1-1-2019

Crafting stone discoidals on the frontier: production and identity in southwest Virginia

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CRAFTING STONE DISCOIDALS ON THE FRONTIER:

PRODUCTION AND IDENTITY IN SOUTHWEST VIRGINIA

A Thesis
presented in partial fulfillment of requirements
for the degree of Master of Arts
in the Department of Sociology and Anthropology
The University of Mississippi

by
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August 2019

ABSTRACT

Stone discoidals are widely recognized as a class of artifacts associated with Mississippian cultural traditions and even some of its various descendant communities. Excavations at the Carter Robinson site, a Fourteenth Century Mississippian frontier site in Lee County, Virginia, have revealed evidence of the production of stone discoidals. Although craft production in Mississippian societies has been the subject of much debate, little to no attention has been given to the production of stone discoidals. The purpose of this thesis is to explicate the method of stone discoidal production at Carter Robinson, and to explore how this production was organized overtime at the site, in order to better understand what role this production played in the political economy of this frontier chiefdom.

DEDICATION

This thesis is dedicated to the late Dr. John W. Cottier.

Everything's right, so just hold tight.

ACKNOWLEDGEMENTS

First and foremost, I should acknowledge and give thanks to my chair and advisor, Dr. Maureen Meyers. Her steadfast patience, guidance, and support saw this project through from the beginning. I would also like to thank the members of my committee, Dr. Jay Johnson, and Dr. Tony Boudreaux; without whose support, and their fare share of patience, this project would not have been possible.

Funding for this project was provided by the Department of Sociology and Anthropology, and the Graduate School, at the University of Mississippi. The Department of Sociology and Anthropology also provided an ideal, collegial environment for my graduate studies.

The members of my cohort deserve a special thanks. Stephanie Orsini, Raymond Doherty, Joshua Shiers, Anna Marie Huerkamp, and Randal Smith were a congenial bunch and integral to my success at the University of Mississippi.

Wiregrass Archaeological Consulting unknowingly provided funding for this endeavor in that I was able to remain a student through employment with the company. Thanks to Justin Stickler, Sarah E. Price, and Robert C. Taylor for their friendship and commitment to chastising me until I finished my degree.

Lastly, and most importantly, I would like to thank my family and friends, but most of all my parents, Hamp and Matilda Bryant, for simply being themselves. Thanks, y'all.

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CHAPTER 1: INTRODUCTION

The late pre-contact Mississippi Period in the Eastern United States is one of the most well-studied periods in human history. It was during this time that, in North America north of Mexico, the institutionalization of hierarchy occurred in chiefdom-level societies that archaeologists commonly refer to as Mississippian cultures. Despite the common appellation, Mississippian cultures were not homogenous; they spoke many different languages and inhabited a variety of natural environments, but they shared symbolic and material cultural traditions. The game of chunkey and its associated artifacts are widely considered to be indicative of Mississippian culture or Mississippian cultural affiliation (Pauketat 2004). However, there has been very little systematic research concerning the function of stone discoidal production and chunkey performance in the political economy of Mississippian chiefdoms. These issues relate to the origin, spread, and variability of Mississippian culture.

Discoidals made of stone and clay are among the most frequently encountered artifacts on sites dating to the Mississippian period. Generally, these artifacts are mentioned in site reports but their function is simply assumed and little to no effort is extended to placing them into the greater context of the site and region. The Carter Robinson site (Figure 1), located in Lee County, Virginia, on an edge of the Mississippian cultural area, provides a unique context in which to explore the implications of stone discoidal production in the political economy of a burgeoning Mississippian chiefdom.

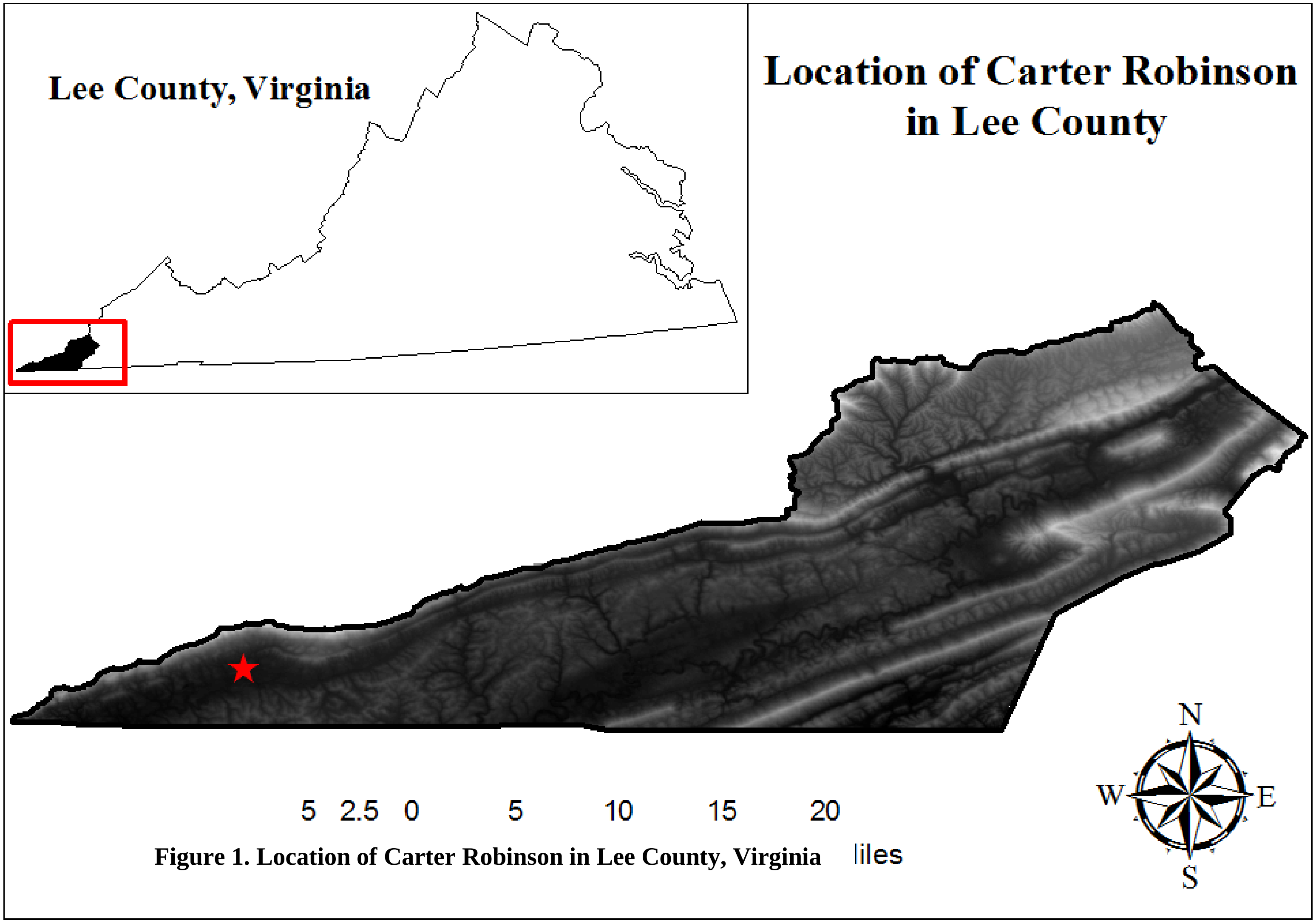

Figure 1. Location of Carter Robinson in Lee County, Virginia

The Carter Robinson site (44LE10) is located approximately 10 miles east of the Cumberland Gap, in Lee County, Virginia, in the shadow of Cumberland Mountain. This location falls along the border between the Cumberland Plateau and Valley and Ridge physiographic provinces (Figure 2). Carter Robinson is situated on a small ridge overlooking a tributary of Indian Creek, which itself is a tributary of the Powell River that eventually forms the Tennessee River. Carter Robinson consists of a single mound surrounded by a small village and plaza complex (Meyers 2011).

The location of Carter Robinson in the hinterlands of the Tennessee River drainage near the Cumberland Gap is no accident. Based on material remains uncovered since excavations began at the site in 2006, the site is believed to have been settled after polity fissioning that occurred among Mississippian chiefdoms located downstream in the Norris Basin of eastern Tennessee (Meyers 2011, 2015). Three research goals guided the initial research at Carter Robinson. First, what was the ethnic affiliation of the inhabitants? Next, why did they settle in this location? Finally, what was the nature of intrasite and regional power relations?

Since 2006, excavations conducted by Maureen Meyers initially focused on identifying the ethnic identity of the site inhabitants. Their Mississippian identity was established through examination of the site's architectural grammar (i.e., the arrangement of structures and a mound around a public plaza) and ceramic data. Architectural and ceramic style changes co-occurred between the Norris Basin and Carter Robinson, suggesting that the inhabitants of both regions maintained a close relationship. After establishing the Mississippian cultural identity of Carter Robinson, research shifted toward understanding why this region was selected for a new community.

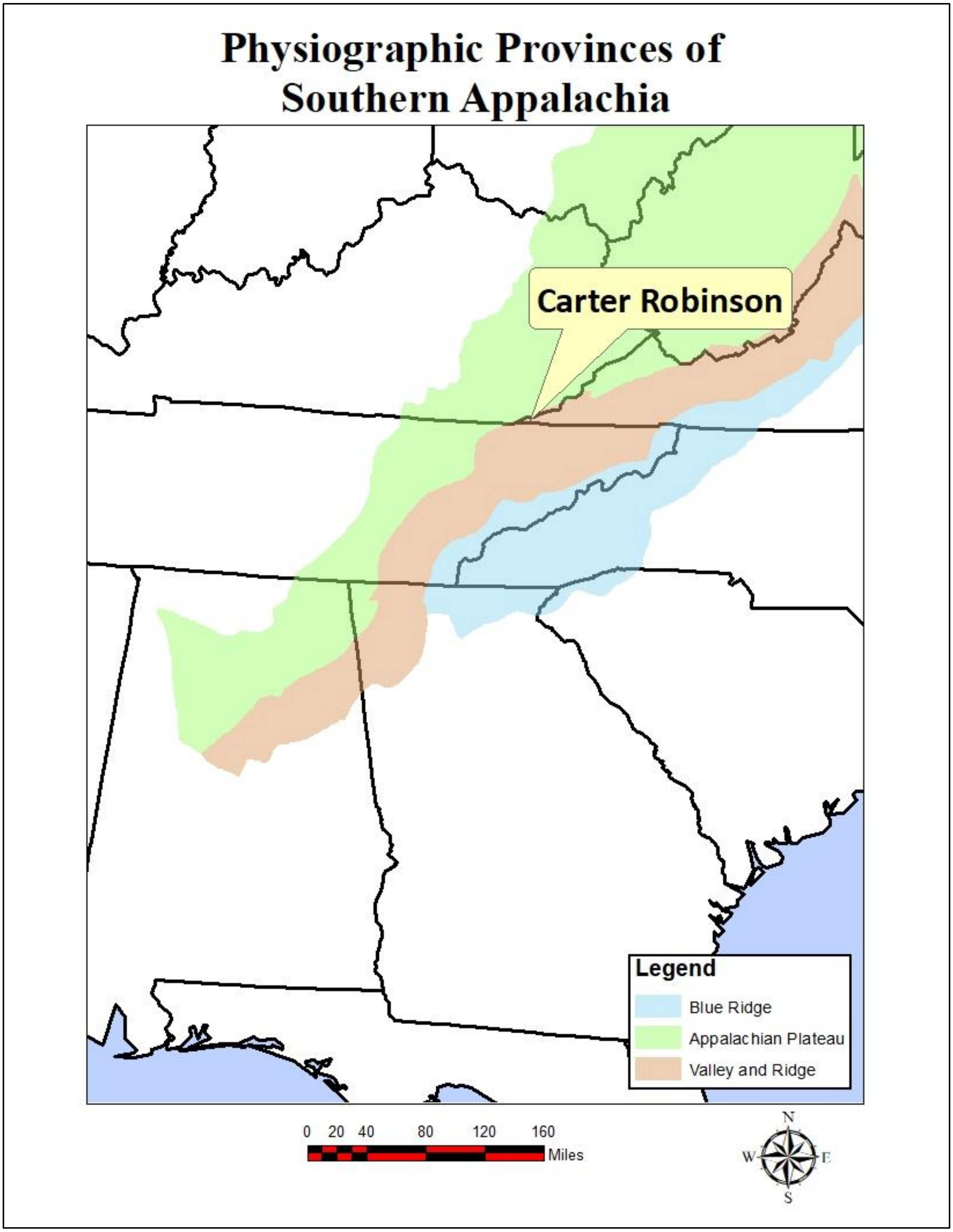

Figure 2. Physiographic context of Carter Robinson.

Evidence of exchange from Carter Robinson suggests that a primary reason for site settlement was economic opportunity. During the earliest period of site occupation, Mississippian potters were exchanging their wares for a minority (5-10 percent) of local Radford ceramic wares (Meyers 2015:233). Other craft items that were likely exchanged include cannel coal, shell, and possibly salt. Overtime, Carter Robinson potters expanded their ceramic production practices to include a variety of tempers and surface decorations typical of surrounding ethnic groups (e.g., Radford and Pisgah). In a small frontier community, this evolution of ceramic production and the changing nature and extent of trade relations with surrounding groups would have affected each household differently. In some cases, new trade relations may have been established and maintained by a single member of the community, and this would be reflected in the remains of his or her household.

The final research question addressed at Carter Robinson was aimed at understanding intrasite variability among households. Although it may seem obvious, those structures located closest to the mound seem to have enjoyed more access to materials and production than structures further afield. Over time, different structures were closest to the mound. Early on Structure 3 was closest to the mound, but the later-built Structure 1 was closest. In both cases, the structure located closest to the mound demonstrates the greatest abundance and variability of materials and evidence of craft production (Meyers 2011).

To summarize, the site was settled after the fissioning of a chiefdom in the Norris Basin of eastern Tennessee. The specific location of the site was selected for its access to trade routes and raw materials useful in exchange. Overtime, the site inhabitants used exchange and entrepreneurial savvy to establish themselves as a distinct polity with far-flung connections. Individual members of the polity were likely instrumental in the establishment and maintenance of trade relations that led to increases in social inequality that may have eventually led to the abandonment of the site.

This thesis attempts to explicate the method, organization, and evolution of stone discoidal craft production at Carter Robinson. With these goals in mind, this study has the potential to contribute to three areas of research. First, because Carter Robinson is a frontier, describing the different material culture is useful data for the wider archaeological community. Researchers curious about stone discoidals may easily locate data on the Cahokian examples, but these outstanding examples and not the norm; what did they look like in southern Appalachia? This thesis provides data on an under-reported region in Southeastern Archaeology. But this study is not only significant to the study of frontiers, it also adds to the study of historical processes such as the spread of Mississippian culture, or *Mississippianization*. It has been postulated that the game of Chunkey accompanied the spread of Mississippian culture (Pauketat 20024, 2009), and evidence from Carter Robinson supports this contention. Finally, this study adds a small piece of the puzzle to the existing literature on Mississippian craft production. Although Chunkey and stone discoidals have long been associated with Mississippian culture, only rarely has stone discoidal production (Davis 2008) been explored in any detail. How did this production work? Did it require any specialization, or did it require a great deal of time? Did chunkey and stone discoidal production accompany the initial movement of people into southwestern Virginia, or did it appear later? Studying the craft production of inalienable Mississippian stone discoidals in a frontier setting improves understanding of what it meant to be Mississippian.

The following chapters deal with issues relating to ground stone artifact production and how this relates to the political economy of Carter Robinson. Chapter 2 reviews pertinent literature and theoretical frameworks that underpin this research. Field methods and results from previous excavations are presented in Chapter 3. Chapter 4 deals directly with the research questions at hand in this project. In Chapter 5, I discuss the results of my stone discoidal analysis and how this production relates to other activities identified at the site. Chapter 6 concludes this study with a summary

CHAPTER II: BACKGROUND

This thesis examines the craft production of stone discoidals among Southeastern chiefdoms during the Mississippian period (A.D. 900-1550). This chapter provides an overview of the background literature and specifically discusses chiefdoms, Mississippian chiefdoms, political economy, the history and archaeology of chunkey stones and the game of chunkey, and stone artifact production.

Chiefdoms

The concept of the chiefdom as a distinct level of sociopolitical organization has been both productive and problematic in anthropology. Oberg (1955) first used the term *chiefdom* in an ethnographic sense, but he did little to define it. Elman Service, in his landmark 1962 publication *Primitive Social Organization: An Evolutionary Perspective*, developed a sociopolitical typology consisting of bands, tribes, chiefdoms, and states. Chiefdoms were defined as "redistributional societies with a permanent central agency of coordination" (Service 1962: 144). In this view, chiefdom societies were believed to have occupied environmentally diverse regions that allowed for specialized production of mutually exclusive goods. The specialized products were organized and redistributed by a central agent, the chief. However, as with virtually all neo-evolutionary typology, any given group of humans rarely, if ever, fit the defined types.

In the mid-1970s the redistribution model of chiefdoms was criticized. In one of the first critiques Donna Taylor (1975) found that none of the societies in her study of east and central Africa clearly fit the redistribution model. Later, Earle (1977, 1987) found that each community in the Hawaiian chiefdoms he studied were set up for maximum ecological diversity, precluding the need for chiefly redistribution. Earle (1977) suggested instead that any redistribution that did occur was only used in preparation for communal feasting events. Thus, the office of the chief was interpreted to serve primarily political rather than economic goals. Kus and Peebles (1977) also found the office of chief to be primarily political. If redistribution was present in chiefdoms, it was very likely not the determining factor in the development of chiefdoms. Nevertheless, the chiefdom concept is still widely employed by anthropologists (Blitz and Lorenz 2006; Hally 2008; King 2003; Livingood 2010; Pauketat 2007; Pollack 2004). Earle (1987: 280) suggests that the persistence of the term is due to the fact that anthropologists need evolutionary typologies to make cross-cultural comparisons. Today, while the term is still used, it is important to recognize that chiefdoms are highly variable in terms of their population size, economies, political and social organizations, in addition to their size. In other words, what is true for one chiefdom may not necessarily be true for another or any other.

Although the concept of chiefdom carries cumbersome social evolutionary baggage, the term is still useful. Moreover, creating a new typological term does nothing to combat the antiquated connotations associated with the chiefdom concept. For this reason, Pauketat (2007:13), and others (Livingood 2010) advocate for a descriptive use of the term chiefdom, which means the term must be defined by each author. In this thesis, chiefdoms are defined as societies that are intermediate between tribes and states. That is, chiefdoms occupy and consolidate definite geographic areas, produce surplus agricultural goods and possess centralized institutionalized hierarchical political authority with hereditary elites, but they lack rigid social classes or well-developed bureaucracies (Livingood 2010:4). This definition is necessarily open to be applicable to a wide variety of societies from the southeastern United States and around the world. Archaeological indicators of chiefdoms include monumental architecture, settlement hierarchies, long-distance exchange networks, prestige goods production and exchange, and evidence of differential access to wealth (e.g., mounds, households, burials, etc.) (Junker 2015).

Mississippian Chiefdoms

Mississippian is the name used by archaeologists to refer to the agriculturally-based societies that existed throughout the Midwestern and Southeastern United States prior to, and for as much as two centuries after, contact with Europeans. During the Mississippian period (approximately A.D. 900-1550) social, political, and economic inequalities were first institutionalized in southeastern North America. Although archaeologists refer to many different peoples as “Mississippian,” the concept is not monolithic. Mississippian cultures were not homogenous; they spoke many different languages but they shared material and symbolic cultural traditions. Traditionally, Mississippian culture has been defined by such material traits as shell-tempered ceramics, wall trench houses, pyramidal platform mounds of varying size and function, and a heavy reliance on maize agriculture (Anderson and Sassaman 2012; Cobb 2003; Griffin 1946, 1952; Scarry 1993; Scarry 1996; Steponaitis 1987; Willey 1966). Although widespread organizational variability existed between Mississippian chiefdoms, and even individual sites within a chiefdom, a generic model of Mississippian chiefdom settlement consists of a hierarchy of villages, ranging from isolated farmsteads and hamlets to huge multimound political and ceremonial centers (Milner 2004:141-151; Steponaitis 1986:390). Mississippian is also used to refer to a period of time (e.g., the Mississippian period) (Anderson and Sassaman 2012). Today, Mississippian cultures are recognized more for their variability than their supposed uniformity. At least some of this variability is due to the geographic and ecological variation across the landscapes occupied by Mississippian peoples.

Painting with a broad brush, the Mississippian world stretched from northern Florida in the south to Wisconsin in the north and from the Atlantic coast of South Carolina in the east to eastern Oklahoma in the west (Figure 3). Some of the most complex and well-understood sites in North America were constructed by Mississippian cultures, sites such as Cahokia (Illinois),

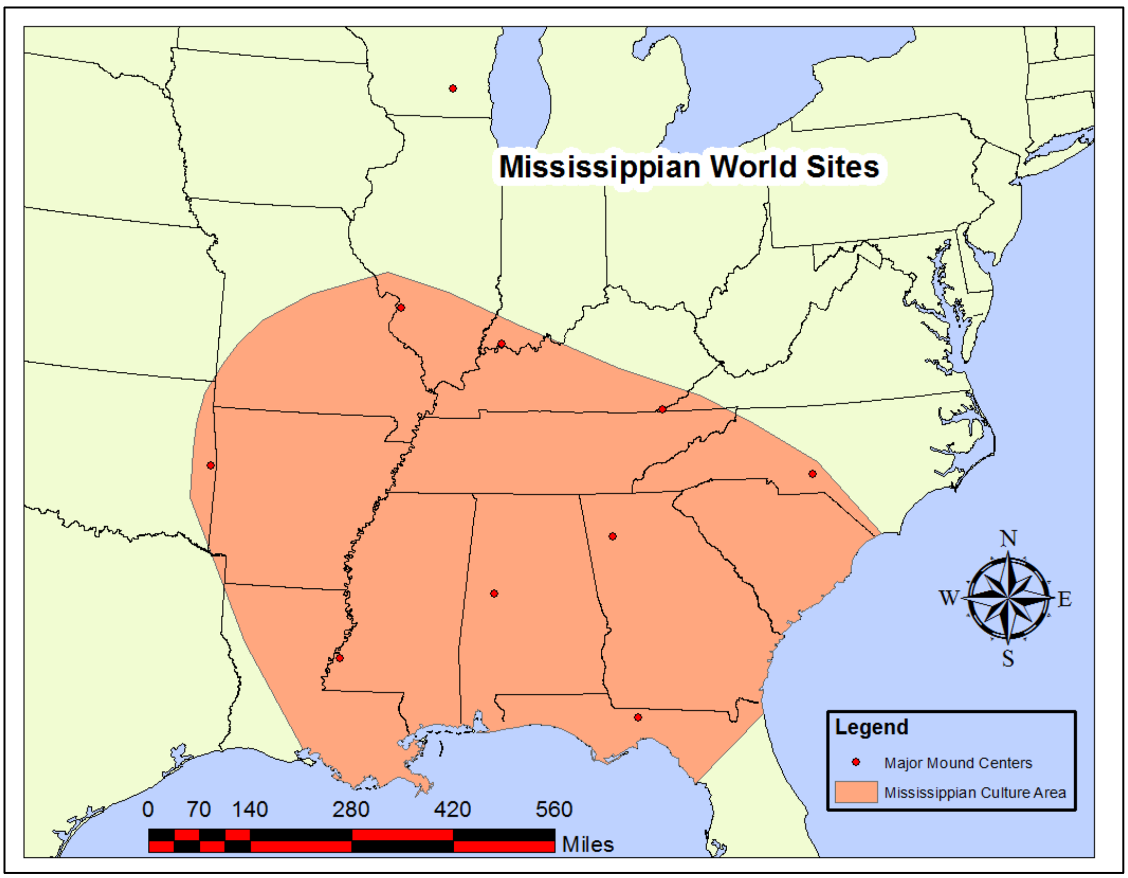

Figure 3. Approximate distribution of Mississippian cultures and select major sites.

Angel Mounds (Indiana) Moundville (central Alabama), Etowah (northwest Georgia), Spiro (eastern Oklahoma) and Lake Jackson (Florida) (Payne 1994). However, there were also many other smaller chiefdoms spread across the Southeast and Midwest during this time. Although the scale of individual Mississippian polities varied widely, they shared many similarities in terms of subsistence, site layout, and general settlement patterns.

Subsistence

The primary subsistence base of Mississippian societies revolved around maize production. However, the long-held misconception that the "three sisters" of corn, squash, and beans arrived in the Eastern Woodlands as a set has been disproved. It is now recognized that eastern North America was one of the few regions of the world where independent plant domestication occurred (Scarry and Yarnell 2011:483). The earliest evidence of horticulture in the eastern Woodlands suggests that hard-rind cucurbits (e.g. bottle gourds) were being cultivated by 2,300 B.C., and bottle gourds from the Windover site in Florida suggest human-modified forms were in use as early as 8,000 calibrated years before present (or approximately 6,000 B.C.) (Scarry and Yarnell 2011:485, 507). Maize agriculture has been dated, at its earliest, to A.D. 200, but did not constitute the primary subsistence element until after A.D. 1000 (Gremillion 2011: 393; Scarry 1993:78). Beans were the late comers, with evidence suggesting they did not constitute a significant portion of agricultural production until after Cahokia appears, and perhaps not until after its decline ca. A.D. 1250 (Gremillion 2011: 394; Muller 1997: 246; Scarry 1993:78-79).

Across North America, hunting and fishing provided the primary source of calories from meat. In southeastern North America, hunting strategies that were established during the Archaic period continued largely unchanged throughout the Woodland and Mississippian periods

(Lapham 2011:412). Important regional variation in terms of available resources and cultural predilection existed, but deer was the primary terrestrial source of meat beginning in the Archaic period. Muller (1997:227) argues that hunting strategies changed between the earlier Woodland and later Mississippian periods due to the intensification of agricultural production. This expansion of agricultural production had the added benefit of attracting edge species that fed on flora growing along the edges of fields and other disturbed patches of earth. As agriculture grew in importance, less time was afforded for extended hunting forays. However, we know from ethnohistoric accounts that during non-agricultural periods large groups of men would spend weeks hunting far away from their villages (Hudson 1976; Ethridge 2003), but this hunting was generally spurred by the need to acquire deerskins for trade rather than subsistence.

Houses/Town Plan

All cultures assign meaning to spaces and places. By studying the spatial organization of Mississippian sites, archaeologists can not only access the possible meaning that different spaces had, but also indirectly investigate other aspects of culture such as economy, political organization, and cosmology. Mississippian settlements range in size from large mound centers to small farmsteads. Across this continuum, however, Mississippian settlements demonstrate a consistent pattern of elements, which has led to the recognition of this organization as an architectural grammar. Lewis et al. (1998:2) state that an "…architectural grammar focuses on the rules by which elements were combined in architectural expression, while an architectural style emphasizes the classification of compositions by their shared expressions." Mississippian architectural grammar, in its basic form, consists of plazas and mounds in addition to boundaries and gates. Regarding the plaza, it has recently been suggested that rather than simple byproducts of mound construction, plazas were major construction events that can provide as much information about site history as mounds or other types of architecture (Davis 2014; Kidder 2004; Lewis and Stout 1998).

Platform mounds are the most visible form of architecture at the largest Mississippian sites. These flat-topped earthen pyramids served numerous functions including the residences and mortuaries for the elites of Mississippian societies and as signifiers of political centers, and they underscored the legitimacy and authority of leaders (Blitz and Livingood 2004:292). Lewis and Stout (1998:17) suggest that it is not the height of mounds that is important; instead, mounds visually differentiated those who occupied them, and their associated clans or group members, from the average community member. Blitz and Livingood (2004:293-294) calculated the volume and duration of use for 35 mounds ranging in size from single-mound sites to minor centers (two to eight mounds) and major centers (nine or more). They found a strong correlation between mound volume and duration of use at single-mound sites and minor centers, suggesting these mounds were added to on a regular basis, perhaps as a part of annual renewal ceremonies. At major centers, however, they found a low correlation between mound volume and duration, suggesting that at these sites mound construction was more heavily influenced by sociopolitical factors such as chiefly power wielded by charismatic leaders who could persuade large populations to work for his or her own exaltation (Blitz and Livingood 2004:298).

Like all aspects of Mississippian society, there is a great deal of variation in the built environment. Historically, Mississippian culture has been associated with wall-trench construction (Griffin 1967), and it has been noted that the adoption of this method of construction spread rapidly across the Mississippian world at about the same time (Muller 1997). Recently, Lacquement (2007a) has provided the most up-to-date review of Mississippian architectural variability, and today it is recognized that structures from the Mississippian period came in a variety of shapes, from circular (McLeod 2015:49) to square/rectangular (Lacquement 2007:60-61; McLeod 2015:48) to cruciform (McConaughy 2007:102). Mississippian construction techniques generally consisted of either small posts within wall trenches (earlier) or large single-set posts. A long-standing debate in Southeastern archaeology concerns the above-ground appearance of these floor-plan styles: did wall trench style houses have a curved roof structure (Blanton and Gresham 2007; Jones and DeJarnette 1936; Lacquement 2005, 2007b; Lewis 1937; Lewis and Kneberg 1941, 1946; Polhemus 1985, 1987; Reed n.d., 2007; Scarry 1995, 1998; Sullivan 2007; Webb 1938; Wilson 2005) while single set post structures had a hipped roof (Black 1967; Harn 1972; Hoebel 1949; Martin et al. 1947; Price 1969; Walthall 1977)? These debates still stand, but Pauketat and Alt (2011:115) suggest that both types of buildings were constructed in the American Bottom region during the Early Mississippian and that both varied over time.

Settlement Systems

Bruce Smith (1978) defined the Mississippian culture as a particular adaptation to riverine environments. These river valley settings provided fertile, friable soils that were optimal for Mississippian agricultural technology, with nutrients replenished through seasonal flooding events (Smith 1978:481). Natural geomorphological processes in the largest river valleys created closely-spaced, essentially parallel, levees, backswamps, and oxbow lakes (Smith 1978:481-482). This environmental variability provided access to not just soil, but a wide range of flora and fauna exploited by Mississippian peoples. Thus, levees were central to agriculture while backswamps and oxbow lakes were central to hunting-and-gathering subsistence activities.

Drawbacks to settling in this type of environment included frequent flooding of bottomlands and the need to move agricultural fields as soil nutrients are depleted (Smith 1978).

Mississippian chiefdoms had variable degrees of settlement hierarchy. Based on work at the largest Mississippian period sites (e.g., Cahokia, Moundville), the stereotypical Mississippian chiefdom would consist of a central administrative town with at least one mound that exerted direct political control over outlying non-mound villages, farmsteads, and hamlets. With each tier in the settlement hierarchy, there were tiers of power structure as well. There were polity chiefs and subordinate village chiefs but, based on ethnohistoric accounts, Hally (2008:15) suggests that chiefs would probably have had various advisors or even structured councils that would effectively have limited his or her sole authority.

At least two competing models of Mississippian settlement organization have been popular over the past 30 years or so (Anderson 1996; Blitz 1999). The first is the classic model of chiefdoms cycling between simple and complex (Anderson 1996:232; Blitz 1999:578). A simple chiefdom would only have one decision-making level over the local, household level of authority. A complex chiefdom would then have two or more levels of decision-making apparatuses above the local household. The largest, most complex chiefdoms would have perhaps as many as four tiers of decision-making levels (Cobb 2003:68). Thus, whether one chiefdom is classified as simple or complex depends on the number communities under the control of a chief (Blitz 1999:578). Of course, the nature and extent of control would change over time, and the natural course of a chiefdom would be to oscillate between simple and complex sociopolitical administrative organization, to rise and fall. Based on early Spanish accounts of protohistoric chiefdoms such as Coosa or Cofitachequi, the term “paramount chiefdom” may be added to this typology (Hudson et al. 1985). A paramount chiefdom would entail a complex chiefdom controlling multiple simple chiefdoms and at least one complex chiefdom (Blitz 1999:578).

Blitz (1999) offers the "fission-fusion model" as an alternative. According to Blitz (1999:579) the simple-complex model failed to account for the arrangement of mound sites in the South Appalachian region. Basically, the earlier model relied too heavily on mounds for simply determining whether one was dealing with a simple or complex chiefdom. Not all mound centers function the same, and not all mound centers in a given region are coeval. Using Hally's (1993, 1996) data from northern Georgia, Blitz argues that the interrelationships between mound sites are much more complex than the simple-complex model suggests.

Hally (1993, 1996) studied the origin, growth, and eventual decline of 47 Mississippian mound sites in northern Georgia. One of the most significant outcomes of this research is the realization that the territories used and controlled by a single polity seldom exceeded 40 km in this area. This distance is approximately the distance a chief could cover in one day to administer subordinate sites, and similar patterns are known cross-culturally (Johnson 1987; Renfrew 1975). Mound sites separated by 18 km or less were primary and secondary administrative centers within a single polity while sites separated by more than 32 km belonged to distinct polities (Hally 1993:159-160). Thus, the geographic size of Mississippian polities in northern Georgia extends approximately 18 km from the central administrative center, which makes a roughly 40 km diameter circle. Livingood (2010: 143-144, 2012:184, 2015) has dubbed these "Hally circles." This pattern of Mississippian polity size has also been shown to apply to chiefdoms in the Lower Mississippi Valley, Northeast Mississippi and western and southern Alabama (Livingood 2010:143-144). Hally circles generally apply to most of the Southeast because they reflect the amount of distance a chief could travel in a single day; however, local differences based on environmental factors are likely to apply.

The nature of Mississippian societies was such that all of the various sorts of cycling (e.g., fission, fusion, budding) were part and parcel of life. There was regional stability through the mechanism of the movement of people. Although individual chiefdoms rose and fell over time, the people who made up these polities did not simply disappear, they just moved.

South Appalachian Settlement Systems

Mississippian culture extended across much of the Southeastern and Midwestern United States, but there are important regional differences in terms of material culture, subsistence

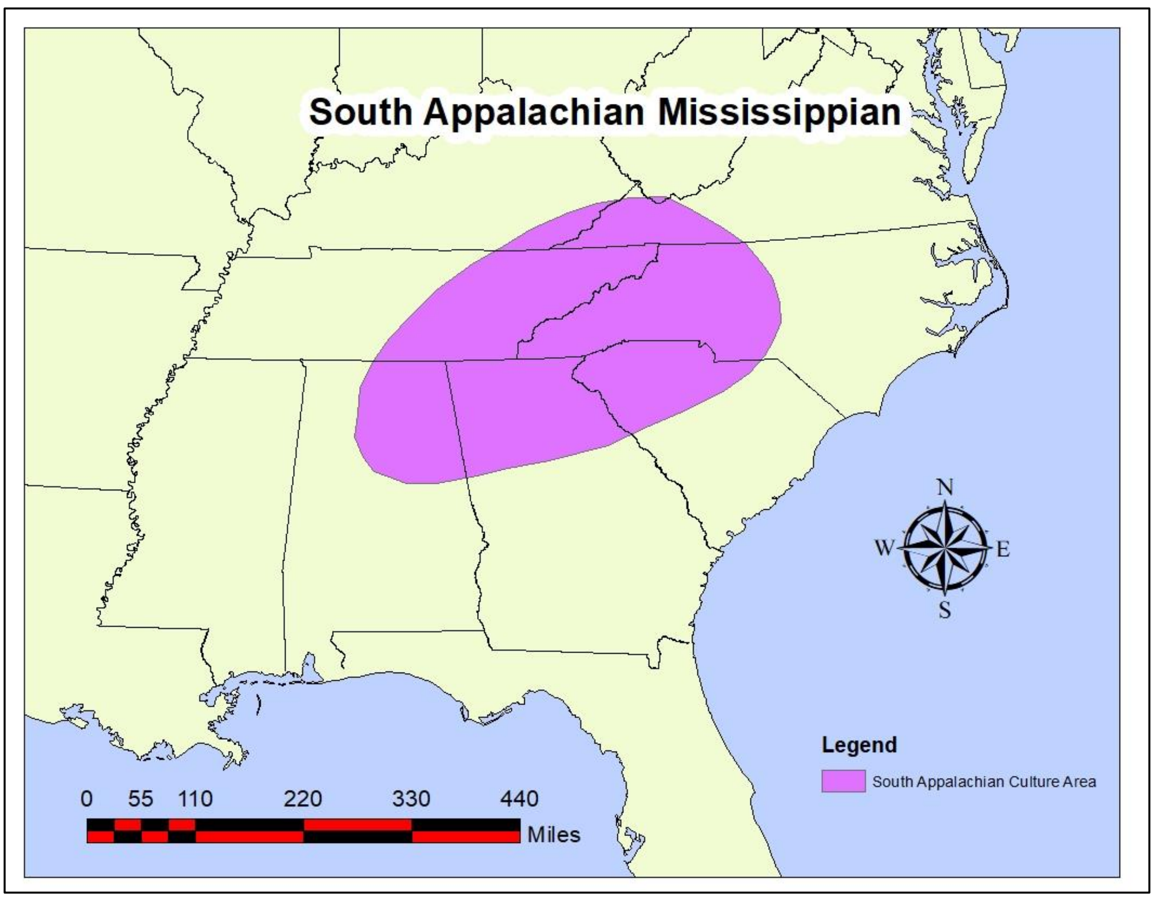

Figure 4. South Appalachian region.

strategies, and social and political organization. Ceramic data have been used to recognize what Leland Ferguson (1971) first described and defined as the South Appalachian Mississippian variant. This region encompasses northern Alabama, Georgia and South Carolina, west-central North Carolina, eastern Tennessee, southwestern Virginia, and southeastern Kentucky (Figure 4).

The late prehistoric ceramic traditions of this region consist primarily of grit-tempered, complicated-stamped wares, which differ markedly from the typical Mississippian tradition of shell-tempered and incised wares (Caldwell 1958:34; Ferguson 1971:7-8; Griffin 1967:190). Because of the mountains in this region, arable floodplain soils are restricted to relatively narrow river and stream valleys and this meant that Mississippian settlements were generally organized in linear fashion (Dickens 1978:117; Hally 1999:97-98; Smith 1978). As a result of this environmental circumscription, and the generally higher altitudes that provide fewer frost-free growing days (Meyers 2011:125), South Appalachian Mississippian cultures pursued a more mixed subsistence strategy, augmenting their agriculture production with the intensive gathering of wild foods, than their counterparts located in broad riverine environments. Based largely on mortuary data, it has been argued that Mississippian societies of the South Appalachian region had less distinct differentiation in terms of social status and power (Dickens 1978; Rodning and Moore 2010).

Frontiers

The study of frontiers, borders, and boundaries has a long history in academic research, but only in recent decades have anthropologists begun to contribute to the literature in a significant way. Anthropologists during the first half of the twentieth century viewed culture as bounded and self-contained (Mead 1928). Later, structural-functionalist analyses (for example, Evans-Pritchard 1969) sought to understand aspects of culture that served to maintain social integration, leading them away from investigations of frontiers and peripheries. Donnan and Wilson (1999:21) suggest a change occurred during the development of anthropological theory in the first half of the twentieth century, from an interest in “what a boundary encompasses to an interest in the boundary itself.” With the development and proliferation of world systems theory (Wallerstein 1974), and its attendant focus on core-periphery relations (Wolf 1982), archaeologists now regularly study the cultural processes along frontiers and how they impact, and are impacted by, the core (Blanton and Feinman 1984; King and Freer 1995; Meyers 2011; Peregrine 1992; Rice 1998). As Wolf (1982:387) states, frontiers are the “rough and tumble of social interaction” in which “groups are known to exploit the ambiguities of inherited forms, to impart new evaluations or valences to them, to borrow forms more expressive of their interests, or to create wholly new forms to answer changed circumstances.” Thus, anthropologists, especially archaeologists, are particularly interested in the cultural dynamics of frontiers because they are regions of interaction, exchange, and innovation where material and ideological aspects of culture may be transformed unpredictably.

Mississippian and Frontier Studies

Mississippian studies initially focused on complex core sites such as Cahokia, Etowah, and Moundville, and paid less attention to smaller and more peripheral sites. Today, it is widely recognized that to understand Mississippian culture in all its complexity archaeologists must examine the range of variability present in the Mississippian world. Mississippian sites are now known to have existed in such diverse locations as southeastern Kentucky (Jeffries 1996; Jeffries et al. 1996), southwestern Virginia (Meyers 2002, 2011), western North Carolina (Beck and

Moore 2002), and southeastern Alabama and southwestern Georgia (Blitz and Lorenz 2002, 2010). A frontier is a zone of intersection between two or more distinct groups. As discussed by Meyers (2015:222-223), frontiers lie on the edge of a larger system (i.e., core-periphery), and are a "distinct place, a crossroads, and a process where different social interactions occur" (Rice 1998:49-50). Frontiers as part of a larger system are subject to processes and events in the larger system, but because they are on the edge of that system, they are also subject to processes and events outside of that system. As this definition indicates, frontiers are highly dynamic and importantly, as Parker (2006:77) notes, most places on earth were at one time or another "connected to, or defined by, a frontier." With the recognition of the constantly shifting and variable nature of frontiers, it is now possible to examine the historical trajectories behind the organizational variability of specific regions.

Political Economy

In this thesis, the production of ground stone discoidals is approached from a political economy perspective. Over time, the term political economy has taken on different meanings, but in the most basic sense political economic studies examine the relations of power and what effects these relations may have on material aspects of life (i.e., production, consumption, discard) (Muller 1997; Roseberry 1988). Since the late 1970s, prominent political economy studies have focused on the development of the modern world system and the spread of capitalism (Wallerstein 1974; Wolf 1982). Recent trends in Mississippian political economy studies have been concerned with issues of scalar and historical processes in addition to the degrees to which specialized production was or was not present (Cobb 2000; Davis 2008; Meyers 2011; Muller 1994; Pauketat 1994).

Political Economic Models: Tributary and Prestige Goods Systems

Of the various approaches to the political economies of chiefdoms, models dealing with the production and distribution of local and exotic goods and resources have been successfully applied to Mississippian societies (Marcoux 2000; Meyers 2011; Trubitt 2000; Welch 1991; Wilson 2001). Wright (1977; 1984) outlined a system that Welch (1991:16) referred to as the *tributary* model. The tributary model of chiefdom political economy postulates that:

> …while food and goods are extracted as tribute from producers, actual distribution is characteristically to lesser figures within the chiefdom, rather than the whole populace, and the redistributed items are often goods made by specialists, either part-time specialists locally supported by commoner production or full-time specialists supported by chiefs using some of the tribute extracted from producers [1984:45].

There are several important aspects of this model to note. First, it proposes that craft goods are often produced by specialists. Second, this production may occur both away from or within central places. Lastly, these goods are redistributed to non-elite (or lower status elite) figures in the chiefdom.

The prestige goods model was first described by Frankenstein and Rowlands (1978) in their foundational study of Early Iron Age polities in Southwestern Germany. As noted by Welch (1991:18), the prestige goods model differs from the tributary model in that it was not derived from ethnographic case studies but was instead developed as a more logical model. This model describes a system in which self-aggrandizers gain and maintain power through the control of esoteric knowledge and material goods and the networks through which they were exchanged. Muller (1997:17) prefers the term “display goods” because, as Robb (1999:6) has pointed out, the concept of prestige goods runs the risk of tautology: which comes first, the prestige bestowed upon an object or the object itself? Following Marcoux (2000:2), display goods are defined as those finely-crafted, non-utilitarian goods produced from non-local materials that frequently contain or present ideological elements. Display goods were utilized in status competitions, by aspiring and established elites alike, to incur and pay social debts; their circulation was cyclical and near constant. Although the specific materials used to produce prestige goods varied over time and across space, in the Mississippian culture area they generally consisted of artifacts made of copper, shell, pearls, non-local lithic materials and objects adorned with religious iconography (Peregrine 1992).

The Organization of Craft Production in Mississippian Chiefdoms

Over the last three decades, discussion concerning the reasons behind economic production in Mississippian societies has frequently revolved around the degree to which craft specialization did or did not occur. There are essentially two schools of thought on this subject: those who argue for elite control of production at central places (Pauketat 1994, 1997; Peebles and Kus 1977; Welch 1991, 1996; Yerkes 1983) and those who argue for the household or communal level of craft production (Brown et al. 1990; Cobb 2000; Davis 2008; Milner 1990; Muller 1997; Wilson 2001).

The issue of specialization has featured prominently in recent discussions of Mississippian craft production (Cobb 2000; Davis 2008; Marcoux 2000). Costin (1986:328) defines specialization as “the regular, repeated provision of some commodity or service in exchange for some other.” It is worth noting that this definition implies some form of exchange, making living near subsistence producers a necessity of specialization. Evans’ (1978) landmark study of chalcolithic craft production identified six features of craft specialization that are highly accessible via the archaeological record: workshops, toolkits, storage facilities, exploitation of unique raw material, exchange and trade for the distribution of craft items and the acquisition of raw materials, and differential distribution of craft goods at sites and within settlement systems. This study highlighted the need for each analysis to specifically define what is meant by 'specialization.' Additionally, with these criteria in mind the probability of identifying all six of these features at any given Mississippian site in the Southeast is very low, leading Cobb (2000) to suggest that production for exchange in Mississippian societies generally took place at the household or community level. Muller (1984) emphasizes the need to distinguish between site specialization and producer specialization.

Research in the American Bottom, at both Cahokia and hinterland sites, has been used to support both the elite control and the dispersed production models of craft production. Yerkes (1983) found that a specialized toolkit consisting of microdrills, often found in conjunction with shell artifacts and debris, likely constituted specialized production, possibly under the control of elite personages. He went so far as to match the Cahokia data that was available to him at that time with Evans' (1978) criteria for specialized production. Similarly, concentrations of microdrills and shell around the nearby Kunneman mound were interpreted by Pauketat (1993; 1994) as evidence for elite-sponsored craft production. For each of these authors, the discovery of caches of raw materials in conjunction with production debris and specialized toolkits at mound sites is distinct evidence of elite-sponsored craft production. What is clear to both authors is that evidence of elite-sponsored craft production may be identified by certain archaeological correlates of specialization, such as production debris and specialized toolkits, recovered from central places.

Hinterland sites have also been used to argue for both sides of the elite control over craft production debate in the American Bottom (Milner 1990; Pauketat 1987, 1994; Prentice 1983;

Yerkes 1989). Bead blanks, microdrills, and shell polish micro-wear on tools prevalent on farmsteads around Cahokia have been interpreted as evidence for elite control of production (Pauketat 1994; Prentice 1983). For Yerkes (1989), the fact that production is restricted to a small number of hinterland sites is enough evidence to suggest that some form of elite control existed. On the other hand, Milner (1990) and Pauketat (1987) have argued against elite control due to the lack of evidence and the effects of small sample sizes and poor rates of preservation.

Cobb's research on the production of Mill Creek chert hoes perhaps exemplifies the most balanced approach to the question of specialized production. He argues for regional specialization in the case of Mill Creek Chert hoes, but he does not see indisputable evidence for elite Cahokian control. Cobb's research demonstrated that although quarries and specialized production sites exist in southwestern Illinois, their widespread distribution does not support centralized control. Importantly, Cobb (2000) suggests that the debate about elite control over production is not a black or white issue; instead, the scalar organization of production between and within chiefdoms, communities, and households is highly variable and must be approached anew each time (*sensu* Wilson et al. 2006).

Muller (1984; 1986; 1997), on the other hand, takes a more conservative approach when he argues that most of the data in these cases could just as easily be explained by a part-time specialization scenario where production was conducted at the level of the household or community. Using archaeological and ethnohistorical data, Muller (1997:50) argues "elite control of display goods is often assumed, but not yet demonstrated." He goes on to argue that access to raw materials and the ability to produce prestige goods crosscuts social boundaries, leading him to suggest that virtually no evidence for elite control over such production exists. In other words, Muller (1997) argues for an open system of status competition between all segments of society. Brown et al. (1990:372) suggest that there was a spectrum of access to non-local goods and the use of items such as shell beads in transactions occurred at all levels of society.

Research at the site of Moundville in west central Alabama has overwhelmingly (Marcoux 2000, 2008; Peebles and Kus 1977; Welch 1991, 1996), but not entirely (Davis 2008), supported the idea that prestige goods production, distribution, and consumption was controlled by elites. In his seminal study of the Moundville economy, Welch (1991) suggested that the power of the elites was derived in part from their ability to control access to exotic raw materials, such as Hillabee Schist used to make hoes and axes, which were necessary for agricultural production and therefore necessary for subsistence needs.

Muller (1997:350) by contrast suggests that the paucity of excavations outside of Moundville itself are the reasons behind the lack of evidence for craft production in the hinterlands of the Moundville chiefdom. Indeed, Davis (2008) demonstrates that certain elements of the Moundville political economy model set forth by Welch (1991) do not hold up when tested against newly available data. To provide a baseline with which to compare the Moundville political economy model, Davis (2008) examined the lithic assemblages of three non-mound sites from the Black Warrior River Valley that dated between the late Moundville III (A.D. 1400-1520) and early Moundville IV (A.D. 1520-1650) phases. She found that inhabitants of these small sites were utilizing local and nonlocal lithic materials in essentially the same ways, suggesting that they had access to a variety of raw stone material (Davis 2008:102). Davis (2008:102) also found that greenstone did not arrive at these sites in the form of completed tools, as implied in Welch's model, again suggesting greater access to non-local lithic material. Finally, two of the three sites examined in her study produced extraordinary quantities of Pottsville sandstone, which previously had not been documented in non-elite contexts. All this data suggests some degree of localized production but does not necessarily constitute specialization.

Prehistoric Exchange

Studying the causes, forms, and effects of exchange has been a mainstay of anthropology. Recurring themes in anthropological research include the study of exchange in terms of economy (LeClair and Schneider 1968; Sahlins 1972), ceremonial reciprocity (Malinowski 1922; Mauss 1925), and kinship (Levi-Strauss 1969) to name just a few. Archaeology necessarily places a great deal of importance on exchange because it can be observed in material culture (Dillian and White 2010). However, studies have generally focused on the creation and maintenance of trade networks at the expense of other mechanisms of exchange such as gambling (DeBoer 2001). A brief review of some of the common types of exchange follows.

Reciprocal exchange is the most common form of exchange in non-market settings. Marshall Sahlins (1965) described three types of reciprocity that occur in societies around the world: *generalized*, *balanced*, and *negative*. Mitchell (1988) and, more recently, Binde (2005) have built upon this scheme to include four types of reciprocal exchange: *positive generalized*, *negative generalized*, *positive balanced*, and *negative balanced*. Positive generalized reciprocity involves equal sharing among members of a given social group and is the type of reciprocal exchange typical of so-called egalitarian societies (Binde 1995:447; Mitchell 1988:641). Negative generalized reciprocity, which is also characterized as occurring within a given social group, can be conceived of like theft or taking advantage of someone (Binde 1995:448-449; Mitchell 1988:641). Positive balanced reciprocity is a broad category but may be best exemplified by bartering between two parties (Binde 1995:447-448; Mitchell 1988:641).

Negative balanced reciprocity signifies a sort of competitive or antagonistic exchange that may be exemplified by a blood feud (Binde 1995:448; Mitchell 1988:641). It is important to note, however, that more than one of these types is generally operating at different scales (i.e., families may exhibit positive generalized reciprocity while exchange relations between members of different villages may exhibit negative generalized reciprocity) (Binde 2005:449). Thus, scale is an important factor when considering exchange and the form is takes.

As a means of the distribution of wealth, symbolized by material goods, exchange has historically been subjected to control by individuals, groups, or institutions in positions of power (Dillian and White 2010; Earle 1991, 1997; Helms 1993). As a widespread form of exchange, gambling would have been subject to such control. Gambling is defined, following Binde (2005:2), as, "the established practice of staking money or other valuables on games or events of an uncertain outcome." While the literature is scant, there are a few ethnographic examples on a global basis. For instance, Balinese cockfighting, and the gambling which inevitably ensued, was perceived as a hindrance to tourism by the Balinese government and deemed illegal (Geertz 1972). While many forms of gambling have been banned by national governments, others thrive so long as their existence benefits the state. In China, non-state-sponsored gambling is illegal but state-sponsored lottery sales rank among the highest in the world (Steinmüller 2011:268). While most prehistoric games affiliated with gambling left little to no evidence in the archaeological record, stone discoidals are relatively well-represented, making these artifacts ideal for the study of prehistoric gaming.

Games, Gaming and Gambling: An Anthropological Perspective

Anthropological interest in the distribution, origin, and function of games dates to the founding of the discipline (Culin 1903, 1907; Roberts et al. 1959; Tylor 1879, 1896). In Western society today, and coming largely from the Protestant work ethic, games are generally considered to be light-hearted, recreational activities that are often called pastimes. Cross-culturally, however, the nature, functions, and constituent parts of games vary considerably. Oxendine (1988:5) defines games as "organized, formal activities involving competition." He further classifies sports as specific types of games that involve the participation of spectators. The prehistoric Mississippian game of chunkey and its various iterations, which involve gambling, are most appropriately conceived of as sports because they involve the players as well as spectators that may have included entire communities or even multiple communities. The Oxford English Dictionary (2016) defines gaming as "the action or practice of playing games, as cards, dice, etc., for stakes." Binde (2005:2) defines gambling as "the established practice of staking money or other valuables on games or events of an uncertain outcome." Games are more than recreation; they allow individuals to develop and hone skill sets that are useful in ordinary, and even extraordinary, situations (Cheska 1979).

Chunkey in History

Archaeological data enable current understanding of the prehistoric origin and spread of stone discoidals and, presumably, the game of chunkey. However, the association of these stone discoidals and the game of chunkey can only be established through historical documentation and ethnographic analogy. In the following paragraphs, I use ethnographic information to briefly outline the tribes that played versions of chunkey and the names they used to refer to the game, the differing rules, and the types of fields, stone discs and poles used.

Tribes that Played and the Names They Used

The game of chunkey was played by historic tribes from South Carolina to Montana (Culin 1907). In the Southeast, ethnohistoric records document the presence of chunkey among the Cherokee in North Carolina (Timberlake 1765); the Choctaw in Mississippi (Adair 1775; Romans 1775); the Creek in Georgia and Alabama (Bartram 1849); the Natchez in Mississippi (Du Pratz 1774); the Bayagoulas and Mougoulachas (Unnamed Officer who kept Journal 1880); and the Houma (Gravier 1861) in Louisiana. In the Midwest and Great Plains regions, the game was played by the Crow (Kurz 1937); Gros Ventre (Boller 1868); Hidatsa, Mandan, and Cheyenne (Culin 1907; Kurz 1937). These tribes spoke many different languages and, thus, the game was known by different names. Among the Choctaw, historic accounts identify the game as "chungke" (Adair 1775; Culin 1907), "achahpih," or variations on this spelling, (Halbert 1897; Swanton 1993), and as "Ulth Chuppih" (Cushman 1899:190). The Mandan referred to the poles used in the game, and by extension the name of the game itself, as "tchung-kee" (Catlin 1841; Culin 1907:512). The Eno were observed by John Lawson using "a staff and bowl made of stone" in a game they called "chenco" (Culin 1907:510; Lawson 1714:57). Finally, Lieutenant Henry Timberlake witnessed the Cherokee call the game "nettecawaw" (Timberlake 1765:77). Thus, while there are some names that do not appear to have any structural similarities, many do suggest a common heritage or origin for the game.

Gameplay

In his treatise on games of North American Indians, Stewart Culin (1907:420-422, 475, 485-488, 510-513) documented the multifarious nature of chunkey. The game is but one version of a larger category of games called hoop-and-pole that was played prehistorically and historically across virtually all of North America (Culin 1907:420; Pauketat 2009:63 Perino 1971:115). Chunkey is the Midwestern and Southeastern variant of this game and was typically played by two, usually male, contestants running side-by-side. One player, or another individual entirely, would send the stone rolling across the playing field after which both players would throw their poles towards the stone itself or where they predicted the stone would stop rolling (Hudson 1976:421-423). Adair (1775:401) provides a concise account of gameplay among the Choctaw:

> Each party has a pole about 8 feet long, smooth, and tapering at each end, the points flat. They set off abreast of each other at 6 yards from the end of the playground, then one of them hurls the stone on its edge in as direct a line as he can…When they have ran a few yards, each darts his pole anointed with bear's oil, with a proper force, as near as he can guess in proportion to the motion of the stone, that the end may lie close to the stone. (Adair 1775:401)

Recognizing the highly variable nature of the game, as recorded in ethnohistoric accounts, Adolf Link (1979) suggested that chunkey is most appropriately conceived of as an umbrella term describing many variations on the same theme. For example, although Bernard Romans (1775:79) and James Adair (1775:401) both witnessed the game during the travels among the Choctaw, they recorded different rules for the game. Cushman also describes the game as played by the Choctaw, but in his account one player throws his pole first then the second player aims his pole at the first pole, which at this point is airborne, to direct it away from the rolling stone (Cushman 1899:190). George Catlin (1841:132) (Figure 5) described the game as it was played among the Mandan, in which the poles were slid along the ground rather than thrown through the air.

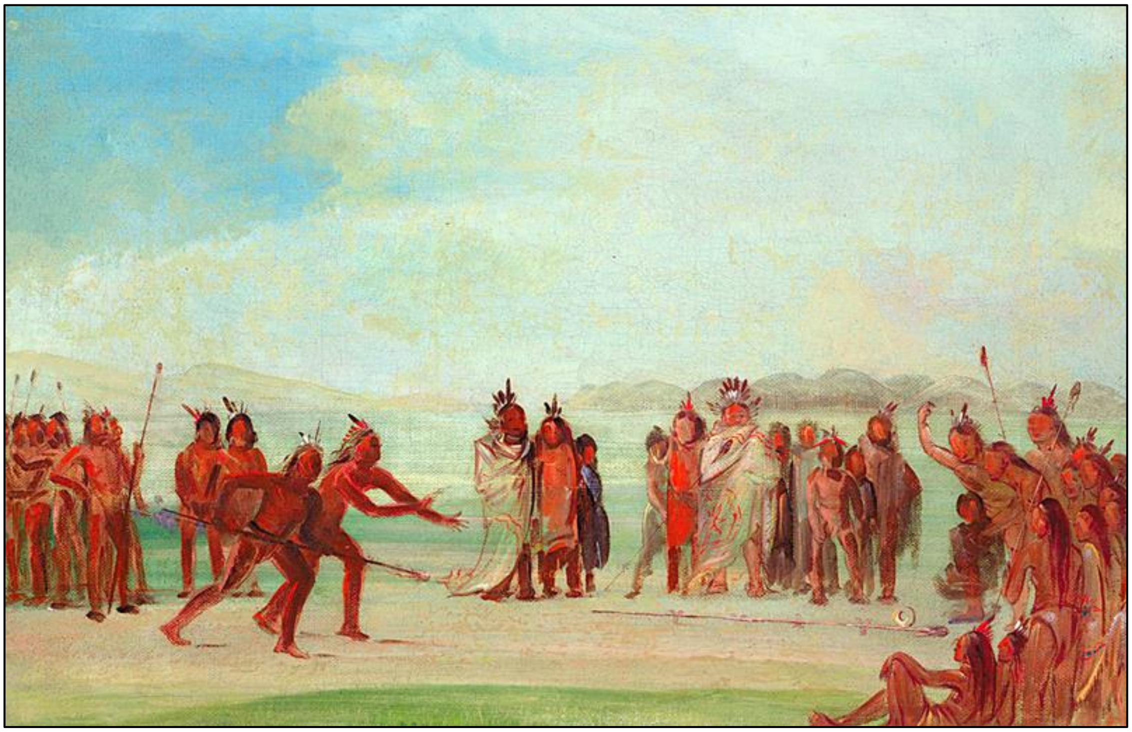

Figure 5. Illustration of Mandan playing Chunkey (Catlin 1841:132).

Equipment

In addition to variations on the rules of the game, there was variability in the equipment used depending on the specific style of the game. For instance, Du Pratz (1768:4) stated that the Natchez played with poles "resembling a Roman *f*." Lewis and Clark (1814:143) witnessed the Mandan playing a game, which they likened to billiards, with "sticks that were about four feet long, with two short pieces at one end in the form of a mace, so fixed that the whole will slide along the board." In another account likening the game to billiards, Henry Boller (1868:160) witnessed the game played among the Gros Ventre of Montana, and he describes the sticks as "seven or eight feet long, with bunches of feathers tied on at regular intervals." Among the

Cherokee, in present-day North Carolina, Lieutenant Henry Timberlake (1765:77) witnessed the game played with poles "about ten feet long, with several marks of divisions."

Fields of Play

Just as the poles used varied so did the fields on which chunkey was played. Based on his observations among the Creek, William Bartram (Squier 1849:135) described the fields of play thusly:

> The 'chunk yards' of the Muscogulges or Creeks, are rectangular areas, generally occupying the centre of the town. The Public Square and Rotunda, or Great Winter Council House, stand at the two opposite corners of them. They are generally very extensive, especially in the large old towns: some of them are from six to nine hundred feet in length, and of proportionate breadth. The area is exactly level, and sunk two, sometimes three feet below the banks or terraces surrounding them, which are occasionally two in number, one behind and above the other, and composed of the earth taken from the area at the time of its formation. These banks or terraces serve the purpose of seats for spectators. In the centre of this yard or are there is a low circular mound or eminence, in the middle of which stands erect the 'Chunk Pole,' which is a high obelisk or four-square pillar declining upwards to an obtuse point. (Squier 1849:135)

Other ethnohistoric accounts (Adair 1775:402; Gravier 1861:143; Lewis and Clark 1814:143; Squier 1849:135) also describe these prepared playing surfaces and make note of their central location near or in the center of villages. The central placement of chunkey fields is clear evidence of the communal and ceremonial importance of the game. The communal association is also signified by the provenience of stone discoidals within village sites. Adair (1775:401) mentions "the hurling stones…are kept with the strictest religious care from one generation to another, and are exempted from being buried with the dead. They belong to the town where they are used, and are carefully preserved." Although some archaeologists have noted the scarcity of these artifacts in burial contexts (Lewis and Kneberg 1946: 122; Pauketat 2004:179), multiple examples have been recovered from burials (Brain and Phillips 1996:154; Fowler et al. 1999; Hally 2008; Jones 1994:139; Jones 1861:83; Putnam 1878; Webb and Wilder 1951). Nevertheless, the clear majority of stone discoidals have been recovered from non-burial contexts, especially near public space or communal structures and within mounds (Colburn 1936; DeBoer 1993:88 Keel 1976:55; Lewis and Kneberg 1946: 122; Polhemus 1987:94; Schroedl1986: 372, M. Smith 1994:144).

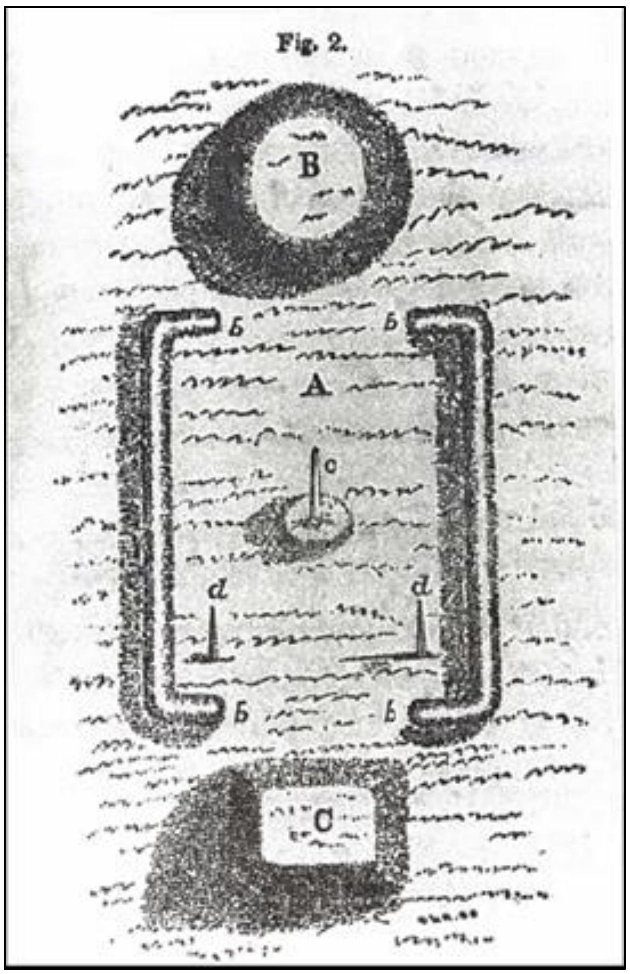

Figure 6. Engraving of Bartram's Creek 'chunk yard' (in Squier 1849:135).

The Archaeology of Chunkey

This game may be inferred in the archaeological record of eastern North America through the presence of stone discs, which are the only gaming equipment that has preserved. Additionally, however, the presence of this game in the precontract period is alluded to by iconographic artifacts depicting chunkey players holding discs and poles (Brown 2004; Fundaburk and Foreman 2001).

The pre-Columbian origin and significance of chunkey can be gleaned through an analysis of southeastern Native American myths. Although myths recorded between the mid-seventeenth and early-twentieth centuries have frequently been used uncritically to interpret prehistoric ideology and iconography (Brown 1985; Howard 1968), Greg Keyes (1992) identified three salient factors of mythology that should be considered before exerting their explanatory power. First, are the main characters gods, god-like, or elites? Second, does the myth explain an actual social position, such as that of chiefs? Finally, and related to the second, does the myth explain actual ceremonies practiced by the group from which the myth was recorded? The chunkey player motif is found in numerous native Southeastern myths, and those stories illustrate how myths were used to underscore social elites and institutions as well as ceremonies. Over time as contact between indigenous Southeastern Native Americans and European Americans increased, the social organization of these groups changed from hierarchical chiefdoms to more egalitarian tribal communities. This shift in social organization resulted in changes in the stories they told: no longer did most tribes need stories that legitimized an elite, chiefly class. With regard to chunkey, early myths outline sociopolitical positions, institutions, and ceremonies, and thus underscore the pre-Columbian origins of chunkey.

The earliest stone discoidals, generally referred to as chunkey stones in the archaeological literature, are found in the American Bottom region and they date to approximately A.D. 600 (DeBoer 1993; Pauketat 2004; Perino 1971). In the most in-depth study of chunkey stones to date, DeBoer (1993) studied the temporal and spatial distribution of well-provenienced stone discoidals from the American Bottom. He found that the earliest stones were recovered from general village midden areas or in association with infant burials (DeBoer 1993:88). A significant number of chunkey stones from Late Woodland contexts have been recovered from the Range site, and these stones were recovered from midden areas near structures and courtyards that possibly functioned as public spaces (Fortier and Jackson 2000) This association of stone discoidals with public buildings and spaces led Pauketat (2009a; see also Zych 2017) to interpret that the stones may have been connected to entire communities or subsets of communities. As Cahokia came to dominate the American Bottom during the tenth and eleventh centuries, the distribution of the stones became restricted to the burials of elite males. This period coincides with the economic, political, and social reorganization of Cahokia (Dalan 1997; Emerson 1997; Pauketat 2004). DeBoer (1993:90) interpreted this to mean that this game, which was once the pastime of children and adults alike, was co-opted by Cahokian elites in their attempts to control exchange and, more importantly, to legitimize their status through the control of symbols.

A recent distributional study of stone discoidals from the American Bottom (Pauketat 2004:63, 86, 179) highlights a shift in use from rural to urban contexts. Based on the presence of biconcave stone discoidals at Late Woodland floodplain farmstead sites, Pauketat (2004:86, 179) asserts that chunkey was played over a larger region before the regional consolidation of Cahokia. After A. D. 1050, a date corresponding to the Cahokian “Big Bang” (Pauketat

1997:31), the distribution of stone discoidals became restricted to large village sites. The appearance of stone discoidals among upland Richland complex (circa A.D. 1050) farming communities is an interesting exception (Pauketat 2004:99, 179). While these artifacts are found in middens, they are conspicuously absent from most burials; they are only known from elite burials at Cahokia.

Stone discoidals like those found in and around the American Bottom are found across a large portion of the Southeastern and Midwestern United States and they generally date between A.D. 600 and the nineteenth century (DeBoer 1993; Perino 1971). George (2001) reported on the presence of biconcave stone discoidals from the Upper Ohio River Valley that were recovered from Fort Ancient and Monongahela sites dating to the tenth through sixteenth centuries. Stone discoidals from these areas are generally smaller than those found at contemporary Mississippian sites (Griffin 1966:72), much like the earlier Woodland period discoidals from the American Bottom (Pauketat 2004:63-64). Fleming (2009:5) provides a synthesis of archaeological work in the Red Wing Locality in the Upper Mississippi River Valley of east-central Minnesota and west-central Wisconsin and documents the recovery of stone discoidals from several sites with "undeniable Mississippian influences." Elsewhere, outside of the American Bottom, biconcave stone discoidals have been reported in southeastern Missouri (Griffin 1952), from Aztalan in Wisconsin (Barrett 1933; Bennett 1952; Fleming 2009); Minnesota (Link 1979, 1980); the Angel site in southern Indiana (Black 1967); Ohio (Meuser 1956; Squier and Davie 1848); throughout Arkansas (Perino 1967, 1971); Tennessee (Perino 1971; Lewis and Kneberg 1946; Lewis et al. 1995); from Spiro in Oklahoma (Hamilton 1952), from Gahagan (Emerson 2004; Webb and Dodd 1939); sites in Louisiana (Fogleman and Girard 2014); South Carolina (Culin 1907: fig. 675a,b); the Winslow site in Maryland (Slattery and Woodward 1992), and even from the Ely Mound site in southwestern Virginia (Carr 1877). The distribution of non-biconcave discoidals covers essentially the same area but they are far more common than biconcave examples.

Pauketat (2009b:49) posits that the game of chunkey was a marker of Mississippian cultural identity. The stones, he argues, were themselves inalienable objects, meaning they were inextricably entangled with Mississippian narratives and places. Moreover, it has also been suggested that individual stones may have been associated with particular players, households, or towns (Pauketat 2009a: Zych 2017). If the game of chunkey is a marker of Mississippian culture, or at least an indicator of interaction with Mississippian peoples (Fleming 2009; George 2001), examining discoidals at the Mississippian frontier might shed light on the function of the game and more specifically on stone discoidal production. Specifically, were the stones being produced for exchange? Were they intended for non-Mississippian peoples, or related Mississippian groups such as those in the Norris basin, or a combination of these?

Lithic Production

Lithic artifacts are some of the most durable archaeological remains, and on many sites stone tools and associated debitage are the most abundant artifact classes. In general, archaeologists place lithic artifacts into two categories: flaked stone and ground stone. This simple dichotomy belies the fact that these categories are constructs that are meaningful only to archaeologists. From a practical standpoint, the production of flaked stone artifacts often requires some grinding, and the production of some ground stone artifacts often requires some flaking. The following paragraphs will briefly define and describe flaked and ground stone artifacts.

Flaked Stone

Flaked stone artifacts are items that were produced through the removal of flakes or chips. To facilitate this discussion, some definitions are in order. Andrefsky (1998: 9-11) uses the terms "objective piece" to denote the object being modified, whether it be a cobble, core, or flake, and "detached piece" to denote the stone material removed from the objective piece. Not all stone possesses the proper mechanical qualities necessary for flaking, but typical rock types used include fine-grained, siliceous materials like chert (i.e., flint, also known as cryptocrystalline quartz), obsidian, and quartzite. Ethnographic studies have documented extensive knowledge of raw stone materials among the aboriginal inhabitants of New Guinea and Australia (Best 1912; Dickson 1981; Hampton 1999), and, based on quarry studies and the antiquity of Native American cultures, this deep knowledge of how to work which types of stone may be extended to Native North America as well (Hranicky 2013:15). Flakes are "detached pieces" and they are removed from an objective piece, such as a core, though either percussion or pressure flaking. Percussion flaking describes the removal of flakes through the application of percussive force using a stone (e.g., hammerstone), antler (e.g., billet), or another similar implement. Pressure flaking refers to the removal of flakes through the application of controlled pressure rather than percussion. Pressure flaking is usually accomplished using an antler tine, or sharpened bone or dowel, to apply pressure to the edge of an objective piece. In general, percussion flaking occurs early in the production process while pressure flaking, which is more precise, occurs late in production process and is also utilized to resharpen tools once they become dull.

Ground Stone

The category of “ground stone artifacts” is, like many archaeological categories, a heuristic construct in that many artifacts in this class require some flaking to produce. With that important note in mind, ground stone artifacts may be grouped into two general categories: (1) those that are ground through use and (2) those that are ground during production (Sutton and Arkush 2009:75). The first category includes artifacts used to process various materials by grinding (e.g., mano), pulverizing (e.g., hammerstone), or scraping (e.g., thumbnail scraper). Examples of the second category include discoidals, palettes, stone pipes, and celts or axes. Adams (2002:1) adds to the above list items used to manufacture tools (e.g., shaft straighteners, burnishing stones) and minerals used as pigment and the ground pigment itself. Ground stone artifacts are produced through a combination of pecking and grinding (Fowke 1891:100; Koldehoff and Kassly-Kane 1995:6; Kozák 1972:19; Odell 2004:75).

Pecking may be thought of as a point along the flaking continuum. The primary difference between flaking and pecking is the amount of force and precision with which it is applied: pecking requires less force and less precision than flaking (Adams 2002:42). More specifically, pecking involves short-distance strokes with a hammerstone or billet. This alters the surface of the objective piece through the creation of small impact fractures that are commonly referred to as peckmarks. These impact fractures are like flakes but they are distributed more uniformly. Essentially, pecking crushes or crumbles whereas flaking produces discrete, formal debris (Adams 2002:42; Kozák 1972:19; Runnels 1981:256).

Utilitarian versus Non-Utilitarian Ground Stone Artifacts

Ground stone tool-kits were utilized long before the development of agriculture (Gremillion 2004:225-226), but they would have been commonplace in most communities of agricultural societies (Bennett 1898; Ebeling and Rowan 2004). Their function was primarily utilitarian in nature. As stated above, ground stone artifacts include those that are ground through use and those ground in production. Artifacts ground through use are items used in the processing of various floral and faunal materials. Examples of utilitarian ground stone artifacts range from milling implements (i.e., manos and metates used to process seeds, grains, nuts, etc.) to tools used to manufacture other tools (e.g., shaft straighteners, burnishing stones, and hammerstones). For Mississippian societies that depended heavily on corn agriculture, milling implements would have been particularly important domestic items. Thus, ground stone artifacts are generally considered domestic, utilitarian tools. However, they were also used for other economic, political, social, and ritual purposes such as grinding pigments and minerals for ceramic and other craft production; grinding food, pigments, or minerals destined for public or community rituals; or even for production of burial goods. Thus, the spatial and temporal contexts of these items are key to identifying the function of each ground stone artifact.

Stone Discoidals

Stone discoidals represent one of the most recognizable artifact classes during the later prehistoric and early historic periods in the Southeastern and Midwestern United States. Although they have a remarkable distribution across these regions and have been linked to the game of chunkey by archaeologists as early as the late nineteenth century (Carr 1877; Jones 1873; Kountz 1881), archaeological interpretations of these stones are relatively limited. Although they are frequently referred to by a suite of names, in this thesis they are referred to as stone discoidals to signify the variation in size and shape that may indicate variations in use. Stone discoidals may be defined as small, circular ground stone artifacts. Given this definition, the term stone discoidal encompasses a wide variety of artifacts in terms of size, shape, and material.

Stone discoidals came in a variety of shapes and sizes. Some were produced with faces, or sides, that are flat, biconcave, biconvex, or a combination of each of these (Colburn 1936; Perino 1971), and some exhibit engravings (Koldehoff and Kassly-Kane 1995; Setzler and Jennings 1951; Webb 1938; Webb and Wilder 1951; Yancey and Koldehoff 2010). The peripheral edges, or rolling surfaces, may be roughened, rounded, flat, beveled, pointed, or possess an even arch (Colburn 1936; Fowler et al. 1999; Perino 1971). Gerard Fowke (1891:99-109) developed the earliest and most comprehensive classification of stone discoidals using collections from the Bureau of American Ethnology. He recognized fifteen classes and several subclasses. However, Fowke's study considered stone discoidals from across North America, and thus many are unrelated to the game of chunkey. More recently, Perino (1971) constructed a typology for the American Bottom region using data recovered from excavations near Cahokia. This typology was expanded by Kelly et al. (1987) and includes Jersey Bluff, Salt River, Prairie DuPont, Cahokia, and Bradley types (Figure 7; Table 1).

The Jersey Bluff type refers to rather large discoidals that are slightly concave on either side with a large, flat edge. Salt River discoidals are similarly biconcave; however, this type has a notably sharper edge, or rolling surface, than Jersey Bluff. Both the Jersey Bluff and Salt River types were most abundant during the Late Woodland period (ca. A.D. 600-800) in the American Bottom (DeBoer 1993:87-88, Figures 5-6). Raw materials used for these discoidals include granite, diorite, quartz, limestone, baked clay, and flint (Perino 1971:115). Prairie DuPont discoidals are typically smaller than the other types described and are perforated in the center; these stones were most popular ca. A.D. 775-850 (DeBoer 1993:87-88, Figures 5-6). Cahokia style stones are similar to Jersey Bluff but with a much more pronounced concavity leaving a narrow rim; these artifacts were most prevalent during the Emergent and “classic” Mississippian periods (ca. A.D. 850-1150) (DeBoer 1993: 87-88, Figures 5-6). Raw materials used for the Cahokia type includes quartzite, sugar quartz, diorite, granite, limestone and sandstone in addition to baked clay (Perino 1971:115). Finally, the Bradley type is nearly flat on one side and convex on the other with a beveled edge; this type reached its zenith as Cahokia declined (ca. A.D. 1150-1400) (DeBoer 1993: 87-88, Figures 5-6).

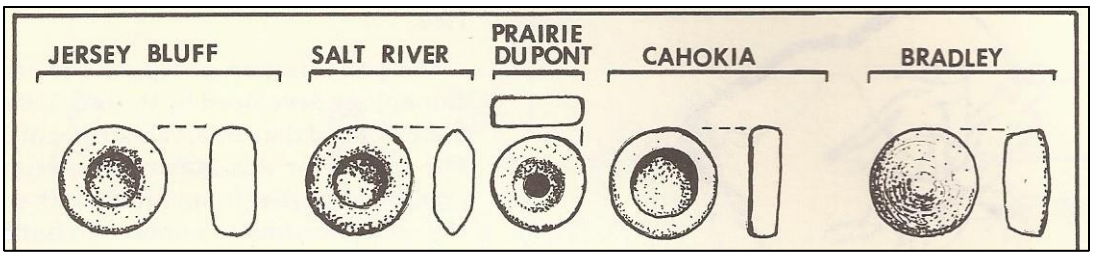

Figure 7. American Bottom stone discoidal types defined by Perino 1971 and Kelly et al. 1987 (from DeBoer 1993:88).

Table 1. Stone Discoidal Types from the American Bottom Region

Type	Sides	Rolling Surface	Time Period
Jersey Bluff	Slight Biconcave	Large, Flat	ca. A.D. 600-800
Salt River	Biconcave	Sharp	ca. A.D. 600-800
Prairie Dupont	Perforated	Small, Flat	ca. A.D. 775-850
Cahokia	Wide Biconcave	Flat	ca. A.D. 850-1150
Bradley	Planoconvex	Beveled	ca. A.D. 1150-1400

Given that stone discoidals were produced by diverse peoples in differing environments over many centuries, they were necessarily made from a wide variety of raw stone materials. This variation in material may have been related to new interpretations of the significance of the game, and the evolution of the discoidal form itself likely influenced, or was influenced by, how the game was played (Perino 1971:116; Zych 2017). Archaeological investigations in northern Georgia suggest that stone discoidals with beveled edges may have been used on a unique surface in a game that differed from the typical chunk-yard described by William Bartram (Colburn 1936; Wauchope 1966). Colburn found (1936:3-5) 32 stone discoidals in close association with what he termed a "bowling alley" at the Mississippian J. J. Greenwood Mound site (9RA1) in Rabun County, Georgia. This feature consisted of several alleyways with several partitions projecting to the right at the far end (Figure 8). Of the 32 stone discoidals from the site, more than half (n=17) had beveled edges. Colburn hypothesized that the beveled edges allowed the stones to curve into these compartments. This form of discoidal conforms with the Bradley type (DeBoer 1993:88). Robert Wauchope (1966:410-415), excavating sites in northern Georgia during the Works Progress Administration era, uncovered a similar playing surface at the Woodland/Mississippian site of Towaliga (9MO1) in Monroe County. This feature also possessed alleyways with off-shooting partitions. Interestingly, John Swanton (1946:684) described a game, known as "'rolling the stone,' or 'rolling the bullet,'" that was played by the Creek Indians, in which a "marble or bullet" was rolled along an alleyway with partitions, the object being to land the rolling object in certain compartments with more points going to those compartments most difficult to access. These findings from northern Georgia in conjunction with Swanton's account suggest that not all stone discoidals were used in the game of chunkey

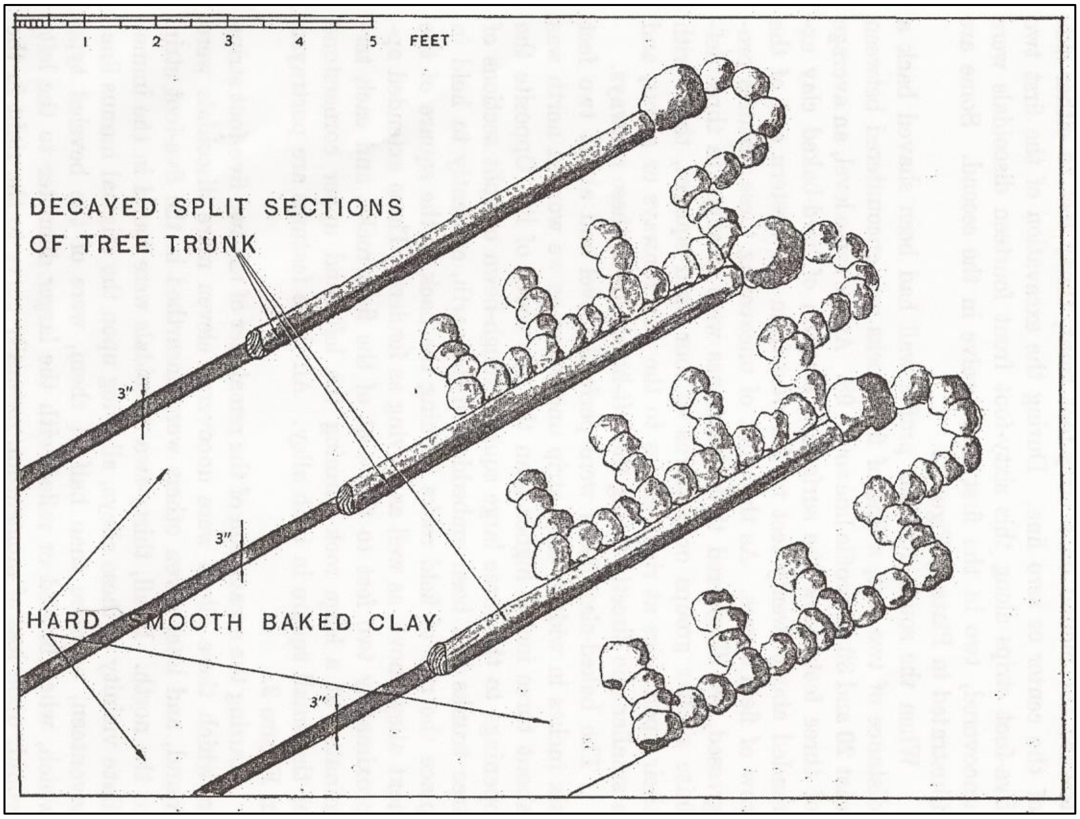

Figure 8. Illustration of "bowling alley" feature from J.J. Greenwood Site (Colburn 1966).

In addition to archaeological data concerning the distribution of variously shaped stone discoidals, ethnohistoric accounts provide pertinent information on how the differing shapes may have been used in different versions of the game. Link (1979) notes that a variety of shapes were common in certain regions. Discoidals with flat sides are seen in the Houma, Natchez, and Mandan versions of the game (Catlin 1841:132; Du Pratz 1768:4; Gravier 1861:143;). Biconcave discoidals are seen among the Choctaw and Eno (Adair: 1775:401; Lawson 1714:57), and biconvex among the Muscogee (Hawkins 1848:71). Using these ethnohistoric accounts, Link (1979) provides compelling evidence to suggest that many different types of stone discoidals were used to play variants of chunkey.

CHAPTER III: RESEARCH QUESTION

As discussed in Chapter 2, stone discoidals represent a class of artifacts that are typically associated with the Mississippian cultural tradition and even many of its descendant communities. These artifacts and the game of chunkey accompanied the spread of Mississippian cultures outward from Cahokia (Pauketat 2004, 2009). Indeed, the geography of stone discoidals maps on to the Mississippian world and its peripheries. Rather than being seen as a simple pastime that Mississippian emissaries brought along, Chunkey is now thought to have played a pivotal role in the Mississippianization of the Eastern and Southeastern United States (Pauketat 2004, 2009).

In southwestern Virginia, Carter Robinson is positioned on the edge of the Mississippian world. Meyers (2011) has shown that the site is was settled by a Mississippian group that originated in the Norris Basin of eastern Tennessee. These people settled Carter Robinson in an upland environment that was already occupied by members of the non-Mississippian Radford culture. Over the course of occupation at Carter Robinson, craft production was an ongoing, likely daily, activity. The ability to trade raw and finished materials with neighboring groups was central to the political economy of this frontier chiefdom. Given that the founders of Carter Robinson originated among the Mississippian chiefdoms of eastern Tennessee, they were the prime movers of Mississippian traditions into the Cumberland Gap region. If chunkey was indeed part and parcel of the spread of Mississippian traditions, what role did the game of chunkey, and the production of the gaming stones themselves, play in the successful establishment of Carter Robinson?

Although stone discoidals are not extremely common, all major mound centers and many minor sites have reported such artifacts. Given their widespread presence across the Midwest and Southeast, it is surprising that the nature and role of their production has remained virtually untouched in discussions of Mississippian political economy and craft production. Given that Southeastern archaeologists have a relatively limited repertoire of ground stone artifacts with which to work (especially when compared with archaeologists working in the southwestern United States), historically their status as “ground stone artifacts” simply meant that these artifacts were pecked and/or ground. Gerard Fowke, in his (1891) extensive typology of stone discoidals using collections from the Bureau of American Ethnology, actually provides one of the most complete descriptions of the various ways that flaking, pecking, and grinding could be combined to produce stone discoidals. DeBoer’s (1993) work on the well-provenienced stone discoidals recovered during the FAI-270 project around Cahokia set the stage for the current state of discoidal studies, but aside from briefly discussing the significance of standardization, he does not mention production. Recently, J. Davis (2008) conducted a thorough analysis of ground stone artifacts (including stone discoidals), their tools of production, and production debris from three sites in the Black Warrior river valley. His study stands out as the most up-to-date approach to ground stone technology in the Southeast.

One of the great debates in Southeastern archaeology concerns the spread of Mississippian culture. In terms of chronology, Mississippian culture first appeared in the American Bottom region with the rise of Cahokia, circa A.D. 1050, in what Pauketat (1997) has termed the “big bang”. From this same region we know that stone discoidals were made and used as early as circa A.D. 600. During the Late Woodland and Early Mississippian periods in the American Bottom, chunkey stones were found in common village middens and sometimes accompanied the burials of both children and adults (DeBoer 1993). Around the time of the "big bang," DeBoer (1993:89-90) demonstrates there was a shift in the context from which chunkey stones were recovered. During the height of Cahokian influence, instead of being located in a midden or a child burial, these stones were found primarily in elite male burials. But as Cahokia began to fail, we see that these artifacts were no longer restricted to elite contexts. DeBoer offers two reasons for this. First, he suggests that the game was coopted by aspiring elites to control the interpersonal exchange (i.e., gambling) that this game facilitated. A second reason suggests that aspiring elites sought to legitimize their new positions by controlling the symbolically potent game of chunkey. Regardless of which scenario was true, the important point is that the game of chunkey played a role in the sociopolitical evolution of Mississippian society in the American Bottom.

As Mississippian culture spread out from Cahokia, so too did the game and its stones. As mentioned previously, Pauketat (2004; 2007; 2009) suggests that because chunkey stones are found in archaeological contexts that match well with the geographic spread of Mississippian cultures, the game of chunkey played an important role in the spread of this way of life. Therefore, if stone discoidals and the knowledge to produce and use them were brought to southwest Virginia by the inhabitants of Carter Robinson, examining the organization of technology and the political economy of this production can shed light on the spread of Mississippian culture.

The purpose of this thesis is to describe the method, organization, and evolution of stone discoidal production at Carter Robinson. There are three major research questions that this thesis addresses. First, how were the stone discoidals from Carter Robinson produced? Although stone discoidals have been recognized as a distinct class of artifacts since the late nineteenth century (Fowke 1891; Jones 1873; Kountz 1891), there has been no systematic description of their production. Second, what is the spatial organization of stone discoidal production at Carter Robinson? Examining the organization of production of discoidals at the site at multiple households will allow for a comparison of production within and between households. Furthermore, stone discoidal production in a frontier chiefdom provides new contexts for interpretation. These data can be used to identify the presence, or absence, of specialized or spatially segregated production. Mississippian craft production has received a great deal of attention in the literature, but the actual production of stone discoidals has not been examined in great detail. If, as DeBoer (1993) and Pauketat (2009) suggest, chunkey played a significant role in the spread of Mississippian culture, then this production should logically have been present early in the occupation of Carter Robinson. Finally, how did the production of stone discoidals at Carter Robinson change over time? As a chiefdom on the frontier of a culture area, Carter Robinson social organization was likely more flexible and less hierarchical than that seen at more central sites like Toqua. This means that aspiring elites had paths to power that were not available at similar sites. Overtime at Carter Robinson, the craft production activities taking place inside structures changes. It is possible that there was an attempt by emerging elites to consolidate the production of shell beads and host feasts in Structure 1. This study provides valuable descriptive data on stone discoidals from a little studied region and helps illuminate the nature of craft production and power at Carter Robinson.

CHAPTER IV: METHODS

This chapter provides an overview of the of the field methods employed at Carter Robinson and the laboratory methods utilized during this study. The fieldwork for this thesis was conducted over the course of several seasons of archaeological fieldwork and field schools between 2006 and 2015.

Excavation Methods

Excavations at Carter Robinson began in 2006 and have continued, off and on, through 2015. Field methods have included multiple methods of geophysical prospection, close interval (10-meter) shovel testing of the site, test unit excavations on the mound flank, and test unit and block excavations of portions of six separate structures within the village area. An overview of these methods is presented below; for more detailed descriptions see Meyers (2011).

Shovel Testing

Carter Robinson was shovel tested at a 10-meter interval over several field seasons. To date, at least 269 shovel tests have been excavated. The location of many, but not all, shovel tests was recorded using a Leica TC305 Total Station. The location of shovel tests excavated during the 2015 field season were recorded using a Deitzgen 6000 series surveyors transit. Shovel testing enabled the identification of site boundaries, the length of occupation, change in ceramic style during occupation, probable structure locations, and a plaza to the east of the mound. (Meyers 2011).

Block and Test Unit Excavations

Block and test units were excavated in areas where geophysical prospection, surface investigations or shovel testing suggested or identified concentrations of archaeological remains. In addition, two exploratory test units were placed on the southern and western flanks of the mound. Test units were excavated to provide more detailed understanding of site stratigraphy. Additionally, test units present better opportunities to uncover cultural features in a more controlled context than shovel testing.

Block 1 is located 10 meters north of the mound and contained remains from Structures 1 and 4 (Figure 9). Block 1 comprises an area of approximately 117 meters^2. A total of 186 features were excavated within Block 1 and 80 percent of these were posts (Meyers 2011:193). Additionally, portions of two structures, Structures 1 and 4, were present in Block 1. Structure 1 contained evidence of shell bead production and appears to have been a special use area based on its large size (floor space totals approximately 35 m^2), proximity to the mound, and evidence of shell bead craft production (Meyers 2011: 341). Structure 4 is a more typical Mississippian structure with interior roof-support posts surrounding a hearth feature. This structure is interpreted to have been a domestic structure.

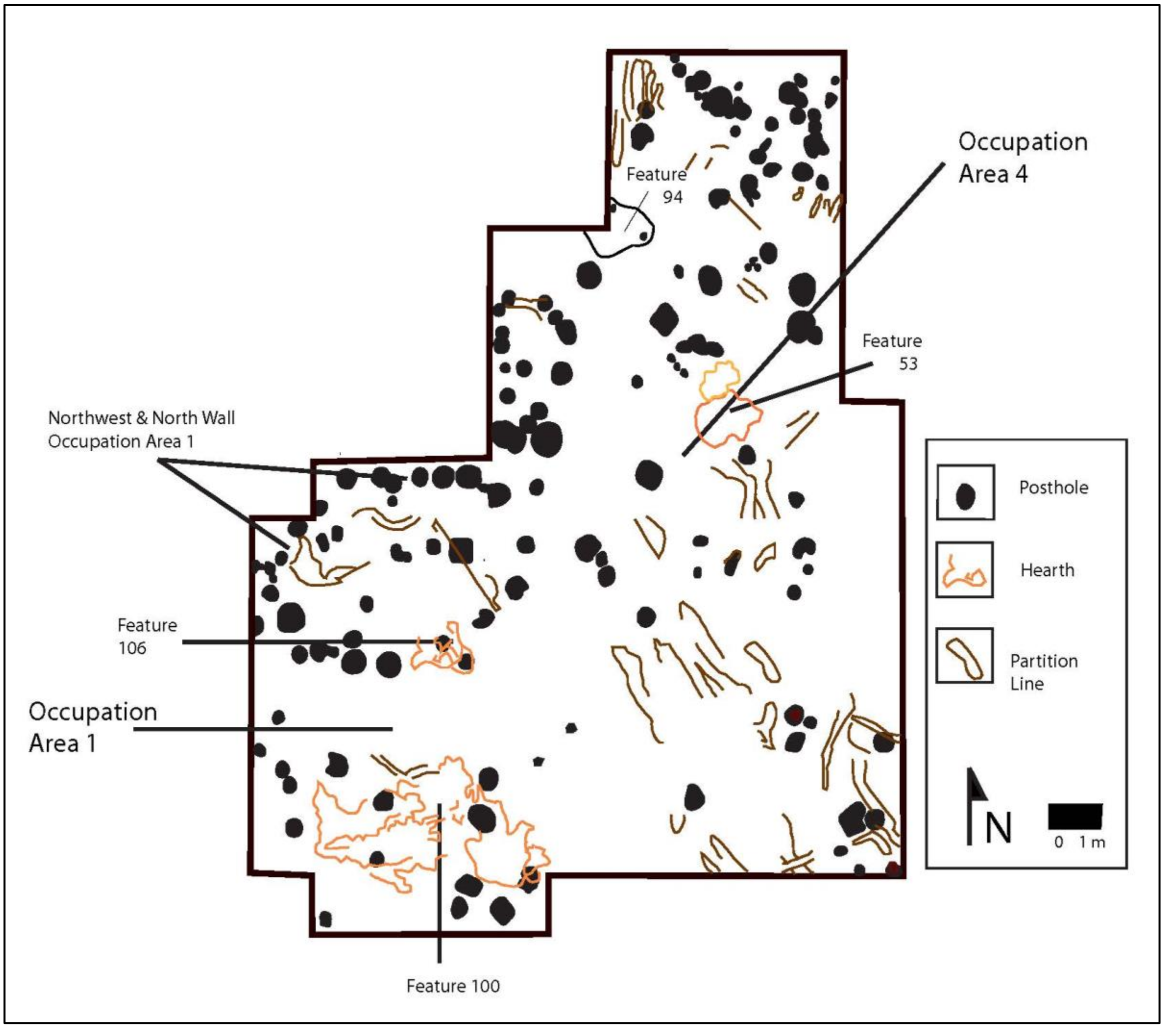

Figure 9. Plan view of Block 1, Occupation Areas 1 and 4 (Meyers 2011:194).

Block 2 is located approximately 25 meters north of the northeast corner of the mound and comprises an area of approximately 26 meters^2 (Figure 10). A total of 46 features were excavated within this block and all but four were posts. The other four features consisted of two trenches and two possible pits. Additionally, a portion of Structure 3 was identified in Block 2. This structure is interpreted to represent the partial remains of a possible wall trench structure. The floor of this structure was virtually devoid of artifacts and did not demonstrate evidence of burning, which suggests it was purposefully abandoned or was not used in a domestic manner.

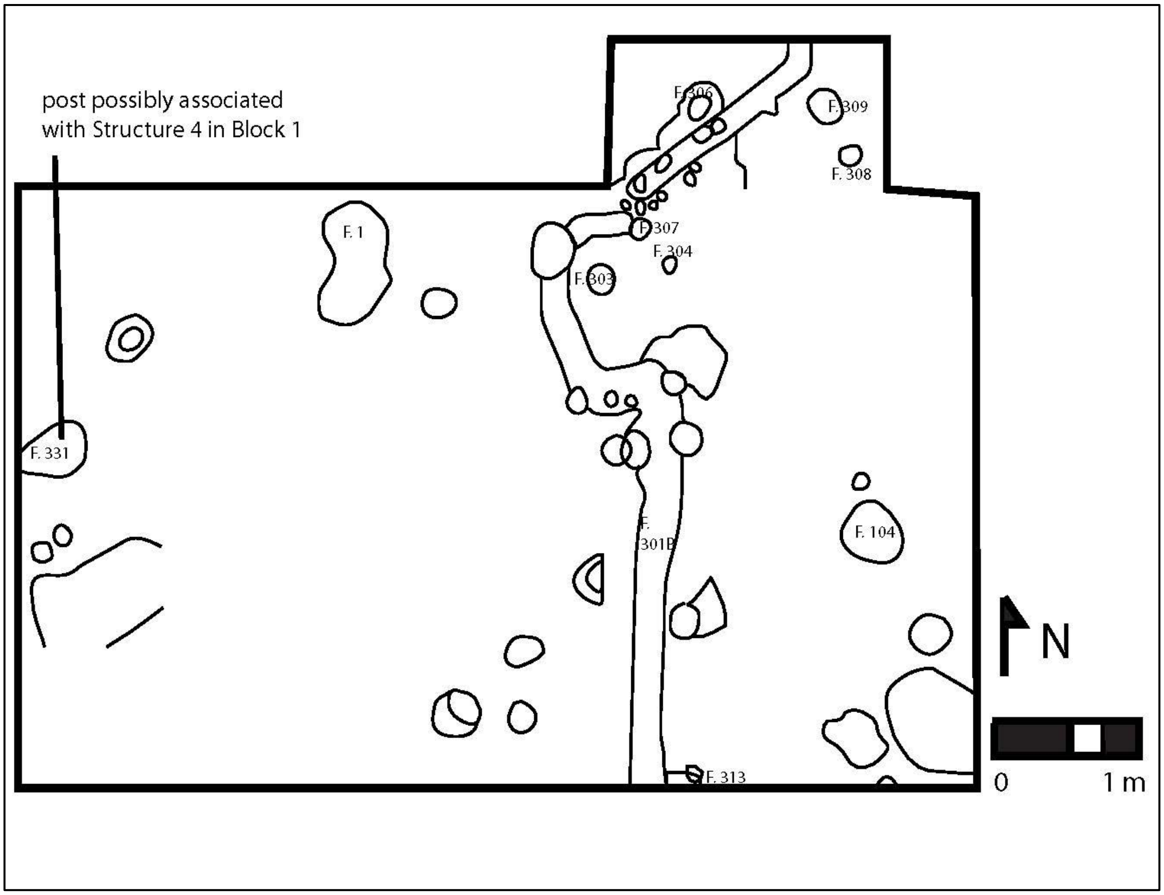

Figure 10. Plan view of Block 2, Structure 3 (Meyers 2011:176).

Block 3 is located 85 meters north and east of the mound and comprised an area of approximately 36 meters^2, and it contained Structure 2 (Figure 11). Excavations there uncovered multiple rebuilding episodes of the structure with different architectural styles and evidence of shell bead production was recovered from the upper levels. The multiple rebuilding stages are separated by sterile clay caps that may represent the early stages of mound construction (Meyers 2015:231).

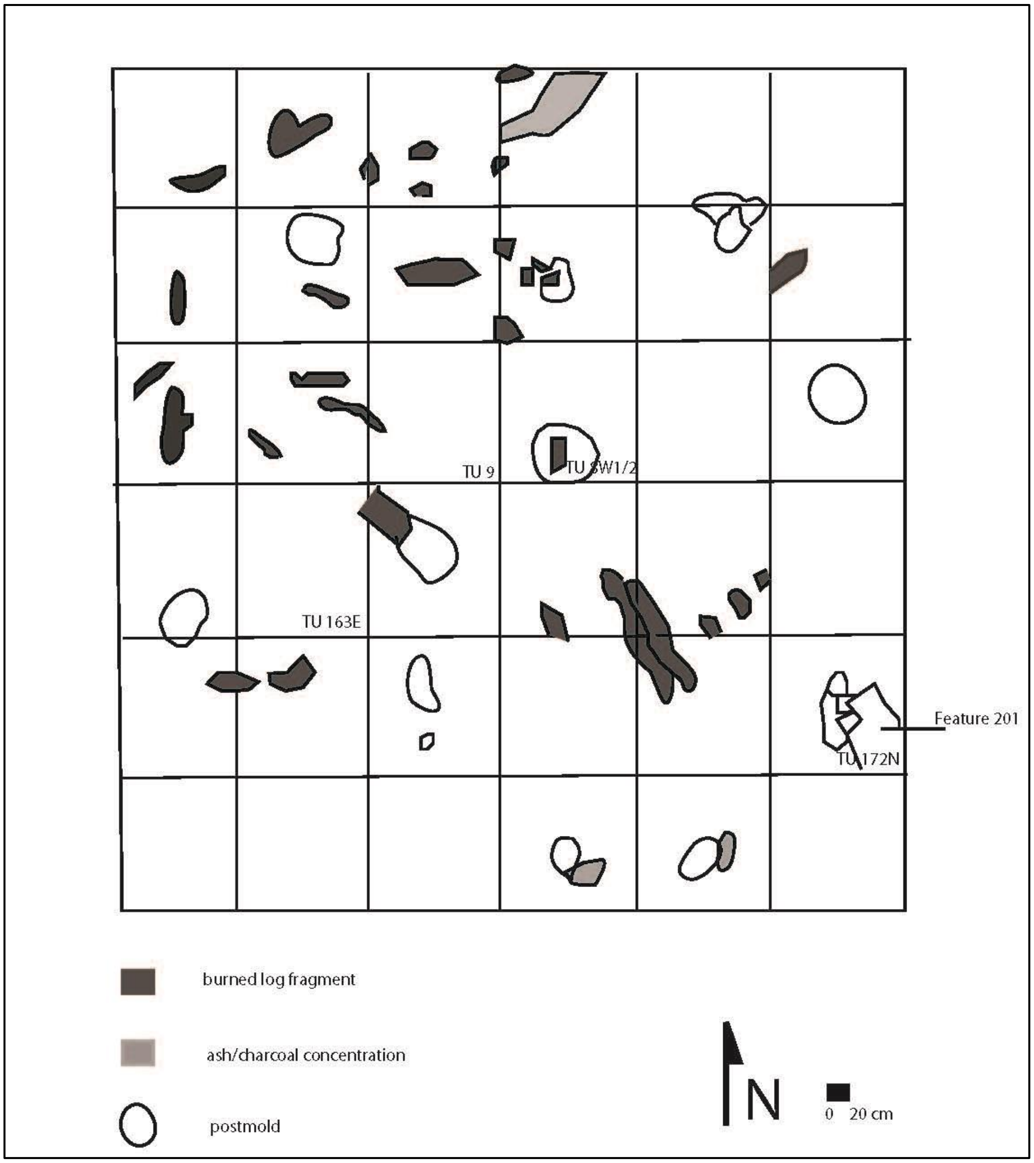

Figure 11. Plan view of Block 3, Structure 2 (Meyers 2011:239).

Test Units 18 and 19 (1x2 meters, each) were excavated along the western and southern mound flanks. Data produced by these excavations, in conjunction with geophysical data and radiocarbon dates, have been used to interpret the construction and use of the mound (Meyers 2011:171). The mound test units showed that mound construction occurred in at least two, but possibly three, levels. Test Unit 19, positioned on the southern mound flank approximately 17 meters south of the mound summit center, produced evidence of a pre-mound structure, Structure

5. The evidence for the structure consisted of three postholes in Zone 3 and one in Zone 4. The presence of shell bead production in this area is suggested by the presence of numerous gastropod shells in Posthole 1 (Meyers 2011: 166) and cut mussel shell from Posthole 2 (Meyers 2011:169). Other architectural debris recovered from these postholes includes charcoal and daub.

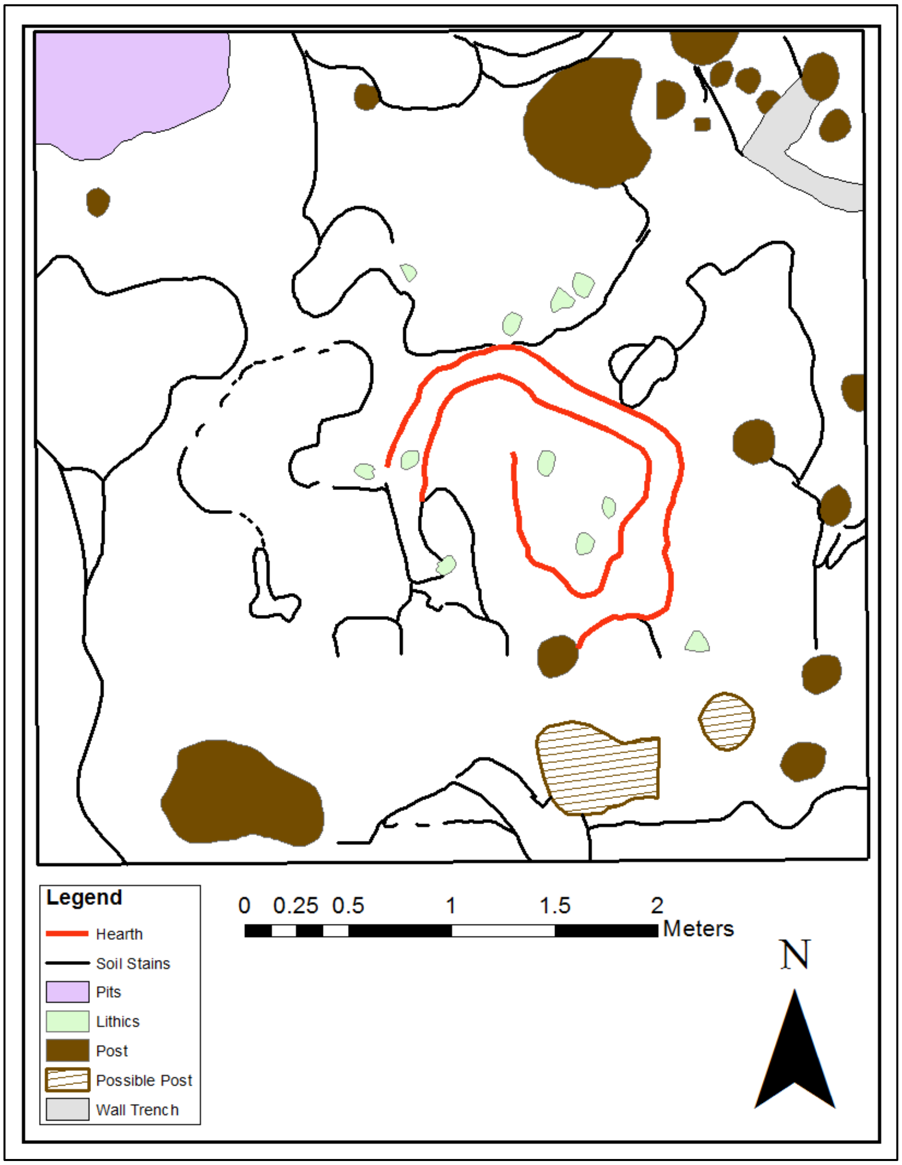

Figure 12. Plan view of Block 4 excavation.

Block 4 was located approximately 90 meters directly south of the mound and comprised an area of approximately 16 meters^2. Within Block 4, a portion of Structure 6, structure with a central hearth and interior support posts, was uncovered (Figures 12 and 13). A total of 30 features were excavated, including an associated midden and hearth. Recent analyses (Capps 2018; Warner 2018) demonstrated that this was a domestic structure occupied during the latter part of the early period and throughout the middle period of site occupation.

Figure 13. Plan view photo of Block 4 excavation.

Occupational History Overview

The occupation of Carter Robinson began sometime around A.D. 1275, when a population of Mississippian peoples settled the site. Based on architectural and ceramic data, the origins of these inhabitants are most likely the Norris Basin of Tennessee (Meyers 2011). They may have moved to this hinterland region to increase their access to or control over the movement of resources such as cannel coal and shell. Over time, traded items grew to include shell beads and possibly salt. Several structures were built in this first period of occupation, including one (Structure 5) located in the area that would become the mound, Structure 3, and possibly Structure 2. Within approximately the next 25 years, Structure 5 was gone and the mound was in its place. The mound was built primarily in one stage, but a second stage was added between A.D. 1300-1325. The results of geophysical survey suggest that after this second stage of mound construction, a structure and ramp were likely placed on the mound summit and eastern flank, based on geophysical survey results. The development of the plaza most likely occurred around the time of mound construction, based on the absence of occupation in this area from the shovel test results. Structure 3 was abandoned shortly after the mound was constructed. Structure 2 burned and was sealed by a yellow clay cap before another structure was built in the same location. Structures 1 and 4 were built closest to the mound at about the same time that the second mound stage was added. The periods of site occupation referenced throughout the remainder of the text consist of the early period (A.D. 1250-1300), the middle period (A.D. 1300-1350), and the later period (A.D. 1350-1400).

Labwork

Following washing and initial sorting, all of the artifacts from each provenience were separated into lots (i.e., ceramics, lithics, daub, shell, etc.) and each lot was given a successive catalog number. Each lot was bagged and grouped, under their respective proveniences. For this thesis, all potential stone discoidals (i.e., disc shaped and bearing evidence of pecking, grinding, polishing, and/or engraving) were given their own catalog number and they were pulled for special analysis; these analysis methods are detailed below. Potential stone discoidals were identified by the presence of production evidence such as peckmarks, grinding striations, or a polished and/or engraved surface. Additionally, possible stone discoidals should be disc-shaped, have a relatively consistent thickness and exhibit a plano-convex cross-section. The production stages outlined below were developed through observations of the artifacts and informed through ethnographic accounts of ground stone tool production (Adams 2002; Best 1974; Dickson 1981; Hampton 1999; Kowta 1980; Kozak 1972; Runnels 1981; Toth et al. 1992).

Pebble Blank Acquisition

Before the production of any artifact may begin, the raw materials used in production must be procured. At Carter Robinson, tabular sandstone pebbles and cobbles are readily available in local streambeds, including surrounding tributaries, and they may also be found on the surface and in the soils of the surrounding hills and valleys. Located immediately south of Cumberland Mountain, Carter Robinson straddles the Cumberland Plateau physiographic region to the north and west and the Valley and Ridge physiographic region to the south and east. Geological formation processes and differential rates of erosion have resulted in the rugged, southwest-to-northeast trending topography and high elevations existing today (Jurney 1953:4; Miller and Fuller 1954:192; Nolde 1992:1-7). Rock types that are more resistant to weathering, such as sandstone, compose the spines of ridges while the more level areas at lower elevations are underlain by rock types that are highly susceptible to weathering, such as limestone and shale (USDA 2016:2). Soils in the vicinity of Carter Robinson are formed from colluvium of sandstone and shale. Thus, weathered sandstone tablets are highly accessibly across the landscape (USDA 2016:54, 138-141). Ideally, the stones selected for discoidal production should have a roughly circular shape, be of consistent thickness, and exhibit a plano-convex cross-section.

Stage I: Pecking and Flaking

After selecting an appropriately shaped, tabular stone of the right size and possessing cortex on all sides, the first stage in the production of stone discoidals involved a process known as pecking. Pecking involves the use of a hammerstone to crush the edge or surface of an object (Adams 2002:41-42; Dickson 1981:37; Kowta 1980:10; Kozak 1972:19; Runnels 1981:256). The purpose of pecking is to roughly shape stone artifacts. In many ways, pecking is very similar to percussion flaking that is utilized in the production of chipped stone tools. In fact, pecking and flaking may best be conceived of as two points along a percussion impact continuum as the dichotomy between ground and flaked stone artifacts is one created by archaeologists (Adams 2002:42; Bradbury and Carr 1999; Shott 1996; Sutton and Arkush 2009:75). The primary difference between flaking and pecking deals with the amount of force and the angle at which it is applied. Pecking requires the application of less force than flaking and utilizes a short-distance, oblique stroke that alters the contact surface through the creation of small impact fractures that are more uniformly distributed than those created by flaking (Adams 2002:42). In effect, pecking crushes or crumbles whereas flaking produces more discreet, formal debris (Kozak 1972:19). Pecking is used to remove unwanted material and to acquire a roughly symmetrical preform of the proper size and shape. Pecking and flaking can be identified by the presence of impact fractures, the scars left after the removal of chips/flakes (Kowta 1980:15), or simply by absence of cortex on an otherwise cortical stone.

Stage II: Grinding

The next stage in the production of stone discoidals is grinding the pecked and flaked edges of each preform. This process serves to remove the divisions between flake scars and thereby refine the disc shape of the stones while also creating a continuous rolling surface. Grinding is accomplished by rubbing the edge, or rolling surface, of each stone disc in a reciprocal, back-and-forth motion on an abrasive implement such as a sandstone slab, which may be lubricated with water (Best 1974; Dickson 1981:151; Hampton 1999:93; Toth et al. 1992). This could be accomplished by holding the disc preform in the hand and rotating slightly after each pass on the abrader. Evidence of this process is present in the form of parallel striations located along the rolling surface of stone discoidals in addition to the abraders themselves. This is also the stage where a beveled rolling surface would be formed.

Stage III: Polishing, Decorating, and Perforating

The final stage of stone discoidal production entailed polishing, and, in some cases, engraving and perforating the artifacts. Polishing requires very fine-grained abrasive action and leaves little to no physical byproduct other than the polished surface on the stone discoidal. The act of polishing creates what is known as tribochemical wear that is the result of complex physical and chemical interactions between the two sliding surfaces (Adams 2002:31). The visible sheen, or polish, is actually a buildup of oxides and residues, otherwise known as reaction products, that are generated as a result of tribochemical wear (Adams 2002:31-33). Among the indigenous Héta of Brazil, grinding and polishing was accomplished in tandem through the use of a lubricating solution of clay and water (Kozák 1972). Similarly, Hampton (1999:93) notes that among the Dani of Papua New Guinea "water is almost always used to lubricate the grindstones and to help create a grinding paste with eroded particles from the grinding rock." The processes of polishing leaves little to no evidence in the archaeological record and is therefore only known through ethnographic analogy or inference based on the finish observed on an artifact. In some instances, stone discoidals produced at Carter Robinson may not have required much polishing due to the cortical nature of the raw material used.

Roundness Index

In addition to macroscopic identification of production stages, a Roundness Index (RI) was calculated for each stone. To calculate the roundness index of each stone discoidal, each artifact was photographed and processed in ArcGIS. Before describing the GIS methods used, I briefly describe the proposed roundness index and how it may be useful in describing stone discoidal production stages.

Logically, as a stone discoidal proceeds from raw, unmodified material to its finished form, the stone will gradually approach a more perfect circle. Stage 1 pecking leaves facets along the edge of the artifact and these facets are easily recognizable by the naked eye. Stage 2 grinding removed these facets and generally perfected the disc-shape. Stage 3 polishing and decorating had a very minor effect on the roundness index of a stone discoidal. Thus, the roundness index between Stage 1 and Stage 2 stone discoidals should differ noticeably whereas the difference between Stage 2 and Stage 3 should be less extreme. The roundness index is defined as the ratio of the area of a stone discoidal to the area of the minimum circumscribing circle. The Minimum Circumscribed Circle (MCC) is the smallest perfect circle that completely encompasses the outline of each stone discoidal. How the roundness index is calculated in ArcGIS is described below.

GIS Methods

The goal of this study is the identification and description of the production of stone discoidals at Carter Robinson. However, a further goal is the identification of the spatial patterning of this production and how it compares with previously identified evidence of craft production at Carter Robinson. Geographic Information Systems software ArcGIS 10.3 was used to help quantify the roundness of discoidals at different points along the production trajectory. In the following section, I describe the protocols for data collection, which involves the digitization of the artifact outlines, calculating the centroid, the use of the Minimum Bounding Geometry tool in ArcMap, and the comparison of the areas of each artifact to the area of the MCC.

Discoidal Digitization

As described above, a finished stone discoidal should approximate a perfect circle. Early stage production failures and rejects ought to be significantly less round than later stage examples. To measure how closely each stone discoidal approximates a perfect circle, the first step involves converting their outlines to vector data. A digital single-lens reflex camera (model Nikon D60) was used to photograph the artifacts. All photos were taken at a focal length of 55mm and saved in JPEG format with an image size of 3872 x 2592 pixels.

Next, a topological geodatabase for each artifact was created in ArcCatalog. A File Geodatabase was utilized (as opposed to a Personal Geodatabase) because they are capable of measuring topological relationships. Two feature datasets are located within each File Geodatabase: one for the stone discoidal outline, and one for the minimum bounding geometry data. Within the stone discoidal dataset there is a Feature Class for the actual digital outline of the discoidal.

After creating the necessary database structure, a raster file of each artifact was imported into ArcGIS 10.3. Each artifact was digitized in their own MXD file but the process was identical for all. The data frame was first cleared of all spatial reference (e.g., datum, projection, etc.) information as this analysis was not geographic. Additionally, the units of measurement for each data frame was set to centimeters. Before digitization could begin, each artifact was georeferenced using the photographic scale. The (X, Y) coordinates for the beginning of the scale (i.e., left-hand side) were identified as 0, 0 while the coordinates for the end of the scale were identified as 10, 0. By georeferencing the artifacts in this way each MXD file was scaled the same.

Next, the outline of each artifact was digitized manually. After completely digitizing each artifact, the centroid, the geometric center of a polygon, was calculated using the calculate geometry tool in the attribute table. Knowing the centroid of each polygon enables optimally superimposing each discoidal with a common reference point (i.e., the geometric center), which is useful in certain geometric shape analysis techniques. As mentioned above, the roundness index is calculated by comparing the ratio of the area of a given stone discoidal to the area of the minimum circumscribed circle for that artifact. The minimum circumscribed circle is a smallest circle that will completely encompass the outline of a given shape. Essentially, this ratio of areas measures how close each stone discoidal is to a perfect circle. Arctoolbox contains a Minimum Bounding Geometry tool in the Data Management Tools toolbox under the Features dropdown list. To create a minimum circumscribed circle, the input data consisted of the digitized stone discoidal outlines. The resulting feature enabled the comparison of the ratio of the area of the artifact outline with the area of the minimum circumscribed circle, which is the roundness index of each artifact.

Spatial Analysis

The production of stone discoidals left archaeological signatures in the form of production debris, production tools, and the discs themselves. To investigate all potential evidence of stone discoidal production, the provenience of each discoidal was cross-referenced with the artifact catalog. An attempt was made to identify co-occurrences of stone discoidals and production debris and tools. Production debris and tools consist of sandstone debitage, hammerstones, and abraders. If any of these items were recovered from contexts in close association with stone discoidals, they were visually inspected. These spatial patterns were then related to craft production evidence from across Carter Robinson.

Conclusions

I have proposed a three-stage production trajectory for stone discoidal production at Carter Robinson. Although production needs differ by the raw material being used, the three-stage trajectory is supported by ethnographic research, experimental archaeology, and other ground stone artifact studies. The Roundness Index proposed herein was calculated in GIS and is used to explore the relationship between stone discoidal production stage and artifact roundness, in an effort to quantify roundness. I conducted a basic spatial analysis by comparing the horizontal and vertical locations of stone discoidal recovery with the location of other craft goods and tools. The methods described in this chapter were used to identify how stone discoidals were produced and how this production was organized across space and over time at Carter Robinson. The results of these methods are presented in the next chapter.

CHAPTER V: RESULTS

This chapter presents results of the analysis of the stone discoidals, and specifically includes a GIS assessment of roundness, and the spatial and temporal distribution of stone discoidals. The collection of stone discoidals from Carter Robinson is small (n=13) but it is sufficiently diverse to reveal the entire production trajectory. The GIS analysis quantifies roundness to test the hypothesis developed in Chapter 3 that finished stone discoidals will more closely approximate a perfect circle than early stage failures, production rejects, and discoidals that were simply left unfinished. Analysis of the spatial distribution of stone discoidals will enable discussion of the organization of production and how this activity changed over time.

Macroscopic Analysis

In this macroscopic analysis of stone discoidal production stages, each discoidal was classified based on the presence of peckmarks, grinding striations, polish, the presence of perforations or other engraving marks, and their level of roundness. Visual inspection assisted by a 10X magnification lens was used to identify this evidence of production, and if possible, stages of production. Of the stone discoidals recovered from Carter Robinson, 77 percent (n=10) are sandstone, 15 percent (n=2) are hematite, and 7.7 percent (n=1) are limestone (Figure 14). All of these raw materials are available locally.

These discoidals range from 22.3-50.15 mm in diameter and 6.9 to 17.6 mm in thickness. The average diameter of the thirteen stone discoidals for which measurements were possible is 33.52 mm. In the following sections, I explain how stone discoidals were identified, review the roundness index, and present the characteristics used to identify each stone discoidal production stage.

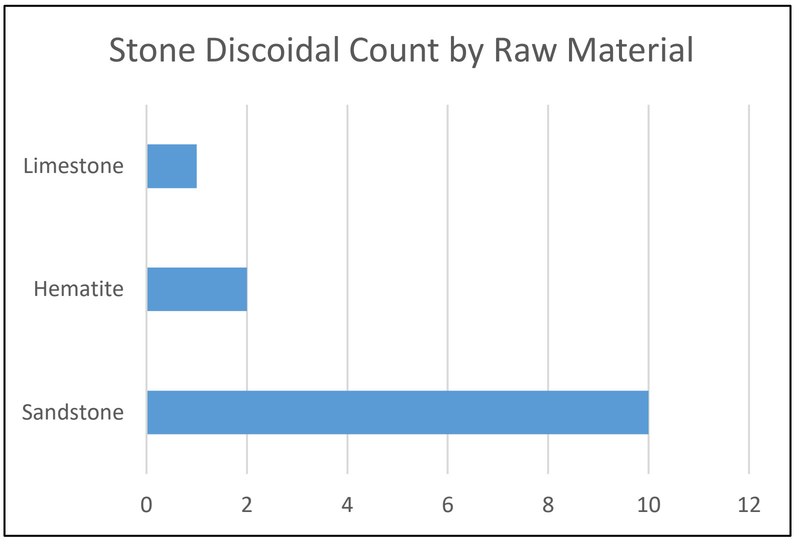

Figure 14. Count of stone discoidals by raw material.

Stone Discoidal Identification

At the beginning of this project, a total of 95 stone artifacts had been tentatively identified as actual or possible stone discoidals, stone discoidal blanks, or fragments. After multiple cleanings and visual inspection of all the specimens, it was determined that all but thirteen were either unmodified rocks that had weathered naturally to produce a rounded shape and water-worn cortex, or they were portions of other types of ground stone artifacts like manos or hammerstones. Many of the artifacts tentatively identified as stone discoidals did not meet the right criteria in terms of shape or size. In other words, they were simply disc-shaped rocks that lacked evidence of pecking/flaking, grinding, or polishing. In instances where the artifact was a fragment of some other ground stone artifact, the artifacts were too fragmented to confidently assign any type of function or purpose. A small fragment of a metate will possess some of the same attributes (e.g., grinding striations) as stone discoidals. It is sometimes not possible to distinguish between small fragments of ground stone artifacts. For this reason, this analysis only considered the stone discoidals that possessed a disc shape and showed evidence of pecking or flaking along the periphery, grinding, and/or polish. The primary means of early stage stone reduction for the stone discoidal artifacts is pecking and/or flaking, evidence of which is easily distinguished from the unmodified surfaces of water-worn pebbles. Water-worn pebbles and cobbles will exhibit an essentially smooth cortex and should show no patterned battering or grinding. Some raw material such as sandstone is more readily flaked than material like limestone. Pecking and flaking are essentially the same action when using a hammerstone to batter the edges of a rock into a rough disc preform. But when using pecking/flaking to remove material from the edge of a sandstone discoidal preform, actual flake scars may result if the sandstone is very fine-grained or well-cemented.

Three types of data were used to identify stone discoidals: 1) the presence of pecking or flaking along the edges; 2) the presence of grinding along the edges; and 3) at least one of the following: the presence of polished surfaces, the presence or absence of drilled center holes, and the presence or absence of engraved faces (Table 2). For an in-depth discussion of the difference between flaking and pecking, and how they may be identified in archaeological contexts, please see Chapter IV.

To identify evidence of production, I used the most readily available means: my visual and tactile senses. First, I moved my fingers along the surfaces of the stones, looking for differences in texture. Following Adams (2002:273), "texture is a relational construct that describes a tool's surface. It is tactile and perceptible as smooth, rough, and so on." This construct does not refer to how coarse or smooth a raw material is because a coarse-grained material may be rubbed smooth and a fine-grained material may be made rough. The concept of *asperity* is important when discussing surface textures. Following Adams (2002:269), "asperity is a combination of material granularity and surface texture, and is influenced by material durability." Thus, coarse-grained materials naturally have more asperity than fine-grained materials, but the durability of either type of material is what determines whether the alteration leads to more or less asperity (i.e., more or less smooth texture). A relatively smooth texture is the natural outcome of physical weathering when a stone has been transported down a streambed. The generally smooth outer layer of water-transported rocks is known as the *cortex*. A rough texture on the cortex indicates some sort of physical alteration of the surface, either through natural or human-made action. When this difference in texture occurs naturally, such as in a stream, the rough textures will not be patterned and generally will only affect a small surface area. As a stone moves downstream, it will occasionally impact other, possibly larger and/or harder stones, and leave small impact fractures. Similarly, when moving downstream the action of small particles like sand may leave traces of abrasion that look similar to grinding striations on ground stone. If a

Table 2. Production Evidence

Cat. No.	Peckmarks	Striations	Finishing
1838	X		
2809	X		
1305		X	
5223		X	
2918	X	X	
147		X	
1160			X
498			X
1030			X
547			X
1146			X
628			X
2985			X

stone was being worked into a discoidal preform, then the altered texture should generally cover the entire surface or at least the entire edge of the disc.

Second, flakescars, peckmarks, grinding striations, polish, perforations and engravings were illuminated under intense light. The use of a hand-held 10x magnifying glass greatly assists in the identification of patterned striations versus random or natural lines or grooves in the rock. Light will cast shadows from inflection points, which reveals flakescars and peckmarks, but it will also reflect off polished surfaces.

Before beginning stone discoidal production, an appropriately sized and shaped raw stone material must be selected. An appropriately shaped stone would be one that is of consistent thickness, possesses flat to convex faces, and is roughly circular in shape. After acquiring the raw stone, the first stage of production requires pecking and flaking to remove unwanted material and to acquire a roughly symmetrical preform. Below I outline how the physical evidence of production on stone discoidals was used to interpret production stages.

Both pecking and flaking require the use of a hammerstone to remove unwanted stone material. Pecking uses less force, and a short-distance, oblique stroke that alters the surface of a rock through the creation of small impact fractures that are more uniformly distributed than those created by flaking (Adams 2002:42). Flaking, on the other hand, uses a more forceful blow that removes discreet chips, or flakes, from the object one wishes to alter. In effect, pecking crumbles rock where flaking produces discreet, formal flake debris. Although pecking and flaking sometimes produce discreet differences, they are best thought of as two points at either end of a percussion impact continuum, because the dichotomy between pecking and flaking of stone artifacts is one created by archaeologists. Flaked stone technology generally requires some pecking, and pecked stone artifacts may at times require flaking.

The second set of evidence is grinding. Grinding serves to smooth pecked surfaces and remove the divisions between flake scars. Grinding may be accomplished in several ways, but I will limit this discussion to the methods relevant to stone discoidal production at Carter Robinson. Crafters there likely held the disc preform in-hand and rubbed the edge in a reciprocal, back-and-forth motion on an abrasive implement such as a large sandstone slab or hand-held sandstone abrader. This was most likely accomplished by holding the discoidal preform in the hand and rotating it slightly after each pass on the abrading element. What this action leaves behind is patterned, generally parallel, striations along the edges of the discoidal.

Finishing touches on stone discoidals consist of polishing and sometimes perforating or engraving the object. Polish is somewhat difficult to identify in archaeological contexts because it involves very fine-grained abrasive action that leaves behind little or no evidence other than the polished surface itself. Polishing creates tribochemical wear that is the result of complex physical and chemical interactions between two sliding surfaces (Adams 2002:31). The residual sheen, or polish, is a buildup of oxides and residues that are generated as a result of the tribochemical wear. To some degree, grinding and polishing may even occur at the same time, because grinding the eroded particles of the rock results in a fine-grained finish as the grinding action continues. Polish may also develop through use, creating another pitfall in the analysis of ground stone artifacts. Many of the stone discoidals in this sample were produced from water-worn cobbles that did not need to be polished over their entire surface. Nevertheless, regardless of how the polish is produced, the resulting reflective surface is fairly easy to identify. Engraving and perforating are the final acts of production in instances where they occur, and both necessitate the use of a drill, graver, or similar tool. Identification of these activities is relatively straightforward. At Carter Robinson, perforation was accomplished bilaterally, with each face of the discoidal being drilled into separately by a stone drill or similar implement. The resulting perforation is biconical, or biconvex, in cross-section and runs through the center of the discoidal. Similarly, engraving requires the use of a sharpened stone edge to cut lines into the surface of the discoidal.

Roundness Index

As a part of the macroscopic assessment of production stages, I quantified the roundness of each stone discoidal to examine the relationship between production stage and roundness (Table 3). The RI is calculated by measuring the ratio of the area of the artifact outline to the area of the Minimum Circumscribing Circle (Figure 15). The RI is measured from 0 to 1, with a perfect circle having a score of 1. Based on my RI calculation, the stone discoidal measurements fall into three clusters with some overlap (Figure 16). The smallest diameter stone discoidals cluster between a RI of .82 and .83, clearly separating them from the larger diameter examples. Mid-sized stone discoidals cluster between .87 and .92, while the largest discoidals cluster between .91 and .97. Clearly, there is a degree of overlap between the mid-sized and largest discoidals, but this may not be surprising when considering that the size and shape of discoidals are essentially perfected by late stage production. Thus, discoidals in RI size range of .82 to .83 are Stage 1, .87-.92 are Stage 2, and .91-.97 are Stage 3.

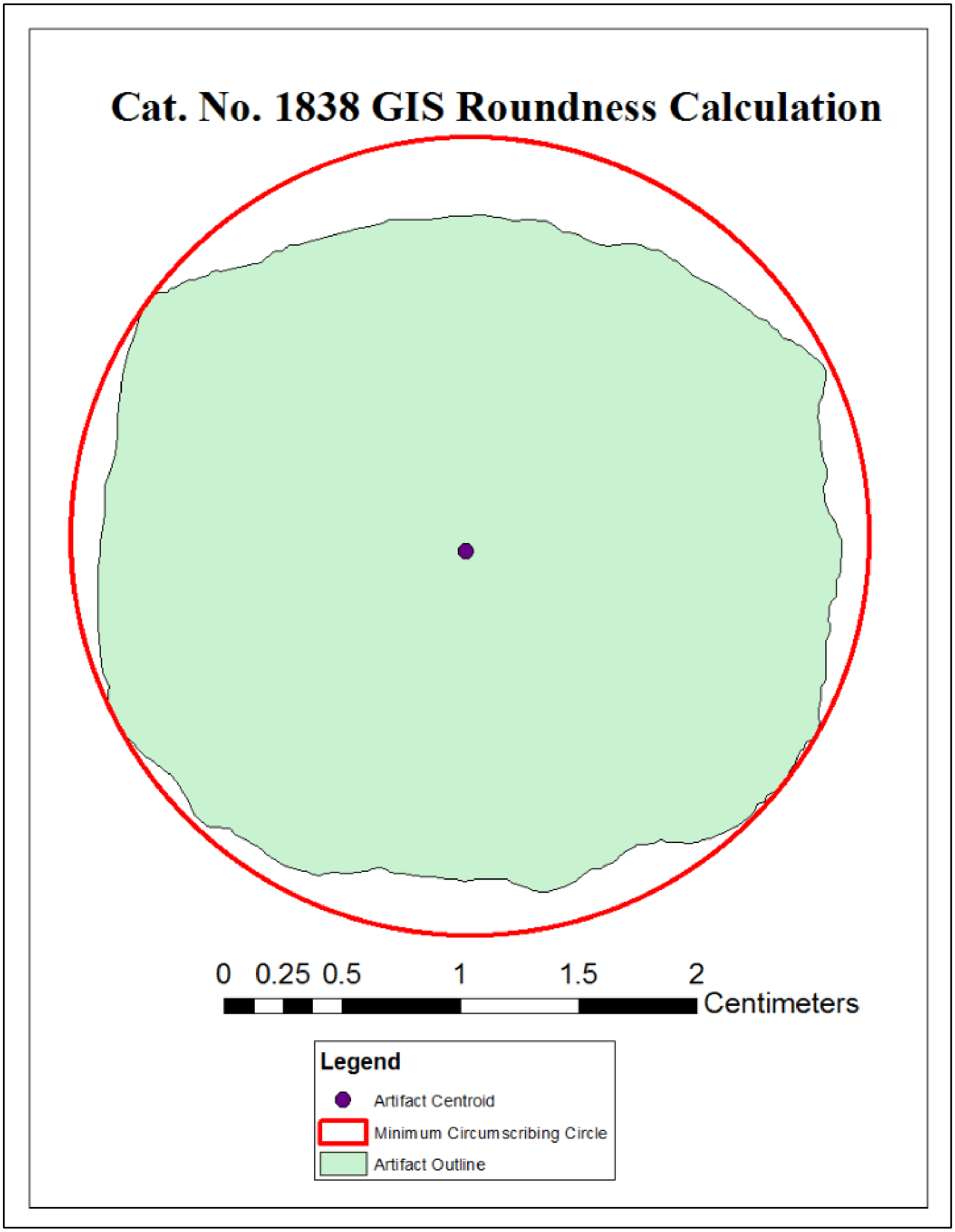

Figure 15. Example of how Roundness Index was calculated in ArcGIS.

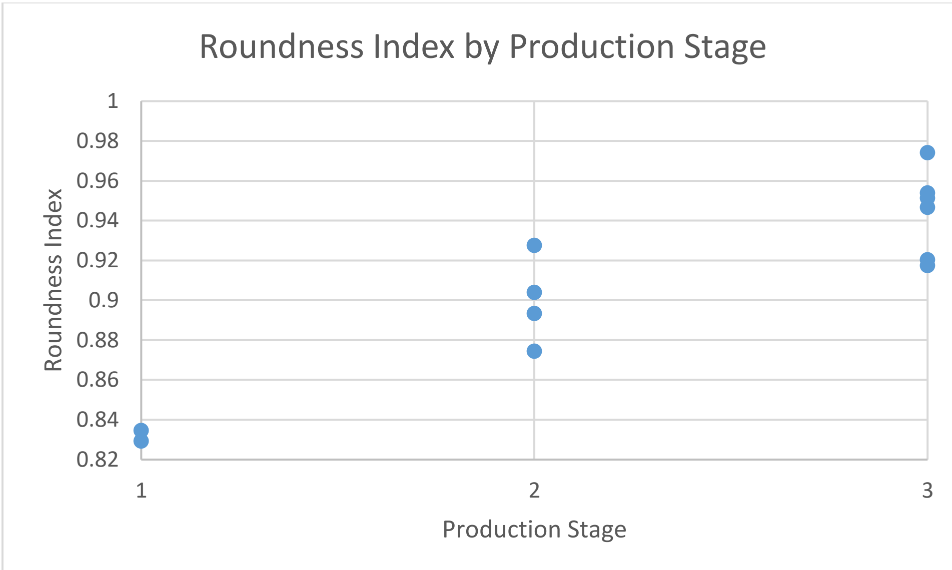

Figure 16. Scatter plot of stone discoidal diameter.

Table 3. RI Variation	
Cat. No.	**Roundness Index**
1838	0.829175
2809	0.834468
1305	0.874436
5223	0.893316
2918	0.903873
147	0.927471
1160	0.917362
498	0.920267
1030	0.946658
547	0.951237
1146	0.953931
628	0.974053
2985	NA

Stage 1

Based on the presence of peckmarks and the roundness index of .83 or less, two stone discoidals have been identified as examples of production Stage I (Figure 17 and Table 4). Both are made of sandstone pebbles that may have been acquired from the stream that flows adjacent to Carter Robinson or other nearby streambeds, but no sourcing data currently are available. These artifacts bear telltale peckmarks and flakescars along the periphery of each disc and they represent unfinished artifacts that were possibly production rejects. Production rejects may be defined as "artifacts which fell out of the production trajectory due to some fault in material or workmanship" (Johnson 1981:43). It is unclear why these stone discoidals were left unfinished; maybe they became too asymmetrical during reduction to achieve the desired end product or perhaps they were simply left unfinished. Below is a detailed description of each of the two Stage 1 stone discoidals.

Figure 17. Stage 1 stone discoidals.

Table 4. Data on Stage 1 stone discoidals from Carter Robinson.				
Catalog Number	**Maximum Width (mm)**	**Maximum Length (mm)**	**Thickness (mm)**	**Roundness Index**
1838	28.3	32.4	12.9	.8291748
2809	32	36	17.6	.834468

Discoidal Catalog Number 1838

This artifact (Figure 12, left) is an excellent example of a Stage 1 discoidal. It is made of sandstone with a roughly hexagonal outline and flat faces. Semi-conchoidal fractures are visible along the edge. It is relatively small with an average diameter of 30.35 mm. Cortex is present on both faces only, while the cortex on the edges has been removed by flaking. Pecking and flaking of this discoidal likely resulted in the object becoming too small while still not coming close enough to an ideal circle to finish.

Discoidal Catalog Number 2809

Discoidal number 2809 (Figure 12, right) is another nice example of a Stage 1 stone discoidal. It is made of relatively fine-grained sandstone with a generally four-sided outline and plano-convex faces. Semi-conchoidal fractures are visible along the edge. The average diameter is 34 mm. Cortex is present across both faces and a portion of the periphery. This discoidal was likely abandoned early in the production process because its size was too greatly reduced to ensure sufficient material to grind into a more ideal circle.

Stage 2

Stage 2 stone discoidals are identified by the presence of parallel striations from grinding along the periphery and faces as well as a RI between .87 and .92 (Figure 18 and Table 5). As the second stage of production progresses, grinding striations should eventually obliterate all evidence of pecking/flaking performed during the first stage of production. Table 5 presents the minimum, maximum, and average diameter, and thickness for the Stage 2 discoidals recovered to date from Carter Robinson.

Based on the presence of grinding striations and the roundness index, a total of four stone discoidals were identified as examples of the second stage of production. All Stage 2 discoidals were made from sandstone pebbles that may have been acquired from the stream that flows adjacent to Carter Robinson or other nearby streambeds. After Stage I pecking, these water-worn stones were ground along the edge to more precisely achieve their circular shape and to remove the peckmarks. Although these stone discoidals are not completed and their shapes are not necessarily representative of the shape desired by their producers, these artifacts all possess plano-convex faces.

Figure 18. Stage 2 stone discoidals from Carter Robinson.

Table 5. Data on Stage 2 stone discoidals from Carter Robinson

Catalog Number	Maximum Width (mm)	Maximum Length (mm)	Thickness (mm)	Roundness Index
1305	37.1	39.3	14	0.8744359
5223	29.7	30.7	8.6	0.893316
2918	38.1	40.4	15.1	0.9038729
147	36.4	38.2	15.2	0.927471

Discoidal Catalog Number 1305

Discoidal 1305 is made of a poorly-cemented, grainy sandstone; has a roughly circular outline; and has one convex face and one concave face. The granular nature of the raw material makes the identification of grinding striations impossible, but the lack of obvious flakescars or peckmarks coupled with the RI of .87 indicates that this stone has been ground after being shaped through Stage 1 percussion. Cortex is present on the faces only. Imperfections in the raw material or the inability of the producer to deal with the coarse texture of the stone likely led to this discoidal being rejected during the grinding stage of manufacture.

Discoidal Catalog Number 5223

This discoidal is made from fine-grained sandstone, has a circular outline and possesses two flat faces. Similar to Discoidal Catalog Number 1305, clear grinding striations are difficult to identify. However, the lack of percussive fractures and the RI both support the Stage 2 identification. Two divots in the outline of the object may have resulted in the abandonment of this stone discoidal, but ultimately this artifact was abandoned or left unfinished for unknown reasons.

Discoidal Catalog Number 2918

Discoidal 2918 is made of very fine-grained sandstone, has a circular outline and flat, cortical faces. Additionally, one face is slightly larger in diameter than the other, suggesting it may have been intended as one of the beveled-edge types of stone discoidals. As discussed in Chapter 2, a very similar game to chunkey required beveled stone discoidals to be rolled along alleyways with individual partitions at the far end. Scoring was accomplished by curving a discoidal into one of these compartments. This form of the game was documented archaeologically in northern Georgia (Colburn 1936; Wauchope 1966) and Swanton (1946:684) described a similar game that Creek Indians played with spherical stones rather than discs. This artifact is potentially the most significant stone discoidal in this study in terms of what it demonstrates about production because it is clearly intermediary. There are very clear conchoidal flake scars around the entire edge, but they show obvious grinding striations, making this a clear example of an early Stage 2 failure or reject. This artifact may have been rejected as the two faces became asymmetrical and this was not the intended form. It is also possible that this stone discoidal was intended to be finished at a later date and it was simply forgotten or lost.

Discoidal Catalog Number 147

Discoidal 147 is made of well-cemented sandstone, has a circular outline and possesses two flat faces. The rock used to make this discoidal was clearly chosen for possessing the proper shape (e.g., plano-convex faces, generally circular outline and consistent thickness) and the material was locally available. This is further evinced by the fact that cortex is present across approximately 50 percent of the edge, meaning that only half of the stone's edge needed modification through percussion. Why this stone discoidal was not completed is unclear.

Stage 3

Stage 3 stone discoidals are polished and sometimes perforated and/or engraved (Figure 19). Polishing requires very fine-grained abrasive action and generally leaves no physical evidence other than the polish itself or perhaps a stone slab on which the polishing was performed. Perforating and engraving necessitate the use of a drill, graver, or similar tool. Chert drills and gravers are plentiful at Carter Robinson, but no formal use-wear analysis of the sort required to identify tools used in crafting stone discoidals has been performed on the site assemblage. Table 6 presents the minimum, maximum, and average diameter, and thickness for the Stage I discoidals recovered to date from Carter Robinson.

Based on the presence of polish, perforation, engraving, and a RI between .91 and .97, a total of seven stone discoidals were identified as finished. Of these, four are made of sandstone, two of hematite, and one of limestone. The limestone discoidal is approximately one-quarter of a full disc and is the only biconcave stone discoidal from Carter Robinson. This is significant because of the three defined types of biconcave stone discoidals (Perino 1971). One, the Cahokia type, is considered to be the classic form of Mississippian chunkey stones (DeBoer 1993; Pauketat 2004) while the other two are biconcave types associated with Woodland cultural traditions. Although incomplete, the base of the concavity is pointed and the concavity rim, which runs along the entire circumference, is relatively wide and flat.

Figure 19. Stage 3 stone discoidals from Carter Robinson.

Table 6. Data on Stage 3 Stone Discoidal from Carter Robinson

Catalog Number	Max Width (mm)	Max Length (mm)	Thickness (mm)	Roundness Index
1160	33.9	34	15.2	.917362
498	21.8	22.8	6.9	.920267
1030	49.4	50.9	10.2	.946658
547	23.1	23.7	8.6	.951237
1146	28.5	29.8	10.3	.953931
628	33.4	33.9	12.2	.974053

Discoidal Catalog Number 1160

Discoidal 1160 is one of the finest examples of a stone discoidal from Carter Robinson. This artifact is made of hematite, is circular in outline, possess a central perforation that gives the faces a biconcave appearance, and bears a cruciform engraving on one face. The central perforation measures between 7.8 and 9.2 mm in diameter. The cruciform engraving actually contains five engraved lines that radiate out from the central perforation. This may indicate that many lines were intended to radiate outward from the center of the discoidal but were never put in place. Or, alternatively, the fifth line may have been accidental as the number four has numerous ritually significant connotations. The opposite face has a fine polish across the entire surface except in the area where a chip was knocked off. The surface of the chipped area is weathered, and the stone was recovered from below the plowzone, indicating that the chip occurred prehistorically, perhaps during use. As a final note on this artifact, a small, fossilized gastropod shell is completely exposed along the finished outer edge, or rolling surface. The fossilized shell is intriguing because it could have easily been obliterated during the production process. The process of pecking and grinding may have revealed the fossil or perhaps this attribute of the raw material made it more appealing to the producer for its potential symbolic potency. The symbolism regarding the craft production of shell beads at Carter Robinson is fascinating to consider.

Discoidal Catalog Number 498

This small stone discoidal is made of fine-grained sandstone and is only slightly larger than a nickel. The entire surface area of the artifact is polished, but minor variations in thickness give it a somewhat uneven appearance. With a diameter of 22.3 mm, this is the smallest stone discoidal in the collection. Although it has polish across the entire surface area, the small size of the artifact does seem to preclude it having been heavily used in a game under the chunkey umbrella. Perhaps it served more as a symbolic token. Whatever the case may be, it was either lost, discarded for an unknown reason, or simply forgotten.

Discoidal Catalog Number 1030

Discoidal 1030 is the largest stone discoidal from Carter Robinson, but it has been split in half leaving only one face present and intact. It is made from sandstone with different colored layers clearly visible on the remaining face, which is somewhat convex. This artifact exhibits a cruciform engraving on one face similar to that of Discoidal 1146. This engraving is more of an "X" shape rather than a true cross as the lines do not intersect at a 90-degree angle. Only one of the engraved lines is completely visible. Half of the other line has been obliterated by a surface chip. The surface of this chipped area is heavily weathered, and the artifact was recovered from the floor of Structure 2, indicating that this chip occurred during site occupation. This chip in conjunction with the missing half of the discoidal is possibly evidence of its use in a game like chunkey. This artifact is split along the bedding plane and therefore missing one entire face which could mean that the event that led to this occurred during game play. Another possibility is that these attributes were the result of ritually "killing" the object. Perhaps it was purposefully disabled before being interred in the structure before abandonment of the structure or site in a closing ceremony of sorts. Other than the missing face and chip, this discoidal is highly symmetrical.

Discoidal Catalog Number 547

Discoidal 547 is the one of two stone discoidals made of hematite. The disc is symmetrical, and the outline is circular. A polish sheen is clearly visible across the entire surface area of the discoidal, but the pitted nature of the raw material has resulted in unpolished crevices. As is the case with Discoidal 498, this stone discoidal is very small (diameter of 23.4 mm) and would have been difficult, if not impossible, to use in an adult-level version of chunkey. That it is made from hematite is interesting. Hematite as a raw material would be an ideal choice for a chunkey stone because of its hardness. It would have possibly withstood actual game play better than other raw material types, and the color red held powerful connotations for both Pre-Columbian and Historic period tribes (Hudson 1976).

Discoidal Catalog Number 1146

Discoidal 1146 is made of fine-grained sandstone, is circular in outline and possesses flat faces. Grinding striations are present along the edge surface, or rolling surface, and points to this discoidal being an unfinished Stage 3 example. Some of the striations are perpendicular to the rolling surface, rather than parallel with it, which indicates that it was vigorously ground in a lateral and circular manner. Polish is clearly visible across most of the surface area and the edge between the faces and the rolling surface is sharp.

Discoidal Catalog Number 628

This artifact is another example of a finished stone discoidal. It is made of a fine-grained sandstone, with a very circular outline, flat, cortex-covered faces, and an unequivocal beveled edge. The bevel is not perfect in orientation as it wavers along the midline of the rolling surface, that would have resulted in a wobble from side-to-side while rolling.

Discoidal Catalog Number 2985

This is the only biconcave discoidal recovered to date from Carter Robinson. It is made of white limestone, and, despite only one-quarter of the disc having been recovered, it was very nearly a perfect circle. The biconcave faces are not symmetrical as one concavity is deeper than the other. Following Fowler et al. (1999), the shape of the concavity is an arch rather than one with a flat bottom and steep sides. This most closely resembles the Jersey Bluff type (Perino 1971:114-115), and it is similar to those reported from areas peripheral to the recognized edge of the Mississippian culture area (e.g., Monongahela, Fort Ancient, and Montgomery Focus).

Comparison to Other Stone Discoidals

Stone discoidals recovered from Carter Robinson are on the smaller end of the range of reported discoidal sizes (Bishop 2016; Emerson et al. 1999; George 2001; Reisdorf 2012; Slattery and Woodward 1992; Zych 2017) (Table 7). Bishop (2016) recently reported on stone discoidal production in Late Woodland/Early Mississippian contexts in north-central Alabama. Emerson et al. (1999) describe the stone discoidals from Mound 72 at Cahokia; these are among the largest and most well-made discoidals recorded. George (2001:7) presents metric data on stone discoidals recovered from Monongahela sites in the Upper Ohio Valley. Slattery and Woodward (1992:173-176) synthesize data from several Late Woodland-period Montgomery Focus sites of the middle Potomac River Valley in northeast Virginia and southwest Maryland. Of the 114 reported, only 105 were complete enough to provide data on the range of diameter and thickness. Residorf (2001) reports on Mill Creek stone discoidals from northwestern Iowa. Zych (2017) has been the most productive stone discoidal researcher since DeBoer (1993) called for more concerted efforts to explore stone discoidal variability and the broader cultural implications of the gaming stones. Zych provides metric data on 62 stone discoidals from

Wisconsin, which he refers to as the Western Great Lakes region, but I did not consider those without diameter measurements.

Table 7. Reported Stone Discoidal Size Range

Region	Sample Size	Min. Diam. (mm)	Max. Diam. (mm)	Min. Thickness (mm)	Max Thickness (mm)	Reference
Mill Creek	9	48.73	73.47	17.95	36.9	Reisdorf 2001
Western Great Lakes	54	45.9	137	17	54	Zych 2017
Cahokia	14	70	105	29.5	47.5	Fowler et al. 1999
North Central Alabama	14	33	144	15.5	45.5	Bishop 2016
Monongahela	38	50	100	17	39	George 2001
Southwestern Virginia	12	22.3	50.15	6.9	17.6	
Southwestern Maryland	105	19	114	6	40	Slattery and Woodward 1992

Stone discoidals were made in a variety of shapes and sizes to fit the needs of those who produced and used them, but also as a result of raw material constraints. Historical accounts document significant variation in the rules of the game and the materials used, and archaeological data support similar variation in the pre-Columbian past as well. Large, Cahokia-style chunkey stones have been found throughout the greater Midwest and Southeast, but generally date from the Early to Middle (A.D. 1050-1450) Mississippian periods. At Carter Robinson, stone discoidals are smaller and seem to be more comparable to those produced by Woodland peoples (Bishop 2016; George 2001; Slattery and Woodward 1992). Despite the noted variation in size and shape of stone discoidals, there appears to have been some degree of shared understanding of what objects were needed to play the game and how to play it. In fact, the material side of the game underwent remarkably little change from its inception in the American Bottom, circa A.D. 600, to the time that it was described by outsiders, nearly 1,000 years later.

With regard to the smaller size of the Carter Robinson stone discoidals, I believe it is reasonable that at a less politically centralized frontier polity, such as Carter Robinson, stone discoidals were not produced by specialists, but rather their production was embedded in the daily, or perhaps seasonal, round of domestic activities. That is, craft production, and not specialization, was occurring. As centrally located Mississippian polities expanded outward into frontier zones, cultural contact led to the reimagining of earlier Mississippian ideals by peoples with different histories, who lived at different times and in different environments, and this resulted in changes to material culture, including in stone discoidals (Pauketat 2004; Zych 2017). These stones may not have been produced for use in grand ceremonies that involved entire towns or chiefdoms, or reenacted trials of mythic heroes. Instead these artifacts may have been produced for more recreational or perhaps diplomatic purposes. Gambling on the outcome of games may not have been desirable when trying to ingratiate yourself, or your community, in a new and potentially hostile region. However, it is also true that these smaller-scale gaming events could have served multiple purposes. They could have referenced and recreated past events while at the same time determined the fortunes of individuals or communities in the present and future. It is important to recognize the small size of the Carter Robinson stone discoidals need not diminish their symbolic weight.

Another interpretation of the smallest stone discoidals, and particularly poorly made discoidal examples from Carter Robinson and elsewhere, is that they were intended for use by children or perhaps even produced by them. Although historic accounts suggest that children were not allowed to play most adult games, they did play various miniature, or imitative, versions of games (Culin 1907:31). Although the archaeological signatures of children or novice craftspeople are sometimes considered in the literature (Baxter 2005, 2008; Hirschfeld 2002; Kamp 2001; Lillehammer 1989; Sofaer Derevenski 1994), children are often missing entirely from interpretations of pre-Columbian, Southeastern archaeological remains. This possibility is particularly interesting in the context of Carter Robinson where the newcomer Mississippian group may have helped relax tensions with Radford groups through game play between adults and children alike.

It is admittedly difficult to conceive of the smallest stone discoidals from Carter Robinson being used in the classic game of chunkey. Perhaps these small discs were simply token reminders of the game and what it represented. Or perhaps these small discs were reminders of the great and mythic games, like stories passed down through the generations. Or they may have had been game pieces, such as dice, in entirely different games; or perhaps they served as proxies when counting out goods or trade items.

In an attempt to shed light on the small diameter stone discoidals from Carter Robinson and elsewhere, I examined the distribution of stone discoidal diameter across the seven geographic regions referenced in Table 7. If the small stone discoidals are a separate class of artifacts that are intended for different uses than the larger stone discoidals, the distribution should be bi-modal. But if the artifacts are all of one type then the data should fall within a relatively normal distribution. As you can see in Figure 20, the data have a continuous, nearly normal distribution, suggesting that these data represent one artifact class with the expected degree of variation present.

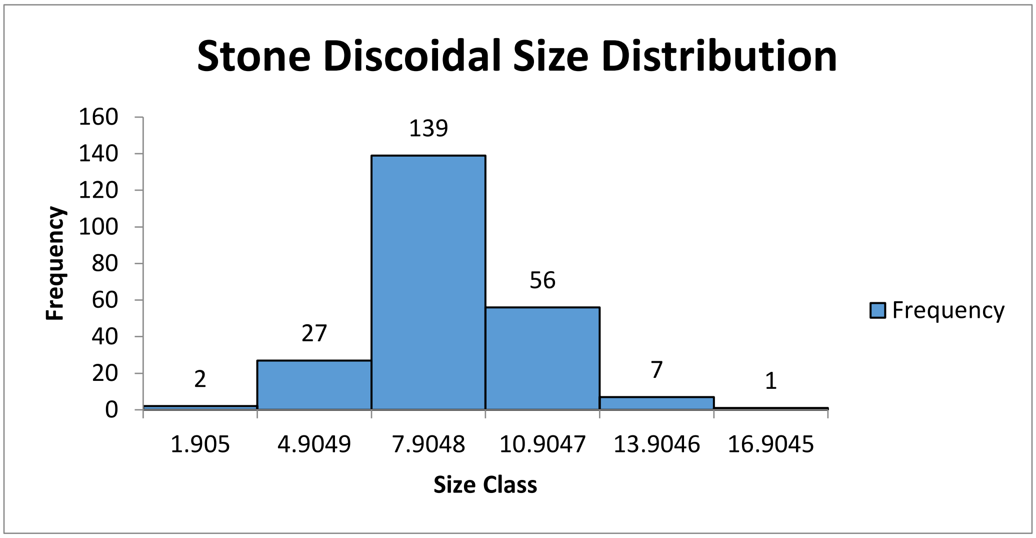

Figure 20. Histogram of stone discoidal size distribution.

Spatial Organization and Provenience

One of the goals of this thesis is to study the organization of stone discoidal production at Carter Robinson. Was this production organized between or within households? How does stone discoidal production compare temporally and spatially with the craft production of other goods? What, if anything does the evidence suggest concerning specialized production? These questions will be addressed at the end of this chapter. In the following section, stone discoidal production data are broken down by excavation block and structures (Table 8).

Table 8. Stone Discoidal Production Stages by Occupation Area

Production Stage	**Structure/Shovel Test (ST)**					
	1	**2**	**3**	**4**	**ST**	**Total**
1	0	0	0	1	1	**2**
2	2	0	1	0	1	**4**
3	4	3	0	0	-	**7**

Block 1

Excavations in Block 1 (Figure 20), encompassing Structures 1 and 4, recovered stone discoidals from all stages of production, ranging from one of the roughest examples of a Stage 1 production reject (Cat. No. 2809) to the only biconcave stone discoidal (Cat. No. 2985) recovered at the site. Excavation of Block 1 produced the largest number and greatest variety of stone discoidals. Given that this block is the largest contiguous excavation unit, and it is located nearest to the mound, this is not surprising. As noted in Chapter 4, two separate structures have been identified in this block but Block 1 also encompasses areas outside of either structure (Meyers 2011:192). Because structures are cultural units while excavation blocks are archaeological units, the spatial and temporal stone discoidal data will be discussed by structure.

Structure 1

Structure 1 is a large single-set post structure located in Block 1, just north of the mound, and it is the largest structure identified at Carter Robinson (Figure 20). A radiocarbon date derived from a sample of wood charcoal from this structure yielded a date of 640+/-40 (Cal. A.D. 1280-1405 2σ [cal. A.D. 1288-1320 1σ]) which indicates that it was in use circa A.D. 1288-1320, which roughly equates to the middle (A.D. 1300-1350) period of site occupation (Meyers 2011:193, 254). Although this structure was large and located near the mound, the size and location of this structure are just two of its important characteristics. Excavations revealed no evidence of a basin, no hearth, and indicate that it may have had an open side facing the plaza. Figure 20 is a plan view map of Block 1, showing Structures 1 and 4 (Meyers 2011:194). Significantly, excavation of this structure revealed evidence of all types of craft production documented at Carter Robinson, setting it apart from the other structures. Tools such as drills (n=37), chisels (n=13), celts (n=4), gravers (n=2) and hammerstones (n=4) were recovered in addition to shell beads, shell fragments, polished bone fragments and a portion of an incised turtle shell (Meyers 2017: 149). Three lines of evidence suggest that this structure was not domestic in nature (Meyers 2011:341). First, the structure likely had an open side facing the plaza. Second, no central hearth was identified. Third, ceramic data from this structure revealed an inordinate number of bowls compared to jars or cooking vessels, suggesting some degree of feasting took place there.

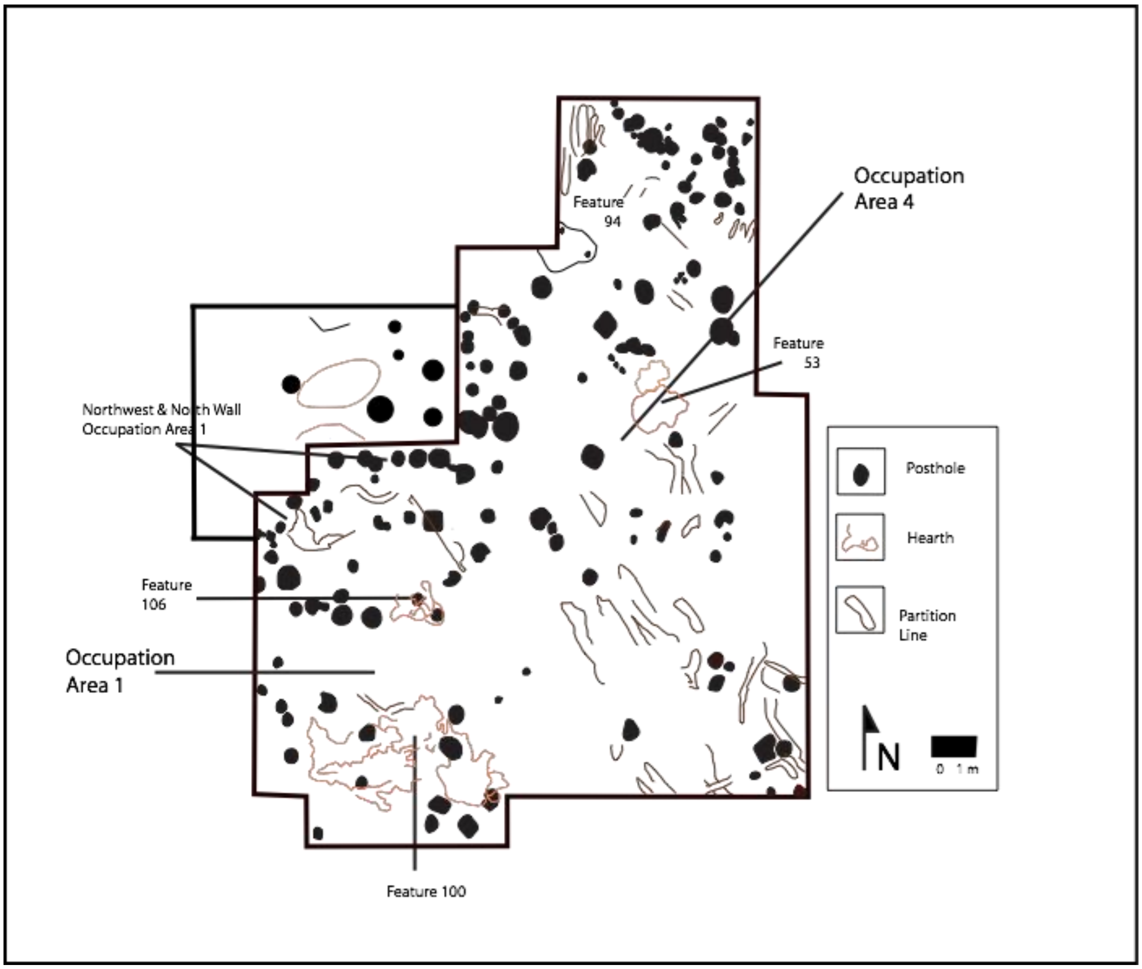

Figure 20. Plan view of Block 1, Structures 1 and 4 (Meyers 2011:194).

Two burned areas within the structure (Features 100 and 106) were identified as features and excavated, revealing the evidence of craft production of shell beads. Feature 100 corresponds well with a "fire basin" feature type that Polhemus (1987:191-194) identified at Toqua and features that Webb (1938) found in the Norris Basin of eastern Tennessee at the Ausmus Farm Mound site. Feature 106 represents either a posthole or a small hearth (Meyers 2011:186). The identification of the area around Feature 106 as a bead production locale is supported by its lack of animal bone, which, if it was present, would indicate a general use hearth. In fact, a small hearth may have been central to shell bead production (Meyers 2011:186). In addition to shell bead production, stone discoidal production also occurred in this locale, based on the fact that stone discoidals from all stages of production were recovered from Structure 1 (Figure 21). The

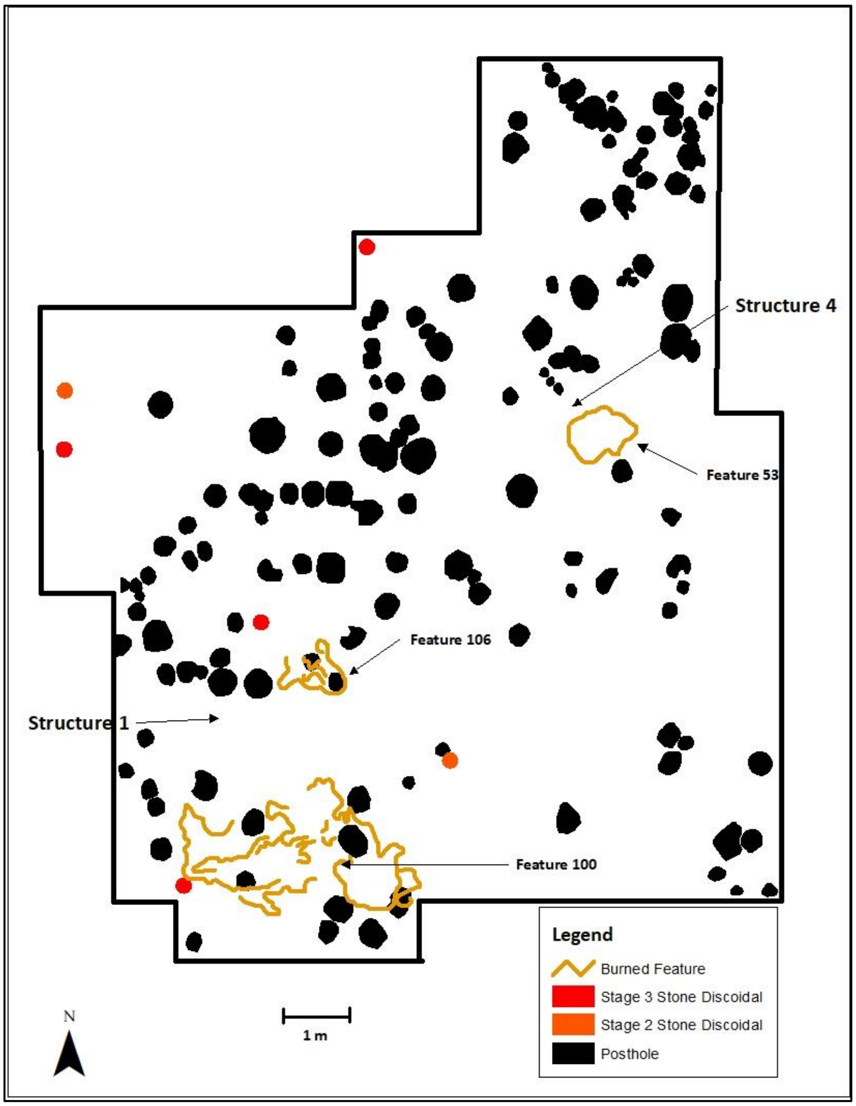

Figure 21. Spatial distribution of stone discoidals from Structure 1.

spatial location and artifact associations of each stone discoidal are presented in Figure 21 below. As noted by Meyers (2011:307; 2017:149-150), evidence of craft production occurred in all quadrants of Structure 1, but it was primarily clustered around the western side of the structure, specifically the northwest corner and within the Structure 1 extension.

Discoidal Catalog Number 147 (Stage 2)

This discoidal was recovered during floor cleaning of the northwestern quadrant of Structure 1, which covers an area of over 14 m^2 and is located within the northern shell bead production area in this structure as identified by Meyers (2011). Discoidal 147 was recovered with a substantial number of other artifacts including 478 faunal specimens, 289 g of shell, three shell beads, 377 ceramic sherds indicating an occupation during the middle period of site occupation, and 408 lithic artifacts. The lithic artifacts consisted of 240 flakes, 9 hafted-bifaces, 26 flake tools, 133 fragments of shatter, three fragments of fire cracked rock and three possible shaped rocks (Meyers 2011). This is the same location as the shell bead production area identified in Structure 1, and the variety and quantity of tools and shell waste and beads all support the interpretation that this area was a shell bead craft production locus.

The presence of the stone discoidals suggests a degree of interaction between the crafting of various goods. Izumi Shimada (1996:30) has termed this “cross-craft interaction,” whereby the technological know-how required to produce one good is useful for or integral to the production different but similar goods. More recently, in looking at craft production during the Middle and Late Woodland periods, Pluckhahn et al. (2018) have used the term “cross-craft production” in a similar way to describe why archaeological correlates of craft production during that time period are often found amongst domestic refuse. In less politically-centralized communities, the crafting of both everyday tools and materials often occurred alongside the production of non-utilitarian ornaments or objects. This relationship between the crafting of different goods in the same space is supported by the craft production of stone discoidals at Carter Robinson. Just about anywhere that crafting was occurring, stone discoidals also were present.

Discoidal Catalog Number 498 (Stage 3)

This discoidal was recovered from Test Unit 21W, which is located in the southwestern quadrant of Structure 1 near the edge of the southern burned area (Feature 100). Discoidal 498 was recovered along with a small number of other artifacts consisting of one core fragment and nine ceramic sherds that date to the middle and later occupations. Although no lithic tools were recovered from this test unit, surrounding test units yielded four hafted-bifaces (identified in above as projectile points and drills above), one tool fragment, and one flake tool. Each of these tools from surrounding test units suggests tool use was occurring in this area but evidence for craft production or other specific activities is lacking.

Discoidal Catalog Number 547 (Stage 3)

This discoidal was recovered during floor cleaning of Test Unit 38W, approximately one meter outside the northeast corner of Structure 1, and one-meter north/northwest of Structure 4. Its location between Structures 1 and 4 complicates identification of the structure from which it originated. Positive identification of which structure this artifact was associated with is not possible. Six lithic artifacts (two core fragments and 4 flakes) and nine ceramic sherds dating to the later occupation were recovered with this discoidal.

Discoidal Catalog Number 628 (Stage 3)

This discoidal was recovered during floor cleaning of Test Unit 1A-east half. This falls just southwest of the northern burned feature (Feature 106) within the shell bead production locale. A total of 479 artifacts were recovered from the same provenience. An unknown quantity of faunal remains, 28 g of shell, 32 g of daub, 253 ceramic sherds, and 169 lithic artifacts were recovered from this location. The large quantity of ceramic sherds is, in some ways, matched by the wide range of temper type and surface decoration combinations. Temper and surface decoration combinations include sand plain, grit plain, shell plain, shell and grog plain, shell cord marked, and shell net impressed. Taken as a whole, these data suggest this artifact was produced during the middle-to-late period of site occupation. Lithics include 125 flakes of chert, three flakes of quartzite, one flake of chalcedony and a fragment of a quartzite stone pipe.

Discoidal Catalog Number 2918 (Stage 2)

This discoidal was recovered during excavation of Test Unit N1036/E100.5, which falls on the western edge of the Block 1 extension. A total of at least 457 artifacts were recovered with this stone discoidal. Specifically, artifacts documented by weight consist of 48 g of shell, including one possible coral bead, 4.2 g of botanical remains, and 30.9 g of daub. A total of 106 ceramic sherds and 158 lithic artifacts were also recovered. Recovered ceramics exhibit a wide variety of temper type and surface decoration combinations, including plain and cord marked, shell and grog; cross cord marked shell and grit tempered; cord marked shell and grit; plain shell and grit; punctate shell and grit; plain shell tempered; smoothed over cord marked shell; cord marked shell; stamped shell; plain shell and limestone; and plain shell, grit, and grog tempered ceramics. These combinations of surface decoration and temper types indicate the end of the middle period of occupation. This artifact was recovered with 193 fragmented faunal remains, including four polished bone fragments and one antler tine tip. Analysis of the assemblage recovered from this area is complete, and results indicate this area was a shell bead production locale (Meyers 2017).

Discoidal Catalog Number 2985 (Stage 3)

This quarter fragment of a stone discoidal is the only biconcave discoidal yet discovered at Carter Robinson. Given that this artifact was broken into a neat quarter disc, it is possible that it was intentionally broken. Importantly, this is the only bi-concave stone discoidal yet identified at the site. It was located in Test Unit N1035/E1001.5, within the Block 1 extension and the northern shell bead production locale. It was recovered with at least 90 other artifacts, including at least four faunal remains, 10 g of shell, 26.8 g of daub, 21 ceramic sherds, and 35 lithic artifacts. Ceramic tempering agents consist of shell and grog; shell, grit, and grog; shell and grit; and grit. These data indicate the middle period of occupation. Stone tools from the same provenience include one biface, one flake tool, and one graver (Bryant and Capps 2018).

Evidence of all types of craft production documented at Carter Robinson was recovered from Structure 1, consisting of non-utilitarian goods (e.g., shell beads, stone discoidals etc.), chert gravers and drills, celts, and chisels, shell artifacts and tools, and salt pan sherds. Ceramics associated with the stone discoidals include those tempered with shell, shell and grog, and shell, grit, and grog, which suggests the middle period of site occupation (Meyers 2011; 2017). One feature (106), located in the northern portion of Structure 1, has been identified as a shell bead production locale (Meyers 2014) with evidence of all stages of shell bead manufacture, in addition to yielding the largest quantity and greatest variety of tools. A trend emerges from stone discoidal, lithic debitage, and shell bead production data within Structure 1. Evidence of these activities is clustered around the possible hearth features. This pattern does not extend to each structure at Carter Robinson, but it does occur in Structures 1, 2 and 6. What this clustering of craft production activities around hearths, or burned areas, means is not clear. In instances where the fire was critical to the craft being produced (i.e., shell ornaments) the pattern is logical. For those artifact or craft good types that do not require light, fire or external heat, this consistency of cooccurrence near hearths may indicate cross-craft interaction.

Structure 4

Structure 4 is a single-set post Mississippian structure with a central hearth but no basin. This structure was identified just northeast of Structure 1, in the northeastern portion of Block 1 (see Figure 5.7) (Meyers 2011). Ceramic data indicate that this structure dates to the middle and late periods of site occupation. Ceramic vessel types recovered included bowls, jars, and plates. Only three tools were recovered from the partial excavation of this structure: one graver, one hammerstone, and one chisel (Meyers 2017:6). A small amount of craft production materials was located in the eastern portion of Structure 4, specifically in the southeastern quadrant of this structure. These materials indicate some shell artifact and salt production may have occurred in the northeastern quadrant, but this is tentative based on the minor amount of craft production materials present (Meyers 2011:356). Excavation of the plowzone and the structure itself produced several thousand artifacts including a bannerstone and mortar and pestle (Meyers 2017:149). A single stone discoidal (Catalog Number 2809) was recovered in association with Structure 4, but it was located outside and north of the structure. Taken together, the ceramic data and few tools recovered from within this structure indicate this was a domestic structure.

Discoidal Catalog Number 2809 (Stage 1)

This artifact was located while clearing the overburden from Test Unit N1044/E1009.5, which is located approximately 2-m north of the northern edge of the structure. Although this artifact was recovered outside of the structural remains, it was near enough to be considered associated with this domestic structure. Lithic debitage density from this structure included 20 stone tools which consisted of five tool types: drill, biface, projectile point/knife (pp/k), scraper, and flake tool (Capps 2018:95-96). In addition, there was a stone discoidal that was rejected during manufacturing. It is difficult to say why this artifact was left unfinished, but I suggest that it became too small during Stage I pecking/flaking and that made it too difficult to manipulate.

Block 2, Structure 3

Located approximately 25-m northeast of the mound, Block 2 encompasses a portion of Structure 3, a possible wall trench structure without a basin (Figure 22). Alternatively, these archaeological remains may represent the western portion of a single-set post structure with wall trenches used as a partition wall (Meyers 2017:149). Numerous postholes were identified near the well-preserved wall trench, and these may represent supports for a bed or bench (Meyers 2011:174-187). Ceramic data indicate that this structure was constructed during the first period of site occupation, making it the earliest structure excavated to date (Meyers 2017:147-149). A scarcity of artifacts recovered from the excavation of the structure floor suggests that it may have been cleaned out prior to its abandonment, or perhaps this structure did not serve a domestic function (Meyers 2015: 231). A large Dallas-type rim and handle sherd was recovered from a central interior post (Feature 104), and it is suggestive of a closing ceremony treatment of the structure (Meyers 2011:320). Despite the dearth of artifacts, one stone discoidal was recovered from this structure. This artifact (Catalog Number 1305) is a Stage 2 production example that was recovered during floor cleaning of Test Unit 153N. Further evidence for craft goods production in Structure 3 includes cannel coal, tools and drills (Meyers 2011:339-341). Similar to Structure 1, this evidence is clustered in the western portion of this space. There is also evidence for production of salt and crafting of shell beads artifacts, but this evidence is too limited to enable interpretation (Meyers 2011:339-344). Overall, this area of the site appears to have had limited craft production activity compared to the other excavation blocks. However, presence of a Stage 2 stone discoidal in this structure suggests that site inhabitants were producing these artifacts during the initial occupation of the site.

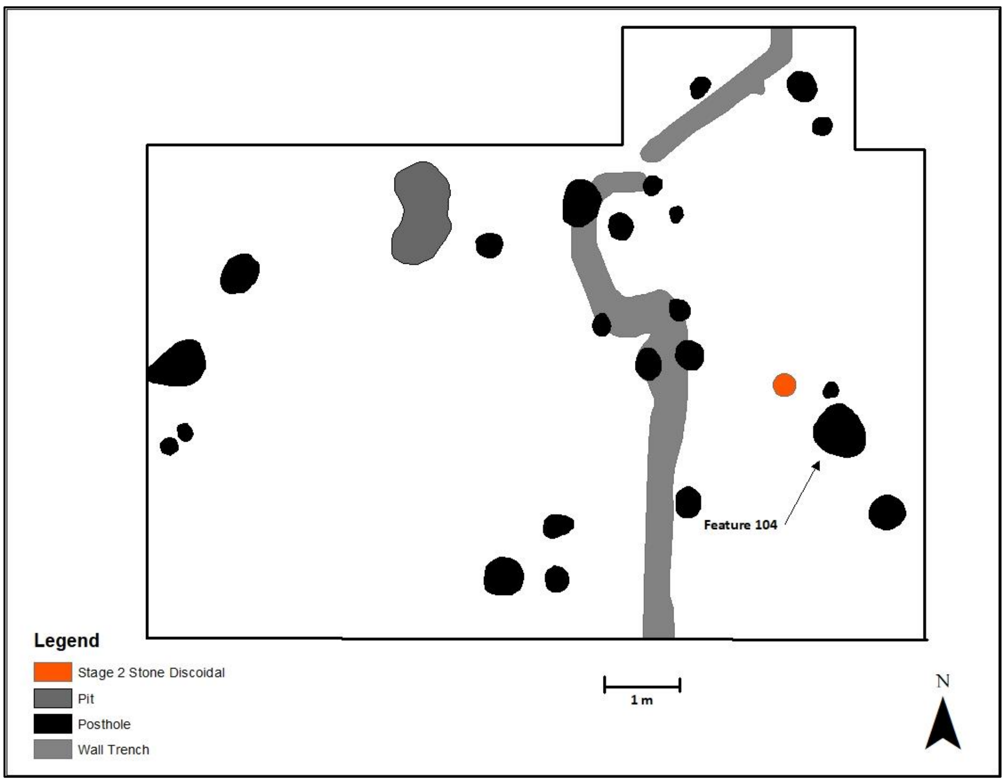

Figure 22. Spatial data on stone discoidals from Structure 3.

Block 3, Structure 2

Excavation Block 3 encompassed a portion of Structure 2 located approximately 80-m east of the mound. This structure contains evidence of at least three rebuilding episodes, and the earliest may have been coeval with Structure 3 (Meyers 2011, 2017). Following Capps (2018), these structures are hereafter referred to as 2a (earliest), 2b (middle), and 2c (latest) with the earliest being a wall trench structure and the later structures being of single-set post construction (Meyers 2017:149). Due to time and personnel limitations, select portions of each of these three structures were fully exposed. Only three 1-x-1-m test units were excavated through each of these structures and into sterile subsoil. Thus, Structure 2c yielded more data as it was the most fully excavated. This structure produced a small but interesting assemblage of stone discoidals. Each of the three stone discoidals from this area are examples of finished Stage 3 artifacts. A nearby shovel test (HH-9), however, recovered a Stage 1 stone discoidal.

Patterns of craft production organization across time – as revealed by Structures 2a, 2b, and 2c – are difficult to discern based on the varying amounts of material recovered from all three structures, but because the stone discoidals are all from Structure 2b (Figure 23) the remainder of this discussion will focus on that structure. Test Unit 9, one of the central test units that was excavated to sterile subsoil, intersected the hearth and yielded Discoidal 1030 in addition to one flake tool, one worked flake, one flake blade, one biface, and one scraper. The other two stone discoidals from Structure 2b were recovered from Test Unit 163E, located one meter south and two meters west of Test Unit 9. That the two test units where stone discoidals were recovered encompass the hearth and its immediate environs is not surprising considering lithic production data were also centered around the hearth at multiple structures around Carter Robinson.

Discoidal Catalog Number 1030 (Stage 3)

This unique artifact was recovered from Test Unit 9, a 1-x-1-m test unit located in the center of Block 3. More specifically, this discoidal was located in Level 5 Upper. Level 5 Upper is a 9 cm-thick layer of yellowish red (7.5YR3/2) compact silty loam with dark yellowish brown (10YR4/6) clay mottles (Meyers 2011:393). These clay mottles come from the overlying Level 4, which is the sterile yellow clay cap between the latest and middle structures in the rebuilding sequence. This level correlates with Zone 33 in nearby Test Unit 163E. Three features were identified within Level 5 Upper. Two of these features were positively identified as postholes (Features 215 and 216) while the third was either a pit with a rodent burrow or a posthole (Feature 217). These associated postholes suggest that this artifact was recovered from the midden of Structure 2b, the middle structure in the occupational sequence of Structure 2.

Although no carbon samples from this second occupational level were obtained, an approximate age for these remains may be identified using radiocarbon dates from the overlying structure and artifacts from all three occupations. Radiocarbon dating of wood charcoal samples from the overlying structure indicate that it was occupied between cal. A.D. 1316-1355 (Meyers 2011: 227; 2017:148). The earliest structure in this sequence is likely synchronous with Structure 3 (first period of site occupation, circa A.D. 1250-1300) based on the wall trench architectural style. Thus, the middle rebuilding episode dates to the early middle period of site occupation or, roughly, A.D. 1300-1350.

Discoidal Catalog Number 1146 (Stage 3)

This discoidal was recovered from Level 4, Zone 40 in Test Unit 163E. Zone 40 was represented by a yellowish brown (10YR3/6) clay that ran from the southwest to the northeast corner of the test unit. The assemblage recovered from Zone 40 consisted of a moderate density of pottery, flakes, and faunal remains. This zone corresponds with Zone 24 in Test Unit 9, so it likely dates to the middle occupation in the rebuilding sequence of Structure 2 (cal. A.D. 1316-1355) in the latter part of the middle period of site occupation (Meyers 2011:254).

Discoidal Catalog Number 1160 (Stage 3)

Made of hematite, this artifact is one of the most exceptional stone discoidals in this study and was recovered from the northeast corner of Level 5, Zone 42 within Test Unit 163E, which is located in the southwestern quadrant of Block 3. This layer equates with the same living surface as Level 5 Upper in Test Unit 9, which produced Discoidal 1030. As with the other two stone discoidals from Structure 2b, this artifact was recovered from the area around the hearth, which is a pattern seen in lithic data at Structure 1, Structure 2b, Structure 2c, and Structure 6. It is worth noting that Structure 2 is the only structure at Carter Robinson to have hematite associated with the lithic assemblage (Capps 2018).

Structure 2b yielded three unique, finished, and intriguing stone discoidals with tight stratigraphic control. Contexts for all three post-date the earliest, possibly wall trench structure. Structure 2b demonstrates the most extensive period of occupation in the form of a midden ranging between 10-15 cm thick (Meyers 2011:230). The three stone discoidals from Structure 2 (Discoidal Catalog Number 1030; Discoidal Catalog Number 1146; Discoidal Catalog Number 1160) were all recovered from the middle structure in the architectural sequence, and all three are different from one another in terms of size and raw material. Although two are made of sandstone, the raw material is not the same, and the third stone discoidal is made of hematite. Two of these artifacts (1030 and 1160), both of which are completed Stage 3 discoidals, possess an engraved cruciform motif that has been documented on stone discoidals dating to the Late Woodland and Mississippian periods throughout the southeast and midwest (Perino 1971; Fortier and Jackson 2000; Jackson et al. 1998; Kelly et al. 1987; Koldehoff and Kassly-Kane 1995; Setzler and Jennings 1941; Webb 1938; Webb and Wilder 1951). This symbolism is thought to represent the number four, which had various sacred connotations among historic period native Southeastern cultures including associations with the four directions, four quarters of the universe, and four winds (Bishop 2016; Pauketat 2009). The act of engraving stone discoidals is a recurring theme in the history of chunkey. Other artifacts potentially involved with craft production from this second rebuilding episode include fragments of polished/cut bone, celt fragments, polished stone, drills or drill tips, a graver, a fragment of mica, and fragments of cut mussel shell (Capps 2018; Meyers 2011).

Structure 2b was occupied during the middle period of site occupation, when major social changes occurred. By the middle period of site occupation, Structure 3 had been abandoned, but Structures 1, 2b, and 4 were still occupied (Meyers 2017). Archaeological deposits from this period of site occupation are distinct from earlier deposits in terms of the quantities of ceramic artifacts and their variability. Meyers (2017:151-152) argues that the increase in ceramic temper types and surface decoration modes indicates increased interaction with local Radford populations. This interaction was the result of efforts to integrate new people into this frontier community. Evidence of this effort is seen in the changing ceramic assemblage but also in the craft production of beads and feasting evidence (i.e., floral and faunal remains, ceramic vessel data) from Structure 1. Ceramic craft production, at the household level, involving a combination of Mississippian and Radford ceramic manufacturing techniques, served to integrate this frontier community. Feasting, and the related increase in production of ceramics with mixed temper and surface decoration, also helped integrate the community. Now, the craft production of stone discoidals adds to this picture of a community trying to establish itself through communal work, game play, and feasting.

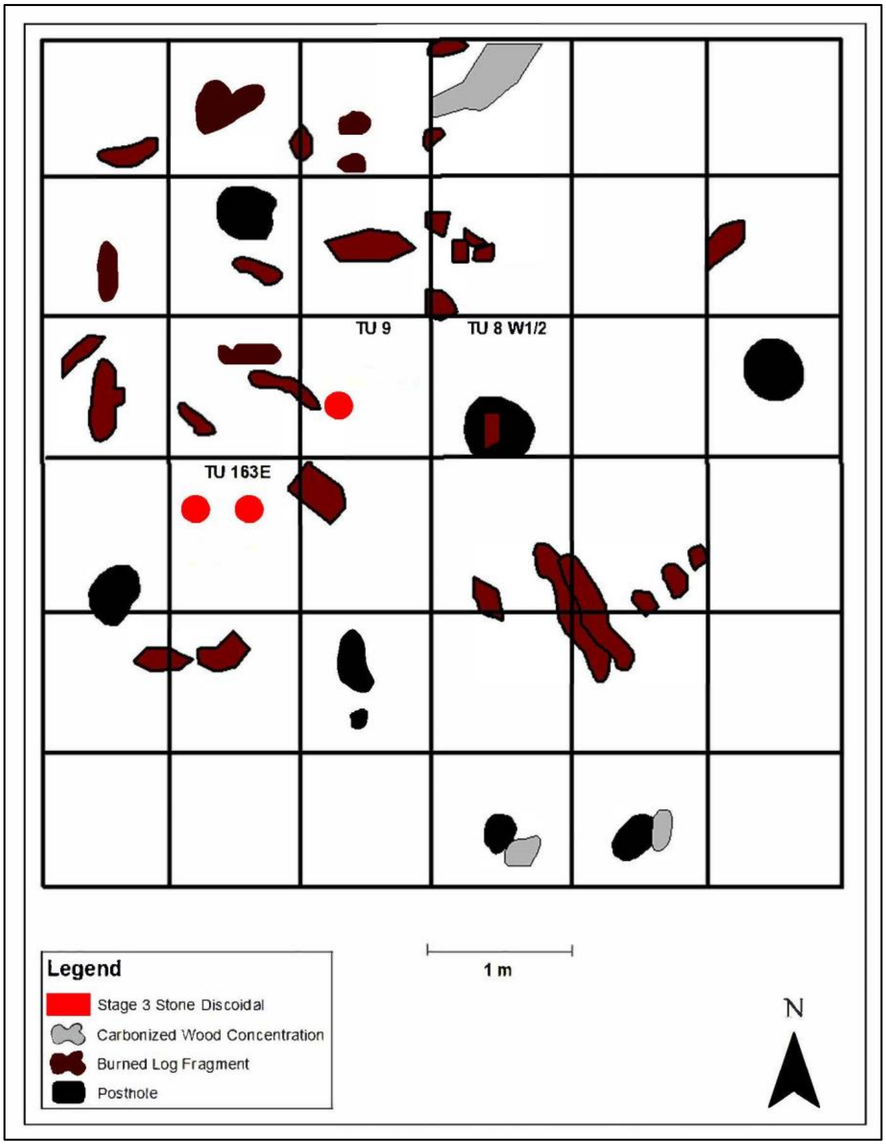

Figure 23. Spatial data on stone discoidals from Structure 2b.

Change Over Time

Previous work at Carter Robinson has demonstrated that the types of craft production and their spatial organization changed throughout the history of site occupation. But only those structures that have produced stone discoidals are considered in the following discussion. An approximate chronological order of the structures discussed consists of Structure 3 (early), Structure 2b and Structure 4 (middle), and Structure1 (late).

During the early period of site occupation, Structure 3 was constructed, and it contained a discoidal, suggesting that the people of Carter Robinson brought the game of chunkey with them. Because Structure 3 predates Structure 1, it would have been in close proximity to the mound during this period, possibly the closest structure located near the mound, although there was originally a structure in the location of the mound. Ceramics from this period exhibit little evidence of Mississippian interaction with local populations. But craft production was already occurring. Tools (n=96) associated with cannel coal pendant production, including drills, general bifaces, and flake tools, along with the majority of cannel coal waste, were recovered from this structure (Capps 2018:94). Tools associated with both craft production and domestic activities were found inside and outside of Structure 3, suggesting that these activities were embedded in everyday domestic activities. The variety of tools recovered support the idea that this was a craft production locus (Meyers 2015). Nevertheless, the quantities of projectile points, bifaces, and flake tools indicates a primarily domestic nature to the activities taking place. The single stone discoidal recovered (Discoidal Catalog 1305) is a Stage 2 example, possessing grinding around approximately 50 percent of the periphery or rolling surface. It is not particularly well-made, and the raw material is a coarse, poor quality sandstone. I believe the low quality of the raw material and the rough, unfinished nature of the artifact suggests it was a domestic gaming stone, meaning that it was made for use by the household. In this structure, cannel coal and stone discoidal craft production occurred alongside one another, but stone discoidal production was the lesser of the two.

Structure 2b is next in the occupation sequence. Structure 2b yielded minor quantities of shell, suggesting craft production of shell beads may have occurred. Evidence of the craft production of stone discoidals occurs in the form of three Stage 3 discoidals recovered from the central portion of the structure. These three artifacts represent the finest finished stone discoidals yet recovered from Carter Robinson and include the only two engraved examples recovered from the site. These stone discoidals were clustered around the central hearth. During the middle period of site occupation, which this structure dates to, ceramic temper variation increased, suggesting increased interaction between the inhabitants of Carter Robinson and local Radford populations. The two engraved stone discoidals would have been potent symbols of Mississippian cultural identity or otherness, and, in this way, may have been particularly attractive to Radford peoples, or others, who visited Carter Robinson for social, economic, or ritual purposes. Alternatively, this structure may have been used by only or primarily Mississippian people, or perhaps the structure held Mississippian ritual significance. That only finished stone discoidals, and the only decorated examples, have been recovered from this structure may indicate that this was the residence of higher-status individuals, but, at the very least, it does not suggest that stone discoidals were being produced in this structure. Structure 2 was rebuilt three times and a distinct yellow soil, that may be a clay cap, separates the first and middle structure in the sequence (Meyers 2011: 232). Using sterile clay caps to separate living surfaces of mounds or rebuilding episodes in structures is a well-known trait, but not all structures receive this treatment. Perhaps, as Meyers (2011:252) suggested, this location may have been in the early stages of mound construction given that it was built on a rise to the east of the mound. If the individuals who resided in Structure 2b had some sort of elevated status, the stone discoidals recovered from this location were probably produced elsewhere, such as in Structure 1. In comparing Structures 2b and 2c, it becomes clear that, although shell craft production increased over time in this location, there is no evidence that stone discoidal production occurred in any of the three iterations of Structure 2.

Structure 1 was also constructed during the middle period of site occupation, and it has several unique characteristics. It is the largest structure at the site, located closest to the mound, likely had an open side facing the plaza, and did not contain a hearth. Importantly, however, it contained the largest number and greatest variety of tool types from Carter Robinson and the most definitive evidence of the craft production of shell beads. Stone discoidals from all stages of production were recovered from throughout this structure. If we compare the overwhelming evidence that Structure 1 was a craft production locale with the limited evidence of craft production and the three finished stone discoidals from Structure 2b, it seems even more likely that Structure 2b was not an area of craft production. Structure 2c, which postdates Structure 2b but was coeval with Structure 1 at the end of site occupation, contained increased amounts of shell and stone tools, suggesting that craft production increased over time across the site. This increase in craft production might have increasingly been driven not just by trade but by demand for craft goods from the inhabitants of other structures at Carter Robinson. As the individuals and social units at Carter Robinson evolved and pursued different paths to power, social inequality, a hallmark of Mississippian society, was likely to have grown at least to some degree, and this would enable inhabitants to begin to consume the goods their neighbors originally produced for trade with outside groups such as the Radford culture.

Subsistence data from Structure 1 also sets it apart from other structures at the site. In addition to the white-tailed deer and corn remains found in most structures, Structure 1 also yielded turtle and persimmon. But even the corn and deer meat found here is different. The corn was primarily recovered in the form of kernels instead of cobs, meaning that it was processed for consumption (Bonzani 2011); the deer remains indicate more choice cuts of meat were eaten here (Lapham 2011). If Structure 1 contained a wider variety and better cuts of meat in addition to more varied floral remains, it may have served such public functions as feasting (Meyers 2011, 2017). Capps (2018) suggested that perhaps there is more overlap between Structure 1 and Structure 4 then previously understood. Structure 4 postdated Structure 1, but there was likely some overlap in occupation. It may have been than an elite personage resided in Structure 4 and oversaw or possibly controlled to some degree the craft production of shell beads occurring in Structure 1.

Finally, Structure 4 was built. As previously discussed, Structure 4 was a domestic structure, and, with a total of 20 stone tools, it contained very little evidence of tool manufacture or use (Capps 2018:95). Additionally, the location of recovered tools has no apparent patterning. This structure did, however, contain minor evidence of shell bead manufacture and salt production. The only stone discoidal recovered in association with Structure 4 was recovered from test unit N1044/E1009.5, which is approximately 4-m north of the architectural features and debris, meaning it was outside of the structure and, therefore, cannot be directly associated with the structure. All available evidence (Capps 2018; Meyers 2011) suggests that Structure 4 was not a craft production locale.

These data further support the contention that craft production intensified over time at Carter Robinson. Over the course of occupation of the site, the types and range of craft items produced changed. However, what this thesis adds to the overall picture is that stone discoidal production occurred throughout the history of the site. It is important to note that not all the structures were producing stone discoidals. Structure 2 has yielded only finished stone discoidals, and this may be evidence of increased social differentiation in the form of access to finished craft goods. The craft production of stone discoidals at Carter Robinson fits well with the established immigrant narrative (Meyers 2011) of Carter Robinson. Although not all structures were producing these artifacts, structures from each period of site occupation indicate that stone discoidal production was a part of the fabric of life here. The presence of stone discoidals and their production at Carter Robinson seems to support Pauketat's (2004, 2007) suggestion that the game of chunkey provided an integral, solidarity-building function that facilitated the spread of Mississippian peoples and lifeways.

Summary

This chapter presented the results of the macroscopic analysis of stone discoidal production, GIS assessment of roundness, and the spatial distribution of stone discoidals. The collection of stone discoidals from Carter Robinson is small but it encompasses the entire production trajectory. The GIS analysis quantified roundness to examine the relationship between finished stone discoidals and how closely they approximate a perfect circle. This GIS analysis of roundness partially supports the hypothesis, developed in Chapter 3, that there is a positive relationship between production stage and RI. The RI of Stage 1 stone discoidals clearly separates them from later stage examples. The RI between Stages 2 and 3, however, has some overlap, making tactile analysis vital for the identification of the production trajectory. Analysis of the temporal and spatial distribution of stone discoidals showed production occurred throughout the history of the site, with Structures 3 (early period), 1 (middle period), and 4 (late period) all containing unfinished stone discoidals, but that not all structures produced these artifacts as Structure 2b yielded only finished examples. This supports Meyers' (2011, 2014) conclusion that over time craft production moves away from cannel coal pendants and towards production of other craft goods, including shell beads and stone discoidals production. The lack of Stage 1 stone discoidals from Structure 1 and the presence of only Stage 3 examples from Structure 2, is interesting. Stage 1 stone discoidal production may have occurred off site at the various sources of the raw material used. This seems likely given that flaked lithics data also indicate that early stage stone tool reduction was occurring off site (Capps 2018:40). Structure 2 was different than the other structures in that no unfinished stone discoidals were recovered from any of the three rebuilding stages of this long-lived structure. The occupants of this structure may have held some elevated status, but the distance from the mound does not support that suggestion. Alternatively, this structure may have held some socio-political or ritual significance that is yet to be fully understood, but to which the finished stone discoidals were integral. Although there are no data to suggest stone discoidal craft production activities were segregated across the site beyond the domestic division of labor, there are difference in terms of activities taking place in each structure. Stone discoidal production appears to have been conducted alongside daily domestic production activities and the craft production of first cannel coal pendants and later shell beads. Stone discoidal production at Carter Robinson was a minor, part-time affair, but it was present throughout site occupation.

CHAPTER VI: CONCLUSIONS

Late pre-contact eastern North America has been the subject of an enormous amount of scholarship over the last 150 years. During the late pre-contact period, the institutionalization of hierarchy first occurred in North America north of Mexico. The diverse cultures that bore witness to this sociopolitical development in eastern North America are known as Mississippian, but their cultures were not homogeneous. They spoke many different languages, but they shared symbolic and material cultural traditions. One of these shared symbolic and material cultural traditions was the game of chunkey and the stone discoidals used in game play.

Warren DeBoer (1993) argued that the political economy of ascendant Cahokia was intimately tied to changes in the way chunkey was performed and perceived. From murky origins as a rural, Woodland period game played by children and adults alike, to the mighty spectacle likely to have been performed in front of thousands during Cahokia's heyday, chunkey was closely linked with the rise of Mississippian culture. Indeed, Pauketat (2004, 2009) has argued that the spread of Mississippian culture was accompanied, and perhaps even facilitated, by the game of chunkey. Recent research at the Carter Robinson site, in Lee County, Virginia, has explored the institutionalization of hierarchy in southwestern Virginia where chunkey and stone discoidals were introduced by Mississippian migrants.

Specifically, research at Carter Robinson has investigated the beginnings of institutional hierarchy in an area where Mississippian culture came into contact with the local egalitarian Late Woodland Radford culture. At Carter Robinson, Meyers identified the site as a frontier of the Mississippian cultures of eastern Tennessee. This affiliation was determined through the analysis of the site's architectural grammar and ceramic traditions. Her ceramic analysis demonstrated change over time occurred and suggested a degree of cultural interaction with local Radford groups. Analysis of house remains revealed evidence of craft production in the form of cannel coal pendants and shell beads. This specialized production is evidence of unequal access to resources, which is a key indicator of hierarchy in chiefdoms.

This study described the method and spatial organization of stone discoidal production at Carter Robinson and whether this production changed over time. This included identifying stone discoidals as compared to other ground stone artifacts, and evidence of production, use, and discard. I used these data to propose a production trajectory and general organization of technology. The spatial and temporal associations of each stone discoidal were then compared with available evidence of other types of activities, such as craft production of cannel coal pendants and shell beads, to explore whether there was any spatial segregation of stone discoidals associated with the production of these other goods.

The results showed that although stone discoidals were produced at a smaller scale than cannel coal pendants or shell beads, it was a constant feature of life at Carter Robinson. However, there are differences between structures in terms of the quantity and stage of production of recovered stone discoidals, and these differences generally parallel the differential production of cannel coal versus shell beads. For example, the earlier Structure 3 contained evidence of cannel coal production in the form of drills, bifaces, and flake tools, and the majority of cannel coal waste, with only one stone discoidal recovered. Although evidence of shell bead production was also present, it was minor in comparison to cannel coal production. By contrast, the later Structure 1 yielded the greatest quantity and diversity of tool types at Carter Robinson (Meyers 2011), the largest quantity of shell bead production debris and beads from all stages of manufacture (Meyers 2014), and it has also yielded the largest numbers of Stage 2 (n=2) and Stage 3 (n=4) stone discoidals with the greatest diversity of raw material types used to produce the stone discoidals (e.g., sandstone, limestone, hematite). Structure 2b, which was also occupied after Structure 3 was abandoned during the middle period of site history, yielded three fine examples of Stage 3 completed stone discoidals, two of which bear symbolically charged engraved cruciform motifs. Although evidence of shell bead production in Structure 2b is limited, this may reflect that only a very small area of the structure was excavated. Evidence from both Structures 1 and 2b suggests that stone discoidal production increase accompanied the increase in shell bead production that occurred during the important middle period of site occupation.

Structures 1, 2b, and 4 were occupied during the middle period of site history when ceramic data indicate increasing interaction with local Radford populations. So what does the concomitant increase in shell bead and stone discoidal production mean for the historical processes that occurred at Carter Robinson? For one, I believe this increase in production over time is evidence of the success of Carter Robinson as a socially and economically viable settlement. Indeed, Meyers (2017) has identified Structure 1 as a locus of social identity formation where the craft production of goods, and control over this production, communal feasting, and possibly even communal gaming, served to create solidarity and help form a new community.

In explicating the method of stone discoidal production at Carter Robinson, this thesis is one of the first studies to deal with the production of stone discoidals at late Pre-Contact sites in the eastern United States. A method for studying stone discoidal production was identified and tested, and this method is easily replicable at other sites. Furthermore, this method of stone discoidal analysis enabled me to study production trajectories across the site, which were then tied into other temporal data, such as the changes in craft production over time, to help better understand the evolution of the political economy of this South Appalachian Mississippian frontier community. This research further supports that craft production was an important social, political, and economic endeavor at frontier sites.

Future studies of stone discoidals in the Southern Appalachia region are needed. First, there is a need for exhaustive reviews of site reports and other difficult-to-access documents to record the variability of stone discoidal shapes, sizes, and raw materials. Following Zych's (2017) lead, this should include visits to county and state, local and regional, museums, libraries, universities, and other repositories to document the variability of stone discoidals. Bishop's (2016) typology for stone discoidals is a good beginning point to fit all discoidals into one overarching framework, but generally a move to create more types seems to be a move in the wrong direction.

Additional studies of stone discoidals from large sites that have been carefully excavated are needed to enable broader interpretations of the role of chunkey and stone discoidal production in Mississippian societies and how this may have changed over the course of Mississippian cultural history. Analysis of stone discoidal production at sites such as Moundville or Etowah, or outlying sites within their chiefdoms, would help elucidate the role this craft production played in the political economies of these important polities. Such studies would also enable a comparison of these sites with Cahokia, for which we already have enough stone discoidal data.

This study has shown that the craft production of stone discoidals, and presumably the game of chunkey, or a similar game, were a constant at Carter Robinson. Overtime, however, as craft production moved away from cannel coal and towards shell beads, stone discoidal production also increased. Because the inhabitants of Carter Robinson were on the frontline of culture change in late pre-Contact southwest Virginia, the production of stone discoidals seems to support the notion that chunkey accompanied the spread of Mississippian culture.

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Zych, Thomas J.
2017 Chunkey and the Historic Experience in the Mississippian World. In *Prehistoric Games of North American Indians: Subarctic to Mesoamerica*, edited by Barbara Voorhies, pp.63-86. The University of Utah Press, Salt Lake City.

VITA

Hamilton Hastie Bryant III

Education

M.A., Anthropology, University of Mississippi, 2019
Thesis Title: *Crafting Stone Discoidals on the Frontier: Production and Identity in Southwest Virginia*.
Maureen Meyers, chair

GIS Certification, Auburn University at Montgomery, 2014

B.A. Anthropology, Auburn University, 2011

Research & Professional Experience

2016-present	Staff Archaeologist, Wiregrass Archaeological Consulting, Mobile, AL.
2016	Archaeological Field Technician, Phase II Evaluation of 22IT725, Itawamba County, MS. Employed by Tennessee Valley Archaeological Research.
2016	Archaeological Field Technician, Phase I survey of City of Starkville Power Station, Oktibbeha County, MS. Center for Archaeological Research, University of Mississippi.
2015	Graduate Teaching Assistant, University of Mississippi Field School, Carter Robinson Mound Site, Lee County, VA.
2014-2016	Graduate Teaching Assistant, Department of Sociology and Anthropology, University of Mississippi.
2014	Field Director, Phase II Archaeological Investigations at 1Le531 for a Proposed Development by Auburn City Schools, Auburn, AL. Conducted on Behalf of Harmon Engineering & Contracting Co., Inc.
2013-2014	Field Director for surveys of Natural Resource Conservation Service Wetland Reserve Program lands. Employed by Auburn University Environmental Institute.
2013-2014	Student Athlete Tutor in Anthropology, Student Athlete Development Center, Department of Athletics, Auburn University, Auburn, AL.
2009-2014	Field Supervisor, Auburn University Field School, Ebert Canebrake Site, Macon County, AL.
2009-2014	Crew Member, 53 Phase I Archaeological Surveys in Alabama. Employed by John W. Cottier.
2008	Student Crew Member, Auburn University Archaeological Field School, Auburn University.

Selected Technical Reports

2010 *A Phase I Archaeological Survey and Evaluation of a Proposed Bridge Replacement on Old Foshee Road, Project No. ESC-ECCBC04, Escambia County, Alabama*. (J. W. Cottier, H.H. Bryant III, and J.A. Gullatte)

2010 *A Phase I Archaeological Survey and Evaluation of a Proposed Bridge Replacement on Cowpen Creek Road, Project No. ESC-ECCBB03, Escambia County, Alabama.* (J. W. Cottier, J. A. Gullatte and H. H. Bryant III).

2010 *A Phase I Archaeological Survey and Evaluation of 2.8 Acres in Preparation for Construction of the Center for Advanced Science, Innovation, and Commerce in the Auburn University Research Park, Lee County, Alabama*. (J.W. Cottier and H.H. Bryant III).

2010 *An Archaeological Survey and Evaluation of a Proposed Sand and Gravel Quarry, Elmore County, Alabama (AHC 10-1050)*. (J.W. Cottier, H.H. Bryant II, and K.M. Ervin).

2011 *A Phase I Archaeological Survey and Evaluation of a Proposed Materials Pit, Montgomery County, Alabama*. Project No. HPP-TRIMPF-0035 (512). (J.W. Cottier and H.H. Bryant III).

2011 *A Phase I Archaeological Survey and Evaluation of the Proposed Approximately 50 Acre Ridge Cabin Colony Phase I Residential Development, Elmore County, Alabama*. Project No. AHC 12-0137. (J.W. Cottier and H.H. Bryant III).

2012 *A Phase I Archaeological Survey and Evaluation of the Proposed Approximately 57 Acre Ridge Cabin Colony Phase II and Phase III Residential Development, Elmore County, Alabama. (AHC 12-0137)*. (J.W. Cottier and H.H. Bryant III).

2012 *A Phase I Archaeological Survey and Evaluation of he Proposed Hurrican Creek Trace, LTD., in Tuscaloosa, Tuscaloosa County, Alabama. (AHC 12-065)* (J.W. Cottier and H.H. Bryant III).

2012 *Phase I Archaeological Survey and Evaluation of the Proposed Creekstone Apartments, Franklin County, Alabama. AHC Project No. 2012074.* (J. W. Cottier and H. H. Bryant III).

2012 *A Phase I Archaeological Survey and Evaluation of the Proposed Ridgecrest Estate, Calhoun County, Alabama. AHC Project No. 2012026.* (J.W. Cottier and H.H. Bryant III).

2012 *A Phase I Cultural Resource Survey and Evaluation of a Proposed Bauxite and Kaolin Mine, Barbour County, Alabama. AHC Project No. 12-1192.* (J.W. Cottier and H.H. Bryant III).

2012 *A Phase I Cultural Resource Survey and Evaluation of a Proposed Material Transfer Station, Montgomery County, Alabama*. (J.W. Cottier and H.H. Bryant III)

2012 *A Phase I Cultural Resources Survey and Evaluation of Approximately 300 Acres in Chewacla State Park, Lee County, Alabama. (AHC 12-357)* (J.W. Cottier, H.H. Bryant III and K.M. Ervin).

2013 *A Phase I Archaeological Survey and Evaluation of a Proposed Bridge Replacement, Project No. CCP 19-28-13, B.I.N. 002846, Coosa County, Alabama.* (J.W. Cottier and H.H. Bryant III).

2013 *A Phase I Archaeological Survey and Evaluation of a Proposed Bridge Replacement, Project No. CCP 19-127-13, B.I.N. 002775, Coosa County, Alabama.* (J.W. Cottier and H.H. Bryant III).

2013 *A Phase I Archaeological Survey and Evaluation of a Proposed Bridge Replacement, Project No. CCP 19-108-03, B.I.N. 000717, Coosa County, Alabama.* (J.W. Cottier and H.H. Bryant III).

2013 *A Phase I Archaeological Survey and Evaluation of a Proposed Bridge Replacement, Project No. CCP 19-107-03, B.I.N. 002809, Coosa County, Alabama.* (J.W. Cottier and H.H. Bryant III).

2013 *A Phase I Archaeological Survey and Evaluation of a Proposed Bridge Replacement, Project No. RCP 56-240-13, Randolph County, Alabama.* (J.W. Cottier and H.H. Bryant III).

2013 *A Phase I Archaeological Survey and Evaluation of a Proposed 4.9 Acre Material Pit, ALDOT Project No. STPOAF-7814 (602), Prattville, Elmore County, Alabama.* (J.W. Cottier and H.H. Bryant III).

2013 *A Phase I Archaeological and Cultural Resource Survey and Evaluation of a Proposed 25 Acre Sand and Clay Quarry, Area Sand & Gravel, Inc., Montgomery County, Alabama.* (J.W. Cottier and H.H. Bryant III).

2013 *A Phase I Archaeological and Cultural Resource Survey and Evaluation of a Proposed 153 Acre Sand and Gravel Quarry, RWS Materials, LLC, Montgomery County, Alabama.* (J.W. Cottier and H.H. Bryant III).

2013 *A Phase I Archaeological Survey and Evaluation of a Proposed Waste Dumping Station, ALDOT Project No. EPR-8970 (900), Talladega County, Alabama.* (J.W. Cottier, H.H. Bryant III, and A.M. Smith).

2013 *A Phase I Archaeological Survey and Evaluation of the Proposed French Farms Village Apartments, AHC Project No. 2013-032, Athens, Limestone County, Alabama.* (J.W. Cottier, H.H. Bryant III, and A.M. Smith).

2013 *A Phase I Archaeological Survey and Evaluation of the Proposed Clarkston Square Apartments, Huntsville, Madison County, Alabama.* AHC Project No. 2013-025. (J.W. Cottier, H.H. Bryant III, and A.M. Smith).

2013 *A Phase I Archaeological Survey and Evaluation of Two Tracts of Land Associated with ALDOT Project No. EPR-8970 (900), Talladega County, Alabama.* (J.W. Cottier and H.H. Bryant III).

2013 *An Archaeological Reconnaissance of the Proposed 100 Acre Moorer Tract, Natural Resources Conservation Service (NRCS) WRP Easement, Bullock and Macon Counties, Alabama.* (J.W. Cottier and H.H. Bryant III).

2013 *An Archaeological Reconnaissance of the Proposed 48.1 Acre Childs Tract, Natural Resources Conservation Service (NRCS) WRP Easement, Montgomery County, Alabama.* (J.W. Cottier and H.H. Bryant III).

2014 *An Archaeological Survey and Evaluation of the Proposed River Carroll Subdivision Development in Auburn, Lee County, Alabama*. (J.W. Cottier and H.H. Bryant III).

2014 *An Archaeological Survey and Evaluation of a Proposed Bridge Replacement Over Odom Creek, Lee Road 27, Project No. 41-138-13. STR#96Z, B.I.N. 005050.* (J.W. Cottier and H.H. Bryant III).

2014 *An Archaeological Survey and Evaluation of a Proposed Bridge Replacement Over Chewacla Creek, Lee Road 27, Project No. 41-124-13, STR#96Z, B.I.N. 001166.* (J.W. Cottier and H.H. Bryant III).

2014 *An Archaeological Survey and Evaluation of a Proposed 25 Acre Fill Area Associated with the ALDOT Birmingham Northern Beltline Project, Palmerdale, Jefferson County, Alabama*. *Project No. ADP-1602z9951)* (J.W. Cottier and H.H. Bryant III).

2014 *A Phase I Archaeological Survey and Evaluation of a Proposed 101 Acre Development by the Auburn City Schools, Auburn, Alabama.* (J.W. Cottier, H.H. Bryant III, and A.M. Smith).

2014 *Phase II Archaeological Investigations at 1Le531 for a Proposed Development by Auburn City Schools, Auburn, Lee County, Alabama*. (J.W. Cottier, H.H. Bryant III, and A.M. Smith).

Grants and Awards

2015 Summer Graduate Research Assistantship Program. University of Mississippi Graduate School, Oxford ($2,500).

Conference Papers and Poster Presentation

2009 Hamilton H. Bryant III
East Alabama and the Second Creek War. 86th Annual Meeting of the Alabama Academy of Science, Livingston, Alabama, April 2009.

2011 Hamilton H. Bryant III and John W. Cottier
Hope Hull: An Incipient Chiefdom Along the Lower Tallapoosa River Valley. 88th Annual Meeting of the Alabama Academy of Science, Jacksonville, Alabama, April 2011.

2011 John W. Cottier, Cameron B. Wesson, and Hamilton H. Bryant III
A Review of the Effectiveness of Subsurface Testing on a Multicomponent Site in Central Alabama. 68th Annual Meeting of the Southeastern Archaeological Conference, Jacksonville, Florida, November 2011.

2012 Hamilton H. Bryant III
Hollis is More than a Quartzite: Distribution, Context, and Meaning. 89th Annual Meeting of the Alabama Academy of Science, Tuskegee University, Tuskegee, Alabama.

Conference Papers and Poster Presentations, continued

2012 Hamilton H. Bryant III
Trenches, Remote Sensing, and Soil Cores: 2012 Investigations at the Ebert Canebrake. 69th Annual Meeting of the Southeastern Archaeological Conference, Baton Rouge, Louisiana, November 2012.

2013 Hamilton H. Bryant III
The Landscape of Chewacla State Park: An Archaeological Survey. 90th Annual Meeting of the Alabama Academy of Science, Samford University, Homewood, Alabama, March 2013.

2013 Matthew LoBiondo, Cameron B. Wesson, John W. Cottier, Hamilton H. Bryant III, and Holly Luscomb

Remote Sensing at the Ebert-Canebrake Site (1Mc25), a Central Alabama Fortified Mississippian Village. Poster presented at the 78th Annual Meeting of the Society for American Archaeology, Honolulu, Hawaii, April 2013.

2013 Cameron B. Wesson, Craig T. Sheldon, Ned Jenkins, Hamilton H. Bryant III, and Joel Lennen
Reassessing Thirty Acre Field (1Mt7): Clarence B. Moore, Remote Sensing, and Central Alabama Mississippian Chronology. 70th Annual Meeting of the Southeastern Archaeological Conference, Tampa, Florida, November 2013.

2014 Cameron B. Wesson, Hamilton H. Bryant III, Craig T. Sheldon, Ned Jenkins, John Cottier
Attempting to Reconstruct a French Colonial Settlement on the Alabama Frontier: Geophysical Investigations at Fort Toulouse. 47th Annual Conference on Historical and Underwater Archaelogy, Quebec City, Quebec, Canada, January 2014.

2014 Allison M. Smith, John W. Cottier, and Hamilton H. Bryant III
A Historical Snapshot of the Native Landscape of the Lower Alabama River in 1814. 71st Annual Meeting of the Southeastern Archaeological Conference, Greenville, South Carolina, November 2014.

2015 Hamilton H. Bryant III and Kenneth R. Smith
Exploring Households and Craft Production at Carter Robinson (44LE10): Preliminary Results from the 2015 Field Season. Poster presented at the 72nd Annual Meeting of the Southeastern Archaeological Conference, Nashville, Tennessee, November 2015.

2016 Sarah A. Blankenship, Rob Bonney, Hamilton H. Bryant III, Allison M. Smith
Eastbound and Down: Moundville III Immigrants and the Ebert Canebrake Site (1Mc25), Macon County, Alabama. Invited paper presented for the symposium, "John W. Cottier of Alabama: A Life in Archaeology,´organized by Craig Sheldon and Cameron B. Wesson, at the 73rd Annual Meeting of the Southeastern Archaeological Conference, Athens, Georgia, October 2016.

2017 Hamilton H. Bryant III
Crafting Discoidals on the Frontier: Production and Identity in Southwestern Virginia. Invited paper presented for the symposium, "The Organization of Mississippian Craft Production," organized by Maureen Meyers at the 74th Annual Meeting of the Southeastern Archaeological Conference, Tulsa, OK, November 2017.

Conference Papers and Poster Presentations, continued

2018 Hamilton H. Bryant III and R. Dalton Capps
Mississippian Lithic Production in the Upland South: A Case Study from Virginia. Invited paper presented by Dr. Maureen Meyers at the 75th Annual Meeting of the Southeastern Archaeological Conference, Augusta, Georgia.

Professional Associations

Alabama Archaeological Society 2009-2019
Florida Anthropological Society 2018-2019
Mississippi Archaeological Association 2015-2019
Southeastern Archaeological Conference 2009-2019