices of the hominy foodway. Like the conceptual metaphors associated with the hominy foodway, it is unlikely that hominy preceded a taste for bitterness; instead, the historical genesis of this proclivity likely preceded hominy, facilitating its adoption.

This is not to say that the practice of the hominy foodway did not have generative qualities. In fact, one domain in which we do see this is in the association between hominy and hospitality. Because the practices of the hominy foodway were centered in or around the home and performed on a daily basis, hominy could be used not only to nourish women and their families, but also to nourish strangers. While, again, this association with hospitality may have been entrenched before the arrival of Europeans, this particular association unequivocally grew in importance during the historic period when hospitality offered a powerful avenue through which Native women could gain access to European colonists and materials. In this way, hominy also developed an economic importance, one that provided a new avenue through which Native women could provide for both themselves and their families through access to colonists and wares through trade.

Presenting the hominy foodway in these terms is perhaps most helpful because it provides an explanation for the extensive and expansive conservatism of the foodway seen throughout the historic Native Eastern Woodlands. By definition, structures are overlapping and polysemic, making it imprudent to try and isolate any particular structure; indeed, the various aspects of sociality enveloped in the hominy foodway readily make this point. Yet, just how many meanings were attached to or defined by the foodway, as well as how many facets of Native life were understood through the hominy foodway is extraordinarily impressive. While all structures are transposable, generalizable, polysemic, and overlapping, this does not mean that all structures are equally used to map the world. Clearly, the hominy foodway was extensively used to map various other domains of Native life, both domestic and ritual. Thus, the conservatism of the hominy foodway was likely a result of not only how widely it was shared, but also the degree to which it was entangled in so many other structures that composed the historic Native Eastern Woodland lifeway.

## Hominy, the Staple

In historic times, hominy was the principal nixtamalizing foodway among indigenous groups in the Eastern Woodlands, serving as the dietary staple throughout the region and perpetuated even after the common bean was widely adopted and incorporated. Foodways, unlike foods alone, must be considered not as biological imperatives, but as social imperatives. The discussion of the hominy foodway presented here stresses this point. For example, after dissemination of the bean, there was no longer a biological imperative attached to nixtamalizing maize kernels. Thus, if the primary motive behind alkaline treatment was chemical alteration or even processing, it is unlikely practitioners would have continued to add wood ash or lye to their maize dishes once a suitable complementary foodstuff was available. Instead, as demonstrated, long after the common bean was disseminated, the shared hominy foodway practiced throughout the historic Eastern Woodlands continued to involve a fundamental set of culinary practices that included nixtamalizing steps. This suggests that for practitioners, the health benefits afforded by nixtamalization may have been secondary to other aspects of the hominy foodway, aspects that helped the foodway persevere throughout the historic period.

The source of this perseverance is likely found in the sociality of the foodway. First, it is imprudent to dismiss the conservative emotional attachments granted to the culinary tastes of Native foodways that placed a premium on bitter, sour, and tart items, especially those that included lye and wood ash. In addition, to a greater degree than any other regional foodway, the hominy foodway was extensively used to map various elements of Native life, both domestically and communally, both secularly and ritually. Hominy is not only a comfort food, but also a special occasion dish, not only a hospitality food, but a feasting food, one served to family, to friends, and to strangers alike. The hominy foodway was used to conceptualize a number of abstract but also central domains of Native life, like home and womanhood, and through the practice of the foodway, a number of physical responses, like muscle memory and even taste, were constructed. Owing to the entanglement of the hominy foodway in so many facets of Native life, it becomes clear why the activities and ingredients associated with it were inseparable from the larger cultural and social role the foodway played, contributing to the overall conservatism of the foodway.

With this articulation of the hominy foodway, it is now time to turn attention to the Early Mississippian period, and specifically to the Black Warrior Valley of west-central Alabama. While the research presented here suggests that it was the hominy foodway, and not maize alone, that was disseminated at the beginning of the Early Mississippian period, demonstrating this proposition requires corroborating the articulation presented here using archaeological data.

Chapters 4 and 5 outline the previous research conducted in the Black Warrior Valley between A.D. 1070-1250, placing particular emphasis on those data that can not only be used to identify the resources and practices of the hominy foodway, but also those that can be used to identify the various schemas and conceptual metaphors associated with the foodway, all of which will be critical to understanding why the hominy foodway was adopted as well as how the foodway ultimately facilitated Moundville's ethnogenesis.

# CHAPTER 4:
# IDENTIFYING THE HOMINY FOODWAY IN THE BLACK WARRIOR VALLEY

Based on the discussion of the historic native hominy foodway articulated in the previous chapter, and drawing on the cohesion and widespread dispersal of the foodway, it seems likely that the hominy foodway, and not the maize plant alone, was disseminated during the Early Mississippian period. However, "likely" is not quite good enough. Using those steps, materials, and ideational findings outlined in Chapter 3, here I address the issue of looking for an archaeological signature for hominy within the Southeastern United States, including reasons why certain traditional procedures employed by foodways researchers are inadequate for specifically investigating hominy. While I suggest that there is no definitive, single test that can be employed for this task, I argue that a holistic approach focused on an archaeological subject area, such as the Black Warrior Valley of west-central Alabama, one that has been extensively researched, may provide the material necessary for sufficiently demonstrating the presence of the foodway .

This chapter reviews previous research conducted in the Black Warrior Valley, focusing specifically on ceramic, paleoethnobotanical, and bioarchaeological research. Ultimately, I propose that the data presented indeed indicate that the hominy foodway was present during the Moundville I phase and was likely widely practiced throughout the valley. In the penultimate section, I review the social landscape of the Black Warrior Valley during the Late Woodland and

Early Mississippian periods in order to propose how the adoption of a hominy foodway, and not just the maize plant alone, may change various models that have previously been proposed for the origins of Moundville. Finally, in the concluding section, I suggest that, based on the early timing of both maize and shell-tempered pottery, perhaps there is an additional signature for the hominy foodway that has yet to be demonstrated.

## The Archaeological (In-)Visibility of Hominy

Based on the hominy foodway that was present and widely practiced throughout the historic native Eastern Woodlands, there are several material and perhaps chemical signatures that could be used by archaeologists to identify the hominy foodway. First is, of course, hominy itself. Raw maize kernels are encased in a pericarp, or thin-skinned seed coat, which adheres tightly to the kernel. When preparing hominy, this seed coat is first loosened in an extended alkaline bath, then removed entirely through grinding. This is one way in which hominy as a dish is distinguished from maize. A second distinguishing feature between these two is that hominy is easier for humans to digest than raw maize, a direct result of nixtamalization. Indeed, alkaline cooking not only makes it easier for people to digest maize by softening it, but it also alters the chemistry of the kernels, making nixtamalized kernels different from non-nixtamalized kernels (Bressani and Scrimshaw 1958; Bressani et al. 1958). Finally, the process of soaking maize in an alkaline solution produces another distinct and perhaps idiosyncratic signature: the alkaline substrate used in the process is absorbed by the kernels.

However, despite the ways that maize and hominy differ, few of these distinctions are likely to be preserved in the archaeological record. For the most part, soft, organic materials are poorly preserved in the Southeastern United States; unless they occur in either wet, anaerobic environments, or dry environments such as caves, they are prone to decompose. The majority of identifiable macrobotanical plant remains that are recovered are found almost exclusively as charred matter for which determining the presence or absence of the differentiating features between maize and hominy is virtually impossible. The most commonly recovered maize remains throughout the region are thus charred kernels, cobs, and, though fragmentary, small portions of maize cupules.

There is a small likelihood that visible residues on the interior of cooking pots, on the other hand, may have the potential to be helpful in differentiating hominy from untreated maize. Visible residues can be deposited on the interiors of cooking pots through several different processes, such as fat accumulation (Hart et al. 2009; Heron and Evershed 1993; Reber and Evershed 2004:20). However, not only are visible food residues only sporadically found on ceramics recovered from the Southeastern United States, but they most commonly accumulate through carbonization and, as such, are unlikely helpful for distinguishing between alkaline-treated and untreated-maize.

While visible residues on cooking pots are sporadically recovered in the Southeastern United States, researchers have had far greater success recovering absorbed residues, or microscopic residues that were absorbed into the porous walls of unglazed ceramic pots during their use-lives through cooking related activities (Heron and Evershed 1993; Reber et al. 2015; Reber et al. 2010). Absorbed residues are extracted from the walls of unglazed ceramic containers using strong solvents, then chemically separated using liquid or gas chromatography. Next, analysts search for identifying signatures for various plants, animals, or other foods through the use of a mass spectrometer attached to the chromatography chamber. Unfortunately, at present, absorbed residue analysis is not yet at a stage where it can unequivocally address questions of the presence or absence of maize (Reber et al. 2015; Reber and Evershed 2004), let alone hominy.

For the moment, researchers interested in detecting maize through absorbed residues must rely on stable carbon isotope analysis. Unfortunately, even this costly form of analysis is limited. First, there is no way to detect the difference between hominy and maize using stable carbon isotope analysis, which simply allows researchers to identity the use of C4 photosynthetic pathway plants like maize (Seinfeld et al. 2009). Second, the test itself is somewhat unreliable. As Hart et al. (2007) caution, it should only be used as a presence/absence test for the plant, and not a test for quantity, because modern experiments have demonstrated that the test systematically underrepresents the presence of maize.

In short, looking for hominy itself is not an option. However, what about investigating the materials intimately tied to, and used in, the process of producing hominy? As noted in Chapter 3, there are several tools tied to the hominy foodway: wooden mortars and pestles, lye hoppers, winnowing baskets (or fanners), and of course, earthenware pots. Of these materials, only lye hoppers and woven, winnowing baskets were likely specific to the hominy foodway and not used for other general purposes, such as grinding nutmeats or cooking foods. Lye hoppers in particular may have been single-purpose tools, used solely to produce lye; however, there is no archaeological evidence to date in support of this being an indigenous prehistoric tool, and not an introduced European tool.

Conversely, woven materials, including basketry, were commonly made and used throughout the entire prehistory of the Southeastern United States. In fact, Horton (2010:277-278, 470) noted changes in woven basketry recovered from the Ozarks around the time maize was widely introduced and adopted, suggesting an intriguing material avenue for investigation. However, like other soft, organic materials, basketry is only sporadically preserved in the archaeological record for the Southeastern United States. The materials that Horton analyzed, for example, were recovered from several dry rock shelters in the Ozarks.

Sadly, the two most durable and prevalent materials associated with the hominy foodway are wooden mortars and pestles and earthenware pots, yet there is no evidence that suggests either of these were solely used for the hominy foodway during the historic period, let alone during prehistory. Regardless, wooden mortars and pestles are rarities in the regional archaeological record. One explanation is that once they broke and were no longer adequate for their primary, intended use, they may have been repurposed, perhaps even used as firewood. The remains from earthenware pots, on the other hand, are common throughout the region beginning during the Late Archaic. While the dimensions and materials used to make ceramic pots vary regionally and temporally, the ethnohistoric review conducted in Chapter 3 revealed no indication that some pots were better for making hominy than others. We will return to this question in Chapters 6 and 7.

While these limitations are great, they should not be considered insurmountable; instead, they simply indicate that in order to investigate the prehistoric dissemination of an ancestral hominy foodway during the Early Mississippian period, a question that is central to this research, it is necessary not to look for a single, key signature of the foodway, but instead to adopt a holistic approach, one ideally built on various lines of archaeological evidence that directly relate to foodways and foodways-related activities. To do so requires an extensively excavated and researched archaeological case study with a well-developed ceramic, paleoethnobotanical, and bioarchaeological record of the Early Mississippian presence and its preceding Late Woodland background. In addition, an excellent case study would be one for which enough research has been conducted in order to evaluate some of the social activities and practices that may have been integral to the foodway, such as feasting events. The Black Warrior Valley, and the Mississippian civic-ceremonial center of Moundville, located in west-central Alabama, provides just such an ideal case study. The next section of this chapter is dedicated to outlining the extensive previous research conducted within this area, focusing on the Late Woodland and Early Mississippian periods, and evaluating this research to determine if it is possible to detect the presence of the hominy foodway.

## Detecting the Hominy Foodway at Moundville

For more than a century, archaeologists have worked on Mississippian-era settlement and occupations within the Black Warrior Valley, with the overwhelming bulk of that research focused on the site of Moundville. From the 1930s to 1940s, an extensive excavation of the site took place under the direction of Walter B. Jones and Maurice Goldsmith using labor primarily from the Alabama Natural History Museum, and supplemented by the Civilian Conservation Corps (Walthall et al. 2002:200). These excavations uncovered a number of domestic structures as well as intact cemeteries, the latter of which produced an extensive artifact inventory composed primarily of whole ceramic vessels. The work from this period has served as the foundation for a plethora of Moundville-based research projects (DeJarnette 1952; McKenzie 1964; Peebles 1971, 1974; Peebles and Kus 1977; Powell 2007; Steponaitis 1983; Wimberly 1956; Wilson 2008). Douglas McKenzie used the extensive cultural material generated by these excavations to produce the first formal characterization of the Moundville archaeological phase (McKenzie 1964).

Several decades later, beginning in the 1970s, fieldwork at the site once again picked up when a number of then graduate students at the University of Michigan under the guidance of Christopher Peebles focused their attentions on the Late Woodland and Mississippian period occupations within the Black Warrior Valley. This included Vincas Steponaitis who, as part of his doctoral research, produced a comprehensive ceramic chronology and vessel analysis for the site based on the extensive ceramic collection generated throughout the history of research at Moundville (Steponaitis 1980, 1983). Chronological placement for the series was primarily derived from the results of several excavations conducted by the University of Michigan that focused on the area north of Mound R and south of the conference building (SCB) (Steponaitis 1980, 1983). McKenzie (1964) had already established that Moundville ceramics are overwhelming shell-tempered, and that shell-tempered ceramics fall into two basic temper-size categories: fine (small) or coarse (large). Importantly, these temper-based categories correspond to broader use-based categories: finewares (fine-shell tempered ceramics) that include ceramics intended for serving foods or for display; and utilitarian wares (coarse-shell temper) that include ceramics used to cook and prepare food. Curious about this discrepancy in practice and use, Steponaitis hypothesized that there were mechanical differences between fine- and coarse-shell tempers and, accordingly, conducted a series of experiments that revealed that fine-shell tempered ceramics were less likely to break when dropped, having greater shock resistance, while coarse-shell tempered ceramics held up better to heating and cooling, having greater resistance to thermal stress (Steponaitis 1983:34-35). He thus demonstrated that the differences in the size of temper used could at least partially be attributed to function, or use (Steponaitis 1983:43-45).

### *Changing Foodways: A.D. 1000-1250*

Maize is not an endemic plant to the either the Southeastern United States nor the Eastern Woodlands, but instead was introduced several millennia after its initial domestication in what is now known as the state of Oaxaca in Mexico. While there is clear but sparse evidence that maize was present during the Middle Woodland period in certain parts of the Southeastern United States, the intensification of maize did not occur until roughly A.D. 900-1000, corresponding to the beginning of the Early Mississippian period.

C. Margaret Scarry, a paleoethnobotanist and contemporary of Vincas Steponaitis's at the University of Michigan in the 1970s, focused her doctoral research on changing foodways between the Late Woodland West Jefferson phase (cal. A.D. 1070-1120) and the Mississippian Moundville I phase (cal. A.D. 1120-1250) (Scarry 1986; calibrated dates are from Steponaitis and Scarry 2016). Interested in the introduction and intensification of maize within the region, Scarry's research demonstrated clear differences in plant utilization between the Late Woodland and Mississippian periods, with the former relying extensively on wild plant resources, and the latter relying primarily on the domesticated cereal crop maize. Importantly, she also demonstrated that maize was not first introduced during the Mississippian Moundville I phase, but was ubiquitous throughout Late Woodland West Jefferson phase midden-filled pit features (Scarry 1986:409). This ubiquity has been cited as support for a growing body of research that proposes that maize was first disseminated in the Southeastern United States sometime during the Middle

Woodland period as a ritual plant, then was later intensified during the Late Woodland and Early Mississippian periods once the plant had been adequately adapted to the regional climate through artificial selection (Fritz 1990). This proposal is counter to a different perception that the maize seen during the Middle Woodland period and that seen later during the Early Mississippian period in fact represent two separate instances of maize dissemination into the Eastern Woodlands. For the Black Warrior Valley, however, subsequent paleoethnobotanical research has produced no signs of maize prior to the West Jefferson phase, suggesting that within this area at least, there was not an endemic intensification of a Middle Woodland maize variant. Instead, maize appears to have been introduced to the area sometime during the Late Woodland period.

Some of the earliest theories for the adoption of maize revolved around the idea of food security, in that maize, unlike wild resources in the Southeastern United States, could be more easily controlled and thus used to produce a more reliable, dependable food source. As part of her doctoral research, Scarry (1986, 1993) assessed whether the risk of crop failure was a driving motivation behind maize's adoption and intensification within the Black Warrior Valley. For food security to have been a primary motivation, it is necessary to demonstrate that people living in the area beginning around cal. A.D. 1000 would have experienced prolonged episodes of drought, flooding, or crop loss due to early or late frosts. In other words, these communities would have had to experience scarcity and risk in order to value security. However, Scarry (1993:178-180) estimated that populations residing within the Black Warrior Valley between A.D. 1000-1200 neither faced nor experienced recurrent crop failure—late spring floods are common but not persistent, prolonged droughts are rarely debilitating, and the space between the last spring and first autumn frost is considerable and more than enough for one full growing season.

Scarry's research also contributed to a growing body of research that subsequently refuted another important assumption generally held, namely that maize and the common bean were disseminated in tandem. Despite the ubiquity of the common bean throughout the Southeastern United States at the time of European contact, the plant was absent from the subject area during A.D. 1000-1250. For the purposes of this research, this finding is important because a dietary alternative to nixtamalization is to complement a primarily maize-based diet with either one or several other foodstuffs, such as those high in protein, of which the most common and in many cases most easily intensified are legumes such as the common bean (*Phaseolus vulgaris*). However, as discussed in Chapter 3, in the Eastern Woodlands, there is little evidence that the common bean was introduced before approximately A.D. 1300 (Baumann and Crites 2016; Hart and Scarry 1999; Yarnell 1993), nearly two centuries after maize was elevated to a dietary staple in many Mississippian communities (Scarry 2007) and a full millennium after its initial introduction to the region (Riley et al. 1994).

Contrasting with the changes in nut and maize consumption between A.D 1000-1250, researchers have noted no other changes in plant or animal consumption among those populations living in the Black Warrior Valley. Both West Jefferson and Moundville peoples utilized some chenopod and maygrass, as well as wild foods such as persimmon, blackberry, blueberry, and elderberry (Scarry 1993), in addition to both terrestrial and aquatic sources of protein (Schoeniger and Schurr 2007). While there are few apparent changes in the procurement of other food sources, Scarry has clearly shown that between the West Jefferson and succeeding Moundville phases, there was a significant decrease in general nut procurement occurring in tandem with a significant increase in maize procurement (Scarry 1986, 2003, 2007). Thus, it seems that the only dietary change that took place was an increase in the consumption of maize and a decrease in the consumption of nuts.

### *Changing Ceramics: West Jefferson and Moundville I Phases Compared*

Concurrent research into the Late Woodland West Jefferson phase also noted a second important cultural change that took place. Excavations at three sites located in Jefferson County, near present-day Birmingham, Alabama, collectively referred to as the West Jefferson Steam Plant sites, demonstrated that in addition to maize, shell-tempered ceramics, a hallmark of the Mississippian cultural expression, were present in small quantities in a substantial portion of the features (Jenkins and Nielsen 1974; O'Hear 1975). Thus, while the majority of these ceramic assemblages were composed of grog- (crushed ceramic) tempered ceramics as well as a few other tempering agents common during the Late Woodland phase, some features also possessed modest amounts of shell-tempered ceramics. To determine if there was a temporal relationship between those features with shell-tempered ceramics and those without, John O'Hear (1975:28) analyzed radiocarbon samples from 12 features at the West Jefferson Steam Plant sites. The dates these samples generated demonstrated that those features without shell-tempered ceramics tended to date slightly earlier in the phase than those features that contained shell-tempered ceramics, suggesting that shell-tempered ceramics may be a signature of the latter half of the phase. Thus, a formal distinction between the early and late West Jefferson phase was established.

Recently, however, this temporal distinction has been questioned. Not only have O'Hear's results yet to be replicated at any other site, but at the time of his research, the West

Jefferson phase was thought to span close to two centuries (A.D. 900-1050; Steponaitis 1983). The most recent estimate, using calibrated dates and spans modeled using Bayesian analysis, places the most likely boundaries at A.D. 1070-1120 (Steponaitis and Scarry 2016:8-9). This very short span makes it less likely that early versus late West Jefferson phase can be reliably detected.

Important for the discussion at hand is that both maize and shell-tempered ceramics are common inclusions in West Jefferson phase features. However, it is not until the Moundville I phase that both maize and shell-tempered ceramics begin to dominate paleobotanical and ceramic assemblages, respectively.

*Changing Diets: Hominy as a Staple*

While both the changes noted in the paleobotanical and the ceramic records are demonstrative of important lifestyle changes, and may very well be linked to the introduction and adoption of an ancestral hominy foodway between the West Jefferson and Moundville I phases, none definitively point to its presence. Instead, each simply suggests that maize was introduced to the region, then intensified. However, the research generated by bioarchaeologists and osteologists interested in the general health and status of Mississippian populations living not only in the subject area but also northern Alabama present a far clearer picture.

One of the first compelling lines of data supporting the hypothesis that an ancestral hominy foodway was practiced comes from a study conducted by Patricia Bridges. Bridges (1989), examining skeletal material recovered from northwestern Alabama in the Pickwick Basin, found significant differences in long bone dimensions and diaphyseal structure between

Archaic (hunter-gatherer) and Mississippian (agricultural) populations. Specifically, Bridges found that agricultural females had stronger and thicker arms compared to Archaic females, suggesting that they regularly engaged in more strenuous arm-related activities. Bridges specifically suggests that Mississippian female arm robusticity may be associated with processing maize using wooden mortars and pestles (1989:392). Of course, this alone is not satisfactory evidence for suggesting the presence of an ancestral hominy foodway. Nut processing, which can also utilize a wooden mortar and pestle but utilizes a similar motor movement as grinding maize, was a common activity throughout the Woodland period.

However, the biological evidence within the Black Warrior Valley is much more compelling. Schoeninger and Schurr (2007), using stable-isotope analysis, examined the diet of those interred at Moundville and dating to the Moundville I-III phases. For early Moundville, they demonstrated that the majority of the Moundville I phase population (n=29) received approximately 40 percent of their caloric intake from maize while all Moundville II phase individuals received approximately 65 percent of their daily caloric intake from maize (2007:127). Complementing Scarry's research, they also found that neither of these increases in maize consumption were paired with an increase in faunal or aquatic resources. This finding is perhaps most important when we combine it with Mary Lucas Powell's (2007) study of the general health and status of the Moundville I-III population. Powell examined the burial population for general signs of trauma, disease, and malnutrition to determine if there were differences in the health of various segments of Moundville society. What she found was that all segments of Moundville's society were generally healthy, including the Moundville I phase population which, according to Schoeninger and Schurr's findings, relied on maize for at least 40% of their caloric intake, making it a dietary staple. Without the common bean and without a complementary increase in animal or aquatic-based protein sources, this healthy status suggests that during the Moundville I phase, populations were subsisting on a nutritionally complete maize-based diet. Were they not, we would expect to see signs of malnutrition within the bioarchaeological record, similar to those Buikstra et al. (1987) documented in the lower Illinois River Valley during the Late Woodland and Early Mississippian periods. All things considered, a nixtamalizing hominy foodway present during early Moundville becomes the most parsimonious explanation of these data.

## The Hominy Foodway at Moundville

As noted already, what the Black Warrior Valley provides is an extensive case study for evaluating the presence and dissemination of a hominy foodway during the Late Woodland and Early Mississippian periods. By evaluating previous research conducted within the area, a great deal of which was shaped by a common research directive, it is possible to demonstrate that during the early Moundville I phase, local populations were not subsisting on maize alone, but instead were actively engaged in and practicing the hominy foodway.

According to these considerations, by the beginning of the Moundville I phase around A.D. 1120, populations within the Black Warrior Valley were practicing a hominy foodway. Likely, based on the presence of maize and shell-tempered cooking pots, the hominy foodway was also being practiced during the preceding West Jefferson phase as well, by at least some members of those communities. As noted in Chapter 1, discourses change when we begin to talk about foodways and not just food. Food is a resource and a biological necessity; foodways are culturally embedded traditions that encompass all aspects of food, from the individuals and steps involved in its preparation, consumption, and disposal to the social events that incorporate them. Establishing the presence and practice of the hominy foodway during the Moundville I phase is essential to the model portrayed in this work, but what is also essential is evaluating the role the hominy foodway, and not simply maize alone, played in the constitution of early Moundville.

When we change the conversation to a hominy foodway, a curious relationship emerges, namely one between maize and shell-tempered ceramics, both of which were present in small quantities during the West Jefferson phase but were increased seemingly in tandem during the Moundville I phase. While both have commonly been interpreted as Mississippian cultural traits, they have rarely been considered as two essential elements of the same foodway. In particular, unburnished, shell-tempered, globular jars, or what were common Mississippian period cooking jars, have only tentatively been explored as essential tools of the hominy foodway. For this reason, the exploration of this relationship will be the primary focus of Chapter 6.

However, before diving into a discussion of this potential relationship, it is first necessary to review some of the current models proposed for the social landscape of early Moundville, between A.D. 1120-1250. It is within this landscape, after all, that the hominy foodway was disseminated and adopted, and thus a review of current thoughts and ideas about this landscape is in order to begin modeling what the avenues through which this adoption occurred. In Chapter 5, I review these models, as well as propose the possibility of a new model, one that suggests a much more ethnically varied social landscape than has previously been described.

# CHAPTER 5:
# THE SOCIAL LANDSCAPE OF EARLY MOUNDVILLE

As identified through the ethnohistoric review conducted in Chapter 3, the historic Native hominy foodway included a great deal more than just maize and nixtamalizing steps. It was intimately linked to women's identity, conceptions of hospitality and the home, and even played a pivotal role in reinforcing a proclivity for bitter foods throughout the Native Eastern Woodlands. Within a historical anthropological framework, these become important considerations because they speak to some of the domains onto which the hominy foodway was mapped and thus used to understand historic Native life. However, before investigating if any of these avenues facilitated the dissemination and adoption of the hominy foodway in the Black Warrior Valley beginning around A.D. 1070, it is necessary to first reconstruct the social landscape of this early period based on the current available evidence.

This chapter begins with a discussion of what researchers have deemed Mississippianization, and proceeds to review discussion of the early, ethnic composition of the Black Warrior Valley between A.D. 1070-1250. My goal is not only to outline previous research on this subject, but also to suggest that earlier interpretations of the social landscape may be too conservative when addressing the idea of ethnic diversity, many times suggesting the presence of only one or two early ethnic groups within the area. Potentially, there is a great deal more diversity in these early communities, a possibility that may have been unintentionally hidden under assumptions of what materials were made locally and what materials were not. It is my intention to initiate a conversation that I will return to in the following chapters, one that suggests the early Moundville landscape was more ethnically diverse than previously conceptualized.

## Mississippianization

Beginning around A.D. 1070, a Mississippian cultural expression began to take root not only in the Black Warrior Valley of west-central Alabama, but also throughout many parts of the Southeastern United States, fostering what many have proposed were chiefdom-level societies. The term “Mississippianization” has come to refer to the various origins of these societies. The earliest, and arguably the greatest expression of these chiefdom-level societies was made manifest at the site of Cahokia, located in the American Bottom, leading many researchers to conceptualize the process of Mississippianization as spreading out from this cultural center (Anderson 1999:226; Anderson and Sassaman 2012:158). Indeed, in this conception, “Mississippian” is viewed not as a singular archaeological material culture, but instead as an ideological, iconographic, and religious expression that included material culture but is not solely identifiable by a single set of material signatures (Anderson and Sassaman 2012:156-157; Pauketat 2009). Such a definition not only allows for differences between Mississippian material assemblages, but it also permits historical perspectives in order to account for differences among these societies.

Within the Black Warrior Valley, there are competing models for understanding the local process of Mississippianization. The first signatures of this expression are visible during the West Jefferson phase (A.D. 1070-1120), with limited use of both maize and shell-tempered pottery. However, by A.D. 1120, or the beginning of the Moundville I phase, a rather rapid cultural and social change occurred, most significantly represented in the ceramic record. As noted in Chapter 4, during the West Jefferson phase, grog-tempered ceramics dominated, whereas shell-tempered ceramics were present but only accounted for a very small relative percentage. During the early Moundville I phase (A.D. 1120-1190), shell-tempered ceramics dominated while grog-tempered ceramics composed a small, but ubiquitous, percentage (Steponaitis 2009:xxvi). Despite differing viewpoints over the past few decades, researchers now generally agree that the period between A.D. 1070-1250 in the Black Warrior Valley likely involved non-local population movements into the area, which ultimately coalesced with groups practicing local ceramic traditions (Jenkins 2003; Jenkins and Krause 2009; Jenkins and Seckinger 2000; Steponaitis 2009:xxv-xxvi).

However, agreeing that there were likely in-migrations of people to the Black Warrior Valley is only the beginning. Central to understanding the process of Mississippianization within the area are a number of issues related to how these new populations interacted with endemic populations. For example, does the Mississippian expression seen at Moundville represent the emulation of Mississippian culture by a local, endemic population, or was the local population acculturated into a Mississippian lifeway, a process sponsored by non-local elites moving into the area? Additionally, any clarity that can be ascertained about the ethnic composition of this early period is also instrumental to understanding not only how the hominy foodway was disseminated, but also what the social and cultural implications of this dissemination were. While we are still quite a long way from quantifying these populations, or even pointing conclusively to specific communities of these groups within this early landscape, I believe there is more to be gleaned from the architectural and ceramic traditions expressed between A.D. 1120-1250 than previous researchers have recognized.

*Non-Local Architecture and Ceramics*

Non-local ceramic styles are common throughout Moundville's history, including the earliest period of the site. However, during early Moundville, these non-local ceramic styles co-occur with non-local architectural styles. This architectural diversity disappeared by A.D. 1250, at which time residents of Moundville began building solely Mississippian-style wall-trench, rectangular structures (Lacquement 2007:Table 4.1).

Researchers have documented at least four different architectural styles within the subject area, all of which date between A.D. 1120-1190. Current research suggests that the endemic West Jefferson phase population built circular domestic structures (Ensor 1976:16-24). However, between A.D. 1120-1190, or the early Moundville I phase, several sites demonstrate an additional four different yet contemporaneous architectural traditions: small basin-floor structures with single-set posts (Big Sandy Farms Site [Ensor 1976]; large, rectangular single set post structures (the Asphalt Plant Site [Steponaitis 1991], the PA Tract at Moundville [Scarry 1995], and the Roadway excavations at Moundville [Wilson 2008]); rectangular, basin-floor structures with a combination of both single set post walls at the narrow sides of the building and wall trenches along the longer sides (the PA Tract [Scarry 1995], the premound zone of Mound

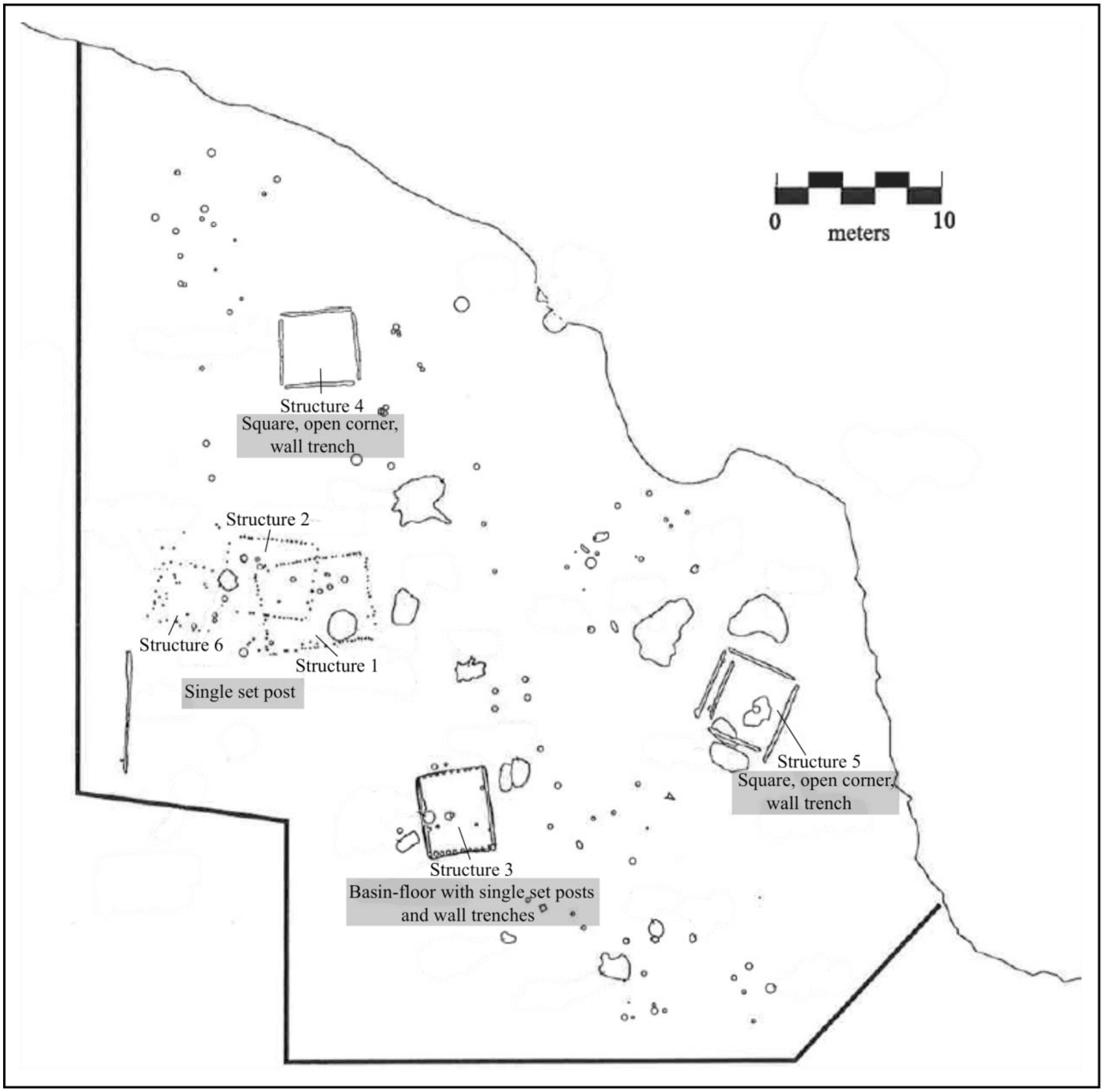


Figure 5.1. PA Tract excavation at Moundville, from Scarry 1995:Figure 48. Structures 1, 2, and 6 represent single-post architectural designs; Structure 3 represents a basin-floor with combination single set posts and wall trenches design; and Structures 4 and 5 square, open corner, wall trench designs.

E at Moundville [Knight 2010:172-173], and the Big Sandy Farms Site [Ensor 1976]); and square, open-corner wall trench structures (PA Tract at Moundville (Scarry 1995) and the Oliver Site (Lawrence 1982). The Picnic Area (PA) Tract, located at the site of Moundville, Scarry (1995, 2007:68-69) noted the latter three of these four architectural styles (Figure 5.1). Two of these styles have also been recorded in other early contexts: another rectangular, basin-floor structure was uncovered at the Big Sandy Farms site (Ensor 1993; Welch 2007:144-145), while at least one square, open-corner wall trench structure was uncovered at the Oliver site Michals 2007:169). Additionally, at the Big Sandy Farms site, a fourth architectural tradition was found that dates to the same period as the previous three: a small basin-floor structure with single-set posts (Ensor 1993). The repetition of these styles at multiple sites during this time suggests they were not isolated, or one-off attempts at construction techniques, but instead represent specific, differing construction traditions.

Importantly, each of these four styles appears to be contemporaneous during the early Moundville I phase. Gregory Wilson (2008), drawing on a series of radiocarbon dates collected from the PA Tract and ECB (East of Conference Building) excavations at Moundville (Scarry 1995, 2007:91), argued that the architectural diversity seen during the early Moundville I phase represents a developmental sequence of architectural styles. In his interpretation, the earliest are single-set post structures, which yield to "hybrid" structures that combine both single-set and wall-trench construction methods, which then yield to the dominant Mississippian domestic architectural design, wall-trench structures that in turn dominated the late Moundville I landscape (2008:45). This developmental sequence suggests that as local populations learned to construct wall-trench buildings, they incorporated the technique into their endemic tradition, first constructing buildings that combined both traditions, then only those of wall-trench construction.

While that is one interpretation, as implied above, there is certainly another. I suggest that instead of a developmental sequence, each of these architectural traditions are, in fact, independent traditions and all are innovative for the subject area. The hybrid structures, as so far known, are confined to the Black Warrior Valley, and do not necessarily represent a transitional technology. Combination wall-trench and single-set post structures with basin floors appear to be contemporaneous with fully expressed wall-trench structures without them, like the wall-trench structure uncovered at the Oliver site.

However, architecture is not the only stylistically diverse genre documented during early Moundville. While ceramic assemblages from Moundville I phase sites are overwhelmingly composed of unburnished, plain, shell-tempered ceramics, all also have small quantities of non-local styles. The early Moundville I phase PA Tract ceramic assemblage at Moundville, for example, includes at least three ceramic assemblages potentially indicative of different ethnic origins: a non-local, Shiloh phase, Mississippian assemblage; a local, Baytown assemblage; and a non-local, late Coles Creek phase assemblage (Figure 5.2).

Of the three traditions, the Shiloh, Mississippian phase assemblage represents the largest percentage of the PA Tract assemblage. Jenkins and Krause (2009) have argued that early Moundville was part of an “adaptive radiation” of Mississippian peoples originating from regions to the north of the Black Warrior Valley. As support, they note that ceramics from the Tennessee Valley Shiloh phase and those of early Moundville share a suite of almost identical diagnostic ceramics, from the incised eyelash motif, lobing practices, and folded- and folded-flattened rim treatments common on Mississippian standard jars from both areas. Because the

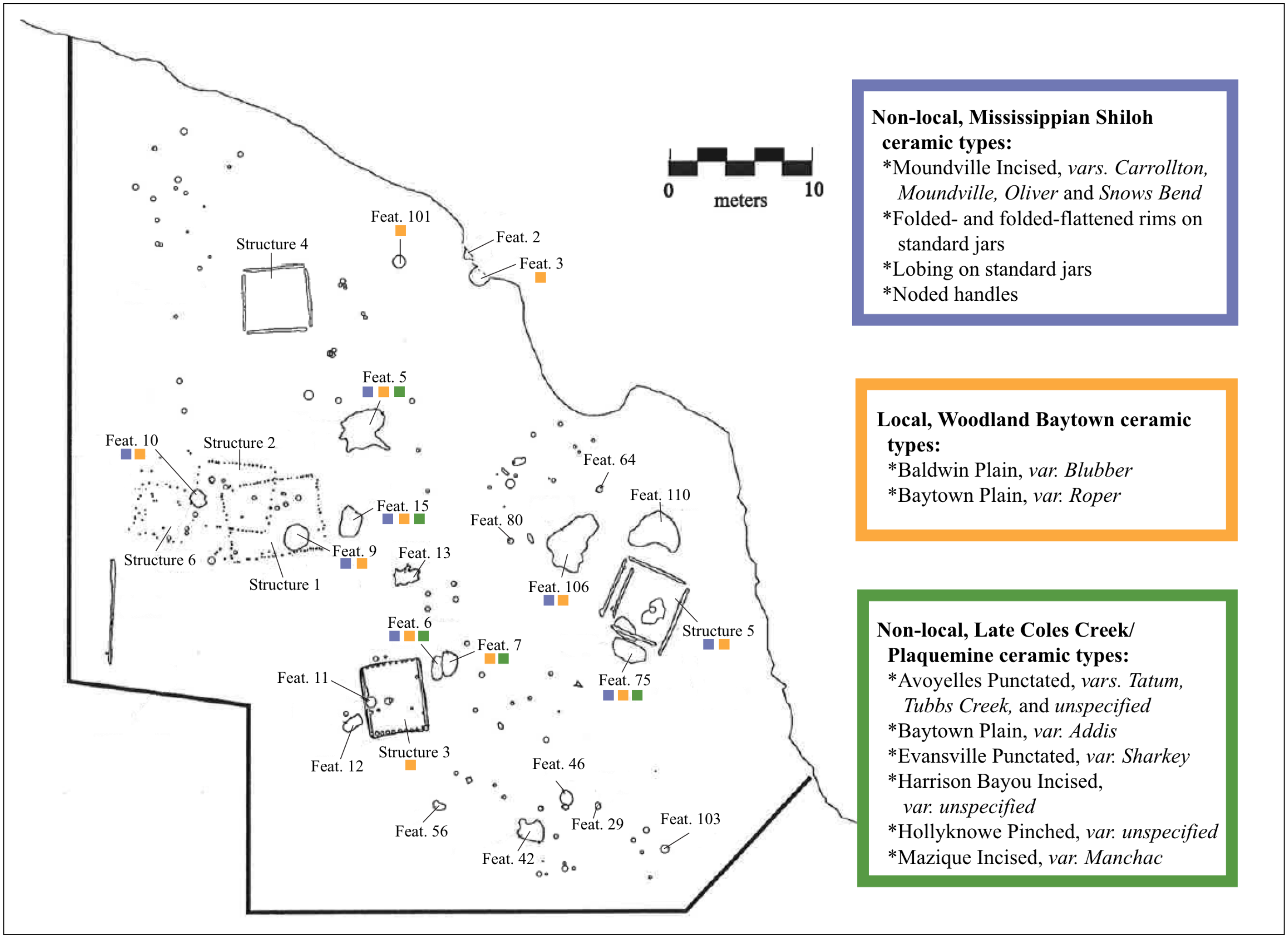


Figure 5.2. Pottery assemblages potentially indicating three separate ethnic origins for the PA Tract at Moundville. (After Scarry 1995:Figure 48.)

tradition makes an earlier appearance in the Shiloh region (Feathers 2009; Welch 2006), a likely interpretation is that Shiloh was the progenitor for the Moundville Mississippian ceramic expression.

The second largest percentage belongs to the local Baytown assemblage, which composes around 20 percent of the PA Tract assemblage. This assemblage is composed primarily of a grog-tempered ware, Baytown Plain, *var. Roper*, and represents the endemic Late Woodland West Jefferson population

Finally, the smallest percentage of the PA Tract assemblage is comprised of a number of styles likely originating in the Lower Mississippi Valley as part of a late Coles Creek/Plaquemine cultural expression. This assemblage includes the wares Avoyelles Punctated, *vars. Tatum*, *Tubbs Creek*, and *unspecified*; Evansville Punctated, *var. Sharkey*; Harrison Bayou Incised, *var. unspecified*; Hollyknowe Pinched, *var. unspecified*; Mazique Incised, *var. Manchac*; and Baytown Plain, *var. Addis* (which includes sherds of a single carinated bowl of nonlocal shape) (Scarry 1995:38-43; 2007:73).

While Jenkins and Krause have interpreted the Shiloh influence as indicative of a large immigration of Mississippian peoples into the Black Warrior Valley, the clear intermixing of both local and non-local ceramics within various features at Moundville's PA Tract as well as the contiguous and contemporaneous habitation of at least three architecturally diverse structural designs suggests a more complicated situation. Excavation of the PA Tract Structure 3, or the basin-floor design with single set posts and wall trenches, and Structure 5, or one of the square, open corner wall trench designs, yielded ceramic assemblages that contained largely Mississippian types such as Mississippi Plain, *var. Warrior*, but also a notable percentage of the Woodland type Baytown Plain, *var. Roper* (Scarry 1995:117). Features 6 and 7, located near

Structure 3 and likely utilized by the structure's inhabitants, contained not only Mississippian and Woodland ceramic types, but also the late Coles Creek ceramic types Baytown Plain, *var. Addis,* Evansville Punctated, *var. unspecified,* Harrison Bayou Incised, *var. Harrison Bayou,* and Hollyknowe Pinched, *var. unspecified* (Scarry 1995:125, 129).

Ultimately, what the architectural and ceramic assemblages of the early Moundville contexts offer is reason to believe that between A.D. 1120-1250, there was greater ethnic diversity at Moundville than previous research has conservatively suggested. While some are comfortable asserting that there were at least two separate ethnic groups inhabiting the Black Warrior Valley beginning around A.D. 1120, a Late Woodland population and a Mississippian population, there is clearly evidence that suggests an even more ethnically diverse landscape. This is not only an important consideration for this research, but also for any research interested in this early period because it was from this social landscape that Moundville was forged. For my purposes, this consideration is essential because it was within this multiethnic social landscape that the hominy foodway was widely adopted and then practiced, establishing it as the dietary staple of Moundville's population.

*Moundville as a Ritual Ceremonial Center*

An essential concern regarding Moundville's origins is the nature of early Moundville after its political consolidation. Through the latter part of the twentieth century, Moundville was conceptualized as a paramount chiefdom akin to those described in Polynesia, in which the power of the paramount chief, as well as those beneath him, was dependent on the control of socially valued objects produced either locally or acquired through trade with distant areas

(Peebles 1978; Welch 1991). As part of this system, commoners living outside of the eponymous site grew enough maize not only to feed themselves, but also to provision those elites living within the center (Peebles 1978:400-408; Welch 1991; Welch and Scarry 1995:413). Following the logic of this model, and accounting for Scarry's (1993) findings that risk management would not have been a likely motive for the adoption of maize, its adoption during early Moundville was thus modeled as a political-economic need, as a food source that could be extensified and, consequently, easily used to produce large stores of the grain to support the growing chiefdom. Maize was modeled as an important resource grown in part for, and manipulated by, elite members of this society.

However, over the past two decades, this model has come under considerable scrutiny. Several researchers have demonstrated that the restricted, elite control over materials originally proposed as integral to a prestige-goods economy was actually far less restrictive throughout Moundville's history, while other objects once thought to be exchangeable were in fact likely inalienable, suggesting that there was not the quantity of skillfully produced goods in circulation necessary to achieve a strictly prestige-goods economy (Knight 2010; Marcoux 2007; Markin 1997; Wilson 2001). Puzzlingly, while the majority of craft and raw materials appear not to have fallen under a restricted, centralized control, maize and cuts of venison were mobilized from groups living outside of Moundville to those groups residing at the center (Jackson et al. 2016; Welch and Scarry 1995).

Recognizing the shortcomings of a strictly prestige-goods model, Scarry and Steponaitis (2016) have proposed that Moundville did not represent a paramount chiefdom organized solely by a political relationship between elites and commoners, but instead was organized along ritual lines likely related to kin membership, suggesting the site was something closer to a ceremonial ground that served multiple towns. While such ceremonial grounds historically were episodic, Moundville may represent a permanent, year-round ascription of these ritual ties upon the landscape. As such, the residents of Moundville would have had two major alliances—a ritual alliance to the center and a political alliance to their towns (Scarry and Steponaitis 2016:261-264). Scarry and Steponaitis (2016:261-263) have suggested that the ritual social membership at Moundville was organized along lines of clans, or what Knight (2007) has less specifically referred to as corporate kin groups. Based on ethnohistoric accounts, clans were exogamous, matrilineal social units spread across multiple towns, each of which had specific ritual knowledge and duties (Knight 1994:375; Scarry and Steponaitis 2016:258). At Moundville, though, corporate kin group membership took on a new importance, providing the design for domestic neighborhoods as well as the spatial arrangement of the earthworks at Moundville (Knight 2007; Wilson 2016).

Additionally, kin group leadership roles, likely filled by high-ranking elders or priests, would have reached beyond the perimeters of Moundville alone, giving these individuals greater social and ritual authority than that of town leaders as kin group leaders oversaw group activities across towns throughout the Black Warrior Valley (Scarry and Steponaitis 2016:258). As part of their position, corporate kin group leaders had access to ritual knowledge and materials, including formal stone palettes (Steponaitis 2016), but would not have had restricted control over the production and access to all socially valuable items (Scarry et. al 2016). Kin group leaders, as well as other members of these kin-based groups residing at the center, also would have been provisioned with food by those members living both within the center and the valley in order to help support the ritual responsibilities of the group. Within this model, Moundville is still conceptualized as a chiefdom society, but one primarily organized along lines of kin group membership rather than political alliance.

This model has a number of strengths. First, it is far more congruent with the archaeological record than the strictly prestige-goods economy model, accounting for what appears to be corporate ownership of inalienable objects, while also sufficiently explaining the lack of restricted, centralized control over exotic materials. Indeed, for early Moundville, it also suggests an important social network through which non-local peoples may have known about the area—exogamous, matrilineal marriage networks. Without knowing the impetus that would have fostered relocating in the first place, this model provides a reason why groups outside of the Black Warrior Valley may have been enticed to relocate.

However, one shortcoming of this model is that, like political-economic models, it still views maize as a resource valued for its potential for extensification. Again, in this view, maize was brought to the area and adopted because it was a valuable resource. Yet, as noted, the residents of the Black Warrior Valley were not simply adopting maize the plant but the hominy foodway, and an important consideration of foodways often overlooked is that foods have to first be deemed good to eat before they can be deemed good to grow, store, and manipulate. In other words, hominy as a dish had to be eaten and liked before the both endemic and new residents of the valley could grow maize and provision the center. We thus arrive at our final consideration of the early Moundville social landscape: what social events would have been the likely venues through which residents ate and learned to like hominy?

### *Communal Feasting?*

Feasting has long been cited as an important social event throughout a great deal of the prehistory of the Southeastern United States (Knight 2001). Like the prestige-goods model discussed above, the central role of feasting in consolidating power was initially drawn from ethnohistoric accounts of Polynesian chiefdoms (Peebles and Kus 1977; Steponaitis 1978). In the Mississippian Southeastern United States, hosting large, communal feasts would have provided the hosts with the opportunity not only to amass new followers and favors, but also to mobilize the labor needed to construct many of the earthworks that punctuate the landscape. While communal feasting was not unique to the Mississippian period (Knight 2001), such large social gatherings were certainly enhanced by a plant like maize, which could be easily extensified to produce exceptionally large food stores, especially in comparison to other, less productive, endemic resources. Unsurprisingly, this emphasis on the extensification abilities of maize has been a widely-stressed attribute throughout Mississippian studies—maize is modeled as a valuable resource that would have been used to nurse the aspirations of those seeking greater influence and power, while feasting events would have been excellent venues for generating this power. Thus, the search for and discussion of feasting events is a common topic in both Woodland and Mississippian period studies (Kassabaum 2014; Knight 2001; Pauketat et al. 2002). This is no less true for the Black Warrior Valley (Knight 2012; Maxham 2001; Scarry et al. 2016).

Following the Moundville as ritual-ceremonial center model outlined above, those individuals and groups best positioned to expand their power during the Moundville I phase would have been clan priests or others with ritual influence who were also already familiar with and had access to stores of maize. Yet, despite expectations, and despite conclusive evidence from areas such as the Lower Mississippi Valley (Kassabaum 2014) or even closer to the subject area, the Tombigbee Valley (Blitz 1993), there is scarce evidence for large-scale, communal feasting events in the Black Warrior Valley (Barrier 2011; Knight 2016:36-37 Scarry and Scarry 1997). The only definitive example of a feasting context comes from a single late Moundville I feature (Feature 10) located at the Grady Bobo site (1Tu66), where a diverse variety of bird taxa as well as an abundance of serving ware compared to utilitarian ware suggests that an unusually large, special occasion took place (Maxham 2001, 2004). Others have proposed possible feasting events, but these contexts are far less conclusive. For example, Scarry et al. (2016) proposed that variations in the execution of the designs seen on Moundville Incised, *var. Moundville* jars from a single feature recovered at the Wiggins site also represents a feasting context. They propose that the refuse from this context derives from more than one household, suggesting a multi-household gathering (Scarry et al. 2016:177-178). While we can accept this as evidence for rural, communal meals, it is difficult to accept that it reflects events on the same order as the large, community-wide feasts documented in other Mississippian areas, and that feature prominently in models of Mississippianization (e.g., Pauketat et al. 2002). Indeed, the gathering at the Wiggins site does not even appear to be on the same order as the mound-centered feasting Blitz (1993) has suggested for the Lubbub Creek site in the Tombigbee Valley.

While it is clear that communal feasting events played an essential role in the development of many early Mississippian societies, at present there is only scant evidence for the same social occasions within the Black Warrior Valley. While communal feasting likely occurred in small episodes at sites like the Wiggins site, there is virtually no archaeological evidence to suggest that it was a driving social force, either at the ritual-ceremonial center, or during the critical early Moundville I phase (A.D. 1120-1190) when hominy was rapidly being sampled and then adopted. This suggests that a different set of social activities helped foster not only the adoption of the hominy foodway but also the genesis of a Mississippian identity at Moundville.

## The Social Landscape of Early Moundville

Understanding the social landscape of early Moundville, beginning around A.D. 1120, is central to understanding the Mississippian identity that was later made manifest on the physical landscape beginning around A.D. 1200. However, truly defining that social landscape is still a work in progress. There are two models that researchers currently hold, each stressing different origins. While both suggest a multi-ethnic community resided at early Moundville, the more conservative model implies that no more than two ethnic groups were involved, an endemic West Jefferson population and a transplant Mississippian population. Any material indications for other ethnic populations present during the early Moundville I phase are considered products of trade. Wilson's (2008) architectural sequence for the Moundville I phase, which suggests that the architectural variability seen in the PA Tract represents a unilinear sequence of styles, comfortably fits within this first model.

The second model, put forth in this chapter, suggests a more liberal interpretation of the data at hand. First, based on both the persistent presence of non-local ceramics and diverse architectural traditions spread across the Black Warrior Valley, the period between A.D. 1070-1250 may in fact have seen multiple population movements into the area, with these new groups intermingling among endemic Baytown groups in the area, which, coincidentally, may have also been plural. Based on the ceramic typologies represented within assemblages from this early period, at least two source locations can be identified for these immigrant groups—the Lower Mississippi Valley and the Shiloh area of western Tennessee. It is reasonable to suspect there may have been others as well.

Importantly, the identification of multiple immigrant groups is congruent with Scarry and Steponaitis' (2016) model of Moundville as a ritual-ceremonial center. For these groups, exogamous marriage networks provided an important avenue through which people outside of the area would not only have known about the Black Warrior Valley, but would have also been drawn to it. In particular, this model works well with a more diverse early social landscape composed of at least three co-resident ethnic groups, providing a clear motive why these diverse peoples would have been intermingled throughout the area and not necessarily concentrated at particular sites.

Finally, the shift specifically to a hominy-based subsistence, rather than merely a maize-based subsistence, necessitates evaluating the social arenas commonly cited as integral to the dissemination of maize in nascent Mississippian communities. In west-central Alabama, as well as through most of the Mississippian cultural world, large, communal feasts have been considered the most probable nuclei of intercommunity interactions, providing both a proverbial and literal stage for status-aspiring individuals. However, there is only limited evidence within the Black Warrior Valley for the kind of feasting events that might serve as such stages, and no evidence at all for feasting during the crucial early Moundville I phase (A.D. 1120-1190) when hominy was first being adopted. This lack of evidence poses a question—if the residents of the valley were not exposed to hominy through large, communal feasting events, then what were the social events that exposed them to it? Where did the endemic residents of the valley first taste hominy, and then how did they learn to make it?

In the next chapter, I propose that during the Late Woodland West Jefferson and Early Mississippian Moundville I phases, groups within the Black Warrior Valley were likely exposed to hominy first through common, domestic meals, then learned the foodway through various communities of practice of the hominy foodway. These communities of practice were not only essential for imparting the culinary knowledge of the foodway, but also for imparting the ceramic knowledge and complementary social practices of the foodway as well. I propose in Chapter 6 that instead of being a generalized cooking pot, the Mississippian standard jar was a specialized nixtamalizing tool, integrally joined to the hominy foodway in the Black Warrior Valley, such that learning to practice the hominy foodway required more than just learning to cook and eat hominy—it also required learning how to craft and use the tools central to that practice.

# CHAPTER 6:
# CHARACTERIZATION OF THE MISSISSIPPIAN STANDARD JAR AT MOUNDVILLE

As Ralph Linton defined them, cooking pots are vessels suited for boiling foods, and those vessels best suited for boiling “have a mouth large enough to prevent explosive boiling over and to permit of stirring its contents, but at the same time small enough, relative to the pot’s capacity and heating surface, to prevent it from boiling dry every few minutes” (Linton 1944:370). Cooking pots can be tall, squat, thick- or thin-walled, conical, or globular. They may have handles, a constricted neck, straight or insloping walls, or a comparatively thick or thin base.

As archaeologists, we have historically recognized these differences as stylistic, manifesting as part of a general homogenous class of “cooking pots.” However, for those who used them, cooking pots were first and foremost tools, and like all tools, came in a variety of designs best suited for particular activities (Braun 1983; Linton 1944). As such, cooking pots are adapted technologies that are integral parts of foodways, or the socially patterned activities, rules, and meanings that include both foods and the culinary preparations that encompass them (Gumerman 1997; Twiss 2007; Weismantel 1988). They are the necessary utensils of a craft, used to achieve particular dishes with distinct flavors and textures, and as such, along with other culinary tools, sit at the center of the everyday meal, those quotidian practices that foster shared traditions, identities, and ideologies (Hastorf and Weismantel 2007:310).

Although it is clear that food choices are conservative elements of social systems, what is often overlooked is that how foods are prepared is, in many cases, more important than the food itself (Atalay and Hastorf 2006; Briggs 2015; Gumerman 1997). Cooking pots play an important role in the transformation of raw food products into culturally significant dishes (Lévi-Strauss 1969). They also play a key role in rendering what are otherwise difficult or even inedible products into nutritionally rich foods. Starchy carbohydrates are the most common primary dietary foods eaten throughout the world, but only a handful of these should be consumed raw (McGee 2004:610-612). Some, like cassava and other members of the arrowroot family, are poisonous, whereas others, like many cereals and pseudocereals, are indigestible to humans in their raw state. Cooking molecularly transforms starchy plants—heat breaks down the weaker granules that compose their cellular structure, resulting in a softer, partially gelatinized, edible product. This extraordinary relationship between starchy carbohydrates and cooking is part of what led primatologist Richard Wrangham to postulate that cooking was one of the greatest achievements in human physiological evolution (2009).

It is glaring, then, that the most prolific form of cooking pot found throughout many parts of the Mississippian cultural world, the Mississippian standard jar, has rarely been considered for the culinary advantages it afforded over other contemporaneous and antecedent cooking technologies (Hally 1983, 1984, 1986), especially for preparing of maize. Historically, the name for the vessel form comes from Phillip Phillips who, in his extensive survey of the Mississippian cultural world, felt this "common cooking jar" was "of fundamental importance [being] one of the most decisive of Mississippi traits." As such, it deserved its own designation (1939:38). Phillips noted the presence of the standard jar throughout the Upper and Middle Mississippian cultural worlds, stressing that the standard jar showed some of the "greatest homogeneity in shape and decoration factors” (Phillips 1939:658). As such, he provided one of the first characterizations of the form as a “coarse thick shell-tempered ware, roughly smoothed but unpolished, more buff than drab in color, the dominant (and perhaps only shape), a large globular jar with vague neck and slightly flared rim generally provided with handles and/or lugs.” He further notes that while decoration is minimal, lobing, outlined by either incised lines or punctations, is common (Phillips 1939:658). Since Phillips’s research, fragments of Mississippian standard jars have proven to be consistently be among the most prolific artifact classes in the majority of Middle Mississippian assemblages (which includes the central Mississippi River valley; the lower Ohio River valley; and the Mid-South area composed of west and central Kentucky, western Tennessee, and northern Alabama and Mississippi), as well as Mississippian Fort Walton assemblages (Figure 6.1). Indeed, both the Mississippian standard jar and the advent of maize agriculture are commonly cited as hallmarks of Mississippian culture, yet the unmistakable relationship that existed between the two (Hally 1983, 1986; Myers 2006) has only been examined in a cursory manner.

In this chapter, I propose that in the Black Warrior valley of west-central Alabama beginning around A.D. 1000, the Mississippian standard jar was not simply a new ceramic technology, but instead a tool specially used to nixtamalize maize. As such, this tool was part of an ancestral hominy foodway, first adopted by local populations as a way to augment the locally entrenched nut foodway that served as the carbohydrate base for Woodland populations in the area, but was eventually eclipsed by hominy in dietary and social importance. To do so, I build on previous characterizations of the Mississippian standard jar (Hally 1983, 1986; Phillips 1939;

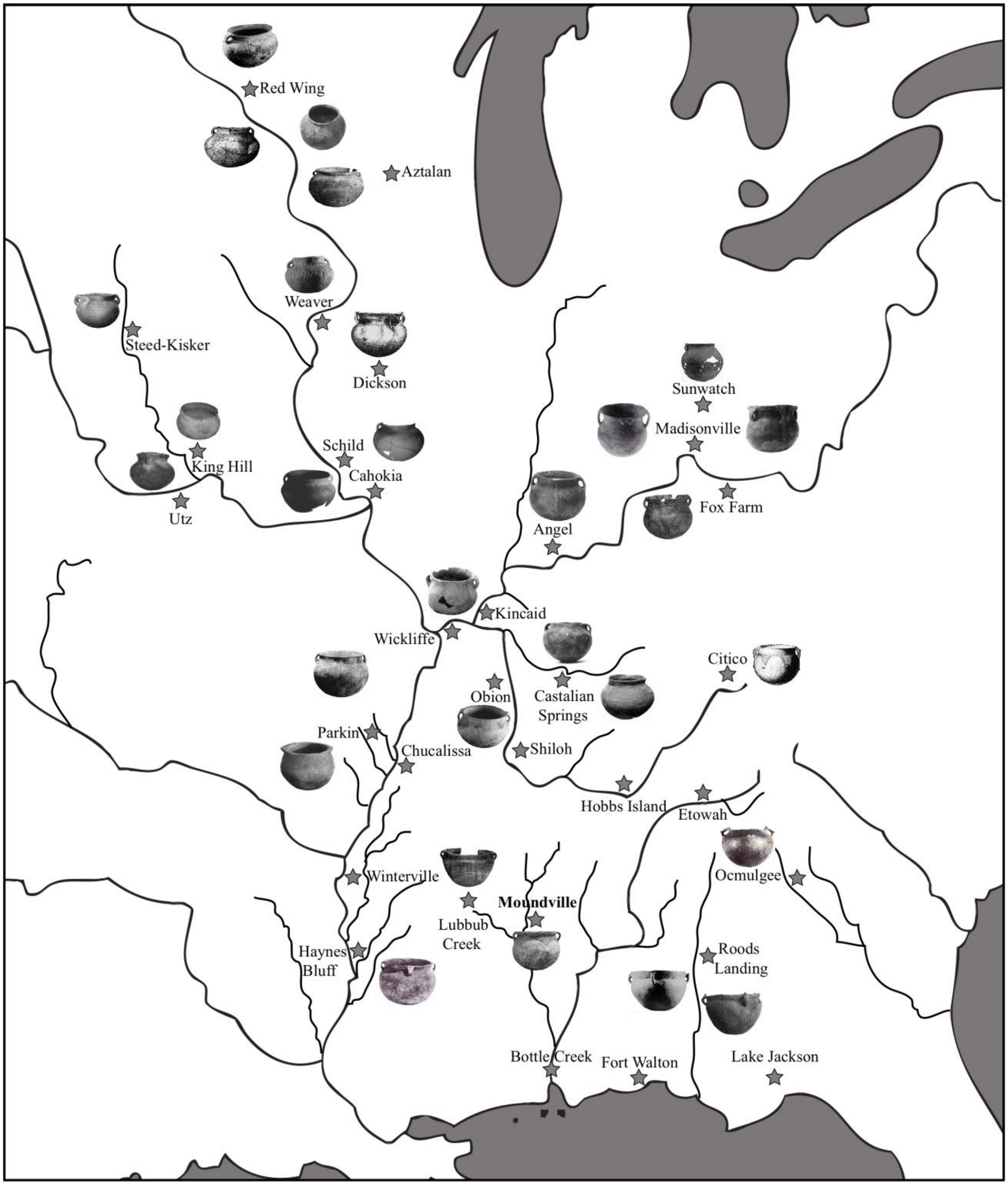


Figure 6.1. Distribution of the Mississippian standard jar throughout the Middle Mississippian and Mississippian Fort Walton cultural worlds.

Steponaitis 1983) that largely focused on stylistic elements as well as properties of mechanical performance, by exploring the jar form through the Moundville I-III phases (A.D. 1120-1520), and present a model for how the jar was likely used throughout Moundville's history. This model also includes a stylistic analysis of early standard jar rim sherds recovered from Moundville I phase contexts. Using the compiled research, I present evidence that the Mississippian standard jar was not a generalized cooking pot, but instead a specific tool used to nixtamalize maize, and that adoption of both the standard jar and the hominy foodway is best understood through a "communities of practice" model.

## Black Warrior Valley Cooking Pots and Foodways

Though far less attention has been paid to the Woodland stage in the Black Warrior valley, it is absolutely clear that the range of Woodland period cooking vessels was morphologically different from their Mississippian successors (Jenkins and Krause 2009; Jenkins and Nielsen 1974). Recently, Hawsey (2015) reanalyzed ceramics from three West Jefferson phase sites (Figure 6.2) to produce a more nuanced characterization of this terminal Late Woodland vessel assemblage, and identified two different forms of grog-tempered jars: ovaloid, which represent the overwhelming majority, and globular. Hawsey identified flaring-rim ovaloid jars as "characterized by an elongated lower body, slightly constricted neck, excurvate rim, and rounded or flattened vessel lip" (Hawsey 2015:31) (Figure 6.3). Ovaloid jars have relatively high shoulders and a base thickness greater than their wall or rim thickness (a ratio of 1.64) (Hawsey 2015:58). They also have a conical, blunt pointed base, which not only carries implications for how such vessels were used with a heat source, but also how heat was distributed to the vessel

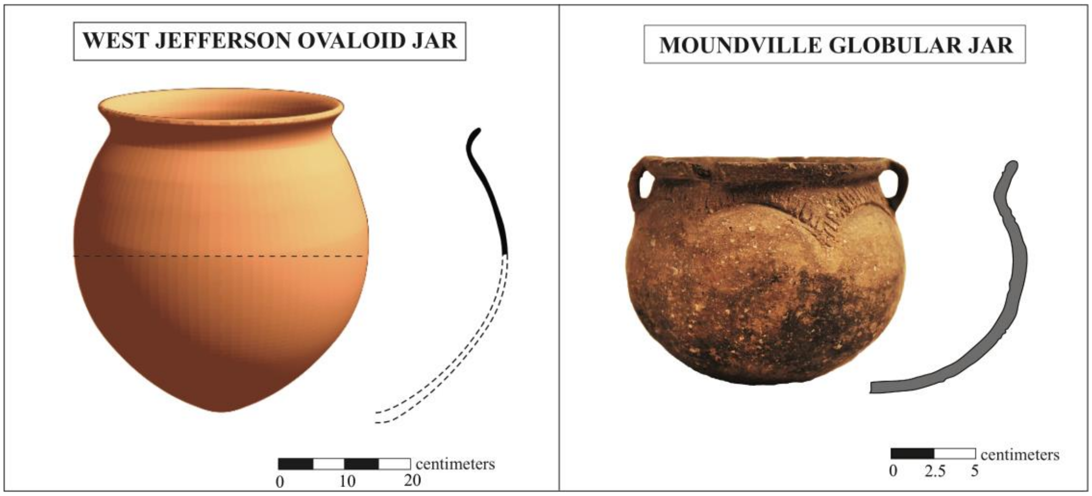


Figure 6.2. West Jefferson phase ovaloid cooking jar and Moundville I phase Mississippian standard jar. (Ovaloid cooking jar composite courtesy of Kareen Hawsey.)

contents. Flared-rim globular West Jefferson jars differ only in the lower body shape—instead of an elongated lower body with a conical base, they are globular, with broad, wide bases (Hawsey 2015:31-33, 58).

Based on both form and use alteration analysis, ovaloid cooking pots were likely placed directly in hearth fires, either supported by cooking stones or large pieces of firewood. Caleb Swan provided an ethnohistoric description of how an eighteenth-century Upper Creek group used ovaloid cooking pots: "These vessels are all without handles, and are drawn so nearly to a point at the bottom, that they will not stand alone. Therefore, whenever they are set for use, they have to be propped upon three sides with sticks or stones" (Schoolcraft 1855:692).

In the Black Warrior Valley, the Mississippian standard jar is a common vessel form found within Mississippian assemblages, including the Moundville ceramic assemblage

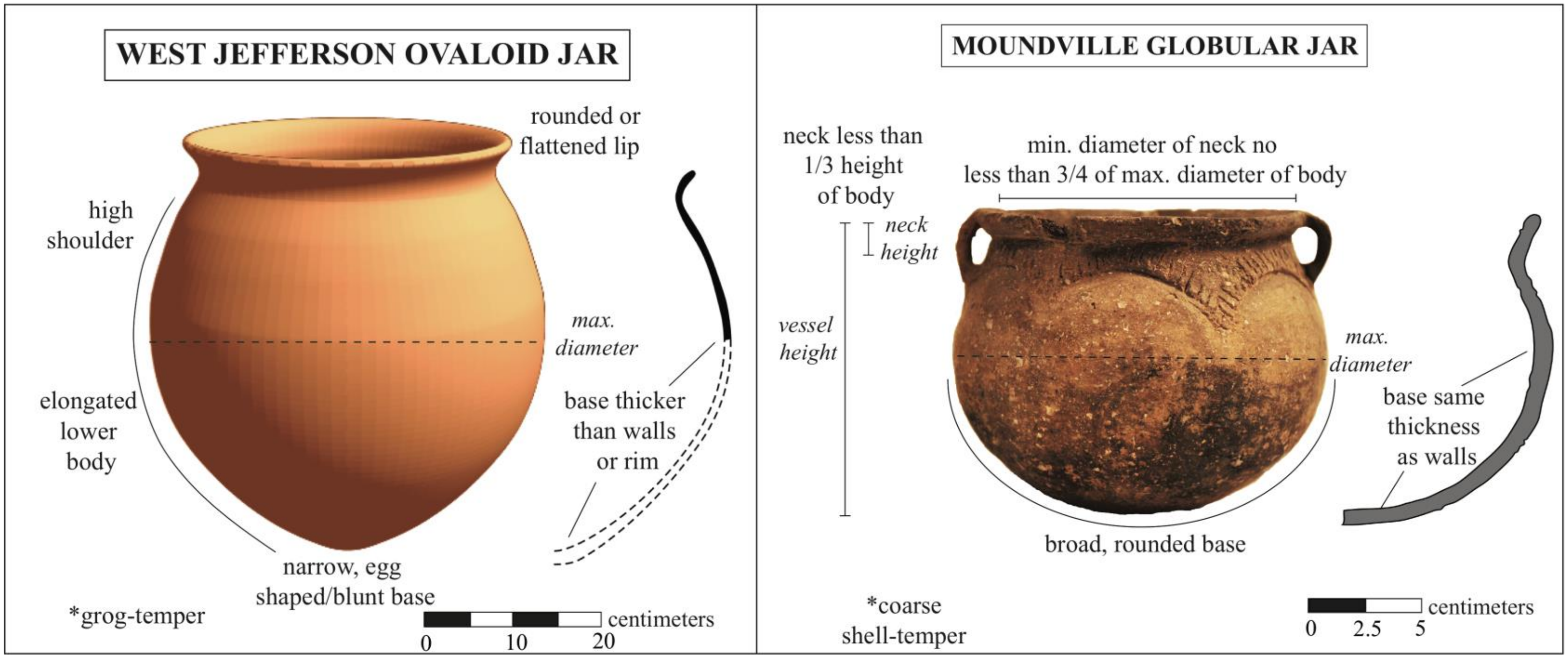


Figure 6.3. Morphological features of West Jefferson phase ovaloid cooking jar and Moundville I phase Mississippian standard jar. (Ovaloid jar composite courtesy of Kareen Hawsey.)

(Steponaitis 1983; Taft 1996). While Phillips (1939:38) was the first to recognize the prolificacy of the Mississippian jar form throughout the Mississippian cultural world, McKenzie (1964:51) and Steponaitis (1983) produced formal characterizations for Mississippian standard jars found at Moundville (Figure 6.2). Moundville standard jars are “vessels that have a more or less globular body, and a wide neck that is constricted in profile. The neck is typically less than one third of the height of the body, and the minimum diameter of the neck is no less than three fourths of the maximum diameter of the body” (Steponaitis 1983:69) (Figure 6.3). Moundville standard jars fall into two separate stylistic categories, burnished and unburnished, with the former not intended for cooking (Steponaitis 1983:33, 69). On unburnished standard jars, the neck either slants outward at the lip or is roughly straight and leans outward from a point at the top of the body (Steponaitis 1983:70). Moundville standard jars are coarsely shell-tempered and may have anywhere from two to over 16 handles. Additionally, Steponaitis demonstrated that coarse shell-tempering has certain benefits over fine shell-tempering: vessels that are tempered with coarse shell have greater resistance to thermal shock, meaning they are better equipped to withstand both prolonged periods of heat-treatment as well as rapid heating and cooling (Steponaitis 1983:36-45).

In the Moundville ceramic assemblage, Mississippian standard jars fall within three size classes based on orifice diameter: small (6-10 cm, effective vessel capacity ca. .2-.9 liters); medium (14-26 cm, effective vessel capacity ca. 2.5-6 liters); and large (34-44 cm, effective vessel capacity ca. 9-28 liters) (Barrier 2011; Knight 2010; Taft 1996). Medium sized jars are the most abundant size class recovered within residential contexts at Moundville, while small jars are the most abundant size recovered from burial contexts (Taft 1996:26). Likely, both small and medium sized unburnished standard jars were primarily used as cooking pots; their handles suggest that they were principally suspended over a heat source. Tentatively, it is my impression that large sized jars, when filled approximately half to two thirds full, may have been too heavy for suspension and instead primarily used for storing both water and dry goods (Hally 1986:287) (but see Chapter 7). Oversized jars do not have handles and were almost certainly dedicated dry goods storage jars (Barrier 2011).

### *The Woodland Stage Nut Foodways*

Among local populations during the Late Woodland stage in west-central Alabama, nuts were the dietary carbohydrate base (Scarry 1986, 2003). Within the region, there are three families of woody plants with edible nuts: *Juglandaceae* (which includes hickory, pecans, black walnuts, and butternuts), *Fagaceae* (which includes acorns, chestnuts, chinquapins, and beechnuts), and *Betulaceae* (which includes hazelnuts) (Scarry 2003:57). Of these, the most heavily utilized were acorns, chestnuts, and hickory nuts.

Oak, or *Quericus* sp., is the most abundant family of hardwoods in the Eastern Woodlands, both historically and prehistorically (Messner 2011:16). It is no wonder, then, that acorns were a staple food in many parts of the region both before and after the introduction of maize. Generally, *Quericus* sp. can be divided into two categories: white oaks and red oaks. From a dietary standpoint, the important difference between white and red oaks is that white oaks produce less bitter nuts, low in tannic acid, while red oaks produce more bitter nuts with higher concentrations of tannic acid. Before eating red oak acorns, their tannic acid has to be reduced or neutralized.

Based on ethnographic, ethnohistoric, and experimental studies, there are three general ways to leach tannic acid from red oak acorns. In all cases, red oak acorn shells were lightly cracked. In the first method, hot or boiling water was poured over the nuts. Heating in this manner was a lengthy process, lasting almost half a day (six hours), and required changing the cooking water several times (Kupperman 1988). Alternatively, cold processing involved submerging the nuts in cold water, either still, such as an artificially dug sand pit or bog, or flowing, such as a stream (Anderson 2005). Cold processing had the advantage of only removing the tannic acid from the acorns and not the oil as well; boiling to remove tannic acid ran the risk of removing some of the oil. A third method drawn from ethnographic observations of Native Californian groups again involved boiling water, but in this method, the acids were not removed—instead, they were neutralized using an alkaline substrate such as wood ash or lye while being cooked or rendered for oil (Anderson 2005; Messner 2011:78). Although it is unclear which method was generally preferred among prehistoric groups living in the Black Warrior Valley, John Swanton (1918:58) indicated that the historic Choctaws used a cold processing method, utilizing cold, running streams.

Both white oak acorns and chestnuts required far less processing than red oak acorns, and were likely processed in similar manners—they were first dried, then depending on the desired final product, they were ground to varying degrees and boiled to make a stew or porridge, or made into meal that could be used to make bread. As with red oak acorns, all could be rendered for oil, but because of their low fat content, this was neither a high-yield nor an expedient process.

Alternatively, hickory (*Carya* sp.) nutmeat is high in both fat and protein (Messner 2011:14) and was generally rendered into oil, or made into a kind of nutmeat ball that could be used to make stock for stews and soups (Fritz et al. 2001). Either cold or boiling water could be used to render hickory nut oil. Boiling hickory nutmeat, however, was not only more effective than cold processing, rendering more oil, but was also more expedient—hickory nut oil could be rendered with only ten to twenty minutes of heat-treatment (Talalay et al. 1984:352).

Acorns and chestnuts, like other starchy carbohydrates, undergo considerable changes in texture and nutritional quality when cooked. When plant starches are heated to their gelation range, or a temperature range that usually starts well below boiling at around 50-60ºC, they begin to not only absorb large quantities of water, but their granules also start to break down (McGee 2004:611-613). The result is a food product with a soft texture that is much easier to digest than when raw. Importantly, not all starches require the same amount of heat-treatment in order to begin or fully achieve gelatinization. The range is variable, depending on a number of characteristics of the food being prepared, and is best thought of as a continuum. Generally, acorn, hickory nut, and chestnut meats, which are already soft, require less heat-treatment to begin gelatinizing than other plant starches.

Owing to the processing and culinary differences between hickory nuts and acorn and chestnuts, it is likely these were, in fact, two separate foodways. For my purposes, from here through on, I will refer to these two foodways as the hickory foodway and the nut foodway, the latter including both acorns and chestnuts. By differentiating between these two, it is possible to articulate a general nut foodway. First, those nuts not immediately consumed were dried either through parching, roasting, or perhaps by being left out in the sun. Drying not only increased the length of time nuts could be stored, but also made them easier to shell (Messner 2011:70). Next, nuts were ground to remove their shells either completely or partially, a distinction based on the intended final product. Boiling was primarily used to make stews or porridges, which only needed a minimal cook time of anywhere from 30 minutes to an hour (Figure 6.4). Thus, heat-treatment was modest—each might be boiled to render oil, or in the case of red oak acorns, perhaps to remove tannic acids, but overall, boiling was only minimally needed to process or cook nuts.

### *The Mississippian Stage Hominy Foodway*

The first traces of maize in the Eastern Woodlands are found during the Middle Woodland stage (100 B.C.-A.D. 500) (Chapman and Crites 1987), although the earliest evidence for extensive cultivation of the plant does not occur until the Late Woodland stage (A.D. 500-1000) (Fritz 1993). At this time, in areas like the American Bottom, maize was incorporated into diets centered on native starchy seeds and grasses that were utilized as primary carbohydrates (Fritz 1993; Johannessen 1993), whereas in areas such as the Tennessee Valley and west-central Alabama, maize supplemented diets principally centered on nuts (Scarry 1993a). Though maize may have initially supplemented these foods, in many areas it eventually eclipsed other carbohydrates and reached the status of a true dietary staple (Schoeninger and Schurr 2007).

Based on both ethnohistoric and ethnographic accounts, the most widely practiced maize foodway throughout the historic Eastern Woodlands was the hominy foodway (Briggs 2015; Chapter 3). As already discussed, the historic hominy foodway involves nixtamalizing steps that not only increase the nutritional value of the product, but also make processing dried maize easier.

**NUT FOODWAY**

MATERIALS:
*cooking pot
*cooking hearth

INGREDIENTS:
*water
*white oak acorns, red oak acorns, chestnuts, hickory nuts

STEPS:
1. Dried: either through parching, roasting, or left out in the sun.
2. Ground: either completely or partially to remove shell.
   *Red Acorns*: water used to remove tannins.
3. Boiled or Cooked: Processed red oak acorns, white oak acorns, or chestnuts made into a meal that could be baked or added to water and boiled.
   *Hickory Nuts:* boiled for oil.

**HOMINY FOODWAY**

MATERIALS:
*cooking pot
*cooking hearth

INGREDIENTS:
*water
*hardwood ash/lye
*dried flint maize

STEPS:
1. Soaking: dried flint kernels are soaked for several hours or overnight in a hardwood ash/lye solution.
2. Rinsed/Rubbed/Ground: kernels are processed to either partially or completely remove hulls and excess alkaline solution.
3. Boiled and Simmered: cooked in an earthenware pot anywhere from two to 12 hours.

Figure 6.4. The prehistoric nut and hominy foodways of the Black Warrior Valley.

Like the nut foodway, the historic native Eastern Woodland hominy foodway follows several general steps and also incorporates certain material classes (Briggs 2015) (Figure 6.4). First, dried flint maize kernels are soaked, usually overnight but for at least several hours, in a solution made with hardwood ashes or lye (extracted from such ashes). The kernels are then processed through any combination of rinsing, rubbing, or grinding, either to remove completely or to begin the process of removing the hulls, as well as any excess alkaline solution. Later, the kernels are variably boiled and simmered in an earthenware pot anywhere from two to twelve hours, with longer cooking periods favored (Briggs 2015:120-121; Wright 1958; see also Chapter 3). Therefore, the historic hominy foodway involves flint maize kernels, hardwood ash, and an extensive cooking period (Figure 6.4). Owing to the prolificacy and conservatism of this foodway throughout the historic Eastern Woodlands, I have suggested that an ancestral hominy foodway including nixtamalizing practices emerged and was disseminated during the Late Woodland and Early Mississippian periods, roughly A.D. 1000-1200, likely in tandem with a hard, flinty maize variant (Briggs 2015:127; Chapter 3).

Although alkaline treatment is key for enhancing the nutritional quality of maize, for my purposes here, the important point is that maize needs to be *boiled*. At different times, the nut and hominy foodways served as dietary carbohydrate bases, and although there are similarities between the two foodways, the cooking time required by each was substantially different. Hominy, unquestionably, required longer heat-treatment.

*Cooking Heat: Fire and Hot Coals*

Cooking vessels are not simply adapted to the foods they are mainly used to prepare, but also to the type of cooking heat and cooking technique they are most frequently used with. As noted, both the nut and the hominy foodways principally used water as a means of cooking (known as wet-mode cooking [Skibo 2013:96-97]), and both involved boiling, though the time used for each varied. Likely, the cooking technique primarily used with each also varied. During the prehistory of the Southeastern United States, there were three types of cooking techniques used to reach a boil in ceramic vessels: hot rock cooking, direct fire cooking, and radiant heat cooking over hot coals.

Conical vessels, like the ovaloid West Jefferson cooking vessels, are best adapted to those preparation techniques that involve direct fire cooking (Figure 6.5). When conical vessels are placed directly in a fire, heat is transferred primarily through the walls, not the base. This is because the base is seated within the ash bed, which is shielded from airflow. Further, conical-shaped vessels are morphologically adapted for primary heat-transference through their walls—the relatively steep-angled, flat sides coupled with a high shoulder maximizes the surface area exposed to the flames. That West Jefferson ovaloid vessels have thicker bases compared to their walls may be a measure to bring stability to the otherwise unstable form. Regardless, a thicker base means even less heat is transferred through the base than the walls, stressing the primary importance of the latter for heat transference.

Use alteration analyses conducted on West Jefferson phase sherds from large and medium sized ovaloid vessels indicate exterior sooting only on lower body sherds, just below the maximum diameter of the vessel (Hawsey 2015:52-54). These patterns suggest that West Jefferson cooking vessels were in fact propped upright with the base resting directly in the hearth, and that cooking fires were built around them (Figure 6.5). While this configuration would maximize the vessel walls for heat transference, placing a pot directly in a fire is not an efficient long-term cooking strategy—not only does ash accumulate around the base, but the fire must be continually stoked to maintain a boil. The walls of the vessel that work so well to maximize heat transference conversely work equally well to maximize cooling. As such, these features fit well with the assertion that West Jefferson ovaloid jars were best suited for cooking nuts and other foods, which required a relatively short period of boiling.

Globular pots, alternatively, are not well equipped for being placed directly in a fire. Globular pots have broad bases compared to conical vessels, and assuming that these vessels were filled at least two-thirds full (Skibo 1992:151), that leaves almost a quarter to a third of the surface area between a globular pot and its contents in the base of the vessel. Thus, if placed in the ash bed of a fire, where the airflow is restricted, the lower contents of the vessel will receive only a marginal amount of heat, leaving only a narrow area from the lower portion of the jar to the shoulder for heat-transference (Figure 6.5). Additionally, the squat, curved walls and low shoulder of the vessel position the opening precariously close to the fire.

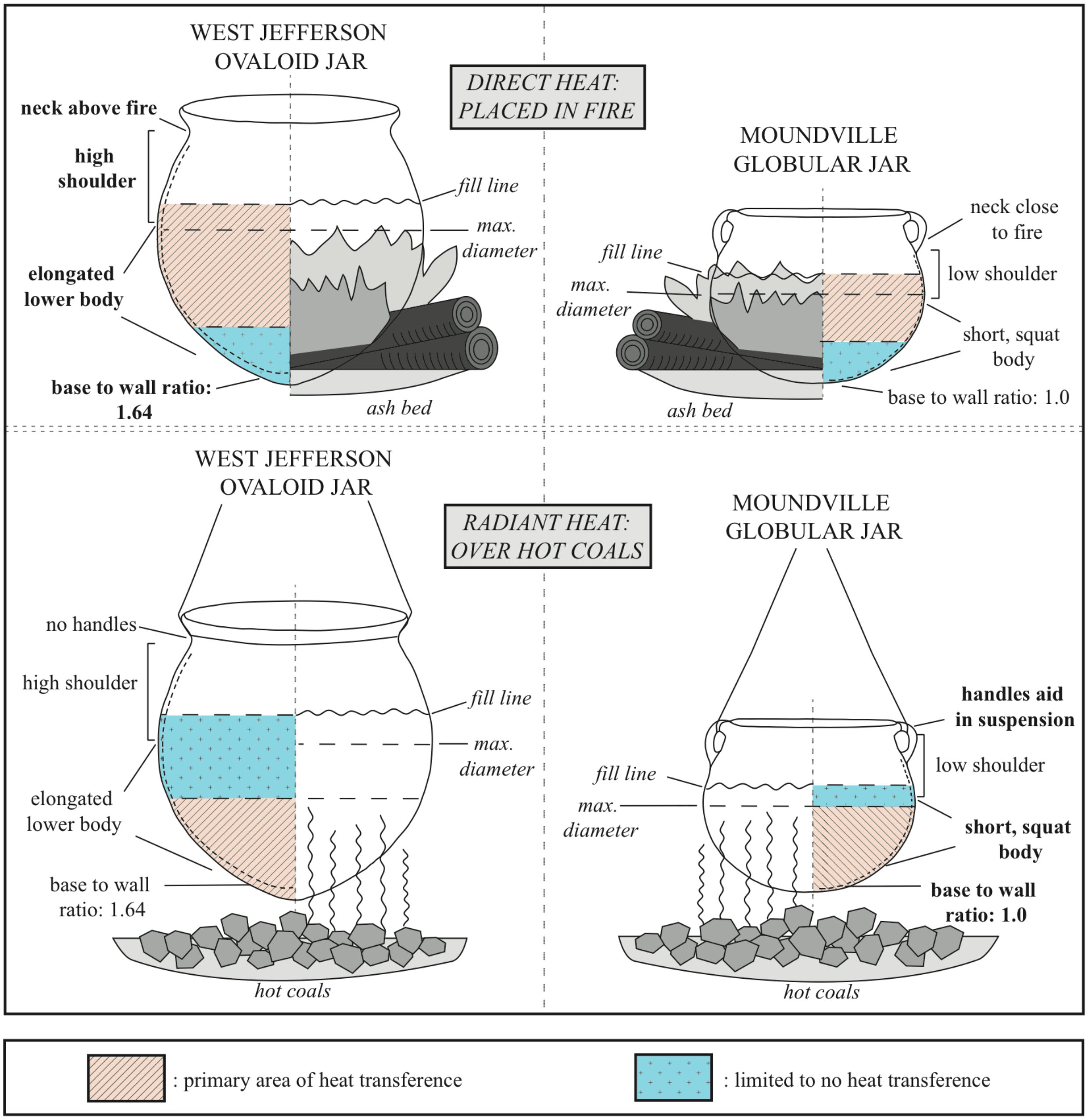


Figure 6.5. West Jefferson ovaloid jar and Moundville globular jar in direct fire and hot coal cooking techniques. Bolded attributes are those that have a clear advantage in that particular technique.

Instead, globular cooking pots, like the Mississippian standard jar, are best suited for being positioned either above a fire or above a hot bed of coals. By elevating the pot, the relatively wide, broad base of the jar is the area closest to the cooking heat, making it the primary location for heat transference (García Arévalo 1978:265). Among Mississippian standard jars, heat transference through the lower portion of the vessel is also enhanced by the relative thinness of the walls and base.

Little research has explored how Mississippian standard jars in the Black Warrior valley were used. David Hally found exterior soot deposits on the body and base sherds of small and medium sized Mississippian standard jars dating to the Mississippian Barrett and Beaverdam phases of Northwest Georgia, suggesting they were regularly used over an open flame (1984:62, 1986:281). However, radiant heat cooking can be a more labor-efficient and a more easily controlled cooking technique than direct fire cooking. As will be demonstrated in the following chapter, coals made from hardwoods remain hot for quite some time, and only need to be replenished every 45 minutes to an hour, unlike direct fire cooking which requires more frequent stoking. When making hominy, for which cooking time likely lasted several hours, these may have been important considerations.

Not only is hot coal cooking well adapted for long-term heat-treatment, but so too is coarse-shell tempering. The greater thermal shock resistance afforded by coarse shell temper would increase a vessel's ability to withstand prolonged heat exposure, a quality that directly translates into a longer use-life for any cooking pot regularly used (Steponaitis 1983:45).

## Principal Components Analysis of Mississippian Standard Jars at Moundville

By describing the shape, qualities, and technical features of the Mississippian standard jar, previous researchers demonstrated that it was an effective cooking pot, one particularly suited for boiling (Hally 1986; Steponaitis 1983). However, I want to take this statement a step further and propose that the jar was a specific nixtamalizing tool, adapted for long-term boiling. I approach this problem from a morphological standpoint. Following both Linton's (1944) and Braun's (1983) suggestions that cooking pots are first and foremost tools adapted for specific tasks, I propose that if the Moundville Mississippian standard jar was a tool essential to the hominy foodway, and that foodway was practiced roughly unchanged throughout Moundville's history, then the qualities of the vessel that made it a tool would demonstrate greater resistance to change over time compared to other, stylistic qualities.

This proposal is founded on a "communities of practice" model, which holds that the process of pottery making took place within a series of culturally embedded practices and structural processes rooted within the physical steps of ceramic production (Lave and Wegner 1991; Regnier 2015:13; Stark 1998). Stylistic choices, while subject to structural conditioning, are also based on individual taste and experience as well as social conditioning, and thus are subject to greater variation and change over time (Dietler and Herbich 1998). Technological choices, on the other hand, are subject to a different set of structural conditions based on practice and performance, and as such, are less likely to vary over time, providing that the tasks for which these choices are adapted to also remain relatively constant (Schiffer et al. 1994). From the viewpoint of a producer, technological features are more uniform because certain features are necessary to ensure the produced item functions properly. How an item performs is thus an element of the mental prototype, or image, for how that item should be constructed.

Although there are very few either whole or partially reconstructed Late Woodland cooking vessels from the subject area, a sizeable number of whole Mississippian standard jars have been recovered from Moundville, primarily from burial contexts excavated during the early part of the twentieth century. While these vessels may have ended as mortuary items, to date, there has been no recorded instance of a single dedicated mortuary vessel recovered from Moundville, including the Mississippian standard jars, that each of these items had previous use-lives before ending as mortuary items (McKenzie 1965:51-53; Phillips 2012; Steponaitis 1983:33-34; 69). Drawing on the whole jar assemblage from Moundville, I examined two samples: whole, unburnished jars from the Moundville I phase (ca. A.D. 1120-1250) burial contexts; and the same from Moundville II/III phase (ca. A.D. 1250-1520) burial contexts. Of the 1,121 whole vessels recovered from mortuary contexts at Moundville, 254 are unburnished, shell-tempered globular jars (Steponaitis 1983:304-334). Of these, only 39 are from Moundville I phase burials, of which only 22 are currently available for analysis. Eighteen Moundville II/III phase jars were randomly selected and included as well, bringing the initial total sample to 40 jars. However, two jars were extreme size outliers, leaving the final sample size at 38.

Moundville jars ultimately used as mortuary vessels overwhelmingly fall into the small size class defined by Taft (1996), with orifice diameters ranging between 6-10 cm. For each jar, I took eleven vessel body measurements: five evenly spaced body width measurements beginning at the point of vertical tangency on the neck to within one centimeter of the base, two height measurements from the rim and from the throat to the base, handle height, handle thickness, and both rim and base thickness (Figure 6.6). Because of their size, only five body measurements

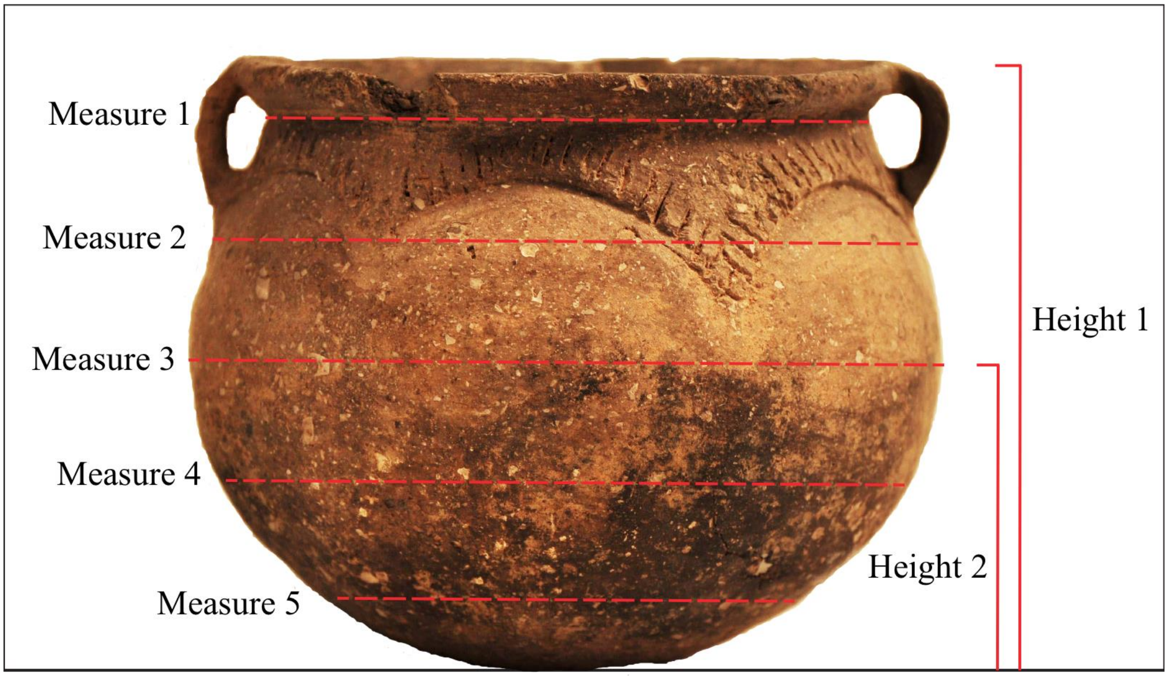


Figure 6.6: Morphological measurements taken on Mississippian standard jars for this analysis. Measurement one is at neck, measurement five is one centimeter from base, and two, three, and four are evenly spaced between one and five.

were sufficient (Regnier 2006; Shennan 1998). Although most morphological measurements were taken on the vessels themselves, the five body width measurements were taken from photographs. Maintaining a constant distance between the camera and the vessel being photographed, and using a sensitive photographic scale consistently positioned parallel to the central plane of the vessel, I photographed each vessel and then used Adobe Photoshop and Illustrator to measure the bodies of the jars (Figure 6.7) (Appendix A). A drawback to this method is that the measurements acquired are indirect. Thus, these values cannot be compared to other measurements from other assemblages. However, because they are proportionate, they are comparable to one another.


Figure 6.7. Example of measurements taken from photographs for this analysis.

The stylistic variables used in this analysis were the number of handles, handle decoration, rim decoration, and surface treatment. While handles are a clear technological feature of Mississippian standard jars, the number of handles on an unburnished jar from Moundville can range from two to over 16 (Steponaitis 1983:70). Arguably, rim thickness could also be included as a stylistic variable. Early in the Moundville ceramic sequence, folded and folded-flattened rims were common on unburnished jars, although this trait is missing by the beginning of the Moundville II phase (ca. A.D. 1250), making them excellent chronological markers (Knight 2010:16). In this analysis, though, they were included as technological traits because rim thickness has the potential to also be a functional feature.

Following James Skibo's (1992, 2013) recommendations, information on use alteration was also collected. During cooking, there are three different classes of sooting that can occur on

| *Variable* | Measure 1 | Measure 2 | Measure 3 | Measure 4 | Measure 5 | Height 1 | Height 2 |
|---|---|---|---|---|---|---|---|
| Measurement 1 | — | — | — | — | — | — | — |
| Measurement 2 | .931 | — | — | — | — | — | — |
| Measurement 3 | .878 | .986 | — | — | — | — | — |
| Measurement 4 | .834 | .956 | .987 | — | — | — | — |
| Measurement 5 | .700 | .804 | .839 | .878 | — | — | — |
| Height 1 | .657 | .791 | .818 | .796 | .535 | — | — |
| Height 2 | .799 | .838 | .800 | .762 | .498 | .836 | — |

Table 6.1. Pairwise Pearson correlation of standard jar measurements.

the exterior surface of a vessel, but the one most informative for archaeologists interested in cooking position and heat source is that which occurs when airborne resins adhere to the comparably cooler vessel surface (Skibo 2013:90-91). Visible to the naked eye, this sooting on the vessel exterior is a direct indication of cooking in or over a fire, while the location of this sooting pattern is an indication of the vessel's position in relations to the fire (Skibo 1992:157-161). Exterior sooting does not occur when vessels are suspended over hot coals because hot coal cooking is flameless and smokeless (García Arévalo 1978:265). A second form of use alteration,interior carbonization, helps determine what mode of cooking (i.e., wet-mode or dry-mode) was predominately employed. In wet-mode cooking, including "wet" culinary techniques such as boiling, an interior carbonized ring can occur above the waterline, whereas in dry-mode, including "dry" culinary techniques such as parching, carbonization is found throughout the interior (Skibo 2013:97). For this analysis, I examined each vessel for both exterior and interior sooting, as well as interior pitting and abrasions.

| *Variable* | *Component 1* |
|---|---|
| Measurement 1 | .909 |
| Measurement 2 | .988 |
| Measurement 3 | .988 |
| Measurement 4 | .973 |
| Measurement 5 | .822 |
| Height 1 | .848 |
| Height 2 | .864 |

Table 6.2. Results of the Principal Components Analysis.

Using SPSS, a pairwise Pearson correlation indicated that the vessel body data demonstrate a strong positive correlation ($p < .001$) (Table 6.1). Conversely, a pairwise correlation indicated no statistically significant relationship for any of the stylistic variables, either in the early or late sample. Interestingly, two morphological features that were not correlated with the rest of the vessel body measurements were rim thickness and base thickness. However, the importance of base thickness in the Mississippian standard jar is probably best understood in relation to not the vessel width or height, but to wall thickness. Along these lines, Hawsey demonstrated that the ratio of base to wall thickness in Black Warrior valley early Mississippian standard jars is 1.0 (Hawsey 2015:58).

The vessel body width and height data were then used in a principal components analysis (or PCA) with individual vessels serving as the units for analysis. Principal components analysis is used to assess underlying patterns or structures within a dataset (Shennan 1998:288), and along with factor analysis, has been successfully used to describe vessel shapes and to assess differences in vessel forms within and between assemblages (Regnier 2006; Shennan and

Wilcock 1975). The PCA for this research extracted a single, unrotated solution underlying the seven correlated body measures (Eigenvalue = 5.865), accounting for 83.78 percent of the variance exhibited in these data (Table 6.2). This single solution again suggests that the globularity is highly consistent among small, unburnished Moundville jars, and consequently that the jar body is the important element of this tool.

To assess whether there are significant differences between the early and later unburnished cooking jars, I used an ANOVA to compare the morphological measurement means between the early and late jar samples. Importantly, these data indicate that there is no statistically significant difference found between the general contours of early and late jars from Moundville ($F = .100$; $p > .05$). Thus, stylistic variation aside, the bodies of both early and late unburnished jars are virtually indistinguishable.

Finally, there were almost no indications of visible use alteration related to cooking activities on either the interior or exterior of any vessel analyzed. While fire clouding was common, this was clearly a by-product of the ceramic firing process, and not related to culinary activities. Additionally, there were no indications of interior pitting or use alteration detected on any other portion of these jars. While this differs from Hally's observations of Barnett and Beaverdam phase Mississippian standard jars, it does conform to expectations for hot coal cooking.

## Stylistic Variation in Early Moundville Standard Jars

In the perennial debate over the origins of a Mississippian identity within the Black Warrior Valley, some researchers have used the lack of diversity among West Jefferson phase and early Moundville I phase vessel assemblages as evidence for a large-scale migration of a foreign population into the area. Jenkins (2003), for example, has demonstrated that between A.D. 1070-1120, there appears to be no developmental sequence between the endemic Woodland ovaloid vessel form and the Mississippian globular form, a sequence that he proposes would be expected were local populations learning to produce a new technology. He uses this observation to suggest that, instead, migrant populations moved into the area bringing the Mississippian cultural tradition with them, leaving the endemic Woodland cultural populations to either assimilate or migrate elsewhere.

However, the basic theory underlying this assumption may be false. Local populations were not composed of amateur craftspeople learning a new technology, but instead professionals expanding the scope of their ceramic practices. As such, a “learning curve” in the form of a developmental ceramic sequence that may be highly visible among novice or amateur ceramists acquiring a new skill may not be represented in the body of early shell-tempered jars manufactured by ceramic professionals.

This is not to say that there is no evidence of a developmental sequence to be found within early Moundville standard jars. Continuing to draw on a “communities of practice” model, stylistic variation in rim treatments among early Mississippian jars may be a better indicator of a population learning to produce a new form. As noted, while technological choices are subject to structural conditioning based on performance and are thus less likely to demonstrate variety, stylistic choices, while also subject to structural conditioning, are additionally based on individual taste and experience, and thus are subject to greater variation

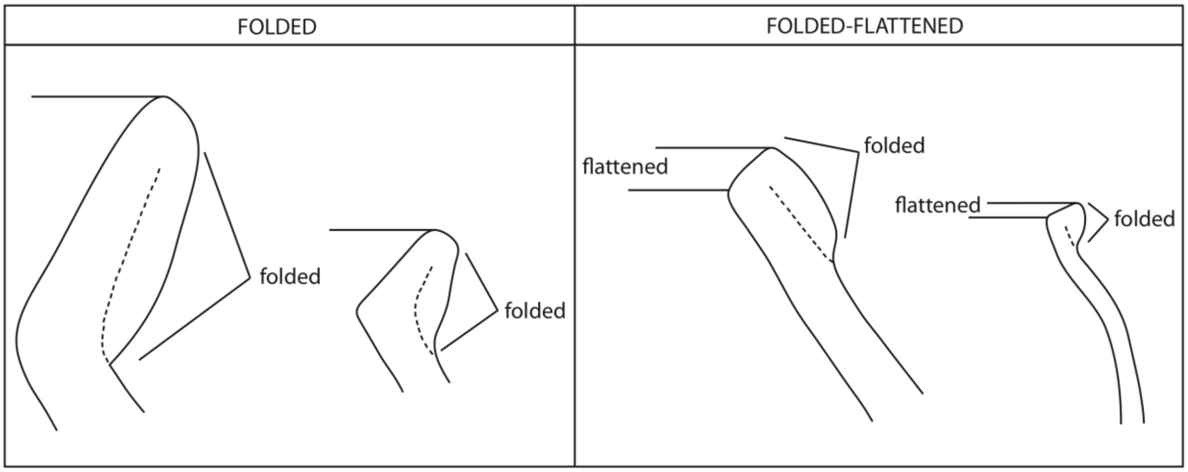


Figure 6.8. Examples of folded and folded-flattened rim treatments. (After Steponaitis 1983:184.)

(Dietler and Herbich 1998). Purely stylistic features are not conditioned by mechanical performance. Instead, “high-visibility” stylistic features signal cultural and social competence, while “low-visibility” stylistic features, like the design of a jar rim, signal greater idiosyncratic differences in production style (Mills 2016; Mills et al. 2015). Greater variation in rim treatments, which would be considered “low-visibility” stylistic features, during the Moundville I phase may be an indication of idiosyncratic artistic expressions of a local population learning a new technology, a feature that we would expect to become standardized over time as practitioners became more and more accustomed to producing and using a Mississippian standard jar. Less variation in rim treatments would be an indication of practitioners who have already standardized this feature, and thus an indication that the crux of a Mississippian identity within the subject area can largely be attributed to the influx of migrant populations moving into the area.

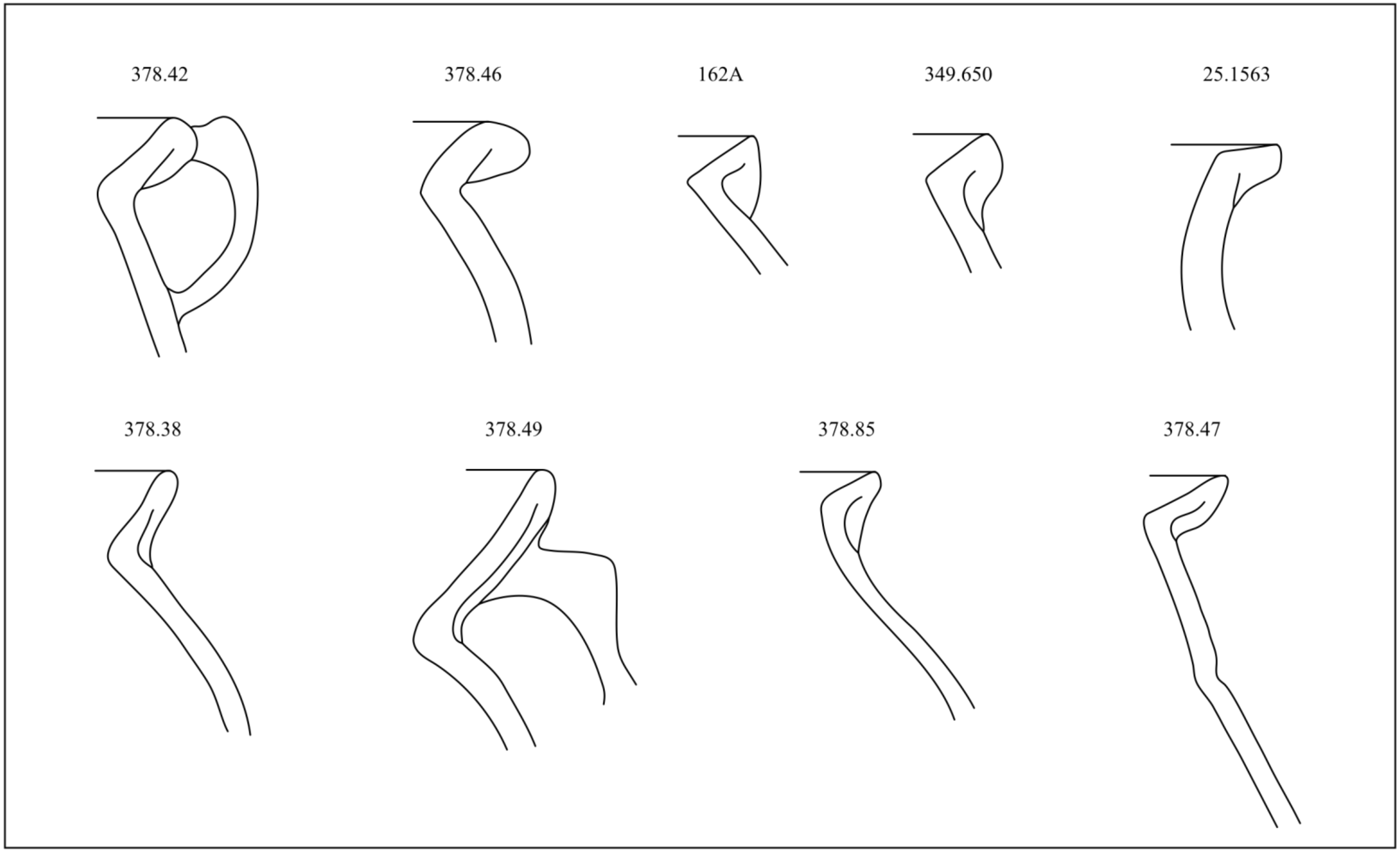


Figure 6.9: Variety in rim treatments exhibited in the unburnished, standard jar rims recovered from the PA Tract and ECB excavations areas at Moundville. (After Scarry and Scarry 1995, Figure 32:a, b, c, d, e, f, g, h, and i. Accession numbers have been shortened to correspond to this research.)

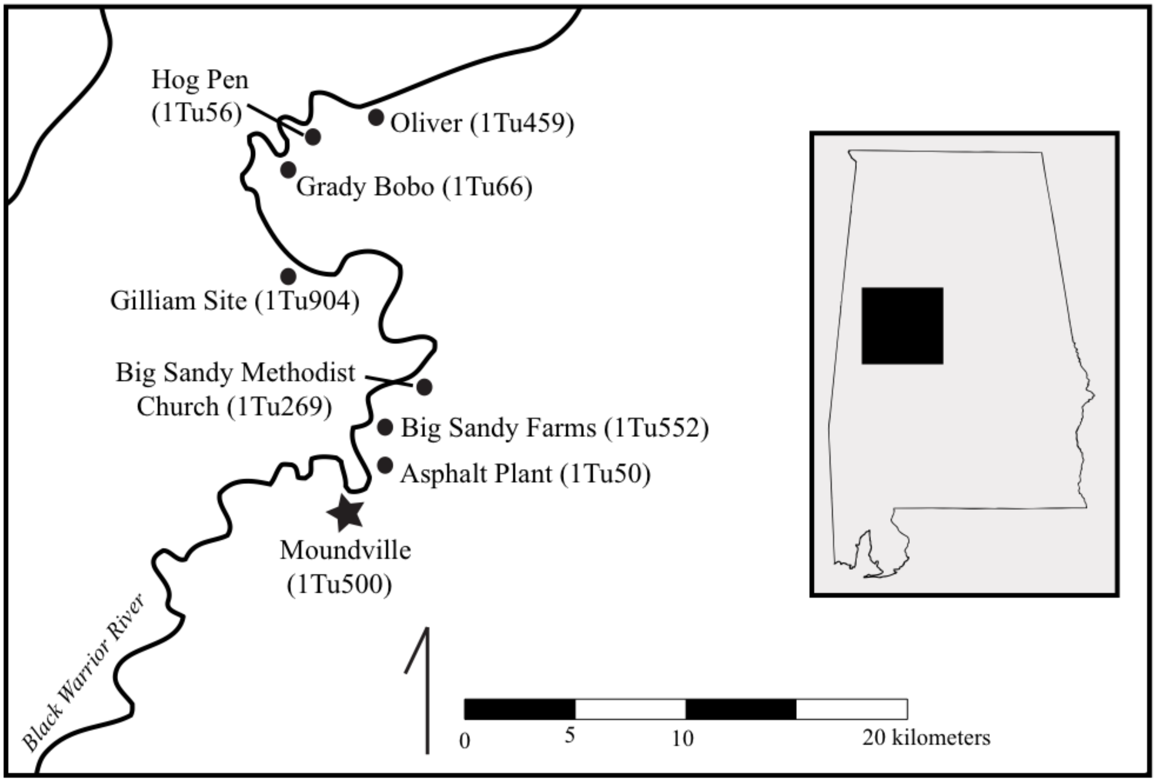


Figure 6.10. Moundville I phase sites that contributed to the jar rim stylistic analysis.

Folded and folded-flattened rim treatments on Moundville standard jars are excellent chronological markers for the Moundville I phase because they vanish by the beginning of the Moundville II phase (A.D. 1250). Both rim treatments represent the addition of an extra coil of clay used to reinforce the lip of a jar. Folded rims are described as those in which the rim is “folded over to the exterior, and thereby thickened,” while folded-flattened rims are not only thickened, but the lip is also flattened (Steponaitis 1983:71-72) (Figure 6.8). Despite this simplistic distinction, in practice, researchers have encountered sorting problems with these two

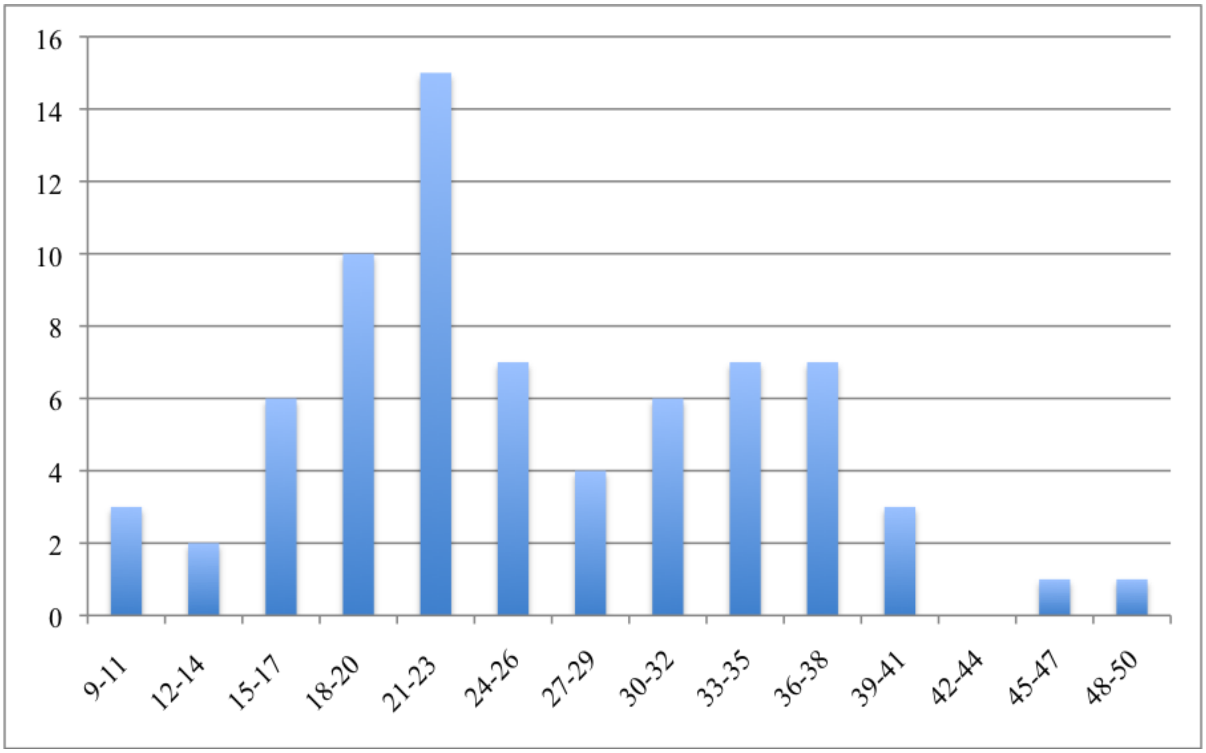


Figure 6.11. Histogram of standard jar orifice diameters (in centimeters) from Moundville I phase sites in the Black Warior Valley. The class sizes correspond to Taft's (1996) size classes.

categories, finding that they collapse too much variation—there are several ways a rim may be folded, from a fold that is limited to the lip of the vessel, to folds that can run various lengths down the outer edge of the neck (Knight 2010:47; Scarry 1995:Figure 32) (Figure 6.9). Because of this, Knight (2010:47) has noted the possibility of a stylistic sequence between folded- and folded-flattened rims, but without further work, little more can be said.

To assess stylistic variation among unburnished jar rims, I reanalyzed ceramic assemblages from 30 contexts pulled from eight Moundville I phase sites, each dating between A.D. 1120-1250 (Figure 6.10). All collections used for this analysis are currently housed in the Erskine Ramsey Archaeological Repository in Moundville, Alabama.  Following the expectations outlined above, I proposed that there was greater stylistic variation in Moundville I phase standard jar rim treatments than previously understood, suggesting that the Mississippian cultural expression in the Black Warrior Valley was largely comprised of local potters learning to craft and practice a new foodway, and not a new population moving into the area and largely replacing an endemic population. Further, following Knight's suggestion, I also proposed that there was a developmental sequence between folded- and folded-flattened rims that would chart chronologically from early Moundville I to late Moundville I.

Using the exclusive landmarks and modes Knight (2010) identified for segregating vessel forms at Moundville using sherds, for all globular, shell-tempered jar rim sherds, I recorded information on style, rim treatment, temper, and the number and style of handles. Using a Starrett dial indicator (adopted after Plog 1985), I also gauged the outer orifice diameter for each jar (Barrier 2007:32-34) and then drew the profile for each shell-tempered jar rim sherd representing 5% or more of the total rim to accurately determine the orientation of the fragment and, thus, the size of the jar. Each sherd profile drawing was scanned, then uploaded to Abode Photoshop and Illustrator where they were digitized and appropriately oriented. The features used to produce this stylistic seriation include first, whether or not a coil had been added to the lip; if one had been added, then I noted whether the lip had been beveled, if the lip had been flattened and the degree to which this occurred, the shape of the lip, the curve of the rim, and the presence of inflection points along the rim. In total, 125 standard jar rim sherds were analyzed, although only 83 met the criteria necessary to be included in this analysis (Appendix B).

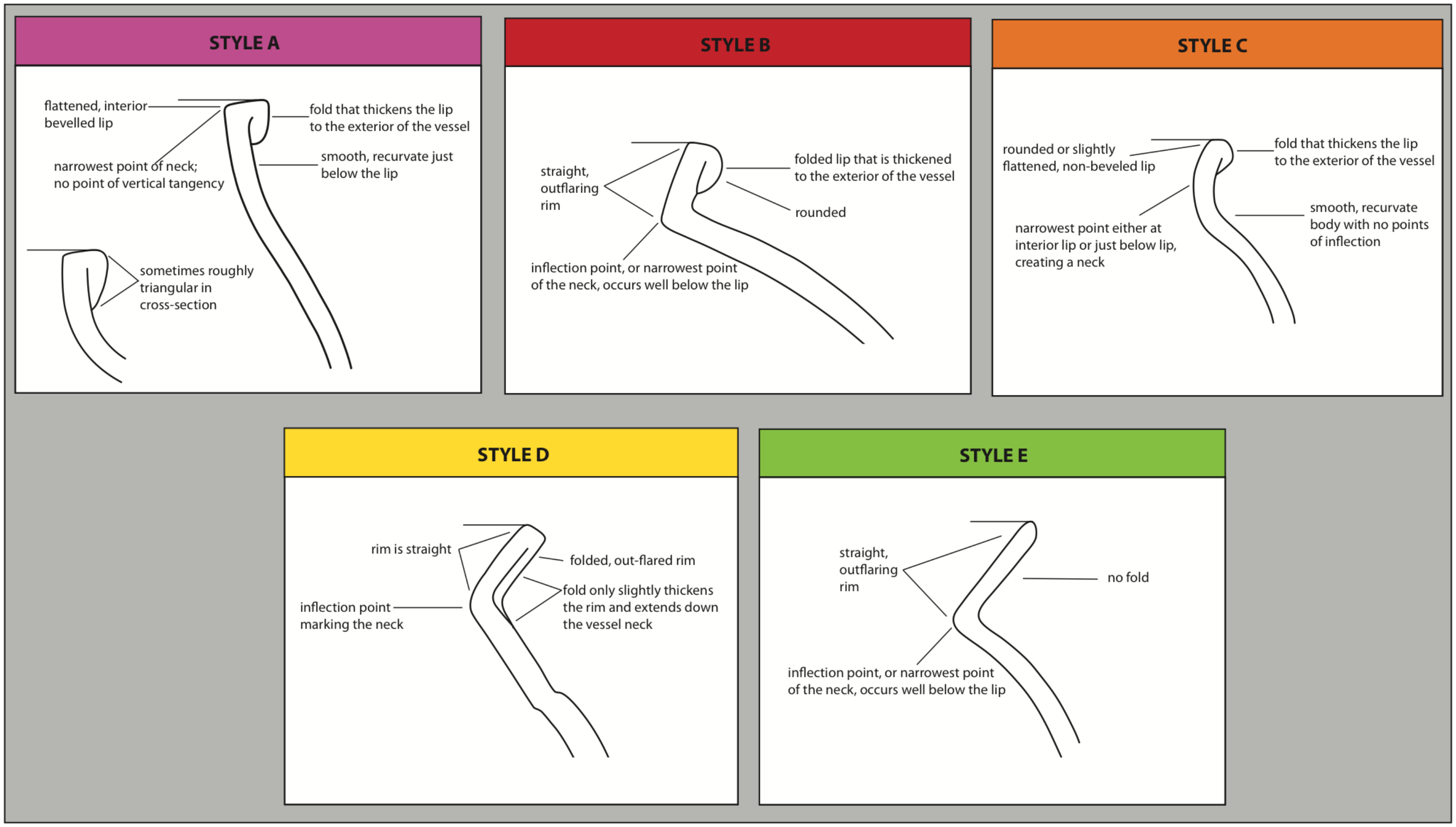


Figure 6.12. Five distinct styles of early rim treatments identified during this research.

The analysis allowed the definition of five distinct styles (Figure 6.12):

- Style A (n = 30) rims have a flattened, interior-beveled lip that is thickened to the exterior by a fold, which sometimes results in a roughly triangular cross-section. The upper body shape of the jar below the lip is smoothly recurvate. In many cases, the narrowest point of the neck is at the interior edge of the lip, resulting in no point of vertical tangency, or what Steponaitis referred to as "neckless" jars (1983:69-70). In other instances, there is a point of vertical tangency just below the lip, creating a neck on the vessel. Finally, many Style A rims come from early Moundville I phase contexts (n = 26, or 78%), although there are several (n = 4, or 23%), notable, later exceptions.
- Style B (n = 5) rims have folded lips that are thickened to the exterior and are rounded. Well below the fold, there is an inflection point creating a neck with a relatively straight, outflaring rim. While three of these rims come from late Moundville I contexts, two come from early Moundville I contexts.
- Style C (n = 22) rims have folded lips that are thickened to the exterior, with a rounded or very slightly flattened, non-beveled lip. The body below the lip is smoothly recurvate with no inflection points. The narrowest point of the neck maybe at the interior lip, or there may be a point of vertical tangency just below the lip, creating a neck below the lip. Like Style A, many of the Style C rims come from early Moundville I contexts (n = 18, or 82%), but nearly 18% (n = 4) come from late Moundville I contexts.
- Style D (n = 11) rims are folded, out-flared rims with a distinct inflection point marking the neck of the vessel. The rim is straight, and the fold, which only slightly thickens the rim to the exterior, extends the full length of the rim down to the vessel neck. All examples of Style D come from late Moundville I contexts.

- Style E (n = 15) rims have direct, unfolded lips. Rims are straight and outflaring, with a distinct inflection point at the vessel neck. Each of these rims come from late Moundville I contexts. Non-folded rims are the dominant form of standard jar rim treatment throughout the rest of Moundville's history.

It seems that while the body of the Mississippian standard jar at Moundville was consistent throughout Moundville's history, conforming to a mental model of what the body of the jar should look like, rim treatments during early Moundville were far more variable. This research also upholds what previous researchers have noted, that the practice of adding an additional coil to the lip is a chronologically early practice and begins to fall out of favor by the late Moundville I phase (Figure 6.13). However, it challenges the view that there were only three rim styles during this early period, as it further distinguishes between the categories folded- and folded-flattened. Style A, for example, contains a number of rims that would, under the earlier classification, be categorized as folded-flattened, but not all of them. A number of what would traditionally be categorized as folded-flattened also fall into Style C. The important difference between these two styles is the flattening that occurs in Style A results in an interior-beveled lip that, combined with the fold, appears roughly triangular in cross-section. In Style C, the flattening and the fold are both more rounded with no beveling on the lip. I noted that the interior bevel of Style A is analogous to the angled interior rim style of Style C, and that specimens of these two styles may be very similar. Further, Styles B, C, and D distinguish between two different kinds of folds—one that extends the length of the rim (Style D) and another that is more bulbous and ends well before the point of inflection (Styles B and C).

Originally, it was my intention to produce a stylistic seriation of standard jar rims styles during early Moundville. Stylistic seriations are sequences in which like items, such as ceramic

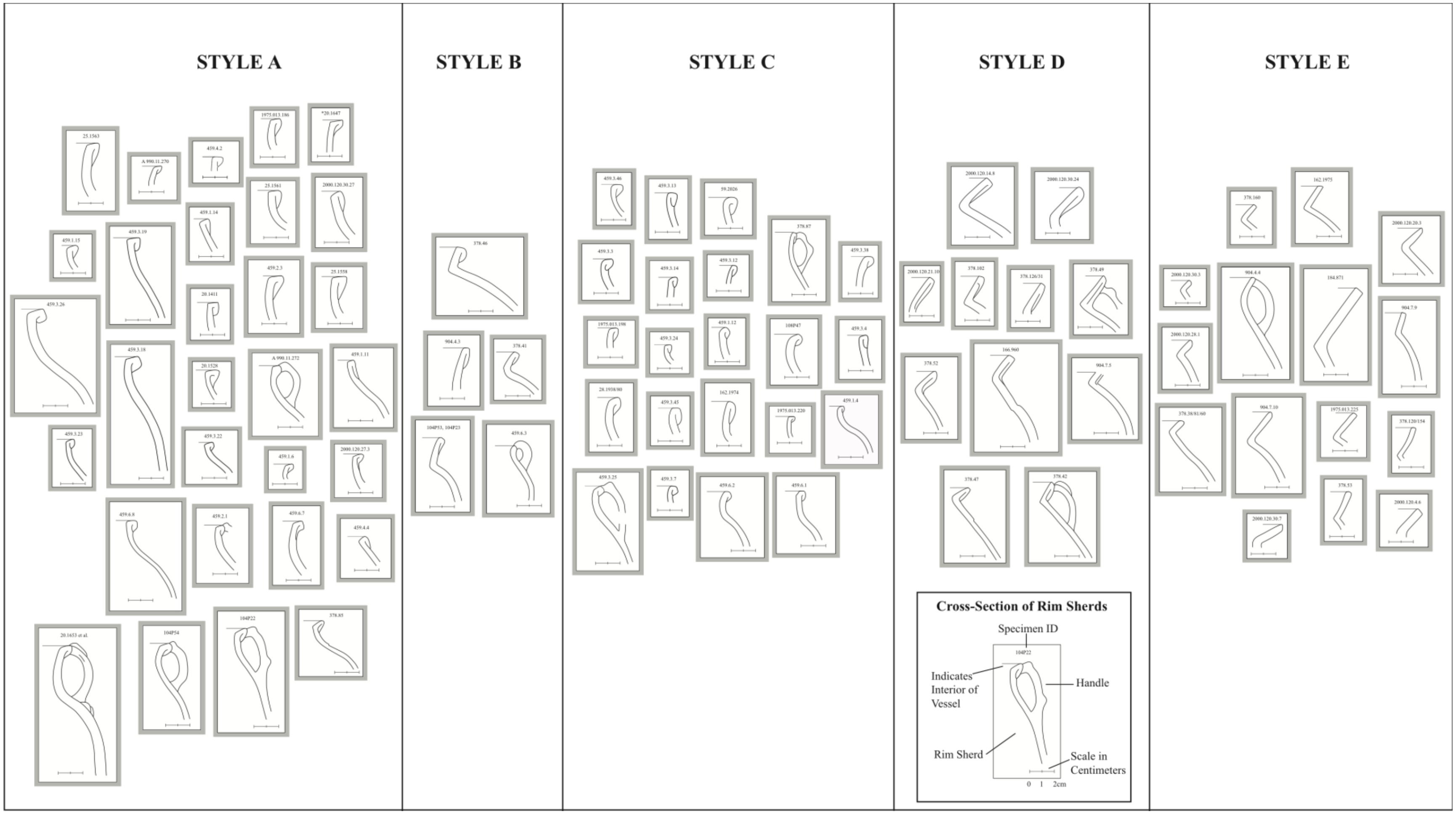


Figure 6.13. Reclassification of Moundville I phase jar rim treatments.

vessels or in this case jar rim treatments, are sorted into stylistic categories that are placed along a linear continuum based on similarity of various identified features within that particular classof item. Stylistic seriations are used to demonstrate developmental sequences among styles, and thus many times, have a temporal component as well (Rice 1987:436-437). While Figure 6.13 does present bounded stylistic categories, and Figures 6.14 and 6.15 suggest that there may be a developmental sequence over time, this statement is misleading. Although at first glance there appears to be a developmental continuity between Styles A and B (from a triangular to a more rounded lip and the increasing prominence of a point of inflection below the interior lip) as well as a developmental relationship between Styles D and E, there is no apparent morphological continuity between Styles B and C or Styles C and D. Further, Style A shares attributes with Styles B and C, while Style B share attributes with both Styles D and C. However, there is a distinct chronological shift, from Styles A, B, and C that contain the majority of rim treatments recovered from early Moundville I phase assemblages, to Styles D and E, which contain the majority of rim treatments recovered from late Moundville I phase assemblages. While there appear to be specific traits in which there is a developmental relationship, as a whole, the sequence lacks an internal cohesion that would suggest a developmental sequence (or, to borrow a phrase from biology, the sequence lacks an internal phyletic order) and that would thus qualify it as a stylistic seriation.

However, if this is not a stylistic seriation, then what is it? Basically, it is a simple reclassification of rim forms that exhibit a rough, overlapping chronology. In lacking an internal phyletic order, this reclassification demonstrates that during the two periods in question (early and late Moundville I), there were several, overlapping rim forms and styles in fashion at any

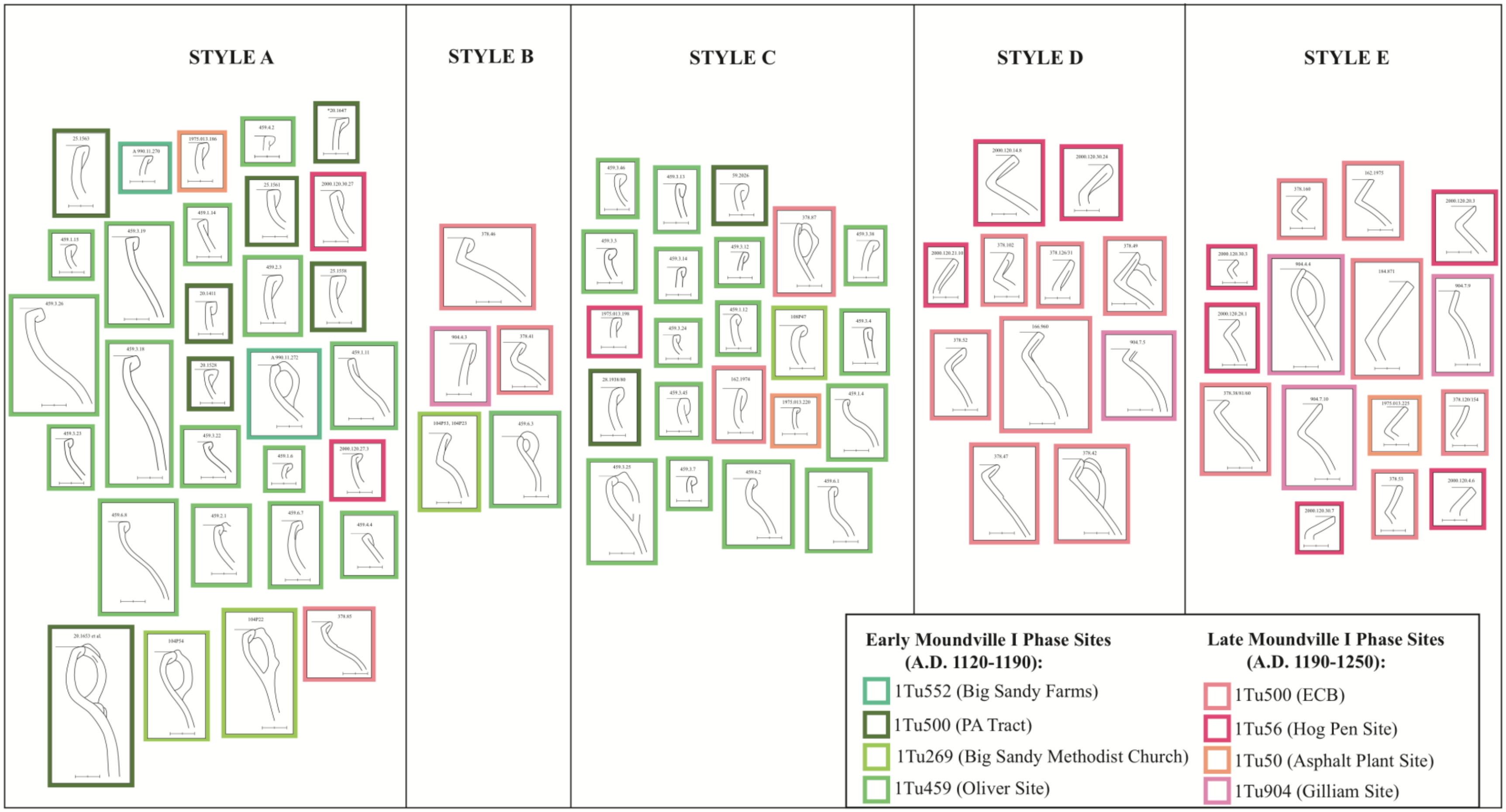


Figure 6.14. Reclassification of Moundville I phase jar rim treatments coded by site and chronological placement.

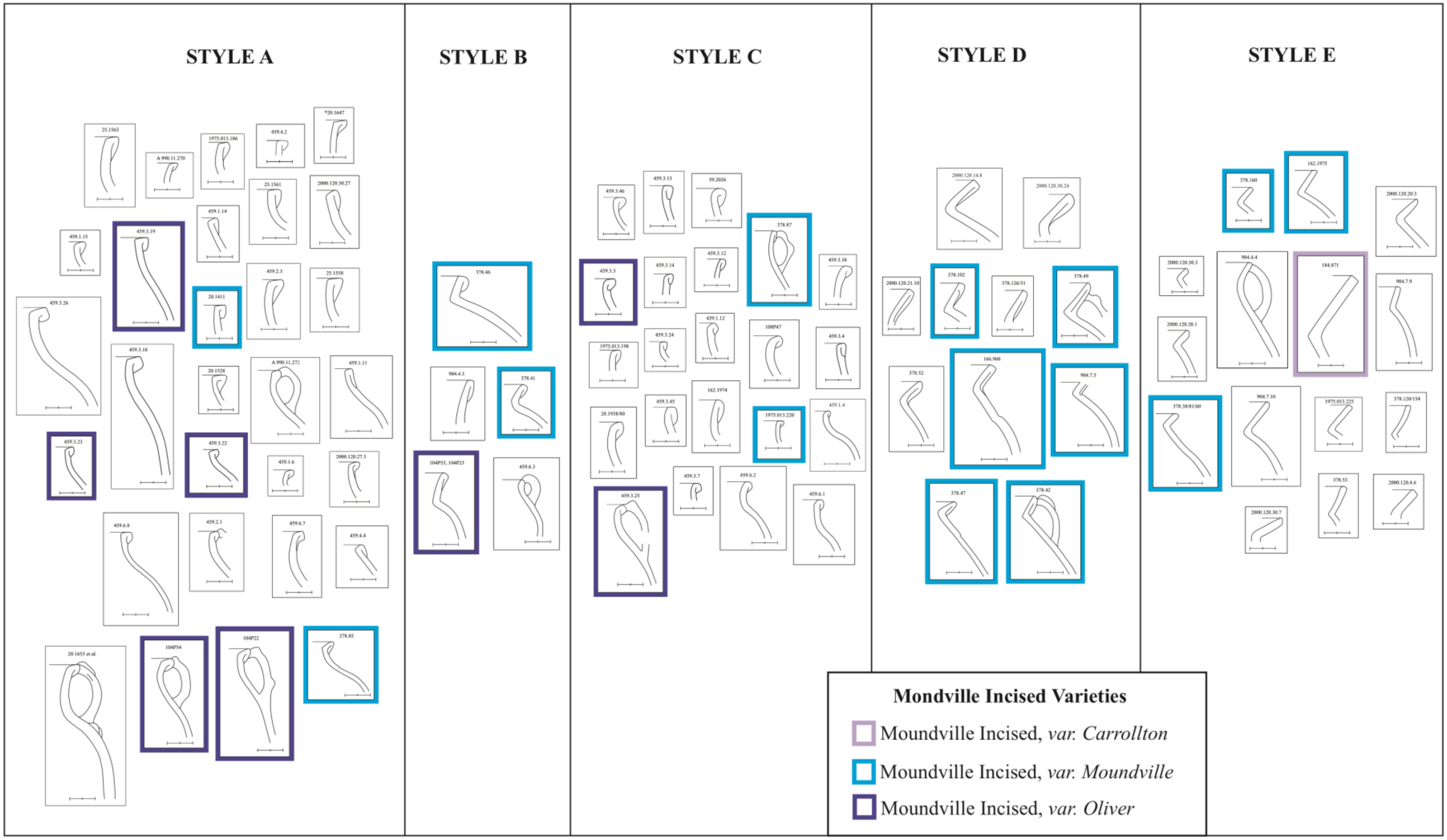


Figure 6.15: Moundville I phase standard jar rim treatment reclassification coded by Moundville Incised varieties.

given time, suggesting that instead of one style or form developing into another, there were several popular rim styles that were practiced between A.D. 1120-1250, all of which were eventually eclipsed during the Moundville II phase by Style E, or non-folded, out-flaring rims. The multiple styles highlighted in the reclassification conform to the expectation established earlier, that low-visibility rim styles were more idiosyncratic than high-visibility incised styles.

Moundville Incised is the local, decorative incising tradition that appears on the bodies of unburnished Moundville jars. Four varieties of Moundville Incised have been articulated, three of which are characterized by incised arches that are placed end-to-end encircling the jar shoulder (*vars. Carrollton*, *Moundville*, and *Snows Bend* [Steponaitis 1983a:23]), and a fourth by incised rectilinear motifs again encircling the jar shoulder (*var. Oliver* [Knight 2010:34]). Further, on some jars, the area just below the lowest incised arch is pushed out, creating broad lobes on the body of the jar. While rim forms are largely uniform by the end of the Moundville I phase (A.D. 1250), only the decorative style Moundville Incised, *var. Oliver* is confined to the Moundville I phase. Moundville Incised, *var. Moundville* and *var. Carrollton* are both found in subsequent Moundville II phase contexts (A.D. 1250-1390), although both reached their peak popularity during the late Moundville I phase (Knight 2010:16), stressing that high-visibility stylistic choices are not only less idiosyncratic than low-visibility stylistic choices, but are also subject to different forms of structural conditioning.

While I was unable to produce a stylistic seriation of jar rim forms, I do not believe this negates my original hypothesis, that within these assemblages, there is evidence that potters within local, endemic communities were learning a new ceramic skill essential to and indicative of the hominy foodway. However, this evidence is not in the form of a learning curve as I

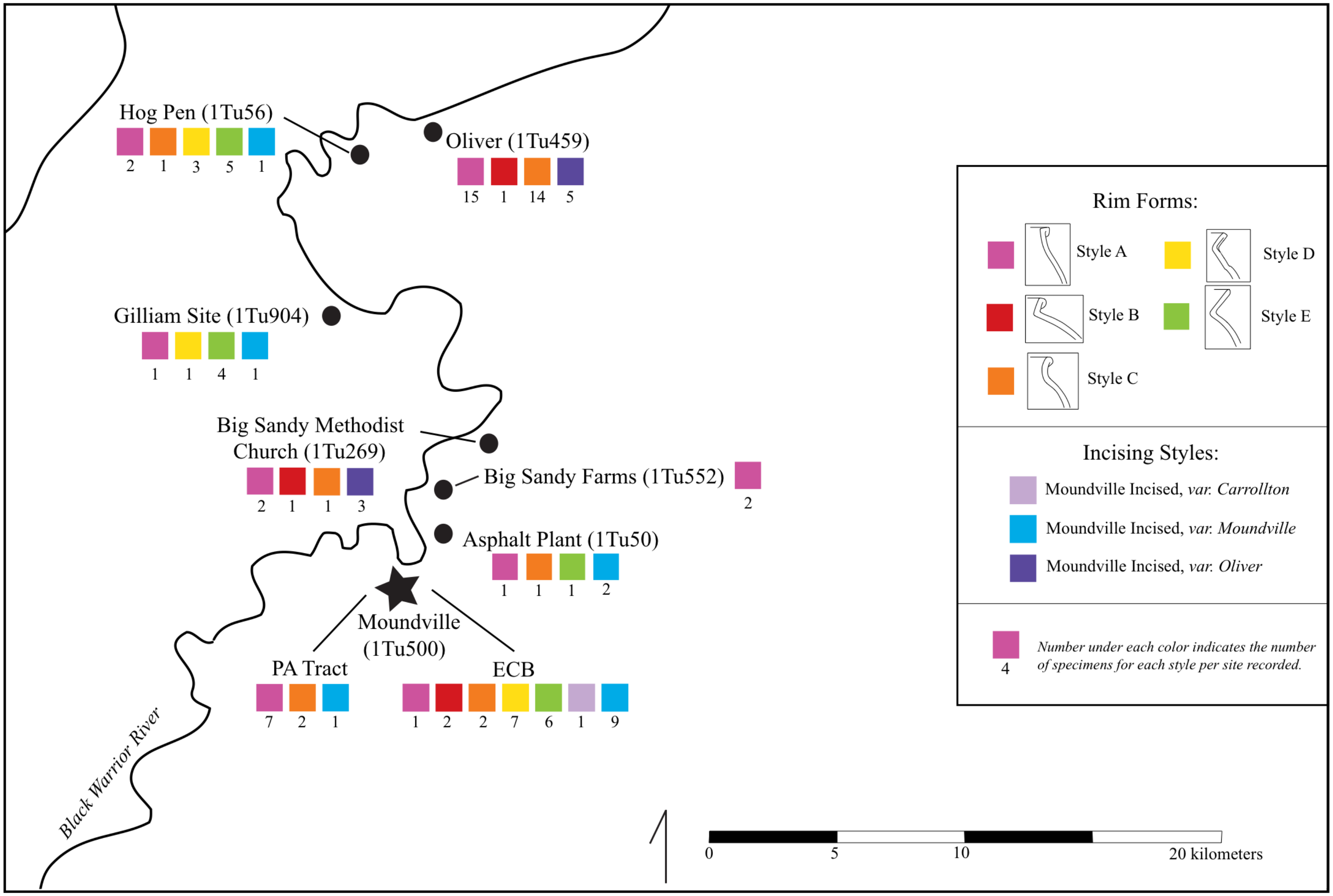


Figure 6.16. Map demonstrating the communities of practice of the standard jar form during early Moundville, articulated through the ceramic analysis presented in this chapter.

initially proposed. Instead, what this research demonstrates is that there were multiple, contemporaneous rim forms and modes of incising on Mississippian standard jars popular during the Moundville I phase. The existence of these contemporaneous styles suggests that there were multiple communities of practice active during this time, with each community initially learning various styles of the standard jar (*sensu* Crown 2001; Stark 2006). That the hallmarks of these communities of practice are not confined to specific localities, but are instead interspersed among various communities and throughout the Moundville I phase (Figure 6.16) suggests an open, relatively fluid social system. The opportunities for interaction with peoples and materials created by this fluidity eventually culminated in the emergence of stylistic homogeneity, seen not only in the “low-visibility” standard jar rim treatments, but also in the “high-visibility” standard jar incising traditions. Thus, while the body of the jar, or what makes the jar a tool, is homogenous throughout the Black Warrior Valley during the Moundville I phase, various high- and low-visibility styles were taught, practiced, and combined to produce a heterogeneous stylistic series.

Researchers rightfully caution against unilaterally equating ceramic styles with ethnicity (Mills et al. 2015:8). Thus, the communities of practice of the standard jar outlined above should not, alone, be considered indicative of the existence of multiethnic communities during early Moundville. However, there are two other lines of archaeological evidence that, when combined with this research, support this proposition. As noted in Chapter 5, Wilson (2008:50) proposed that the architectural diversity seen during the early Moundville I phase represents a developmental sequence, from single-set post structures to “hybrid” structures to wall-trench structures, with the latter becoming the dominant architecture form by the late Moundville I phase. However, like the standard jar stylistic reclassification presented above, Wilson may not, in fact, have described a developmental sequence, but instead imposed an order on what were otherwise disparate architectural traditions. In other words, each of these traditions may not be connected, but instead may be representative of different contemporaneous architectural traditions that were constructed and practiced when non-local peoples moved into the area.

Second, as noted in Chapters 4 and 5, early Moundville ceramic assemblages, while primarily composed of Mississippian style ceramics, are also typically composed of some small amounts of Late Woodland West Jefferson style ceramics (usually no more than 15%), as well as intermittent examples of non-local, non-Mississippian styles (Scarry 1995). Similarly, Mississippian style sherds typically make-up a small percentage of West Jefferson phase assemblages. In both cases, these small percentages are rarely considered to be indicative of contemporaneous cultural expressions, but instead as ceramic palimpsests as the Mississippian ceramic tradition replaced the endemic West Jefferson tradition. However, like the variety of architectural styles represented during early Moundville, the recovery of both Late Woodland West Jefferson wares and Mississippian wares from the same sites as well as in some cases the same features, may instead suggest that these traditions not only overlapped (instead of abutted) but in some areas were also coterminous, contributing to a socially and culturally diverse early Moundville landscape (Michals 2007:169-170; Scarry 1995:236). While I must again caution that ceramic styles are not wholly synonymous with ethnicity, the small but consistent presence of non-local ceramic styles present throughout early Moundville I ceramic assemblages in the valley further bolsters this proposition, suggesting that it is at least possible that people, and not just their items, were moving into the area.

Alone, each of the archaeological lines of evidence are not enough to argue that the early Moundville I communities located in the Black Warrior Valley were multi-ethnic or represent the movement of different groups of people into the Black Warrior Valley; however, together they present a strong argument for the presence of culturally and socially diverse communities that dotted across the early Moundville I landscape. Thus, while the communities of practice of the standard jar detailed here are insufficient to make an argument for multi-ethnicity, when combined with the architectural stylistic traditions present as well as the entirety of the ceramic assemblages from which they are taken, a rather simple scenario emerges: during the Late Woodland West Jefferson phase, small groups, either as individuals or as families, began to move into the area, a process that continued during the Moundville I phase, producing culturally heterogeneous communities composed of both local and non-local peoples. This was the stage on which the hominy foodway was disseminated.

### A Note on Early Jars and *Cucurbita pepo*

Another stylistic element specific to early Moundville jars, and thus an excellent chronological marker, is a form of incising that appears on the body between the neck and maximum diameter of the vessel. Commonly, potters would incise a series of wide arches that may or may not be accompanied by “eyelashes” incised above the uppermost incised arch (Knight 2010:34-35). In the three stylistic varieties that involve arches (Moundville Incised, varieties *Moundville*, *Carrollton*, and *Snows Bend*), often the lowest arch is beveled, creating a distinct lip. In many cases the visual effect extends to pushing out broad lobes in the body wall beneath the arches (Knight 2010:34) (Figure 6.17). This is the lobed treatment that Phillips

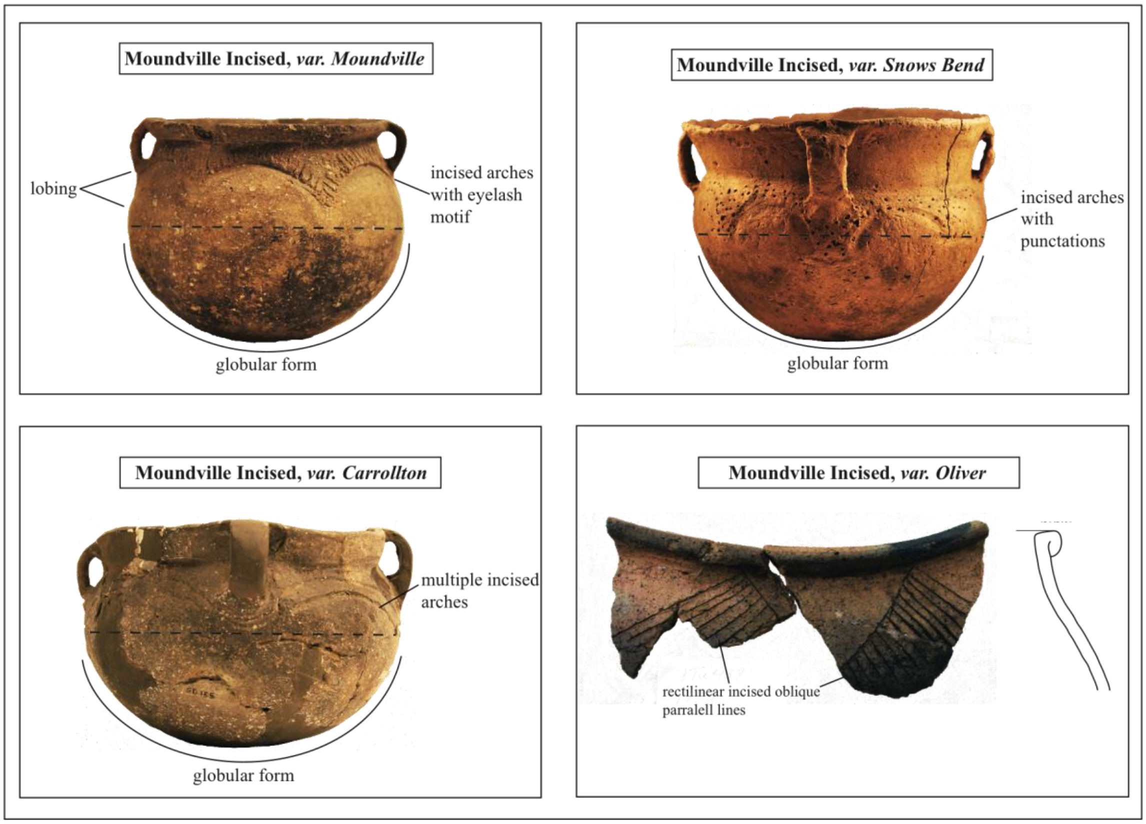


Figure 6.17. Moundville Incised, *varieties Moundville*, *Carrollton*, *Snows Bend*, and *Oliver*, with stylistic aspects resembling *Cucurbita pepo* highlighted.

(1939:658) characterized as a common stylistic element of the Mississippian standard jar found in many parts of the Early Mississippian world, and colloquially referred to as "melon lobing" (Phillips 1939:644). At Moundville, such lobing is confined to the style Moundville Incised, *var. Moundville* and is most popular chronologically during the early Moundville I phase (A.D. 1120-1190). However, lobing does not appear on all Moundville Incised vessels, but instead was irregularly utilized, nor is the treatment confined to any one early Moundville I context (Knight

Figure 6.18. Top left: Moundville Incised, *var. Moundville* jar (SD 265) demonstrating eyelash motif and lobing. Top right: sketch of *Cucurbita pepo* by Philip Gerog Friedrich von Reck, ca. 1736. Bottom left and right: three jars from the 2016 exhibit at the Mexican National Museum of Anthropology on ceramics and the natural forms they are based on. (Photos of Formative Mexican ceramics courtesy of Vernon J. Knight.)

2010; Scarry 1995). Like the incised eyelash design, lobing is a stylistic treatment that is completely absent by the beginning of the Moundville II phase (A.D. 1250).

Vernon J. Knight has referred to the lobed treatment found on some Moundville Incised standard jars more specifically as "pumpkin lobing," stating that it is "worth speculating on whether a natural prototype for the design might be found in a cucurbit" (Knight 2010:34).

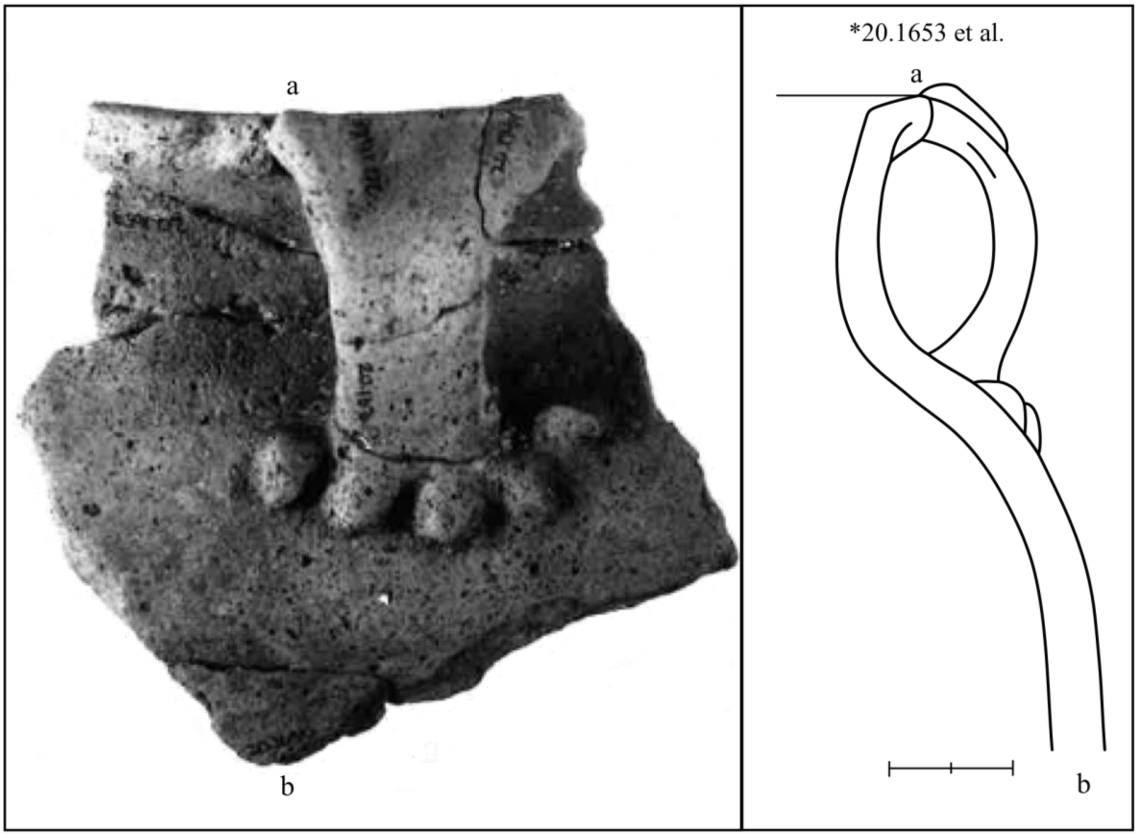


Figure 6.19. Handle from a Moundville I phase jar resembling the stem of *Cucurbita pepo.* Photograph on left is from Scarry and Scarry (1995:20). (Scarry and Scarry labeled this sherd 379.2 ECB, but in this research, it is labeled 20.1653.)

Indeed, Knight specifically suggests that it is the incised and beveled arches and lobing on these vessels that bear a striking similarity to the lobing most notable on squashes with examples of the longer eyelash motif reminiscent of the ridges that surround the stem, suggesting that these stylistic features are indexical references to the vegetable (Figure 6.18). Even some handle treatments on standard jars may be indexical references to the stem of the vegetable. While the pumpkin, *Cuburita pepo pepo*, was a late introduction to the Eastern Woodlands, lobing is also common among descendents of the endemic *Cucurbita pepo ovifera*, including the acorn squash. Indeed, while there is no formal typology of handle styles on early Moundville standard jars, several loop handles recorded during this research have features that bear a striking resemblance to the stem of many varieties of squash that are descendents of *Cucurbita pepo ovifera*, including acorn squash. The area where these handles affix to the jar widen and trail into the neck, and in several cases, contain either indentations or nodes where this occurs (Figure 6.19).

This similarity bears an important question: were Mississippian standard jars skeumorphs of *Cucurbita pepo*? Presently, there is no evidence that cucurbits other than bottle gourds (*Lagenaria siceraria*) were used either prehistorically or historically as storage or cooking containers, ruling out the possibility that these stylistic elements suggest the Mississippian standard jar was a skeuomorph in the strictest sense (i.e., indicating a technological relationship between the two; *sensu* Blitz 2015:666). In fact, with the exception of the *Lagenaria siceraria*, cucurbits make poor multi-use containers—while their fleshy rinds can be roasted, they are not easily dehydrated, making them highly susceptible to rot.

However, it is possible to use cucurbits as single-use containers. After removing the top and the pithy inside, the body can be filled with water and brought to a boil to cook a stew (which might also include hickory nut oil, acorns, or venison) or filled with other foods, such as fruits and vegetables, and thus used to steam the contents while roasting the shell of the cucurbit. For this form of use, the cucurbit would be placed on the edge of an open fire, or might be placed in a bed of hot coals, cooking for upwards of an hour or two.

While this culinary explanation can certainly be used to suggest a skeumorphic relationship between the Mississippian standard jar and cucurbits, I would like to also suggest that the relationship between these two items may derive from a separate but equally important practice. Once again following the "communities of practice" model integral to this chapter, it is important to remember that the Mississippian standard jar not only represented a new cooking technology, but also a new ceramic technology and form quite different from the West Jefferson cooking jars that local potters were accustomed to producing. The Mississippian ceramic cultural tradition was a stark break from the endemic Late Woodland potting tradition; while bowls would have been familiar ceramic forms, the globular, shell-tempered, thin-walled Mississippian standard jars were considerably different from the conical, grog-tempered, thick-walled West Jefferson conical cooking jars. Early potters first conceiving of how to model these new pots may have reflexively related them to a form they were considerably more familiar with, one that closely resembled the Mississippian standard jar in both size and shape—a rounded cucurbit, similar in shape to the common pumpkin or acorn squash with which we are now familiar with. This is a common technique in crafting of any sort—new shapes and designs are made familiar by relating them to more familiar shapes and designs (Lave and Wenger 1991; Figure 6.18). By doing so, artisans are able to better conceptualize and replicate the dimensions of the new object. Globular cucurbits, like the acorn squash, would have provided ceramic producers familiar with the vegetable with a simple, mental reference for the basic shape and dimensions of the new ceramic form. If this is the case, the Southeastern United States is not the only area where such a device may have been used. Indeed, in 2016, the Mexican National Museum of Anthropology featured an exhibit on the mimicry of forms found in nature and present in ceramic containers, with several pieces from the Formative period in central Mexico touted as squash pots (Figure 6.18, bottom row).

Instead of favoring one explanation over the other, I suspect that both contributed to the relationship between the Mississippian standard jar and *Cucurbita pepo*, making it the most obvious, and likely reflexive, prototype for endemic populations learning this new technique. Seemingly, this reasoning would suggest that pumpkin lobing was not introduced to the area, but instead was an endemic innovation. As noted, lobing is a widespread stylistic feature found on Mississippian standard jars outside of the Black Warrior Valley. Likely, the tradition may have been familiar to several potters, who perpetuated it and maybe even consciously drew on it, to teach others the process.

It is important to address one notable issue. At present, no remains from *Cucurbita pepo* have yet to be recovered from West Jefferson or Moundville I phase contexts dating between A.D. 1070-1250 in the Black Warrior River valley. However, *Cucurbita pepo* seeds have been recovered from Late Woodland Ellis phase features at the Little Canoe Creek site, located in the Coosa River valley just east of the Black Warrior valley (Leone 2012), suggesting that while no remains have been recovered, the plant was known also known in the Black Warrior Valley.

## Characterization of the Moundville Mississippian Standard Jar

What these analyses suggest is that throughout Moundville's occupation (A.D. 1120-1520), the Mississippian standard jar was a specialized culinary tool used to nixtamalize maize. Through time, the jar morphologically changed very little, while early on, variation in rim styles as well as a potential iconographic reference to *Cucurbita pepo ovifera* suggests a population adopting and learning a new ceramic form. Based on these results, we may add the following to the characterization of the Mississippian standard jar: while stylistic attributes such as rim decoration, handle design, and surface treatment may vary, the contours and thickness of the vessel design conform to specific requirements of the hominy foodway, which was the first foodway in many parts of the Eastern Woodlands that required long-term boiling. At Moundville, the lack of sooting suggests that the Mississippian standard jar was suspended over a bed of hot coals, a culinary technique that is likely more fuel-efficient than direct-heat cooking over long cooking periods. That proposition will be tested in the following chapter.

For Moundville Mississippian standard jars, the results of the stylistic analysis do not support the suggestion of a "learning curve" not seen in the body of the jar. This is most evident in the lack of a developmental, phyletic order in the rim style analysis presented above. However, despite the expectation of a learning curve, the lack of one does not suggest that these groups were ethnically homogenous. Instead, the data presented here strongly supports the existence of multiple communities of practice during the Moundville I phase (A.D. 1120-1250). Specifically, these data highlight several areas of practice that demonstrate these various communities of practice: the different rim styles, the four different Moundville Incised styles, and the use of pumpkin lobing. That none of these practices are confined to a particular site but all are coterminous and contemporaneous suggests multiple, overlapping communities of practice of the standard jar. This is particularly evident in the different rim styles popular during the early Moundville I phase, which, due to their low-visibility, were not easy for other practitioners to mimic visually; instead, these styles had to be learned. They had to be taught.

The most parsimonious explanation for these various communities of practice is that there were various teachers, each of who began by teaching a slightly idiosyncratic technique and style based on her own varying traditions. Indexical references to *Cucurbita pepo* may just as easily reflect these varying traditions as they may also reflect a learning device, either taught to or devised by local potters learning a new ceramic tradition. These traditions, however, were not bound to particular sites nor exclusive to individual communities—that many were contemporaneous as well as overlapping suggests that these communities were fluid, and knowledge was not restricted to one community or another, but likely was freely exchanged between practitioners. While there was no demonstrable learning curve in ceramic production, these various and overlapping communities of practice do suggest that endemic peoples in the valley began producing and using a new ceramic form likely introduced through several non-local individuals or groups that moved into the area.

Additionally, between A.D. 1120-1250, potters producing Moundville standard jars potentially included iconographic elements that signal an ideational association between the form of the jar and the general shape of globular squash, such as the ancestors of acorn squash. While there is a clear skeumorphic explanation for this relationship, I have presented a second explanation congruent with the "communities of practice" model introduced in this chapter. Like the similarities between the endemic nut foodway and the hominy foodway that produced a "historical metaphor" in the minds of local populations, the suggested iconographic reference of early Moundville Mississippian standard jars to *Cucurbita pepo ovifera* may in fact be a manifestation of what Marshall Sahlins called the "structure of the conjuncture" (Sahlins 1981:35), or what William Sewell referred to as an occurrence which ultimately contributes to an event (Sewell 2005:227), in which local potters made an unfamiliar ceramic form familiar by reflexively associating it with *Cucurbita pepo ovifera*.

Above all, this analysis indicates that the jar was an essential material component of this foodway, and was likely disseminated in tandem with hominy during the Late Woodland and Early Mississippian periods, being a tool specially adapted for long-term heat-treatment in a cooking mode suspended or propped above coals. As such, this analysis further supports the proposition that hominy, and not maize more generally, was disseminated into the Black Warrior River valley and adopted by endemic peoples beginning around A.D. 1070.

# CHAPTER 7:
# HOMINY AND THE SUPERIORITY OF HOT COAL COOKING

Inherent in the characterization of the Mississippian standard jar articulated in the previous chapter are several expectations that, while congruent with the archaeological record, still need to be tested. Ultimately, I wanted to test the effectiveness of cooking suspended over hot coals as opposed to cooking directly in a fire. Here, effectiveness is gauged by three specific variables: how long does it take to reach a boil, how much fuel is used in each cooking scenario, and what resources are required to maintain a boil. Related to this is the proposal that through hot coal cooking, it is possible to prepare a palatable pot of hominy. Finally, the characterization of the Mississippian standard jar proposed in the previous chapter also suggests that *large* Mississippian standard jars are unsuitable for this practice because the weight of the liquid would overstress the rim and the handles of the jar.

While many of these expectations are central to the characterization of the Mississippian standard jar as a nixtamalizing tool, they are also critical to the model upon which this dissertation is based: that owing to the materials, knowledge, and learned practice essential to the hominy foodway, it was best transmitted from practitioner to practitioner, and thus on the household level. Thus, in addition to these proposals, Chapter 3 articulated several steps essential in the hominy making process that involve producing lye from hardwood ashes, with a preference demonstrated for hickory ash. The expectation is that lye solutions made from wood ash are indeed caustic enough, or alkaline enough, to nixtamalize maize.

Following these proposals, this experimental project was broadly divided into three parts designed to address each proposal. Experiment I addresses the effectiveness of cooking directly within a fire compared with cooking suspended over a bed of hot coals, by assessing the similarities and differences between boiling water in a West Jefferson globular vessel in a direct-fire cooking scenario and boiling water in a Moundville Mississippian globular jar suspended over a hot bed of coals. This experiment also addresses whether or not it is possible to cook in a Mississippian standard jar of the large size mode, suspended over a bed of hot coals. Experiment II deals exclusively with recreating and establishing guidelines for the non-cooking, early steps involved in the hominy foodway, including producing wood ash lye. Finally, Experiment III, utilizing findings from the previous two experiments, involves demonstrating the proficiency of cooking hominy in a Mississippian standard jar suspended over a bed of hot coals.

## Hot Coal Cooking and Mississippian Cooking Features

While hot coal cooking, or radiant heat cooking, is mentioned in several ethnohistoric accounts and is a prehistoric cooking technique documented in the Caribbean (García Arévalo 1978:265) and the Pacific (Skibo 2013:82-87), this practice is not commonly understood as a culinary tradition practiced by native populations residing in the prehistoric Southeastern United States. Arguably, this may simply be an oversight. Many archaeologists may not have thought about different cooking strategies. The default notion has typically been that Mississippian populations used direct-heat cooking methods similar to their Woodland and Archaic predecessors.

Perhaps the greatest demonstration of this assumption can be found in Charles Hudson's *The Southeastern Indians* (1976), an extraordinary compendium, even to this day, on the culture and history of the Southeastern Indians. In his section on cooking and eating habits, Hudson provided a prolific description of the hominy foodway (1976:304), as well as a number of different foods and cooking techniques practiced by groups throughout the region (1976:300-309). However, nowhere within this work is there mention of just how these foods were cooked; in other words, Hudson never discusses either hot coal cooking or direct-heat cooking. The only mention of specific uses of fire are those attributed to smoking meats (in which he specifies the need to build one) (1976:300-301), or in making cornbread using hot coals (1976:305). In each of these cases, the cooking technique is presented as marked, as opposed to the unnamed, unmarked cooking technique that was more commonly used. This, we can assume, is direct-heat, or open fire, cooking.

For those archaeologists whose primary interests involve Mississippian foodways, a familiarity with Hally's (1983; 1986:286-287) work has surely helped to reinforce this engrained notion. His analysis of sooting patterns on the exterior of Barnett phase Mississippian standard jars recovered from northwest Georgia demonstrated that within these groups, small and medium sized Mississippian standard jars were suspended over open fires, evidenced by sooting on the base of jars from these assemblages. While his findings are sound, they are not congruent with the lack of sooting patterns found on Mississippian standard jars recovered from Moundville, stressing that the unquestioned application of this assumption to other Mississippian period sites may not be correct (Welch and Scarry 1995).

While it may be inaccurate to assume Hally's cooking strategy findings are transposable to Moundville, in earlier comments I agreed with his observation that large Mississippian standard jars were likely storage jars, either dry or wet, and not primarily cooking pots (Hally 1986:287). Like their smaller counterparts, sherds of large Mississippian standard jars at Moundville lack soot residue on their exterior, suggesting that if they were they used for cooking, they too would have been suspended over a bed of hot coals. However, because of the excessive volume of large Moundville Mississippian jars, which ranges from approximately 9 to 30 liters (or 9 to 30 kilograms, approximately 20 to 66 pounds), I proposed that they were too heavy to be regularly suspended.

## Archaeological Experiments and Experimental Archaeology

The most direct way to articulate this experience is through an experimental archaeological approach informed by findings from the ethnohistoric review conducted in Chapter 3, the archaeological record, and ethnoarchaeological research primarily focused on the preparation of starchy grains. Combined, experimental archaeology and ethnoarchaeology (which, owing to their complementary research goals, are grouped together here) serve as one of the strategies outlined in Michael Schiffer's school of behavioral archaeology used to address processual archaeological questions. To address questions of process, experimental archaeology mandates replicating either the materials or behaviors that produced the archaeological record, but within a controlled environment in order to allow the researcher to manipulate dependent variables (Outram 2008; Schiffer et al. 1994). Accordingly, some of the more popular subject matter among experimental archaeological studies include those replicating the steps required to produce specific classes of artifacts, such as projectile points or other lithic tools (a procedure known as *chaîne opératroie*) (Aubrey et al. 2008; Schlanger 1994); studies concerned with the mechanical and functional performance of various artifact classes, including ceramic vessels (Herbert 2008; Steponaitis 1983; Upton et al. 2015); and those studies designed to replicate specific patterns of wear accumulated throughout an artifact's use-life (Miller 2015; Schiffer et al. 1994; Skibo 1992).

Ethnoarchaeology approaches similar questions about process by engaging in ethnographic research. However, unlike most ethnographic research, ethnoarchaeological research specifically documents the materials and practices of those they study in order to better understand the archaeological record. This approach is most closely associated with Lewis Binford, who proposed that archaeologists engaging in ethnographic study should focus their research on the material aspects of culture often overlooked by ethnologists. In his famous study conducted among the Nunamiut, Binford carefully noted and mapped the depositional patterns of bones, tissue, and tools involved in the butchering of a caribou in order to help detect similar activities preserved within the archaeological record (Binford 1978). Following Binford, numerous other researchers have conducted ethnoarchaeological research with an emphasis on not only the material traces of culture but also on the activities that ultimately introduce these materials into the archaeological record.

While a great deal of ethnoarchaoelogical research has focused on lithics and the activities that surround them, the Kalinga Ethnoarchaeological Project of the University of Arizona and the University of the Philippines has primarily focused on the activities that surround pottery production and use (Stark and Skibo 2007). Kalinga is both a province in the Philippines in the Cordillera Administrative Region of Luzon as well as a language spoken by a number of groups that occupy the upland region of Luzon (Skibo 1992:54). The Kalinga live on the periphery of the Philippines nation-state, rely primarily on intensive farming, and produce and use several forms of ceramic cooking vessels. Like historic and late prehistoric native groups in the Eastern Woodlands of North America, the Kalinga diet is based on a single dietary carbohydrate staple, rice, which is supplemented by various other foods.

As part of the Kalinga Ethnoarchaeological Project, James Skibo (1992) spent several months in the Kalinga village of Guina-ang documenting used ceramic pots in cooking and cooking-related activities, with an eye to use-alteration patterns that may be detected within the archaeological record. Although the ultimate goal of Skibo's research was to correlate activity with use-alteration patterns on ceramics, he also outlined a number of cooking considerations often overlooked in ethnological and archaeological research. For example, he carefully described where pots were stored, how they were cleaned, which pots were dedicated to which activities, how food was transferred from the cooking pot to the serving bowls, the kind of fuel each stage of cooking required and where this wood was collected, and the detailed order in which food was prepared (Skibo 1992:60-64). This careful attention to the materials and practices associated with cooking highlights a number of important questions often underrepresented or even missing in the archaeological record, but should nonetheless be important considerations in any experimental archaeological project designed to elucidate cooking practices.

Among archaeological studies concerned with cooking in the Mississippian period of the Southeastern United States, only a handful of research designs have utilized experimental archaeological approaches or ethnoarchaeological findings (Blitz and Welch 1998; Miller 2015; Steponaitis 1983; Thompson 2008; Upton et al. 2015). Generally, the topic receiving the most attention is the utility of shell-tempering. Shell-tempering research has generally followed two lines of inquiry. The most common are those concerned with the mechanical performance or technological advantages afforded by this tempering agent compared to other agents (Feathers 1989, 2006; Herbert 2008; Steponaitis 1983; Stimmel et al. 1983; Tite et al. 2001). Less common are those concerned with the relationship between shell-tempering and maize. For example, following Morse and Morse's (1983) suggestion, Upton et al. (2015) investigated the potential for shell-tempering to passively nixtamalize maize, finding that while mussel shell may be an appropriate alkaline substrate, its inclusion in paste used to make Mississippian vessels was not strong enough to alter the chemistry of maize cooked within.

These studies contribute to our understanding of the ancestral hominy foodway in several important ways. However, there is still a great deal left to learn. Several were designed around testing a single hypothesis, which in turn mandated the strict control of any dependent variables that may affect the outcome (Blitz and Welch 1999; Upton et al. 2015). Others utilized modern materials, like a mechanical grinder (Blitz and Welch 1998), or modern practices, like using sawn and split log firewood (Herbert 2008). Thus, while each successfully addresses a single proposition, none sufficiently articulates the entire foodway, nor addresses many of the specific claims made in this research.

Of the small handful of research designs concerned with Mississippian cooking practices, only two have specifically addressed the hominy foodway (Blitz and Welch 1998; Thompson 2008). Blitz and Welch (1998), interested in the reported effects that lye may have on the hulls of mature maize kernels, conducted a small experiment to assess whether lye-treated maize produces more finely pounded maize particles, or grits, than non-lye treated maize. Following a Cherokee recipe for *conihani* (which called for a solution made from 0.5 kg of hardwood ash in 6 liters of water, with a pH of 11.3), Blitz and Welch tested two different kinds of maize under two different conditions—one which followed the recipe, and a second in which the kernels were neither ground nor boiled. They found little evidence that lye treatment makes grinding maize easier, which they note is a direct contradiction to the ethnohistoric accounts that prompted their research. In fact, they found that lye treatment actually increases maize processing time, suggesting to them that the lye treatment did not serve a functional purpose, and that the reason for the practice was thus something different.

Thompson (2008), by far, developed the most extensive experimental study of Mississippian cooking practices. First, his research produced a complete material toolkit for Mississippian cooking practices based on artifacts recovered from the prehistoric Mississippian site of Lubbub Creek in west-central Alabama. This toolkit not only included the materials directly involved in Mississippian cooking, but also those involved in the manufacture of shell-tempered ceramics, the production of wooden spoons, and even the manufacture of stone tools used to process foods. Thompson’s research was informed by information gathered on modern Choctaw (Chahta) cooking practices, as well as an extensive experimental archaeological project to reconstruct the manufacture and use of each of these materials. The result is not only the most extensive study to date on Mississippian cooking practices, but also a helpful guide to those activities associated with Mississippian cooking that should be visible within the archaeological record.

Regarding Mississippian standard jars, Thompson asserts that this ceramic class is well suited for boiling, but contests that they were used to make thicker stews. He notes that, “As predicted…this segment of research found that Mississippian jars are not especially suited to frequent stirring, or ladling thick contents, like Sagamite [hominy with meat]. They are however, excellent for cooking ‘thinner’ foods like Koshiba [poke greens] or Tanchi Labonna [a posole-like whole kernel hominy thinned with meat and water]” (2008:190). Thompson (2008:190-191) further proposes that the handles found on Mississippian standard jars were not used for suspension, but were instead used to help grasp and lift the vessel from its use directly within a fire. He proposes that support for this assertion comes from the lack of use-alteration on jar handles in the Lubbub Creek assemblage (2008:191). This statement echoes Hally's (1986:279, 282) assertion that while the handles on Mississippian standard jars can be used for suspension and to securely tie down a cover, on large Mississippian standard jars, they can also be used to help transport the vessel when hot (1986:267). However, unlike Hally, Thompson does not also suggest that Mississippian standard jars at Lubbub Creek may have been suspended, using the lack of use-alteration around the handles as well as the information gathered from modern Choctaw cooking practices to suggest they were always placed directly within a fire. Once again, Thompson relies on some of Hally's findings to support his assertion (Thompson 2008:179-180). While Hally does assert that small and medium sized Mississippian standard jars were regularly suspended, contrary to Thompson, he also suggests that this suspension was done over an open fire as evidenced by sooting patterns on the bottom of Mississippian standard jars recovered from the Barnett and Beaverdam phase assemblages (1986:281).

While Thompson's assertions for how the Mississippian standard jar would have been used are based on modern Choctaw practices, they are not entirely congruent with the archaeological record. First, it seems peculiar that looped handles, which take more time to fashion than simple nodes or flanges, would have been a common feature of Mississippian standard jars throughout the Mississippian cultural world were they simply used as points of leverage. Further, this proposal does not explain why looped handles on Mississippian standard jars commonly occur in numbers greater than two. Third, while the ceramic assemblages that both Hally (1986) and Thompson (2008) analyzed may have demonstrated some sooting on the base of Mississippian standard jars, this is not the case for jars recovered from Moundville, which, as indicated in Chapter 5, lack any use-alteration sooting patterns that suggest they were ever used within a direct-fire cooking scenario.

Regardless, Thompson's research established an important precedent for the subsequent study of Mississippian period cooking practices. First, he conducted not only an extensive but also a holistic study, drawing on the archaeological record as well as on historic, ethnographic, and experimental sources. By doing so, Thompson substantially contributed to an often overlooked, but essential, Mississippian period practice. He also highlighted the importance of such research to extant Indian tribes, stressing that such studies are not conducted within a vacuum, but likely may be informed by and may in turn also inform modern practices.

While Thompson's research arguably contributes much to our understanding of what the ancestral hominy foodway may have looked like, it too utilized a number of modern practices and perceptions of cooking, such as the use of sawn and split log firewood as well as direct-fire cooking. These choices, while congruent with his observations of modern Choctaw cooking practices, arguably result in only a partial view of what the ancestral hominy foodway may have looked like.

## Recreating the Ancestral Hominy Foodway at Moundville

It took nearly one year to gather or produce each of the replica materials required for this project, which included growing flint maize, collecting ash samples, and commissioning replica vessels. Once all the necessary materials were in hand, this research was carried out over a period of approximately two months, spread out through the fall of 2015 through the winter of

2016. The project was broken into three experimental components, designed to address each of the propositions outlined at the beginning of this chapter. The first component involved a set of boiling experiments; the second, a series of nixtamalizing experiments; and the third, cooking hominy in a replica Mississippian standard jar over a bed of hot coals. These experimental components were conducted in two primary locations. Experimental components I and III were conducted in a half acre wooded lot, while experimental component II was conducted in a modern kitchen equipped with an electric stove-top range; both are located in Tuscaloosa, Alabama. Those experiments conducted in the wooded lot were undertaken with the help of Vernon J. Knight, Jr., while those that took place in the modern kitchen were conducted with the help of Andrew Draughon.

*Collecting Ingredients: Growing and Drying Flint Maize*

Hominy begins not in the pot but in the field. During the summer of 2014, two households were kind enough to incorporate flint maize into their home gardens: those of Vernon J. and Judith Knight as well as Kathryn Oths and William Dressler (Figure 7.1). Flint maize kernels can easily be sourced through various seed-saving and heirloom vegetable Internet vendors, including numerous North American heirloom varieties. However, many of those sourced to the Eastern United States are historic varieties popular during the early twentieth century that were not nixtamalized nor used to make hominy. However, many Italian flint variants are still valued for their tough kernels, and thus may be closer to prehistoric Eastern Woodland flint variants. For this project, I purchased Floriani Red Flint maize seeds from Victory Seeds, an Italian flint variant prized as a fine polenta corn. Close to 100 kernels germinated, resulting in approximately 40 mature maize plants in the Knight garden and around 20 in the Oths-Dressler garden. Plants in the Knight garden were hand pollinated to ensure the production of ears. A late summer drought hit both crops hard, and both also suffered from corn earworms and fall armyworms, bringing the total number of harvestable plants closer to 50.

In general, each plant produced between two to three ears of maize. However, two factors reduced the total ear harvest. As noted, worms were an issue early on. Both gardens used natural pesticides to deter worm development (a combination of Dipel dust, Neem oil, and Meyer's Natural Dish Soap), yet these were only partly effective. In the Oths-Dressler garden, we found that fire ants were the best solution for culling worms—fire ants swarm an ear, devouring larvae, pupae, and any other insect. Once clear of any insect life, fire ants move to another ear. As the ears matured and dried on the stalk, pests were no longer a problem, and ears were easily collected.

A second factor that reduced the total harvest was mold. In both gardens, there were a dozen or so ears partially covered in mold. At first, I discarded some of these ears, assuming they were unsuitable for drying and subsequently making hominy. Nearly a dozen ears were discarded due to mold, two of which were given to chickens at the Knight garden; however, the grain was already too tough for the chickens, who chose not to eat them. Several weeks later, we found these ears, mold-free, with many kernels still attached. While the rejected-chicken fodder ears were excluded from the total harvest collected for this research, they suggest that while mold may be an issue if ears are eaten green, once they mature, it is no longer a concern.


Figure 7.1. Growing and drying Floriani Red flint maize during the summer of 2014: (a) Vernon J. Knight working in the Knight garden; (b) maize plants in the Knight garden; (c) an ear of Floriani Red drying in the University of Alabama Archaeology Lab; (d) drying rack set up in the University of Alabama Archaeology Lab.

After the ears were harvested, they were dried in September of 2014, in the Marten ten Hoor Hall Archaeology Lab at the University of Alabama, Tuscaloosa (Figure 7.1b and 7.1d). Ears were inverted, suspended by their husks on a drying rack in a cool, dry location. The ears were considered “dried” when the kernels could be easily wiggled when touched, and were subsequently wrung off the cobs. In total, 38 ears were collected and dried, yielding 1.4 kilograms, or 3.2 pounds, of dried flint maize kernels. Following seed-saving tradition, seed from three ears, deemed the best of the harvest, were reserved for Kathyrn Oths for the next growing season. Dried kernels were stored in an airtight Tupperware container along with silica dehydrator packets.

*Replica Mississippian Jars and Cooking Fuel*

Tamara Beane, a renowned Creek potter who specializes in Southeastern United States Native American reproductions, crafted the earthenware pots used in this project. Five pots were commissioned based on West Jefferson and Moundville phase vessels recovered from the subject area: three medium-sized Moundville Incised jars, one large Moundville Incised jar, and one medium-sized Late Woodland cooking jar. The medium-sized cooking jars are approximately 16 to 18 cm tall, having an outer rim diameter of 20 cm, and an effective vessel capacity of 4.5 liters; the large Moundville cooking vessel measures 40 cm in height, 35 cm in outer rim diameter, and has an effective vessel capacity of 23 liters. Vessel wall and basal thickness for each of the Mississippian vessels is approximately 0.6 cm. These jars were shell-tempered, and the clay was harvested from the northern river bank on Hemphill Bend on the Black Warrior River, the location of Moundville. Unlike the Mississippian replicas, the Late Woodland cooking vessel was not based on a whole, recovered specimen, but instead on a composite West Jefferson globular jar illustrated by Jenkins and Krause (2009, Figure 8d; see also Jenkins and Nielsen 1974). At the time, Kareen Hawsey's (2015) composite ovaloid West Jefferson vessel reconstruction, used throughout Chapter 6 of this work, had not yet been produced. The vessel produced for this project is grog-tempered and 22 cm tall with a variable wall thickness of approximately 0.6 cm near the rim, just over 1 cm at the base, and has an effective vessel capacity of 4.5 liters (Figure 7.2).

A final, critical material that needed to be collected before the experiment could commence was firewood. Limb fall was likely the most routine fuel source used throughout the prehistory of the Southeastern United States, yet this is rarely acknowledged in the literature. As James Skibo's description of Kalinga cooking practices indicates, instead of logs, limb fall including branches and twigs were used to produce a cooking fire (Skibo 1992:64). Limb fall, unlike sawn and split firewood, exists in an extraordinary, renewable abundance within wooded areas, an abundance that is far greater than many might expect (Figure 7.2a). It is easily sorted into categories based on size and type, both of which ethnoarchaeological research suggests are important considerations (Skibo 2013:52). Finally, because limb fall is dried wood, unlike felled trees that are green, it is usually not necessary to cut limb fall. Instead, it can be easily broken into smaller segments, a job for which an axe with a greenstone celt blade, like those found at Moundville, would be an ideal tool.


Figure 7.2. Limb fall and replica jars used in this experiment: (a) example of limb fall from a hardwood forest in central Alabama; (b) limb fall and size categories used in this experiment; (c) replica vessels used in this experiment; note that the globular West Jefferson vessel is the central vessel in the foreground; (d) close up of one of the medium sized Mississippian standard jars used in this experiment.

Following these guidelines, limb fall for this series of experiments was collected from a 0.1 hectare lot over a period of four weeks, then sorted into four distinct, but arbitrary size classes: fuel grade one (limbs with a diameter less than 1 cm); fuel grade two (limbs with a diameter range of 1-1.5 centimeters); fuel grade three (limbs with a diameter range of 1.5-3 centimeters); and fuel grade four (limbs with a diameter of 3-6 centimeters) (Figure 7.2). The lot was a typical southeastern floodplain forest, primarily composed of coastal plain hardwoods. Species contributing to the limb fall assemblage, in approximately decreasing order of frequency, included water oak, beech, yellow poplar, black cherry, and loblolly pine.

## Experiment I: Boiling Water in Replica Vessels

Before attempting to cook hominy in the replica Mississippian standard jar, it was necessary to establish certain basic parameters for cooking under controlled conditions for the two scenarios proposed in this dissertation: direct-heat using a West Jefferson globular vessel and hot coal cooking using a medium-sized Mississippian standard jar. Following the proposed models outlined in Chapter 6 (Figure 7.5), we boiled distilled water three separate times in each of the proposed cooking scenarios to establish baselines (Figures 7.3, 7.4c, and 7.4d). The overall experiment was designed to articulate what prolonged cooking in each scenario entails, and to specifically ascertain if there are quantitative or qualitative differences between the two regarding the following questions:

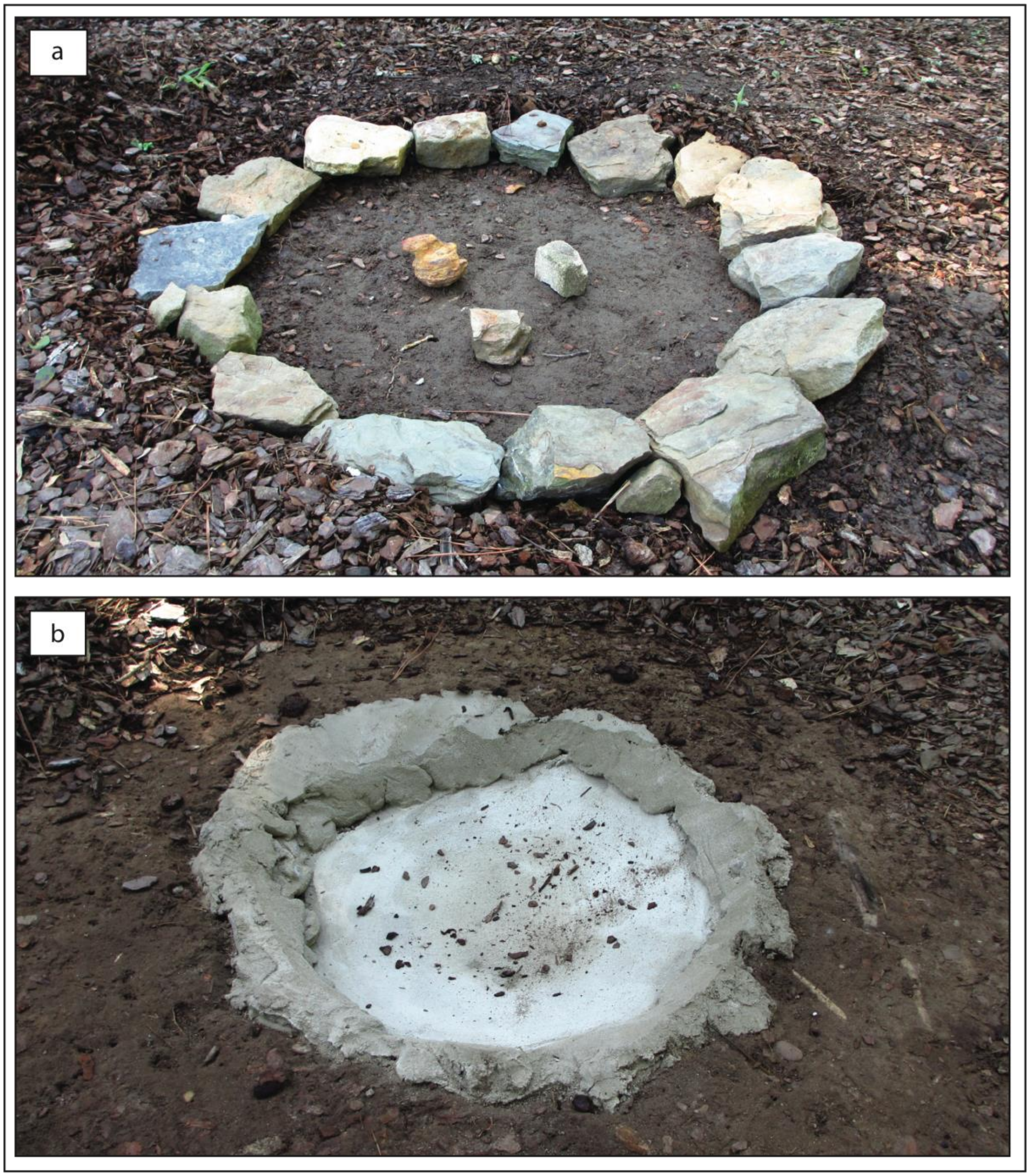


Figure 7.3. The replica hearths used in this experiment: (a) West Jefferson style hearth with three stone supports in the center, used to hold up the West Jefferson globular jar; (b) cement-lined Mississippian style basin hearth.


Figure 7.4. Boiling experiments: (a) West Jefferson globular jar at a roiling boil; (b) Vernon J. Knight lighting a base fire used to make hot coals for boiling water in a Mississippian standard jar (pictured in the background); (c) Mississippian standard jar suspended over a bed of hot coals; (d) West Jefferson globular jar in a direct-fire cooking position.

- How long does it take to reach a full boil (temperatures exceeding 100ºC) under each of the proposed replica conditions?
- How much fuel is required to both reach and maintain a boil for approximately one hour?
- Are there notable differences in the kinds of firewood suited for each condition?

Using the replica jars made by Tamara Beane, Vernon J. Knight, Jr., and I conducted the boiling experiments over a three-day period (August 31-September 2, 2015) (Figure 7.4). To establish these parameters for each scenario, the replica pots were used with their respective cooking scenario for three separate trials, with each of the three trials ideally accomplished within the same day. Both the West Jefferson globular jar and the Mississippian standard jar were filled two-thirds full, exactly 3 liters of water for each. Water temperature was measured with a thermal infrared thermometer, as well as with a cooking thermometer set in a wire harness (Figure 7.7a). Water volume was measured before and after each trial to determine how much water was lost during the experiment. Following each trial, use alteration patterns, particularly sooting patterns, were documented photographically, with special attention paid to those patterns identified as possible archaeological markers.

To ensure consistency, atmospheric conditions were recorded and every measure was taken to ensure each trial was completed under roughly the same conditions. Additionally, between each trial, the jars were allowed to completely cool.

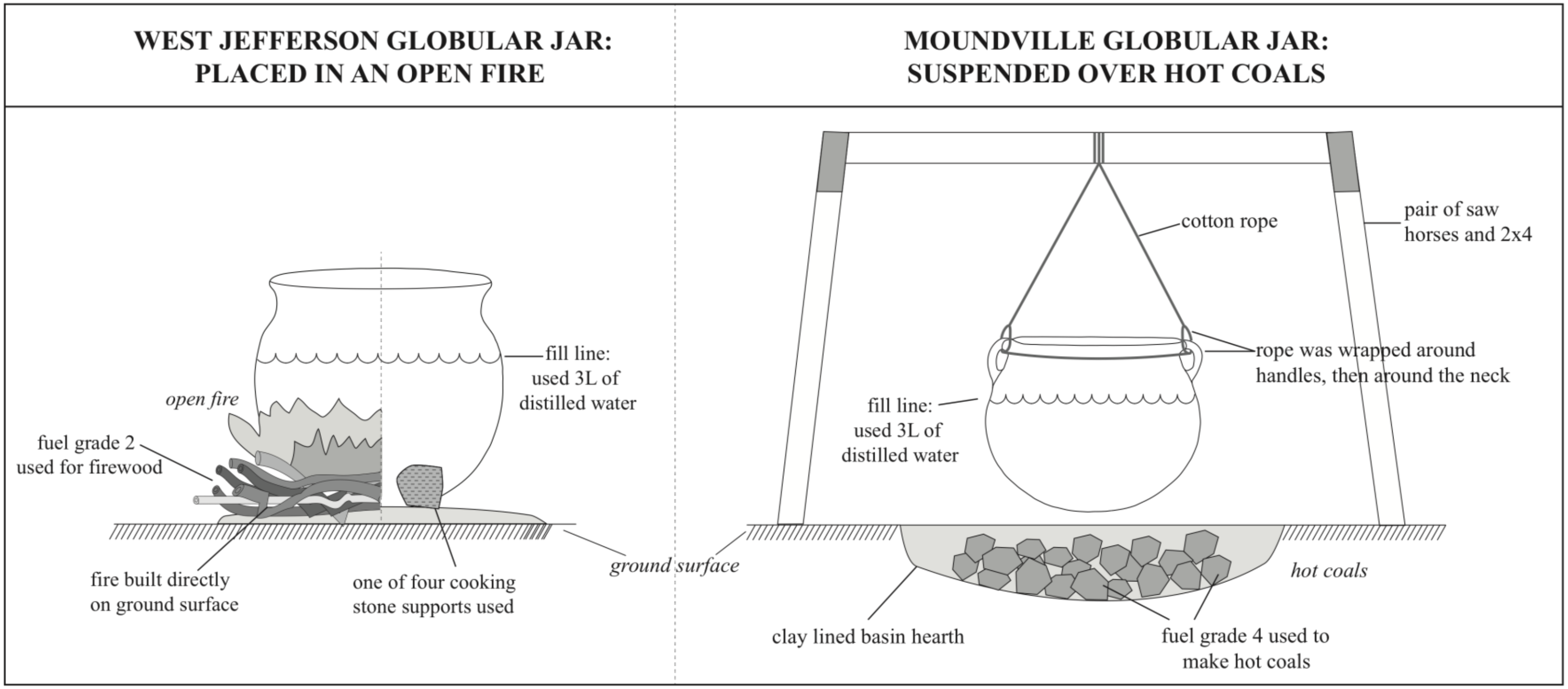


Figure 7.5. Diagram of the two cooking set-ups used for this experimental portion.

*West Jefferson Globular Jar in Direct Heat*

Excavated cooking features from West Jefferson phase sites as well as use-alteration patterns on West Jefferson jars indicate that these cooking pots were positioned in an open-air fire built on the ground surface (Hawsey 2015; O'Hear 1975:104-105). Following this practice, we filled the replica West Jefferson ovaloid pot with 3 liters of water then positioned it within the cooking hearth using three small rock supports, around which we built the cooking fire (Figure 7.5). For each iteration, one kilogram of fuel grade one (diameter of less than 1 cm) was used to start the fire, then roughly 2 kilograms of fuel grade two (diameter of 1-1.5 cm) and 1 kilogram of fuel grade one were used to reach and maintain a boil for one hour. All grades were primarily composed of hardwood limb fall, including fuel grade one. Of the four fuel grades, fuel grade two was sufficient to produce a fire hot enough to produce a rolling boil, though also small enough to encompass the vessel while keeping the flames from lapping above the lip of the vessel. Fuel grade three (diameter of 1.5-3 cm) was used once during the second trial; however, this fuel grade proved to be unsuitable for this size vessel within this particular cooking scenario—the larger limbs continually fell away from the pot, shifting the fire away from the body of the West Jefferson jar and to the outer edges of the hearth. The smaller fuel grade two, however, remained close to the pot, keeping the fire close to the body of the vessel.

To maintain a rolling boil, it was necessary to constantly stoke the fire, and thus it was not possible to leave the fire unattended for more than a few minutes at a time. One aggravating variable is that on the day of our experiments, the wind continually changed direction, exacerbating the stoking required to maintain a rolling boil. However, there were a few pockets throughout the day where there was no wind, during which the open fire still required near constant stoking. Frequently, we would stoke the fire, help it reach its zenith, which would result in a rolling boil, all to have it die down just as quickly and turn into a small simmer.

Although we learned valuable lessons during each trial, trial three should be considered the most representative reflection of the process, and the 25 minutes to boil I regard as the baseline established by these trials (Table 7.1). While cool-down time was not recorded, as noted, once we stopped stoking the fire, the full boil quickly vanished, and within twenty minutes, the water temperature dropped below 80ºC (180ºF); within another five minutes, it dropped below 60ºC, or approximately the lowest possible end of the effective cooking threshold range established for maize. Based on all three trials, on average, 1.6 liters of water (53% of the original volume) was loss during one hour of boiling (Table 7.1).

*Moundville Globular Jar Suspended Over Hot Coals*

Excavations at Moundville indicate that domestic hearths, generally found in the center of house floors, were shallow clay-lined basins (Davis 2014:141-142). Accordingly, we produced a replica hearth feature by lining a small, shallow pit with cement. We used two sawhorses and a 2x4" piece of lumber from which to suspend the medium Mississippian standard jar, using braided cotton rope. The rope was tied through the handles and wrapped around the neck of the vessel, then suspended. Based on the recommendations of several Medieval European reenactors who regularly cook with hot coals, the coals were first made in a separate nearby hearth, then transferred to cement-lined hearth over which the Mississippian standard jar was suspended. This practice is supported by archaeological evidence: suspending the jars over an open fire, even one used to make hot coals, would leave carbonized residue on the vessel.

| Trial No. | Vessel Type | Cooking Mode | Fuel Sizes Used | Wood Consumed (kilogram/hour) | Time to Boil | Max. Temperature Reached (Celsius) | Temperature Range Sustained (Celsius) | Water Loss (volume/hour) |
|---|---|---|---|---|---|---|---|---|
| 1 | West Jefferson Globular Pot | Directly in Fire | 1 and 2 | 8 kilos/hr. | 29 minutes | 100 | 85-100 | 40% |
| 2 | West Jefferson Globular Pot | Directly in Fire | 1, 2, 3 | 7 kilos./hr | 31 minutes | 100 | 85-100 | 60% |
| **3** | **West Jefferson Globular Pot** | **Directly in Fire** | **1 and 2** | **4 kilos/hr.** | **25 minutes** | **100** | **90-100** | **60%** |
| 4 | Mississippian Standard Jar | Suspended Over Hot Coals | 1 and 4 | 7 kilos/hr. | 39 minutes | 93 | 88-93 | 33% |
| **5** | **Mississippian Standard Jar** | **Suspended Over Hot Coals** | **1 and 4** | **5 kilos/hr.** | **15 minutes** | **100** | **90-100** | **60%** |
| **6* | *Mississippian Standard Jar* | *Suspended Over Hot Coals* | *1 and 4* | *5 kilos/hr.* | *never reached a boil* | *88* | *75-88* | *did not measure* |

Table 7.1. Raw measurements for every trial of experiment one. Note that trial six did not feature into the baseline established for cooking with a Mississippian standard jar over a bed of hot coals because that iteration did not reach a boiling temperature. Those trials bolded represent the most representative trials for each set-up in my judgement.

One kilogram of fuel grade one was used to start the fire, then hot coals were made using two to four kilograms of fuel grade four (diameter of 3-6 cm). As in our experience using a West Jefferson globular vessel with direct fire, we generally preferred using hardwood limbs. We found that larger hardwood limbs made excellent, large coals that were easily transferred to the replica basin hearth. Large, hardwood coals remained exceedingly hot for upwards of one hour, at which point new coals were needed to maintain a consistent cooking temperature. The first two trials included an optimal setup, in which the jar was suspended 3-5 cm above the coals, leaving enough room for the coals to breathe, but keeping the jar in close proximity to maximize exposure to the radiant heat. For the last trial, however, we did not leave enough room between the suspended pot and the bed of hot coals, piling the latter under the base of the pot and in the process, inadvertently choking off the air supply. As a result, we never reached a full boil, and the entire trial was deemed a failure. However, this failure stressed the importance of leaving enough space between the coals and the suspended pot—too much space and the pot never boils, but too little space and the coals die, mimicking the ash bed effect, discussed in Chapter 5, that makes direct-fire cooking in a Mississippian standard jar far less effective.

As with the West Jefferson globular jar trials, each trial involving the Mississippian standard jar suspended over hot coals was a learning experience. However, trial five (or the second trial using this set-up) should be considered most representative, with 15 minutes considered the approximate time it takes to reach a full boil (100ºC) once hot coals made from two to four kilograms of fuel grade 4 are placed under the Mississippian standard jar (Table 7.1). Unlike the direct-fire set-up, once a boil was reached using this set-up, it took very little effort to maintain it for one hour. It was necessary only to occasionally stoke the coals in order to help bring the temperature of the pot back up to a full boil. Also, the time it took the pot still suspended over the bed of hot coals to cool down took substantially longer than the West Jefferson globular jar left in the direct-fire cooking hearth. However, similar to West Jefferson trial three, approximately 1.75 liters of water was lost during trial five (or approximately 60%) (Table 7.1).

### *The Two Cooking Set-Ups Compared*

Important qualitative and qualitative differences were noted during each boiling scenario. Comparing only trials three and five, which I consider the most representative for each cooking scenario, there appear to be quantitative differences between these two scenarios. Cooking in the West Jefferson globular jar placed directly in a fire, for example, appears to not only take longer (25 minutes to reach a full boil, as opposed to 15 minutes for the Mississippian standard jar), but this set-up also required two more kilograms of fuel per hour to maintain a boil. However, this comparison is misleadingly simple. First, the time to boil mentioned above does not include the time it takes to also produce hot coals, which were then transferred to the basin hearth over which the Mississippian standard jar was suspended. In trial five, this process took 15 minutes, increasing the time to boil in this set-up to 30 minutes.

Second, while there is a clear quantitative difference in the amount of limb fall each cooking scenario requires in order to reach and maintain a boil for one hour (Figure 7.6), the most important difference is that each requires a different size of limb fall. As noted, smaller limb fall (fuel grades one and two) served as the best fuel choice for the West Jefferson globular jar placed directly in a fire; larger pieces of limb fall tended to fall away from the pot. However, large limb fall (fuel grade four) served as the best fuel choice for making hot coals, with smaller

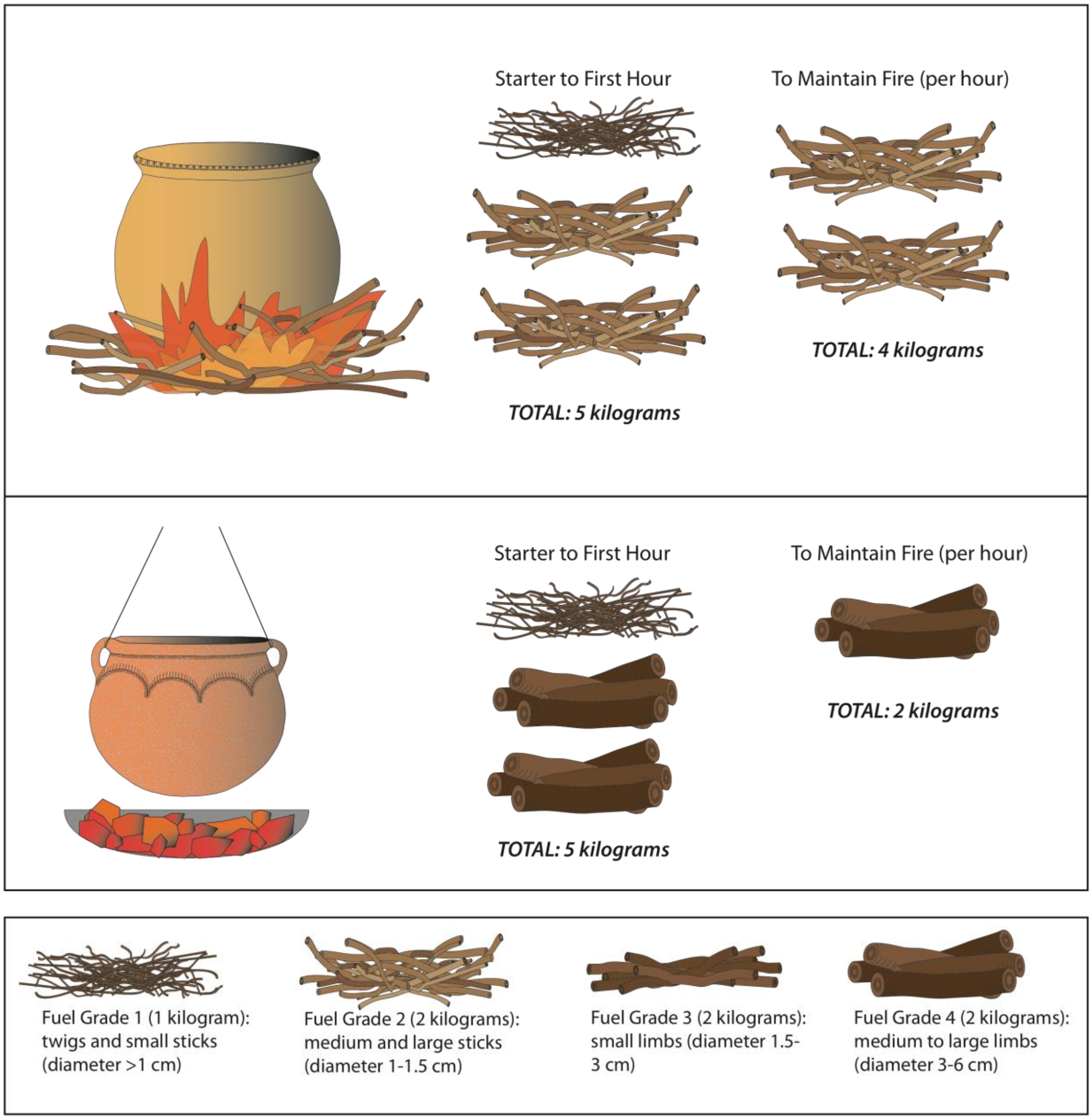


Figure 7.6. Baseline for fuel consumption for West Jefferson trial three and the Mississippian standard jar trial five.

limb fall (like fuel grades one and two) completely ineffectual in this capacity. Further, fuel grades one and two are typically more abundant in a forest than fuel grades three and four

(Figure 7.2a, 7.2b). Thus, the finding that the West Jefferson jar placed directly in a fire required two more kilograms of fuel per hour to maintain a boil than the Mississippian standard jar suspended over a bed of hot coals may not indicate the latter is more fuel efficient. Again, what this suggests is that the most important difference between these two cooking set-ups may not be how much each set-up used, but instead the kind of limb fall used.

Another important difference between these two set-ups was the degree of maintenance involved in each. Without a doubt, cooking with hot coals was far easier and required less maintenance than cooking with the West Jefferson jar placed in a fire. Not only do hot coals have greater longevity than the smaller limb fall used in the direct-fire set-up, but the basin hearth also helped to trap the radiant heat from the coals, while the open air fire was far less contained, losing more heat outward to the surrounding air. While both methods are effective for short-term cooking, and arguably are equally efficient for that purpose, what the findings presented here suggest is that a Mississippian standard jar suspended over a basin hearth of hot coals is far more effective and efficient at long-term cooking than a West Jefferson jar placed directly in a fire.

Finally, the use alteration patterns noted on each vessel match those found on archaeological specimens, suggesting that the scenarios tested are in fact congruent with the practices of both the West Jefferson and the Mississippian populations within the subject area (Briggs 2016; Hawsey 2015). Specifically, while the body of the replica globular West Jefferson vessel was covered in soot, including a small ring of shiny soot close to the flame line, the base was relatively clean (Figures 7.7 and 7.8). The replica Mississippian standard jar, on the other hand, only had a small patch of soot along the base where a coal was added to the basin hearth prematurely and created a small flame. Otherwise, the Mississippian standard jar was clean, lacking any soot or other permanent alterations that could easily be identified as indicative of


Figure 7.7. Sooting patterns observed on both the West Jefferson globular jar placed directly in a cooking fire and Mississippian standard jar suspended over a bed of hot coals after three iterations of boiling in each: (a) profile of each jar; (b) base of each jar. Note that the base of the West Jefferson globular jar lacks soot because this portion of the jar was beneath the flames.

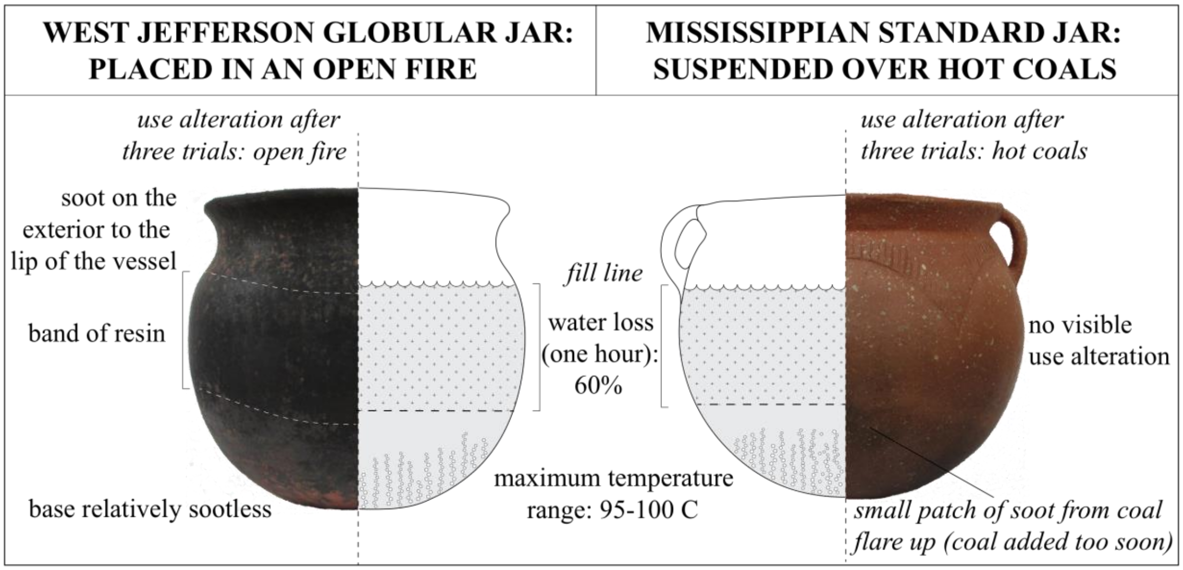


Figure 7.8. Diagram of results from the boiling experiments conducted for this research.

use. This included a lack of any alteration around the handles, which were likely spared any form of abrasion due to the way the cotton cord was fastened around the neck of the vessel (Figure 7.4c). (Note that the slight dark discoloration in the photograph of the Mississippian standard jar in Figure 7.7 is not a result of heat-treatment, but rather because the pot was saturated after nearly four hours of boiling experiments.)

*Boiling and Suspending a Large Mississippian Standard Jar*

Large Mississippian standard jars are ubiquitous throughout the Mississippian cultural world (Blitz 1993; Hally 1983, 1986; Morse and Morse 1990:56; Pauketat 1987), yet their primary function has been not been adequately determined. Because they have effective vessel capacities ranging from 9-28 liters (with equivalent weights of 9-28 kilograms, respectively), I did not believe that they would have been used for cooking. As noted, based on differences in use-wear patterns between medium and large sized Barnett and Beaverdam phase jars, David Hally (1984, 1986) proposed that large Mississippian standard jars were primarily used as storage containers, either for dry goods or water, and not for cooking like their smaller counterparts. Following Hally, I made the same proposal in the previous chapter, suggesting that, when full, large Mississippian standard jars at Moundville would be too heavy to suspend over a bed of hot coals, and thus were most likely used as storage jars.

However, if these large jars were primarily used for storage, it is strange that they are identical in design and morphology to their smaller counterparts. Holding true to the "pots as tools" mandate, cross-cultural ethnographic and archaeological research suggests that dedicated ceramic storage vessels frequently share a number of distinct morphological qualities (Henrickson and McDonald 1983; Rice 1987). Rice (1987:227), for example, notes that dedicated ceramic dry-goods storage vessels tend to have thick walls and thick bases in order to increase stability, as well as to help keep moisture out of the vessel and away from the materials being stored. Henrickson and McDonald (1983:632) note that storage vessels tend to have a relatively wide opening to facilitate easy access to the stored materials. For example, among the set of pots found in every Kalinga household, James Skibo (1992:60) documented three morphologically distinct jar forms: a rice cooking jar, a stewing jar, and a water storage jar. In contrast to both the stewing and rice cooking pots, the water storage pot is larger and a bit squat, an intentional design which not only increases the stability of the vessel, but also increases its surface area and, as such, helps keep the temperature of the water relatively cool (Figure 7.9). That large Mississippian standard jars are morphologically identical to their smaller counterparts

Figure 7.9. Left, Kalinga water storage pot; center, rice cooking pot; right, stewing pot. (Image from Skibo 2013:30.)

suggests that they may also have been used for cooking. And yet at Moundville, sherds from large Mississippian standard jars lack any signs of sooting, just as with their smaller counterparts, suggesting that had they been used for cooking, they too were suspended over bed of hot coals. This is a daunting task—as noted, when full of water, large Mississippian standard jars have a substantial weight, anywhere from 9-28 kilograms, or roughly 20-62 pounds. Impressionistically, this seems like an incredible stress placed on the rim and handles of these jars, neither of which are specially adapted in any way for larger pots and substantially heavier contents. Even those handles that were reinforced by riveting through the body of the vessel at the base of the handle (Steponaitis 1980:182) would still seem unsuitable for this task.

Thus, the final question we needed to address through our boiling experiments was to determine if, first, it was possible to reach a boil in a large Mississippian standard jar and, second, if it was possible to suspend a full, large Mississippian standard jar over a hot bed of coals without breaking the jar.

For this experiment, we only had access to a single replica large Mississippian standard jar. Suspecting that the handles of such jars might not bear the full weight of suspension by cords, we thus began by testing whether or not it is possible to reach a full boil in a large Mississippian standard jar placed directly in a fire (Figure 7.10). Using the same surface hearth used to boil water in the globular West Jefferson jar, we used 1 kilogram of fuel grade one to build a small fire, then added 2 kilograms of fuel grade two. Once the fire was established, we positioned the large replica Moundville Mississippian standard jar on four small stone supports in order to keep the vessel stable throughout the cooking process. The vessel was filled two-thirds full (approximately 18 liters) with distilled water. Once in place, we then began adding 2 kilograms of fuel grade three to build the fire. Although it took close to one hour for the pot to reach a full rolling boil (100ºC), once it did, it was not difficult to maintain the boil as long as we continued to add fuel to and stoke the fire (Figure 7.10a, 7.10d, and 7.10e).

However, simply demonstrating the ability to boil in a large Mississippian standard jar does not mean it was used as a cooking pot by prehistoric Mississippian populations living in the Black Warrior River valley. Because large Mississippian standard jar sherds from Moundville lack evidence of sooting, we know that if they were used for boiling foods, they had to have been suspended over a hot bed of coals. Thus, the final step was to determine if a large Mississippian standard jar, filled with water, could be suspended in the same manner as smaller jars without breaking (Figure 7.10f and 7.10g). Following a similar procedure used for the medium


Figure 7.10. Experimental boiling and suspending a large Mississippian standard jar: (a), (d) and (e) large Mississippian standard jar placed in a direct-heat cooking position; (b) sooting pattern on the jar after a single use; (c) cooking thermometer; (f) the author adding water to a suspended Mississippian standard jar; (g) the large Mississippian jar at the end of our suspension experiment. Note that the break occurred along the collar, snapping off a single handle in the process.

Mississippian standard jar outlined above, two lengths of braided cotton rope were used. The first piece was wrapped around the neck of the vessel then tied as tightly as possible. A second piece was then wrapped through the first piece of cordage, through a handle, and tied off just above the rim. The other end of this same piece of cordage was looped over the sawhorse suspension and then tied in an identical manner around the other handle.

Thus, the large Mississippian standard jar was first suspended empty. Once we were confident it was secure, we began filling the jar with distilled water one liter at a time. At 15 liters, or two-thirds full, there were no indications that the jar was unstable or close to breaking, and no points of weakness, such as small cracks in the body or along the rim of the vessel, were observed. We continued to fill the jar until we reached the neck of the vessel, at which point the jar was full (23 liters, or 23 kilograms which is approximately 50 pounds). Still, there were neither points of weakness nor any indications that the structural integrity of the jar was close to being compromised. Of course, a cooking pot must do more than hold water—it must also be able to withstand the motions associated with the general practice. Thus, we stirred the water using a wooden spoon, jostled the jar, shook it a bit, and even bounced it up and down on its suspension, all to simulate activities associated with cooking. Still, the jar maintained its integrity, exhibiting no points of weakness nor indications of structural failure.

Eventually, the jar did break, but this was only when we violently bounced the filled jar on its suspension, effectively multiplying the weight of the full vessel. Doing this, a single handle and close to one-fourth of the neck fractured away (Figure 7.10g). While this fracture rendered the vessel ineffective for further suspension, and thus concluded the experiment, it did not irrevocably destroy the vessel. However, Mississippian standard jars, unlike earlier cooking pots during the Woodland period, were rarely mended by drilling holes in the rim and the body (Wallis 2007, 2011:171-172; Young and Nagrant 2004:54). Thus, while it may have been possible to mend the jar, there is little evidence that it would have been done by those living at Moundville, and thus the fracture sustained by the vessel would have effectively "killed" it.

This suspension experiment, combined with the findings above, suggests that contrary to expectation, like their smaller counterparts, large Mississippian standard jars could have been effectively used as cooking jars suspended over coals.

## Experiment II: Wood Ash, Wood Ash Lye, and Grinding

The ethnohistorical record for the native Eastern Woodlands is clear: Native cooks nixtamalized their maize using hardwood ash or wood ash lye. While this practice is unequivocal, accounts of it are sparing—few go into further detail regarding the quantity, duration of exposure, or cooking times Native cooks employed. Based on the handful of accounts that do record further detail, as well as various experiments on the basic steps involved in nixtamalizing maize (Bressani et al. 1958; Pappa et al. 2010; Upton et al. 2015), the next steps included rinsing the kernels and then grinding them to various consistencies, depending on the intended final product. While helpful, this account is still incomplete.

Thus, before it was possible to cook hominy in a replica Mississippian standard jar over a hot bed of coals, it was first necessary to further articulate the early steps involved in preparing maize by answering two specific questions related to the process:

- How much wood ash, or wood ash lye, is required to nixtamalize maize?
- Are there perceptible differences (e.g., in alkaline strength, or in taste, smell, or color) in the various wood ash lyes that can be made from different hardwoods?

While both of these questions are central to articulating the early steps in the hominy foodway, the latter is directly derived from the ethnohistoric review conducted for this research. As mentioned in Chapter 3, there are several accounts that suggest the final taste of the dish was an important element, not only to the integrity of the meal as well as the cook, but also perhaps to the conservation of the foodway throughout most of the historic period. While the cooking time and as well as the variant of maize selected certainly affect the final dish, wood ash lye was frequently referred to as a condiment as well as a vital ingredient, added for flavor, suggesting that this ingredient did more than nixtamalize the food. Thus, while the kind of maize used may generically be referred to as "flinty" (e.g., Adair 1775:416), the kind of wood ash used is frequently stated as a specific genus of hardwood, such as hickory or locust.

*How Much and Which Lye*

Following the clear prescriptions outlined in the ethnohistoric review, hickory ash was required for this project. To assess the proposition that hickory ash produces stronger (more alkaline) lye than other ash, one other ash sample was collected consisting of predominately water oak with about 10 percent black cherry. As noted in Chapter 3, Emmaline Driver (Anonymous 1975:189) stated that ash was first sifted before it was used in cooking, producing "clean" ash. Thus for this experiment, both ash samples were twice passed through a fine metal sieve to remove any large particulate matter such as charcoal or pieces of unburned wood.

According to Muriel Wright (1958), Native groups in Oklahoma made lye by pouring hot or boiling water into a V-shaped wooden trough packed with hardwood ash, the lye being collected at the base of the trough and channeled into a container (Figure 6.9b). For stronger lye, the liquid might be passed through the hopper a second time. Unfortunately, it was not possible to either construct or use a wooden ash hopper for this research; this portion of this research was conducted in my home kitchen. Instead, I followed the recommendation of several homesteading websites (which produce lye to make homemade soap, but in same cases also make hominy) that, in principle, follow the same basic steps outlined by Wright (Figure 7.11).

In place of a wooden trough, I used two plastic food-grade five gallon buckets. Near the base of each bucket, approximately three centimeters from the bottom, I drilled a single hole that I plugged with a 1/8" screw. Next, I firmly packed the bottom of each bucket with 2.25 liters of clean ash, one with hickory ash and the other with the water oak/cherry mixture, and gently poured 5 liters of boiling water over the ash in each bucket. I let the mixture cool for approximately one hour, and then elevated both buckets high enough to place a glass Mason jar beneath the drill hole. Finally, I removed the stopper and let the lye seep out. It took 5-8 hours to fill a single 28 ounce Mason jar with lye (Figure 7.11a and 7.11e). Within the first hour, it was clear that there were discernable visual differences in the two lyes: the hickory lye was a reddish amber color, while the water oak/cherry ash lye was a lighter gold color (Figure 7.11f).

Previous studies have demonstrated that in order to achieve nixtamalization, the alkaline solution used has to have a pH of 10.9 or greater (Bressani et al. 1958; Pappa et al. 2010). Using a Luckystone brand digital PH-009 pH meter, I measured the pH of each lye produced after a single pass through the plastic lye hopper. Both the hickory lye and the water oak lye had pH values of 13.7. Further, one teaspoon of lye in one cup of water (or a 1:48 ratio) had a pH of

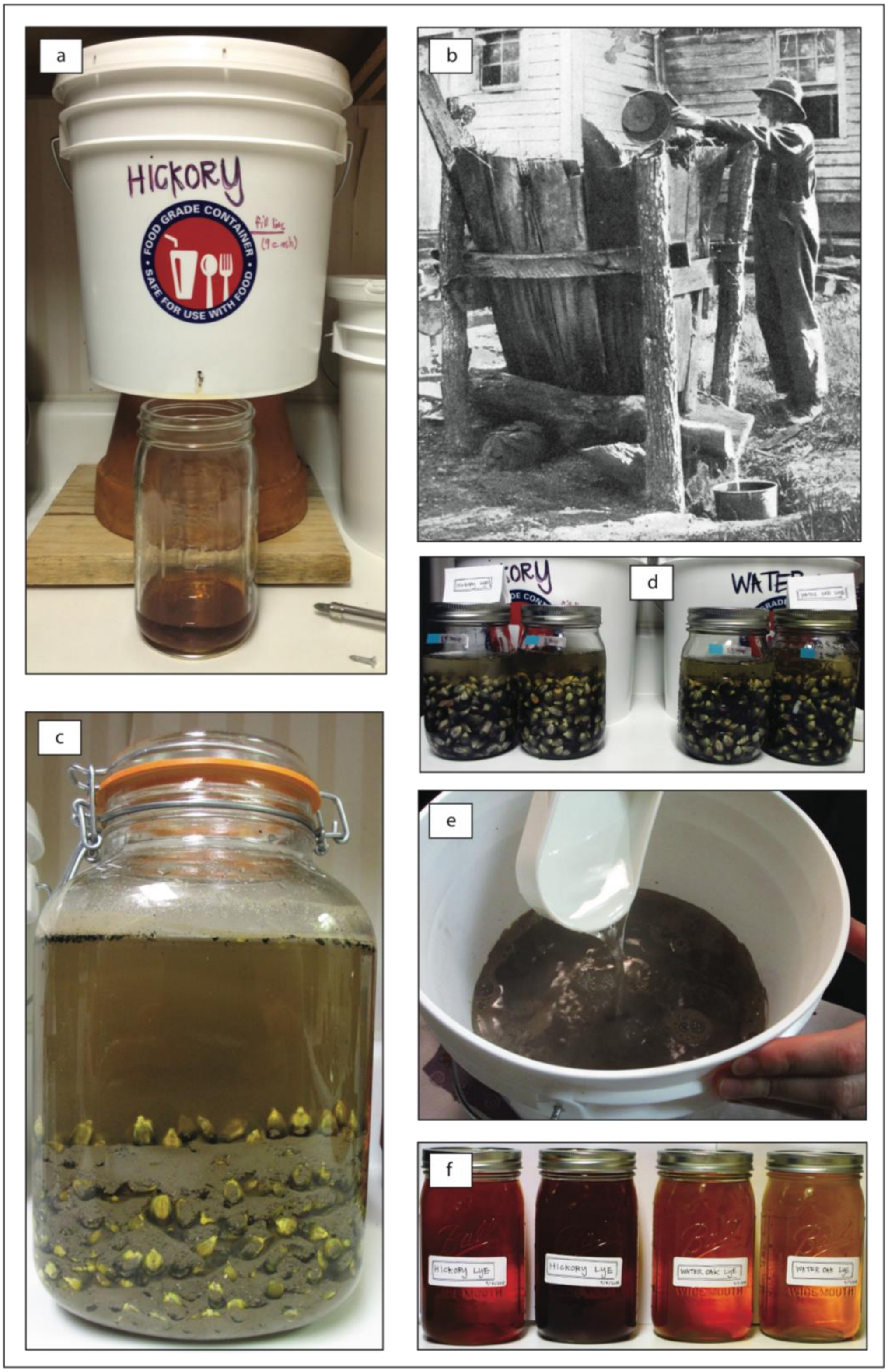


Figure 7.11. Lying experiments: (a) modern lye drip; (b) historic ash hopper used to make lye; (c) blue flint maize kernels soaking in a solution of water and water oak ash; (d) trial seven of the lying experiments; (e) pouring boiling water into a bucket packed with hickory ash to make lye; (f) lyes generated for this research.

12.0, suggesting that even weak lye made after a single pass through a hopper and added only sparingly to a water solution will meet the minimum alkaline threshold required for nixtamalization.

*Soaking and Grinding Maize*

As previously noted, there is no general consensus, either in the ethnohistoric literature or among modern practitioners, of exactly how much lye or wood ash should be used to make hominy, yet there is substantial reason to believe the amount added has less to do with achieving nixtamalization and more to do with achieving a particular texture and flavor. Among Wright's collection of recipes, instructions vary from adding "enough to remove the husks" to a recipe for *conihani* that calls for two to three tablespoons of strong lye to every quart of corn. Reports similarly vary for how long to soak maize. Several accounts specify that kernels were soaked long enough to soften the hulls and facilitate their removal, yet not so long, or in so strong a solution, that the hulls dissolved and the kernels became too soft to grind. Yet, despite these variations, there is a general consensus of opinion over what the final product looks and tastes like—a soft, crushed kernel porridge with a bland to slightly bitter taste. This, more than any other consideration, appears to be most important.

In order to determine the ratio of lye to water needed to achieve the described final product, I produced 24 solutions of wood ash lye (twelve from each lye sample). Beginning with a solution of ¾ teaspoon lye to 1 cup distilled water (pH 11.7), the alkaline strength of solutions was incrementally increased until the final solution, which was an undiluted solution of the wood ash lye straight out of the hopper (pH 13.7). Next, I soaked 2.27 kilograms (or half a pound) of dried, flint maize overnight in each solution (Figure 7.11d). After draining and rinsing the samples, I gauged how successful a solution was based on how easily the hulls were removed from the kernels during grinding (Figure 7.12). Even though the most dilute solutions still had a nixtamalizing pH (Bressani et al. 1958; Pappa et al. 2010), I quickly learned that this does not mean they were strong enough to achieve the texture and consistency prolifically described in the ethnohistoric review (Chapter 3). If the solution was too weak, the hulls did not separate from the kernels; if the solution was too strong, the kernels were too soft to grind, making them far more suitable for maize dough than hominy (Figure 7.12c). Kernels from every iteration of the soaking experiment were ground in a wooden tree stump mortar crafted for this project by Vernon J. Knight (Figure 7.12a and 7.12b). Ultimately, a solution with a pH of 12.6 (in this case, with a ratio of 1:4 wood ash lye to distilled water) served as the lower end of the threshold for a solution made from weak lye that would produce the desired effects. (Note that stronger lye, such as one that was passed through the hopper more than once, or even commercial lye, would likely have a different ratio of lye to water before reaching a pH of 12.6, perhaps around 1:6 or 1:7.)

I recorded several observations during this process. First, despite Blitz and Welch's (1998) findings to the contrary, I found that adding lye did, in fact, facilitate the removal of the kernel hulls (Figure 7.12a and 7.12d). As several practitioners have observed, alkaline treatment does "deskin" the kernel, allowing the hull to detach from the kernel which can then, during grinding, be completely separated from the grain. Second, while some few sources suggest that hickory ashes may make stronger lye than other hardwoods (Anonymous 2001; Schoolcraft 1855 vol. 5:274), both ash samples produced for this experiment had basically equivalent pH values. The only notable difference was their color, a reflection of the different concentration and


Figure 7.12. Removing hulls and grinding maize: (a) blue flint maize, soaked overnight in a lye solution, partially ground in a wooden mortar; (b) replica wooden mortar and pestle with partially ground maize in basin; (c) dissolved hulls from a solution that was too strong to make hominy, but likely appropriate for making masa; (d) removed hulls, or “peeled skins,” from maize that was soaked in a 1:3 ratio (lye to water); (e) close-up of partially ground maize; (f) coarsely ground maize with some pericarps present. Without the aid of a replica set of winnowing baskets, it was extraordinarily difficult to remove the hulls.

composition of tannins in each wood. Many oak ash lyes, like acorns, may have an overall taste that is somewhat unappealing based on the amount of tannic acid in the wood. This, and not the pH of the lye, may be the one of the reasons hickory ash lye seems to be preferred over oak lye—the high concentration of tannic acid in the latter may have been too bitter and thus distasteful for many people.

Finally, while it was not necessary to also winnow the grain from the hulls for each sample, I did attempt to winnow several samples. What I found is that there are few modern substitutes for traditional winnowing baskets (Figure 7.12e and 7.12f). When the sample is damp, as it invariably is after several hours of soaking, the hulls are heavy and are not easily blown away. Paper and plastic substitutes are inadequate for separating these materials. As noted in Chapter 3, it in fact may be that winnowing baskets are specifically adapted to this process. It is very possible that both the tighter weave as well as the pattern, combined with the material used in these baskets (likely river cane) helps to separate the hulls from the kernels (Hill:1997:50-51; Horton 2010:487). Replica winnowing baskets were not commissioned for this project, and thus their significance to the process cannot be described here.

*Cooking Hominy with Lye*

For the final portion of this second experiment, it was desirable to cook hominy using an electric stovetop range in order to establish what hominy at various stages of doneness looks and tastes like. Ethnohistoric accounts provide various descriptions of what a “finished” pot of traditionally-made hominy looks, smells, and tastes like, with the most labor intensive being those in which the grain is soft all the way through and had completely gelatinized, giving the dish the consistency of well-cooked porridge or mush. Using the process detailed above as a guide, as well as drawing heavily on Muriel Wright's collection of recipes, I prepared several pots of hominy over the course of a week, making close observations on both the taste and consistency of each dish. Utilizing both lye samples, I also compared the taste between pots of hominy made with each. Neither I, nor my assistant Andrew Draughon, could detect a difference. However, this particular observation is not conclusive. For one thing, both lyes produced for this project are relatively weak by comparison to the ethnohistoric descriptions, and while the "weakness" of the lye used in this research has no bearing on nixtamalizing the maize, as the soaking solution was still stronger than the minimum published pH value of 10.9, a second pass through an ash hopper, may have further concentrated the tannins in each lye, contributing to a difference in taste. Second, despite many descriptions of using lye or ash as a condiment added to the dish either late in the cooking process or when it was done, I chose not to try either.

### Experiment III: Cooking Hominy in a Replica Mississippian Standard Jar

As the boiling experiments detailed above sufficiently describe, there are clear, demonstrable differences between cooking in a West Jefferson globular jar in a direct-fire situation and a Mississippian standard jar suspended over a bed of hot coals. Importantly, while both are efficient short-term cooking strategies, the differences between the two strongly suggest that hot coal cooking is better adapted, and thus a superior choice, for long-term boiling. Further, while direct-fire cooking requires frequent stoking, hot coal cooking requires far less attention. These preliminary findings suggest that a Mississippian standard jar suspended over a bed of hot coals would indeed be the ideal set-up for the long-term cooking periods used to make hominy.

Regardless, it was still necessary to experimentally demonstrate one thing: in a real world setting, is a Mississippian standard jar suspended over a bed of hot coals able to sufficiently cook a pot of hominy? Thus, while the evidence amassed so far may point in that direction, it is incomplete without using an experimental design to explicitly answering the following:

- Is it possible to reach and sustain an effective cooking temperature range (or the gelatinization range of maize) for a prolonged period when a Mississippian standard jar is suspended over a bed of hot coals?

Following the guidelines established in both the ethnohistoric review as well as those above, on September 26, 2015, I soaked one quart of blue flint maize in a 1:3 solution of water oak lye to water **(**pH 12.7**)**. The next morning, after rinsing and lightly grinding the kernels, Vernon J. Knight and I separated the hulls from the grain by hand to the best of our ability in lieu of having a traditional winnowing baskets. Once the grain was prepared, we poured it into a medium-sized Mississippian standard jar along with four liters of water (a 1:4 ratio by volume), then suspended it over the basin hearth (Figure 7.13). Following the same procedures detailed earlier for hot coal cooking, the fire was first started with 1 kilogram of fuel grade one, then coals were made in batches using 2 kilograms of fuel grade four limb fall. When the coals were ready, we transferred them to the basin hearth.

Similar to our earlier experiments, we were easily able reach and sustain a boiling temperature by adding new coals to the fire every 45 minutes to an hour (Figure 7.14). It took approximately four kilograms of hardwood coals for the pot to reach the lower end of an effective cooking range (approximately 58ºC, or the gelatinization range for maize), and a third


Figure 7.13. Cooking hominy in a replica Mississippian standard jar over a bed of hot coals; (a) the author stirring a pot of boiling hominy; (b) cooking thermometer placed inside pot. Note that that the thermometer reads in Fahrenheit.

Figure 7.14. Hominy cooking in a replica Mississippian standard jar over a bed of hot coals.

batch, added at the 45-minute mark, to reach temperatures over 100ºC. By the first hour mark, our pot of hominy was in danger of boiling over from adding too many coals too quickly. Spreading out the coals helped reduce this risk, as did stirring the pot. An hour and a half in, our hominy began to set; however, before completely setting, by the two-and-a-half hour mark, we had to add more water to compensate for what was being lost to evaporation. While this addition of water added to the overall cooking time, the temperature of the pot never dropped below the effective cooking temperature threshold. By the three-hour mark, our hominy was soft all the way through the kernel and germ, and thus had reached the appropriate texture. Unaware that we were so close to our final product, we added the last batch of hot coals we had begun preparing ten minutes earlier, and then let the pot sit unattended, until the temperature dropped below an effective cooking range. To our surprise, this took nearly three additional hours.

In total, beginning with one quart of maize, we produced 3.3 kilograms of hominy (7.25 pounds), or approximately 2,376 kcal (hominy is valued at 72 kcal/100 g) (Figure 7.15). As a carbohydrate base that would have either been served with other foods, like venison or hickory nut oil, or even as a solitary dish flavored with wood ash lye (Briggs 2015:129-132), a medium-sized pot of hominy would have sufficed at least a family of four or five for a single day, needing to be replenished or added to the following day.

What this culmination of our experimental efforts demonstrated is that it is absolutely possible to cook hominy in a Mississippian standard jar suspended over a bed of hot coals. To achieve the desired texture specified in the ethnohistoric review, a minimum cook time of approximately three hours was required. This was considerably shorter than some of the longer cook times specified in the review, which extend to an upwards of 12 hours. However, this is likely not a discrepancy between the source material and the results presented here, but instead a reflection of slower and perhaps more varied cooking practices, which may have involved longer periods of "low temperature" cooking, using temperatures that hover closer to the lower threshold of the gelatinization range for maize. While we chose to add new coals every 45 minutes to an hour, the extended cook time recorded at the end of our experiment clearly demonstrates that adding coals this frequently is not necessary to cook a pot of hominy—after the first batch of coals is added and the pot begins to simmer, cooks have the option to wait longer before adding a new batch. Doing so would not only afford the cook greater time away from the cooking pot, but also helps explain the great discrepancy in reported cooking times.

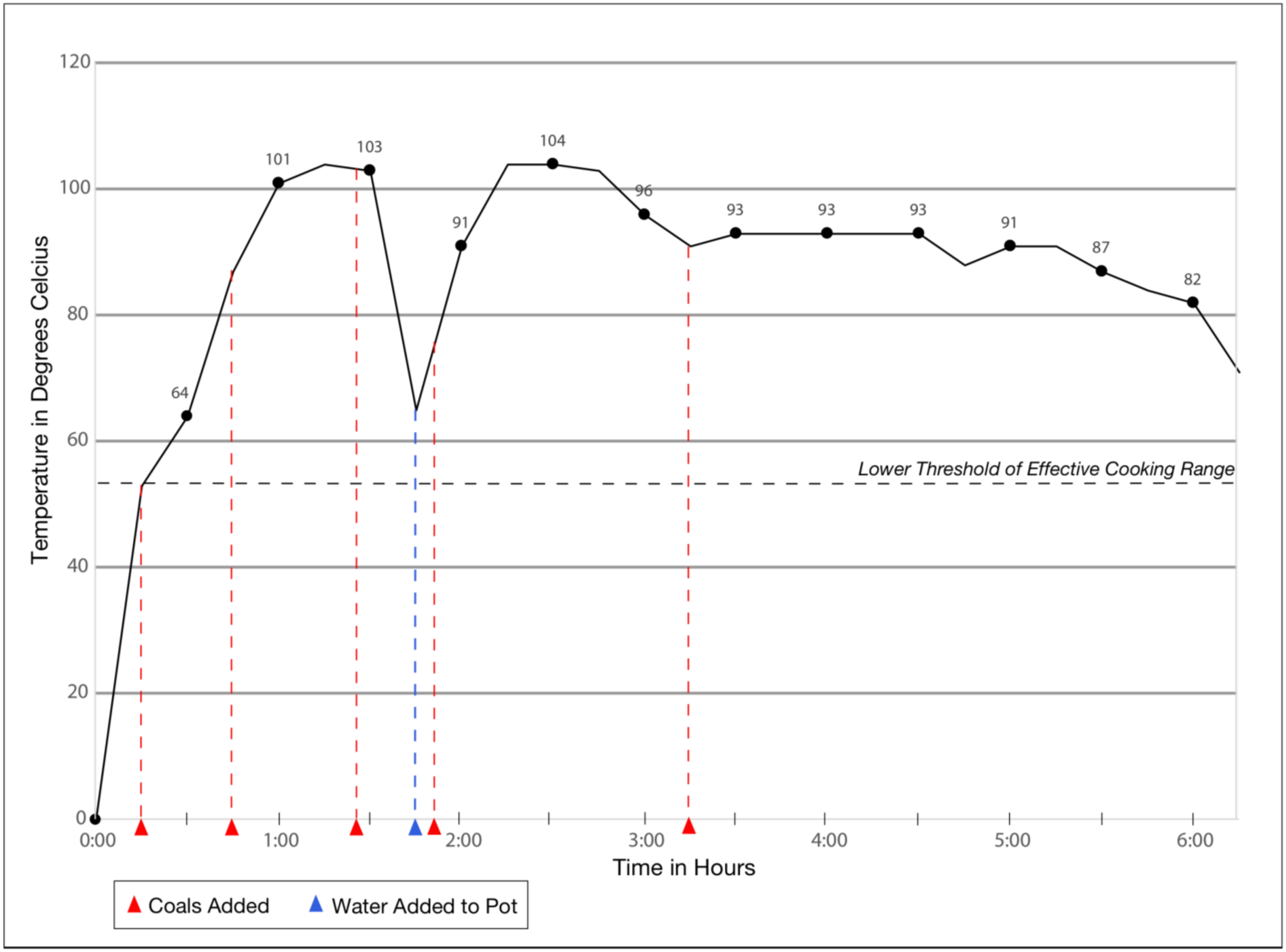


Figure 7.15. Cooking temperature over time for hominy cooked in a replica Mississippian standard jar suspended over hot coals.

## Implications

To review, each of the three experiments conducted for this research meaningfully contribute to our overall understanding of prehistoric cooking in the Black Warrior River valley. First, this project succinctly demonstrates that, following suggestions made in ethnoarchaeological research, limb fall is more than sufficient to use as cooking fuel. Owing to its renewable abundance within wooded areas, only a relatively small collecting area would have been needed, helping to reduce the amount of time involved in gathering cooking fuel, an important consideration when we conceptualize both Woodland and Mississippian gathering patterns. Further, it demonstrates that not all cooking fuels are the same nor appropriate for every culinary task. Cooks within the Black Warrior River valley would have certainly appreciated and understood the different applications inherent in the kind and size of limb fall, each of which would have been a consideration when gathering cooking fuel for particular tasks. Based on the findings presented here, populations that subsisted primarily on acorns and other nuts and used both West Jefferson conical and globular jars in open fires would have preferred smaller limb fall, while populations that subsisted primarily on hominy and used Mississippian standard jars over hot coals would have preferred larger limb fall.

Although ethnohistoric and ethnographic sources may be ambiguous on the specificities of using wood ash lye to nixtamalize maize, the research presented here demonstrates that the amount of lye used by hominy-eating populations in the Southeastern United States exceeds the minimal alkalinity necessary to accomplish nixtamalization, suggesting that while nixtamalization nutritionally enhanced the final product, perhaps the greater cultural consideration among those populations eating hominy was instead the taste and consistency of the dish. Thus, while the relatively weak lyes produced for this research, compared to those described in the ethnohistoric record, were more than sufficient to nixtamalize maize, they were not sufficient to alter the taste profile of hominy. Conversely, stronger lyes, especially when added while the dish was boiling or as a condiment once the dish was complete, would certainly affect the final flavor.

Counter to the expectations established in Chapter 5, this research also demonstrates that large-sized Mississippian standard jars were, in fact, suitable for suspended hot coal cooking, and like their smaller counterparts, could easily have been used as cooking pots. However, does their use as cooking pots, especially considering their large volume, suggest that these vessels were used to cook large communal feasts? Is their presence during early Moundville an indication of feasting, and thus contrary to the model central to this dissertation? Perhaps not. As mentioned in Chapter 4, with the single exception of a context recovered from the Grady Bobo site, there are no indications to date of large, communal feasting events taking place throughout Moundville's history. While large Mississippian standard jars are found in later Moundville II-III phase mound deposits, such as those on Mounds Q and G, other signatures of communal feasting are absent—there are no indications, either in the kinds of foods that were eaten or the quantity of their remains, for any of these contexts (Jackson and Scott 2010; Knight 2010:167, 301-302, 365; Taft 1996).

Like medium and small-sized Mississippian standard jars, large Mississippian standard jars are ubiquitous, though far less frequent, among household assemblages, not only during early Moundville but also throughout Moundville's history (see Figure 6.11). This ubiquity suggests that large Mississippian standard jars served a common, domestic culinary purpose.

While it is possible that practitioners cooked hominy in large Mississippian standard jars, their size suggests a different activity to which they were well-suited: rendering animal fat. Fat is rendered by heating the tissue until it melts. If a large Mississippian standard jar suspended over a bed of hot coals was used to do so, it is likely that a large portion of the butchered animal, meat, fat, and bones, would have been placed in the pot along with enough water to cover the portions of flesh. Once heated high enough, the fat would rise and eventually congeal at the top, similar to the process described for making ku-nu-che balls out of hickory nuts (Fritz et al. 2001), then skimmed off. Rendered fat, like salted meat, can be kept for extraordinarily long periods of time in unrefrigerated environments without fostering harmful fungi, mold, or bacterial growth. Arguably, in the humid Southeastern United States, use of rendered fat may be a better preservation method than salt curing, the latter being well-suited to cooler, drier climates. Unlike salt curing, the use and presence of rendered fat is described extensively in the ethnohistoric literature for the Eastern Woodlands, including the Southeastern United States, with bear fat frequently specified as a common additive to hominy dishes (Beverly 1722:155; de Montigny 2010 [1747]:343; Parker 1981:74; Romans 1776:92). In fact, Choctaw families in Mississippi still use very large cast iron kettles for rendering fat (Thompson 2008).

Finally, central to the characterization of the Mississippian standard jar offered in Chapter 5 is the proposed relationship between the vessel morphology and hot coal cooking, as well as the efficacy of hot coal cooking. The third research experiment demonstrates that suspending a Mississippian standard jar over a bed of hot coals is an extraordinarily effective cooking method that can certainly be used to make a pot of hominy. Though previously unexplored as a potential technique used by Mississippian populations, this research clearly demonstrates that hot coal cooking is not only possible, but, further, is a superior cooking technique for long-term boiling when compared to direct-fire cooking. Boiling for one hour in a West Jefferson globular jar placed directly in a fire requires constant maintenance and stoking; to extend this process over a three- or four-hour period would be extraordinarily laborious. However, using a West Jefferson globular or ovaloid jar to prepare a food or dish that only requires minimal heat-treatment, and not a slow, long boil, would require only as much effort as it takes to bring the pot to a boil. However, boiling in a Mississippian standard jar suspended over a bed of hot coals requires minimal maintenance and only the hourly addition of new fuel. By comparison, hot coal cooking is also a far more controllable cooking technique, especially when used in a basin-lined hearth that can help concentrate heat inward. Coals are not open flames, and if they are transferred to the hearth at the appropriate time, will not flare up. As such, they require far less supervision than an open-air fire. Cooks using hot coals have the option of stepping away from a cooking pot, leaving it unattended for substantially longer periods of time.

Importantly, the use-alteration patterns recorded during these boiling and cooking experiments are congruent with the archaeological record. Not only did the West Jefferson globular jar placed directly in a fire develop a shiny band around the body of the vessel, fulfilling Skibo's expectations for this form of cooking, but the Mississippian standard jars suspended over a hot bed of coals were completely sootless, with no detectable signs of use alteration. This research demonstrated that by transferring the coals from an open-air hearth to a basin hearth, hot coal cooking can be completely flameless from start to finish, resulting in "pristine" cookware that lacks any sooting residue.

Ultimately, the experimental research presented substantially contributes to our understanding of the ancestral hominy foodway. It not only suggests that the characterization of the Mississippian standard jar presented in Chapter 6 is correct, but also that the description of the hominy foodway compiled through the ethnohistoric sources in Chapter 3 is likely very similar to the ancestral hominy foodway that I propose was practiced in the Black Warrior River valley beginning around A.D. 1070-1120. Speaking more broadly to the archaeological field, it demonstrates the importance of incorporating experimental designs into our research. While many of the expectations for the ancestral hominy foodway, the Mississippian standard jar, and the utility of hot coal cooking were supported, a few key expectations were not: notably, that large Mississippian standard jars were primarily used as storage pots owing to their unsuitability for suspended cooking over a bed of hot coals, and that hickory lye is stronger than other lye made from other hardwoods including oak.

With this cumulative body of information at hand, it is now time to present a new model for understanding the social and cultural genesis that took place during early Moundville and the role that the ancestral hominy foodway played in this process.

# CHAPTER 8:
# A HISTORICAL ANTHROPOLOGICAL APPROACH TO MOUNDVILLE'S ORIGINS

"Cooking is the language through which society unconsciously reveals its structure."

-Claude Lévi-Strauss (1990)

Beginning around A.D. 1070 in the Black Warrior Valley of west-central Alabama during the terminal Late Woodland West Jefferson phase, the first semblances of a Mississippian lifeway appeared in the form of scatterings of maize and shell-tempered pottery. Approximately fifty years later, or sometime around A.D. 1120, maize was no longer a minor component of the diet, but instead the dominant carbohydrate, while shell-tempered ceramics dominated ceramic assemblages. Throughout the subsequent early Mississippian period, known as the Moundville I phase (A.D. 1120-1250), groups living within the Black Warrior Valley not only increased the amount of maize they consumed and the amount of shell-tempered ceramics they produced, but they also began constructing wall-trench structures, building earthen mounds, and participating in a Mississippian religious expression. By A.D. 1200, a localized Mississippian identity had crystallized at the site of Moundville in the form of a broadly uniform ceramic complex, a diet dominated by maize, and the beginning of construction on a bold, new mound and plaza arrangement manifesting in the arrangement on the high terrace at Hemphill Bend.

For decades, researchers have searched for clues that shed light on the origins of Moundville, the second largest Mississippian center in the Southeastern United States. The precocious appearance of maize suggested to many a synergistic relationship between the foodstuff and the development of the ritual-ceremonial center. However, this relationship has traditionally been modeled through a political-economic lens, suggesting maize was used to sponsor community-wide feasting events designed to attract followers, events that simultaneously served as an introduction of the plant to new populations (Cobb 2003:76; Fritz 1998; Knight and Steponaitis 2007). Continuing in this vein, it was also proposed that these new populations were enticed to adopt and begin growing maize because of the control that they could assert over the food source. Unlike a dependence on wild resources, maize-based agriculture is a more predictable and secure subsistence strategy, allowing food producers to control the amount of surplus generated each season. However, there are important issues with this model—not only is there a paucity of archaeological evidence indicative of communal feasting recovered from the Black Warrior Valley during either the Late Woodland West Jefferson or Early Mississippian Moundville I phases, but there is also no evidence for prolonged crop failure within the area.

Despite being inadequate, economic models are still commonly cited when discussing this synergistic relationship. For one, within this context, they make sense, fitting comfortably within a long history of anthropological and archaeological thought that focuses on viewing food as a resource (Fried 1960; Oberg 1955; Sahlins 1972), and particularly, one used to vie for power in nascent chiefdom societies (Sahlins 1963; Service 1962). For another, and directly related to the first, no reasonable alternative model has been suggested; it seems we have a difficult time seeing food as anything *but* a resource. This is unfortunate. Such a reductionist attitude toward food obscures the complex culinary and social practices bound within and shaped by foodways, as well as those people intimately involved in its preparation and consumption (Atalay and Hastorf 2006; Hamilakis 1999; Sutton 2010; Twiss 2007).

Ultimately, what the research presented in this dissertation contends is that the synergistic relationship essential to Moundville's origins was not that between the Mississippian center and maize, but instead between Moundville's people and the hominy foodway. Before maize was deemed good to grow, store, and manipulate, hominy, the most important cooked maize dish among historic Native groups within the Eastern Woodlands (Briggs 2015), had to first be deemed good to eat and good to make. Essential to the hominy foodway was the Mississippian standard jar, the most prolific artifact found throughout the Mississippian cultural world and a tool specifically used to nixtamalize maize.

This chapter reviews the proposals and findings presented in this study, concluding with a new model for understanding Moundville's origins that centers on taste, gender, and practice. The argument is rooted in a historical anthropology of cognition, which offers a framework for understanding social and cultural change predicated on history and the workings of the human mind. Drawing on the findings presented here, I propose that in the Black Warrior Valley of west-central Alabama, Moundville's origins are rooted in the late Woodland West Jefferson phase with the introduction of both non-local women and the hominy foodway, brought to the area through exogamous marriage networks. The foodway was disseminated through open, overlapping communities of practice, which created a constellation of practice of the hominy foodway. Through this constellation of practice, a new community identity emerged, one specific to the area and predicated on local history. This new identity became the foundation on which

Moundville society was built, and ultimately the identity inscribed in the 32 earthen mounds and a large, central plaza that characterize the site.

## Historical Anthropology of Cognition

In recent years, there has been a growing interest in historically-based theoretical perspectives that provide researchers with the latitude to independently model the origin and development of Mississippian societies. The most prominent theoretical perspective within this tradition is historical processualism, although a second perspective, eventful analysis, has gained in popularity over the last few years. Eventful analysis, developed by the sociologist William Sewell but introduced to archaeology by Robin Beck and colleagues (2007), maintains a strong conception of structure within the structure/agency dialectic, with gradual structural change culminating in events, or historical moments of structural disruption that are distinguished by creative actions not predicated on history. Within this tradition, structures are multiple and overlapping, comprised of mental schemas, which are transposable, and resources, which are actual, polysemic, and unpredictable (Sewell 2005:216). Because resources and schemas exist in a mutualistic relationship in which they generate one another, the built world becomes more than a mere reflection of ideational schemas. Structures are always gradually changing.

Despite the popularity of these theoretical traditions, both are incomplete theories of history, lacking a theory of directionality and causation (Callinicos 1995). By going back to the roots of eventful analysis, however, it is possible to ameliorate this shortcoming.

Eventful analysis is predicated on Marshall Sahlins's historical anthropology, which is a deliberate attempt to adopt Claude Lévi-Strauss's structuralism, including structural analysis, into a historical study of practice (Sahlins 1981:7). Sahlins tried to introduce both a theory of transformation and directionality to structuralism by suggesting that structures are the product of history, and that structural change is the result of an introduced dissonance within a structural system. Structures are transformed through what Sahlins called the “structure of the conjuncture” (Sahlins 1981), or the process by which a person non-discursively interprets new experience using already held, historically constructed structures derived from the structural system they were raised in. Typically, the “structure of the conjuncture,” or *encounter* (which is the shorthand used throughout this dissertation) is absorbed within a system, leaving it relatively unchanged. However, structural systems can fail, reaching the limits of what they are able to explain, in which case the result is a moment of social and cultural chaos, culminating in a historical event that requires a novel solution in order to realign the structural system.

Importantly, what historical anthropology provides is the framework for a theory of directionality—the crux of an encounter is that it is understood as being like something in the source structural system, which is then non-discursively employed to understand the encounter, or target. In other words, the encounter is predicated on metaphor, and thus structural change is ultimately metaphorically driven.

However, it is not enough to simply say that structural change is metaphorically driven; a surprising amount of cognitive research has demonstrated not only that we think and process the world metaphorically, but it has also produced a number of complementary findings that further inform how we absorb, process, and interpret the world around us. For this reason, I propose that it is possible to develop a historical anthropology of cognition, founded on the premise that structures are adapted to the hardwiring of the human mind. Augmenting the theoretical frameworks provided by Marshall Sahlins’s historical anthropology and William Sewell’s eventful analysis, I offer five principles drawn from findings in linguistics, neuroscience, and cognitive anthropology that provide directionality and causation to these theoretical traditions:

(1) Structures are inherently conservative and, all other factors being equal, will only change incrementally through encounters.

(2) When large-scale, structural change is imminent, people will continue to non-discursively rely on their own structures, giving the appearance of agency in some cases to observers.

(3) Practice-based (non-discursive) knowledge is acquired through observation or practice, and thus is different from spoken language-based (discursive) knowledge. As such, non-discursive knowledge will not necessarily be disseminated in the same social realms as discursive knowledge.

(4) Structures are products of the relationship between schemas, resources, and the human body and mind, a relationship that many times is expressed through conceptual metaphors, which are both derived from history as well as the embodied experience of living.

(5) Structural change proceeds metaphorically. In other words, as researchers, when we identify change in various structures, we are seeing either the results of various encounters that are metaphorically driven, or the outcomes of events that again are the results of the uncommon use of a particular structure or structures.

These principles establish a clear avenue through which to explore the adoption of both maize and shell-tempered ceramics, as well as the subsequent emergence of a Mississippian identity within the Black Warrior Valley. First, it is important to model the adoption of maize, the earliest trace of a Mississippian lifeway within the subject area, as an encounter predicated on a historically-based metaphor. In other words, when populations in the Black Warrior Valley first encountered maize, they understood the plant as similar to foods they already knew, mapping qualities of already held source structures onto the new Mississippian targets. To understand how maize was mapped, it is important to consider not simply maize as a food, but maize-based foodways. Foods alone are rarely as important to our identity as how they are prepared, who prepared them, the rules that surround their consumption, and even those that govern their disposal. In other words, to begin modeling the encounter that led to the adoption of maize, it is important to first articulate the maize-based foodway that populations within the subject area came into contact with, and then to identify the Late Woodland foodway upon which the new foodway was cognitively modeled.

## The Hominy Foodway of the Native Eastern Woodlands

Hominy is a dish of boiled maize kernels, either ground or whole, that have been nixtamalized, or alkaline cooked. Throughout the historic Native Eastern Woodlands, hominy was the dominant maize-based dish, serving as the foundation for a large number of resulting recipes (Briggs 2014, 2015). The ethnohistoric review presented in Chapter 3 demonstrates that there were a number of materials, culinary steps, and social practices that were, and in some cases still are, integral to the general historic Native hominy foodway.

There are three basic culinary steps that define the Native historic hominy foodway. First, dried flint maize kernels are soaked in a solution made from either hardwood ash or lye (which is made by leaching water through wood ash). This soaking can last anywhere from several hours to overnight. The kernels are ready for the next step when their hulls are either noticeably loosened or when they began to change color, taking on a white or light yellow hue. Next, the kernels are drained, then processed in a variety of ways that are intended to remove the hulls, or seed coats, that encase the kernels. Most commonly, the kernels are ground using a wooden mortar and pestle, as well as a set of woven baskets intended to help separate the hulls from the ground kernels, but in a few cases, the alkaline solution in which the kernels are soaked is caustic enough that the hulls virtually dissolve, making it possible to simply rinse or rub the hulls away. Finally, once the kernels are processed to the desired grain, the meal is then boiled in an earthenware pot for anywhere from one to ten hours. This long boiling period is important for imparting the signature, porridge-like texture that defines the Native hominy foodway.

Equally important to the hominy foodway are several social practices and connotations associated with hominy. During the historic period, hominy clearly held connotations of both health and hospitality, both of which likely arose from the close association of the preparation of hominy with women, centered around the home. Ethnohistoric sources indicate that not only did women grow maize, but they were also the primary cooks within Native communities. This pronounced relationship between women and the hominy foodway constructed several integral aspects of female-gendered practices and identity, and also shaped a number of the broader connotations that enveloped the hominy foodway. Hominy acted as a sick food, used in times of disease to help the infirm by serving as an easily digested food and a source of comfort (du Pratz 1774:12-13). As the dietary staple of the Eastern Woodlands, hominy would have been one of the most prevalent foodways throughout the lives of most Natives, ensuring that it had a strong association with both childhood and home (Bartram 1791:454). Further, this relationship with women and the home helped foster a connotation of hominy as a hospitality food, one that was served to any and all visitors (Fenton 1978:301; Romans 1957:203).

Outside of the home, the hominy foodway played an important role in the widely practiced Green Corn ceremonies of the Eastern Woodlands, as well as in widely shared corn origin stories. Hominy is a common food served during the community-wide Green Corn ceremonies, while maize ash, ash of course fulfilling an important role in the preparation of hominy, plays a ritual role in several ceremonies. Hominy also features prominently in broadly shared Eastern Woodland oral traditions about the origins of maize, which hold that it is a gift from the body of the Corn Mother, one that she prepares into hominy and uses to feed her children (Swanton 1929:230-231; Urban and Jackson 2004:710; Witthoft 1949:77).

Finally, in addition to these connotations and associations, the practice of the hominy foodway contributed to a widespread preference for bitter dishes. Several sources indicate that wood ash or even lye was added as a kind of condiment to finished dishes, a practice that some European observers wrongly interpreted as intended to make these dishes saltier (Catesby 1754:173-174; Chauchetière 1901; Hariot 2007 [1590]:39-40; Lawson 1960:361). Because perceptions of food are largely social products, which in turn culturally constructs taste (Bourdieu 1984), it is likely that while Europeans and Euro-Americans favored salty dishes, Natives in the Eastern Woodlands favored bitter and perhaps even sour dishes. This proclivity for bitter foods is undoubtedly central to the widespread perpetuation of nixtamalizing culinary practices by Native cooks long after the practice had ceased having any particular health benefit (Briggs 2015).

### *A Taste for Nixtamalization*

Essential within the hominy foodway are the sequence of steps that result in a nixtamalized final product. Nixtamalization is a Nahuatl word that refers to the process of alkaline cooking maize kernels. Nixtamalized dishes, like those that result from the general recipe for hominy articulated above, follow two basic steps that result in the chemical transformation of maize from an incomplete dietary staple into a complete one: first, maize kernels are exposed to an alkaline solution, and second, they are boiled for at least thirty minutes (the minimum period required to chemically alter the kernels) (Bressani and Scrimshaw 1958:774-778). This chemical transformation is accomplished by decreasing the solubility of the zein portion of the seed while simultaneously increasing the relative release rate through digestion of most of the essential amino acids otherwise locked tightly within the kernel's endosperm (Bressani and Scrimshaw 1958:777; Katz et al. 1974:765-773).

Nixtamalization, or alternatively the proper nutritional supplementation of a non-nixtamalized maize-based diet, is essential for any population that relies on maize as a dietary staple. Heavy reliance on untreated maize will result in a chronic wasting disorder called pellagra, which is brought on by a severe niacin deficiency. Pellagra, while named for the rough, thickened skin that develops late in the course of the disease, has several other severe symptoms, such as dementia and chronic malnutrition, which in many cases makes the disease fatal if left untreated. While maize-based foodways and the resulting diets heavily reliant on maize were commonly disseminated throughout the New World with nixtamalizing practices, the same cannot be said of the dissemination of maize into European or Euro-American homes. Nixtamalizing practices were commonly interpreted as peculiar, and done solely for taste and thus non-essential (Speck 2004:44), resulting in the dissemination of maize divorced from nixtamalizing practices. There were several unfortunate outbreaks of pellagra in both Europe and in North America among populations who received their culinary knowledge of maize through these channels (Chacko 2005; Fussell 1999; Osborn 1988).

An alternative to nixtamalization is to supplement a diet high in maize with complementary foodstuffs high in protein. While animal protein is an excellent complementary foodstuff, historically, the most common complementary foodstuffs include varieties of the common bean. Of interest is the fact that that the common bean was widely grown and eaten by Native groups throughout the historic Eastern Woodlands, negating the biological necessity for nixtamalizing practices (Anonymous 2000:190-191; Bartram 1853:47-48; Cushman 1899:231; Hudson 1975:307). Yet, as late as the twentieth century, not only were nixtamalizing practices still common, but wood ash and lye were common condiments added to final dishes in order to enhance their flavor (Adair 1775:116; Lawson 1960:361; Speck 2004:44), stressing that the perpetuation of the practice throughout the historic period had more to do with taste than with biology. This conservatism suggests that, for practitioners, while nixtamalizing maize was likely understood to have a health benefit, more importantly, it was a culinary process that resulted in a desired taste and texture. In other words, the taste of hominy was valued over its health benefits.

## The Hominy and Nut Foodways Compared

Indeed, the taste of the hominy foodway likely played an fundamental role in its dissemination and practice during the Late Woodland West Jefferson and Early Mississippian Moundville I phases of the Black Warrior Valley (A.D. 1070-1250). During the Woodland stage in west central Alabama, acorns and chestnuts served as the dietary carbohydrate base, with acorns the most abundantly consumed (Scarry 1986, 2003). While hickory nutmeat, which is high in both fat and protein, was generally rendered into oil (Fritz et al. 2001; Messner 2011:14), acorns and chestnuts are, in contrast, low in fat and high in carbohydrates and thus are far less suitable for rendering oil. Instead, acorns and chestnuts were ground, then boiled, to make a kind of mush or porridge, a dish that in texture would have borne a striking similarity to hominy (Anderson 2005; Kupperman 1988). Additionally, acorns from both white and red oaks possess tannic acid, which has a bitter taste. While this bitterness is subtler in white oak acorns, in red oak acorns, the tannic acid must be reduced or neutralized before being consumed.

Although there were certainly variations in how different varieties of acorns and chestnuts were processed, it is possible to articulate a general nut foodway. First, those acorns or chestnuts not immediately consumed were dried then cracked to either partially or entirely remove the shell. Next, the nutmeat was boiled either to render oil or to make a mush, to which various other foods could be added to make either a stew or porridge. Heat-treatment was not prolonged; in order to reach a gelatinized texture, acorn and chestnut meat need only be boiled for thirty minutes to an hour.

Unmistakably, there are several general culinary similarities between the nut and hominy foodways. Both involve first drying the foodstuff, then grinding it in order to help remove the hard outer casings that envelop both maize (the pericarp or seed coat) and nuts (the shell). Red acorns bear another similarity to maize, in that they also require some form of water processing, like soaking, in order to leach the majority of the bitter tannic acid from the nutmeat. Next, both foodways involve boiling for a minimum of at least 30 minutes. However, while a half hour is a sufficient period of time to soften acorn and chestnut meat and thus produce a kind of nut porridge, for hominy, this is only the minimum threshold for achieving a nixtamalized, or chemically altered, maize product. To achieve the highly prized, softened texture of hominy frequently referred to in the ethnohistoric record, much longer periods of heat-treatment are required, typically those that last anywhere from one hour to upwards of 12 hours. However, the resulting, final product for both foodways is remarkably similar—a slightly bitter, porridge-like dish that could serve as a stand-alone meal, or to which any number of other foodstuffs could be added.

I suggest that the similarities between the practice and product of these two foodways led to the widespread adoption of the hominy foodway within the Black Warrior Valley. During the Late Woodland West Jefferson phase (A.D. 1070-1120), as populations within the area first encountered a nixtamalizing hominy foodway, they mapped the new foodstuff cognitively using a schema they were intimately familiar with—the nut foodway. In this way, hominy and maize would have first been understood as *like* nut dishes and thus as like nuts, particularly acorns and chestnuts. That this foodway included nixtamalizing practices is evident from bioarchaeological evidence from the Moundville I phase (A.D.1120-1250), during which the hominy foodway eclipsed the nut foodway in importance, with maize contributing nearly 40 percent of the caloric intake for those populations living in the Black Warrior Valley (Schoeninger and Schurr 2007). The fact that these populations were healthy and not undernourished (Powell 2007) suggests they were subsisting on a complete maize-based diet, and in the absence of the common bean, which was not disseminated into the region until around A.D. 1300 (Hart and Scarry 1999), this strongly suggests that this hominy foodway included nixtamalizing practices.

Notably, this further suggests that while nixtamalizing maize unequivocally had a health benefit, for these early practitioners, it was in fact the *taste* of hominy afforded through nixtamalization that not only prompted the adoption of the foodway but also perpetuated the practice long after the common bean was adopted. Indeed, acorn dishes, with their slightly bitter taste and mush-like consistency, likely the prepared the palate of those residing in the Black Warrior Valley for the introduction of hominy. As such, the health benefits of nixtamalization were likely a serendipitous byproduct of a culinary method that, first and foremost, produced a dish with a flavor and texture that was complementary to the endemic taste profile.

## Tools of the Trade: the Mississippian Standard Jar and Hot Coal Cooking

An essential tool of the hominy foodway was the Mississippian standard jar. The most prolific form of cooking pot found throughout many parts of the Mississippian cultural world, the Mississippian standard jar was originally thought to be a generalized cooking pot (Phillips 1939), and not a specialized tool for nixtamalizing maize (Briggs 2016). While there are a number of similarities between the culinary steps involved in the nut and hominy foodways, one of the most notable differences is that the hominy foodway requires a much longer boiling period in order to achieve the softened, porridge-like texture that characterizes the dish. However, not all ceramic forms, nor all cooking strategies, designed for long-term boiling. During the Late Woodland West Jefferson phase, the primary cooking pot used was an ovaloid, grog-tempered jar. Hawsey (2015:31) characterized the West Jefferson ovaloid jar as having an elongated lower body with a blunt pointed base, a slightly constricted neck, an excurvate rim, a rounded or flattened vessel lip, and a base thickness greater than the wall or rim thickness. In contrast, Mississippian standard jars recovered from Moundville are globular, shell-tempered vessels with slightly constructed necks and have a base thickness that is equal to their wall thickness

(Steponaitis 1983:69). Additionally, use alteration analysis suggests that these two pots were used with different cooking strategies—West Jefferson ovaloid jars were placed directly within cooking fires (Hawsey 2015) while Moundville Mississippian standard jars were suspended over a bed of hot coals (Briggs 2016).

In order to test the hypothesis that Moundville Mississippian standard jars were nixtamalizing tools well adapted for long term boiling, I first conducted a diachronic, morphological study of whole, unburnished Mississippian standard jars recovered from burial contexts that date to the Moundville I-III phases (A.D. 1120-1520). The study followed a communities of practice framework, which holds that stylistic choices in pottery making are subject to greater variation and change over time than technological choices because they are based on individual taste and experience as well as social conditioning (Dietler and Herbich 1998). Technological choices, conversely, are subject to a different set of structural conditions based on practice and performance, and thus are far less likely to vary over time so long as the tasks to which they are adapted also remain constant (Schiffer et al. 1994). The results of this analysis demonstrate that while stylistic qualities of the jar changed over time, the globular body of the jar remained consistent and unchanged. This finding suggests that the design of the jar was such that it fulfilled a technological purpose, one that did not vary throughout Moundville's history.

The second part of my proposition, that Moundville standard jars were suspended over a bed of hot coals and that hot coal cooking is a superior cooking strategy for long-term boiling, was tested using an experimental archaeological framework. Using carefully replicated ceramic vessels produced by Tamara Beane, a renowned potter known for her Southeastern United States Native American reproductions, Vernon J. Knight and I conducted a series of culinary experiments utilizing replica materials and conducted under replica conditions, in order to gauge the effectiveness of the proposed model for the early Mississippian Black Warrior Valley hominy foodway. These experiments demonstrated that while West Jefferson ovaloid vessels are well-adapted for being placed directly in open fire, Mississippian standard jars are conversely well-adapted for suspension over a basin hearth containing a bed of hot coals. When placed directly in an open fire, West Jefferson ovaloid vessels quickly reach a boil; however, maintaining a boil for more than an hour requires constantly stoking the fire and removing ash that accumulates around the base. A Mississippian standard jar suspended over a basin hearth in which hot coals are placed, however, is a superior set-up for long-term boiling. Not only are hot coals sufficient for reaching a boil, but maintaining a boil only requires replenishing the coals every forty-five minutes to an hour. Further, the basin hearth, while allowing airflow, also helps trap and direct the radiant heat from the coals, keeping the suspended pot hot hours after fresh coals have stopped being added. Finally, while placing a pot within a fire covers the vessel in soot, suspending a jar over a bed of hot coals is a sootless form of cooking, leaving the exterior walls of the vessel pristine, which corresponds to the use alteration patterns for both West Jefferson ovaloid and Mississippian standard jar sherds recovered from the subject area.

The results from both the ceramic and the experimental studies further articulate the material and practice-based components of the hominy foodway in the Black Warrior Valley beginning around A.D. 1050-1120. First, like the historic hominy foodway of the Eastern Woodlands, this Early Mississippian foodway included both flinty maize and nixtamalizing practices, the latter of which contributed to a bitter taste profile also characteristic of the West Jefferson nut-based cuisine. Additionally, this hominy foodway also included the Mississippian standard jar, a globular, shell-tempered vessel that represents a stark departure from the grog-tempered, ovaloid jars that comprise West Jefferson phase assemblages, as well as basin hearth hot coal cooking, another departure from West Jefferson phase cooking practices. As such, the wide-spread dissemination and adoption of the hominy foodway throughout the subject area between A.D. 1070-1250 represents a substantial change in not just what was primarily eaten by residents of the valley, but also in the tools and practices used in their day-to-day culinary activities. Understanding the impact of this change requires positioning this transition within the social and ethnic landscape of the West Jefferson and Moundville I phase Black Warrior Valley.

## The Social and Ethnic Landscape of Early Moundville

Researchers have long searched for the origins of the Mississippian expression made manifest at the site of Moundville. Views on the site's genesis can generally be thought of as falling somewhere along a continuum. On one side is the proposal that Moundville represents an endemic development, growing out of local Late Woodland populations who came into contact with Mississippian peoples and ideas. On the other end of the continuum is the proposition that a migration of a foreign population into the area brought the hallmarks of the Mississippian culture with it, while subsequently driving local populations out. The majority of researchers fall somewhere in between, leaning toward one side or the other, but generally maintaining that Moundville emerged out of the interaction between local Late Woodland and non-local Mississippian populations. Following the findings from other Mississippian centers, it has been further proposed that large, communal feasts hosted by aspiring elites with access to maize stores played an important role in the dissemination and subsequent adoption not just of maize, but also of shell-tempered ceramics.

There are, however, problems with these models. I argue that each oversimplifies the ethnic diversity of this early, formative time. Late Woodland West Jefferson phase ceramics have been routinely recovered from Moundville I phase contexts in the Black Warrior Valley along with a small but persistent late Coles Creek/Plaquemine ceramic presence indigenous to the Lower Mississippi Valley. Further, at least four separate architectural traditions have been documented in the subject area dating between A.D. 1120-1250. Combined, these separate material classes suggest that migration of non-local peoples into the Black Warrior Valley at this time did not originate from a single location, but instead from several areas, including but perhaps not limited to the region surrounding the Shiloh site in southwestern Tennessee and the Lower Mississippi Valley. At the same time, local peoples formerly representing the West Jefferson phase continued to live in the area, side-by-side with the newcomers.

Within this ethnically diverse landscape, large, communal feasts could have served as important nexus that formed social ties between the diverse groups that populated the area, while also as serving as venues through which to introduce to the hominy foodway. Not only are communal feasting features prominently in the origins of other Mississippian societies, but communal feasts are also excellent stages for aspiring elites to attract followers. It is thus extraordinary that to date, no evidence for episodes of large communal feasts have been recovered from contexts dating between A.D. 1120-1250, save a single late Moundville I phase feature (A.D. 1190-1250) from the Grady Bobo site (Maxham 2001). Indeed, communal feasting seems a logical social arena to not only introduce the hominy foodway to this diverse population, but also to foster the social ties necessary to forge a common identity. With the apparent paucity of communal feasting events, how was the hominy foodway disseminated and, further, how was a coherent Moundville identity, which is clearly evident only in the post-1200 A.D. period, made manifest on the landscape?

By pivoting the conversation to discuss the hominy foodway, with its hot coal cooking and Mississippian standard jars, and not simply maize and shell-tempered ceramics, answers to these questions may emerge. Mastering the hominy foodway involved acquiring both discursive and non-discursive knowledge. In other words, it would not have been enough to simply taste hominy and like it; women had to learn and master the set of practices involved in cooking hominy, from nixtamalizing maize and cooking over a bed of hot coals to crafting globular, shell-tempered ceramics. From pot to preparation, from start to finish, hominy is an involved process. While the steps for cooking hominy and perhaps too the knowledge for hot coal cooking could have been verbally imparted, crafting globular, shell-tempered ceramics is a form of non-discursive knowledge that would have been best imparted through demonstration and practice.

Unlike feasting events, shared, everyday meals centered around the home would have been excellent contexts through which to establish the relationships required to transmit and learn the culinary and ceramic practices of the hominy foodway. The impetus for adopting the foodway would have been predicated on taste. While the taste of hominy was one that European colonists and explorers frequently found unappealing (Briggs 2015:129-132), hominy's flavor profile fit well within the culinary tradition of the Late Woodland Black Warrior Valley, which was characterized by bitter nuts like acorns, hickory nuts, and chestnuts (Scarry 1986, 2003, 2007). After tasting hominy and deeming it good to eat, women then needed to acquire the broad set of practices and skills involved in preparing the dish. Domestic meals centered around the home would have served not only to introduce hominy to those unfamiliar with the dish, but also would have fostered the social ties required to learn to craft shell-tempered, globular, Mississippian standard jars.

### Constellation of Practice of the Hominy Foodway

Finally, a careful consideration of the dissemination and practice of the hominy foodway instead of maize and shell-tempering alone also provides a window into the social landscape of the Early Mississippian Black Warrior Valley. Learning the non-discursive practices involved in manufacturing Mississippian standard jars required demonstration. In addition to gathering and heat-treating shell as well as mixing the paste to the right consistency (Steponaitis 1983:45), Mississippian standard jars represented a break in ceramic technology and form from the relatively thick-walled, ovaloid jars manufactured during the West Jefferson phase to relatively thin-walled, globular jars. Imparting this knowledge necessitated informal schooling between those skilled in manufacturing shell-tempered, globular ceramics and those learning to craft them. This schooling would have taken place within various communities of practice, or social networks of practitioners engaging in the same craft (Lave and Wegner 1991). Archaeologically, it is possible to identify communities of practice by looking at the spatial distribution of the signature materials and stylistic traditions associated with the range of crafting activities.

While the bodies of Mississippian standard jars were essential to the function of the vessel as a nixtamalizing tool and, thus, remained consistent throughout their history of production and use at Moundville, stylistic elements, like modes of incising on the body and rim modes, were far less so. Unlike technological choices, which are governed by performance as well as structural conditioning, stylistic choices in ceramic production are governed by individual taste and experience as well as structural conditioning, making them subject to greater variation than their technological counterparts (Dietler and Herbich 1998). Further, stylistic choices can be divided into two broad categories: "high-visibility" choices, which are those stylistic elements that are prominent and signal social and cultural competence; and "low-visibility" choices, which are those elements that are far less prominent such as rim treatments, and reflect idiosyncratic differences in production style (Mills 2016; Mills et al. 2015).

High-visibility stylistic choices include the four decorative styles of the type Moundville Incised: *varieties Carrollton*, *Moundville*, *Oliver*, and *Snows Bend*. Three of the Moundville Incised varieties are designs characterized by a series of incised arches placed end to end, located on the shoulder of unburnished jars (Steponaitis 1983:323): *var. Moundville* is characterized by the addition of "eyelashes" over the uppermost arch; *var. Carrollton* by nesting arches on the shoulder of the vessel; and *var. Snows Bend* by the embellishment of the incised lines with rows of punctations (Knight 2009:33-36). The fourth Moundville Incised variety, *Oliver*, lacks arches, and is characterized by broad, asymmetrical line-filled triangles on the shoulder of the vessel (Knight 2009:33-36).

Low-visibility stylistic choices in Moundville standard jars, conversely, include differences in rim modes. Unlike incising styles, rim treatments are far less conspicuous and as such do not signal social and cultural competence. Instead, differences in rim modes represent idiosyncratic diversions in production steps, serving as signatures for different communities of practice (Mills 2016; Mills et al. 2015).

By cataloging and mapping the distribution of high- and low-stylistic choices represented on unburnished Moundville standard jar rim sherds recovered from eight Moundville I phase sites, I articulated and characterized several communities of practice of the hominy foodway active between A.D. 1120-1250. After demonstrating greater variation within unburnished standard jar rim treatments than was previously recognized, and defining five distinct rim treatments used during the Moundville I phase, I tabulated, then plotted these styles against the Moundville Incised decorative styles to explore the possibility that there were distinct communities of practice of the Moundville standard jar. What I found is that both high- and low-visibility stylistic traditions were present in virtually all surveyed site assemblages. Rim modes are not confined to particular sites nor to particular incised designs, suggesting that the communities of practice of the hominy foodway, composed primarily of women, were socially fluid, open networks.

That these traditions overlap, and that no patterns, either spatial or decorative, were detected suggests that the communities producing these standard jars were not isolated, but were instead engaged in what Wegner (1998) referred to as constellations of practice, or large, interactive webs composed of multiple communities of practice. This strongly suggests that the social landscape of early Moundville was not composed of bounded, exclusive social groups, but instead was characterized by an inclusive constellation of practice of the hominy foodway through which women learned the production steps for making shell-tempered, globular, Mississippian standard jars. Importantly, when we consider the dearth of evidence of feasting activities within the subject area, it is likely that this constellation of practice was also the social venue through which women also learned those amalgamated culinary steps involved in the production of the hominy foodway, from growing maize and nixtamalizing kernels, to the long cooking period integral to the final product.

## A Historical Anthropological Approach to Moundville's Origins

The culmination of this research is a new model for understanding the emergence of the ritual-ceremonial center of Moundville. Around the beginning of the Late Woodland West Jefferson phase (ca. A.D. 1070), non-local women schooled in Mississippian cultural practices, through exogamous marriage networks, began moving into the Black Warrior Valley, some of who brought the hominy foodway with them. Exogamous marriage networks, as opposed to migrant groups of both men and women moving into the area, not only aligns with Scarry and Steponaitis' (2016:258) ritual-ceremonial model for Moundville, but also helps explain the staggered appearance of Mississippian cultural materials within the subject area. Both maize and shell-tempered ceramics are persistent within West Jefferson phase assemblages, and while maize alone may indicate that these populations were eating hominy, shell-tempered, globular jars are a key sign that hominy was also *produced* within the subject area, indicating the presence of craftswomen well versed within the practice. As such, the most parsimonious explanation is that Mississippian women were moving into the area, likely from the Shiloh region of western Tennessee. Complementary materials indicative of Mississippian male gendered activities, like Mississippian-style structures, lithic technologies, or social activities like chunkey, are far more sporadically encountered during the West Jefferson phase, suggesting a more profound influx of women than men during this time. This influx culminated in the fully Mississippian Moundville I phase (A.D. 1120-1250).

Thus, with Mississippian women came the hominy foodway. Both men and women endemic to the area, as well as other non-local residents attracted to the area through these marriage networks but also new to the foodway, first encountered hominy through small meals prepared in the home. That hominy was deemed good to eat is because the dish fit within the endemic taste profile of the Black Warrior Valley, which was characterized by the nut foodway. Hominy, as a slightly bitter, porridge-like food, is similar to and used in similar ways as the nut-based dishes they were accustomed to preparing and eating. Importantly, though, is not simply that endemic residents understood it as similar to something they already knew, but that these were not fleeting encounters with a new dish—encounters with hominy persisted.

After understanding hominy as good to eat, women had to learn to practice the foodway. Although there were similarities between the new and the old foodways, practicing the hominy foodway required mastering a set of new skills, as well as learning to manipulate a new set of schemas and resources. Women had to learn to grow, care for, harvest, and dry maize, as well as how to cook, serve, and dispose of hominy. Women had to learn how to craft and subsequently cook with globular, shell-tempered jars. Wood ash, boiling, shell, firewood selection, and even women's labor all developed new meanings and values with the practice of the hominy foodway. This, in turn, affected a number of preexisting resources and schemas, like grog-temper, acorns, hickory nuts, and ovaloid jars, which were either eclipsed in importance, like acorns, or gradually rendered obsolete, like grog-tempering and the ovaloid form.

Further, the hominy foodway had a profound impact on women's social networks. As noted above, the foodway was disseminated through interconnected, overlapping communities of practice initiated by the same domestic meals in which women first encountered hominy. This constellation of practice included a number of activities specific to the hominy foodway that were enacted in public spaces, a performance that fostered an inclusive social landscape. The resources and schemas of the hominy foodway were not private or reserved for any particular group, but were instead public and unrestricted. All women had equal access to the foodway.

Finally, the hominy foodway also fundamentally altered the concept of femininity within these communities. For women, their days were now defined by the set of steps involved in producing hominy. Their social networks were now extensions of those women with whom they engaged in the public practices of the foodway. Hominy was not only the spoil of women's work, but it was also the symbol.

However, the practice of the hominy foodway affected more than just women; it also fostered an emergent identity that encompassed all members of these early Moundville communities. Hominy became the common meal of all, male and female alike, and while the practices had a profound impact on women's identity, the consumption of the foodway created a practice that all residents within the valley partook in. Hominy became the food children grew up with and the food they were fed when sick. Hominy became the food central to social events, the one served to guests and to family members alike. Residents were drawn into a multi-community constellation of practice of eating hominy, one that joined an early Moundville landscape peppered with multi-ethnic residents. The importance this unrestricted network is that in addition to fostering a common identity, it also provided a common a set of structures, schemas, and resources, or a common set of sources with which to cognitively map new targets. In other words, through eating hominy and practicing the foodway, residents took part in a shared worldview. This common, shared set of structures helped usher in other structures associated with the Mississippian expression, including wall-trench architecture, the game of chunkey, and even a religious expression (Knight 1989). Thus, by altering what they ate, these groups essentially altered who they were and made way for who they would become.

Following the model proposed here, in the Black Warrior Valley between A.D. 1070-1250, encounters with and ultimately the incorporation of the shared, overlapping structures of the hominy foodway not only altered the everyday practices of women and changed the concept of femininity, but also generated a new, communal identity shared throughout the valley. Genesis, though, is always paired with destruction. Thus, with these changes, a number of disruptions occurred. As noted above, resources and schemas of the nut foodway that were highly prized among West Jefferson communities were soon eclipsed in importance by those of the Mississippian hominy foodway. Similarly, as the social networks and identities generated by the hominy foodway grew in importance, others waned. Disruptions continued to mount as subsequent encounters with other Mississippian structures took place, introduced through the same exogamous marriage networks that brought Mississippian and late Coles Creek/Plaquemine women into the valley. Older resources and schemas inherent to the concepts of masculinity, domicile, religion, and the built landscape began to wane as Mississippian structures involved with these conceptions grew in importance.

In response to these mounting disruptions, around A.D. 1200, a novel, creative solution was conceived, one that would marry old and new. The manifestation of that event was the intentional landscape constructed at the ritual-ceremonial center of Moundville: 30 earthen mounds, of which 15 were associated with corporate kin-groups and arranged in pairs of substructural and mortuary mounds that decrease in size as you move south and situated around a quadrilateral, artificially leveled plaza (Knight 2007:45; Scarry and Steponaitis 2016). This construction project inscribed the new Moundville identity on the landscape, signaling that Moundville was something different from the West Jefferson phase villages and early Moundville I phase farmsteads that dotted the valley (Knight 2007:45; Levi-Strauss 1963; Scarry and Steponaitis 2016:261). Moundville was a stratified, permanent ceremonial ground organized spatially and socially along both kin-group and political lines (Knight 2016; Scarry and

Steponaitis 2016; Wilson 2016). While this new Mississippian settlement attracted peoples from across the area, Moundville's residents maintained close ties to the hinterland communities. Not only were the residents of the center provisioned with foodstuffs (Welch and Scarry 1995), but also the constellation of practice of the hominy foodway outlined in this dissertation encompassed neighborhoods at Moundville as well as contemporaneous sites throughout the valley.

## Mississippian Societies and the Hominy Foodway

Following the model presented here, Mississippianization can thus be characterized as a series of encounters with, and subsequent incorporations of, various endemic and foreign structures that resulted in the emergence of historically idiosyncratic Mississippian cultural expressions. While the dissemination of the hominy foodway likely signaled the movement of Mississippian women into the Black Warrior Valley, this may not necessarily be the case for other Mississippian centers. Understanding the relationship between the hominy foodway and a given Mississippian center involves exploring the history of an area, both before and after the Mississippian expression emerged.

Nor should it be expected that the hominy foodway involved precisely the same resources or the schemas throughout the Mississippian world—as various groups encountered the foodway under different and varying circumstances, relying on their own historically generated structures to cognitively map it, the hominy foodway and its attending resources and schemas were altered. Indeed, exploring the history of the hominy foodway outside of the Black Warrior Valley may reveal other attendant tools or ideas that reflect changes in the overall practice or even localized manifestations (e.g., following Elizabeth Benchley's [2003] suggestion, Wickliffe funnels).

For decades, researchers have pondered the connection between maize and the emergence of Mississippian societies in the Southeastern United States. However, the research presented here suggests that this synergistic relationship should no longer be modeled as maize and Mississippianization, but instead as the hominy foodway and Mississippianization. The Mississippian standard jar was an integral part of the foodway, serving as a specialized nixtamalizing tool. Further, the hominy foodway included a number of schemas and resources that through encounters and subsequent practice of the foodway, changed the daily lives of those who engaged in it. Years before the residents of the Black Warrior Valley built flat-topped, earthen mounds or lived in wall-trench structures, and before they were artisans fashioning copper pendants, ceremonial greenstone celts, or formal paint palettes, the people of Moundville ate hominy.

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# APPENDIX A

Moundville Mississippian standard jars used for principal components analysis reported in Chapter 6. Total jar sample size was 38.

| | |
|---|---|
| **Vessel ID:** MdSka 56 | **Accession No.:** A938.1.15 |


| | |
|---|---|
| **Type Variety:** Mississippi Plain, *var. Warrior* | **Chronological Placement:** |

**BODY MEASUREMENTS:**

| | | |
|---|---|---|
| **Measure 1:** 9.1 cm | **Measure 4:** 9.4 cm | **Height 2:** 5.5 cm |
| **Measure 2:** 10.8 cm | **Measure 5:** 6.6 cm | **Rim Thickness:** 0.3 cm |
| **Measure 3:** 10.6 cm | **Height 1:** 7.0 cm | **Base Thickness:** 0.6 cm |

**HANDLES:**

| | |
|---|---|
| **# of handles:** 2 | **Handle Thickness:** 1.0 cm |

**USE ALTERATION:**

| | |
|---|---|
| **Spallings:** One of the exterior | **Signs of Use Wear:** small patches of sooting on the exterior; virtually none |

| Vessel ID: NE 2 | Accession No.: A932.4.1 |
|---|---|


| Type Variety: Mississippi Plain, *var. Warrior* | Chronological Placement: l MVII-e MVIII |
|---|---|

**BODY MEASUREMENTS:**

| | | |
|---|---|---|
| **Measure 1:** 8.0 cm | **Measure 4:** 10.7 cm | **Height 2:** 4.6 cm |
| **Measure 2:** 10.9 cm | **Measure 5:** 8.0 cm | **Rim Thickness:** 0.45 cm |
| **Measure 3:** 11.5 cm | **Height 1:** 7.2 cm | **Base Thickness:** 0.5 cm |

**HANDLES:**

| **# of handles:** 8 (5 in tact) | **Handle Thickness:** 1.1 cm |
|---|---|

**USE ALTERATION:**

| **Spallings:** none | **Signs of Use Wear:** small amount of charring on base; otherwise, none |
|---|---|

| Vessel ID: NE 18 | Accession No.: A932.4.5 |
|---|---|


| Type Variety: Mississippi Plain, *var. Warrior* | Chronological Placement: after MVI |
|---|---|

**BODY MEASUREMENTS:**

| | | |
|---|---|---|
| **Measure 1:** 12.7 cm | **Measure 4:** 13.9 cm | **Height 2:** 7.4 cm |
| **Measure 2:** 16.1 cm | **Measure 5:** 8.7 cm | **Rim Thickness:** 0.4 cm |
| **Measure 3:** 16.0 cm | **Height 1:** 9.3 cm | **Base Thickness:** 0.35 cm |

**HANDLES:**

| | |
|---|---|
| **# of handles:** 4, 2 in tact | **Handle Thickness:** 1.85 cm |

**USE ALTERATION:**

| | |
|---|---|
| **Spallings:** none | **Signs of Use Wear:** none |

| Vessel ID: NE 25 | Accession No.: A932.4.6 |
|---|---|


| Type Variety: Mississippi Plain, *var. Warrior* | Chronological Placement: |
|---|---|

**BODY MEASUREMENTS:**

| | | |
|---|---|---|
| **Measure 1:** 8.6 cm | **Measure 4:** 10.7 cm | **Height 2:** 5.5 cm |
| **Measure 2:** 11.3 cm | **Measure 5:** 7.0 cm | **Rim Thickness:** 0.38 cm |
| **Measure 3:** 11.8 cm | **Height 1:** 8.7 cm | **Base Thickness:** 0.5 cm |

**HANDLES:**

| | |
|---|---|
| **# of handles:** 2 | **Handle Thickness:** 1.4 cm |

**USE ALTERATION:**

| | |
|---|---|
| **Spallings:** none | **Signs of Use Wear:** none |

| **Vessel ID:** NE 597 | **Accession No.:** A932.4.59 |
|---|---|


| **Type Variety:** Moundville Incised, *var. Moundville* | **Chronological Placement:** MVI-eMVII |
|---|---|

**BODY MEASUREMENTS:**

| | | |
|---|---|---|
| **Measure 1:** 11.6 cm | **Measure 4:** 12.1 cm | **Height 2:** 6.4 cm |
| **Measure 2:** 13.5 cm | **Measure 5:** 8.3 cm | **Rim Thickness:** 0.4 cm |
| **Measure 3:** 13.6 cm | **Height 1:** 9.2 cm | **Base Thickness:** 0.6 cm |

**HANDLES:**

| **# of handles:** 2 | **Handle Thickness:** 1.4 cm |
|---|---|

**USE ALTERATION:**

| **Spallings:** none | **Signs of Use Wear:** none |
|---|---|

| | |
|---|---|
| **Vessel ID:** NG 32 | **Accession No.:** A930.5.6 |


| | |
|---|---|
| **Type Variety:** Mississippi Plain, *var. Warrior* | **Chronological Placement:** MV III |

**BODY MEASUREMENTS:**

| | | |
|---|---|---|
| **Measure 1:** 9.3 cm | **Measure 4:** 9.6 cm | **Height 2:** 4.9 cm |
| **Measure 2:** 10.7 cm | **Measure 5:** 7.2 cm | **Rim Thickness:** 0.4 cm |
| **Measure 3:** 10.6 cm | **Height 1:** 7.7 cm | **Base Thickness:** 0.4 cm |

**HANDLES:**

| | |
|---|---|
| **# of handles:** 4, all intact | **Handle Thickness:** 1.7 cm |

**USE ALTERATION:**

| | |
|---|---|
| **Spallings:** none | **Signs of Use Wear:** some ash on the base, maybe a char ring from manufacture |

| | |
|---|---|
| **Vessel ID:** NW 9 | **Accession No.:** A934.2.1 |


| | |
|---|---|
| **Type Variety:** Moundville Incised, *var. Snows Bend* | **Chronological Placement:** eMVII |

**BODY MEASUREMENTS:**

| | | |
|---|---|---|
| **Measure 1:** 12.3 cm | **Measure 4:** 11.7 cm | **Height 2:** 7.5 cm |
| **Measure 2:** 14.1 cm | **Measure 5:** 7.7 cm | **Rim Thickness:** 0.5 cm |
| **Measure 3:** 13.5 cm | **Height 1:** 9.0 cm | **Base Thickness:** 0.6 cm |

**HANDLES:**

| | |
|---|---|
| **# of handles:** 4 | **Handle Thickness:** 1.59 cm |

**USE ALTERATION:**

| | |
|---|---|
| **Spallings:** one on the exterior near the base | **Signs of Use Wear:** some charring, but otherwise, none |

| | |
|---|---|
| **Vessel ID:** NW 11 | **Accession No.:** A934.2.2 |


| | |
|---|---|
| **Type Variety:** Mississippi Plain, *var. Warrior* | **Chronological Placement:** eMVII |

**BODY MEASUREMENTS:**

| | | |
|---|---|---|
| **Measure 1:** 11.6 cm | **Measure 4:** 11.5 cm | **Height 2:** 7.6 cm |
| **Measure 2:** 12.9 cm | **Measure 5:** 7.4 cm | **Rim Thickness:** 0.5 cm |
| **Measure 3:** 12.9 cm | **Height 1:** 10.4 cm | **Base Thickness:** 0.8 cm |

**HANDLES:**

| | |
|---|---|
| **# of handles:** 2, both intact | **Handle Thickness:** 0.8 cm |

**USE ALTERATION:**

| | |
|---|---|
| **Spallings:** none | **Signs of Use Wear:** some charring around the body, likely from manufacture |

| | |
|---|---|
| **Vessel ID:** NW 12 | **Accession No.:** A934.2.3 |


| | |
|---|---|
| **Type Variety:** Mississippi Plain, *var. Warrior* | **Chronological Placement:** MVI-eMVIII |

**BODY MEASUREMENT:**

| | | |
|---|---|---|
| **Measure 1:** 11.0 cm | **Measure 4:** 11.6 cm | **Height 2:** 6.2 cm |
| **Measure 2:** 12.7 cm | **Measure 5:** 7.6 cm | **Rim Thickness:** 0.7 cm |
| **Measure 3:** 13.0 cm | **Height 1:** 9.2 cm | **Base Thickness:** 0.35 cm |

**HANDLES:**

| | |
|---|---|
| **# of handles:** 2, with 1 intact | **Handle Thickness:** 1.7 cm |

**USE ALTERATION:**

| | |
|---|---|
| **Spallings:** 1 on the base of the exterior and 1 on the interior. | **Signs of Use Wear:** some sooting in one spalling; otherwise, none. |

| Vessel ID: NW 15 | Accession No.: A934.2.8 |
|---|---|


| Type Variety: Mississippi Plain, *var. Warrior* | Chronological Placement: MVIII |
|---|---|

**BODY MEASUREMENT:**

| | | |
|---|---|---|
| **Measure 1:** 9.8 cm | **Measure 4:** 10.7 cm | **Height 2:** 5.4 cm |
| **Measure 2:** 11.8 cm | **Measure 5:** 7.2 cm | **Rim Thickness:** 0.5 cm |
| **Measure 3:** 12.3 cm | **Height 1:** 8.2 cm | **Base Thickness:** 0.3 cm |

**HANDLES:**

| | |
|---|---|
| **# of handles:** 2, intact | **Handle Thickness:** 1.9 cm |

**USE ALTERATION:**

| | |
|---|---|
| **Spallings:** 1 on the exterior base | **Signs of Use Wear:** some charring in the base, an ash ring, then more charring—from manufacture? Otherwise, none. |

| | |
|---|---|
| **Vessel ID:** NW 24 | **Accession No.:** A934.2.10 |


| | |
|---|---|
| **Type Variety:** Mississippi Plain, *var. Warrior* | **Chronological Placement:** MVI-eMVIII |

**BODY MEASUREMENT:**

| | | |
|---|---|---|
| **Measure 1:** 11.6 cm | **Measure 4:** 10.8 cm | **Height 2:** 6.0 cm |
| **Measure 2:** 12.4 cm | **Measure 5:** 7.0 cm | **Rim Thickness:** |
| **Measure 3:** 12.3 cm | **Height 1:** 8.7 cm | **Base Thickness:** |

**HANDLES:**

| | |
|---|---|
| **# of handles:** 2 | **Handle Thickness:** 1.3 cm |

**USE ALTERATION:**

| | |
|---|---|
| **Spallings:** 1 (which is composed of several) on the exterior base | **Signs of Use Wear:** none |

| | |
|---|---|
| **Vessel ID:** Rho 46 | **Accession No.:** A930.2.5 |


| | |
|---|---|
| **Type Variety:** Mississippi Plain, *var. Warrior* | **Chronological Placement:** post MVI |

**BODY MEASUREMENT:**

| | | |
|---|---|---|
| **Measure 1:** 11.4 cm | **Measure 4:** 14.2 cm | **Height 2:** 8.7 cm |
| **Measure 2:** 15.7 cm | **Measure 5:** 8.6 cm | **Rim Thickness:** 0.4 cm |
| **Measure 3:** 16.3 cm | **Height 1:** 13.7 cm | **Base Thickness:** 0.6 cm |

**HANDLES:**

| | |
|---|---|
| **# of handles:** 2 | **Handle Thickness:** 1.8 cm |

**USE ALTERATION:**

| | |
|---|---|
| **Spallings:** none | **Signs of Use Wear:** none; some small pockets of soot on exterior body; ash on base. |

| Vessel ID: Rho 138 | Accession No.: A930.2.14 |
|---|---|


| Type Variety: Lower Tennessee River Valley | Chronological Placement: |
|---|---|

**BODY MEASUREMENT:**

| | | |
|---|---|---|
| **Measure 1:** 11.7 cm | **Measure 4:** 12.4 cm | **Height 2:** 7.2 cm |
| **Measure 2:** 14.2 cm | **Measure 5:** 8.2 cm | **Rim Thickness:** 0.6 cm |
| **Measure 3:** 14.3 cm | **Height 1:** 10.0 cm | **Base Thickness:** |

**HANDLES:**

| # of handles: 4, intact | Handle Thickness: 1.6 cm |
|---|---|

**USE ALTERATION:**

| Spallings: none | Signs of Use Wear: ashy base with a charred ring |
|---|---|

| Vessel ID: Rho 163 | Accession No.: A930.2.25 |
|---|---|


| **Type Variety:** Moundville Incised, *var. Moundville* | **Chronological Placement:** MVIII |
|---|---|

**BODY MEASUREMENT:**

| | | |
|---|---|---|
| **Measure 1:** 9.1 cm | **Measure 4:** 9.4 cm | **Height 2:** 5.3 cm |
| **Measure 2:** 10.6 cm | **Measure 5:** 6.6 cm | **Rim Thickness:** 0.4 cm |
| **Measure 3:** 10.6 cm | **Height 1:** 7.7 cm | **Base Thickness:** 0.6 cm |

**HANDLES:**

| | |
|---|---|
| **# of handles:** 2 | **Handle Thickness:** 1.1 cm |

**USE ALTERATION:**

| | |
|---|---|
| **Spallings:** none | **Signs of Use Wear:** none |

| Vessel ID: Rho 328 | Accession No.: A930.2.40 |
|---|---|


| Type Variety: Mississippi Plain, *var. Warrior* | Chronological Placement: MVI-eMVIII |
|---|---|

**BODY MEASUREMENT:**

| | | |
|---|---|---|
| **Measure 1:** 13.3. cm | **Measure 4:** 14.9 cm | **Height 2:** 7.2 cm |
| **Measure 2:** 15.5. cm | **Measure 5:** 9.9 cm | **Rim Thickness:** 0.6 cm |
| **Measure 3:** 16.0 cm | **Height 1:** 10.0 cm | **Base Thickness:** 0.7 cm |

**HANDLES:**

| | |
|---|---|
| **# of handles:** 2, both reconstructed | **Handle Thickness:** NA |

**USE ALTERATION:**

| | |
|---|---|
| **Spallings:** 1 on the exterior base | **Signs of Use Wear:** inconsistent pockets of sooting on the exterior of the vessel |

| | |
|---|---|
| **Vessel ID:** Rho 329 | **Accession No.:** A930.2.41 |


| | |
|---|---|
| **Type Variety:** Mississippi Plain, *var. Warrior* | **Chronological Placement:** MVI-eMVIII |

**BODY MEASUREMENT:**

| | | |
|---|---|---|
| **Measure 1:** 10.5 cm | **Measure 4:** 10.7 cm | **Height 2:** 5.6 cm |
| **Measure 2:** 11.8 cm | **Measure 5:** 7.6 cm | **Rim Thickness:** 0.7 cm |
| **Measure 3:** 11.9 cm | **Height 1:** 8.7 cm | **Base Thickness:** 1.05 cm |

**HANDLES:**

| | |
|---|---|
| **# of handles:** 2, though not intact | **Handle Thickness:** NA |

**USE ALTERATION:**

| | |
|---|---|
| **Spallings:** none | **Signs of Use Wear:** ash on the base; sooting ring on the exterior of vessel and rim, though inconsistent. |

| | |
|---|---|
| **Vessel ID:** Rw260 | **Accession No.:** A939.2.18 |


| | |
|---|---|
| **Type Variety:** Moundville Incised, *var. Carrollton* | **Chronological Placement:** MVI-eMVII |

**BODY MEASUREMENT:**

| | | |
|---|---|---|
| **Measure 1:** 11.9 cm | **Measure 4:** 10.8 cm | **Height 2:** 7.4 cm |
| **Measure 2:** 13.2 cm | **Measure 5:** 6.8 cm | **Rim Thickness:** 0.4 cm |
| **Measure 3:** 12.7 cm | **Height 1:** 9.1 cm | **Base Thickness:** 0.75 cm |

**HANDLES:**

| | |
|---|---|
| **# of handles:** 2, both intact | **Handle Thickness:** 1.2 cm |

**USE ALTERATION:**

| | |
|---|---|
| **Spallings:** none | **Signs of Use Wear:** small patch of sooting |

| | |
|---|---|
| **Vessel ID:** Rw571 | **Accession No.:** A39.2.24 |


| | |
|---|---|
| **Type Variety:** Mississippi Plain, *var. Warrior* | **Chronological Placement:** post MVI |

**BODY MEASUREMENT:**

| | | |
|---|---|---|
| **Measure 1:** 13.0 cm | **Measure 4:** 13.7 cm | **Height 2:** 6.3 cm |
| **Measure 2:** 15.5 cm | **Measure 5:** 8.7 cm | **Rim Thickness:** 0.6 cm |
| **Measure 3:** 15.8 cm | **Height 1:** 10.8 cm | **Base Thickness:** 0.4 cm |

**HANDLES:**

| | |
|---|---|
| **# of handles:** 17, all intact | **Handle Thickness:** 1.0 cm |

**USE ALTERATION:**

| | |
|---|---|
| **Spallings:** none | **Signs of Use Wear:** none |

| Vessel ID: SD 29 | Accession No.: A932.3.13 |
|---|---|


| Type Variety: Mississippi Plain, *var. Warrior* | Chronological Placement: lMVII-MVIII |
|---|---|

**BODY MEASUREMENT:**

| | | |
|---|---|---|
| **Measure 1:** 17.0 cm | **Measure 4:** 17.1 cm | **Height 2:** 10.1 cm |
| **Measure 2:** 20.2 cm | **Measure 5:** 9.3 cm | **Rim Thickness:** 0.55 cm |
| **Measure 3:** 20.2 cm | **Height 1:** 13.9 cm | **Base Thickness:** 0.8 cm |

**HANDLES:**

| **# of handles:** 4, intact | **Handle Thickness:** 1.15 cm |
|---|---|

**USE ALTERATION:**

| **Spallings:** none | **Signs of Use Wear:** none |
|---|---|

| Vessel ID: SD 31 | Accession No.: A932.3.11 |
|---|---|


| Type Variety: Mississippi Plain, *var. Warrior* | Chronological Placement: lMVII-MVIII |
|---|---|

**BODY MEASUREMENT:**

| | | |
|---|---|---|
| **Measure 1:** 11.6 cm | **Measure 4:** 14.1 cm | **Height 2:** 7.5 cm |
| **Measure 2:** 15.0 cm | **Measure 5:** 8.4 cm | **Rim Thickness:** 0.5 cm |
| **Measure 3:** 15.6 cm | **Height 1:** 11.4 cm | **Base Thickness:** 0.6 cm |

**HANDLES:**

| # of handles: 4, intact | Handle Thickness: 1.05 cm |
|---|---|

**USE ALTERATION:**

| Spallings: none | Signs of Use Wear: inconsistent sooting around the base |
|---|---|

| **Vessel ID:** SD 32 | **Accession No.:** A932.3.12 |
|---|---|


| **Type Variety:** Mississippi Plain, *var. Warrior* | **Chronological Placement:** lMVII-MVIII |
|---|---|

**BODY MEASUREMENT:**

| **Measure 1:** 14.9 cm | **Measure 4:** 14.1 cm | **Height 2:** 8.3 cm |
|---|---|---|
| **Measure 2:** 16.7 cm | **Measure 5:** 8.3 cm | **Rim Thickness:** 0.4 cm |
| **Measure 3:** 16.5 cm | **Height 1:** 10.7 cm | **Base Thickness:** 0.7 cm |

**HANDLES:**

| **# of handles:** 2, 1 intact—drill hole next to broken handle | **Handle Thickness:** 1.0 cm |
|---|---|

**USE ALTERATION:**

| **Spallings:** none | **Signs of Use Wear:** some sooting around body of jar. |
|---|---|

| Vessel ID: SD 155 | Accession No.: A932.3.16 |
|---|---|


| Type Variety: Moundville Incised, *var. Carrollton* | Chronological Placement: eMVII-lMVII |
|---|---|

**BODY MEASUREMENT:**

| | | |
|---|---|---|
| **Measure 1:** 12.0 cm | **Measure 4:** 12.0 cm | **Height 2:** 6.0 cm |
| **Measure 2:** 13.3. cm | **Measure 5:** 8.8 cm | **Rim Thickness:** 0.5 cm |
| **Measure 3:** 13.7 cm | **Height 1:** 8.6 cm | **Base Thickness:** |

**HANDLES:**

| **# of handles:** 4, 1 intact | **Handle Thickness:** 1.2 cm |
|---|---|

**USE ALTERATION:**

| **Spallings:** none | **Signs of Use Wear:** minimal sooting on the exterior |
|---|---|

| Vessel ID: SD 177 | Accession No.: |
|---|---|


| Type Variety: Mississippi Plain, *var. Warrior* | Chronological Placement: MVI-eMVIII |
|---|---|

**BODY MEASUREMENT:**

| | | |
|---|---|---|
| **Measure 1:** 10.0 cm | **Measure 4:** 11.1 cm | **Height 2:** 6.6 cm |
| **Measure 2:** 12.3 cm | **Measure 5:** 7.2 cm | **Rim Thickness:** 0.5 cm |
| **Measure 3:** 12.4 cm | **Height 1:** 9.0 cm | **Base Thickness:** 0.6 cm |

**HANDLES:**

| | |
|---|---|
| **# of handles:** 2 | **Handle Thickness:** 1.5 cm |

**USE ALTERATION:**

| | |
|---|---|
| **Spallings:** none | **Signs of Use Wear:** none; some patches of sooting |

| | |
|---|---|
| **Vessel ID:** SD 262 | **Accession No.:** A932.3.21 |


| | |
|---|---|
| **Type Variety:** Mississippi Plain, *var. Warrior* | **Chronological Placement:** MVI-eMVIII |

**BODY MEASUREMENT:**

| | | |
|---|---|---|
| **Measure 1:** 10.1 cm | **Measure 4:** 11.0 cm | **Height 2:** 6.3 cm |
| **Measure 2:** 12.1 cm | **Measure 5:** 7.3 cm | **Rim Thickness:** 0.55 cm |
| **Measure 3:** 12.4 cm | **Height 1:** 9.2 cm | **Base Thickness:** 0.8 cm |

**HANDLES:**

| | |
|---|---|
| **# of handles:** 2 | **Handle Thickness:** 1.1 cm |

**USE ALTERATION:**

| | |
|---|---|
| **Spallings:** 1 on the exterior | **Signs of Use Wear:** no use wear on exterior; some sooting on the inside |

| **Vessel ID:** SD 265 | **Accession No.:** A932.3.22 |
|---|---|


| **Type Variety:** Moundville Incised, *var. Moundville* | **Chronological Placement:** MVI |
|---|---|

**BODY MEASUREMENT:**

| | | |
|---|---|---|
| **Measure 1:** 9.5 cm | **Measure 4:** 10.8 cm | **Height 2:** 5.3 cm |
| **Measure 2:** 11.1 cm | **Measure 5:** 6.6 cm | **Rim Thickness:** 0.6 cm |
| **Measure 3:** 11.8 cm | **Height 1:** 9.5 cm | **Base Thickness:** 0.7 cm |

**HANDLES:**

| **# of handles:** 2, 1 reconstructed | **Handle Thickness:** 0.9 cm |
|---|---|

**USE ALTERATION:**

| **Spallings:** none | **Signs of Use Wear:** some ash and charring around the base; patches of sooting |
|---|---|

| Vessel ID: SD 365 | Accession No.: |
|---|---|


| Type Variety: Mississippi Plain, *var. Warrior* | Chronological Placement: MVII-MVIII |
|---|---|

**BODY MEASUREMENT:**

| | | |
|---|---|---|
| **Measure 1:** 10.1 cm | **Measure 4:** 10.3 cm | **Height 2:** 6.5 cm |
| **Measure 2:** 11.9 cm | **Measure 5:** 7.4 cm | **Rim Thickness:** 0.4 cm |
| **Measure 3:** 11.5 cm | **Height 1:** 9.2 cm | **Base Thickness:** |

**HANDLES:**

| | |
|---|---|
| **# of handles:** 4 | **Handle Thickness:** 1.1 cm |

**USE ALTERATION:**

| | |
|---|---|
| **Spallings:** none | **Signs of Use Wear:** none |

| | |
|---|---|
| **Vessel ID:** SD 579 | **Accession No.:** A932.3.32 |


| | |
|---|---|
| **Type Variety:** Mississippi Plain, *var. Warrior* | **Chronological Placement:** MVII-MVIII |

**BODY MEASUREMENT:**

| | | |
|---|---|---|
| **Measure 1:** 11.4 cm | **Measure 4:** 10.5 cm | **Height 2:** 5.7 cm |
| **Measure 2:** 12.1 cm | **Measure 5:** 7.8 cm | **Rim Thickness:** 0.4 cm |
| **Measure 3:** 12.0 cm | **Height 1:** 8.0 cm | **Base Thickness:** 0.7 cm |

**HANDLES:**

| | |
|---|---|
| **# of handles:** 4; 2 are reconstructed | **Handle Thickness:** 1.3 cm |

**USE ALTERATION:**

| | |
|---|---|
| **Spallings:** none | **Signs of Use Wear:** none; minimal charring on base |

| | |
|---|---|
| **Vessel ID:** SEH 22 | **Accession No.:** A930.4.8 |


| | |
|---|---|
| **Type Variety:** Mississippi Plain, *var. Warrior* | **Chronological Placement:** |

**BODY MEASUREMENT:**

| | | |
|---|---|---|
| **Measure 1:** 12.6 cm | **Measure 4:** 12.2 cm | **Height 2:** 7.2 cm |
| **Measure 2:** 14.6 cm | **Measure 5:** 8.2 cm | **Rim Thickness:** 0.5 cm |
| **Measure 3:** 14.2 cm | **Height 1:** 9.5 cm | **Base Thickness:** 0.6 cm |

**HANDLES:**

| | |
|---|---|
| **# of handles:** 2, both intact | **Handle Thickness:** 1.9 cm |

**USE ALTERATION:**

| | |
|---|---|
| **Spallings:** none | **Signs of Use Wear:** none |

| Vessel ID: SW 15 | Accession No.: A936.2.6 |
|---|---|


| Type Variety: Mississippi Plain, *var. Warrior* | Chronological Placement: MVI-eMVIII |
|---|---|

**BODY MEASUREMENT:**

| | | |
|---|---|---|
| **Measure 1:** 7.1 cm | **Measure 4:** 9.2 cm | **Height 2:** 4.3 cm |
| **Measure 2:** 9.4 cm | **Measure 5:** 7.1 cm | **Rim Thickness:** 1.6 cm |
| **Measure 3:** 10.0 cm | **Height 1:** 6.6 cm | **Base Thickness:** 0.7 cm |

**HANDLES:**

| | |
|---|---|
| **# of handles:** 2, with an interior node at attachment | **Handle Thickness:** 0.4 cm |

**USE ALTERATION:**

| | |
|---|---|
| **Spallings:** 1 on the exterior body | **Signs of Use Wear:** some sooting on the base, and some sooting on the interior of the jar |

| | |
|---|---|
| **Vessel ID:** SW 17 | **Accession No.:** A936.2.7 |


| | |
|---|---|
| **Type Variety:** Mississippi Plain, *var. Warrior* | **Chronological Placement:** MVI-eMVIII |

**BODY MEASUREMENT:**

| | | |
|---|---|---|
| **Measure 1:** 9.8 cm | **Measure 4:** 8.6 cm | **Height 2:** 5.0 cm |
| **Measure 2:** 10.4 cm | **Measure 5:** 5.9 cm | **Rim Thickness:** 0.5 cm |
| **Measure 3:** 10.0 cm | **Height 1:** 6.9 cm | **Base Thickness:** 0.6 cm |

**HANDLES:**

| | |
|---|---|
| **# of handles:** 2, 1 reconstructed | **Handle Thickness:** 0.9 cm |

**USE ALTERATION:**

| | |
|---|---|
| **Spallings:** 1 on the exterior base | **Signs of Use Wear:** some sooting on the very base of the jar |

| | |
|---|---|
| **Vessel ID:** SWG 40 | **Accession No.:** A934.1.10 |


| | |
|---|---|
| **Type Variety:** Mississippi Plain, *var. Warrior* | **Chronological Placement:** MVI-MVIII |

**BODY MEASUREMENT:**

| | | |
|---|---|---|
| **Measure 1:** 11.3 cm | **Measure 4:** 10.7 cm | **Height 2:** 5.4 cm |
| **Measure 2:** 12.4 cm | **Measure 5:** 7.9 cm | **Rim Thickness:** 0.6 cm |
| **Measure 3:** 12.0 cm | **Height 1:** 7.4 cm | **Base Thickness:** 0.5 cm |

**HANDLES:**

| | |
|---|---|
| **# of handles:** 2, both are intact | **Handle Thickness:** 1.6 cm |

**USE ALTERATION:**

| | |
|---|---|
| **Spallings:** none | **Signs of Use Wear:** minimal—ashy base with inconsistent char ring |

| Vessel ID: SWG 44 | Accession No.: A934.1.11 |
|---|---|


| Type Variety: Mississippi Plain, *var. Warrior* | Chronological Placement: lMVII-lMVIII |
|---|---|

**BODY MEASUREMENT:**

| | | |
|---|---|---|
| **Measure 1:** 13.7 cm | **Measure 4:** 13.9 cm | **Height 2:** 6.5 cm |
| **Measure 2:** 16.0 cm | **Measure 5:** 8.8 cm | **Rim Thickness:** 0.4 cm |
| **Measure 3:** 15.9 cm | **Height 1:** 9.5 cm | **Base Thickness:** 0.5 cm |

**HANDLES:**

| # of handles: 4, and all are intact | Handle Thickness: 1.5 cm |
|---|---|

**USE ALTERATION:**

| Spallings: none | Signs of Use Wear: minimal, with some ash on bottom and pockets of sooting |
|---|---|

| | |
|---|---|
| **Vessel ID:** WP 20 | **Accession No.:** A936.1.2 |


| | |
|---|---|
| **Type Variety:** Mississippi Plain, *var. Warrior* | **Chronological Placement:** eMVII |

**BODY MEASUREMENT:**

| | | |
|---|---|---|
| **Measure 1:** 14.1 cm | **Measure 4:** 13.6 cm | **Height 2:** 7.8 cm |
| **Measure 2:** 15.7 cm | **Measure 5:** 8.7 cm | **Rim Thickness:** 0.6 cm |
| **Measure 3:** 15.6 cm | **Height 1:** 9.2 cm | **Base Thickness:** 0.5 cm |

**HANDLES:**

| | |
|---|---|
| **# of handles:** 2, both intact | **Handle Thickness:** 2.1 cm |

**USE ALTERATION:**

| | |
|---|---|
| **Spallings:** none | **Signs of Use Wear:** minimal charring on base |

| Vessel ID: WP 21 | Accession No.: A936.1.3 |
|---|---|


| Type Variety: Moundville Incised, *var. Moundville* | Chronological Placement: eMVII |
|---|---|

**BODY MEASUREMENT:**

| | | |
|---|---|---|
| **Measure 1:** 12.1 cm | **Measure 4:** 13.0 cm | **Height 2:** 5.7 cm |
| **Measure 2:** 14.3 cm | **Measure 5:** 9.1 cm | **Rim Thickness:** 0.4 cm |
| **Measure 3:** 14.4 cm | **Height 1:** 8.3 cm | **Base Thickness:** 0.8 cm |

**HANDLES:**

| # of handles: 4, all intact | Handle Thickness: 1.0 cm |
|---|---|

**USE ALTERATION:**

| Spallings: none | Signs of Use Wear: none |
|---|---|

| | |
|---|---|
| **Vessel ID:** WP 30 | **Accession No.:** A936.1.7 |


| | |
|---|---|
| **Type Variety:** Moundville Incised, *var. Snows Bend* | **Chronological Placement:** MVI-MVII |

**BODY MEASUREMENT:**

| | | |
|---|---|---|
| **Measure 1:** 9.4 cm | **Measure 4:** 10.0 cm | **Height 2:** 5.4 cm |
| **Measure 2:** 11.2 cm | **Measure 5:** 6.4 cm | **Rim Thickness:** 0.3 cm |
| **Measure 3:** 11.5 cm | **Height 1:** 7.9 cm | **Base Thickness:** 0.4 cm |

**HANDLES:**

| | |
|---|---|
| **# of handles:** 4, all intact | **Handle Thickness:** 1.4 cm |

**USE ALTERATION:**

| | |
|---|---|
| **Spallings:** none | **Signs of Use Wear:** some patches of sooting; none |

| | |
|---|---|
| **Vessel ID:** WP 207 | **Accession No.:** A936.1.32 |


| | |
|---|---|
| **Type Variety:** Mississippi Plain, *var. Warrior* | **Chronological Placement:** MVI-MVII |

**BODY MEASUREMENT:**

| | | |
|---|---|---|
| **Measure 1:** 11.1 cm | **Measure 4:** 10.6 cm | **Height 2:** 6.5 cm |
| **Measure 2:** 12.2 cm | **Measure 5:** 7.1 cm | **Rim Thickness:** 0.4 cm |
| **Measure 3:** 11.9 cm | **Height 1:** 8.4 cm | **Base Thickness:** 0.5 cm |

**HANDLES:**

| | |
|---|---|
| **# of handles:** 4, all intact | **Handle Thickness:** 1.0 cm |

**USE ALTERATION:**

| | |
|---|---|
| **Spallings:** none | **Signs of Use Wear:** some patches of sooting |

| **Vessel ID:** WP 221 | **Accession No.:** |
|---|---|


| **Type Variety:** Mississippi Plain, *var. Warrior* | **Chronological Placement:** MVI-eMVIII |
|---|---|

**BODY MEASUREMENT:**

| | | |
|---|---|---|
| **Measure 1:** 12.4 cm | **Measure 4:** 12.3 cm | **Height 2:** 8.5 cm |
| **Measure 2:** 13.9 cm | **Measure 5:** 7.4 cm | **Rim Thickness:** 0.4 cm |
| **Measure 3:** 13.7 cm | **Height 1:** 10.2 cm | **Base Thickness:** 0.5 cm |

**HANDLES:**

| **# of handles:** 2, intact | **Handle Thickness:** 0.3 cm |
|---|---|

**USE ALTERATION:**

| **Spallings:** none | **Signs of Use Wear:** none |
|---|---|

| **Vessel ID:** WP 228 | **Accession No.:** |
|---|---|


| **Type Variety:** Mississippi Plain, *var. Warrior* | **Chronological Placement:** lMVII-eMVIII |
|---|---|

**BODY MEASUREMENTS:**

| | | |
|---|---|---|
| **Measure 1:** 9.5 cm | **Measure 4:** 10.1 cm | **Height 2:** 5.6 cm |
| **Measure 2:** 10.9 cm | **Measure 5:** 7.0 cm | **Rim Thickness:** 0.5 cm |
| **Measure 3:** 11.1 cm | **Height 1:** 8.4 cm | **Base Thickness:** 0.6 cm |

**HANDLES:**

| **# of handles:** 2, one is reconstructed | **Handle Thickness:** 1.1 cm |
|---|---|

**USE ALTERATION:**

| **Spallings:** none | **Signs of Use Wear:** none; some ash on base |
|---|---|

# APPENDIX B:
# MISSISSIPPIAN STANDARD JAR RIM SHERDS FROM MOUNDVILLE I PHASE CONTEXTS

This table includes a list of all rim sherds analyzed for and reported in Chapter 6. Under "Rim Orifice Diameter," sherds marked "fractured" indicate that while more than 5% of the rim sherd was present, it was not possible to make three points of contact using the Starrett dial indicator.

| SPECIMEN ID | SITE | CONTEXT | TIME | RIM ORIFICE DIAMETER | RIM STYLE | MOUNDVILLE INCISED |
|---|---|---|---|---|---|---|
| 459.1.4 | Oliver (1Tu459) | Feature 1 | Early MVI | 22 | C | |
| 459.1.6 | Oliver (1Tu459) | Feature 1 | Early MVI | fractured | A | |
| 459.1.11 | Oliver (1Tu459) | Feature 1 | Early MVI | 25 | A | |
| 459.1.12 | Oliver (1Tu459) | Feature 1 | Early MVI | 20 | C | |
| 459.1.14 | Oliver (1Tu459) | Feature 1 | Early MVI | 30 | A | |
| 459.1.15 | Oliver (1Tu459) | Feature 1 | Early MVI | 38 | A | |
| 459.2.1 | Oliver (1Tu459) | Feature 2 | Early MVI | handle | A | |
| 459.2.3 | Oliver (1Tu459) | Feature 2 | Early MVI | fractured | A | |
| 459.3.3 | Oliver (1Tu459) | Feature 3 | Early MVI | 23 | C | var. Oliver |
| 459.3.4 | Oliver (1Tu459) | Feature 3 | Early MVI | 23 | C | |
| 459.3.7 | Oliver (1Tu459) | Feature 3 | Early MVI | 18 | C | |
| 459.3.12 | Oliver (1Tu459) | Feature 3 | Early MVI | 15 | C | |
| 459.3.13 | Oliver (1Tu459) | Feature 3 | Early MVI | 24 | C | |
| 459.3.14 | Oliver (1Tu459) | Feature 3 | Early MVI | 21 | C | |
| 459.3.18 | Oliver (1Tu459) | Feature 3 | Early MVI | 36 | A | |
| 459.3.19 | Oliver (1Tu459) | Feature 3 | Early MVI | 22 | A | var. Oliver |
| 459.3.22 | Oliver (1Tu459) | Feature 3 | Early MVI | 37 | A | var. Oliver |
| 459.3.23 | Oliver (1Tu459) | Feature 3 | Early MVI | 33 | A | var. Oliver |
| 459.3.24 | Oliver (1Tu459) | Feature 3 | Early MVI | 28 | C | |
| 459.3.25 | Oliver (1Tu459) | Feature 3 | Early MVI | 33 | C | var. Oliver |
| 459.3.26 | Oliver (1Tu459) | Feature 3 | Early MVI | 40 | A | |
| 459.3.38 | Oliver (1Tu459) | Feature 3 | Early MVI | 40 | C | |
| 459.3.45 | Oliver (1Tu459) | Feature 3 | Early MVI | 49 | C | |
| 459.3.46 | Oliver (1Tu459) | Feature 3 | Early MVI | 18 | C | |
| 459.4.2 | Oliver (1Tu459) | Feature 4 | Early MVI | 21 | A | |
| 459.4.4 | Oliver (1Tu459) | Feature 4 | Early MVI | 26 | A | |
| 459.6.1 | Oliver (1Tu459) | Feature 6 | Early MVI | 9 | C | |
| 459.6.2 | Oliver (1Tu459) | Feature 6 | Early MVI | 19 | C | |
| 459.6.3 | Oliver (1Tu459) | Feature 6 | Early MVI | 40 | B | |
| 459.6.7 | Oliver (1Tu459) | Feature 6 | Early MVI | 24 | A | |
| 459.6.8 | Oliver (1Tu459) | Feature 6 | Early MVI | 21 | A | |
| 104P22 | Big Sandy Methodist Church (1Tu269) | X101 | Early MVI | handle | A | var. Oliver |

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|---|---|---|---|---|---|---|
| 104P54 | Big Sandy Methodist Church (1Tu269) | X101 | Early MVI | 47 | A | var. Oliver |
| 104P53, 104P23 | Big Sandy Methodist Church (1Tu269) | X101 | Early MVI | 11 | B | var. Oliver |
| 108P47 | Big Sandy Methodist Church (1Tu269) | X101 | Early MVI | 33 | C | |
| A 990.11.270 | Big Sandy Farms (1Tu552) | Structure 1 | Early MVI | 19 | A | |
| A 990.11.272 | Big Sandy Farms (1Tu552) | Structure 1 | Early MVI | handle | A | |
| 20.1411 | PA Tract (1Tu500) | Feature 5 | Early MVI | 18 | A | var. Moundville |
| 20.1528 | PA Tract (1Tu500) | Feature 5 | Early MVI | fractured | A | |
| *20.1647 | PA Tract (1Tu500) | Feature 5 | Early MVI | 38 | A | |
| 20.1653 et al. | PA Tract (1Tu500) | Feature 5 | Early MVI | handle | A | |
| 25.1558 | PA Tract (1Tu500) | Feature 10 | Early MVI | 36 | A | |
| 25.1561 | PA Tract (1Tu500) | Feature 10 | Early MVI | 25 | A | |
| 25.1563 | PA Tract (1Tu500) | Feature 10 | Early MVI | 22 | A | |
| 28.1938/80 | PA Tract (1Tu500) | Feature 15 | Early MVI | 30 | C | |
| 59.2026 | PA Tract (1Tu500) | Feature 110 | Early MVI | 21 | C | |
| 1975.013.186 | Asphalt Plant (1Tu50) | Mound Area | Late MVI | 17 | A | |
| 1975.013.198 | Asphalt Plant (1Tu50) | Mound Area | Late MVI | 18 | C | |
| 1975.013.220 | Asphalt Plant (1Tu50) | Mound Area | Late MVI | 10 | C | var. Moundville |
| 1975.013.225 | Asphalt Plant (1Tu50) | Mound Area | Late MVI | 21 | E | |
| 162.1974 | ECB (1Tu500) | Feature 13 | Late MVI | 23 | C | |
| 162.1975 | ECB (1Tu500) | Feature 13 | Late MVI | 32 | E | var. Moundville |
| 166.960 | ECB (1Tu500) | Feature 19 | Late MVI | 33 | D | var. Moundville |
| 184.871 | ECB (1Tu500) | Feature 45 | Late MVI | 29 | E | var. Carrollton |
| 378.38/81/60 | ECB (1Tu500) | Feature 187 | Late MVI | 21 | E | var. Moundville |
| 378.41 | ECB (1Tu500) | Feature 187 | Late MVI | 22 | B | var. Moundville |
| 378.42 | ECB (1Tu500) | Feature 187 | Late MVI | 36 | D | var. Moundville |
| 378.46 | ECB (1Tu500) | Feature 187 | Late MVI | 24 | B | var. Moundville |
| 378.47 | ECB (1Tu500) | Feature 187 | Late MVI | 33 | D | var. Moundville |
| 378.49 | ECB (1Tu500) | Feature 187 | Late MVI | 24 | D | var. Moundville |
| 378.52 | ECB (1Tu500) | Feature 187 | Late MVI | fractured | D | |
| 378.53 | ECB (1Tu500) | Feature 187 | Late MVI | 17 | E | |
| 378.85 | ECB (1Tu500) | Feature 187 | Late MVI | 18 | A | var. Moundville |
| 378.87 | ECB (1Tu500) | Feature 187 | Late MVI | 16 | C | var. Moundville |

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|---|---|---|---|---|---|---|
| 378.102 | ECB (1Tu500) | Feature 187 | Late MVI | 41 | D | var. Moundville |
| 378.120/154 | ECB (1Tu500) | Feature 187 | Late MVI | 31 | E | |
| 378.126/31 | ECB (1Tu500) | Feature 187 | Late MVI | 31 | D | |
| 378.160 | ECB (1Tu500) | Feature 187 | Late MVI | fractured | E | var. Moundville |
| 2000.120.4.6 | Hog Pen (1Tu56) | 62N12E/62N15E | Late MVI | 21 | E | |
| 2000.120.14.8 | Hog Pen (1Tu56) | 62N12E/62N15E | Late MVI | 18 | D | |
| 2000.120.20.3 | Hog Pen (1Tu56) | 62N12E/62N15E | Late MVI | 19 | E | |
| 2000.120.21.10 | Hog Pen (1Tu56) | 62N12E/62N15E | Late MVI | incorrect | D | |
| 2000.120.27.3 | Hog Pen (1Tu56) | 62N12E/62N15E | Late MVI | 14 | A | |
| 2000.120.28.1 | Hog Pen (1Tu56) | 62N12E/62N15E | Late MVI | 14 | E | |
| 2000.120.30.3 | Hog Pen (1Tu56) | 62N12E/62N15E | Late MVI | 27 | E | |
| 2000.120.30.7 | Hog Pen (1Tu56) | 62N12E/62N15E | Late MVI | fractured | A | |
| 2000.120.30.24 | Hog Pen (1Tu56) | 62N12E/62N15E | Late MVI | 33 | D | |
| 2000.120.30.27 | Hog Pen (1Tu56) | 62N12E/62N15E | Late MVI | 22 | E | |
| 904.4.3 | Gilliam (1Tu904) | Feature 4 | Late MVI | 36 | B | |
| 904.4.4 | Gilliam (1Tu904) | Feature 4 | Late MVI | 27 | E | |
| 904.7.5 | Gilliam (1Tu904) | Feature 7 | Late MVI | 33 | D | var. Moundville |
| 904.7.9 | Gilliam (1Tu904) | Feature 7 | Late MVI | 15 | E | |
| 904.7.10 | Gilliam (1Tu904) | Feature 7 | Late MVI | 15 | E | |